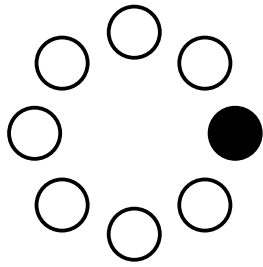


ISESEA-5
2015

5TH INTERNATIONAL SYMPOSIUM ON
ENVIRONMENTAL SOCIOLOGY IN
EAST ASIA

30TH OCTOBER - 1ST NOVEMBER 2015
SAKURA HALL, TOHOKU UNIVERSITY
SENDAI, JAPAN

DISASTER, RISK AND
SUSTAINABLE COMMUNITY



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PROCEEDINGS

DISASTER, RISK AND
SUSTAINABLE COMMUNITY



Sendai Tourism,
Convention and
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THE PROGRAM

DAY 2 (31st October 2015)

08:30 Reception Desk Open

09:30~12:10 **Regular Session 1**, Sakura Hall Room A

Environmental Pollution

Chair: Sanghun LEE & Eric ZUSMAN

Speakers: Yanping FAN, Yui KAMINAGA, Xinling FENG,
Atsushi NOZAWA, Pengli CHENG, Yajuan LUO,
Ruilian ZHANG

Regular Session 2, Sakura Hall Room B

Health Risk and Environmental Justice

Chair: Ajiang CHEN & Saburo HORIKAWA

Speakers: Shu-Fen KAO, Yasushi MARUYAMA,
Ryoichi TERADA, Kenji OTSUKA, Tarique NIAZI, Dan LIU,
Chih-Tung HUANG

Regular Session 3, Sakura Hall Room C

Disaster Restoration: Refugee and Community

Chair: Shin-Ock CHANG & Juju WANG

Speakers: Kiyomi NAKAMURA, Shiqi WANG,
Atsushi WATABE, Chul Hwan KOH and Jongseong KHIM,
Taisuke MIYAUCHI, Noriko IWAI, Dowan KU and Cheol-Jae LEE

12:10~13:00 LUNCH BREAK

13:00~14:40 **Regular Session 4**, Sakura Hall Room A

Adaptation to Environmental Change in Community

Chair: Noriko IWAI

Speakers: Zhonghua ZHANG and Song WANG and Yuhuan
ZHAO, Dickella Gamaralalage Jagath PREMAKUMARA,
So-Young LEE, Eric ZUSMAN and Seejae LEE
Alfian HELMI

Regular Session 5, Sakura Hall Room B

Nuclear Security, Risk and Democracy

Chair: Shu-Fen KAO

Speakers: Fang YANG, Mika Markus MERVIÖ,

Yoichi YUASA, Sanghun LEE

Regular Session 6, Sakura Hall Room C

Management and Use of Natural Resources

Chair: Taisuke MIYAUCHI

Speakers: Regina Hoi Yee FU,

Tatsuya KINJO and Akira TERABAYASHI,

Eirini Ioanna VLACHOPOULOU, Darien Danielle MIZUTA,

Mitsutaku MAKINO and Hiroyuki MASUDA,

Shin-Ock CHANG

14:40~16:10

Regular Session 7, Sakura Hall Room A

Environmental Behavior

Chair: Ryoichi TERADA

Speakers: Juju Chin Shou Wang, Tao CHEN and Lanping

WANG, Ajiang CHEN, Yixin XING

Regular Session 8, Sakura Hall Room B

Environmental Perception

Chair: Seejae LEE

Speakers: Hiromi YAMASHITA, Masahiro TAKAHASHI,

Wei-Hsu LU, Hang LI

Regular Session 9, Sakura Hall Room C

River Project and Memory

Chair: Yajuan LUO

Speakers: Armelle FAURE, Atsushi HAMAMOTO,

Sayaka MORI, Jintu GU

16:20~18:20

Themantic Session

Disaster, Risk and Sustainable Community

Panelists ① : Dr. Koichi HASEGAWA

Panelists ② : Dr.Yayoi HARAGUCHI

Panelists ③ : Prof. Yasumasa IGARASHI

Discussant ① : Dr. Dowan KU

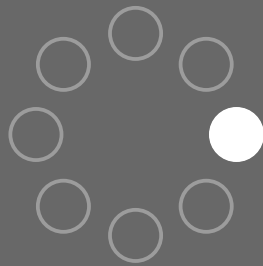
Discussant ② : Dr. Shu-Fen KAO

18:20~18:30 Coffee/Tea Break

18:30~20:30 Farewell Party at Cafeteria

REGULAR SESSION 1

ENVIRONMENTAL POLLUTION



ISESEA-5

Sociological Exploration of Endogenous Pollution in Suburban Villages in Urbanization

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Hohai University, Nanjing, China

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Abstract

The pollution of suburban village embodies the blending features of both urban and rural pollution. The process of urbanization has an impact on suburban villages and thus polluted the environment there. By investigating why water quality in “Nong Gong Pond” of Li village has deteriorated, this paper analyzes the reasons for the pollution in Li village which suffers no exogenous industrial pollution. The investigation shows that the direct reasons include the influx of external pollution, large-scale cultivation, transformation of ways in land utilization, and lack of follow-up management of sewage disposal facility. The hidden social and economic reasons include worship for economic rationality, culture logic of human relationship orientation, spiritual pollution, administerization of community and the reduction of power.

Key words

Urbanization Suburban Villages Endogenous Pollution

The theory of Environmental Kuznets Curve (EKC) in the field of economics has pointed out that the relationship between environmental quality and the level of per capita income is described in a inverted U curve. While Chinese urbanization is bringing the rapid social and economic development and significant increase of people’s income, the rough development also has brought a series of social problems such as environmental pollution and waste of resources.

Suburban area is the outlying area under urbanization in the periphery of the core built-up area after industrialization, serving as the edge of the city and is also first-impacted rural area by the wave of urbanization. Urbanization measures like industrial agglomeration, large-scale cultivation and the migration have brought the suburban area unprecedented development opportunities. However, the

subsequent environmental problems like ecological destruction, increased pollution and resource consumption are also evident. The growing environmental problems in suburban areas not only hinder the advance of urbanization but impact the coordinated development of urban and rural areas. Thus, exploration of social and cultural factors concerning environmental problems in suburban villages is of great significance.

1. Literature Review

Water pollution is one of environmental pollution faced by suburban areas, which is categorized into two types by the academic circles according to the pollution sources: point source pollution and non-point source pollution. The former refers to the sewage from fixed outfall including industrial and urban sewage, while the latter means pollution sources scattered in various regions, associated more with agriculture, rural areas and farmers (Dayong Hong, 2004). Some scholars have defined it as exogenous and endogenous pollution. The former refers to industrial pollution outside the village while the latter refers to pollution produced by villagers themselves within the village. The former will lead to the latter (Ajiang Chen, 2009). This paper studied a village which suffers mainly from non-point source pollution by villagers themselves without outside industrial pollution.

When it comes to the reasons of endogenous pollution in the village, which can be summarized as follow: the first is the influence of the binary social structure in urban and rural areas, which sees non-point source pollution in rural area as reproduction of binary social structure. (Dayong Hong, 2004); the second is the shock of urbanization and industrialization, including large-scale cultivation, changes of villagers' ways of living and lifestyle. (YinXu, Yanhu Geng, 2010); the third is the breakage of traditional culture, including the protection of local knowledge (Fan Jiang, 2012) and the loss of traditional community ethics (Ajiang Chen, 2000); the fourth is low quality of the villagers, including the abuse of fertilizer and pesticides (Fang Yang, 2010), weak environmental awareness (Qing Feng, 2006) and other behavior which all together have a significant impact on the environment. These reasons in some extent reveal the environmental pollution in rural areas, but not the deep motivation behind the farmers' behaviors. Previous studies mostly focus on pure rural society, with less attention to suburban environmental pollution, ignoring the particularity of suburban environmental issues resulting from both urbanization and traditional culture.

Based on the insufficiency of previous studies, this thesis is mainly qualitative research, comprehensively using methods of literature study, participation observation and interviews to explore social, economical and cultural factors behind suburban endogenous pollution. A lot of work has been done: collect relevant documents and materials related to the rural environment, get into "Li Village" for field observations, and conduct semi-structured interviews of ordinary villagers, cultivation specialist, village head and leaders of village committee.

2. Overview of “Li Village”^[1] and Change of Water Quality

2.1. Scenic “Li Village” with Convenient Transportation

Located in hilly terrain at the southern suburbs of Nanjing city, “Li Village” has a population of over 500 in around 120 households, with per capita income of about 20000 yuan. It covers an area of more than 6000 acres, including 4000 acres of forest area and 300 acres of farmland, which used to grow rice, rape, wheat and other crops. In 2005, Nanjing city implemented greening projects and then farmland in “Li Village” was collectively sublet, mainly for planting greening trees. Villagers got rent of 700 yuan per acre every year. Every household kept about 0.5 acre of land to grow vegetables for their daily use. “Li Village” enjoys superior geographical position and convenient transportation with a village road leading to the provincial highway. 2005 witnessed the increased number of migrant workers, most of whom worked nearby. An estimated number is 700 or 800, which surpasses that of local residents.

Nanjing municipal government built the first “farmers park” in 2007, “Farmers park” project expanded a pond of “Li Village” into two, with the water interlinked, and a tourist trail and a sightseeing bridge in the middle. The total area of two ponds is about 8 acres. The villagers called this area “farmers Park”. The pond bears no name but villagers call it “Nong Gong Pond” in order to address it... “Nong Gong Pond” is close to mountains on the west and the main road on the east expanding outside the village. On the other side of the road is the residential area of “Li Village”, on the eastern side of which lies the “General Mountain” scenic spot. The reservoir water in the scenic spot flows down the mountain into “Nong Gong Pond” of “Li Village”, which forms relatively complete body of water in “Li Village”. In addition to “Nong Gong Pond” which is largest in area and closest to the residential district, other ponds are also in this water system. In the whole water system, all kinds of exposed drainage pipes can be seen, by which the residents’ living sewage is discharged into the river. In autumn/ winter, the cold weather makes water in “Nong Gong Pond” limpid, with some of water plants and rubbish floating on the surface, while in the warm spring/summer, eutrophication of water breeds aquatic organisms like duckweeds and exudes bursts of odor. Ditches linked to “Nong Gong Pond” are also overgrown with water plants.

2.2. The History of Water Quality Change and the Improvement Measures

According to the villagers, they relied mostly on “Nong Gong Pond” in daily life for drinking, washing and irrigation before 1970s. In 1970s, tap water was available in every household in “Li Village” for daily use. Before 1990, water from “Nong Gong Pond” could still be used for drinking. When the water pipe froze in winter, villagers would take water from the “Nong Gong Pond”. However, after 2000, water deterioration of “Nong Gong Pond” began to accelerate, no longer used to wash the dishes or rice but mops and stuff. In order to meet the standard of provincial sanitation and ecological village, every household was equipped with “Three Format” septic tank^[2] in 2006 for pollution-free treatment.

[1] According to the academic standard, this paper takes the name of “Li Village” to address the village.

[2] “Three Format” septic tank is a simple manure sedimentation and pretreatment device, which can separate solid manure from liquids, makes anaerobic digestion of certain organic matter and removes CODC R and eggs. However, its effect in sewage treatment is limited, as well as on TP and TN removal. The sewage discharged into the environment is obviously not up to the national emission standards and sewage treatment capacity is relatively small, which needs sludge cleaning every six months, too time-consuming. (Yuhua Wang, Ying Fang, 2008)

In 2007, the municipal government invested in the construction of “sewage purification tank” for domestic sewage.

3. Exterior Reasons

The environmental problem is accompanied by social development, which is closely related to the social structure, population change and the change of production mode. “Li Village”, located in the suburban area in the urbanization process, was first to undergo the wave of urbanization and industrialization. Many changes took place within the village, including the population structure, the villagers’ way to make a living, and interpersonal relationship, which all had a significant impact on the water quality of “Nong Gong Pond”.

3.1. Population Boom

Urbanization process accelerates to attract a large number of migrant workers, whose choice of residence is generally located in the village of suburban area due to the cheap rent and higher employment rate for migrant workers. Located in the suburban area, “Li Village” enjoys convenient transportation with the industrial park and flea markets nearby, attracting a large number of migrant workers. With the acceleration of urbanization process, migrants in “Li Village” have been gradually increasing since 2005. Currently almost all villagers in “Li Village” lease their houses, with some accommodating up to 7-8 migrant families, and 2-3 families at least. From the village lead, we learned that at present migrant population in “Li Village” is nearly the same as that of local villagers.

Environmental population capacity is the capacity of the environment to accommodate people, determined by the natural conditions, production technology and social conditions. Undoubtedly, the large influx of migrant population brings the environment in “Li Village” under unprecedented pressures, but also continues to challenge the limit of the environmental capacity of in “Li Village”. Population in “Li Village” is continuously growing, but the corresponding environmental facilities fails to keep up. The “Three Format” septic tank, garbage collection stations and other facilities are designed according to the local population. Migrants share a family toilet (“Three Format” septic tank) with the landlord. Due to the increase of total feces, and low processing capacity of “Three Format” septic tank, the sewage water discharged into the environment is obviously not up to the national emission standards and sewage treatment capacity is relatively small. (Yuhua Wang, Ying Fang, 2008). Consequently, the feces discharged into “Nong Gong Pond” are far more than that in traditional society, inevitably leading to the deterioration of water quality. In addition to the increase of excrement, the increase of the migrant population also brings an increase of domestic sewage, which is not directly discharged into the river without any treatment.

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3.2. Large-scale Cultivation

In addition to the increase in the total amount of feces, the other reason for the deterioration of rural water quality is the influence of large-scale cultivation. A pig daily excretes manure of 6kg (amount to 5 times of people) and yearly excretes 2.19t. Large-scale pig farms have serious impacts on the surrounding environment due to the large amount of feces and high nitrogen and phosphorus levels (Yunbo Tian, 2006). “Li Village” has had a tradition of pig farming, and every household used to raise 1-2 pigs, which caused no environmental pollution. Two reasons can be summarized: first, the number of pigs was small, lower than 200; second, in traditional agriculture, pig feces could be reused as organic fertilizer. At present, large-scale households are about five, a total of about 200-300 in the village. One pig farmer lives next to “Nong Gong Pond”, whose large-scale farming according to the villagers has ten-year history. They directly discharged the pig manure into the pond, which was mainly responsible for water quality deterioration of “Nong Gong Pond”.

As to the environmental problems caused by large-scale pig raising, the village committee once carried out remediation, trying to build the “Three Format” septic tank to purify the pig manure, but the effect was not obvious due to the following reasons: first, pig manure was really too much, so Three Format”septic tank is difficult to meet the demand; second, pipelines were used for connection within the septic tank. In winter, the pigsty was covered with grass which flew into Three Format”septic tank along with pig manure, clogging the pipes. Thus, to deal with the pig manure through the tank was not feasible. Some farmers even broke the pipeline in order to prevent the pipe blockage. The usual treatment conducted by pig farmers was to shovel out solid manure, leaving the liquid waste flowing directly into the pond, which caused water deterioration.

3.3. Change of Land Use Pattern

Land in traditional society was mainly used for grain production and agricultural production was featured by intensive and meticulous farming. Farmyard manure was the main land fertilization to increase land productivity. After 2005, Greening project was implemented in Nanjing. This not only meant the change of land use, but also direct influence on the environment. The land was mainly used for planting trees after Collective sublet, and farmyard manure was no longer used to fertilize the land. Although every household remained 0.5 acres of land so they would pick pig manure from pig raisers.

However, the consumption of pig manure is limited, leaving the majority flowing into “Nong Gong Pond” through the sewage pipe.

After the collective sublease, the demand for farmyard fertilizer reduced. Deterioration of water quality in “Nong Gong Pond” could be attributed to river landfill. In order to expand land area for higher profits, some tenants filled the original ponds and ditches, resulting in a ditch plugging, accelerating the riverbed to be silted up, disabling the gentle river to exchange and purify water. Thus, deterioration of water quality in “Nong Gong Pond ” was aggravated.

3.4. Lack of Follow-up Management of Sewage Facilities

Due to its adjacency to the scenic area, it is necessary to improve the water quality in order to meet the standard of provincial hygiene and ecological village. The village committee once had taken measures of constructing sewage purification pool and “three cell pool”, which did not achieve expected effect due to poor management.

When it comes to the purification pool, the following text can be seen in the website introducing “Li Village”: *“In order to improve the construction level of greening ecological village, the first village sewage purification station and high standard public toilet was invested and constructed in Nanjing City,”*^[3]. The purification pool was constructed in 2007 along with “farmers park” project, but the purification tank did not play an important role. Reasons are that on the one hand, the purification pool was not suitable for dispersely populated rural area, because most domestic sewage was directly discharged into the river; on the other hand, the purification pool was lack of post management, for example the pipe got no maintenance after being broken. When it comes to “Three Format” septic tank, every household was equipped with it, which was invested by the village committee. The pool was connected through pipelines, which needed regular cleaning, otherwise it would easily be blocked. “Three Format” septic tank in pig raising household was more vulnerable to the blockage due to the large amount of feces. However, pipeline cleaning was very troublesome, so some farmers just destroyed the pipe. In fact, the pool did not play a role.

4. Interior Reasons

During the investigation, the author found that the villagers not only clearly discerned the deterioration of water quality in “Nong Gong Pond”, but also understood the reasons, for which they felt pity and helpless. Then, why didn’t they stand out to stop these behaviors? Why was the water quality still deteriorating? Why did the village’ huge investment in environmental remediation achieve no results? Behind these surface reasons hide deep reasons, involving the economic, political, social and psychological aspects, which serve as main causes of water deterioration in “Li Village”.

4.1. Worship for Economic Rationality

In “Li Village”, almost every household provided accommodations for 4 migrant families and more even for 7-8 families, getting rent of 200 yuan -300 yuan per month in each room. The average annual

[3] <http://baike.baidu.com/view/7061184.htm?fr=aladdin#3>

rent per household could reach at least 10,000 yuan. The destruction of the village environment and the improvement of family income generated the struggle between economic rationality and environmental rationality. It was very obvious that the former outweighed the latter. The reasons would be very simple: first, the income improvement was visible and tangible for villagers, while environmental damage was a gradual process. In the first few years, the villagers were not aware of the influence of migrant population on the environment until the river had been polluted due to various reasons. This kind of pollution did not greatly influence villagers' daily life, because they had found the alternative---tap water; Second, the income improvement was individual, while water deterioration concerned the collective interests, also caused by the group. Hardin in "The Tragedy of the Commons" pointed out that "the destruction of the environment has a close relationship with the maximization pursuit of individual". Individual rationality caused collective non-rationality. (Michaelbell,1957). In "Li Village", the improvement of individual income was based on the destruction of the collective environment, and individual economic rationality had caused the collective environmental non-rationality.

In economics philosophy, there is an assumption of "economic man", which means people behave to pursue their best economic interests. Sociology assumes human beings are complex with their behavior influenced by economic interests as well as other factors. Weber classified rationality into four types: instrumental rationality, value rationality, emotional rationality and traditional irrationality. The first two bring rational behaviors while the rest bring irrational behaviors. Instrumental rationality is the highest rational components. In society transformation period with rapid economic development, "Li Village" was first to be impacted by the urban economic activities, and villagers' rational target was pursuing the best economic benefits by means of high rent and farming income. Thus, people's pursuit of rational economic behavior had become instrumental rational behavior. Out of the sense of respect and belonging of village public facilities, villagers' environmental protection behavior was more in line with the meaning of Weber's" emotional rationality. When the instrumental rationality and emotional rationality coexisted, the former outweighed the latter in villagers' struggle between them. In another word, the economic rationality outweighed the environmental rationality.

4.2. Cultural Logic of Human Relations

Pig farmers polluted the environment of the village out of economic rationality. Why did not villagers in the neighborhood make a protest? Why did the villagers indulge their behavior? To answer this question, it is necessary to return to the social structure of Chinese rural society. Chinese rural society is an acquaintance community, as explained in Xiaotong Fei's "patterns in different order": Complex social relationship exists among people. In the society of acquaintances, to maintain the order of the village, the most important way is through human relations, while one of the main principles to establish and maintain human relations is the face-saving principle, which requires people to take into account human feelings and be impartial and reasonable. (Baifeng Chen, 2011). Due to the dominance of face-saving principle in the whole rural society, people won't easily break relationships with others unless involved in vital interests of their own.

Although affected by modern society in a large extent, “Li Village” was still an acquaintance community in nature as Xiaotong Fei described. People followed the cultural logic of human relations and carefully maintained face with each other. Environmental issues had been lagging behind. People had less sensitivity to it, and when they realized the seriousness the water quality had been deteriorated, and the deterioration of water quality did not cause great inconvenience to their life. Besides, environmental damage caused by raising pigs concerned the collective interest with no direct damage to individual interests. It was no wonder that the villagers did not directly “protest” pig farmers which would be inconsistent with face-saving principle in the society of acquaintance. It can be said it is because of the cultural logic of human relations in the country that people showed tolerance to pig raisers.

A villager near A's house said: *“It always smells around the pigsty. We can't blame because they will hate us? Only the government can take steps to deal with it, we ordinary people are too busy handling so many trifle things to.....”*

4.3. “Spiritual Pollution”

When seen from “outside” to “inside”, it can be transmission from material pollution to “spiritual pollution”. Ajiang Chen has pointed out that industrial pollution has the dual pollution characteristics of material pollution and spiritual pollution, which not only pollute the water, but also have a negative effect on people's behavior and ideas. In fact, not only exogenous industrial pollution brings dual pollution, so does endogenous pollution. The “Nong Gong Pond” was not affected by exogenous pollution, but endogenous pollution. Once the river water was polluted, villagers wouldn't try to protect it, and would freely discharge waste and sewage to it instead. People who contaminated the water were no longer to blame because the water was dirty and useless. Above description shows the transmission from outside material pollution to inside “spiritual pollution”.

When seen from “inside” to “outside”, it can be transmission from villagers' pollution to migrants' pollution. After villagers themselves polluted the water, migrant people carried out the two round of pollution, which was not to blame. Migrant people opened shops selling braised pork, tofu and rice dumplings in the village. These small workshops daily produced large amounts of sewage, which was directly discharged into the river. However, these behaviors were not accused by villagers, at least not directly protested. If people's tolerance on the behavior of the pig raisers stemmed from the cultural logic of human relations, then tolerance on migrants' pollution was due to “spiritual pollution”, which made people indifferent to the river.

4.4. Community Administration and the Weakening Power

As the villagers said, *“Environmental governance is beyond the power of ordinary people”*. Let's take a look at the role of village committee as the government's “spokesperson” in water deterioration of “Nong Gong Pond”. Have they felt desperation in environmental governance?

First, let's come to the growing number of migrants and domestic sewage. Initially, the influx of migrants did not cause much concern of the committee, with the gradual increase in population, the

problem was gradually emerging, the most obvious of which was illegal construction. Due to adjacency to the scenic area, disorder illegal construction was unsightly. The village committee had ever taken steps to demolish half-built houses. However, most villagers were involved and village cadres were members of the society of acquaintance, so this violation was not suppressed. As mentioned above, the village committee had invested a lot of money to build the "Three Format" septic tank for each household as well as a sewage treatment tank to deal with the growing number of domestic sewage, which did not play the expected role due to the lack of effective management.

Next, let's come to the behavior of pig raisers. In an interview of a village leader LZJ, he told us some villagers had reflected to the village committee the influence of raising pigs and the committee could nothing but to restrict the number of pigs. He added, "*But this limitation was difficult for villagers lived by raising pigs.....*". It was not feasible either to limit the size of the pigs through subsidies. LZJ continued, "*If pig farmers get subsidies, people who do not raise pigs will hold a grudge. If they raise pigs the next year, the committee would also have to subsidize them. It can't be affordable for the village*". In addition, either pig farmers or workshop like braised pork shop owned legitimate business license. The village committee is not legal operation department, so it has no right to ban its business qualification.

Traditional Chinese rural pursued a policy of elderly governance, which sustained the social order through the "rites". The elderly had very high authority in daily issues of the village but in the process of social changes, elderly experience was no longer applicable, along with the disappearance of elderly governance (Xiaotong Fei, 2008). In the development of urbanization, the village committee, although as the villagers' autonomy organization, is to a large extent the power extension of the government in the grassroots society. With the reform of rural taxes and fees system, the village committee has been gradually weakened in the power of the rural community. Therefore, many environmental governance measures in "Li Village" were implemented for the inspection and appraisal from superior officers, which were not sustainable. In addition, although the village committee was the core power of the village, its authority had been greatly weakened along with the weakening of village cohesion and belonging, village. It was no surprise the village committee remediation did not succeed in governing illegal buildings, neither in pig farmers and braised pork stores.

5. Conclusion

Water deterioration is a problem with multiple causes and effects. Behind the various exterior reasons lie many interior reasons, which are really responsible for water deterioration and its tricky governance in rural areas. Suburban village embodies special characteristics for the following reasons: first, its close location to the city makes it first impacted by the urbanization and industrialization. Villager's life style and concept of value is first affected, thus affecting the ecological environment; second, suburban village is still a society of acquaintances, and traditional rural values still have profound soil to survive, affecting interpersonal and everyday life among the villagers; meanwhile, community administration and the weakening power makes core authority of power decreasing. In the contradiction between traditional value idea and urbanization, environmental problems in suburban villages can be attributed to special reasons.

In analysis of water deterioration in “Nong Gong Pond”, the primary cause can be the change of people’s concept of value. In order to improve the rural water quality, relevant sewage treatment facilities should be built as well as the change of value from simply pursuing economic rationality. Based on the interests of the community, conception of ecological rationality should be introduced along with existing economic rationality. The contradiction between individual rationality and collective non- rationality needs to be tackled. In the pursuit of economic interests, pay attention to environmental protection and ecological interest to seek balance between economic and environmental rationality.

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Yokkaichi Facing its Turning Point

-New Historical Museum for Yokkaichi Pollution -

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Introduction

In the 1960s to mid-1970s, a serious health issue called “Yokkaichi Asthma (in Japanese, *Yokkaichi Zensoku*) happened in Yokkaichi City, Mie Prefecture. Resulting from the air pollution caused by the petrochemical complex in the coastal area, Yokkaichi Asthma is a serious health hazard led by industrial air pollution. Tightly related to the sharp and rapid economic growth in Japan at that time, Yokkaichi air pollution was labeled as one of the four major environmental cases of pollution (in Japanese, *Yondai-Kougai*) in Japan.

Through my research, it has become clear that the history of the outbreak of Yokkaichi Asthma itself is a solid evidence of environmental pollution causing social issues such as destruction of people’s lives and the local community, which is still hard to resolve after half a century. However, a turning point has appeared; the establishment of “Yokkaichi Pollution and Environmental Museum for Future Awareness (In Japanese: *Yokkaichi Kougai to Kankyo Miraikan* hereafter called Kankyo Miraikan),” which newly opened on 21 March 2015. As later discussed in this paper, Kankyo Miraikan was the latest but last for a historical museum to open within the four major environmental cases of pollution in Japan.

This paper will discuss the following three points; the brief history of Yokkaichi air pollution and the outbreak of Yokkaichi Asthma, the related social destruction of the local community, and the establishment of the new Kankyo Miraikan as a turning point for this social issue.

1. Characteristics of Yokkaichi City

Near Nagoya, Yokkaichi City is located almost in the middle of Japan (see Figure 1). With a population of 312,654 people, total of 133,236 households, it is the largest municipal of Mie Prefecture (as of June 2015). Port of Yokkaichi and heavy chemical industry is located along the coastline.

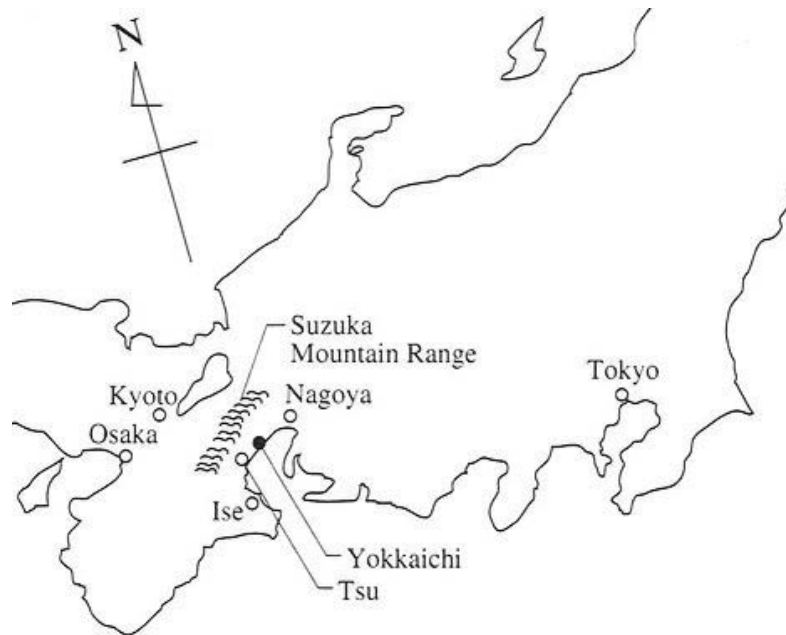


Figure 1. Location of Yokkaichi City
reproduced with permission from ICETT, 1994, ICETT.

2. Construction of the petrochemical complex

After the Second World War, the introduction of the first Japanese petrochemical complex was to Yokkaichi and some other coastal areas. This was intended to be a milestone for the Japanese Government's regional development plan to revitalize the country in the postwar period that led to the Japanese economic growth period in the 1960s. Following the success in Yokkaichi, the development of the petrochemical complex made an expansion throughout Japan. However, before long, the heavy chemical industry launched in Yokkaichi coastal area led to related health problems to the residents living in the opposite shore.

3. Emergence of Shiohama Zensoku

From late 1950s to the early 1960s, in conjunction with the full-scale operation of the No. 1 petrochemical complex, residents of the coastal area of Yokkaichi suffered serious respiratory health problems, later called "Yokkaichi Asthma." The untreated air with sulfur dioxide (SO₂) emitted from the petrochemical complex led to severe air pollution. At the first phase of this pollution, Isozu, a small fishery community at the tip of the Shiohama district was affected, located only 400 meters away from the nearest emission source, at the opposite shore of Suzukagawa River (see Figure 2). In this phase of the Yokkaichi asthma, the disease was called "Shiohama Zensoku," because the number of patients grew only in this area.



Figure 2. Viewing the No. 1 petrochemical complex from Isozu Community
(3 July 2015, all photos taken by author)

4. Outbreak of Yokkaichi Asthma

In the next phase, during 1963 up to 1989, more than 2,216 citizens including the broader area of Yokkaichi suffered respiratory problems.^[1] Overseas media reported Yokkaichi as a “department store of pollution.” At the time, Yokkaichi City suffered various kinds of pollution related to the intensive operation of the petrochemical complex; air pollution, water pollution, soil contamination, noise, vibration, ground subsidence, and offensive odor.

The above environmental issues all fit into the seven major types of pollution later defined by the Basic Act for Environmental Pollution Control first legislated in 1967(taken over in the current Environmental Basic Act).

To the dismay of residents, the primary steps taken as environmental control measures led directly to spreading the ill effect to the main urban area of Yokkaichi. Turning the existing short plant smokestacks into a collected stack and extending its height up to nearly 130 meters, the discharged pollutant next hit the residents living around the main Yokkaichi area. Affecting the vast residential areas along the coastal side, Shiohama Asthma soon became recognized as the Yokkaichi Asthma.

At this point, according to Kenichi Miyamoto, Yokkaichi turned to be the “starting point of Japanese environmental regulations” (Miyamoto, 2007) through the diverse environmental quality improvement movements and regulations taken by the national, prefectural and the municipal levels. For example, SO₂, the main cause for Yokkaichi Asthma, lowered beyond the legal demand of

[1] Total number of official Yokkaichi Asthma patients until the cut off of certification in 1989. Therefore does not include patients who did not receive or could not ask for certification for various personal/social reasons. Yokkaichi Medical Association estimates that the real number of affected residents triple.

environmental regulations by 1976^[2].

However, still nearly 400 patients live mainly within the city, many in the deeply affected Isozu (as of June 2015, the total number of officially certified patients are 385). Therefore, it is not correct to say that Yokkaichi has totally overcome its environmental problems; it is only that the levels of the pollutants such as SO₂ went below the legally demanded level because of the regulations, leaving unrecoverable diseases caused by the environmental pollution.^[3]

From then, people recognize Yokkaichi as one of the four major diseases as well as one of the four major serious environmental pollutions in Japan.

5. Yokkaichi and Other Three Pollution Issues

Table 3 compares the historical museums for the Four Major Pollution. The four major serious environmental pollutions in Japan all occurred in the mid1950 onto1960s due to the economic growth

Table 3 Comparison of Four Major Pollution Museums

| | Year of Establishment | Official Name (in Japanese) | Municipal/ Prefectural | Museum Location | Type of Pollution |
|---|-----------------------|--|------------------------|---|-------------------|
| 1 | March 1993 | Minamata Disease Municipal Museum (水俣市立水俣病資料館) | Municipal | Affected area, reclaimed area in Minamata Bay (Minamata City, Kumamoto Prefecture) | Water Pollution |
| 2 | December 1995 | Niigata Learning Center for Humans & the Environment (新潟県立環境と人間のふれあい館：新潟水俣病資料館) | Prefectural | Affected area, branch watershed of Aganogawa River (Niigata City, Niigata Prefecture) | Water Pollution |
| 3 | April 2012 | Toyama Prefectural Itai-itai Disease Museum (富山県立イタイイタイ病資料館) | Prefectural | Affected area, near Jinzugawa River (Toyama City, Toyama Prefecture) | Water Pollution |
| 4 | March 2015 | Yokkaichi Pollution and Environmental Museum for Future Awareness (四日市公害と環境未来館) | Municipal | Approx.7 km away from affected area (Yokkaichi City, Mie Prefecture) | Air Pollution |

[2] The Court decision and its four-year legal process for the Yokkaichi Air Pollution Lawsuit in 24 July 1972 urged the environmental improvement movements in both direct/indirect manners. Due to limitations of space, for more details, see International Center for Environmental Technology Transfer (ICETT, 1994).

[3] For the vulnerability of Isozu as a disaster-prone area, see Kaminaga (2008).

of the country. All museums are public. Niigata Learning Center for Humans & the Environment and Toyama Prefectural Itai-itai Disease Museum are prefectural, on the other hand, Minamata Disease Municipal Museum and Yokkaichi Pollution and Environmental Museum for Future Awareness are municipal, due to their regional naming to the pollution itself.

As shown in Table 3, Yokkaichi was the latest and last to build an establishment to commemorate its pollution experience. Moreover, while the other cases rose from water pollution of rivers and bayside; Yokkaichi is the only air pollution case in terms of pollution causes for health diseases.

6. Corruption of Local Communities

The problem of environmental pollution is not limited to the ecological destruction or the health hazard. As Nobuko Iijima pointed out, environmental pollution not only leads to local residents' health problems but also the corruption of the local community (Iijima, 1993).

It took more than half a century for Yokkaichi to establish a museum commemorating Yokkaichi Air Pollution. The effort to establish the Kankyo Miraikan met the veto of equal intensity from the local community; within the Shiohama district. The neighborhood community association of Isozu, which has the biggest number of Yokkaichi Asthma patients, was surprisingly against constructing the museum in Isozu^[4].

At first, Yokkaichi City planned to build the historical museum on the second floor inside the local public health center in Shiohama. The Northern Mie Health Promotion Center, commonly known as Health Plaza, is a publicly run facility by Yokkaichi City. Relatively conveniently located at a twelve-minute walk from the nearest private railroad station, Shiohama Station, this Health Plaza was also the formal Shiohama Hospital where the Yokkaichi Asthma patients spent their years hospitalized. After the Prefectural Shiohama Hospital moved out from the old building to a new and larger one, in April 1999, the Health Plaza opened up to the public.

Not only for the local peoples' accessibility, but also for its past function as the hub station of medical treatment for the patients in Isozu since the air pollution begun, it seemed to be the exact place to memorialize Yokkaichi Air Pollution and its worst hit area. As shown in the above figure, the other three out of the Four Major Pollution Museums are located at their pollution-affected area. For instance, in the case of Minamata, Minamata Disease-related public medical and research institutions along with the historical museum all stand on top of the reclaimed area of Minamata Bay.^[5]

[4] One reason said to be the local objection was Yokkaichi City's way of approach; the first idea was to bring the Kankyo Miraikan after abolishing the Health Plaza for it counts as one of the City's money-losing facilities (Ito ed., 2015). Nevertheless, note that the leadership of community association of Isozu and the victims are not born by the same members of the community. The leading members of the community association tend to be retired workers, in this case, typically those who worked for the petrochemical complex over a long period.

[5] Eco-park Minamata is a bayside public park formed by the dredged highly toxic mercury contaminated sludge of Minamata Bay.

Table 4 Path to Kankyo Miraikan

| Year/Date | Incidents | Notes |
|---------------|---|--|
| 2001 | Opening of an Internet website "Virtual Yokkaichi Pollution Resource Center(<i>Yokkaichi Kougai Shiryou-kan</i>)" | Within the official website for Environmental Division, Yokkaichi City, |
| January 2005 | Establishment of "Reference Room for Yokkaichi Pollution(<i>Yokkaichi Kougai Shiryou-shitsu</i>)" | Inside former Yokkaichi Municipal Environmental Learning Center, 4 th floor, Honmachi Plaza |
| August 2012 | Set up of an Investigative Commission for "(tentative) Yokkaichi Pollution Resource Center" | Task force for a historical museum of Yokkaichi Air Pollution |
| November 2012 | Official name for the museum is fixed to "Yokkaichi Pollution and Environmental Museum for Future Awareness," Location fixed to one of the floors inside the existing Yokkaichi Municipal Museum | The idea of a historical museum at the affected area changed to the downtown of Yokkaichi |
| December 2014 | Yokkaichi Municipal Museum and Yokkaichi Municipal Environmental Learning Center closed for renovation | |
| 21 March 2015 | Opening of Yokkaichi Pollution and Environmental Museum for Future Awareness(renewal of the Municipal Museum) | Yokkaichi Municipal Environmental Learning Center(1996.8~2015.12) was integrated |

7. Benefits to a Kankyo Miraikan

The Yokkaichi Pollution and Environmental Museum for Future Awareness (Kankyo Miraikan) opened on 21 March 2015. After a turmoil dividing the Investigative Commission for "(tentative) Yokkaichi Pollution Resource Center," the term "Yokkaichi Pollution" remained as the title. In result of the strong rejection from the community association of Isozu, Yokkaichi City decided to construct the Kankyo Miraikan inside the existing Yokkaichi Municipal Museum in occasion of its renewal.



Figure 5. Yokkaichi Municipal Museum
(3 March 2015)



Figure 6. Kankyo Miraikan (2nd floor)
(30 May 2015)

Located mainly on the second floor of the Yokkaichi Municipal Museum, the Kankyo Miraikan plays an important part of the renewed exhibition of the Municipal Museum (see Figure 6, 7, 8). However, the Yokkaichi citizen's reactions split. For example, Impressions of "Area of Outbreak of Environmental Pollution," the main exhibition for the Kankyo Miraikan is "Too gloomy. This is not what we wanted (statement by a male Yokkaichi citizen living near the No. 3 petrochemical complex. 19 March 2015)." In addition, the intended contrast of "Efforts for Environmental Improvement" (Figure 7) seems exaggerated to those who volunteer as interpreters for the Kankyo Miraikan floor (interpreter course applicant, male Yokkaichi citizen, 28 February 2015).

The former Reference Room for Yokkaichi Pollution at the Yokkaichi Municipal Environmental Learning Center was undersized but the merit was its closeness to the petrochemical complex. From the window, one could see the tall stalks right before themselves.

Despite the distance from the affected Isozu area, Kankyo Miraikan tries to appeal to the visitors' imagination by installing a replica of the Shiohama elementary school classroom on the first floor. The point is that Shiohama elementary school is located directly across the street from the oil refinery of No.1 petroleum complex. Museum visitors can experience the reproduced scenery from the classroom window (see Figure 8).

Still, the Kankyo Miraikan has more of an advantage to overcome the physical distance from the affected areas. As a museum that made a renewal, there sits the most advanced planetarium in the world, and life-sized doll exhibitions that transports you back to the early ages of Yokkaichi. In addition to the academic value of the museum itself, this location has merits to citizens: a four-minute walk from the nearest station accompanied with a supermarket and commercial facility enables easy access to this admission-free museum (permanent exhibition are free, including Kankyo Miraikan). On weekends and long vacation seasons, volunteer exhibition interpreters help the visitors to understand the history of Yokkaichi facing the air pollution. Besides all that, the "Kataribe," the surviving witnesses, are indeed a strong complementary for Kankyo Miraikan (see Figure 8).



Figure 7. Kankyo Miraikan (2nd floor)
(28 February 2015)



Figure 8. "Kataribe" at Kankyo Miraikan
(30 May 2015)

8. Surviving witness and a Storyteller; "Kataribe"

In Yokkaichi, the victims of pollution caused diseases and those who lived/survived Yokkaichi's heavy pollution period during 1959 to 1976 are valuable surviving witnesses. "Kataribe," storytellers in Japanese term, are the ones who can pass on the moral lessons and messages to the next generation. As the strong opposition from the neighborhood community association has shown, speaking out against the pollution blaming the petrochemical complex has been more like a taboo for the local community. Among the big population of patients, only a handful of them made a public appearance.

The serious problem now is that remaining survivors are aging. Last remaining plaintiff of Yokkaichi Air Pollution Lawsuit, Yukikazu Noda is now 83 years old, carrying several health concerns. Plaintiff of Yokkaichi Air Pollution Lawsuit consisted from nine patients living in Isozu, but the youngest of all, Yukikazu Noda is the only one left. He has been speaking out from then, supported by Yoshiro Sawai.

Yoshiro Sawai, who kept on tracking the Yokkaichi Air Pollution incident taking photos and various records, is a "newcomer" to the city 70 years ago, also turns to 86 this year.

According to the Kankyo Miraikan, a storyteller is defined as local people who can speak about their real experience with his/her own words^[6]. At this moment, registered "Kataribe" for Kankyo Miraikan are only ten; the last remaining plaintiff Noda, the "newcomer" Sawai who kept tracking the Yokkaichi Air Pollution, social activists, local school teachers, former plant workers/engineers of the petrochemical complex, and a few local residents of Isozu who did not suffer Yokkaichi Asthma.

Conclusion

To conclude, this study reveals following three points; (1) Yokkaichi is truly facing a turning point in its history as a memorial of one of the most serious pollutions. The birth of Kankyo Miraikan is a glorious attainment level, although some areas still to be seriously involved. (2) One big problem is

[6] "Storyteller" Yokkaichi Pollution and Environmental Museum for Future Awareness <http://www.city.yokkaichi.mie.jp/yokkaichikougai-kankyoumiraikan/storyteller.html>

that storytellers are aging. How to pass on the moral lessons and the messages learned from the heavy pollution and the severe pollution-related diseases to the next generation and onto the world is the question to Kankyo Miraikan and Yokkaichi to solve. Training more volunteer exhibition interpreters may be one answer. (3) Finally, the people of the local community and the entire Yokkaichi City must realize the importance of a hub station that Kankyo Miraikan may become, to send important messages to the world. Despite the distance from the affected area, Kankyo Miraikan has many advantages. Yokkaichi is given a mission to make the most of it and invite new and repeat visitors.

Three months from its opening, the Kankyo Miraikan met their 30,000 visitor on 25 July 2015. Next year, Japan will host the Summit Conference in Ise City, in southern Mie Prefecture. Mayor Tanaka insists that all meeting nations to stop over at Yokkaichi to visit and study the lessons of Yokkaichi Air Pollution at the Kankyo Miraikan.^[7]

Yokkaichi Air Pollution was indeed a tragedy. Nevertheless, we have not yet overcome the air pollution in the world. In this respect, it is the Kankyo Miraikan's mission to provide the world a straightforward report of the Japanese experiences and some hints to the solution of their pollution.

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[7] 24 July 2015 Chunichi Shinbun.

Abstract

Yokkaichi, the largest city in Mie Prefecture well known for its three huge petrochemical complexes, is also known as one of the four major environmental cases of pollution (Yondai-Kougai) in Japan. From 1959 to mid-1970s, the residents suffered a serious health problem, “Yokkaichi Asthma,” resulting from the air pollution caused by the petrochemical complex constructed in the main coastal area of the city.

This paper will introduce a movement in this area; the birth of “Yokkaichi Pollution and Environmental Museum for Future Awareness (in Japanese: Yokkaichi Kougai to Kankyo Miraikan),” which newly opened on 21 March 2015. Located inside the Yokkaichi Municipal Museum building, the Yokkaichi Pollution and Environmental Museum for Future Awareness marks a turning point for Yokkaichi Air Pollution.

As discussed in this paper, the history of the outbreak of Yokkaichi Asthma is a solid evidence of the fact that environmental pollution causes social issues such as destruction of people’s lives and the local community that is still hard to resolve after half a century.

Keywords

Yokkaichi Pollution and Environmental Museum for Future Awareness, Yokkaichi Air Pollution, Yokkaichi Asthma, petrochemical complex, local community

Low Emissions Development in China:

An Analysis of National and Subnational Development Pathways

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Abstract

In this study, we analyze low emissions pathways at the national and subnational level in China through 2050. The study begins with national level trajectories based on China's future energy use as well as experiences of other rapidly industrializing countries such as Japan. The emphasis in mapping the national trajectories is placed on what levels of development China hits an inflection point and moves down a low carbon, low emissions development pathway. The paper then turns to subnational emissions pathways for cities in Northeast China. The emphasis in mapping the subnational trajectories are the locally appropriate policies and measures (urban infrastructure, energy supply diversity, and energy reduction of residential construction, etc.) that lead to an inflection point and reductions in city level carbon and air pollution emissions.

Keywords

low carbon development; air pollution; flue-gas desulfurization equipment; district heating systems; energy consumption

1. Introduction

Over the past decade, China's economy has begun to move from relying chiefly on heavy industry and large energy providers to a broader range of sectors and services in rapidly urbanizing cities. A consequence of this economic diversification and urbanization has been a change in the nature and sources of emissions of carbon dioxide (CO₂) and air pollution. Whereas China once focused on curbing chiefly industrial emissions of CO₂ and sulfur dioxide (SO₂), it now confronts controlling fast-growing mobile sources and complex atmospheric problems such as photochemical smog from the reactions of hydrocarbon nitrogen oxides (NO_x). A critical question for China's policymakers is what policy and measures are needed to lead to a reduction in emissions of CO₂ and other air pollutants. In

other words, what would a low emissions development pathway look like in China?

The primary purpose of this paper is to shed light on this question at the national and subnational levels in China. In the paper, we estimate the trajectories of low emissions pathways at the national and subnational level in China through 2050. The study begins with national level trajectories based on China's future energy use as well as experiences of other rapidly industrializing countries such as Japan. The emphasis in mapping the national trajectories is placed on at what levels of develop China hits an "inflection point" and moves down a low carbon, low emissions development path. The paper then turns to subnational emissions pathways for cities in Northeast China. The emphasis in mapping the subnational trajectories are the locally appropriate policies and measures (urban infrastructure, energy supply diversity, and energy reduction of residential construction, etc.) that lead to an inflection point and reductions in city level carbon and air pollution emissions.

2. Research Methods

To get deeper insights into the emissions drivers at the national level, the paper relies chiefly on the International Energy Agency (IEA), the Japan Institute of Energy Economics (JIEE) as well as comparative analysis of China's medium- and long-term energy and environmental by the National Development and Reform Commission, Energy Research Institute (NDRC-ERI). Based on the calculations of these three sources, it is possible to understand at what levels of development emissions levels from China's economy begin to turn downward.

2.1 Prospects for China's Energy and Environment through 2050

The IEA and JIEE constructed the "Asia / the world of up to 2040 of the International Energy Agency (IEA) Energy Outlook 2013 using a model that predicted the transition of China's "National Development and Reform Commission, Energy Research Institute" in energy demand structure for a low-carbon society in 2050. It is possible to distill the key drivers behind emissions as well as varying assumptions as shown in Table 1 from the above sources.

Two key drivers of emissions are population and economic development. In all of the above sources, the annual rate of population growth is increasing gradually from .1% to .5%. In all of these sources, population is expected to peak around 1.4 billion people between 2025 and 2040. The estimates of GDP vary more across these sources. The NDRC estimates GDP growth at 9% from 2010 to 2020; 6% from 2020 to 2035; and 4.5% from 2035 to 2050. Meanwhile, the JIEE estimates that China's economy will average 5.2% growth per year from 2011-2040, with growth rates falling from more than 10% over the past 20 years.

Table 1. Comparison of Drivers behind China's Energy Demand

| Drivers | Research institute | 2010 | 2020 | 2030 | 2035 | 2040 | 2050 | |
|---|--------------------|---------|-------------------------|--------------------------|----------------------|--------|--------|--------|
| Primary energy consumption Mtoe | IEA | 2,209 | 3,465~ | 3,687~ | 3,835~ | - | - | |
| | IEE | 2,216 | 3,345 | 4,068 | 4,361 | 4423 | - | |
| | NDRCERI | 2,399 | 3,077~ 2,858 3371 | 3,744~ 3,161 3,868 | 3,983~ 3,181 - | 4341 | 4,659 | |
| Component ratio % | Coal | IEA | 67%09 | 62~59% | 60~53% | 60~51% | - | - |
| | | IEE | 72% | - | - | 55% | 50% | - |
| | | NDRCERI | 71% | 62~55% | 53~45% | - | 48~39% | 44~34% |
| | Oil | IEA | 17% | 17~18% | 18~19% | 17~18% | - | - |
| | | NDRCERI | 18% | 23~21% | 31~22% | - | 31~21% | 28~21% |
| LNG | IEA | 3% | 7~8% | 9~10% | 10~11% | - | - | |
| Renewal energy | IEE | - | - | - | 13% | - | - | |
| | NDRCERI | 3% | 6~8% | 8~11% | - | 9~13% | 10~14% | |
| Nuclear power | IEA | 12% | 10~11% | 9~12% | 9~13% | - | - | |
| | NDRCERI | 7% | 8~12% | 9~15% | - | 9.7 | 10~16% | |
| CO ₂ Amount of emission Billion tons | IEA | 1% | 4% | 5% | 5% | - | - | |
| | NDRCERI | 1% | 2~4% | 3~7% | - | 6~11% | 9~15% | |
| CO ₂ Amount of emission Billion tons | IEA | 7,311 | 9,727 | 10,113 | 10,253 | - | - | |
| | IEE | 7,400 | - | - | 7,900 | - | - | |
| | NDRCERI | 8,484 | 10,189 | 11,656 | - | 11,656 | 12,705 | |

Source: Created based on the World Energy Outlook 2011-2012 (IEA), "Asia / World Energy Outlook 2012" (Institute of Energy Economics, Japan), "Low-carbon development roadmap China 2050 : analysis of energy demand and the situation analysis of carbon emissions" (National Development and Reform Commission, Energy Research Institute)

It is important to point out, however, that all of these sources also assume that even as population and economy growth slow after 2020, both energy efficiency and the share of energy from renewables will likely increase. This is reflected in estimates of primary energy use (TPES). Both the NDRC and JIEE calculate that average annual rate of up to 2040 increases by 1.7%, while primary energy consumption or approximately double over the entire period. The NDRC, JIEE and IEA offer slightly different estimates on the amount of energy generated from coal. NDRC assumes coal dependency to be at 48% in 2040, dropping to 44% in 2050. On the other hand, the JIEE assumes coal dependency to be at 55% in 2035, rising to 51% in 2040. Last but not least, the IEA expects that coal dependency will sit between 51-60% in 2035. This is the result of increased use of substitutes for coal such as natural gas, renewable energy and nuclear power.

The different sources are divided on the main sources of low carbon energy. IEA suggests that 9-13% in 2035 the ratio of renewable energy will account for primary energy, whereas JIEE is 5.1% in 2035 and 10% in 2040. In contrast, NDRC suggests that renewable energy ratio reaches 16% as a result of policies promoting nuclear and wind power.

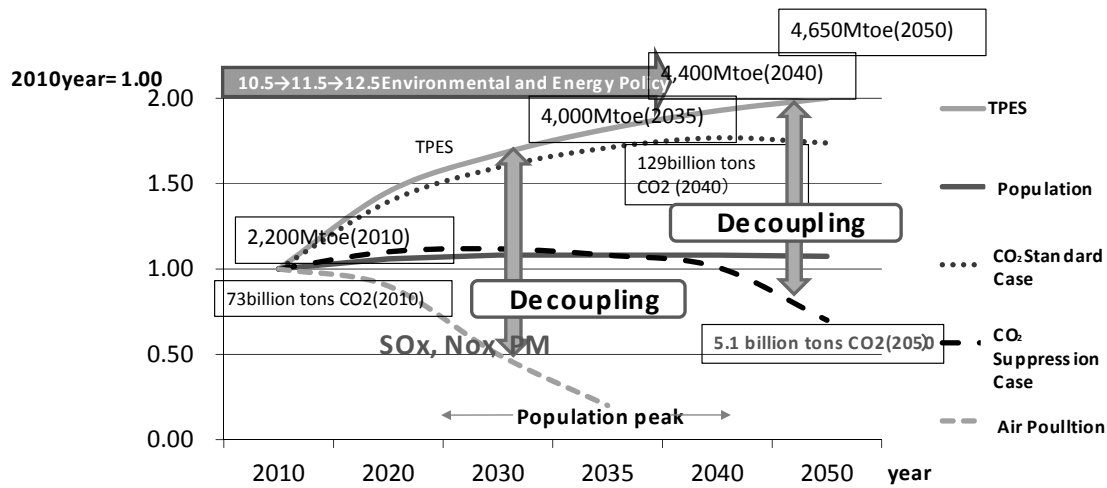


Figure 1. Energy and environmental outlook based on the three studies reported (schematic diagram)

2.2 Prospects for Reductions in Air Pollution Emissions

The previous subsection focused chiefly on energy use and CO₂ emissions. This subsection focuses on emissions of air pollutants drawing upon the experience of Japan. That experience suggests that if innovative policies are introduced faster than the social activities generating pollution, it is possible to greatly reduce the absolute levels of air pollution. On the other hand, the expansion of social activities causing environmental problems can also outpace the introduction of policies, leading to more pollution.

The Japanese experience also suggests that there are essentially two stages of pollution and relevant response measures. The first stage involves measures that control industrial pollution typified by flue gas desulfurization and denitrification equipment. The Japanese experience suggests these policies can cut industrial pollution in half. The second stage targets reductions in emissions from mobile sources through emissions standards and low-emission vehicles. Nevertheless, improvement of air pollution from mobile sources is not as easy as stationary sources; the rate of emissions growth only begins to fall come when the rate at traffic volume increase slows.

The progress of China's air pollution and low-carbon of in which energy use is expanding, Japanese experience may be in formative in three ways:

For large source industrial pollution, the pollution load can be reduced sharply through exhaust gas treatment equipment.

A significant challenge after the industrial pollution is air pollution from mobile sources. Many parts of China are at this stage now.

The transition to a low-carbon economy will be the most challenging issue for China; it requires both significant changes in the energy supply and energy demand.

In summary, it is possible to achieve a decoupling between air pollution and economic drivers (such as GDP) by 2020. Achieving this decoupling for CO₂ by 2040, however, promises to be difficult.

3. Low Emissions Cities in China

In China, a long-term strategies have been introduced for eco-friendly cities that have helped push forward low emissions development These strategies began in 2011 during the “12th Five-Year” period when there was growing emphasis on clean energy. According to the 12th Five Year Plan, cities were expected to optimize their energy structure, combine heat and power, improve gas pipe network, and promote renewable energy. At the same time cities were given numerical targets for air pollution for each sector and installing pollutant removal equipment.

In Northeast China, city heating supply area and heating energy consumption have increased. Some estimates suggest that between 2000-2010 the city heating supply area increased from 3.3 to 9.8 billion m²; and energy consumption increased to 163 million tce from 84 million tce (Building Energy-Saving Research Development Report, 2012) Moreover, because of the large dependence on coal, these cities confront problems such as air pollution emissions from winter heating as well as increase in automobiles. Enhancements of energy environmental measures are required to curb these emissions.

Based on the above, two approaches to low emissions city in Northeast China have been discussed: one is the air quality improvement via changes in city infrastructure; and the promotion of low carbon urban infrastructure.

Table 2. Measures for Eco-Friendly Cities

| | | |
|---------------------------------|---|---|
| City infrastructure improvement | Measures to power generation and heat supply facilities | <p>A. Air pollution: prospects of possibilities and environmental improvement of air pollution total load reduction. By ensuring the introduction and good quality fuel of flue gas treatment equipment</p> <p>B. Promotion of energy conservation: the possibility of energy conservation. By the accelerated introduction of cutting-edge next-generation coal-fired power plants, thermal power plants, district heating plant</p> <p>C. low-carbon propulsion: the possibility of low-carbon, by Expansion of natural gas supply, effective utilization of coal seam gas, renewable energy and nuclear power propulsion</p> |
| | Housing and building improvements | <p>D. Energy efficiency improvement of housing by the renovation of existing housing and dissemination of new homes and Evaluation of the synergistic effect by the district heating system improvements.</p> |

The introductions of high-efficiency power generation facilities as well as desulfurization and denitration measures that reduce air pollution and strengthen emissions standards are important. In China, SO_x (SO₂ equivalent) and soot emissions from power plants account for about 40% of total emissions. The introduction of flue gas desulfurization equipment on large-scale equipment facilities that started during the 10th Five Year Plan and carried through to the 11th Five-Year Plan period reached a 95% penetration rate. Meanwhile dust removal device have been mandated and kept in place for many years.

The introduction of desulfurization equipment on power plants has skyrocketed from 14% in 2005 to 86% in 2010. By the end of 2014, thermal power flue gas desulfurization units are operational is about 760 million kW (power generation installed capacity base, the same below), accounting for 83% of national thermal power plants or 92.1 % of all coal-fired power generation facilities.

Table 3. The Status and Outlook for Exhaust Gas Treatment Equipment

| Item | Performance of flue gas treatment | Corresponding technology |
|--|---|--|
| SO ₂ Desulfurization Technology (DeSO _x) | 95% desulfurization dissemination (China) 68 ~ 99% desulfurization average 0.21g / kWh Achieve(Japan) 99% desulfurization efficiency, Practical realization 0.01g/kWh It is being promoted to ensure the low-sulfur fuel ,In China | Desulfurization equipment wet limestone gypsum method Desulfurization equipment dry activated carbon method The introduction of natural gas Ensure low sulfur coal (0.7%) |
| NO _x Denitration Technology (DeNO _x) | 75% denitration is being promoted (China) 67~93% denitration average 0.51g / kWh(Japan) 93% NO _x removal efficiency is practical. It is reduced to 0.05g / kWh (Japan Isogo thermal power plant) | Two-stage combustion method, low-NO _x burners Flue gas denitration equipment (NH ₃ reduction method) |
| PM Dust collection Technology | Current 0.01~0.02g/kWh(Japan) There are areas where equal levels were put to practical use In China. | Electrostatic precipitator (ESP) Bag filter |

Source: J-POWER Group Sustainability Report2013

In addition to the aforementioned SO₂ control measures, there are also NO_x reduction measures. Power plant and district heating account for one third of smoke and soot emissions in China. Mandatory removal rates of 75% for denitration equipment were introduced in China during the 12th Five-Year Plan (2010-2015). By the end of 2014, operational thermal power flue gas denitration units were installed on 687 million kW power generation facilities. This accounted for about 75% of thermal power plants or 83.2% of the total national coal-fired power generation facilities. In recent years, Japanese advanced Isogo thermal power plants have been marketed that reduce NO_x emissions to 0.05g / kWh with 93% NO_x removal efficiency equipment. If these technologies were introduced in China, they would lead to far greater reductions in NO_x. The present status and outlook for exhaust gas treatment are presented in Table 3.

Dust collection technologies have also made progress in China. By the end of the 2014, the thermal power generation industry began to use a bag filter or electrostatic precipitator for 189 million kW (power generation installed capacity base). These technologies were installed on facilities accounting for 22.9% of total coal-fired power generation. The penetration of bag filter installation reached

75 million kW, accounting for 9.1% of the total coal-fired power generation. In addition, the bag + electrostatic precipitator 114 million kW have been installed on 13.8% of coal-fired power generation facilities.

Since the end of 2011, monitoring systems for PM_{2.5} have also been actively promoted in China. Since PM_{2.5} consists of a combination of emissions of different sources; the mechanism generating and diffusing PM in the air is also complex. At the most fundamental level, the control measures require significant reduction in key air pollutants, such as SO_x, NO_x, soot and dust. In September 2013, the central government formulated the air pollution prevention action plan to help curb PM_{2.5}; local governments were also requested to implement comprehensive measures, including more stringent controls on production facilities management, retiring outdated equipment, suppressing coal consumption, promoting clean energy, and improving pollution monitoring systems. Some of the key pollution control measures are summarized in Table 4

Table 4. Pollution Control Measures (including waste gas treatment)

| Item | Old emission standards | | New emission standards * | |
|---|---------------------------------|--|-------------------------------------|--------------------------------|
| | New facility apply | Existing, high-sulfur coal, anthracite | Apply to Beijing, Shenyang etc. * * | Applied to other areas |
| SO _x SO ₂ Conversion | 400 mg/m ³ 140ppm | 1,200 mg/m ³ 420ppm | 50 mg/m ³ 17.5ppm | 200 mg/m ³ 70ppm |
| NO _x NO ₂ Conversion | 450 mg/m ³ 220ppm | 1,100 mg/m ³ 536ppm | 100 mg/m ³ 49ppm | 200 mg/m ³ 97ppm |
| Soot and Dust | 50mg/m ³ | 200 mg/m ³ | 20 mg/m ³ | 30 mg/ m ³ |

Appendix: China's air pollutant emission standards for thermal power plants (national standards)

*National standards : July 29, 2011 promulgated, apply from January 1, 2012.

**Beijing, Shanghai, Guangzhou, Shenyang, Shandong Peninsula, Wuhan, Changsha, Chengdu, Fujian

In addition, the possibility of introducing coal technology is critical to air pollution. In recent years, state-of-the-art clean coal technologies that are not very different from Japan have been introduced in China. Also, air pollution regulations are continually being strengthened that will likely lead to significant reductions in SO_x, NO_x and PM from stationary sources through 2020.

4. Low Carbon Policies in Northeast China

There is also a need to steadily improve the thermal efficiency of energy conversion facilities, increase efficiencies in district heating systems and reduce energy loss from heating destinations. The cities of Shenyang, Dalian, Changchun, and Harbin in Northeast China all aim to reduce energy consumption by transforming their industrial structure and promoting renewable energy in line with local conditions.

According to the 12th Five-Year Plan, Shenyang has focused on promoting wind power, solar power, nuclear power, and low emission vehicles. Dalian has concentrated on offshore wind power

development that takes advantage its coastal location. Harbin has promoted wind power and solar power generation given that it is located in a region that receives strong winds and plenty of sun. In addition, Harbin also promoted model geothermal and ocean water heat use pilot projects. Meanwhile, Changchun capitalizes on favorable conditions for harvesting bio-energy. These above initiatives are cornerstone of each of the city's pursuit of low emissions development.

The approaches to low-carbon development at the city level can be divided into those that 1) promote energy efficiency; and 2) diversification of energy sources:

1. Improving energy efficiency-In Northeast China, increases in energy efficiency have involved improvements to district heating systems (such as changes to the fee system pay-as-you-go with temperature controls); improvements of thermal efficiency in coal facilities; reductions in heat energy consumption per unit through energy-saving housing. Economic growth is necessary to maintain and modernize infrastructure in each of the above cases.
2. Diversification of energy sources-The increased penetration of low-carbon energy sources will bring down CO₂ emissions intensity. However, through 2040 increases in energy consumption are likely to offset these improvements in emissions intensities. This underlines yet again why China's low carbon transition will not occur until

Table 5. Promotion of energy-saving and low-carbon urban infrastructure

| Item | 2010 | 2020 | 2030~2035 | 2050 |
|--|--|--|--|--|
| Thermal power plant efficiency improvement *4 | Pulverized coal-fired power (Introduction of USC advances) Power generation end : 43% Sending end 41% | USC is main from 2020 ~11%↓ Power generation end : 48% Sending end : 46% | Premise the introduction of IGCC 11~15%↓ Power generation end : 51~53% Sending end : 46~48% | Premise the introduction of IGFC 25%↓ Power generation end : 60% Sending end : 55% |
| District heating system improvement | Reduced to 2/3 per heat unit. Plant thermal efficiency 64.4%(17.4%↑) | Residential energy saving, heat usage-based pricing, the introduction of heat meter translating. | Efficiency is improved with the development of coal utilization technology. | Dissemination of energy-saving housing, Reduced to heat unit. Plant thermal efficiency |
| Energy-saving house New building: energy-saving standard achievement Existing: residential remodeling (heating heat utilization) | New construction: residential energy conservation standards 50% achieved Existing: 180 million m2 remodeling 11, 5 Five years 59 million ton energy saving | New building: energy-saving standard 65% achieved Existing: House energy saving remodeling is round. More energy-saving housing spread | New building: energy-saving standard 75% achieved This new housing area by the time increased 3 billion m2, 1% of the northeast. | Housing-friendly carbon emissions small environment is extensively available. |
| CO ₂ Emission factor(t-CO ₂ /toe) | 3.00 | 2.96~2.93 | 2.74~2.73*2 | 2.40~1.45 |
| CO ₂ Amount of emission One million tons | 7311*3 | 8044~8294 | 8593~8169 | 8822~5115*1 |

Source: J-POWER Group Sustainability Report2013□Created on the basis of the Chinese government published materials, etc.

Note: * 1 primary energy equivalent (Chinese Academy of Sciences 2050 roadmap based on estimates). * 2 2030 value. * 3 IEA. * 4 Electric Power Development Co., Ltd. Materials.

5. Conclusions and Way Forward

In this paper, we have analyzed the feasibility of low emissions development at the national and subnational level in China. The prospects of these development pathways were analyzed both in terms of reductions in CO₂ and pollution emissions. Based on the previous analysis, we arrive at the following conclusions:

By 2020, stationary source air pollution can be reduced sharply in China. More concretely, it is

possible to decouple air pollution and energy consumption provided the following three conditions are met:

1. The steady promotion of clean coal technologies, exhaust gas treatment technologies and clean fuels.
2. District heating system improvement and transition to a fee of pay-as-you-go systems.
3. Improving housing insulation, introducing new construction materials and energy-savings housing.

It may also be possible to achieve a decoupling between CO₂ emissions and energy consumption by 2040. Doing so will require higher rates of renewable energy use that capitalize on locally favorable conditions; and reductions in primary energy use spurred by achievements in energy use technologies.

A major challenge in the future of China's air pollution is a response to mobile source emissions from rapid motorization. Predicting trends in mobile source emissions is more difficult than industrial pollution; this is not unique to China but is also apparent in other countries such as Japan. In the future, we hope to continue to focus more on the feasibility of decoupling at the sectoral level, including the residential and transport sectors.

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Growing Risk of Sufferings by Industrial Pollution Problem in 1950s

-A Case Study of Minamata Disease-

Atsushi Nozawa

1. The purpose of this paper (presentation)

Minamata Disease is one of the worst industrial pollution problems. Almost sixty years have passed since the discovery of the disease. However the effects of this problem have not been solved yet. The patients have still suffered from the disease, now the symptoms have become more severe in relation to aging issues especially among congenital Minamata Disease patients. This paper explores how their symptoms or disabilities have become severe as aging and discuss what kind of issues need to be problematized as today's risks of Minamata Disease. The analyses are based on the viewpoint of discussions about environmental risk

2. Outline of Minamata Disease^[1]

Minamata Disease is one of the worst industrial pollution problem that has struck Japan in the post-Second World War period. Minamata Disease was officially discovered at Minamata City in Kumamoto prefecture in May 1956. Kumamoto prefecture is one prefecture in Japan's southern island, Kyushu region. This Disease was caused by Chisso Corp. that operated a big chemical factory in Minamata city at that time. Waste water that contained methyl mercury was discharged from the factory into Minamata Bay. As a result, the contaminated water polluted fish and shellfish.

Symptoms of Minamata Disease were appeared among those who ate the sea foods. There are various symptoms as the central nervous system is damaged by methyl mercury and the followings are recognized as the main symptoms: unsteadiness, numbness in the hands and feet, general muscle weakness, narrowing of the field of vision, damage to hearing and blurred speech and so on.

The point at issue of Minamata Disease is that the criteria for certification as the victim. The number of certified patients is 2,277, among whom 1,853 patients have already died. On the other hand,

[1] The history of Minamata Disease is mainly based on the following books.

Masazumi Harada, 2004, *Minamata Disease*, Minamata Disease Victims Union.

Timothy S. George, 2002, *Minamata. Pollution and the Struggle for Democracy in Postwar Japan*, Harvard University Asia Center

the number of uncertified patients is 15,437^[2].

| | certified | uncertified | waiting for decisions |
|------|-----------|-------------|-----------------------|
| 1970 | 72 | 2 | 28 |
| 1971 | 58 | 1 | 136 |
| 1972 | 154 | 10 | 411 |
| 1973 | 298 | 40 | 1,968 |
| 1974 | 73 | 22 | 2,628 |
| 1975 | 128 | 24 | 2,924 |
| 1976 | 104 | 84 | 3,360 |
| 1977 | 180 | 98 | 4,171 |
| 1978 | 143 | 296 | 4,695 |
| 1979 | 117 | 601 | 4,666 |

Figure 4. The increase or decrease of the number of patients in 1970s.
(only in Kumamaoto prefecture)

Figure 1 indicates the increase or decrease of the number of patients in 1970s. After 1973, more people applied to be certified as the victim. One reason is that in this August the compensation agreement was finally concluded between the victims and the company.

However, the new certification criteria were issued in 1977 by the Ministry of the Environment) and the guideline issued in 1977 made certification standards much stricter. The authority gave explanation that the new criteria made the process smooth, but as the result, this modification occurred the increase of the uncertified victims. This was not because of the progress of medical research, but because of political and financial reasons. At that time, Chisso corp. had suffered from the burden of large payments of compensation. In addition, recession after oil crisis made the situation even worse. So, Chisso corp. was unable to make enough payments for patients, and as a result, the government decided to issue prefectural bonds to support Chisso corp. Inevitably thousands of patients remained uncertified.

A lot of people could not be certified because of severe criteria for certification by the authority. Getting certified is directly linked to getting financial compensation from the company. So the authorities regulated the number of the certified victims to prevent the company bankrupting. This means that the Certified patients indicate those who are eligible to obtain compensation. It is not medical but political problem.

Uncertified patients were not satisfied the criteria, so they negotiated with the government and Chisso corp. for compensation. As a result of long negotiation, the government implemented a

[2] Minamata Disease Municipal Museum (As of March 31, 2015).
<http://www.minamata195651.jp/list.html#3> (Accessed: 2015/06/19)

political settlement for uncertified patients in 1995 and 2009. Over 40,000 people got certain amount of compensation but it's much lower than that of certified victims.

Most parts of Minamata Disease problem have been related to this certification issue. Many uncertified victims have protested against the unfair certification system, not only for compensation payment but also for identification as the victim. However because of its seriousness, one issue has not been focused on: how the certified victims have led their lives after getting compensation payment. This issue has become more important and urgent as the victims are getting old.

Almost 60 years have already passed since the discovery of Minamata Disease, so it can be said that the effects of pollution were finished. However this problem has not solved yet. The first issue is unfair situation for the uncertified victims and the second issue is symptoms and disabilities are getting worse among the certified victims as they grow older. In this paper (presentation), the second issue will be focused on.

3. Emerging issue

Basically, a starting point to understand environmental issues is that the effects of environmental problem influence many fields in a society, environmental problem is phenomenon that needs to be explained by explanations from many disciplines both natural science and social science in order to get more extensive knowledge of the problem. However, at the same time, we have to define who is the victim, what is the urgent topic, and what the problem is, so, eventually one discipline has great influence to define the character of the problem.

In case of Minamata Disease, a main issue changed with periods. According to the most serious issue at the time, the discipline that defines the character of the problem has changed. The following slides indicate the important events of Minamata Disease and main discipline at the time.

Minamata Disease was discovered in 1956. In this period the most serious issue was to find the cause of the Disease, both the effect on human body and on natural environment. So, the main disciplines were medicine and chemistry.

In the end of 1960's the Government recognized officially that Minamata Disease was caused by environmental pollution. In this period, the victims brought lawsuits for compensation against the company. So, the main issue was the responsibilities of the company and main discipline was law. In this time, the problems of Minamata Disease had discussed in courts, for example, a judgment decided influenced the definition of the disease.

Since the latter half of 1970s, the main issue has been the compensation for uncertified victims because of severe certification criteria. In 1995 and 2009, the government implemented the first settlement for uncertified patients. So, the main discipline was law and politics.

In the period of 2010, — this is the topic of this paper (presentation) —, aging and its attendant deterioration of disability has become urgent topic. In general, the aged people need more welfare services, in addition, it has been demonstrated that the symptoms become worse as they grow older. Victims have more difficulties to lead their everyday life than ever before. The Aging issue will be occupied an important part of researches about Minamata Diseases. It has been past almost 60 years

from the discovery, so most victims are over 50 years old, there many victims over 70. More people will need welfare services. In order to understand this issue, a new discipline is required; Social welfare studies. In case of social welfare studies and disability studies.

4. Case studies

In this section, the issue of 2010 is analyzed based on interview surveys with congenital Minamata Disease victims. They were damaged during pregnancy, so were born with severe disabilities. Now approximately just only 80 congenital victims are identified. Today, their disabilities have become more severe than other victims. The survey has been conducted since 2011 and interviewed 9 victims. In this paper (presentation), 3 cases are analyzed.

Case.1: Man, 56 years old, living at home (as of 2011)

He wants to live independently in a institution with residential care service before 60 years old, one reason is that his mother is over 80 years old. Now, he has received residencial care from his mother, so he was worried about care in future

Case.2: Man, 56 years old, living at institution for the victims.

He has lived in an institution for victims over 30 years, but now stay out overnight three times in a month, now, he wants to have more opportunities to stay outside the institution, and if possible, wants to live outside the institution.

Case.3: Man, 48 years old, living at home.

He is a certified victim, and wants to live alone in future. He is the certified, so has gotten certain amount of compensation money, but has felt an acute anxiety in the future because of physical deterioration. He already claimed to raise compensation money to authorities twice, but the demand was denied. The reason was "It could not be found acute deterioration in applicant's daily life".

5. Findings

Each victims want to live independently, but its meaning is not same. Their demands are different according to their own situations;

1. wants to live in an institution with residential care.
2. wants to have more opportunities to stay outside.
3. wants to raise compensation money in order to get residential care.

Each has needs social welfare services, but what kind of services they need are different, it depends on their health factor of themselves and their families and social factor; certified or not certified by the authority and their life history.

The important thing is their demands cannot be solved by only compensation money. Their disabilities will become more severe in future. So, it is required to construct and manage permanent welfare services; a kind of social security system for victims in the damaged area. Compensation

means not only to pay money temporary but also to support their everyday life permanently. Both are essential to solve environmental pollution issue.

The Comparison and Integration of Environmental History and Environmental Sociology

A Case Study of Cancer Village

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Abstract:

Environmental History and Environmental Sociology are the two important discipline branches of social science study on the environment problems. Their benign development is not only related to the survival of the two discipline in the future, but to the resolve of the environment problems in the reality. Environmental History and Environmental Sociology have a lot of common on the birth time, place and theoretical basis. During the process of development, environmental history emphasized too much the character of interdisciplinary, which probably leads to the danger of lacking of theoretical innovation. Less attention of social variables also can cause less enough explanatory power. On the contrary, Environmental Sociology is lack of calm, comprehensive and systematic characters that historical narrative have, and it concerned about the present too much which made it master the historical facts not enough and detailed. On the case study of a cancer village, we attempt to create an example of an analysis frame with the aspects of history narrative and introduction of social variables. The example of analysis frame emphasizes learning the merit of History in the aspect of history narrative, and learning the advantages of Sociology in the aspect of social variables analysis.

Key Words:

Environmental History; Environmental Sociology; history narrative; social variables; Cancer Village

Environmental pollution and ecological crisis is one of the hot topics in today's academia, leading to the birth of the branch of traditional disciplines, whose research object is based on the environment. Environmental History and environmental sociology branches generates two branches: Environmental

History and environmental Sociology. Remarkable achievements has been made after decades of development, however, the defects of emerging discipline are also obvious. This paper analyses the characteristics of environmental history and environmental sociology from a comparative perspective, hoping to learn from each other and promote integration between the two disciplines, so as to accelerate the sound development of each discipline. This paper also attempts a case study analysis, thus building an interdisciplinary perspective and analysis framework.

I. History on environmental issues: Environmental History

1. The birth of Environmental History and its meaning

As a branch, environmental History of first born in the United States in 1960s and 1970s. It appears because of the following two main social background: Firstly, after United States World War II, pollution problems have become increasingly serious and deteriorating ecological environment with the rapid development of industry; secondly, the United States environmental campaign has been in full swing across the country. In addition, with the rapid development of many disciplines in the united States after WWII, knowledge of these disciplines continue to accumulate well prepared for the birth of environmental history (Mao Hong, Bao 2000: 70-83).

Up to now, agreement on what is environmental history has not yet been reached by the environmental historians, but the most general formulation "environmental history is the study of the history of relations between human being and nature," was able to get everyone's basic identity (Jing Ai, 2004: 5-7), This situation is perhaps one of the common features of all new disciplines, showing that the subject is still in the early stages of development, it is the same with the rise of environmental sociology contemporaries in the United States. The researchers always encounter the embarrassing question like "what is Environmental Sociology".

In the field of Environmental history, beach-mark figures' definition of the environmental history reflect their own research focus and academic background. American Environmental History gives the definition: "Environmental History studies the relationship between man and nature, it strives to understand how natural provide selection and obstacles to human action, how people change their ecosystems, as well as different cultural attitudes about how the non-human world profoundly shape the beliefs, values, economics, politics and culture. Environmental history belongs to interdisciplinary research, learning insights from history, geography, anthropology, science and many other disciplines."

2. Characteristics of environmental history research

From the literature review of Environmental history, most scholars highlighted the ecological basis of environmental history on the theoretical basis while on the research methods, they emphasis more on the interdisciplinary nature.

Ecology discipline born earlier than environmental history a century or so. Some scholars believe that ecology's impact on the environmental history research is mainly reflected in two aspects: Firstly, ecology derives human ecology, disciplined focus shift from biological body into the human body as the main body; and natural ecosystems to human ecosystem; Secondly, ecological ethics reminds

human being of paying attention to biological right apart from human right itself (Gao Guorong 2005: 120-125). Put it simply, ecology's contribution to environmental research is to shift the research object from the "objects" to "people", the other hand is the opposite process. Some other scholars believe that the significance of ecology to environmental history is "ecological consciousness." This awareness is mainly reflected in the historic overall awareness and human emotions that historians hold while doing environmental history research (Hou Wenhui, 2004: 25-32). The author believes that "overall sense of history" may be affected by the concept of ecology "system" and "Community", and "human emotion" has the internal consistency with the above-mentioned biological rights.

Environmental historians emphasize interdisciplinary studies, especially knowledge across between history and natural science, natural sciences including subjects like ecology and geography. Although some scholars do not use the "interdisciplinary" concept, it is still emphasis on the "multi-disciplinary", while others are mixing together.

3. The possible defects of environmental history

For a new discipline, the emphasis on innovative research methods may be where its vitality lies, but such emphasis may also be buried in the trend of history. The researchers focus on the importance of environmental history in the study of natural science, but too much emphasis on this point and ignoring the standpoint of the researcher's own discipline is likely to go astray. Bao Maohong holds that "Environmental history must adhere to the basic characteristics of narrative history." He argued that environmental history researchers should "adhere to the traditional characteristics of history, but also meet the challenges critical thinking" (Maohong, Bao 2000: 70-83). I was inclined to support what Bao said that emerging discipline researchers should constantly absorb knowledge from other disciplines on the basis of the subject itself. It will be a more appropriate approach.

Another possible flaw of Environmental History research is insufficient attention to the variable "society" Almost all related scholars have emphasized the importance of other natural sciences knowledge in interdisciplinary research (or multidisciplinary), but relatively little attention is paid to the relationship between changes in environmental history and social variables. This approach could lead to an imbalance in the longitudinal study of environmental history and horizontal dimension, leading to the failure of explanation of the results, or insufficient inspiration to contemporary society.

4. An exception: Social history on environment research

In the field of historiography, researchers have begun to bring environmental variables into research category, exploring the historical role of environment variable on social changes. The intersection of social history and environmental history also produced two new research directions, namely social ecology and ecological social history, which make up the "Natural History" in a certain extent. However, the relevant research is still relatively small (Wang Lihua, 2000; Xianming, 2010: 24-29). Moreover, social history researchers also concerned about the "social" variable from a point view of historical changes, and still does not solve such issues like the transverse dimension of environmental history research and the "current" lacking of concerning.

II. The impact of sociology to environmental issues: Environmental Sociology

1. Birth and connotation

History strikingly similar. The birth of time and the background of environmental sociology and environmental history is almost the same. In fact, it is related to social-economic background and academic prosperity after World War II in the United States. Industrial pollution causes environmental damage. In practice areas, political and social leaders are in the forefront, actively promote the environmental movement, and finally form the world's largest and most developed environmental social movements. In academia, the US academic research are extremely active with a lot of academic research focus shift from Europe to the United States, therefore many achievements have been made. Traditional academic research can not explain the new social phenomenon, so some new discipline and direction come in to being. Environmental sociology and environmental history have a lot of similar theoretical foundation, it can be called cousins from different disciplines ownership. ^[1]

The same with environmental history, environmental sociology has long been no universally accepted definition. Catton and Dunlap first defined environmental sociology as “ research on the interaction between environment and society “, which share the same definition with environmental history, “Environment and Society” and “Nature and Human” are much alike (Catton WR , Dunlap R E., 1978: 41-49).

2. Features and defects of environmental sociology studies

It is the same with the environmental history, the development of ecology provides an important theoretical source for the birth of environmental sociology. Ecology's impact on the environmental history mainly embodies in two aspects: “human ecology” and “ecological consciousness”. While ecology's impact on the environmental sociology lies in “social ecology” and “ecofeminism “and” deep ecology in ecology research. Social ecology holds that ecological issues is the root of social inequality while ecofeminism believes that male dominance is a major cause of environmental destruction, and deep ecology emphasizes the diversity and richness of the value of the Earth (Cheng Peng li, 2013: 24 -28).

Interdisciplinary is also considered to be an important research method by environmental Sociology researchers, however, the attendant disciplinary position problems also plague some scholars. Catton and Dunlap think whether considering environmental phenomenon directly as a variable is the distinction between “environmental sociology” and “sociological environmental issues”. Some scholars believe that the environmental sociology is a branch of sociology, and its research methods is based on the methodology of sociology. Environment can not be the direct object of Environmental Sociology. Although environmental sociology is an interdisciplinary subject, it can not sweep all the research levels of environment and social relations. Environmental sociology should prepare itself for positioning (Lu Tao, 2004: 8-17).

Subject positioning that Environmental sociologists debate will become a controversial topic in a

[1] Hong Dayong has a comprehensive and in-depth analysis of environmental sociology emerging background. See “Hong Dayong, 1999,” Western environmental Sociology research Sociology research No.2.

long period of time. This early controversy reflected in the so-called “NEP paradigm” criticism, the discussion focused on the research subject, whether the subject is the physical environment variables or “socialized point environment variable.” [2]

III. Integration by comparison

1. Comparison between Environmental History and Environmental Sociology

Environmental History and environmental sociology are new discipline born in 40 years ago, their survival among many other branches after World War II proves their own vitality. Two subjects were both born in the United States, introducing in China in the 1990s and they get more social concern in the 21st century, thus maintaining a good momentum of growth. However, China’s environmental history and environmental sociology still are faced with serious challenges both in theoretic construction and constructive methods.

Bao Maohong summarizes four aspects of issues that China environmental history exists. The first point emphasizes the weak theoretical foundation. Historical Geography in China do not pay attention to the theoretical analysis, this situation has not improved while in environmental history research. Related theoretical level research still remain in Marx and Engels’ analysis of a given framework, and no attempt was tried to undertake a comprehensive study. Bao criticized that Chinese environmental history study lacks theoretical exploration. (Bao, 2004: 475-499). In comparison, China’s environmental sociology theory is also weak, but scholars attach importance to environment sociology theory. It appears the concepts of Chinese localization, micro and medium. This could be related to subject property, history focuses on the basis of historical data so that it emphasizes more on “facts”, while sociology always attached importance to “social facts”, theory testing or theory innovation and then back to theory. Of course, the long-term training of disciplinary thinking will produce an impact on scholars, but it should not become an excuse for lacking of theoretical innovation. Whether it is environmental history, or environmental sociology, theoretical dialogue and innovation should always carry out in the whole process of research.

Environmental history and environmental sociology are the results of multi-disciplinary knowledge accumulation and evolution. Both disciplines emphasized the importance of interdisciplinary approaches and multidisciplinary knowledge. In the literature of environmental history research methods, we can often see the implementation of natural science research methods as well as numerous related disciplines. This tendency may lead to environmental history study deviate from their discipline standpoint: “multidisciplinary” and “interdisciplinary” to “no discipline”. It will lose its own charm in historical environmental issues studies. Of course, some scholars recognize the dangers of this tendency, reminding environmental history researchers of the stance must be history, otherwise it may turn out to be a “catastrophic consequences” (Griffin, 1998: 155). From environmental sociology paper, we have seen some of the “catastrophic consequences”, too much emphasis on knowledge of the natural sciences leads to lacks of “sociological taste”. For environmental history and

[2] About what is NEP, see “Catton WR, Dunlap R E. ‘Paradigms, Theories, and the Primacy of the HEP-NEP Distinction’. *The American Sociologist*, 13.

environmental sociology researchers, it should be better to have a good command of multidisciplinary base in natural sciences property study, moreover, they should have an accurate understanding of the natural science characteristics, but research stance should always be history or sociology, and always adhere to its own disciplinary research paradigm.

2. Heading for integration: possibility exploration

As homologous clan brothers and sisters, environmental history and environmental sociology grow up and have their own development, but at a critical time, they can still cooperate with each other and continue to strive for being stronger. Each discipline has made some achievements after decades of development, but shortcomings are still evident. By comparing and learn from each others advantage, both discipline reap the benefit and develop better and faster without changing the subject property itself. In the research perspective and research methods, each discipline has its own merit.

In the research perspective, environmental history can introduce “social” variables to a greater extent and the form the research study chain of “Nature-Society-human” to enrich contents of environmental history. Currently, environmental history research emphasis more on “natural science” in interdisciplinary properties. However, there are still relatively obvious “natural science centrism” feature, it is a lack of discipline confidence. Environmental history research should pay more attention to social factors such as social structure, gender and other alike factors influencing nature and human relationship changes. Insufficient attention to “Social” variable may lead to environmental history research on contemporary environmental issues, or short of concern to current environment pollution. This is third issue proposed by Bao Hongmao (Bao, 2004: 475-499). In contrast, environmental sociology researchers should learn from history perspective in the research process. In the study, environmental sociology should not only concern about the “current” environmental issues but also traced, analyzed the history of the problem, only in this way, can we achieve a thinking pattern of “calm, comprehensive, systematic” rather than merely with “moral appeal and sensational way to arouse the people’s attention to environmental issues and their passion” (Bao Maohong, 2000: 70-83)

In methodology and research methods, environmental sociology should learn from history. History (Environmental History is no exception) is very good at meticulous historical documentation process, and speak out the “story”. Sociology has a strong sense of “problem consciousness”, “current awareness” as well as sensitivity of what occurred at present, but it seems that concerns of historical facts and analysis is enough or deliberately away. In fact, sociology do have a historian tradition. Classic sociologists like Marx, Weber are good at exploiting historical data to make comparison and analysis, and they published a large number of classics. Three decades later, a new discipline - historical sociology has finally been born in 1960s in the United States, which breaks the ice. (Li Huajun, 2012: 372-377). Environmental Sociology could absorb nutrients not only from an environmental history but also historical sociology. For Environmental history, it should learn more methods of field investigation and empirical research from the sociology researchers. On the one hand, in the field of social sciences, sociological research method has been dominated by a strong advantage, and has accumulated research experience. On the other hand, environmental history, although

emphasizing interdisciplinary research, but still with a strong natural history research method: do not focus on field investigations, archaeology scholars could be an exception. The difference between Environmental History and traditional historical research is that the former involves the study of the natural environment, researchers must learn out of the den and move forwards to the natural and society

In the following, I try to use the above analysis and conclusions on a case study ---“cancer village”. As I am a researcher of environmental sociology, so the analysis would be from a sociological perspective, but it will try to apply methods of environmental history, prompting the study to a more comprehensive level.

IV. A new analytic framework: a case of “cancer village”

1. The beginning of the “story”: the ancient spring “cancer village”

Cancer Village “is a unique Chinese phenomenon in last decade as industrial and agricultural pollution increase, rural health damage arising,” cancer village “is the folk and media expression, it is not rigorous scientific concepts (Chen Ajang, 2012: 98-110). Ancient springs village is located in Chongqing, the only municipality in western China under the jurisdiction of T County, less than 50 km from the downtown area.^[3] As the name suggests, the ancient springs spa is famous for its spring. At that time, Chongqing was regarded as the National government, the village has a natural surroundings and, the climate is relatively cool, especially of its health spa, which attracted some of the politicians so that they establish residence and health institutions here. However, this village, which was well-known for its beautiful surroundings, became the focus of the media at the end of 2004 because of serious pollution and high incidence of cancer. In 2013, the ancient springs became one of the more than 200 cancer villages in the list of “Chinese cancer map “produced by the folk.

Why such a big gap in the transition? I led the research group entered the ancient springs twice in May 2013 and in September 2013 respectively, we made a field investigation to understand the situation, and wrote a report. From 2013 to 2015, the research group also collected other relevant circumstances of ancient springs by other means, especially historical documents related to the investigation, and it will be of great help to revise and improve the report.

2. How to tell the “story”: Narrative

Some scholars believe that the Environmental History that historians study is a subject of narrative historiography using linguistic processing story telling strategy, and then put forward the basic characteristics that environmental history research should adhere to when facing serious challenges, i.e., postmodernism versus traditional methods of historical research, “(Bao Maohong, 2000: 70-83).” In fact, this is a common challenge facing the humanities and social sciences in recent years, i.e. the “humanities and social sciences in the narrative switch.” Sociology also pay attention to narrative history, and today increase to the narrative sociology disciplines, a new angle. Mei si also raises three

[3] According to academic norms practices, the paper and the following county and person names were carried out anonymously.

basic elements of the narrative.^[4]

The relationship between pollution and cancer is the core subject in sociological research (Chen Ajiang, Cheng Pengli, 2011: 30-41). In many cases, pollution and disease these two variables are both history and reality because the contamination happened before, and still exists, so does the disease. In the ancient springs case, there are two narratives: contamination and disease, one is a kind of narrative literature, and the other is narrative investigation.

3. Narrative Literature

There are mainly two literature related to pollution, One is periodicals, it is very limited and appears in the early stage, the information is very indirect; the other is news reports, it is informative, and mainly centralized in certain time, but very direct. The largest sources of pollution in ancient springs is a paper mill. The paper mill has a long history, dating back to around 1937. Paper mill was first set up by well-known paper makers Dr Zhang Yonghui who study abroad in Germany, later controlled by Yan yangchu, the Chinese civilians Educational Association. After 1949, the paper mill has turned into state-owned enterprises, it ran well from 1984 to 1989, once become the largest paper companies in Chongqing (Gou Liyi, 1990: 222). Journal "Sichuan Papermaking" mentioned in 1986, 1990, 1996 that paper mill's pollution to the environment, specifically, such statements like "environmental pollution is very serious", "it cause serious water pollution to the environment", "it is not only undrinkable, but also impair product quality as industrial water" and so on. News media reported the ancient springs paper mill pollution in 22, November 2004 to 24 November. Chongqing Morning Post reported 3 consecutive days of pollution in ancient springs, it was this report that pushed the ancient springs into the list of "China cancer village map". After that, Xinhua and other major news media have reproduced the relevant reports. This three-day continuous coverage of the pollution directly owe the serious water pollution to the paper mill. There are a variety of colors of effluent discharge, it not only pollutes the river, but also the rice fields.

Literature related to diseases are concentrated in 22 - 14, in particular Day 22's report, the reporter first pointed out the list of cancer deaths in ancient springs in recent years, and then analyzed, the death of the list and followed by referring what the doctors said, owing the cause of cancer to water pollution. Based on years of experience in "cancer villages" research, it is suggested that this is often the common practice for media to expose "cancer villages", it draws people's attention by "high incidence of cancer," and then spears directed towards local pollution.

4. Narrative Survey

Obtaining information by using participant observation and in-depth interviews is the main method to carry out fieldwork by sociologist field surveys can not only help researchers to obtain direct sensory experience, but also tap the lack of literature materials, which is often voiced by interviewees.

Field survey data acquisition of pollution and disease are interwoven, not completely separated.

[4] Refer to "Narrative and sociology" published by Cheng Boqing on the website of sociological perspective, <http://www.sociologyol.org/yanjiubankuai/fenleisuoyin/shehuiyanjiufangfa/dingxingfangfa/2008-09-24/6163.html>, September 2008.

Research group carried out investigation twice, in May 2013 and September. Through the investigation and observation, It is indicated that ancient springs paper mills has been closed since 2011,, Although the factory still remains and the factory facilities is also intact, there is no pollution over time, , the river has become clear, but whether it still contains the toxic contamination left unknown.

Understanding of past pollution episodes mainly comes from what villagers recalls. The villagers said that paper mill gave out not only emissions, dust, but also the discharge of sewage. Villagers along the river near the village often smell the stink odor. White smoke falls on the body and hair, as well as vegetable, the scene is just like snowing, Mill emissions is putrid, what's worse, it makes the fish extinct. River water and groundwater have been contaminated by mill waste water, leading to the villagers changed the drinking water source several times.

Referring to cancer data in the news media, research group also collected some cancer incidence and mortality data through field survey. By imprecise statistical analysis, research group believes that villagers in Group 5, which near the paper mill, has a more serious cancer morbidity and mortality from 1985 to 2013, the number of lung cancer deaths accounts for the largest proportion. This result coincides with statistics carried out by "Chongqing Morning Post" reporters. Through field surveys, research group has a direct perception of cancer, the survey women suffering from liver cancer has already dead when they visit her again while she was still alive and enjoyed the sunshine in front of the door when they make initial survey at that time.

5. Greater analytical framework: the introduction of other "social" variables

If the fusion of environmental history and environmental sociology embodies in the narrative time difference: past and present, then the introduction of "social" variables will make the narrative more academic.

In the "cancer villages" case studies series, the residents' cognition of pollution and the relationship between disease is an important variable which researcher often concern, put it simply, sociologists' research focus is environmental action caused by environmental action.^[5]

Researchers often have great access to large amounts of some environmental struggle data through surveys on environmental struggle in the village where pollution and disease coexistence. Relevant research results are more common in the field of environmental sociology. In this case, specifically, pollution and disease were tested under "past tense, "therefore, with limited environmental struggling resources.

Thinking in a broader time and space with ancient spring "cancer villages", you will find that the pollution is related to paper mills, and paper mills is related to industrial heritage in Chongqing . Chongqing industrial heritage comes mainly from the national government, it has something to do with developing provisional capital during the military enterprises and civil enterprises. Another source comes from the "three-line construction." implemented by China in the early 1960s to the 1980s. China. On the one hand, these industrial heritage has laid a foundation for the industrial development

[5] For more "cancer villages" sociological case study, see "Chen Ajiang, Cheng Pengli et al., 2013, "cancer villages' investigation," China Social Sciences Publishing House. "

of Chongqing, on the other hand, it also left rooms for environmental damage and pollution. "Industrial Heritage" and the environmental damage would be another meaningful topic that environmental history and environmental sociology can do the research in larger time and space.

V. Conclusion

Environmental History and environmental sociology arise from human's fear and concern to environment damage, both have obvious "problem consciousness" and humanistic concern. In addition to emphasize interdisciplinary trait, both developed a different research characteristics based on their own discipline. These research characteristics emphasized different points, yet it also exposed their shortcomings and defects. The possible defects of Environmental history study is too much emphasis on interdisciplinary characteristics, thus may leading to disciplinary stance lost; in addition, insufficient attention is paid to social variables, this may also lead to the narrow interpretation to the conclusion. The Environmental sociology research methods emphasizes social variables and field investigations, it is possible to compensate for the defects of environmental history research; Likewise, learning detailed and systematic historical narrative method will improve environmental sociology's rough story telling shortcomings. By Comparison of environmental history and environmental sociology, prompting the two disciplines heading for integration and fusion, it will be conducive to the better development of the two disciplines.

The article attempts to analysis a "cancer village" case concerned by environmental sociology, and put environmental history and environmental sociology studies integration into practice; establish a new analytic framework. Due to the limited level of the author as well as the space limitations of the article, the case study is still in the tentative stage, more dialogue and discussion will be included in the practice field. in future research.

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Power Guanxi^① and Renqing the Social Cultural Reason Why Industrial Pollution is Difficult to Control in China

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Abstract

The social mechanisms of industrial pollution are different in different countries. Based on the field work in Yancheng city in Jiangsu province, we found that the industrial pollution problem in China embeds in complex social and cultural structure. The allocation mode of relevant power makes power relatively concentrated, social relation structure and social relationship norms characterized by a sequence with different grades, and the unique Renqing principle gave the social space to the polluting enterprises to obtain power's asylum through establish Guanxi with and give Renqing to the person in power, resulting in the persons who should have use power to control industrial pollution become the protectors of polluting enterprises, leading the industrial pollution difficult to control.

Key Words

pollution, power, Guanxi, norms, Renqing

1. Introduction

A large number of studies have been carried out in the academic circles of China on the environmental governance problem which largely stayed in policy and difficult to implement. Many researches point that the crux of the issue is due to existing system of China. ^[1] Some studies explain this problem from the perspective of local fiscal revenue. And some studies explain this problem from the perspective of social and cultural characteristics in china. ^[2]

All of these factors are the important reasons for the long industrial pollution, but they can't explain a series of phenomena I found in the field investigation of Yancheng City, Jiangsu Province. That is in many cases, the relationship between polluting enterprise owners and local officials play a protective role in local environmental management. It is not an individual phenomenon, but a more common

phenomenon. According to local environmental law enforcement officers, small enterprises have small Guanxi, big enterprises have big Guanxi.

From this phenomenon, the environmental problem in China is not only a technical problem, and it is not only a system, policy issues, it is also deeply embedded in China's complex social and cultural structure. How did this happen? This paper is intended to explain this issue based on the empirical materials gained from the fieldwork in recent years. This paper will answer two questions: (1) what's the characteristic of the allocation of power in local environmental governance, which person or institution in power has the influence on the survival of the polluting enterprises. (2) What is the operation mechanism of the environmental administrative power intertwines with Guanxi and Renqing, and how does this block the local pollution control.

2. The allocation of environmental administrative power and its influence on polluting enterprises

So far as the status, environmental protection work in China is mainly depended on the government, rather than the other organizational units. Implementation of environmental protection work is mainly relying on local governments. Therefore, the power allocation method in local environmental administrative system is very important for the practical effect of environmental protection. First, we can discuss the power allocation of the local environmental administrative affairs in a general sense. Then based on enterprise owners' point of view, inspect which external power has an impact on their survival and operations, and who have these powers.

2.1. The allocation of environmental administrative power

2.1.1. Top leaders of local party and government: the core of the local power system

Local Party committee and government leadership team is the center of local power system, party secretary and government executive heads are the top leaders of local party and government and the core of local power system, in the daily lives of Chinese people they are often referred to as the "Yibashou (一把手)", refers to the people who have the greatest power. If at the provincial level, they're provincial party secretary and provincial governor; If at the municipal level, they're municipal secretary and municipal governor, and so on.

Under this Local power allocation framework, the top leaders of local party and government have the maximum powers in local environmental governance. First, the local environmental work will be carried out or not, how to carry out and carry out in what degree are all depend on the top leaders of local party and government. The importance of the local environmental governance often depends on how important it is for the top leaders of local party and government, not depend on the severity of pollution. The judgment of the top leaders of local party and government is based on government performance appraisal system their superiors make. If this system emphasizes economic growth rather than environmental protection, the top leaders of local party and government will focus efforts on economic growth, ignoring the environmental work, and vice versa.

Secondly, one of the core powers of the top leader of local party is power of appointment and

removal of personnel. This leads the local environmental protection department leech on to the top leader of local party. Whether the leaders of local environmental protection departments can flow upward, to a large extent depend on the top leader of local party. This leads to a phenomenon, when the top leader of local party pay attention to the environmental protection, local environmental protection department will attach great importance to environmental protection work. When the top leader of local party does not attach importance to environmental protection work, and even make a tendency to sacrifice the environment for the economic development, the environmental protection department will select to turn a blind eye.

Third, the top leader of local government has the biggest responsibility for the environmental protection within the local area. His powers are reflected in two aspects. First, he has the power to shut down polluting enterprises. According to the Environmental Protection law of the PRC, ordering the polluting enterprises stop production and shut down need the approval of the local government. Secondly, he has the power of the approval and arrangement of the local environmental protection budget, including finance budget of local environmental protection department and the special funds for local environmental management project.

2.1.2. “Scarecrow”: local environmental protection department with great responsibility and little power

Environmental protection department is the local department of environmental protection administration, and the functional organizations of local government. Its responsibilities include: implementation of national environmental laws, regulations and policies; it is responsible for the environmental admittance of the upcoming projects, for the examination and approval of major development and construction zone, and the environmental impact assessment documents of projects; responsible for the supervision and management of local environmental pollution, investigate and punish environmental violations, and so on.

Although the local environmental protection department has so many and important responsibility, compared with its power was very asymmetrical, some studies call this phenomenon as “great responsibility with little power”^[3]. We can investigate from the following three aspects: first, based on the above, we can know that local environmental protection department is controlled by the top leader of local party and government at the aspect of the personnel and finance. Therefore, for these above responsibilities, the local environmental protection department can not carry out perfectly, what need to be focus on and what can be done often limited to the top leaders of local party and government.

Second, in this power pattern, the local environmental protection department even has no power to decide some affairs within its responsibility range, and need to obey the top leaders of local party and government. For example, we know that local environmental protection department is responsible for the environmental admittance of the upcoming projects, and this is very important for the control of local pollution. But an official of a local environmental protection department of Yancheng city, Jiangsu province told me that:

Environmental protection department even can not decide if a polluting enterprise can or not can build here.

Many polluting enterprises moved in even without the agreement of the environmental protection department. For example, some large enterprise's economic benefits are very good; but it has polluting risk. But the top leaders of local party and government think the environmental protection department has no reason not to approve.

Third, in terms of pollution regulation, though the local environmental protection department has the environment supervision responsibility, it does not have the power to ask a polluting enterprise to stop production or shut down, only has the power to give warning and impose a fine.

These aspects have a great limit for the local environmental protection department to play a substantial role in environmental regulation. So some studies compare it to Scarecrow. ^{[4][5]}

2.2. Which person or institution in power has the influence on the survival of the polluting enterprises?

First of all, for the polluting enterprises, the top leaders of local party and government have the greatest influence to them. Because if polluting enterprises can be born and would be shut down depends on these top leaders' attitude in many cases.

The second is local environmental protection department. The impact of local environmental protection department on polluting enterprises includes several aspects: examine and approve enterprises' environmental impact assessment document, the supervision and management of local environmental pollution, investigate and punish environmental violations, and so on. These works are carried out finished by different administrative office of departments of local environmental protection department.

The third is court. The impact of the court on polluting enterprises is occurred when these polluting enterprises refuse to fulfill the penalty decision make by local environmental protection department. The court has the power to compulsory execution.

These persons or institutions in power are very important to pollution enterprises. If pollution enterprise owners want polluting space without punishment, they need to find some way to influence the behavior of persons or institutions in power.

3. The operation mechanism and consequence of the environmental administrative power intertwine with Guanxi and Renqing

As a matter of fact, in the Chinese context, hosts of polluting enterprises owners do gain the polluting space from these persons or institutions in power without any administrative penalty. Nevertheless, the emergence of this phenomenon, whose mechanism wears unique Chinese characters and which grows out of the society soil with unique social relation structure, relation norms and social exchange based on Renqing, should not be simply attributed to power rent-seeking or bribery, for it is deeply rooted in Chinese culture.

3.1. The social structure of Guanxi and the dealing standard

Basically, Guanxi is of the Pattern of Difference Sequence, as were once used by Fei Xiaotong to name the Guanxi situation in Chinese local society. This particular definition indicates that the Guanxi one

has with another, following a certain sequence, depends on how close, or how intimate they are, which resembles the waves of water, which get thinner when pushed further from the center. ^[6]

The structure of Guanxi presents the characteristic of difference sequence is because when someone deals with the Guanxi others, he automatically adopts different principles towards people with different position in his structure of Guanxi. What's more, the norms by which people deal with Guanxi is in accordance with its difference sequence, decided by the extent of intimacy.

Liang Shuming once published his ideas about the difference sequence that exists in Guanxi. Considering that people's relations as well as the obligations they should for others are respectively linked to their intimacy with each, he defined Chinese traditional society as one based on ethics. The research carried out by Huang Guoguang came to the identical conclusion, "If anyone asks the a people who monopolize a certain kind of social resource to distribute their resources among the applicants, the first thing that comes to the people's mind is what kind of Guanxi he has with each of the applicants and its extent ". ^[7]

It is for the reasons above that Chinese normally don't act as they are supposed to. If two individuals are intimate friends, for instance, the asked doesn't cope with things by the regulations, if do official business according to official regulations may hurt their Guanxi. It is hard for Chinese people to take measure without considering their Guanxi, which reflects a Chinese slang "familiar people handling affairs more easily(shu ren hao ban shi 熟人好办事)". But if two people did not know each other, do official business according to official principles is taken for granted.

Except for the characteristic of difference sequence, there is another characteristic Chinese people deal with Guanxi, reciprocity is needed during two people in their Guanxi. When someone accept another people's help, he should give help or something else back, Otherwise he will think owe something to the one once help him and feel him discourtesy. There is a sentence in The Book of Rites compiled in the Western Han Dynasty, saying "courtesy demands reciprocity(Li Shang Wang Lai 礼尚往来)".

3.2. Norms of Guanxi and Renqing interaction

In people's daily life, the social norms system dealing with Guanxi is consist in Renqing. Renqing is a common language which means what we are supposed to do when dealing with Guanxi. When dealing with social relationships, you will be rated as "incomprehension of Renqing (不通人情)" or "incomprehension of Renqing and traditional code of conduct (不通人情世故)" if you violate standards which the other people identify. Because of reciprocity is needed when dealing with Guanxi, when you get helps and you don't reward others, we can say that you own them Renqing and you need repay the Renqing, which means Renqing need reciprocity too. According to the difference sequence of Guanxi, Renqing have the difference of thick, thin, sparse, and dense. The closer the Guanxi is, the thicker and denser the Renqing is.

Generally speaking, Renqing isn't utilitarian or motivated. It's a natural state in social interaction and a need for people to help and support each other in daily life. However, there exists utilitarian Renqing exchange which develops on the basis of the natural Renqing interaction in Chinese society.

Some people deliberately send Renqing to another person making this person own Renqing to him; in order to get the resources they want from this person, and then achieve his purpose.

Generally, Renqing interaction exists only in acquaintances and it's hard for strangers to do it. Because there isn't Qing (情) and Yi (义) between people unfamiliar. In which case, it's inadvisable to give Renqing to others and other people won't accept. Therefore, in China if someone needs to obtain resources from a stranger and form utilitarian Renqing exchange, needing establish Guanxi first. If two unfamiliar people originally become familiar and establishing unique Guanxi, utilitarian Renqing exchange become naturally. From this we can see that the utilitarian of Renqing often based on the ethic relation.

3.3. Establishing Guanxi and utilitarian exchange of Renqing : the interaction between the polluting enterprises owners and persons in power

There are a large number of polluting enterprises in China. These owners of polluting enterprises will face the risk of being fined, suspended for rectification, detention, closure, and so on if their pollution behaviors are discovered by local environmental law enforcement officials.

Hence, polluting enterprises owner often choose to establish Guanxi with persons in power and maintain the long-term, stable Guanxi with them through the utilitarian exchange of Renqing to obtain a long-term protective umbrella. From the above content we realize that, under the current allocation pattern of regional environmental administrative power, top leaders of local party and government have the power to decide whether polluting enterprises have the social space to be born or to be closed; local environmental protection bureaus has the power to approval the environmental impact assessments of these enterprises and supervise if they pollute the environment; the court has the power to enforce pollution enterprises to perform the punishment. So those top leaders of local party and government, main leaders of local environmental protection bureau, officials who in charge of approval the environmental impact assessments and supervise enterprises' polluting behavior are often target persons that polluting enterprises owners establish Guanxi with.

Among them, top leaders of local party and government are the key target persons that polluting enterprises owners establish Guanxi with. If some polluting enterprise owner establishes Guanxi with top leaders of local party and government, the other persons in power in this region will turn a blind eye to this enterprise's pollution behavior for avoiding offend local top leaders what will affect his political career. Some large-scale enterprise owners can establish Guanxi with superior leaders of local top leader. In this case, local top leader need to flatter enterprise owners, expect enterprise owners help them improve Guanxi with their superior leaders.

It is interesting that after polluting enterprise owners establish Guanxi with persons in power they have the tendency to identify their Guanxi as the quasi-kinship. for example, just like Brothers or parent-child Guanxi. This has a great connected with the Chinese social relation structure and social relationship norms which are characterized by a sequence with different grades: the closer the Guanxi is, the more frequent and heavy the Renqing exchange.

Polluting enterprise owners maintain long-term stable Guanxi with those persons in power

mainly through the continuous utilitarian exchange of Renqing. Although the utilitarian exchange of renqing exist the trade of money and power, just like general offering or accepting bribes and power rent-seeking, the difference is the utilitarian exchange of Renqing is based on the ethics relation. Because there is a quasi-kinship relationship between the enterprise owner and person in power, when at festival and at New Year, and at the time of the person in power or his family member scelebrate the birthday, get ill, and so on, enterprise owner need to send Renqing to the person in power like his other relatives and friends. The Renqing enterprise owner send must have highly economic value, both because their quasi-kinship Guanxi and this Renqing is utilitarian. Accordingly, when the enterprise owner has a problem related to pollution, the person in power will give help with power to give a Renqing back, just like a brother or friend ought to do. As Xuewei Zhai said, this kind of exchange became euphemistic because its meaning of Renqing.^[8]

The direct result of this phenomenon is that environmental law enforcement become more difficult, and the pollution problem is hard to control. We found many similar cases in our field work.

4. Conclusion and discussion

Based on the above analysis, we can see that industrial pollution problem in China embeds in the complex social and cultural structure. The allocation mode of relevant power makes power relatively concentrated, social relation structure and social relationship norms characterized by a sequence with different grades, and the unique Renqing principle gave the social space to the polluting enterprises to obtain power's asylum through establish a Guanxi with and give Renqing to the person in power, resulting in the persons who should have use power to control industrial pollution become the protectors of polluting enterprises, leading the industrial pollution difficult to control.

In order to promote the pollution control, it is very important to constructing relevant policy measures to avoid the party and government officials to protect polluting enterprises. Some new contents have been added in the new Environmental Protection law of the PRC which is put in force from January 1, 2015, for example, people who in charge of the local government and the competent department of environmental protection protect will be given administrative sanctions including record of demerit, record of a major demerit, demotion, removal from office, discharge if the local government, the competent department of environmental protection protect the environmental illegal activities. However, the problem is very difficult to control because it is rooted in the Chinese social and cultural soil, and is well hidden to see. We need to pay closer attention to it.

Notes

① Guanxi: A Chinese term that indicates one's social relationship with others, which can be intimate or aloof.

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Analysis of the Relationship between Environmental Policies and Air Quality during Major Social Events

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Abstract

Based on an analysis of major recent social events in China, such as the 2008 Beijing Olympic Games, 2010 Shanghai World Expo, 2014 Nanjing Youth Olympic Games and 2014 Beijing Asia Pacific Economic Cooperation Conference, mandatory, temporary, and indemnificatory quantitative policies aimed at protecting air quality, which were carried out by both central and local governments, made substantial contributions to changes and improvements in air quality. To some extent, the findings show that command and control measures play a significant role in protecting air quality, while the law and economic and voluntary environmental safeguard measures do not during major social events. Therefore, it reminds us the air quality could and will improve not only during major social events but also in the regular days if we implement appropriate environmental policies and safeguard measures.

Key words

major social events; environmental policy; air quality; command and control measures

1. Introduction

Yale University and Columbia University in New York City recently published "The Environmental Performance Index Report 2014," which described the use of an air quality index to evaluate environmental performance for the first time. The index includes three indicators of air quality: household air quality, average exposure to PM_{2.5} and PM_{2.5} exceedance. PM_{2.5} (fine particulate matter) has been calculated using quantification techniques to evaluate air quality. Suspended particles can lead to lower respiratory infections, cancer and other diseases. Until recently, the suspended particle monitoring reports published by most countries have used PM₁₀ (particles between 2.5 and

10 micrometers in diameter) as the main index. However, fine particulate matter (particles with a diameter less than 2.5 micrometers) can be inhaled into the lungs and is more dangerous than coarse particulate matter. Compared to PM₁₀, PM_{2.5} can spread farther and produce toxic substances containing heavy metals and carcinogens. Therefore, it can have more profound effects on human than PM₁₀.

Air is a public good and is characterized by its non-excludability. Recently, to realize the GDP growth target and bring about government achievements, local governments developed many public policies aimed at attracting foreign investments, which has resulted in more intense industrial activity, ultimately resulting in increased air pollution and damage to public health. The government aims to improve air quality by developing different public policies, requiring a balance between public benefits and maintain social stability. A successful policy is not only decided by decision makers but also by relating real-world situations and their subjective initiatives. However, in the process of policymaking, the antinomy phenomenon inevitably occurs. On the one hand, policymakers are required to sufficiently develop their subjective initiatives and to improve their cognitive and thinking skills. On the other hand, policymakers should be calm, objective and respectful of the facts. Due to the non-rationality of decision makers, their interests and deviation from an idea will affect their subjective initiatives. As a result, the policies that are developed by policymakers have certain limitation and contradictions^[1]. Therefore, this paper aims to assess the relationship between environmental policies and air quality and to understand which of the environmental policies and regulations that were in place during the major social events of recent years should be implemented.

2. Literature review

Many studies have investigated the functionality of environmental policies by focusing on the features, evolution and transition of environmental policies in recent years.

In 1972, the United Nations Conference on the Human Environment (UNHEC) highlighted the need for environmental protection in China. To solve the environmental pollution problem, the Chinese government has taken a series of environmental protection measures and developed related laws and regulations. Initially, the environmental policies were aimed at strengthening the functionality of environmental administrative institutions, developing environmental laws and regulations and enhancing environmental management. Later, the government sought to balance economic development and environmental protection^[2]. In the 1970s and 1980s, economic management and authority were centralized in China. The primary administrative tools were command and control measures. Guided by laws and regulations, environmental regulators required pollution dischargers to internalize the pollution costs. The specific measures involved regulators who published and implemented relevant laws and regulations and subsequently required enterprises to install pollution control technology to achieve the fixed pollution emission levels^[3]. Because of the "reform and opening" policy, China has experienced rapid economic development, and the development patterns have mainly included extensive economic growth and contaminated economic growth. Thus, to reduce pollution, the government has adopted subsequent supervision and penalty measures. Because of low

penalties, most enterprises have preferred to accept the penalties instead of improving their pollution controls^[4]. At the same time, early in the development of environmental policies, the decision-makers neglected to sufficiently communicate and interact with citizens, enterprises and non-governmental organizations (NGOs). A stakeholder group was unable to transfer measures from institutionalized public opinion to the government^[5].

Due to the disadvantages of the initial environmental policies and the rapid development of the economy, environmental policies are continuously evolving. Since the 1990s, environmental laws have been continuously enhanced. Policy measures have been changed from command and control measures to law and economic measures. The use of economic incentives has been limited because of poor environmental infrastructure and higher administrative costs. Additionally, such measures cannot be implemented quickly. Considering administrative costs and time efficiency, voluntary environmental measures seem to be the best choice^[6]. Recently, fire hazards and water pollution have continuously increased and have evolved into a major public crisis. According to the principles of prevention and preparation in disaster management, environmental policies will move away from being the “fireman” and move toward carrying out more work related to prevention and early warning. Antecedent supervision will be the main focus^[5]. Due to the rapid social development that has occurred in China, living standards have improved. The hierarchy of needs has gradually changed and has become oriented toward the living environment. Therefore, enhancing the environmental democracy concept is the basis for participating in environmental protection and is necessary for protecting the public’s environmental benefits and for realizing the survival, development and self-value of environmental protection groups^[7].

Environmental polices aim to improve environmental quality and to realize the coordinated development of society, economy and environment. Many studies have evaluated air quality through different perspectives. Moreover, scholars have used data or examples to analyze the effects of environmental policies, urbanization, climate change, human activities and major social events on air quality.

Some scholars have conducted quantitative studies on the relationship between environmental policies and air quality. Zhang zhe and Wang jinnan studied the relationship between air quality and per capita GDP in several large cities and found that air quality changed with economic development and depended substantially on policy orientation^[8]. Song guojun noted that in the process of air quality management, the government should pay more attention to laws and regulatory measures. Through comparisons, Song guojun found there is an association between air quality and government administration^[9]. Zhang weidong and Wang hai used the VAR (Vector Auto-regressive) model to analyze the effects of environmental policies on economic development and environmental pollution. They found that the implementation of environmental policies does not improve the relationships, referring to economic growth enhancing environment pollution and environment pollution restraining economic growth, because the environmental policies could not be sufficiently implemented. Therefore, to accelerate economic growth, the government should pay more attention to preventive controls and to strengthening the implementation of environmental policies^[10]. Another study assessed

the improvements in air quality that would result from implementing targeted sulfur dioxide (SO₂) and nitrogen oxide (NO_x) emission controls in China in 2010. The results showed that these emission controls can lead to significant air quality benefits^[11]. Lastly, another study determined that the environmental policies and strategies of the Nigerian oil and gas industry had a positive impact on the Nigerian environment, especially in terms of creating awareness among all stakeholders. With respect to challenges, regulator inefficiency due to inadequate logistics, a poor environmental database, duplications and overlaps in the duties of regulators are some of the challenges that were identified. The prospect of environmental policies and strategies in Nigeria is generally considered to be bright, especially considering the fact that the industry is still evolving. Relevant recommendations were made on how to achieve improvements^[12].

The literature review indicates that there is a relationship between environmental policies and air quality, that environmental policy measures have evolved from command and control measures to laws and regulatory measures, and that citizens have played a significant role in the policymaking process. Previous studies have provided the theoretical foundation and direction for this paper. However, no studies have analyzed the relationship between environmental policies and air quality during major social events. Therefore, the current paper applies previous theories and uses specific examples to analyze the relationship between environmental policies and air quality during major social events, with the aims of summarizing the interconnections and providing a reference for similar social events. The following two questions are addressed in this study. What was the relationship between environmental policies and air quality during recent major social events? What role have environmental polices played in improving air quality? By analyzing the relationship between environmental policies and air quality during major social events, we were able to summarize the effects of environmental policies in different political, social and economic conditions and to provide resources for environmental protection during major social events.

3. A broad analysis of air pollution management and cases in China

Air pollution and poor air quality are caused by rapid economic growth models that sacrifice environment quality; such growth models are common in almost every county. However, public awareness of environmental protection is gradually increasing with economic growth. Additionally, the public is demanding better environmental controls. There are many successful cases of environmental pollution management in western countries. For example, air pollution was successfully managed and air quality clearly improved in Paris, France, between 2002 and 2012. Several lessons can be learned from the following measures. 1. Reducing vehicle speed limits. According to regional air quality monitoring data, the main sources of pollution included industrial emissions, human activities and traffic and transportation. Subsequently, the Paris police lowered the vehicle speed limit on beltways, expressways and highways from 70 km/h to 60 km/h, 90 km/h to 70 km/h and 130 km/h to 110 km/h, respectively. Reducing the speed limit can lower engine speed, reduce fuel consumption and lessen pollutant emissions. 2. Offering free public transportation to encourage the public to drive less. 3. Abolishing government vehicles. 4. Traffic restrictions based on even-and odd-numbered license

plates. 5. Enhancing supervision and inspection. There were 700 police officers across 60 checkpoints who were responsible for punishing individuals who broke the law. The penalty for breaking the law was 22 Euros if immediately paid, increasing to 35 Euros if paid within three days.

All of the above measures aimed to penalize environmental polluting behaviors through environmental regulations or administrative methods by the local government. These measures are relevant for managing air pollution in China. By collecting and analyzing data from the websites of the Ministry of Environmental Protection of the PRC and the local government's Environmental Protection Agency, we found that during major social events, the central government and local governments developed environment laws or regulations to protect the air quality. In this paper, the 2008 Beijing Olympic Games, 2010 Shanghai World Expo, 2014 Nanjing Youth Olympic Games and 2014 Beijing Asia Pacific Economic Cooperation Conference are investigated to examine the relationship between environmental policies and air quality. Table 1 presents the laws, environmental policies, general planning and specific protective measures that were implemented during these events.

Table 1 The environmental policies and regulations during major social events between 2008 and 2014.

| Events | Related environmental laws and environmental policies | General planning | Specific protective measures |
|----------------------------|---|--|--|
| 2008 Beijing Olympic Games | <ol style="list-style-type: none"> 1.Olympic Games Environment Improvement Work Plan for the Central Government Office in Beijing. 2.Opinion of Engineering Bidding and Construction Approval Management for the Olympic Games Environment. 3.The 2008 Olympic Games Green Car Plan. | <p>Beijing and the surrounding five provinces enacted management and control measures for dust, vehicle, industry and coal plant emissions. During the Olympic Games, Beijing enacted vehicle restrictions, stopped construction and restricted emissions from key enterprises. Tianjin and Hebei temporarily adopted emission reduction measures. Through the cooperation of six provinces, various pollution control measure were implemented to ensure improvement in the air quality during the Olympic Games.</p> | <ol style="list-style-type: none"> 1.Better manage vehicle emissions and encourage green travel. 2.Stop certain partial construction projects and improve roadway sweeping. 3.Halt and restrict production by major polluting enterprises. 4.Reduce emissions from coal-fired plants. 5.Reduce organic waste gas emissions. 6.Implement emergency pollution control measures in extreme adverse weather conditions. |
| 2010 Shanghai World Expo | <ol style="list-style-type: none"> 1.Promote and Guarantee Work for the Shanghai World Expo from the Shanghai Standing Committee of the People's Congress. 2.Shanghai Measures for Administering Dust Pollution Prevention and Control. 3.The Shanghai Boiler Air Pollutant Emission Standard. 4.The Yangtze River Delta Region Environmental Protection Cooperation Agreement. 5.The 2010 Shanghai World Expo Environment Air Quality Safeguard Measures. | <p>The purpose of these measures was to strengthen cooperation in the Yangtze River Delta, rely on the environmental protection departments of Jiangsu, Zhejiang Province and Shanghai and build a united environmental air quality monitoring system to forecast trends over the following 48 hours. Moreover, the measures were also enacted to monitor the emissions of coal-fired plants, important industries, boilers, vehicles and straw burning located within 300 kilometers of the World Expo stadium.</p> | <ol style="list-style-type: none"> 1.Reduce the emission of sulfur dioxide and completely end sulfur removal construction of coal power plants by 2010. 2.Accelerate the removal of old vehicles and promote the management of vehicle environmental protection measures. 3.Accelerate oil and gas recovery in gas stations. 4.Solve the problem of straw burning. 5.Build an environment guarantee work system for the Shanghai World Expo as soon as possible. 6.Close small coal-fired power plants and boiler plants during bad weather. |

| | | | |
|---|---|---|---|
| 2014 Nanjing Youth Olympic Games | 1.Environment Air Quality Safeguard Plan of the Second Summer Youth Olympic Games. 2.2014 Nanjing Youth Olympic Games Environment Safeguard Temporary Work Plan. | To make the youth Olympics “green”, the Environment Air Quality Safeguard Plan of the Second Summer Youth Olympic Games allocated different tasks to 23 cities in the Yangtze River Delta region. | 1.Strengthen the management and control of volatile organic compound emissions from the oil and gas industry. 2.Strengthen the management and control of non-point sources of volatile organic compound emissions. 3.Stop the construction of pile foundations, earth and stone works and dreg transportation starting on July 15, 2014. 4.Stop straw burning. 5.Monitor sulfur removal, denitration and dedusting in the 23 surrounding cities; High quality low-sulfur coal needs to be used in the 23 cities. |
| 2014 Beijing Asia Pacific Economic Cooperation Conference | 1.Environment Air Quality Safeguard Plan of the 2014 Beijing Asia Pacific Economic Cooperation Conference. 2.State Council Action Plan for Air Pollution Prevention and Control. 3.Air Pollution Control Action Plan of Beijing, Tianjin, Hebei and the Surrounding Areas. 4.Beijing Air Pollution Control Regulation. | To guarantee improved air quality during the 2014 Beijing Asia Pacific Economic Cooperation Conference, the government developed the Environment Air Quality Safeguard Plan of the 2014 Beijing Asia Pacific Economic Cooperation Conference and implemented the following action plans: “stop driving”, “stop and restricting production” and “stop construction”. | 1.Reduce the use of vehicles of all party and government offices, social organizations, public institutions and state-owned enterprises by 70%. 2.Prohibit the use of vehicles that are used to transport earth and stone, dregs, and dangerous chemicals. 3.To implement traffic restrictions based on even- and odd-numbered license plates between 3 o'clock to 24 o'clock. 4.Provide the workers of institutions, enterprises and organizations with 6 days of holiday, excluding those working for the 2014 Beijing Asia Pacific Economic Cooperation Conference. 5.Close some power plants. |

Source: Data from the websites of the Ministry of Environmental Protection of the PRC and the local government's Environmental Protection Agency.

Table 1 shows that during the major events analyzed in this study, the government developed related laws, environmental policies, general planning and specific protective measures. Additionally, the quantitative policies, general plans and specific measures aimed at protecting the air quality were mandatory, temporary and indemnificatory. The related laws and environmental policies that were enacted to protect the environment were mandatory, and the general planning guided the government in implementing the specific measures. However, what was the role of these mandatory, temporary, and indemnificatory policies, general plans and specific measures in protecting and improving the air quality?

The air quality index data available on the Ministry of Environmental Protection of the PRC website was only available for a short period of time. Therefore, we used air quality data and straw burning fire point data from remote sensing monitoring that was conducted during the 2014 Nanjing Youth Olympic Games and 2014 Beijing Asia Pacific Economic Cooperation Conference to analyze the relationship between environmental policies and air quality; the results are shown in Table 2.

Table 2. Statistical data for the Beijing air quality grades in 2014.

| Statistical data for the Beijing air quality grades in 2014 | | | | | | | |
|---|-----------|-----------|----------------|--------------------|-------------------|------------------|-------|
| Month | Excellent | Favorable | Mild pollution | Moderate pollution | Serious pollution | Severe pollution | Total |
| 1 | 4 | 8 | 7 | 9 | 2 | 1 | 31 |
| 2 | 2 | 2 | 4 | 0 | 2 | 5 | 15 |
| 3 | 4 | 11 | 5 | 6 | 4 | 1 | 31 |
| 4 | 0 | 13 | 8 | 5 | 4 | 0 | 30 |
| 5 | 2 | 12 | 11 | 6 | 0 | 0 | 31 |
| 6 | 0 | 12 | 10 | 8 | 0 | 0 | 30 |
| 7 | 0 | 9 | 7 | 10 | 5 | 0 | 31 |
| 8 | 1 | 9 | 13 | 8 | 0 | 0 | 31 |
| 9 | 1 | 16 | 9 | 4 | 0 | 0 | 30 |
| 10 | 2 | 13 | 3 | 3 | 6 | 4 | 31 |
| 11 | 3 | 16 | 3 | 2 | 3 | 1 | 28 |
| 12 | 6 | 14 | 3 | 3 | 2 | 0 | 28 |
| Total | 25 | 135 | 83 | 64 | 28 | 0 | 347 |

Source: Website Ministry of Environmental Protection of the PRC.

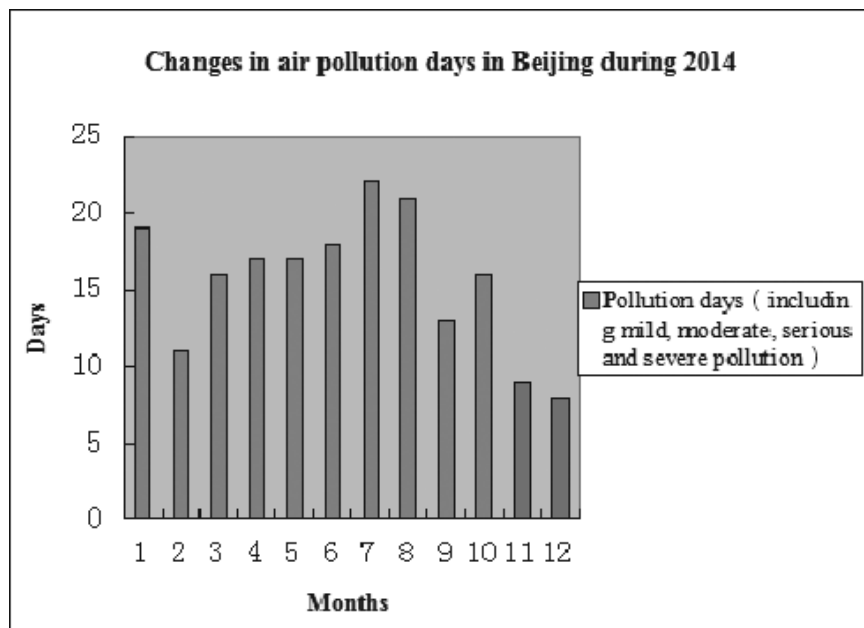


Figure 1. Changes in air pollution days in Beijing during 2014.

Source: Website of the Ministry of Environmental Protection of the PRC.

To ensure that the APEC conference was successful, the central government office in Beijing developed the Environment Air Quality Safeguard Plan for the 2014 Beijing Asia Pacific Economic Cooperation Conference and implemented the following action plans: “reduce vehicular travel”, “stop and restrict production” and “stop construction”. During the APEC conference, the AQI was below 100, which means that the air quality was favorable. In November, there were 16 days on which there was favorable air quality; this was the maximum number of days during the entire year, and either mild or moderate pollution were recorded on a total of 5 days.

As a result of the development and implementation of the Air Pollution Control Action Plan of Beijing, Tianjin, Hebei and the Surrounding Areas, a coordinated effort by Beijing, Tianjin and Hebei was enacted to manage the air quality and control air pollution. The direct result was that during the APEC conference, the air quality was favorable and better than during the other months of the year. The implementation of these environmental policies resulted in profound effects, suggesting that managing and controlling air pollution requires the perseverance and diligence of both central and local governments. Only with such measures can we see the blue sky and beautiful scenery again. The above analysis shows that the command and control measures played a crucial role in the implementation of the mandatory, temporary, and indemnificatory policies, general plans and specific measures. As a result, the air quality greatly improved.

Table 3. Statistical data for the Nanjing air quality grades in 2014.

| Statistical data for the Nanjing air quality grades in 2014. | | | | | | | |
|--|-----------|-----------|----------------|--------------------|-------------------|------------------|-------|
| Month | Excellent | Favorable | Mild pollution | Moderate pollution | Serious pollution | Severe pollution | Total |
| 1 | 0 | 6 | 9 | 5 | 8 | 2 | 30 |
| 2 | 2 | 6 | 6 | 2 | 0 | 0 | 16 |
| 3 | 0 | 16 | 12 | 2 | 1 | 0 | 31 |
| 4 | 2 | 18 | 10 | 0 | 0 | 0 | 30 |
| 5 | 0 | 5 | 21 | 2 | 3 | 0 | 31 |
| 6 | 1 | 9 | 12 | 4 | 4 | 0 | 30 |
| 7 | 2 | 14 | 14 | 1 | 0 | 0 | 31 |
| 8 | 11 | 18 | 2 | 0 | 0 | 0 | 31 |
| 9 | 3 | 21 | 6 | 0 | 0 | 0 | 30 |
| 10 | 0 | 19 | 9 | 3 | 0 | 0 | 31 |
| 11 | 1 | 12 | 9 | 5 | 1 | 0 | 28 |
| 12 | 0 | 19 | 11 | 1 | 0 | 0 | 31 |
| Total | 22 | 163 | 121 | 25 | 17 | 2 | 350 |

Source: Website of the Ministry of Environmental Protection of the PRC.

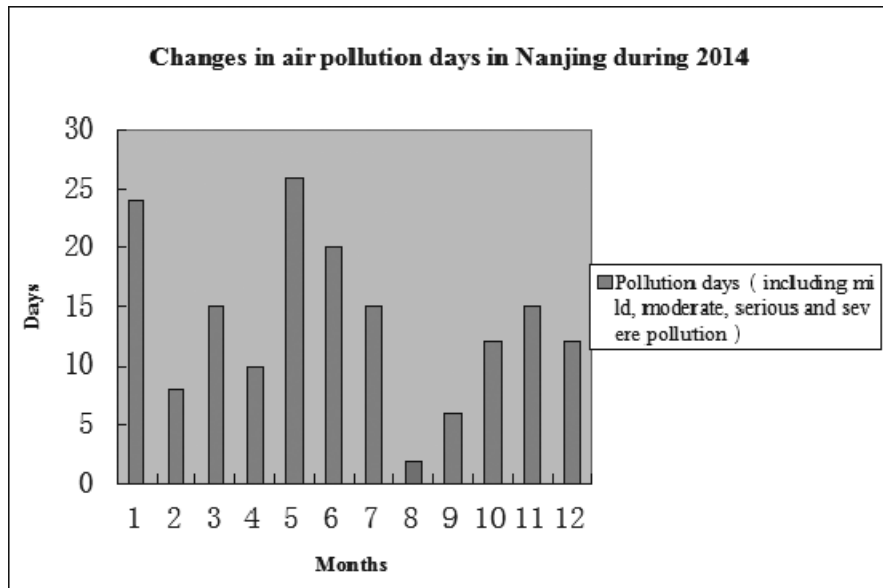


Figure 2. Changes in air pollution days in Nanjing during 2014.

Source: Website of the Ministry of Environmental Protection of the PRC.

The 2014 Nanjing Youth Olympic Games opened on August 16th and ended on August 28th. In September 2014, a group of experts released air quality safeguard data based on the 2014 Nanjing Youth Olympic Games air quality safeguard measures. Figure 2 and Table 3 show that there were 29 days with either excellent or favorable air quality and only 2 days with mild air pollution in August. During this month, the citizens of Nanjing breathed 3764 tons and 1750 tons less PM10 and PM2.5 than usual, representing decreases of 44% and 36%, respectively.

Although the air quality was favorable during the 2014 Nanjing Youth Olympic Games, the air quality during other months in 2014 was not ideal. According to the statistics, there was pollution on half of the days in January 2014. There were 9 days with mild pollution, 5 days with moderate pollution, 8 days with serious pollution and 2 days with severe pollution. During the first half of the year, the air quality standard of Nanjing was reached on 37.6% of the days, and there was severe pollution on 16 days. Based on this data, the air quality of Nanjing was unsatisfactory. However, during the 2014 Nanjing Youth Olympic Games, the Nanjing city government adopted several reasonable and legal measures to quickly improve the air quality of the city. The administrative measures, which included stopping construction, stopping production, restricting vehicular travel based on even- and odd-numbered license plates and forbidding straw burning, greatly improved the air quality compared to the usual severe air quality.

According to the straw burning fire point data from the remote sensing monitoring system (collected from the website of the Ministry of Environmental Protection of the PRC), no fire points were found between July 18, 2014, and September 2, 2014. There were also no fire points observed during August, which was the month that the 2014 Nanjing Youth Olympic Games were held. Thus, the “stopping straw burning” measure was sufficiently and successfully implemented during the 2014 Nanjing Youth Olympic Games. This finding indicates that the command and control measures implemented during

major social events can greatly improve the air quality in China over short periods of time.

4. Conclusions and discussion

Our analysis of the 2008 Beijing Olympic Games, 2010 Shanghai World Expo, 2014 Nanjing Youth Olympic Games and 2014 Beijing Asia Pacific Economic Cooperation Conference showed that implementing environmental policies during major social events is necessary and can significantly improve air quality. The determined implementation of the mandatory, temporary, and indemnificatory policies, general plans and specific measures that were discussed above quickly improved the environmental quality in the respective cities. Meanwhile, the command and control measures played a significant role in the implementation of the environmental policies; however, the law and economic and voluntary measures did not have such an effect. Although we intended to discuss and analyze the relationship between environmental policies and air quality during more social events, our paper is limited to the four major social events that were mentioned above due to limited time for the collection and analysis of the available data. When considering implementation costs and effects, especially compared to mandatory and temporary policies, the implementation of regular and non-obligatory policies requires the use of the law and economic and voluntary measures.

Some scholars have noted that the public's awareness of environmental protection has entered a stage from forced concern to social construction period. The public has already paid more attention to environmental protection not only after exposure to environmental pollution but also before being directly and seriously affected by environmental pollution^[13]. On the one hand, this has increased the public's awareness of environmental protection; on the other hand, the government and decision makers must consider more conditions and restrictions for implementing environmental policies. Thus, environmental policies must be more reasonable, and their implementation needs to be highly efficient. Reducing air pollution requires more communication and cooperation between the government, industry and the public.

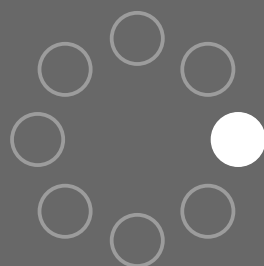
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REGULAR SESSION 2

HEALTH RISK AND
ENVIRONMENTAL JUSTICE



ISESEA-5

Barriers and Possible Path Towards Innovative Risk Governance: EMF Case in Taiwan

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Abstract

A narrow focus on risk is a limited response to incomplete knowledge. It magnifies “social risk” and leaves science advice vulnerable to the social dynamics of groups to manipulation by political pressures seeking legitimacy, justification and blame management. Therefore, there is a need for humility about science-based decisions and to call for a more-equal partnership between social and natural science in policy advice (Stirling, 2010). Like many other types of emerging technologies receiving global attentions, different sources of EMF health risks controversies have been a social problem since early 2000s in Taiwan. These EMF controversies include: local communities protest against construction of mobile phone base stations, high-voltage power lines, substations, weather radars ...etc. In facing challenges of complexity of risk assessment and/or scientific uncertainty, EMF risk controversies in Taiwan reveal the limitation of what the traditional natural sciences and risk assessments can handle. It is critical to examine the dynamics of expertise and how the authoritative technocratic expert politic or a hidden, delayed tech risk society (Chou 2000) has constructed a more vulnerable risk culture and regulative culture. Utilizing qualitative approach with secondary data analysis and in-depth interviews with public health experts, technocrats and citizens, and focus group discussion on scientific uncertainty of EMF, precautionary principle and risk governance innovation, the author first inquires patterns and limitations of risk communication of technocrats and industry, and investigates the framings of scientific knowledge embedded behind risk perceptions of varied social actors. Then, the author probes into the technocrats’ view points on public participation in technology decision-making. It is found that due to technical complexity, formation of current EMF protection regulation is still dominated by expert-centrism and technocracy, based on the belief that these are

supposed to be exclusive realm of technical experts. The author reflects upon questions surrounding the prospects and limitations for democratization of expertise within the deliberative forum of expert panel meetings and two focus groups in Taiwan. Finally, the author discusses some challenges of democratization of expertise in this Taiwan case and then proposes possible path towards innovative risk governance involving the public and with partnership between social and natural science in policy advice of EMF risk governance.

Key words

EMF, risk governance, uncertainty, precautionary principle, Taiwan

1. Introduction

A narrow focus on risk is a limited response to incomplete knowledge. It magnifies “social risk” and leaves science advice vulnerable to the social dynamics of groups to manipulation by political pressures seeking legitimacy, justification and blame management. Therefore, there is a need for humility about science-based decisions and to call for a more-equal partnership between social and natural science in policy advice (Stirling, 2010). Like many other types of emerging technologies receiving global attentions, different sources of EMF health risks controversies have been a social problem in Taiwan since early 2000s. For example, due to the public is quite concerned for EMF health risks, during January to November 2005, about 22,000 local protests against mobile phone base station took place, which led to 400 base stations had been demolished and resulted in monetary cost. In 2010 the Ministry of Education promoted the e-book program, which drew a great social concerns regarding exposing young children with excess non-ionizing radiation in their daily learning environment. One of the significant EMF health risk controversies drew social attention is Chigu weather radar in southern Taiwan (Kao, 2012). Other sources of EMF risk controversies come from E-tag...etc.

In facing challenges of complexity of risk assessment and/or scientific uncertainty, EMF risk controversies in Taiwan reveal the limitation of what the traditional natural sciences and risk assessments can handle. The author argues that the EMF controversy is not a question of pure science, but involved with uncertainty and complicated interactions of technical-social systems, including health, ethical, economic and social concerns. It is critical to examine the dynamics of expertise and how the authoritative technocratic expert politic or a hidden, delayed tech risk society (Chou, 2000) has constructed a more vulnerable risk culture and regulative culture.

In this article, the author, through a qualitative research approach, investigates EMF risk controversies in Taiwan, reflects upon questions surrounding the prospects and limitations for democratization of expertise and examines the dynamics of expertise and the transformation of how politics of expert authority permeating deliberation within the deliberative forum of expert panel meetings in Taiwan.

2. Methods of Data Collection

The author has employed three major methods to collect varied data.

2.1. Documentary data:

Varied forms of documentary data were collected during January 2000 up to June 2015. They include: newspapers account, governmental documents, transcripts of one public hearing in 2008, and two experts panel meetings in 2011 and 2012 among telecommunication technology and power industry, NGOs, and public health experts. In addition, information provided on the websites of the Environmental Protection Administration (EPA) in Taiwan, National Communication Commission (NCC) in Taiwan, Health Promotion Administration, Ministry of Health and Welfare in Taiwan, WHO, ICNIRP ...etc. are also analyzed.

2.2. In-depth interview:

The author conducted 10 in-depth interviews with technocrats and public health experts to understand framings of scientific knowledge embedded behind their risk perceptions.

2.3. Focus group:

Two focus groups with technocrats, public health experts and NGOs were conducted on May 29th and July 7th 2015 to discuss precautionary principle measure and possibility and limitation of employing innovative risk governance design and related issues.

3. Patterns and Limitations of EMF Risk Communication:

As EMF risk controversies began to draw societal attentions and varied local protections against mobile phone base stations, high-voltage power transmission line and substations in early 2000s. The technocrats' EMF risk communication patterns could be characterized into two stages. The first stage is between 2005 and March 2012. The second stage began from March 2012 to 2015. What divided these two stages is the expert panel meeting of March 27th 2012 mentioned in Section 3. Patterns and limitations of EMF risk communications are briefly presented in Table 1.

Table 1: Patterns and Limitations of EMF Risk Communication in Taiwan

| 2005-2012 | 2012-2015 |
|--|--|
| One way / propaganda. | Recognize scientific uncertainty of EMF risk. |
| Selectively presented EMF related risk information in literatures of WHO & ICNIRP. | Emphasize Taiwan adopts international protection measures. |
| No differentiation between acute exposure and long-term exposure. | Begin to provide a more balanced views on international literatures. |

4. Contested Expertise

In order to respond social demands to clarify interpretation of wordings in EMF regulation in Taiwan, the EPA called two expert panel meetings. One was on June 17th 2011, the other was on March 27th 2012. The first meeting – “Consultation panel of precautionary mechanism and risk assessment for non-ionizing radiation” consisted of 11 members with expertise from fields of public

health, telecommunication technology, electronic engineering and, including 6 experts of EPA's risk assessment committee for non-ionizing radiation and one congresswoman. Right at the beginning of discussion, composition of this expert panel was challenged. One of the members of EPA's risk assessment for non-ionizing radiation committee was with interest conflict. This member H was with many hats – he was general secretary of Taiwan telecommunication industry association, national science advisory board member, and also served in EPA's risk assessment committee for non-ionizing radiation. In the meeting, one panel member G suggested H to resign from EPA's risk assessment committee for non-ionizing radiation to avoid interest conflict. In addition, the goal of this expert panel meeting was to discuss health risk or for policy-making should be clarified. Expert panel member, J, a public health expert expressed that the discussion of precautionary mechanism should focus on health risk and the current panel composition was not appropriate. J suggested to have enough percentage of public health experts in the composition of the panel for precautionary mechanism was important. At the end, it was decided that discussion for precautionary mechanism and risk assessment for EMF should focus on health risk, instead of policy-making, and concluded that the composition of the next expert panel meeting should have experts from public health or related fields.

The second expert panel meeting was hold on March 27th 2012 to discuss whether the term of “non-ionizing radiation environmental suggested criteria” (環境建議值) is appropriate or not in Taiwan EPA's regulation for EMF? In the first phase of this expert panel discussion, two camps of expertise, namely telecommunication technology and environmental groups including medical doctors took turn to address their viewpoints. How scientific knowledge had been framed in a contested way is analyzed in the next section.

4.1. Contested Framing of Scientific Knowledge

4.1.1. Technocrats & Industries

Representatives from telecommunication technology stressed there's no need to emphasize the translation of ICNIRP 2010 guideline for basic restriction as “acute/short term” exposure because it is indeed meant for short-term. In addition, they framed that the effects of EMF long-term exposure have not been an issue among the international scientific communities. As one presentative from power industry stated:

“... ‘the Environmental suggested value’ refers to the limit of ‘acute’ exposure. There is no need to give special emphasis ...The concern regarding effects of long-term exposure has not been confirmed by the scientific community. Therefore, it ‘can not and does not need to’ establish long-term exposure standards.”

This statement later in the second phase of the expert panel meeting were criticized by a couple of experts from public health as a wrong statement. As one leading public health expert in Taiwan said:

“Today, the wording of Professor Wu from Jiaotong University, as the representative from the power industry, should be careful ... Scientifically speaking, there is no doubt concerning acute exposure. The

concern of “long-term exposure” is not “unscientific.” I want to emphasize that “it is not unscientific.” If you say it is unscientific, you are saying epidemiology unscientific. This is wrong. “Long-term exposure” as one type of issue, varied from short-term exposure, and it’s more difficult to conduct study. Long-term exposure is unlike acute exposure easily to be studied. This is the nature of research. Rather than to say one is science, the other is called non-science. Such a statement is misleading people.”

In addition, the industry and technocrats emphasized that “ICNIRP guideline’s exposure limits have been embedded multiple safety factor and it’s not in relation to cancer. Therefore, it ‘does not need to and should not’ add additional safety factor.” (2nd expert panel meeting minute). Furthermore, both industries and technocrats highly hold the scientific authority of ICNIRP, shown in the statement of one representative of power industry below:

“ICNIRP has been appointed by the World Health Organization (WHO) and the International Labor Organization (ILO) as the international non-ionizing radiation exposure standard-setting institute, their professionalism and impartiality should not be suspected. ICNIRP’s exposure guidelines represent the overall consensus and progress of the international scientific community according to the latest updates of scientific research.”

4.1.2. Civil Society

Civil society (representative from impacted communities) challenged the rhetoric of “scientific approach” by indicating gaps that current literatures may not fully cover in EMF risk controversy. For example, one community representative said:

“If we want to seriously consider EMF risk issue from scientific point of view, we also must strictly take the following factors into accounts, such as varied lifestyles, mobility, and in some cases that their EMF exposures are much heavier ... Currently, it seems to me that we use a hypocrite way to treat this issue, utilizing information deriving from the majority of people and saying there’s no impact to people’s health. Then, to say this is a scientific approach, from my view point, it’s not objective”

In addition, “scientific dimension” in relation to EMF risk controversy is important, risk perception of the public is equally critical. As the following statement from one community representative revealed:

“The dimension of pollution prevention and control involves a wide range. In addition to the scientific evidence that we stress in the upstream level, it may involve the actual biological effects or harm to human body, which is mainly related to the public health or biomedicine. The other critical issue has to do with the public’s perception If today we are to talk about policy or regulation, we must have the general public involvement in this discussion, because the general public is those who will be greatly impacted by the policy. The issue of the long-term EMF exposure has caused the people do not trust the government, resulting in people’s social anxiety. Under this condition, the feelings of the people is very important.”

4.1.3. Public Health Experts

In the second phase of the expert panel meeting discussion, several public health experts pointed out that in fact international literatures clearly state that exposure limit refers to the short-term acute effect. The current evidence is insufficient to set up a quantitative standard for protection from long-term exposure. In this case, it is not an issue of pure science any more, but a question of regulation and policy, which solely employing scientific evidence to support argument is insufficient. The wording of current EMF regulation in Taiwan does not clarify exposure limit as long-term or short-term exposure. Literatures from ICNIRP and WHO are all meant for short-term exposure. Therefore, they suggest current regulation should clearly state exposure limit applies only to the case of short-term exposure. In addition, a number of public health experts indicated the precautionary principle has not been mentioned in the current regulation. EPA should take up the responsibility to implement precautionary principle into current regulation in addition to clarify current regulation is for acute exposure. If precautionary principle is implemented, it is necessary for the industry to take protection measure into consideration and communicate with community before EMF-emission facilities are constructed.

As a result of extended discussion among a group of public health experts during this expert panel meeting, the term of “environmental suggested criteria” in EPA regulation was removed and replaced by literal translation, with the wording of acute exposure in the regulation.

5. Technocrat’s View on Public Participation in EMF Risk Governance

Due to technical complexity, technocrats in Taiwan holds the belief that risk assessment should be exclusively a realm of technical or professional experts. It is emphasized that “Expert Panel Meeting” is an effective tool to solve risk controversies. Therefore, the current EMF regulation is still dominated by expert-centrism and technocracy.

6. Is Expert Panel Meeting An Antidote?

Recent years, the form of expert panels has been widely used by EPA in Taiwan to solve varied environmental controversies. The EPA considers the expert panels as an innovation tool to increase public participation in varied controversies over environmental or health risk issues, including this case of EMF controversies over weather radar and other sources of EMF. Considering the format and procedures of these expert panel meetings, views from two different camps over certain controversial issues are presented in the first phase, then in the second phase experts of specific field give their feedbacks and perspectives towards particular controversial issue. Through their discussion, consensus is reached. This form of deliberation is limited in public participation as it does not give opportunity for citizens to ask questions or dialog with the experts in the second phase.

In addition, I think democratizing expertise is as much a learning experience for experts as it is for citizens. Although, a number of public health experts indicated that scientific uncertainty and complexity of conducting research in the field of long-term exposure and considered precautionary protection measures as important in EMF regulation. Unfortunately, according to my interview with

public health experts in the expert panel, a number of them expressed little appreciation of citizens' perspectives, such as taking dimension of risk perception into consideration, to have more public participation in risk analysis ...etc. On the contrary, they expressed how apparently these citizens "believe what they claim is true as a faith." Or they show no interests to consider the EMF field may be witnessing one of those shifts in prevailing paradigms that Thomas Kuhn (1962) pointed out or the approach of so-called "post-normal science" to deal with current EMF risk controversies in Taiwan. These public health experts are holding linear, "normal science" mindset. On this level, I think democratizing expertise is as much a learning experience for experts as it is for citizens.

7. Possible Path Towards Innovative Risk Governance

Findings in EMF risk controversy in Taiwan reflect that when the government, from time to time, improperly manages risk events in various decision-making processes, the public's confidence in the government administration fall (Löfstedt, 2002). Scholars (Beck, 1999; Kasperson, 1992) have pointed out that the public's risk perception is a complex, subjective and social construction process, so the actions and responses of the government, media and social movement groups to risk events is critical. In addition, Savadori (2007) pointed out the importance of communication of information, as the efficiency of information communication will affect people in their risk assessment and judgments. It is possible for people to lose their trust in the system if the government cannot manage risk and disputes effectively, such as failing to provide more scientific facts, simplifying the uncertainty and ambiguity of scientific findings in order to attenuate risk perceptions (Kao, 2008), or considering the stakeholders, particularly the public or the impacted population, as irrational / ignorant without engaging with them over the courses of risk assessment and risk communication. Unfortunately, nowadays technological complexity often is used as a main weapon to deal with "NIMBYism." When policy decision makers face various incidences of risk controversies, they often rush to carry out the implementation of its authority on the grounds of a high degree of complexity of environmental issues and/or lack of technology and resources to tackle problems. Conversely, under a certain amount of pressure and time limitations to make decision, the technocrat, in order to reach a compromise, often combines scientific and political decision-making (Jasanoff, 1990). The EMF risk controversies across from varied local communities have been enhanced because the local community was not sufficiently included in further scientific inquiry and the decision-making process of risk governance. Taiwan has extremely high population density. Facing growing constructions of facilities of EMF sources and mobile phone usages, it presents a good opportunity for the risk regulators and/or risk management agencies as well as risk analysis researchers to further investigate the health effects of exposure to daily long-term EMF. At the very least, protective measures should have been implemented in the EMF regulation. Sadly, risk management agencies in Taiwan failed in terms of competent risk management/governance.

Science can provide important information, but cannot determine correct policies. It is the uncertainties, which dictate and demand the reference to explicit values. Therefore, it's critical to enhance public participation in risk analysis and to collectively make choices over innovation

pathways of risk governance, particularly for the issues relevant to potential hazards that are emerging from non-ionizing radiations arising from the usage of mobile phones and power lines ... etc. Societies should be with humility in the face of scientific uncertainty and ignorance, with wise application of the precautionary principle to anticipate and minimize potential hazards. One of the antidotes to this challenge is to move in the direction of having an "extended peer community" with some degree of legitimacy and influence. Varied policy tools could be applied to go beyond the current model of expert-panel meeting in Taiwan. These include "citizen juries," "focus groups," "consensus conferences," or "stakeholder forums," ...etc. These must be included in the risk governance systems and operate so as to encourage dialogue and foster mutual respect. When stakeholders are involved in a specific issue, either as laypersons or counter-experts, they are treated as potential peers, sharing the definition and management of a problem. Additionally, they can contribute resources of local knowledge and understanding which complement the generalized knowledge of scientists or technocrats. Therefore, mechanism and designs of involving extended peer communities into the implementation of a program for "knowledge assessment" is vital, as cultivating mutual trust is central to this new model of participatory risk governance in relation to risks and environmental or health hazards.

The current condition of separations between technical, social, and ethical dimensions of a particular controversies is with limitations for democratizing expertise. We should stimulate more participatory risk analysis and governance, to employ more realistic and transparent systems of scientific inquiry in those areas which need more knowledge to fill in gaps of current EMF related investigation. Even in the discussion of health effects of EMF, a wide range of expert selections to prevent any homogenization of expert panels is rather critical. This could broaden scope of risk governance to create a more socially and scientifically robust assessment—that is with transparency and more stakeholders' involvement, especially at the crucial problem framing stage.

Facing three main scenarios with EMF, particularly with the RF from mobile phone (Gee, 2009: 13). One is where much avoidable harm was not prevented. Two, is where precautionary actions to reduce EMF exposure avert much potential harm, and stimulating more sustainable innovation in the production and use of the mobile phone technologies and energy systems. Three is where such precautionary actions to reduce exposures are taken but they turn out to have been unnecessary, if reasonable, given the state of knowledge today. I think this is a question the whole society must face and make a choice together through deliberation. This is not solely scientific question as I already emphasize, but a challenge and re-negotiation of varied boundaries in conventional governance model.

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Fukushima Disaster and Organic Farmer

A Case Study of "Rumor Damage"

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Abstract

The purpose of this research is to describe damage of organic farmers, which were brought about by the disaster of Fukushima nuclear plant in 2011.

Organic farming has played a symbolic role as a "safe" alternative farming method against risk of artificial chemicals of modern agricultural technology. However, radioactive materials from Fukushima nuclear plant brought high uncertainty to agricultural products and seriously affected organic farms which should be "safer" than conventional farming. Most of organic farmers around Fukushima lost 30 percent of customers. However, not all of their products were polluted by radioactive materials and their damage was partly based on precautionous attitude. Therefore it could be called "rumor damage".

Based on questionnaire survey for customer of organic vegetables, this research points out factors which affect their attitude to keep on consuming against "rumor" or not. The result shows that there are no significant effect according demographic attribute, including with and age of children.

It is also made clear that there are two factors which influence customers' decision. One is a degree of proactive actions, which correlates with dependency on media, for what they think would reduce the risk of exposure. The other is a personal connection and trust between farmers and consumers, which effects to reduce a sense of risk.

It would be stated as conclusion that those who had been seeking for "risk-free" food were amenable to the media and reacted to the issue of radioactive material. This coevolution between people's idea of risk and risk information contrast the "trust" shown by some consumers. We focus on this kind of non-rational attitude as a possible solution for "risk" and illustrate how "trust" has been constructed.

Environmental Social Exclusion and Double Invisibility of Multiple Chemical Sensibility (MCS) Sufferers

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Abstract

It is estimated that there are nearly one million sufferers of multiple chemical sensitivity (MCS) in contemporary Japan. Although the number is almost equivalent to that of the rheumatism, the existence of MCS patients is much less visible and less salient in daily social life. This presentation is an environmental sociological attempt to analyze the cause of the invisibility and, as the result, social victimization or exclusion of these MCS patients through both quantitative and qualitative research.

One of the keywords here is “double invisibility” of MCS sufferers. MCS as environmental pollution induced disease contrast significantly with typical industrial pollution disease like that of Minamata mercury poisoning. Both the causes and the symptoms of MCS include wide range of toxic chemicals and the symptoms vary from one patient to another. However, every MCS sufferers has common problems that they have grave difficulty to mingle with people as the symptoms appear from every chemicals in the social sphere. This is the first reason why they become “invisible” from ordinary people and social life. Minamata sufferers have filed the lawsuits against the responsible factory repeatedly, whereas the MCS patients cannot target specific responsible parties as the causes are so diverse and, in this sense, considerably “invisible”. The “double invisibility” makes it difficult for the patients to carry out socially recognizable actions.

Yet, the symptoms of MCS have seriously troubled the sufferers no less than other pollution victims have suffered. Not only physical symptoms but also social misunderstanding or prejudice has sometimes driven them out of workplaces and schools. MCS symptoms often invalidate the patients to behave normally at office or at school and some of able-bodied persons recognize them as lazy or lacking motivation. Along with “double invisibility”, the lack of understanding often leads the patients to “socially excluded” situation in workplaces or at school.

This paper describes the actual condition that the patients have faced through an opinion survey conducted in 2012 and attempted to analyze sociological difficulty when they construct the issue as a

socially acknowledged “environmental problem”. The findings shows that the situation MCS patients face is to find ways to ameliorate their private living condition at home for the time being rather than to reduce overall threat of toxic chemicals in our community or society at large. Nevertheless, majority of patients are aware that administrative and social support, information disclosure of chemical hazard, reconsideration of lifestyle, etc. are necessary.

1. Introduction: An outline of problematization of MCS in Japan

I have researched on environmental movements, environmental justice movements addressing disproportionate allocation of toxic chemicals, in particular. When I attended lectures on chemical issues a decade ago or so, I noticed that one of the most salient and keen participants are Multiple Chemical Sensitivity (MCS) patients. I recognized MCS patients with thick mask tightly on or choosing places to sit very carefully to avoid smell of chemicals such as synthetic detergent or shampoo from other participants.

It is quite understandable that they desperately need the regulatory policies for toxic chemical phase-out because they show the MCS symptoms when they expose to even very small amount of chemicals such as pesticides, detergents, solvents, plastics, synthetic fabrics, smoke, ink, perfumes, and so on. [1] The symptoms vary from patients to patients, including headaches, itchy eyes, fatigue, nausea, diarrhea, muscle pain, difficult breathing, palpitation of the heart, irregular pulses, loss of memory, etc. The diversity of MCS symptoms and vague demarcation with other illness, as well as diversity of the chemicals that cause MCS, makes it extraordinarily difficult for doctors to diagnose properly and immediately.

According to Dr. Satoshi Ishikawa (MD), one of the leading proponents, allergist T. Randolph was the first to propose the symptoms of “chemical sensitivity” in the 1950s. MCS was known to the public only in the mid-1990s in Japan, when so-called “sick building (or sick house, sick school) syndromes” became a social problem and attracted significant media attention. Sick building syndrome is a kind of MCS caused primarily by formaldehyde in, for example, plywood board and glue in newly built houses. Approximately 60% of MCS patients develop the symptoms triggered by sick building syndromes (CSSC, 2005). The number of MCS patients is estimated around 700 thousands or 0.7% of the population in Japan (Ishikawa, 2009). However, in the U.S. where industrialization started earlier than Japan, the number is estimated 2 to 15% (*ibid.*).

Another incident that made the word MCS notorious was “Suginami Disease” in 1996. Several hundred residents living near a newly built municipal plastic solid waste crushing facility in suburban Tokyo developed MCS symptoms (Haraguchi, 2003). The dispute over the cause of MCS like symptoms was referred to the Pollution Arbitration Committee in 1997. The Committee decided that the solid waste facility was the cause of the sufferings. This was the first, epoch-making arbitration decision on MCS in Japan, although the Committee admitted only during a limited period of time. (Haraguchi, 2003)

In addition, residents in rural area, school children in particular, suffered MCS from rice paddy pesticides sprayed by helicopters. Some school children also showed the symptoms when they exposed

to wax on the floor containing organophosphate pesticides. Approximately 20% of MCS are estimated due to pesticides and agricultural chemicals.

These events became sensational because thousands of families that moved to their newly built houses got sick and had to evacuate from their precious homes. Some of them with serious MCS symptoms had to move to remote area with full of natural environment to remedy MCS. They can be said a sort of “environmental refugees” because they had to leave their home sweet homes, family, and home town, to quit their jobs giving up their work careers just to cure MCS. MCS patients are excluded from many aspects of social life such as meeting people, using public transportation, eating ordinary foods, reading books or newspapers (due to ink), using medical care (due to medical chemicals), and living in own homes. It is so ironical and serious that patients cannot go to hospitals and school children cannot go to school. MCS patients are deprived of the very basic life chances under “environmental exclusion from social life” now.

Another grave issue is that MCS has not been recognized as physical syndrome and in many cases treated as psychological disorder. This misunderstanding gives another pain to the patients. When patients feel symptoms like fatigue or inertia from some chemicals, people around them in the work places and at home think they are lazy or neglecting their work. This leads the patients to difficult situation in the office and at home. Therefore, many patients are actually losing jobs or getting apart from their spouse. These are the typical “victimizing structures” (Iijima, 1984) of MCS patients.

MCS sufferers have been excluded in our society from enough medical recognition and care, from social or administrative recognition and support, from family support, from job opportunity and education, and from continuing their normal livelihood in their communities. It is quite natural for them to organize themselves to pressure the Government to take effective measures on MCS sufferings and ultimately to promote more stringent policies for reduction of risks from toxic chemicals on the basis of “precautionary principles”. Realizing a toxic chemical-free society is the only solution for them.

However, taking actions is not easy for the sufferers because, at first, they have to tackle with the causes of their own MCS at home to recover their health. As the causes, circumstance, and symptoms vary patient to patient, they sometimes have difficulty to even share the same social objectives to construct MCS as a social problem. The purpose of the opinion survey is to analyze the difficult situation they face.

2. The outline of survey and respondents’ perception of MCS

Table 1. Profiles of the respondents (%)

| Sex | | Age | |
|---------------------|------|------------|------|
| Male | 10.6 | 20 – 29 | 3.2 |
| Female | 88.7 | 30 – 39 | 10.5 |
| | | 40 – 49 | 26.5 |
| Marital Status | | 50 – 59 | 27.5 |
| Single | 25.9 | 60 – 69 | 24.1 |
| Married | 63.7 | 70 or more | 7.5 |
| Married in the past | 9.8 | | |

The opinion survey for MCS patients was carried out in January 2012 on 1,200 MCS patients who were registered as members of the Center for Supporting Chemical Sensitivity (Patients), a nation-wide non-profit organization for supporting MCS patients. [3] The questionnaires were sent by postal mail and 664 respondents (55.3%) returned the questionnaires.

One of the demographic feature of the respondents is, as Table 1 shows, the facts that 88.7% are female. Females are said to be more vulnerable in general to toxicants and chemicals. Female prevalence in MCS patients as such typically exemplify the case. Majority of the patients are middle aged (40s to 60s) women, typically housewives.

Table 2. Estimated causes that triggered respondents' MCS symptoms (Multiple answers) (%)

| | |
|--|------|
| 1. Newly built houses, house reform, or moving in new houses | 64.0 |
| 2. Usage of pesticides for termites and other chemicals at home | 50.2 |
| 3. Usage of chemicals at workplaces or at school | 34.4 |
| 4. Spraying pesticides and herbicides in respondents' neighborhood | 30.5 |
| 5. Newly built or reformed workplaces and schools | 26.2 |
| 6. Dental treatment | 26.0 |
| 7. Medical treatment or taking medicines | 17.0 |
| 8. Electro-magnetic waves at home or in neighborhood | 17.0 |

As we see in Table 2, 64.0% of the respondents estimated "(moving into) newly constructed house" is the most common cause or trigger of the onset of their MCS. The estimated causes are followed by "insecticides used at home" (50.2%), "toxic chemicals used at workplace or school" (34.4%), "pesticide spraying in the neighborhood" (30.5), "newly constructed buildings at workplace or school" (26.2%), "dental treatment" (26.1) and so on. Compared with the data in the early 2000 in which "sick buildings" were prevalent as the cause of MCS, pesticides and other chemicals seems to have more impact relatively in our data.

Yet, another reason why majority of MCS patients are housewives would be hypothesized that middle-aged women as housewives spend most of their time at home. And in case the house is newly built one with higher concentration of, for example, formaldehyde, they are more likely to suffer MCS.

It is a shocking and ironical fact that dental and other medical treatment often triggered MCS. It would be even more ironic that not only those patients who were treated at dental clinic or hospital become MCS, but also quite a few medical professionals such as doctors, nurses, and medical technicians suffered MCS too according to the respondents' specification of their occupations. As 34.4% of respondents answered that chemicals used at their workplaces triggered MCS, not only medical professionals but also various factory workers, laboratory researchers, construction workers and carpenters, and even some of office workers working with chemicals are threatened too.

Table 3. "How long did it take to be diagnosed properly as MCS?" (%)

| | |
|-----------------------|------|
| 1. Immediately | 28.2 |
| 2. Less than 1 year | 17.7 |
| 3. 1 to 5 years | 21.3 |
| 4. 5 to 10 years | 10.7 |
| 5. More than 10 years | 13.0 |

The first difficulty for MCS patients is to become aware of being MCS. Everyone can notice something wrong with their body when they become poor physical condition, however, very few think of MCS or even most of them never heard of MCS. Neither do the doctors. As Table 3 shows, only 28.2% of respondents were diagnosed as MCS immediately. The rest of MCS patients had to visit several hospitals for some years until they were finally diagnosed as MCS.

Table 4. "Have you been diagnosed wrongly before diagnosed as MCS?" (Multiple answers) (%)

| | |
|--|------|
| 1. Dysautonomia or general malaise (自律神経失調、不定愁訴) | 40.1 |
| 2. Others | 29.3 |
| 3. Psychogenic disorder (心因性障害) | 24.0 |
| 4. Postmenopausal syndrome (更年期障害) | 17.6 |
| 5. Depression (鬱病) | 15.8 |

In the meantime, they were often wrongly diagnosed as dysautonomia or general malaise (40.1%), psychogenic disorder (24.0%), postmenopausal syndrome (17.6%), and depression (15.8%). We can guess a lot of middle-aged women see doctors to complain of series of menopausal syndromes and the doctors may not think of MCS with their preoccupation on complaint of middle-aged women. Meanwhile, it may be natural that complaint from younger working men and women is in many cases interpreted by doctors as mental disorder from stressful working condition. However, MCS patients have been treated inappropriately by the doctors for some years with wrong prescription that even worsened their MCS symptoms.

Table 5. "How did you feel when you were diagnosed as MCS?" (Multiple answers) (%)

| | |
|--|-------------|
| 1. I understood and persuaded myself that I suffered from MCS | <u>69.1</u> |
| 2. I became anxious about my work life and family life in the future | 57.6 |
| 3. I felt hopeless and depressed about the difficulty to cure | 47.8 |
| 4. I felt positive that I can fix my objectives to cure and to adjust myself | <u>37.1</u> |
| 5. I became concerned that my family might also suffer from MCS | 30.6 |

Table 5 is the result of the question asking MCS patients' feelings when they were first diagnosed as MCS. We expected more respondents would choose negative answers but more respondents than expected reacted rather positively: "I understood that I suffered from MCS" (69.1%). This illustrates that the fact that they were finally diagnosed correctly and they felt they emerged from the long and dark tunnel at last. However, when they came to themselves, they faced miserable reality that there were no ways to cure MCS except for discharging toxic chemicals for a long time to remedy the symptoms. Younger patients tend to be more pessimistic than the middle-aged, supposedly because they are responsible and have to support their family and children for a longer time than the aged.

Table 6. Symptoms of MCS by sites of body (Multiple answers) (%)

| Symptoms by sites | At the beginning of MCS | After MCS becomes serious | At present |
|---------------------------------------|-------------------------|---------------------------|------------|
| 1. Eye | 52.2 | 73.3 | 64.6 |
| 2. Ear | 35.1 | 65.9 | 59.1 |
| 3. Mouth, throat | 49.8 | 55.2 | 45.2 |
| 4. Nose | 67.1 | 84.3 | 79.9 |
| 5. Respiratory and circulatory organs | 54.1 | 75.9 | 57.2 |
| 6. Digestive and urinary organs | 50.7 | 66.2 | 55.2 |
| 7. Skin | 49.5 | 66.8 | 63.0 |
| 8. Muscle and joints | 40.6 | 64.7 | 53.7 |
| 9. Gynecological symptoms | 29.4 | 38.2 | 26.4 |
| 10. Nervous systems | 72.4 | 88.8 | 73.5 |
| 11. Mental disorders | 62.3 | 88.4 | 68.6 |
| 12. Electro-magnetic sensitivity | 16.7 | 58.2 | 54.8 |
| 13. Others | 22.9 | 35.4 | 29.7 |

Table 6 indicates where in the sites of the body the patients have trouble with MCS symptoms. It indicates that MCS symptoms occur almost every part of the body. Although no tables are attached here, there are some causes that correlate the sites of body. However, the correlation occurs only sporadically and inconsistently so that we can imagine doctors would have significant difficulty to diagnose accurately. Table 6 also tells us that symptoms never calmed down even after they recovered more or less. The patients not only have to bear the burden of the symptoms but also the physical burden leads to their social difficulty as we see in the next section.

3. “Inexistency” and “invisibility” of MCS and social exclusion

Table 7. Causes of family trouble from MCS (Multiple answers) (%)

| | | | | |
|--|------|------|--------|-------------|
| 1. Frustration and the glooms from poor physical condition | | | | <u>54.9</u> |
| 2. Uncooperative attitude of family in changing living condition | | | | <u>44.6</u> |
| 3. Poor physical condition is regarded as laziness by family members | | | | 29.6 |
| 4. MCS symptoms are regarded as the result of physical weakness | | | | 28.8 |
| 5. Insufficiencies of housework and/or childcare | | | | 25.5 |
| | Male | 5.7 | Female | 27.8 |
| 6. Employment separation or reduction of working hours | | | | 21.1 |
| | Male | 35.7 | Female | 19.8 |

Among hardships for MCS patients, the most heartbreaking one is the facts that they are frequently misunderstood by others including their own family. It may be natural that non-MCS persons can hardly understand the agony that MCS patients suffer, not from heavy metals or SO_x, but from minuscule amount of household chemicals like detergent and shampoo. Table 7 indicates that more than half of the respondents have had troubles with other family members concerning MCS sufferings.

Most common cases would be the situation in which MCS patients cannot play their family role due to their poor health condition and feel guilty and gloomy about the future. Female respondents are more concerned about their insufficient performance in housework and male respondents are more concerned about employment. Also the patients often feel disappointed when others misunderstand or regard inaction of the patients as laziness. In addition, MCS patients sometimes experience psychological instability to control their emotion or temper affected by some of the chemicals. Quite a few patients confessed that they became shorter tempered than before. This may be another reason why they experience more frequent argument with family members or friends.

In short, MCS symptoms, including both physical inactivity and emotional instability, tend to be perceived by others as patients' personal disposition or character such as laziness or irritability rather than health damage from toxic chemicals. As the result, MCS patients are frequently not regarded as the victims of chemicals substances but rather as peculiar type of persons. And MCS as an environmental illness is rather difficult to be recognized and highly “invisible”.

Table 8. Difficulties in daily life and social life (Multiple answers) (%)

| | |
|--|------|
| 1. Difficult to attend social events and gatherings (weddings, funerals, etc.) | 74.8 |
| 2. Unable to go to beauty salons | 64.7 |
| 3. Unable to use public transportations | 59.0 |
| 4. Difficult to go and see doctors illness other than MCS | 56.3 |
| 5. Difficult to see friends | 53.4 |
| Age Under 49: <u>57.1</u> 50-59: 53.6 Over 60: 49.3 | |
| 6. Difficult to go and see dentists | 53.1 |
| 7. Difficult to be understood by others and MCS patients are regarded as lazy | 50.7 |
| Age Under 49: <u>55.2</u> 50-59: 51.4 Over 60: 45.0 | |
| 8. Difficult to read newspapers and books | 44.0 |
| 9. Unable to use home electrical appliances and information devices | 42.8 |
| 10. Difficult to find eatable food (organic and additive-free) | 42.2 |
| 11. Difficult to take care of sick family and aged parents | 36.8 |
| 12. Difficult to find wearable clothes and shoes | 36.3 |
| 13. Economic difficulty due to job separation or changing jobs | 31.8 |
| Age Under 49: <u>48.5</u> 50-59: 31.1 Over 60: 11.0 | |

Not only MCS symptoms affect their family life but also it limited patients' social activities and life chances significantly. As Table 8 indicates, MCS symptoms have difficulties to attend gatherings and social events, to use public transportations, to be treated at hospitals, to be educated at school, to use electrical devices including information terminals, and to work for enough income to live on. Younger patients tend to be more concerned about this life chance limitation.

Nevertheless, nearly half of respondents, younger patients in particular, experienced job separation or job displacement and living in separate house from family due to their sensitivity to chemicals (no tables attached). In general, handicapped persons have had more equal opportunity to work and learn at offices and at school, with, for example, development of wheelchair access paths. "Wheelchair access paths" for MCS patients would be, doubtlessly, toxic free society in general.

Table 9. Social and institutional faults and tasks for MCS:

| | |
|---|------|
| 1. There are very few doctors who can properly diagnose MCS | 89.0 |
| 2. The present regulation on chemicals is based on ordinary persons but not for those with high sensitivity or MCS patients | 87.2 |
| 3. There are no administrative support systems for MCS patients | 82.4 |
| 4. Information on safety and hazard of chemicals is very limited | 76.8 |
| 5. There are few shelters for MCS patients for climatotherapy | 71.6 |
| 6. MCS patients will increase near future unless efficient measures are taken | 70.9 |
| 7. Very few hospitals are available for MCS patients in case of illness other than MCS | 70.7 |
| 8. There are little public offices or non-profit organizations MCS patients can consult with | 65.3 |

Table 9 is the result of questions regarding claims of MCS sufferers for administrative support, policy reform, medical improvement, establishing patients’ collective actions for policy change, and so forth. Among these in Table 9, although most of the patients answer “Strongly agree”, their primary concern for the time being seems to be rather improvement of personal support and “detoxication” of their direct environment rather than overall social reform.

I interpret that their priority is given to individual improvement rather than social change from my interview to the CSSC officials and patients. Basically, they had to eliminate toxic substances or electric magnetic field in and around their house or to find shelters to evacuate for some time just to survive. After they recover relatively, they have opportunity to join collective actions. And actually, patients established pressure groups to lobby. In October 2009, MCS movement members and patients were so enthusiastic that the Ministry of Health and Welfare finally admitted MCS as a medical symptom and added it to the official master disease name list. Since then, MCS patients can be treated as a MCS patient officially and medical insurance is applicable to it. Above all, they feel so relieved because they are liberated from misunderstanding and prejudice that MCS is a mental illness. This was the first significant success of the MCS movement. However, policy reform for reduction of hazardous chemicals has not been promoted since then.

Table 10. Primary cause of MCS: “insufficient regulation” or “lifestyle” by age

| | A “Insufficient regulation” | Rather “A” | Neutral | Rather “B” | B “Lifestyle” |
|----------|-----------------------------------|---------------|---------|---------------|------------------|
| Under 49 | 17.60% | 23.20% | 19.90% | 24.00% | 15.40% |
| 50 – 59 | 26.20% | 16.90% | 20.20% | 26.20% | 10.40% |
| Over 60 | 36.70% | 15.90% | 18.40% | 15.00% | 14.00% |
| Total | 26.00% | 19.20% | 19.50% | 21.80% | 13.50% |

Looking at this issue from a little different angle, MCS patients were not anti-toxic chemical activists from the beginning. Rather, as Table 10 indicates, their opinion on the primary cause of MCS is divided between “insufficient regulatory policies” and “their own lifestyle depending on chemicals”. Aged patients, who have been less dependent, supposedly, on chemicals, tend to contribute the cause to “policy failure”, whereas more of younger patients seem to contribute it to their “personal lifestyle”. The latter, rather individualized risk definition, seems to resemble to Beck’s concept of “individualization of risks”.

MCS patients’ primary concern so far seems to address the cause of “environmental social exclusion” of MCS patients, I dare say, rather than insufficient chemical management policy itself. MCS movement major success in registering MCS as a medical symptom and added it to the official master disease name list in 2009 was a meaningful step forward to promote “social inclusion” of MCS patients.

4. Conclusion

In this article, I attempted to characterize the situation of multiple chemical sensitivity (MCS) patients as “double invisibility” and as “environmental social exclusion”.

By contrast with typical industrial pollution such as Minamata mercury poisoning with singular cause and series of typical symptoms, MCS sufferings differ drastically with diverse causing chemical hazard and various patterns of symptoms. Although even Minamata disease patients have had a lot of hardship in the processes of public recognition as patients, once they were recognized, relatively fixed image of the disease was shared among the public. Meanwhile nearly one million MCS patients are far less visible among the public.

Due to the incredibly wide variety of symptoms and causing chemicals, even doctors often inappropriately diagnose. And the patients themselves are often not aware of the disease. These vague characteristics of MCS make it especially difficult for non-MCS patients to correctly understand the disease. And MCS patients have been misunderstood as mentally ill or just as lazy persons and are likely to lose their jobs or to be absent from school. The patients suffer not only from the disease itself but also from prejudice and “social exclusion” by their colleagues and the public in general.

“Double invisibility” is typical characteristic of MCS resulted from diversity of both cause and symptoms. However, this is not the only case. We may find similar environmental sufferings from unprecedented substances such as endocrine disruptor, genetically modified organisms, nano particles, and so on. We can and should learn lessons from MCS cases that many of environmental sufferings would be highly “invisible” at first and may entail “exclusion” of sufferers from major social settings.

This situation is similar to what Iijima (1984) called “victimization structure” in which patients suffer from not only physical disorder but also from socially constructed prejudice and political pressures. In nutshell, MCS patients are uncommonly sensitive persons to chemicals and usually they are out of consideration when environmental regulatory standards are settled. This can be categorized a kind of “environmental injustice”. These cases give us significant suggestions for environmental

sufferings today and in the near future.

Notes

- [1] MCS is triggered by exposing to high level of toxic chemicals or to low level of them for a long period of time. At first, patients only react to specific or related materials, however, later on, they start reacting to wide range of less related chemicals.
- [2] The dispute over the cause of MCS like symptoms was referred to the Pollution Arbitration Committee in 1997. The Committee decided that the solid waste facility was the cause of the sufferings. This was the first, epoch-making arbitration decision on MCS in Japan, although the Committee admitted only during a limited period of time. (Haraguchi, 2003)
- [3] In the late 1990s, MCS patients started to organize smaller groups of their own in communities. In 2001, MCS patients' organizations, consumers' co-operative organizers, doctors, scientists, and supporters established the first national level MCS movement non-profit organization, "Chemical Sensitivity Support Center (CSSC)" in Yokohama, with the membership of twelve hundreds.

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Policy and Social Responses to Environmental Health Risk in China

A historical and comparative review focusing on the early stage of policy development

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Abstract

For this decade, Chinese government has responded to environmental health issues actively, such as establishing the new office of environmental health monitoring, conducting an epidemiological survey on relations between water pollution and cancer in one river basin, and issuing the action plan for environment and health. Also, there have been increasing people's concerns about the health risk caused by a doom-like smog, drinking water pollution, heavy-metal contamination in the soil, and food contamination as its consequences through news reports by official media as well as sensational disclosure by social media. Thus, the environmental health risk seems to become a center of the target by Chinese environmental policy at last. Looking back to the history of her environmental policy, however, we can easily find the fact that there have occurred a lot of environmental pollution accidents to damage human health and in the worst case to cause human death since 1970's. This paper will review the environmental policy in China focusing on responses to environmental health hazard and its risk in the early stage of policy development, and discuss how and why such hazard and risk had not been mainstreamed for long years, referring to Japanese experiences and lessons about policy and social responses to pollution health hazard under the pro-development system woven by interactions between state and society.

Keywords

China, environmental pollution, environment and health, environmental policy, Japanese experiences

Introduction

China has enjoyed rapid economic growth for several decades. However, simultaneously, China has not effectively controlled environmental pollution and has followed the road of "polluting on one hand, while treating it on the other hand," which has resulted in frequent pollution-related accidents and

conflicts even to date. Long-sustained environmental pollution has damaged ecological crisis in both urban and rural areas and, in the worst cases, caused serious health hazards to local communities.

For this decade, Chinese government has responded to environmental health issues actively, such as establishing the new office of environmental health monitoring, conducting an epidemiological survey on relations between water pollution and cancer in one river basin, and issuing the action plan for environment and health. Also, there have been increasing people's concerns about the health risk caused by a doom-like smog, drinking water pollution, heavy-metal contamination in the soil, and food contamination as its consequences through news reports by official media as well as sensational disclosure by social media. Thus, the environmental health risk seems to become a center of the target by Chinese environmental policy at last.

The launch of environmental policy in China can be back to early 1970's. There emerged serious environmental pollution problems, and conflicts between polluting factories and damaged farmers due to unregulated economic development in China in 1970's, and central and local governments had to respond to these problems. Although the view that environmental problems could not occur in socialist states was still dominant in the late period of the Cultural Revolution, official delegates were sent to the UN Conference on the Human Environment at Stockholm in 1972 at the initiative of Premier Zhou Enlai, who was anxious about the seriousness of environmental deterioration in China at that time. This event pushed forward environmental policy development at the First National Conference of Environmental Protection held in 1973. After several years, the Third Plenum of the Eleventh Central Committee of Chinese Communist Party (CCP) was held in December 1978, which was known as the epoch of launching the 'Reform and Open Door' policy to push forward environmental policy through the line of CCP nationwide. The first official document focusing on the environmental policy issued by CCP said, "We should not follow such a winding road as construction first, treatment then", implicating lessons to be learnt in developed countries which had faced with serious environmental deterioration. At the Second National Conference of Environmental Protection held from December 1983 to January 1984, it was declared that environmental policy, as well as family planning, were basic state policies and that it was essential to harmonize economic development with environmental protection (Otsuka 2007).

In the following sections, we look into how environmental pollution with serious health hazard in China were recognized and responded by central and local governments from the launch of environmental policy in 1970's to the Second National Conference in early 1980's through a survey of official documents edited by central environmental administration in that period as well as focusing on water pollution in the Huai River Basin where serious health hazard caused by pollution had been reported earlier.

Environmental pollution and its health damage from 1970's to early 1980's.

About official documents on China environmental policy from 1970's to early 1980's, there are two anthologies issued by the central environmental administrative organization^[1]. One is an anthology of documents issued from 1973 to 1978 (GHBB 1988), and the other is an anthology of documents

issued at the Second National Conference of Environmental Protection held from the end of 1983 to the beginning of 1984 (CXJHBHB 1985). Looking through these two anthologies, we can understand what and how state has responded to serious environmental pollution and its health impact in that period.

First, according to the report made by Deputy-Director of Ministry of Health at the Second National Conference, we can understand some works on the field of environment and health launched such as environmental monitoring, setting the standard concerning the environment and health, environmental impact assessment based on the standard, and studies on health impacts by environmental pollution. Second, some cases of health hazard by severe environmental pollution were sporadically-reported in official documents, such as heavy-metal poisoning, respiratory diseases, cancers and death of a disease in the worst case, although there had never been disclosed any comprehensive science report of them. Third, environmental health hazard had already spread from the surrounding of one polluter to a wider range of the environment such as air pollution in a form of smog and water pollution along the river basin. Forth, people affected by environmental health hazard had sometimes resisted industrial polluters by escaping from a heavy-polluted workplace, disputing about heavy pollution and so on. Thus, the serious situation of environmental pollution and its health impact had already been recognized by state leaders and bureaus, provincial and local governments, enterprises and scholars in that period.

Increasing water pollution in the Huai River Basin

The Huai River Basin, which is located in the eastern part of China between the Yellow River Basin and the Yangtze River Basin, has suffered from floods and droughts for hundreds of years. Because of the frequent natural disasters and the lack of effective measures against them, the basin has suffered from a “lack of development” and “economic depression” (Wu 2005, Ma 2011). After the founding of the People’s Republic of China (PRC) in 1949, central water project developments have reduced the risk of the damage from natural disasters to a certain extent. Since the 1970s, however, as China has opened up and developed, increased industrial, urban, and agricultural activities have led to a rapid deterioration in water quality in the rivers and other water bodies and have brought an increase in new risks to the basin^[2].

Water pollution accidents were reported in the basin as far back as the 1970s, and in the 20 years to the 1990s, there were over one hundred more incidents that have resulted in the cessation of industrial operations, the death of fish, disruptions in water supply, and a rise in human health hazards. For example, in 1973, there was industrial wastewater damage to food crops, and in 1974, organophosphate poisoning of people and animals was reported. From 1979 to 1992, according to the official collection of archives at the Huai River Water Resources Commission (HRWRC) of Ministry of Water Resources (MWR), there were over 160 water pollution accidents in the whole basin causing: the death of fish (63 times), crippling damage to food crops (42 times), drinking water crises and human and animal poisoning (30 times), and blazes caused by spilled oil in the river (11 times). The resulting health damage to the people in the basin over this period included cases of diarrhea, cutaneous disease, and dizziness. Notably, in 1974, the local government officers in Bengbu, which is located near the main

stream of the Huai River, organized a petition to the then-Vice Prime Minister, Li Xiannian, appealing for a solution to the serious river pollution. There had already been some critical events observed that had caused serious economic and health damage, so there was a strong local appeal to the state to develop counter-measures in this early stage of the worsening water pollution.

Responding to that local appeal to the state, the State Council issued a research report by the Secretariat Office of the State Council Leading Group on Environmental Protection in 1975, which proposed assigning a new water resources protection task for the Huai River to the branch office of the Huai River Control Planning Group under the authority of the Ministry of Water Resources and Electricity. Soon after that, the Water Resources Protection Office was established when the Planning Group was reorganized as the Huai River Control Commission in 1975. This was the predecessor to the HRWRC Water Resources Protection Bureau. It should be noted that the environmental administration in China had just been launched and its institutional building was under construction at that time. The new functions vested in the branch office were limited to research, monitoring, and river water quality analysis. Along with the development of the water monitoring network in the basin and the launch of the environmental protection administration in the late 1970s, a demarcation between water resource administration and environmental protection was defined clearly as the former was to be in charge of the surface water quality in the major rivers, while the latter was to be in charge of the industrial wastewater and the surface water quality of the urban rivers. This demarcation has continued to date, yet no division in either administration took responsibility for the health damage from the heavy water pollution at that time.

Considering the fact described in the above section that the Ministry of Health had already launched monitoring activities on the environment and health as well as studies on the impact of environmental pollution to human health, while we cannot find any science report of similar studies in the Huai River Basin where water resource management had already launched water quality monitoring in the rivers, it can be deducted that water resource administration and public health administration had conducted environmental monitoring and research activities separately without mutual cooperation.

Referring to Japanese experiences

Referring to the Japanese experiences of 'Kogai' in the era of rapid economic growth from 1950's to early 1970's, policy and social responses to environmental pollution and its health impact in China from 1970's to early 1980's can be discussed from the dichotomy of development and the environment. Japan has transformed her development strategy from balancing coordination of economic development and environmental conservation to prioritizing people's health and life while pursuing economic development in 1970's when victims and their supporters won against polluters in their lawsuits (Miyamoto 2014). In China, however, there were different situations not only in a difficulty of lawsuit and social movement under control of the communist party but also in conceptual context of environmental pollution in China and its health hazard referring to 'Kogai' in Japanese. As Kataoka (1997) pointed out earlier in his study on environmental law in China that the same Chinese

character of Japanese 'Kogai' (公害, 'Gonghai' in Chinese) has been used in laws on environmental protection as well as the Constitution but that its implication is rather marginal among a variety type of environmental pollution. Also, as Miyamoto indicated, 'Kogai' has an important implication of human rights infringement in Japan. 'Gonghai' in Chinese, however, seems to have little focus on the human rights matter. This is the first point to be noticed in terms of comparison between Chinese and Japanese experiences on environmental health hazard.

The second point is that China has established the concept to deal with the contradictory relation between economic development and environmental protection in that period as a slogan of 'unification of economic interests, social interests, and environmental interests' (經濟效益、社会效益和環境效益的統一) at the Second National Conference. Although one scholar had addressed the prioritizing of social interests including material satisfaction, healthy life and happiness while satisfying both economic interests and ecological interests^[3], this way of thought seems to be faded in echo of unifying three interests addressed by the Deputy Prime Minister at the Conference. It should also be noticed that poor development situation in China comparing with developed countries was widely thought to be a hard constrain to tackle with environmental pollution by setting environmental standards and taking technological solutions. Thus, basic administrative works on the environment and health already launched in the early stage of environmental policy development, however, there were wide recognition of economic and technological constraints to tackle with environmental pollution among leaders and bureaucrats at that time^[4].

It is often mentioned to Japanese lessons on 'Kogai' as "pollution first, clean up then". Ui (1971) stated that the rapid economic growth in Japan could realize due to the 'Kogai', rather than saying that the growth accompanied 'Kogai'. That means the rapid economic growth could realize in sacrificing ecological environment and human health. It seems that China had (and have) followed the same road of Japanese lessons, even though there were found positive administrative and social actions against pollution at very early stage of policy development.

Conclusion

China had faced with serious environmental pollution and its health hazard since 1970's and there were positive policy and social responses to tackle with this issue. However, under recognition of poor economic and social development situation at that time, most leaders and bureaucrats could think they had to respond to the issue of environment and health not as a top priority issue but as one of three interests to be balanced. As a result, China had took the same road of Japan which sacrificed human health and welfare while pursuing rapid economic growth. For further understanding of situation in the following decades, we should find more robust evidence to form a "path dependency" to hamper problem resolution in the field of the environment and health to date in China.

- ^[1] The first environmental protection administration body at the state level was the State Council Leading Group on Environmental Protection set up in 1974. The group was abolished and the Environmental Protection Bureau was newly set up under the Ministry of Urban and Rural Environmental Protection in 1982. The bureau was renamed as the National Environmental Protection Agency in 1984, and its functions were strengthened as an independent organization under the direct control of the State Council in 1988 (Otsuka 2007).
- ^[2] Shuilibu Huaihe Shuili Weiyuanhui 2007. The same reference was used in the below facts.
- ^[3] Yu Guangyuan, who was Marxist and Deputy-Director of State Science Committee.
- ^[4] Yu also supported this idea even though he insisted that social interests should be considered as a priority among three interests.

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Equity and Sustainability

Insights from Environmental Sociology

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Abstract

German Sociologist Ulrich Beck's seminal work, *Risk Society*, powerfully demonstrates how society is densely proliferated with risks that have organically grown from unsustainable human social behavior. Earlier, Schnaiberg, and sociologists in the political economy tradition, identified a primal contradiction between the infinite economic expansion and the finite natural world. Both assumptions received critical scrutiny, however. Beck was criticized for generalizing unsustainable behavior to undifferentiated humanity; while sociologists in the political economy tradition were faulted for viewing all economic activity inherently in contradiction with sustainability. Environmental Sociologist Freudenburg, in his theory of disproportionality, further reinforced such criticism. He empirically showed that only a fraction of economic activities actually account for the bulk of environmental risks, such as emission of pollutants, although such risks are the product of unsustainable individual and social behaviors. Besides, environmental sociological perspectives such as environmental classism and environmental justice shine light on inequities in the distribution of environmental costs and benefits. Environmental bads, which are disproportionately produced by a tiny minority of people in power and wealth to their own advantage, are widely dispersed to the economically and racially marginalized groups. Building on these arguments, disaster studies scholars have innovatively challenged the assumption of disasters being "natural," or an "act of God," or a "freak event." All disasters are social (man-made) in their antecedents and consequents. Even natural disasters are "natural hazards" that human actions and institutional behaviors convert to disasters. Yet Disasters are unequal in their impact, which affect different categories of people differently: Women, children, the elderly, disabled, the poor and racial-ethnic minorities. More importantly, disasters worsen the pre-existing vulnerabilities of these categories of people, hampering their recovery. This paper argues that disaster risks, which result from unsustainable behavior, are unequally borne by already marginalized groups. Empirically focusing on climate-induced disasters and their disproportionate impact on coastal and

island communities in East Asia, it identifies inequities in the distribution of environmental costs and benefits. In conclusion, it draws on environmental sociological insights into the subject, and suggests that the pathway to risk reduction runs through sustainability.

Environmental Injustice and Health Risk

A Review and Reflection from Environmental Sociological Studies in the United States

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Abstract

More and more researches have been concerning about the relationship between the ecological environmental factors and health outcomes, especially the implication of environmental injustice for public health. However, recent studies made limited progress in this direction, a definitive link between environmental injustice and health outcome has not yet been established, and little is known about the attributable risks of social and environmental factors in which social and environmental risks may combine to create cumulative burden on the health of the most vulnerable groups. Also, limitations on available data make this a serious problem for present and future studies.

In this paper, the author reviewed the study of environmental injustice and human health in the United States, explored the different theoretical perspectives and research methods on this issue, combed through the phases of environmental justice and health movement and corresponding paradigmatic transition in the United States, found some unsolved problems of studies. Finally, showed some new directions of future research. In author's view, environmental sociology certainly has an important role to play in addressing these issues, more research is needed on a range of emerging environmental injustice and human health issues. "Interpreting the world in order to change it," should be a goal that brings many into the study of environmental sociology in the first place.

Key Words

environmental injustice, health risk, theoretical perspective, research methods, good lessons and unsolved problems, direction of future research

INTRODUCTION

In the past several decades, there have been hundreds of studies investigating the correlations between race, income and environmental burdens. Literature reviews reveal overwhelming evidence that

toxic waste sites and facilities that release toxic emissions are more likely to be sited in low-income neighborhoods, with primarily nonwhite residents (Bullard et al. 2007; Rowan and Fridgen 2003). The poor and especially the nonwhite poor may experience the cumulative impacts of exposure to unhealthy environmental conditions in the United States.

Health in the United States is closely linked to race and class. Lower-income communities and communities of color have higher rates of diseases ranging from asthma to lead poisoning to higher rates of mortality (Brulle and Pellow 2006; Gee and Payne-Sturges 2004; Williams and Collins 1995).

More and more researches have been concerning about the relationship between the environmental pollution and health outcomes, especially the implication of environmental injustice for public health. However, recent studies made limited progress in this direction, a definitive link between environmental injustice and health outcome has not yet been established, and little is known about the attributable risks of social and environmental factors in which social and environmental risks may combine to create cumulative burden on the health of the most vulnerable groups. Also, limitations on available data make this a serious problems for present and future studies.

In this paper, the author reviewed the study of environmental injustice and human health in the United States, explored the different theoretical perspectives and research methods on this issue, combed through the phases of environmental justice and health movement and corresponding paradigmatic transition in the United States, found some unsolved problems of studies. Finally, showed some new directions of future research.

ENVIRONMENTAL JUSTICE AND HEALTH MOVEMENT IN THE UNITED STATES

As defined by Bullard (1993), environmental justice is the principle that “all people and communities are entitled to equal protection of environmental and public health laws and regulations”.

The U.S. environmental movement is the single largest social movement in American history, with over 6,500 national and 20,000 local environmental organizations. The most important part of it is environmental justice and health movement, which arose in the early 1980s. There is no specific founding point for the environmental justice and health movement, but it was largely caused by two other movements — the anti-toxics movement and the racial critique of the civil rights movement (Carder EF, 2010).

The context of environmental justice and health movement in the United States is as follows ((Mohai P, Pellow D, Roberts T. 2009; Carder EF, 2010; United Church of Christ, 1994):

1971 the President’s Council on Environmental Quality (CEQ) acknowledged racial discrimination which adversely affected urban poor and the quality of their environment.

1982 Warren County: a poor and predominantly African American community was one of the fourteen counties chosen by the State of North Carolina for placing a toxic waste landfill along the roadway.

1983 US General Accounting Office Report found that 3 out of the 4 offsite hazardous waste landfills in the EPA’s Region 4 (Southeast region) were located in poor black communities.

1987 The United Church of Christ Commission for Racial Justice issued the “Toxic Waste and Race

in the United States” report. The report was the first national study exposing the relationship between waste facility location and race.

1989 US Department of Health and Human Services’ report on Black and Minority Health, and the report of The Future of Public Health were published and promoted the Minority Health Initiative.

1990 The Clean Air Act was passed and Bullard’s book *Dumping in Dixie* was published in the same year.

1991 The first National People of Color Environmental Leadership Summit was held in Washington.

1992 The federal Environmental Protection Agency (EPA) created an Office of Environmental Justice.

1993 EPA established a National Environmental Justice Advisory Committee (NEJAC) to provide independent advice and analysis from stakeholders on EJ issues.

1994 President Clinton signed Executive Order 12898, directing agencies receiving federal funding to address the disproportionate environmental impacts of their policies and programs on low-income communities and communities of color.

In 1992, a National Law Journal report alleged that the EPA had discriminated in its enforcement of environmental protection law and indicated that federal fines were more lax for industries operating in communities of color; the cleanup of environmental disasters in communities of color were much slower than those carried out in wealthier white communities; standards for clean up in communities of color were not as rigid as those applied in white communities (Bullard RD, Mohai P, Saha R, and Wright B, 2007; Carder EF, 2010).

Since 2000, EPA has been running the federal superfund programme (which designated a pool of money to remediate toxic sites where the polluter was unknown or incapable of clean up) on US 1.2 billion a year. According to the government estimate, 375 sites have been fully cleaned up and ended up as offices, commercial sites, or residential neighbourhoods^[1].

From this concern, the environmental justice and health movement emerged and focus on the relationship between environmental injustice and human health, and pay more attention to the perceived increasing pollution in poor neighborhoods and communities of color. This movement has existed for more than four decades in the United States, reaching its top in the 1990’s.

The groups in environmental injustice communities seek to reduce the use of toxic materials, and to ensure a safe and clean environment for all peoples. These Groups describe their purpose such as: “Preventing exposure to toxic materials that cause breast cancer”, “Creating safe schools to protect our children’s health”, or “Ensuring that medical waste from hospitals is disposed of in an environmentally responsible way.” Some of the leading environmental organizations include the Center for Health, Justice, and the Environment, and the 1 in 9 Breast Cancer Action Coalition (United Church of Christ, 1994).

[1] See the detailed information from the link: <https://www.chinadialogue.net/article/show/single/en/6869-US-grapples-with-the-legacy-of-its-polluted-lands>.

Table 1. Number and Percentage of People of Color Environmental Groups Focusing on Issues

| Issues | Percentage |
|-----------------------------|------------|
| (1)Water pollution | 73.0 |
| (2)Toxics | 72.4 |
| (3)Waste disposal | 66.7 |
| (4)Community organizing | 63.0 |
| (5)Environmental justice | 58.8 |
| (6)Air pollution | 57.9 |
| (7)Recycling | 47.6 |
| (8)Worker health and safety | 43.9 |
| (9)Housing | 43.0 |
| (10)Pesticides | 42.4 |
| (11)Energy | 40.9 |
| (12)Parks and recreation | 39.7 |
| (13)Wildlife | 34.5 |
| (14)Lead poisoning | 34.2 |
| (15)Facility siting | 26.1 |
| (16)Asbestos | 13.0 |

Source: From the People of Color Environmental Groups Directory (Bullard, 1994)

THEORETICAL PERSPECTIVES FROM ENVIRONMENTAL SOCIOLOGY

Perspective of Science of Environmental Justice

Steve Wing (2005) defined science of environmental justice as a science that can serve as a knowledge base for public health advocacy by exploring the location of pollution sources, unsafe environments, and the racial and economic characteristics of communities with environmental hazards. It has provided an empirical basis for demonstrating patterns of environmental injustice.

Since 1980s, the environmental justice and health movement has become one of the most important forces influencing public health conditions and environmental health science. Environmental justice advocates consider environmental quality and population health as an issue of social justice. American environmental sociologists found that the development of science of environmental justice could promote effort to reduce environmental injustice, and also give communities a strong scientific support to protect themselves from environmental contamination. Some advantages of science of environmental justice are listed below:

- (1) Research institutions and government agencies play a very important role in developing partnerships with environmental justice communities. They bring prospects for positive transformation of science and health, and for reducing the existing environmental injustice.
- (2) The development of science of environmental justice has brought environmental justice activist and researchers together through foundation-supported programs, and also promoted the combination of scientific theoretical research and empirical study on the issue of environmental injustice and public

health (Shepard PM, Northridge ME, Prakash S, Stover G, 2002).

(3) Science of environmental justice can be of great value in providing identification of hazardous agents and route of transmission in order to increase community members' self-protection. It can also provide community members with scientific research tools, help them further understand their living and working conditions, and environmental impacts on their health (Steve Wing 2005).

(4) Environmental justice movement combining with scientific evidence can gain much more power to take actions in order to fight pollution and unsafe living and working environment.

Illness Experience Perspective

American environmental sociologists also use illness experience perspective to explore the relationship between environmental injustice and public health. Many researches have demonstrated that those who lack basic environmental conditions (such as safe air, water, living conditions and access to medical care) for good health are the same people who organize to fight for better health conditions (Brown P, Mayer B, Zavestoski S, 2003).

For community members, socialized illness experience is a necessary process that most of them have to experience. The main steps are as follows:

- (1) Personal disease and symptoms are discovered by individuals.
- (2) Adapt to their illness in order to function in daily life.
- (3) Find other people in same communities have the same or similar illness and symptoms.
- (4) Organize to seek recognition of a disease and search for diverse interpretations of the cause.
- (5) Choose to be a passive patient or engage in a struggle to make some change.
- (6) Community-based organizations encourage people to share their illness experience, and work to transfer their personal experience of illness into a collective identity.
- (7) Integrate illness experience with environmental injustice and environmental health effects.
- (8) Fight against adverse environmental factors that may cause or continuous increase the risk of their illness.

Unlike professional researchers, for whom environmental injustice and public health may be a research subject or occupational interest, but for community members, they must choose to endure adverse environment or to combine general education about disease with political actions to alter local pollution sources.

Perspective of Scientific and Social Uncertainty

While the environment has always played a key role in community health, the relationship between environmental pollution and specific illnesses is still not widely acknowledged. When exploring the relationship between environmental injustice and the risk of public health, American environmental sociologists tend to use scientific and social uncertainty perspective. They categorize different levels of uncertainty, and try to answer the correlation between uncertainty and science.

Table 2. Different kinds of uncertainty

| Types of Uncertainty |
|---|
| 1. Risk- know the odds |
| 2. Uncertainty- don't know the odds; may know the main parameters; may reduce uncertainty but increase ignorance. |
| 3. Ignorance- don't know what we don't know. Ignorance increases with increased commitments based on given knowledge. |
| 4. Indeterminacy- causal chains or network open. |

Source: Brian Wynne (1992).

In the US political culture, the scientific uncertainties about what happens to a waste in landfills make regulators unwilling to sanction it when its safety was so uncertain. Thus the social threat which exists in the conflictual, mistrustful and adversary US regulatory culture causes scientific uncertainty to be accentuated (Trainor SF, Chapin FS, 2007). Uncertainty underlying decisions would be a social risk, however, it is undeniable that some degree of an uncertainty is also a kind of scientific evidence to demonstrate the relationship between environmental injustice and public health.

The Risk of Environmental Health Perspective

Although there exist some areas of scientific and social uncertainty, some American environmental sociologists still believe that many exogenous environmental factors, such as viruses, radiation and other pollutants can contribute to cause a variety of cancers due to their promoting properties. An increasing number of studies link environmental pollution to a range of disabilities and chronic illnesses. Here are some main evidences to support this viewpoint:

(1) Since the Second World War, about 100,000 chemicals have been so far marketed without sufficient toxicological control. Such products can act as persistent toxic pollutants and contaminate air, soil, water and food (Irigaray P, Newby JA, Clapp R, Hardell L, 2007).

(2) Increased cancer rates are associated with exposure to industrial chemicals in the environment. Evidence from epidemiological studies as well as animal experiment support the view that some industrial chemicals can cause neurobehavioral disorders and learning disabilities (Irigaray P, Newby JA, Clapp R, Hardell L, 2007).

(3) Individuals noticed a strong relationship between environmental pollution and their health in many diverse locations. Some of the key examples was the extremely high rate of breast cancer among women on Long Island, and the increasing rates of asthma among children exposed to automobile exhausts (Landrigan PJ, Schechter CB, Lipton JM, 2002).

(4) An institute of Medicine report on EJ and public health found that there are identifiable communities of concern experience higher levels of exposure to environmental stressors in terms of both frequency and magnitude (Gleick PH, Christian-Smith J, Cooley H, 2012).

DIFFERENT RESEARCH METHODS

Environmental Checklist Method

Environmental checklist method is very helpful in planning and conducting an environmental impact task, and is widely used by American environmental sociologists and policy makers. Here is an example of Checklist for addressing and summarizing environmental impacts from U.S. Department of Agriculture (USDA).

Table 3. USDA Checklist for Addressing and Summarizing Environmental Impacts

| Types of Uncertainty |
|---|
| 1. Risk- know the odds |
| 2. Uncertainty- don't know the odds; may know the main parameters; may reduce uncertainty but increase ignorance. |
| 3. Ignorance- don't know what we don't know. Ignorance increases with increased commitments based on given knowledge. |
| 4. Indeterminacy- causal chains or network open. |

Source: From Canter LW. 1999

Environmental checklist method provide a structured method for identifying key impacts and relevant environmental factors. It represents the collective professional knowledge and judgment of their interdisciplinary team by discussions and modifications during the planning, conduction, and summarization of environmental impact studies. Thus it has a relative high level of credibility and useability (Canter LW, 1999).

Cumulative Environmental Justice Impact Assessment

American sociologists are more inclined to use composite measures to approximate cumulative environmental impact. Cumulative Environmental Justice Impact Assessment (CEJIA) can play an important role in further understanding of environmental injustices in the United States.

According to NEJAC, cumulative environmental risks and impacts is the "matrix of physical, chemical, biological, social and cultural factors which result in certain communities and sub-populations being more susceptible to environmental toxins, being more exposed to toxins, or having compromised ability to cope with and/or recover from such exposure".(Hynes HP, Lopez R, 2007).

In some classical case studies, American environmental sociologists use CEJIA to measure the negative environmental impacts. By controlling the density and severity of environmental hazardous sites, they demonstate that exposure patterns take a generally linear distribution when put race and class included. That means environmental injustice not only exists in poor communities and communities of color, but also exists in other kinds of communities, even in white and more affluent communities. CEJIA can also reduce the scientific and social uncertainties and variations by the ways in which averaging, standardization, and aggregation are performed (Krieg EJ, Faber DR, 2004).

Preventive Paradigm

One of the most important changes of environmental policies in the last decade has been the shift from remedy towards prevention. The preventive method shifted public attentions from “end-of-pipe” to “upstream”. There is an increasing concern on product-design, green technology innovation, strategy making, and the management and control of the industrial processes. The preventive paradigm challenges our existing views of the relationship with scientific knowledge, preventive criteria need to be found to determine decisions affecting environmental loads (Taylor DE, 2000).

GOOD LESSONS AND UNSOLVED PROBLEMS

Good Lessons

- (1) American environmental sociologists have been much more advanced in demonstrating the relevance of the sociological discipline for further understanding and interpreting environmental injustice and public health.
- (2) American environmental sociologists have much to offer not only in terms of discipline foundation, but also the respect to sociological methods and interdisciplinary studies.
- (3) An empirical foundation is very strong in the United States. Most empirical studies on environmental injustice and public health were restricted to statistical analysis of quantitative data.
- (4) We can learn much from Americans in combining scientific studies with the investigation from grassroots organizations in the community.
- (5) American environmental sociologists show strong commitment to continuing research into risks and uncertainties related to environmental injustice and public health.
- (6) American environmental sociologists have built combining indexes, such as social class, education, income, housing, family structure etc; and a greater emphasis on the comparison of different ethnic groups in environmental injustice and public health issues.

Unsolved Problems

- (1) The strict classification of communities into categories of environmental justice and non-environmental justice is problematic, it will put policy makers, public health officers, and community activists into dilemma, because it is very difficult to distinguish these two kinds of communities at realistic aspect.
- (2) The failure of an ecological world view to become institutionalized in the U.S. As Dunlap has argued that how to spread the rapidly growing ecological worldview from scientific and academic communities to society and communities at large still has a long way to go. (Dunlap, 2008)
- (3) The scientific community is oriented toward assessing specific questions and producing knowledge that assumes problems have technological solutions. However, this knowledge may be of little value to exposed communities if these communities lack political power, or their health impacts are not recognized as an urgent issue.
- (4) Environmental injustice and health organizations may face difficulties in keeping objective and neutral or remaining their original principle when participate with researchers to build a science of

environmental justice.

(5) Environmental injustice and health organizations may also have difficulties in getting long-term financial support from government. They also lack their own technical staff to deep their studies of environmental injustice and public health.

(6) The severe lack of action from government in protecting exposed communities that has allowed environmental pollution still to cause hazard on public health.

DIRECTION OF FUTURE STUDIES

Social science and natural science have an important role to play in addressing these issues. For example, environmental health scientists can participate by providing technical assistance, education and health guidance to communities. Government can provide financial support to scientific institutions as well as community organizations in order to figure out the connections between science, environmental justice, and public health. Strengthening the power of communities would be a very important step working for social justice and transformation of the institutions that create environmental injustice.

Technical solutions would be fine, but for communities facing environmental injustice, their value depends on the extent to which social justice is advanced. Environmental sociology study should answer the questions of whether and to what extent human health is determined by social structures and/or environmental structures. Environmental sociologists have an important job to do: can not only concern the environmental injustice and related health impacts upon residents, but also take the demographic and sociological characteristics of a community into account. Also, the environmental justice and health movement must be participated by sociologists and social change must be a major goal. "Interpreting the world in order to change it" would seem to be a goal that brings many into the study of environmental sociology in the first place.

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The scale war

An STS analysis on the debate of scale frames in constructing environmental
injustice grievances

Morgan Chih-Tung Huang**

This study adopts an STS and Policy (Science, Technology and Society) approach in analyzing a scale debate in the environmental justice (EJ) research. It argues that EJ is in danger of being understood in purely mathematical terms. This trend distracts EJ from the structure of the real-life. Too often, researchers have delved deeply into the debate of technicalities, say the scale war. My STS message is that, we can understand a lot more about EJ by examining the social forces that shape its development. In the scale war, it is evident that one's scale choice reflects one's world-view; this world-view however will never go unchallenged through the passage of time. This article argues that, by analysing social forces the scope of EJ research could go beyond the technical.

Keywords

environmental justice, STS, scale, zip-codes, census tracts

1.1 A brief history of EJ

Nearly all observers agree that the EJ movement can trace its origins to the Warren Anti-PCB (polychlorinated biphenyls) movement in North Carolina. Warren County was the poorest community; it also had one of the greatest proportions of African Americans in the state. In 1982, residents in Warren organised to protest against the site of a PCB landfill. The protesters believed that this site was purposely chosen to take advantage of the community's lack of political power (Ringquist, 2006:251). Although the Warren protest failed to halt the operation of the landfill, it raised awareness of inequity in environmental matters across the United States. Soon after the Warren protest, several empirical researches started to focus on the relationship between hazardous facilities and the demographic characteristics of their surrounding areas. Among them, the US GAO (US General Accounting Office)

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research was one of the first in its kind.

The US GAO selected four large landfills in south-eastern states and collected the racial and ethnic data within a radius of four miles. This research showed that, in three of the four chosen samples, Blacks made up 52%, 66%, and 90% of the population. However, within the states as a whole there is only 22%-30% Black population. Additionally, between 26% and 42% of the populations adjoining the sites lived below the poverty line; these states in general however only have 12%-19% of their population living below the state poverty line (US GAO (U.S. General Accounting Office), 1983). The US GAO report was, and still is, widely cited as revealing a clear correlation between waste sites, race and income.

In 1990, concerned activists and academics formed the so-called *Michigan Coalition* during the conference of *Race and the Incidence of Environmental Hazards*. This Coalition appealed to the EPA to address EJ (Bunyan Bryant & Mohai, 1992a; 1992b). In response, the EPA Administrator created the *Environmental Equity Workgroup* to address the allegation that racial minority and low-income populations bear a higher environmental risk burden than the general population. Two years latter, this workgroup issued its final report *Environmental Equity: Reducing Risk for All Communities* (US EPA, 1992a, 1992b). Echoing the workgroup's suggestions, President Clinton issued Executive Order 12898 in 1994. This Order, on the one hand, indicates that the EJ movement's claims have been officially considered in the policy-making process. It also marks the introduction of the term environmental justice into federal policy. Its interpretation, on the other hand, leaves room for ongoing pollution so long as the negative effects can be shared proportionately. Evidently, this Order marked EJ's institutionalisation.

20 years after the issuance of the Order, EJ celebrated its 20th anniversary. As a celebration, the EPA announced its *Plan EJ 2014*. In the plan, EPA reaffirmed its commitment to EJ and assured that the Agency will treat *Plan EJ 2014* as a road map to help EPA integrate EJ into its programs, policies, and activities. In implementing the Plan, EPA promised to seek for meaningful engagement with communities and stakeholders. It is fair to say, EJ is facing a turning point and it is time to revisit how the concept of EJ has been shaped, challenged, and then reshaped. For me, the debate of scale frames is a starting point.

1.1.1 The scale war: Zip-codes vs. Census tracts

There are two units usually found in the EJ literature: zip-codes and census tracts (Fahsbender, 1996; Williams, 1999a, 1999b). It goes without saying that zip-codes are designed for mail delivery. In this analytical unit system, the whole territory of the US is identified by five-digit zip-codes. Since zip-codes are devised as an administrative convenience for mail delivery, they do not necessarily respect political boundaries. The demarcated areas are not necessarily uniform in size, population, and density (average 86.19 square miles and with around 30,000 people). Of course, zip-code areas are also subject to change

There are two rationales behind the use of zip-codes. Theoretically, the unit of zip-code is an adequate representation of the community under study. Since most US citizens know their zip-codes

well, zip-codes provide the locals with a clear mind map over their local landscapes (Fahsbender, 1996; Grubestic & Matisziw, 2006; Krieger, et al., 2002; US Bureau of the Census, 2000; Williams, 1999b). The practical rationale for using zip-codes is based on data availability. These codes offer a useful way to partition a region in terms of geography and demography. As a result, the US Census Bureau also tabulates demographic data according to zip-code areas. By using the same analytical unit as the Census Bureau, no data transition is needed; comparable spatial and demographic data are readily available. Moreover, zip-codes also provide an easy way to determine the position of toxic facilities (US Bureau of the Census, 2000; Williams, 1999a; 1999b:319 ff.).

The other commonly-used unit of analysis is the census tract. Census tracts are an official unit that the US Census Bureau uses to aggregate the basic data of the American population every ten years. According to the Bureau, at the time of establishment, census committees deliberately delineate residents who share similar population features, economic status and living conditions into the same tract (median 0.74 square miles and with around 4000 people) (Fahsbender, 1996:130-134; Fisher, Kelly, & Romm, 2006:703). For this reason, demographic characteristics within a tract are rather similar. Because of its homogeneity and consistency, the court and some scholars insist that the census tract is the most appropriate unit for testing EJ (Anderton, Anderson, Oakes, & Fraser, 1994; Been, 1994a).

Similar to zip-codes, the theoretical rationale behind applying census tracts in EJ is that they provide good, if not better, approximations of community. Specifically, this analytical unit is smaller in area than zip-codes. Therefore, when census tracts are applied to aggregate the territory of a community, they establish a closer simulation of the community and thereby provide more detailed information (high resolution) about the target areas. For this reason, it has been suggested that one should always use "the smallest available scale" (Noonan, 2008:1159).

1.2 MAUP: Getting the scale right

As we can see, zip-codes and census tracts have quite a few common characteristics and the most significant difference between them is their scales. When there is more than one scale available, the MAUP emerges. MAUP (modifiable areal unit problem) here refers to the possibility to choose different spatial units (zip codes or census tracts) to examine the same event or area. The MAUP arises because of the scale dependency in the EJ analysis.

Take the UCC and SADRI (Anderton, et al., 1994) debate. SADRI asserts that their study is a replication of the UCC research; the only difference is that SADRI's analytical scale is census tracts rather than zip-codes. After redoing the UCC research, SADRI found that when shifting the scale of analysis, the previous correlation between hazardous facilities and race disappears. Since no correlation can be found, by definition the condition of "injustice" is absent as well. It is rather clear that the existence of EJ is very sensitive to the chosen scales of analysis.

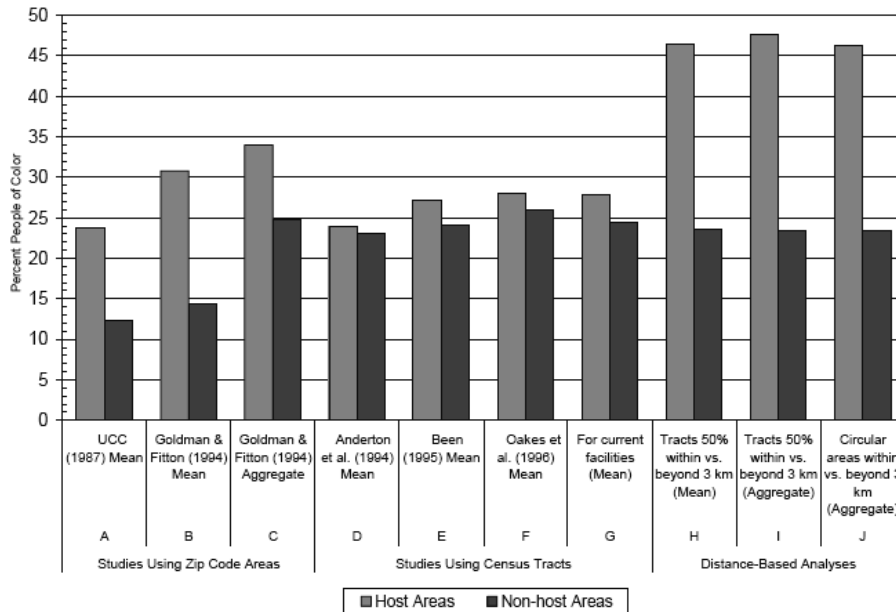


Figure 1. Comparing results of past studies

Source: (Bullard, Mohai, Saha, & Wright, 2007:44)***

Calling into question the mainstream EJ assumption that environmental injustice has been scientifically proved, SADRI made a novel claim: the conclusions we draw vary according to the scales we employ. After the SADRI study, the scale issue soon sparked considerable debate and later became a “scale war” within both the movement and academia. Scholars disagree on what unit of analysis researchers should employ to obtain the most accurate results possible (Baden, Noonan, & Turaga, 2007; Cutter, Holm, & Clark, 1996; Downey, 2005; Mohai, 1995; Most, Sengupta, & Burgener, 2004; Noonan, 2008; Zimmerman, 1994).

1.3 Nobody is correct: Ecological fallacy vs. individual fallacy

Clearly, the selection of analytical unit resulted in entirely different outcomes. Generally speaking, larger scales (i.e. zip-codes) suggest stronger statistical correlations between race or income and LULU’s spatial distribution; conversely, smaller scales (i.e. census tracts) lead to weaker correlation. Both sides accused their counterpart of committing some serious methodological mistakes. Ecological and individual fallacies are the most common rhetorical ammunition in the MAUP debate.

After repeating the UCC study and found no association between facilities and low income or/and Black social groups, the SADRI brought an accusation of ecological fallacies against the UCC:

Because geographic data can be aggregated to produce information on larger regions, it seems reasonable

*** For the a-c group, these zip-code-based studies suggest that LULUs are more likely to be sited in places with more minority populations. Conversely, from a census tract analysis (the d-g group) no such evidence can be found. As one can see, the percentages of people of colour in host and non-host areas are very close in the d-g group; therefore, the condition of injustice does not exist. Here, I focus on unit-based methods (zip-codes and census-tracts) only. Distance-based methods (h-j) (impact circles) will be discussed later in this chapter.

to begin with an analysis of areas that are as small as is practical and meaningful. Beginning with too large a geographic unit invites the possibility of “aggregation errors” and “ecological fallacies”; that is, reaching conclusions from a larger unit of analysis that do not hold true in analyses of smaller, more refined units. (Anderton, et al., 1994:232)

Ecological fallacy happens when a researcher makes an inference about an individual on the basis of aggregate data for a group. In other words, this fallacy assumes that individual members within a group must have the average characteristics of that group at large. The MAUP is closely related to the topic of the ecological fallacy. In the context of EJ, the ecological fallacy is the situation in which researchers incorrectly draw conclusions about smaller groups based on an observation of larger spatial units in which general patterns are found (Babbie, 2005:102-104; Cutter, et al., 1996; Mitchell & Walker, 2008; Mohai, 1995).

This kind of ecological reasoning is dangerous because a certain pattern learned from a larger group/unit level might in fact say nothing about the pattern in the smaller groups/units or individuals that make up the larger group/unit. So, if a piece of research is only conducted at a certain level, say zip-codes, in effect we could not know for sure whether or not the pattern can be found at a smaller level, say census tracts. For this reason, the UCC study stands accused of committing an ecological fallacy because it simply assumes that their observed patterns will recur at another analytical scale. That is, even though UCC’s research was conducted at the zip-code level only, their conclusion implies this pattern is prevalent so that similar patterns at another observational level can be inferred from it. SADRI disproved this assumption.

Ironically, when UCC supporters fought back, they accused the SADRI authors of committing the “individual fallacy”, the very opposite of the ecological fallacy (Mohai, 1995:626-628). The individual fallacy is the assumption that something learned from an individual case can be generalised to all other similar cases. In the EJ context, researchers may incorrectly use the results drawn from one case study to infer patterns of injustice for other places, times, or situations (Mitchell & Walker, 2008). The risk of an individual fallacy is that the observed case may be simply an individual exception; thus it says nothing about the other cases or the larger group that the individual belongs to. In this fashion, having one or two studies suggesting that EJ does not exist does not mean that the identifying associations are meaningless. What it does say is that the MAUP may conceal variations that are not visible at the larger level, and that researchers should be more careful.

As the originator of the MAUP, Stan Openshaw, once said, the easiest way to solve the MAUP is simply to “pretend” it does not exist and “hope” the end result of the analysis is still meaningful (Openshaw, 1984:31). No matter which units are selected, so long as the research results are put into a meaningful statistical and spatial context, in some way the end result should still be relevant to the observed characteristic, even though a consensus cannot be achieved on issues. In other words, the MAUP reminds researchers to be more careful and reflective about their data; it however does not in any way compromise the strong evidence for EJ and one should not use MAUP as an excuse for not taking actions.

Moreover, according to the UCC allegiants, several individual fallacies can be founded in the SADRI study. These fallacies revolve around exclusion and inclusion. For instance, the SADRI authors claimed that some census tracts should be excluded from the dataset of the control population, because these tracts are regarded as not suitable for a toxic substance disposal facility (TSDF):

[These areas] arguably were not feasible sites for the TSDFs. This Strategy [to exclude some census tracts from the database], for example, might tend to exclude national parks, rural areas without any transportation facilities, cities without an industrial economy that would require local TSDF services, etc. (Anderson, Anderton, & Oakes, 1994:92)

The decision to exclude some tracts has profound methodological implications and these implications are critical for explaining the conflicting findings and conclusions between SADRI and UCC. Briefly, although SADRI asserted that its study is a replication of the UCC, in reality these two studies are not quite the same. This directly contradicts the claims of SADRI, who attribute their different findings to the choice of units of analysis.

1.4 A very different solution: The only way to solve the MAUP is to abandon EJ altogether

Instead of using one agreed most appropriate scale, scholars from public policy discipline tend to use a series of scales to demonstrate the sensitivity of EJ research to the MAUP. Once the other critics roll up to join the debate, they often make things even more complicated. Quite often, the goal of EJ analysis is to identify patterns directly related to individual situations. However, since the empirical evidence is quite mixed, it could be erroneous to infer individual situations based on ecological data. When confronted with these inconsistent results, what are EJ policymakers supposed to do (Noonan, 2008; Rhodes, 2005)? To what extent should policymakers take actions to tackle EJ?

The substantive findings themselves cannot offer the answer to these questions. Unsurprisingly, people from different camps provide completely different interpretations on this matter. EJ advocates are more likely to support the standpoint that as long as evidence is not biased in the construction of spatial variables, we should still *do something* to correct the possible injustice (Mohai, 1995; Tesh & Williams, 1996). Its critics, however, do not share this thinking. Some contenders have gone as far as suggesting that EJ be abandoned altogether. For one thing, it is argued that EJ is typically a central concern in environmental policy already. As a result, they argue, there is no need to brand something EJ and then take it outside the core of all policy considerations (Noonan, 2008). For another, as Bowen (2001) has long argued, since we know so little about EJ, we should wait until all data are in. Without solid evidence, investing on any EJ issue will be considered a waste of public money. The problem is that, this view can be easily distorted as a philosophy of *doing-nothing* as they themselves proved that the data will not tell us much. If that is the case, EJ victims are forced to face with an endless wait for action.

1.5 Concluding discussions

As Williams (1999a:56) has noted, the battles of scale occur in several fields, including extra-institutional arenas, say grassroots activities, institutionalised systems, such as election campaigns, and academia. Under the scale politics, the winners are those who can successfully frame/reframe a social issue according to their own world-views. By pursuing a specific world-view, actors choosing this particular understanding of scale receive or monopolise resources. The losers, on the opposite side, are those who fail to frame/reframe their argument in terms of the appropriate scale. Since these underdogs are unable to contest the dominant value system, they fail to guide specific activities through particular scales. As Herod stressed:

[r]ecognizing that scale is itself socially constructed opens possibilities for political action because it acknowledges that geographic scales are materially constrained by social actors, and that there is a politics to this constitution. The question geographers should therefore ask, perhaps, is not how scale orders social processes but, rather, how social actors create geographic scales through their activities. (Herod, 1997: 147)

After reviewing the history of the “scale war” within EJ, it is apparent that social/political actors, mainly activists and researchers, set forth their own analyses of what causes an EJ problem and what the solution might be; other groups challenged these interpretations and policy recommendations by offering alternatives. The fact is that there are many competing or alternative interpretations and definitions of EJ. They vary according to time frame, standpoint, and emphasis on political or economic factors. Therefore, the meaning of EJ has been reinterpreted and then renegotiated over time. In a nutshell, one’s scale choice reflects one’s world-view; this world-view cannot go unchallenged through the passage of time.

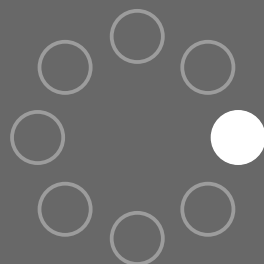
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REGULAR SESSION 3

DISASTER RESTORATION:
REFUGEE AND COMMUNITY



ISESEA-5

Administrative Plan and the Continuation of Communities

– A case of Mt. Unzen-Fugen Volcanic Eruption–

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1. Concern with issue

This report will clarify how communities struck by disasters work to continue through an analysis of a case where local citizens who had experienced a volcanic eruption leased their own land as a dumping ground.

Areas that have experienced the catastrophe of a natural disaster are forced with one of two choices to either rebuild the place where they live by “reconstructing the disaster area” or by “moving their village.” In other words, a region that has lost a lot due to a disaster could either attempt to repair and revive the disaster area to restart people’s lives or the people of the region need to work to rebuild from zero in a new place.

The area handled in the case study in this article is the Annaka district that stuck by the Mt.Uzen-Fugen volcanic eruption 24 years ago. This district faced a crisis of having their community divided by a subsequent administrative plan. The disaster prevention plan made after the disaster stuck was worked on as a public works project. Nevertheless, the necessary plan to handle natural disasters decided on the extent of the project based on the terrain, and much of the project did not coincide with the boundaries of the community. Accordingly, the community was confronted with the crisis of being divided. The community was pressed into taking a difficult response both by being struck by a natural disaster and also by the subsequent administrative plan that was worked out.

2. An Overview of the Shimabara Disaster and Area of the Case Study

The Annaka district that is the subject of this case study is located in the basin of the Mizunashi river in the southern area of Shimabara city. On 3rd June, 1991, a giant pyroclastic flow caused much causality including 14 local fire fighters. Prior to the disaster, the Annaka district was comprised of the former town of Antoku and the former town Nakakoba. The names of these towns were combined to create the name of the Annaka district. The neighborhood association liaison council of Annaka

district was constructed of 14 neighborhood association 5 neighborhood associations from the former town of Nakakoba and 9 from the former town of Antoku. This liaison council existed as an organization that was above all of the neighborhood associations. There was a tendency for population of the town of Antoku to increase prior to the disaster partly due to the fact that it was close to Shimabara city. There were many households that moved to the area with the intention of building a house to serve as a permanent residence. These types of new household were encouraged by their neighbors to go and talk to the heads of the neighborhood associations, and they were able to socialize with other people through a variety of activities upon joining the neighborhood association. Peoples lives (including the important ceremonial occasions in family relationships and their agricultural practices) were supported by their participation in the neighborhood association activities.

The focus of this study is on the responses of 9 neighborhood associations of the former town of Antoku that were distributed in the lower basin of the Mizunashi river. This region faced the crisis of having a divide community because of an erosion control plan made right after the disaster. The people dubbed triangle area between the Mizunashi river and the guide levee river channel created by this erosion plan as the Annaka triangle zone. At this time, this area had 324 households and 1183 people lived there. Of these households, 79 of them were in sites within the scope of the project while 245 of them were in sites that were not.

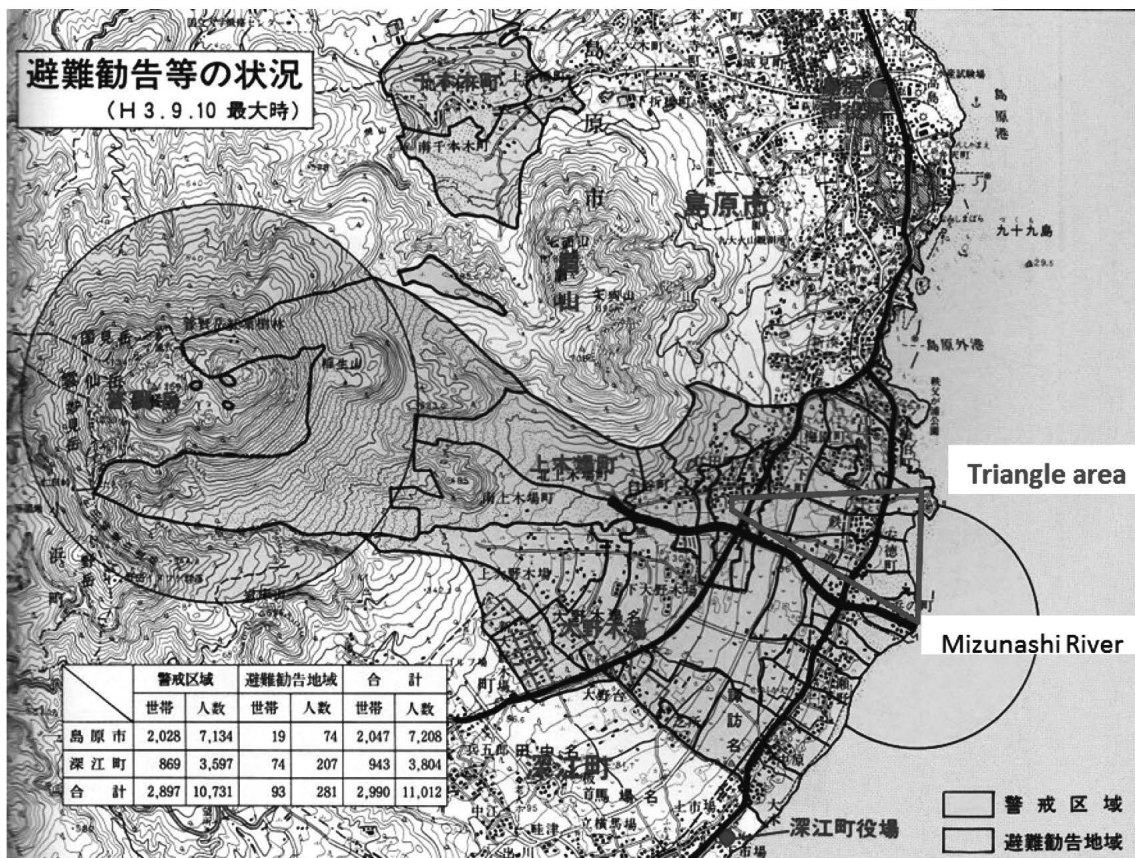


Figure 1. Map of Shimabara City in 1991

Sources: Shimabara City, 1992. Publicity SHIMABARA 1・2. Shimabara city Office.

3. The Disaster in Annaka District and the Basic Plan for Erosion Control

Table 1. The chief events in Shimabara Disaster

| Year | M/ D | Disaster situation/ Movement of residents |
|-------|--|---|
| 1990 | 11.17 | Mt. Uzen Eruption |
| 1991 | 5.15 | Onset of debris flow at Mizunashi river |
| | | First evacuation of the citizens of the Kamikoba district |
| | 5.26 | The strike of the pyroclastic flow at the Mizunashi river and the initial evacuation caused by it |
| | 6.3 | Large-scale pyroclastic flow (43 people missing or dead and 179 houses burned down) |
| | 6.7 | Establishment of the first hazard area on the west side of the Annaka district |
| | 6.8 | Large-scale pyroclastic flow (207 houses burned down) |
| | 6.12 | Closure of the entire national highway 251 |
| | 6.12 | Expansion of the hazard area (an area of the ocean 2.5 kilometers from the mouth of river) |
| | 6.15 | Conference between the mayor and the residence of Kamikoba district on the problem of moving the group |
| | 6.22 | The start of moving into temporary housing |
| | 6.30 | Large-scale debris flow (151 buildings damaged) |
| 7.11 | Kamikoba neighborhood association, announcement of group movement | |
| 7.19 | The citizens of the Kamikoba neighborhood association inspected from a helicopter, the complete revocation of the group movement | |
| 11.10 | Every newspaper and magazine reporting the "plan for the super dam" | |
| 1992 | 2.03 | Call for an official announcement of the erosion control and emergency erosion prevention plan by the coordinated district neighborhood association liaison council of Annaka |
| | 2.22 | Nagasaki prefecture announced the basic idea of the plan for erosion control through forest conservation |
| | 5.13 | Completion of the 1st sediment retarding basin erosion control construction work |
| | 5.12 | Completion of the 2nd sediment retarding basin erosion control construction work |
| | 8.08 | Intermittent large-scale debris flow until the 15th (244 houses damaged) |
| | 9.15 | Large-scale pyroclastic flow (218 houses burned down) |
| | Beginning October | The idea of raising the Annaka triangle zone brought up by citizens |
| | 10.13 | Review of part of the national erosion control ideas |
| | 11.27 | Review of the prefecture's erosion control plan |
| | 12.18 | The Kamikoba neighborhood association agreed to the measurements from an aerial photograph |
| 12.19 | Decision to raise the Annaka triangle zone by the Disaster Reconstruction Promotion Council | |
| 1993 | 1.31 | Official announcement of the project to raise the Annaka triangle zone by the "Disaster Reconstruction Symposium" |
| | 2.19 | Announcement of the basic plan for reconstruction |
| | 4.28 | Devastating damage to the Annaka triangle zone by a large debris flow |
| | 6.21 | Abandoning the removal of earth and sand piled up on national highway 251, and preparing the earth and sand to guarantee vehicle passage |

Sources; Shimabara City. 1992. Publicity SHIMABARA 1・2. Shimabara city Office.

On 7th June, 1991 a residential area was established as a hazard area for the first time since the enactment of the current Disaster Countermeasures Basic Act. After this, another large-scale pyroclastic flow occurred, and the national Route 251 that runs north to south in Shimabara city was closed. Five days later, almost all of the Annaka district (including an area of the ocean 2.5 kilometers from the mouth of Mizunashi river) was set as a hazard area.

On 30th June, 1991 the day that the citizens of the Annaka district evacuated from the established hazard area, a large-scale debris flow took place. This struck 106 houses (primarily in the Kamada area of the Annaka district and Kita-Antoku), and it caused partial damage to all of them. Anxiety spread through the citizens of the Annaka triangle zone that is located south of Kamada and Kita-Antoku that sooner or later a debris flow would hit their land. Thus, countermeasures to debris flow became the largest matter of interest.

Nagasaki prefecture build some sediment retarded basins up stream from Kamada and Kita-Antoku and made a plan to protect the regions that had avoided damage from the debris flow. In response to this, the landowners readily gave their cooperation to rent out land for constructing these sediment retarded basins; this was likely partially because of the suggestion that in the future more debris flow could take place on the Mizunashi river. However, in February of 1992, Nagasaki prefecture officially announced the plan to construct a permanent countermeasure by building a guide levee in Kamada and Kita-Antoku. Many of the landowners learned about this plan from a report in the newspaper.

Moreover, because the basic erosion control plan for the Mizunashi river only discussed the aspect of being a disaster prevention measure, people were dissatisfied about what would happen to their lives. While this was a rushed plan to prevent the spread of disasters, the lack of consensus among the citizens would become a protracted affair.

The people of the Annaka triangle zone that had avoided damage and was outside of this project did not endorse this basic plan. The reason for this was that they felt they could not relax and live in this area because their land would become a pit that was stuck between the guide levee and the Mizunashi river. The people in the project sites were given funds for the sale of their land that they would use to rebuild their lives; however, the people outside of the project sites did not anticipate any funds to rebuild their lives to cover the costs of constructing a new home or to remove the sand and dirt. The people outside of the project sites could not get rid of the feeling of unfairness because people in the project sites would be receiving money for their land and be able to restart their lives by moving to a new place. However, those outside of the project sites were the same victims of the disaster, but they did not have any such prospects.

Moreover, the basic plan that was official announced by Nagasaki prefecture for the Mizunashi river created a confrontation between the neighborhood associations of the former town of Antoku. In contrast to the citizens of Kamada who asked the debris to washed away through the Mizunashi river, the citizens who lived on both banks of the Mizunashi river asked for it to be washed away through the guide levee in accordance with plans.

The connections between people through neighborhood association activities and their occupations

supported life in the Annaka district. Despite this, the confrontation that arose from the delineation of people inside and outside of the administrative plan's project sites became the main cause for the break in the unity of the Annaka district. Because of this confrontation, the citizens agreeing on the basic plan for erosion control as a rushed disaster prevention countermeasure caused many separate problems. This confrontation also made the coordinated district neighborhood association liaison council of Annaka lose its function of coordinating each of the neighborhood associations.

4. A dumping ground for the sand and earth from the disaster and the raising project

(1) Why was the sand and earth from the disaster taken over?

In 1992, the people of the Ominamishita neighborhood association on the right bank of the Mizunashi river had their anxieties exacerbated by worrying if the debris flow that had initially been discharged in Kamada had expanded into their own neighborhood. This was because the repeated occurrences of debris flow made the removal of the discharged debris go slowly and not progress. Thus, the earth and sand continued to pile up, and the people thought the land in Kamada was raised by pile of earth and sand from the low Kita-Antoku. They believed that it would discharge in the direction of the Mizunashi river because the channel that the debris flowed through changed to flow downward.

Several people from the Ominamishita neighborhood association were living in evacuation shelters while starting to talk about how they would rebuild their own lives going forward. Even though they were not currently being struck by a disaster, the houses and fields were included in the hazard area. So there was still nothing people could do with them.

Mr. O from the Ominamishita neighborhood association said the following about some people getting away from the project sites in the plan that was announced by the administration. "It is strange that the same victims are divided into people getting money and people not getting money by being inside or outside of the line." Of course, the administration said they could not do anything about this. Thus, Mr. O and his associates thought if they won't by the whole area as the project site, what can the people in the Annaka) triangle zone (including ourselves) do so that we are saved.

The administration, on the other hand, conducted a questionnaire on the citizens about rebuilding. It seems that Mr. O requested the people in the neighborhood association to answer the questionnaire by saying "we plan to return in the future." He asked them to do this despite the fact that the citizens didn't know about the future and that it might not make sense for each individual. The reason he made this request was because he thought that if the victims answered that they would return to their original area, the administration would do something for them. For Mr. O and his associates the priority to be worked on at this time was the implementation of the rebuilding a life in the affected area of the Annaka triangle zone.

In order to keep living, it was essential to eliminate the anxiety about further debris flow by raising the land and making money for rebuilding. To do this the plan to rent out their own land as a dumping ground for the earth and sand from the disaster was born as an idea to accomplish these things.

This idea guaranteed money that could be used as funds for rebuilding the lives of the victims who fell outside of the project site. But it did more than this, it also was also a plan that raised the land and

allowed for rebuilding peoples lives without them having to let go of their own land that was struck by a disaster.

(2) Implementation of an unprecedented land raising project

From 21st October to 20th November 1992, Shimabara city took proposals from citizen's group within the city when they were settling on a basic reconstruction plan. Thus, a demand to raise the land was submitted, and it was adopted in the original reconstruction plan. After this, Shimabara city officially announced the plan to raise the land in order to "create a safe residential space" to the citizens.

The reconstruction project from the eruption was worked on from April of the following year as a project under the direct control of the nation. The Uzen reconstruction construction office was established as an office for this project. In March before it was opened, the Ministry of Construction expressed several ideas like "if the erosion control facilities are completed, the safety of the area is guaranteed, so it is not essential to raise the land" and "the amount of earth and sand that is discharged is influenced by the weather, so we cannot make predictions of about the complete project. Accordingly, high risk projects are not appropriate as public works projects." On the other hand, they did not completely deny the project to raise the land partly because they were faced with the issue of guaranteeing a dumping ground for the debris.

The dialogs between the Ministry of Construction, the city of Shimabara and the citizens who endorsed the land raising project went on for a long time. The Ministry of Construction conducted them in a way that they could confirm the decision of the people and the city. Apparently, the following exchange took place during this time.

"Even if we raise the land, we won't pay 1000 yen of rent money. If the unit price is 300 yen..." (Ministry of Construction)

"We will still do it for 300 yen." (Representative of the citizens)

Moreover, when the plan to use the earth and sand to construct the Imari/Saga airport was brought up, the citizens who were landowners were opposed saying "we won't let vehicles to transport the earth and sand pass through the Annaka district. After these types of exchanges took place, Mr. O reflected that "the administration probably wanted to know if we were serious." He was likely opposed to the suggestion of 300 yen if it was only simply money for rebuilding. However, for these citizens renting out land as a dumping ground for debris was not a problem of the amount of money. Rather, these citizens were interested in alleviating the feeling of unfairness that arose from the line drawn by the administrative plan. In other words, they were interested in if the people outside of the project sites could be saved by a public works project in the same manner that those inside the project sites were.

During this time, the extent of damage from the debris flow continued to increase, and from April 28th 1993, there were continuous debris flow rocks that caused devastating damage to the Annaka triangle zone. There were 159 houses that were fully or partially destroyed. Up to this point, there

had been earth and sand from the debris flow that had poured into this area, but people continued to remove it by themselves. However, the amount of earth and sand that piled up due to the debris flow during this time were on a scale where they could not be removed by oneself. The Shinto god of the former town of Antoku and the Tenma Shinto shrine had piles of earth and sand 6m high, and the archway of the Shinto shrine was almost completely buried.

As long as a public works program was not introduced, reconstruction just by the citizens was discouragingly difficult. This disastrous debris flow led to a change in opinion about the plan to raise the land that had been pushed forward by some citizens. There an increase in people who had decided that “the only option was raising the land.”

The Ministry of Construction who at that time had stated that a project raising land was not suitable as a public works project expressed their agreement with the citizens’ plan. This was because it became clear that to transport the earth and sand from the disaster to another location, new public works projects were essential. Land transportation needed new roads built and sea transportation required new harbors. Thus, they thought that public works projects for a “dumping project” were not appropriate because it was not a permanent endeavor. Moreover, compared with the costs of building roads and outfitting harbors, the costs of paying rent for a dumping ground and the costs of subsequently raising the land were a low price to pay.

As the damage from repeated debris flow continued, Nagasaki prefecture and the city of Shimabara worked with the citizens to confer a response. At this liaison council, one of the people in charge of Nagasaki prefecture said that if all of the landowners agreed to use the Annaka triangle zone as a dumping ground, they might be able to pay some rent money.

The citizens who were primarily the ones who advanced the land raising idea took this and held an explanatory meeting for the landowners. At this meeting, it was the plan that if rent was set at 1000 yen per unit for the 4.6 million km³, the money made could be evenly distributed amount 324 households. However, some of the citizens “didn’t understand” or “couldn’t grasp” this, so the plan only received a half hearted dubious response. Nevertheless, of the 7 neighborhood association in the triangle zone three of them (the Ominamiue, Ominamishita and the Hama neighborhood associations) submitted requests to implement the raising project. Little by little the opportunity for the land raising project became more probable as something that the entirety of the Annaka district should work towards.

Then on 19th June, the coordinated district neighborhood association liaison council of Annaka and the 9 related neighborhood associations submitted a demand for the land raising project. On 30th June, the “liaison council on implementing the land raising of the Annaka triangle zone” was started. The city of Shimabara served as the executive office for the liaison council, and the Ministry of Construction, the locally elected prefectural assembly and the city council members were added as advisers.

Later in October, it was decided that the management tasks of the dumping ground would be handled by a public land development company in Shimabara city, and a system to implement the land raising project was prepared. However, this project was a plan made by citizens that did not fall under

the framework of existing public works projects, so it required a 100% agreement of the landowners. Thus, the conference became in charge of obtaining the consent of the landowners.

By April of 1994, 526 of the 544 landowners had agreed, but it was January of 1999 before there was a 100% agreement on the land raising and land readjustment plans. This was extremely difficult because of the need to guarantee sites for cemeteries and temples, but the agreement for only the land raising project was obtained in one year and 3 months.

The 100% agreement on the raising project was able to be implemented in a year and 3 months because the liaison council of the landowners was persuasive. The most difficult thing for the liaison council to get the citizens to understand was that private property would face a land reduction of 30%. For example, if a person owned 1000 acres of land, they would lose 300 acres. However, if a person only owned 100 acres, they would only lose 30, and the theory was that this was unfair. On this point, the people at the liaison council who gave good explanations to the other people as fellow victims of a disaster and convinced them by saying that “ debris flow could happen at any time, but 700 acres is guaranteed with the raising project. Will you just throw that away?” If this was a normal public works project a land reduction of 30% of one’s private property would very likely not be accepted in negotiations. Nevertheless, the reason that people were able to do this was because of the special circumstances of recovering from a natural disaster.

5. Conclusion

This article has clarified how communities struck by disasters work to continue through an analysis of a case where local citizens who had experienced a volcanic eruption leased their own land as a dumping ground.

The people in the triangle zone of the former town of Antoku accepted two hardships to try to accomplish rebuilding their lives and reconstructing the community after the disaster. The first of these two hardships was being responsible for the earth and sand from the disaster. The second of these two hardships was a 30% land reduction of private property.

The earth and sand that people took on from the disaster was not just soil that was taken from a mountain and brought in; rather, it was earth and sand that was discharged by a disaster that brought catastrophe to Shimabara that included rubble and that took 44 lives. By accepting what at a glance seems like a disadvantageous choice, the triangle zone that was outside of the project set up in erosion control basic plan after the disaster got to be included in the reconstruction project. In other words, this zone was able to work out a way to go from what seemed like unavoidably rebuilding independently to having people get money to cover rebuilding costs from a public works project.

Moreover, people accepted having their own land reduced by 30% (in the end it was 26.1%) during the raising project. If they had not accepted the land reduction, it is possible that the private property would have been wasted as a dumping ground for the earth and sand from the disaster. Everyone had to accept a land reduction of 30% in order for the continued existence of the community.

24 years have passed since this disaster, and this community has continued to exist because they took on the earth and sand from the disaster and undertook the raising project. Now, new households

are preparing residences in this community; it has a large super market, hospital and police box on site. The two hardships that the citizens faced during the disaster caused the continued existence and development of the community.

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Reconstruction or Adaptation?

A Reconsideration of Environmental Refugee Communities

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Abstract

As technology develops, so do concerns regarding potential danger; specifically, concerns are being raised about nuclear power, dams and urbanization. However, once a project fails or unintended outcomes occur that are beyond human control, it will incur a disaster. But, it seems this cannot prevent the government from implementing those projects. At the same time, the disappearance of rural areas and farmlands due to economic development has also become a severe environmental problem. Many people are losing their farmland and being forced to emigrate from their disappearing or occupied homes. Such examples are abundant in recent years. From China's Three Gorges Dam Project to Japan's Fukushima Daiichi Nuclear Power Plant Project large amounts of people have been compelled by government action or nature to migrate and accept a new lifestyle. The same situation is faced in Western China by the desert community of Minqin and also by Wenchuan, which is still recovering from a violent earthquake. Meanwhile, there is a commonality among these cases, that is, people have to reconstruct and adapt to a new life and form a new community. But, if the research on this subject focused solely on migration, the refugee communities themselves will be excluded. And, if we reconsider the experiences of those failed environmental protection projects, we may discover that it is important to take into account the community's local knowledge and how their lives are impacted.

Introduction

We live in a world chasing after economic booms. Thousands of development projects were constructed driven by interests expansion. To compare with environmental protection projects, the interest expansion projects take up most parts of project schedules. In China, The Three Gorge Dam Project forced 1.13 million people (Feng Xiaotian, 2004) out of their homeland. In the meantime, the ecological recovery plan had been implemented in Inner Mongolia, Gansu, Xinjiang etc. Ecologically vulnerable places forced large amounts of people off their land. For example, debris flows from devastating earthquakes have pushed millions of people out of their homes. Meanwhile, some places

faced both natural disasters and government pressure, such as nuclear power plants, leading people to move out of their homeland. Whether it is due to developing expropriation, deterioration or even disaster, those emigrants were being called “environmental emigrants” or “environmental migrants”. According to the definition produced by the IOM (International Organization for Migration), which is being used with expanding popularity, “Environmental migrants are persons or group of persons who, for compelling reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad” (IOM, 2007). In general, it has become the norm for farmland degradation, desertification and water scarcity to force people to emigrate. Water pollution, desertification, dam projects, earthquakes, etc, bring catastrophe for families with fragile livelihoods living in ecological sensitive place. Some of the projects have the aim of taking people away from dangerous places. For example, in areas affected by water scarcity, the government encourages farmers to emigrate to nearby places or to change their lifestyles by implementing environmental protection policies involving subsidies. However, most of the projects are not succeeding because the new lifestyles are not suited to farmers who live according to their local knowledge and the missing subsidies are not being used to help the farmers. In the meanwhile, the flawed government objectives are not only unhelpful but also squeeze the poor into a more restrictive lifestyle. Good intentions leading to bad outcomes is no longer a strange occurrence in this century.

The meaning of the research object

Looking internationally, the United Nations High Commissioner for Refugees (UNHCR), in its 1993 book *The State of the World’s Refugees*, identified four root causes of refugee flows. These were political instability, economic tension, ethnic conflict and environmental degradation. The claim also pointed to the link between environmental degradation and population movement, and recognized that the numbers of displaced people were larger than indicated by the statistics on refugee flows (Steve Lonergan, 1998). Myers (1995) states China has 120 million internal migrants, and at least six million should be regarded as environmental refugees. Also he pointed out that there are now at least 25 million environmental refugees. In the meantime, the International Organization for Migration (IOM, 1992) goes farther, noting that there might be one billion persons who have been “environmentally displaced from their original habitat”.

As Alena Perout pointed out when the environmental resources barely support life there and environmental degradation continues, many will have to migrate to a new location. Many will wait until the last possible moment to leave their homes and will feel a sense of desperation similar to that of the millions of refugees around the world today who flee political and social unrest. Those whose migration is due to the degradation of their environment are environmental refugees (Alena Perout, 1995). Furthermore□the migration streams generally resulting from three main disruptions there are disasters, expropriation of environment, and deterioration of environment (Diane C. Bates, 2002). However, under such a definition of environmental refugees, some refugee communities which waited until the last chance of displacement will be unreasonably excluded from the research.

Although there are differences in the definitions between “environmental refugee” and “environmental emigrant”, this article will focus on the non-voluntary emigrant community in the context of environmental change. In this meaning, the focus should be on the environmental refugee community. Specifically, one research object in this article is the environmentally degraded according to my accessible observation.

Lessons learned from cases of international environmental refugee communities

As Ogenga Otunnu’s research on environmental refugees in Sub-Saharan Africa pointed out the responsibility for the existence of environmental refugees in Sub-Saharan Africa both lay in the nature of the state, the political economy and the international economic system. Climate change and wars as well as overpopulation and economic reasons become a burden on the community trying to continue its usual way of life. As a result, in order to survive, such a population mainly faces two choices. The first one is to stay in the original habitat with the government’s help and adopt a more sustainable lifestyle. The other one is immigrating to a new place which is often supported by the government under the goals of protecting and recovering the original habitat’s ecological environment.

Research on refugee communities is dominated by worries over conflict and instability owing to the problems of poverty and homelessness. In the eyes of the large population, refugee communities are seen as unstable places in their homeland as well as a source of potential conflicts which could be triggered at any time. However, in fact, the most relevant forms of environmental degradation could be categorized by general processes like pollution, deforestation or desertification and degradation of ecological places such as the danger of submerged islands or the development of big projects such as the Three Gorges Dam, etc. In the refugee community, the poverty and instability encouraged the government to launch policies to help them out of their dilemma. Because their movements were driven by flood, famine or the loss of traditional conditions for economic survival, these people are more likely to be exploited rather than cause conflict for the reason that those who are most victimized by environmental change are also likely to be weak and numerically few. And, aiding these populations must primarily be seen as a humanitarian obligation rather than a policy based on security considerations (Astri Suhrke, 1993). Based on the point above, it is important to protect refugee communities from further harm and to encourage them to adapt to sustainable lifestyles.

The cases of ecological recovery projects in China

However, because these types of situation can be highly complex, the implementation of government policies in refugee communities is fraught with difficulties because to some extent policy often relies on clearness and simplicity to solve local problems and rebuild the refugee community. Based on the viewpoint of James C. Scott as explained in *Seeing Like a State*, the “from up to down” government policy often starts from the goal of control and management so that the focus is standardization and rational thinking instead of getting along with the local farmers’ lifestyles. Minqin is an example to clarify this problem.

Minqin is a small oasis surrounded by three deserts in Gansu Provinces in western China.

According to a 2007 report, the water resources in the oasis are not enough to support the farming livelihood there so the government enacted and implemented an ecological policy to recovery the ecological environment as well as pull poor farmers out of tragedy. The policy mainly consists of three parts. The first is "shutting down motor-pumped wells and reducing area of arable land". The second is "ecological financial compensations and other supporting compensation". The third one is "economic encouragement" for farmers to recovery from losses sustained due to water scarcity and damage caused by desertification. However, like other cases which have been implemented, such as an ecological protect in Inner Mongolia which forced a large amount of herdsmen to move. The outcome of that policy brings different ecological benefits for herdsmen due to the different form of movement. In general, the higher ecological benefits of involuntary movement are due to the preservation of the form of the original community. Conversely, the benefits of voluntary movement are lower than involuntary movement due to sparse inhabitations. Moreover, the actual economic benefits are lower than the anticipated economic benefits because the government often ignores the local livelihood experience of herdsmen. More importantly, the differences of original lifestyle with new living strategy have significant influence on herdsmen's ability to adapt to migration. Not to mention, between there is an occurrence impassive impact on the culture and customs brought by migration. As with the migration community, the same survival dilemma was also encountered in Minqin County, an environmental refugee community in which life supporting resources were threatened by the encroaching desert and more frequent sandstorms. In the community, usage controls restricted the lifestyles of local farmers who are used to depending on their local knowledge for surviving. Meanwhile, the large amount of compensation is missing from the process of distribution which is attributed to the local government's corruptions and caused farmers' living standards to decline. In addition, the mismatching of economic encouragement is unhelpful for farmers struggling to survive. In both cases, the project made it more difficult for the original inhabitant to move out and adapt to a new lifestyle designed by the government. The distance, economic activity and the difference from their original lifestyle made their adaptation more difficult. In those situations, the emotional support and the inner support from the community might highlight its importance.

Reconsidering governmental plans for environmental refugee community.

The national viewpoint is often simple and clear which means it lacks consideration of the possibility of environmental change in the long-term. The migration distance, the feasibility of economic activity, the similarity of original daily life and emotional support determine the likelihood of the rebuilding's success. However, questions are raised by refugee flows into a new placement provided by the nation, especially the refugee community constructed by the government. In the viewpoint of the government a clear, active guide and a simple plan serve as their management goal. In this case, the community's ability to recover is managed by the government's plan. Generally, the community's aid plans were designed by a belief in management and recovery. It inevitably ignores or disregards people's original local knowledge by providing them with direct support such as food and money. In the short term, it is the effective and timely provision of a shelter for poor people. However, in the long-term they lack

plans to encourage them to rebuild their original lives or to adapt a new life, both of which need local knowledge and far-sighted policy. As James Scott (1998) pointed out, owing to the features of clearness and simplification certain schemes to improve the living conditions have failed. When it comes to refugee communities, governments often want to strengthen them. If they ignore the real needs of the community, well-intentioned plans are in danger of failure and may even bring a larger harm to the community. Therefore, to rebuilding the community often requires that the community adapt to the designed plan. When the adaption is unsuccessful, the possibility of successfully rebuilding rests on the community's resiliency. In this situation, the community's endopathic structure, source and the flow of impetus becomes the crux of the community's destiny.

Conclusions

This paper mainly reconsidered the condition as well as analyzed the reason for unsuccessful support by governments to environmental refugee communities. Several features of environmental refugee communities and the definition of the refugee community have also been reviewed. Firstly, the environmental refugee community should not be only presumed by the flow movement because of its diversity and the complicated reasons behind the phenomenon of displacement. Those communities forcefully rebuilt after the disaster or environmental degradation by the government should also be considered in the environmental refugee community. Furthermore, the paper analyzed the reason for the failure of government protections plans in the cases of two communities in China. The government's plan for the community often rests on the intention of reconstruction by providing alms and resources to those in need. But in the long term the community must change their lifestyles and adhere to various adaption's guidances. However, under the experience of the national plan's traits of clearness and simplification the community's reconstruction seems harder than it appears and it is more than just help. The ability to adapt to the new situation is the crux of the rebuilding plan and is not confined only to emigrant communities internationally but also to the original habitat's community.

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Lessons from the stakeholders' discussions after Fukushima Daiichi Nuclear Power Plant Accident

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1. Background

Fukushima Daiichi nuclear power plant accident posed diverse challenges to the people, depending on their conditions such as locations, livelihoods, family structures, and so forth. Farmers are affected in many ways, such as the restriction of planting or shipping, price slump due to the harmful rumours. Young parents with children had especial concerns about the ambient dose and the contamination of food and water, since children are considered as more sensitive to the to the exposure to radiation. Sometimes families were separated as the young parents and children evacuate while older members stay in the community.

2. The action research project focusing on decontamination and its limitation

The author was involved in an action research project called FAIRDO (Fukushima Action Research on Effective Decontamination Operation)^[1]. Launched by a few universities and research institutes in Tokyo and Fukushima, FAIRDO aimed to contribute to the rehabilitation of the disaster affected people, through analysing the status and providing practical recommendations to the decontamination activities.

Decontamination is a series of activities to remove the radiation contaminants spread by the accident, from the buildings, houses, roads, fields, etc.. The Act on Special Measures for the Treatments of the Radioactive Contaminants in August 2011 specified the National government and about 110 municipal governments to carry out decontamination in the designated areas. To successfully reduce the radiation levels and set the basis of the reconstruction of the areas, a number of issues should be examined. Just to name a few: how to secure the necessary resources; how to develop technologies and train the workers; how to communicate with the residents to agree on the methods and coverages of activities; how to share the information among municipalities, as well as with citizens. FAIRDO project

[1] <http://www.iges.or.jp/jp/scp/fairdo/index.html>

aimed to explore these issues and contribute to the smooth recovery of the society in the affected areas. However, our studies revealed that the reduction of radiation through the decontamination may not necessarily lead to the recovery of the conditions where people can retrieve their lives with a safe conscience.

Firstly, the communication between the citizens and the municipal governments were not effectively done in many cases. The governments faced difficulty reaching agreement with their residents on the coverages, methods, and the set-up of the temporary storages of the contaminants. On the other hand, the citizens felt mistrustful of the governments that did not listen to their concerns and decided by themselves on various issues, such as the designation of the Specific Evacuation Recommendation Sites^[2], provision and stoppage of supportive measures, limitation of cultivation. These policies were announced only everything was determined.

Secondly, the mutual distrust was strengthened partly by the confused patterns of providing necessary information after the accident. A number of experts who were not commissioned by the governments also came to the affected areas and provided various information, including those sometimes inconsistent with the official ones. Such diversity of information source sometimes caused confusion among the citizens, and hindered communication among themselves, as well as between them and the governments.

Thirdly, people's living conditions and life stages would shift during the years required for the reduction of external radiation, and would make it unrealistic for people to recover the status quo. For instance, it is quite difficult to resume cultivating rice paddy after leaving their land idle for three years. While most of the people working in the agricultural sector are aged 65 or older, quite many of them would give up farming during the years of limitation. For parents with children who evacuated to the other areas, three to four years mean that their children proceed to higher education, and became firmly rooted in the new location. In such cases it is not realistic for them to resume the status quo, even the radiation dose is reduced.

People had diverse recognitions of the risks of radiation and the appropriate measures to deal with them, depending on their diverse conditions. Similarly, they had different visions of the community after reconstruction, as well as the desirable life of their own families. One of the serious challenges was that the people and the governments have had scarce opportunities to share their own concerns, and to discuss the possible visions of the reconstruction of the communities and the rehabilitation of the people's lives, including those who are not going to return. Based on such consideration, we organized a series of round table discussions, inviting the local governments, NGOs, residents' groups, and researchers.

[2] After the accident, the national government first set the "returning difficult areas" and "living restricted areas" in the areas with high level of contamination. However, a number of hotspots were identified out of these areas. The government carried out surveys and designated total 282 households exceeding the dose level exceeded 20mSv/year as Specific Evacuation Recommendation Sites.

3. The FAIRDO roundtable meetings

3.1. Overview

The FAIRDO roundtable meetings were organized four times in 2013 and 2014. The first and the second meetings were held in Fukushima city, inviting the government staffs of the Prefecture and Municipalities, NGO staffs and University researchers. The participants, including the prefecture and the municipal governments, shared their experiences of the communication with their residents. Some of the cases of the citizens' initiatives to cooperate with farmers and scientists to ensure the safety of food were also introduced.

The third and fourth meetings were held in Ryozen-cho of Date city, where the hotspots were found and caused severe challenges, inviting the representatives from the residents' activities to ensure the safety of agricultural activities, to support parents and children, and so on. The residents' groups provided fruitful subjects to be discussed.

Table The overview of the roundtable meetings

| | Date / Venue | Participants |
|---|---|--|
| 1 | 26 Jul 2013 Fukushima University | 2 from national ministries; 3 from Fukushima prefecture government; 4 from municipal governments; 5 from civil organizations; 1 from decontamination operator; 10 researchers (universities/institutes in Japan); 5 researchers (institutes in Europe) |
| 2 | 27 Sep 2013 The conference centre in Fukushima city | 1 from national ministries; 1 from Fukushima prefecture government; 3 from municipal governments; 3 from civil organizations; 1 from decontamination operator; 9 researchers |
| 3 | 12 Nov 2013 The community centre in Ryozen-cho, Date city | 1 from national ministries; 2 from Fukushima prefecture government; 4 from municipal governments; 1 from civil organizations; 1 from decontamination operator; 13 researchers; 4 residents from Ryozen-cho |
| 4 | 29 Jan 2014 The community centre in Ryozen-cho, Date city | 1 from national ministries; 2 from Fukushima prefecture government; 3 from municipal governments; 3 from civil organizations; |

3.2. The subjects

In what follows some of the subjects discussed in the third and fourth roundtable meetings will be introduced.

1) The distrust to the “safety” emphasized by the governments and the experts

One of the residents of Ryozen-cho described that several people in the white protective suit suddenly appeared in the area 4 days after the accident and began monitoring. Residents had good reasons to be worried as they were not informed of what the men in white suits were doing. The city office released the ambient dose map after a few months. However, it was not so helpful for them to determine their daily behaviours since it showed the monitoring result in 1km mesh. The information on radiation gradually became abundant. However, people were still confused due to the various ways of interpreting the figures were also introduced by many “experts.”

At the roundtable meetings, the experts raised confusion and challenges by raising the topics of the “relatively safer” condition in Fukushima, in comparison with the areas where the background radiation is stronger, such as some of the European countries and middle Asian countries. Even the experts spoke in good faith to make people relieved by telling them the scientific fact, their ways of communication may embarrass them.

2) Frustration over the one-sided decisions of the governments

Date city was not designated as the evacuation recommendation zones. However, about 128 houses in Ogunia, one of the areas comprising Ryozen-cho of Date city, were identified as the Specific Evacuation Recommendation Sites^[3]. The families living in the designated houses were suggested to evacuate, and were provided with the affluent amount of the compensation^[4]. The community was not involved in the decision process, till the city office announced it by letters sent only to the designated families. This caused serious confusion among the community.

Why did they decide by themselves, without consulting the community? No discussion was held at the time of designation, and delisting. Some of the houses were delisted before decontamination. (snip) how can we go together with them with smiles? What was even worth, the hard situation uncovered the personalities of people, such as those tend to detract others, that we were not required to see before. This is the segmentation of the community caused by the nuclear accident. (12 November 2013, Mr. A, the former leader of the residents’ group to monitor the radiation in Oguni)

As this consequence, some of the families moved out without telling their neighbours. This is not the only case of the one-sided decision of the city government. According to a woman who also participated in the roundtable, they were not involved in a number of decisions, such as: the closing

[3] 113 households in 104 spots were designated in 30 June 2011. Then the other 15 households in 13 spots were added. They were delisted in 14 December 2012, as the dose level became lower.

[4] The designated households received JPY 100 thousand per one member per month till March 2013. The other families received a one-time payment of JPY 80 thousand for adult and 400 thousand for pregnant women and children under 18 years old to the other families.

out of the support for children to use taxi to ensure a safe commute to the schools^[5]; serving of rice produced in Fukushima for school lunch; and so on^[6]. They were offered brief questionnaire surveys afterwards of the decision, in the best cases. Through Such experiences they deepened their frustration against the city government.

3) Causes of insecurity other than radiation

People have been required to take care of a number of issues other than radiation. Parents are put in a double-bind with their responsibilities to ensure the safety of their children from the radiation risks, as well as to provide the necessary condition for their sound development in the society.

(After the city's decision to use Fukushima-made rice for school lunch) I made my boy bring rice I cooked myself for a while. However, he said "Why only I should do this? I want to have the same lunch with my friends." "Won't I be allowed to join the swimming class?" I thought I was the only person to save him. However, I knew it was also important for him to have the same experience with his friends, for his mental health. I appreciate the school teachers giving good considerations, but I do not yet feel completely relieved. (12 November 2013, Ms. B, the leader of the young mothers' group of Oguni)

Their responses to the risks of radiation sometimes conflict with the other activities. This is one of the reasons why people were pressed for difficult decisions.

4) The difficulty of communication among the residents

The people in the community had diverse conditions such as family structure, designation of the Specific Evacuation Recommendation Sites, and so on. Naturally their awareness and opinions about the risks of radiation became diverse, and made it difficult to communicate to each other. Daily conversation in the disaster affected areas sometimes touch upon the issues of radiation, that tend to cause stress. People who are strongly concerned with the radiation are bruised by unintentional talks, such as "Are you still concerned with such a matter?" or "Are you sure to eat such foods?" They want to determine how to protect themselves, but they are still sensitive about their neighbour's words.

The difficulty of communication among the residents was partly caused by the policies of the national and the local governments. At the 3rd roundtable meeting, Ms. B pointed:

The Specific Evacuation Recommendation Sites segmented the families in the community. Even among the colleagues who have worked together, half of them were designated, and the other half were not. It became

[5] Many of the children of the families evacuated from the Specific Evacuation Recommendation Sites used taxi to commute to the primary schools in Ryozen-cho. The city office supported the taxi fee. Upon the delisting of the Specific Evacuation Recommendation Sites in December 2012, the city once announced the stoppage of the support. However, it met strong opposition by the residents and decided to continue the support one year.

[6] Most of the schools refrained from serving Fukushima-made rice for school lunch after the accident for a while. Date city repeated examination of the contamination of rice and decided to use Fukushima-made rice again in the 38 primary and secondary schools since 10 April 2013.

impossible to work hand in hands after that. This bruised us. My family was designated, but some of my friends weren't. (12 November 2013, Ms. B)

Communication among those who evacuated and those who stayed in the community was also difficult. When one of the experts who attend the community discussion mentioned that people were keen to listen to those who are away, Ms. B promptly responded that they (who are evacuating) haven't heard such requests at all.

3.3. The manners of talking

While discussing the above mentioned issues, the participants used a few characteristic manners of talking.

1) The universality and the particularity

The "safety" told by the experts to reassure the lay people often result in the oppositions or distrust. In the roundtable discussions, the risks in Oguni, in comparison with the other countries with higher levels of natural radiation such as Europe, triggered hot debates.

The natural radiation is 7.5 mSv in Finland, about 6 in Sweden, and slightly above 4 in France. The figures in European countries are higher. The figure (of Oguni) became closer to Europe. (12 November 2013, Mr. C, the officer at the Fukushima Branch of the Ministry of Environment)

If I directly take what Mr. C said, I will go mad and say "what are you talking about?" But I follow the words of the chairman and refrain from being emotional. I want to stress that we have lived in the landscape of the mountain and forest, and the wild plants and mushrooms we collected there were highly contaminated. Whenever you disseminate information, please do understand such situation. We still face difficulties. (12 November 2013, Mr. A)

The two participants understand the points of the argument differently. Mr. C describes the universal fact that humans can live safe even in the areas with higher background radiation. However, Mr. A calls on them to take the particular context into account by repeating the word "we." To Mr. C, the point of the argument was how well the residents understand the universal fact. To Mr. A, however, the point was that "safety" should be determined in the particular conditions.

After this, a university professor (Mr. D) objected to Mr. C, saying that they still need to carefully examine the conditions of people in Fukushima. This probably showed the participants that sometimes the experts' opinions are not unified, and therefore they are not always the only right answer.

AT the 4th roundtable in January 2014, Mr. C asked the chair to give him a chance to explain the material he prepared after the previous meeting.

At the previous meeting the residents showed anxiety about radiation, and this seemed to hinder the progress. I prepared this so that you could understand the current status. I studied to get rid of the anxiety about radiation. The result is that the natural dose in Japan is 2.09 mSv on average, while that in northern Europe is 4.5 mSv. If we consider the current status of 1 mSv (in Oguni) we find that the similar levels of radiation are observed in the other places. (29 January 2014, Mr. C)

However, Mr. A challenged him again.

(Mr. C) said the dose in Sweden is higher. However, human has high ability to adapt. I suppose people there could have adapted already. We have not yet had such adaptability. We are not eased by knowing that others live (in similar levels of radiation) since we have lived in a clean condition so far. I do not intend to oppose him. I just want you to know how we think. (29 January 2014, Mr. A)

In this conversation he appeals the participants to take account of the particular background by pointing out the potential difference between those who have lived in the high radiation areas, and those who experience the sudden increase of the dose due to the accident. In other words, he expresses that their feeling of anxiety will not be relieved only by telling them the universal scientific facts.

He does not deny the scientific fact presented by Mr. C. However, he attempts to relativise it, not as the single correct answer, but as one of the information to be referred to. By saying "I just want you to know how we think" he asks the experts to recognize that they have their own capacity to interpret their condition, and their interpretation can be juxtaposed to the expert's opinion. Their particularity is emphasized in this context.

2) The diffident manner and the reservation of the representativeness

We invited the residents from the two areas of Ryozen-cho, namely, Oguni area that suffered from the high level of radiation and experienced the confusion due to the Specific Evaluation Recommendation Sites, and Kakeda area that were not as highly polluted as Oguni. Both of them showed reserved attitudes and gave adequate considerations to each other.

Our generation have children. Furthermore, our condition is different from Oguni, even though we are in the same Ryozen-cho. I have always explored to what extent I could speak. I have always thought that people in Oguni might say those in Kakeda would never understand their feelings. On the other hand, some of people in Kakeda say they were already too much bothered, and want themselves left alone. (12 November 2013, Ms. D from Kakeda area)

The residents have developed such reserved manners of talking through their experiences of the severe conflict within the community as well as between the communities. They also give thoughts to those who don't want to (or can't) present themselves at the occasions of discussions. Their diffidence

is effective to reserve their representativeness as “the victims” and to prevent the crucial conflict that might close the conversation, among the people with diverse conditions and different concerns about the risks. At the same time, they alert the government staffs as well as the experts that what they talk might differ from the opinions of “the victims,” and that the particular conditions of the hardships should always be taken account.

Despite such effects, such manners may also have a drawback. They may sometimes refrain from raising the issue that they want to talk deep down inside, out of their diffidence.

4. The implications for the sustainable communities

Unfortunately, the roundtable meeting was not held after the fourth, due to the conditions of the organizers’ side. However, the four times of meetings gave us the opportunity to lean the points of arguments, as well as the manners of talking, all of which are of interest. The participants from the affected areas stress their particularity to argue that they have their own ways of interpreting the risks, which could be juxtaposed with the expert’s knowledge. They also gave considerations to the others who might have different kinds of concerns, wishes for their future. They have developed such wisdoms to handle the difference in their awareness, wishes, as well as the objective conditions, from their experiences to be puzzled by the diversity in the “experts’ opinions,” or to be confused to witness the severe conflict among the neighbours.

When we think of the relationship between the experts and the lay people, we tend to pay attention to how the experts can effectively provide the scientific knowledge to the lay people, to make the governments decide the right direction, or to make the people agree to it. However, in the cases when the stakeholders have diverse thoughts on the issues seriously affecting their ways of living, it may be more appropriate to deliberately seek for the issues on which they can continue the conversation and work together regardless of the difference in their standpoints and different understandings of the risks, without resolving the discrepancies.

However, it should be recognized that the continuous conversation in diffident manners may lead the participants to refrain from raising the topics that they sincerely want to discuss, or to miss the opportunities to reach agreements on important matters. They may not stay motivated to participate if the meetings are repeated without any outcomes.

The nuclear accident revealed the difference in the awareness of the risks and the conflicts among the community people, as well as the trust between the community and the local governments. However, the accident was not the single cause of these challenges. Mr. A in Oguni said “the disaster put forward what should have occurred here in 10 years.” Like any other communities suffering from depopulation problem, Oguni was not able to come out with the common vision to maintain the community, even before the disaster.

What topics should be discussed among the community people when the status quo of the community is not realistic, and people do not necessarily want to live there? What kind of conversations can enable the people to rehabilitate their livelihoods among the people having diverse

concerns and wishes? What roles can the experts or the other people from outside can take to support them? The conversations in the roundtable meetings marked the potential challenges that a number of communities would face when they are urged to discuss their sustainability in the near future.

Disaster, response, and recovery of the *Hebei Spirit* oil spill, Korea

Impacts on ecosystem services and its coupled households

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Abstract

This presentation describes the *Hebei Spirit* oil spill (HSOS) damages on coastal ecosystems and the coupled households of coastal communities. The economic losses associated with HSOS at the individuals and households levels were elucidated by analyzing damage claims settled by coastal inhabitants. Damage claims data were obtained from the local court that approved the claims for the International Oil Pollution Compensation (IOPC) process. The analysis covered settled and court-granted individual claims for monetary compensations due to the HSOS. Government reports were used to examine national responses. Results are depicted in three folds: 1) HSOS damages to coastal ecosystems, 2) social and national responses shown to mitigate HSOS damages, 3) individual and household responses shown by litigation data to balance the economic losses due to HSOS damages, and finally, 4) ecosystem recovery and community recovery. The emphasis was laid on 3) and 4) which analyzed community structure in economic view, its dependency on ecosystem services, and the linkage of ecosystem recovery to community recovery. Government designated the HSOS a disaster and passed legislation impelling mitigation efforts. Residual oils could still be seen in engulfed bays and muddy sediments as recently as 2013. Benthic fauna along the rocky shore showed a fair recovery with five years of the oil spill. Water quality recovered first, with thick oils and brown sheens having been mostly removed within a couple of weeks owing to massive removal actions. Life subsisting systems of coastal communities were closely linked to coastal ecosystem services: subsistence households were clearly observed in settled claims data analysis. Individual monetary compensation awards were far less than the contingent valuation method (CVM) estimation of ecosystem services lost. Only ~11% of the settled claims were approved by the court. Governmental questionnaire surveys

about local community recovery, in terms of livelihood, business, conflict, and public image of the affected area, were strongly negative (negative 45 %, neutral 39 %, positive 15 %) until 2009. Recovery of the local community lagged behind the ecological recovery.

Introduction

The present work synthesized findings from our two prior papers published in *Ocean & Coastal Management* (Hong et al., 2014; Kim et al., 2014), and adding an economic aspect of individuals and households at HSOS affected coastal communities. The main argument of the present paper is, however, that households of coastal communities nearby HSOS impacted coasts were closely linked economically to coastal ecosystem services. The litigation records of the Seosan local court, which handled HSOS claims, revealed that many coastal residents made their livings in artisanal fisheries. Local residents use hooks and rakes to catch clams and oysters in mud and sand flats and along rocky shores during ebb tides. The scenery of those artisanal fisheries represents a typical cultural landscape characteristic to the Korea coast. A similar panoramic view can be seen on opposite Chinese shores in the Yellow Sea, substantiating the occurrence of socio-economic and cultural coupling of coastal communities to their ecosystems. However, these coastal environment-reliant human activities have not been well quantified. Court documents of damage claims provided a clue to scrutinize the ecological-economical coupling of individuals and households with ecosystem services in a quantified manner. We may regard the court decision of economic damage compensation as an officiated valuation of ecosystem services rendered.

The HSOS litigation produced a variety of official records regarding economic compensation for ecosystem service-concerned damages. The Seosan local court maintains the records of settled and granted individual claims employed for International Oil Pollution Compensation (IOPC) procedures. The information in the court records has served as an official and legally binding valuation of the coastal ecological services utilized by local inhabitants. We supposed that the settled claims should correspond to a contingent valuation method (CVM) estimation of coastal ecosystem services. The court documented economic compensations awarded to individuals and categorized the awards by county and business sector. These empirical data matrix and observations have assisted to describe the affected households and community in economic view.

Although the HSOS was considered a small- to medium-scale disaster, it was catastrophic for the local Korean communities who were exposed to physical and chemical hazards while living in deteriorated coastal ecosystems, and experiencing disrupted local subsistence consequent to those hazards and the deterioration. The spill did not result in direct threats to people's lives, but rather affected people's job security, economic welfare, and health. The HSOS was publically perceived as a risk and triggered nationwide volunteering actions to help with the cleanup. Cleanup efforts were supported by millions of citizen volunteers. The government passed legislation to fund Disaster Risk Reduction (DRR, ISDR, 2009) including direct financial aids to residents. Multi-disciplinary endeavors of organizations propelled the perception of a nationwide disaster, which enhanced the mobilization of emergency actions, preventing the exacerbation of the HSOS into a larger-scale crisis. We questioned

whether the aforementioned social behavioral response alleviated vulnerabilities across social groups. However, the litigation documents supported a poor alleviation in certain sectors such as artisanal fisheries.

Most of cases were filed by artisanal fisheries plaintiffs (70%, 88,198/127,471) as shown in Table 1 (see Result section). Moreover, of the 63,103 court-granted cases, 49,468 (78%) were granted to artisanal fisheries plaintiffs, with an average award for HSOS damages of US\$4,400. The governmental DRR programs should support the mitigation in some degree, but actual burdens of HSOS damages must have been dispersed heavily among household of poor fishermen. These inferred vulnerabilities would be supported with the present empirical data.

A consideration of empirical data in disaster research referencing social theory was often emphasized. Our study was not strengthened at that standard of disaster sociology, and rather employed an empirical description pertaining to an adaptive disaster cycle including disaster, response and recovery. The description encompasses social groups of individual, household, community, society and nation. Society here was termed to represent the public sentiment of appreciating HSOS as a risk and a social solidarity featured in voluntary contributions nationwide.

Methods

Overview of HSOS accident

A crane barge (Samsung No. 1) collided with the *Hebei Spirit* oil tanker about 10 km off the Taean coast, RO Korea, at 7:06 am on the 7th of December, 2007 (MLTM, 2013). The tanker was carrying 209,000 tons of crude oil and was anchored at the collision site preparing to head for the Daesan petroleum industrial port to deliver oil. A crane barge being towed by two tugboats lost her course as one of the two connecting ropes broke; the crane clashed into the tanker several times, resulting in three vertical cracks that were several meters long. About 10,900 tons of oil spilled into Taean coastal waters over the next day, and then dispersed along the west coast of Korea over the following several weeks (Figure 1). Strong tidal currents induced by macrotidal regimes (4-6 m tidal heights) accelerated the spread of spilled oil over the entire western Korean coast. About 350 km² of coastal area were impacted, encompassing rocky shores, beaches, and fisheries grounds

The HSOS, the largest Korean marine oil spill on record, was about one third of the spill volume of the *Exxon Valdes* oil spill and about three times that of the second largest oil spill in RO Korea, namely the *Sea Prince* oil spill which occurred in the South Sea in 1995 when a ship became stranded on a submerged rock while trying to avoid a typhoon. Approximately US\$18m in economic compensation was awarded to coastal businesses by the court, with most of that (~US\$14m) being awarded to fishermen. Economic damage claims settled outside of court amounted to about five times (~US\$90m) the amount of damages awarded by the court.

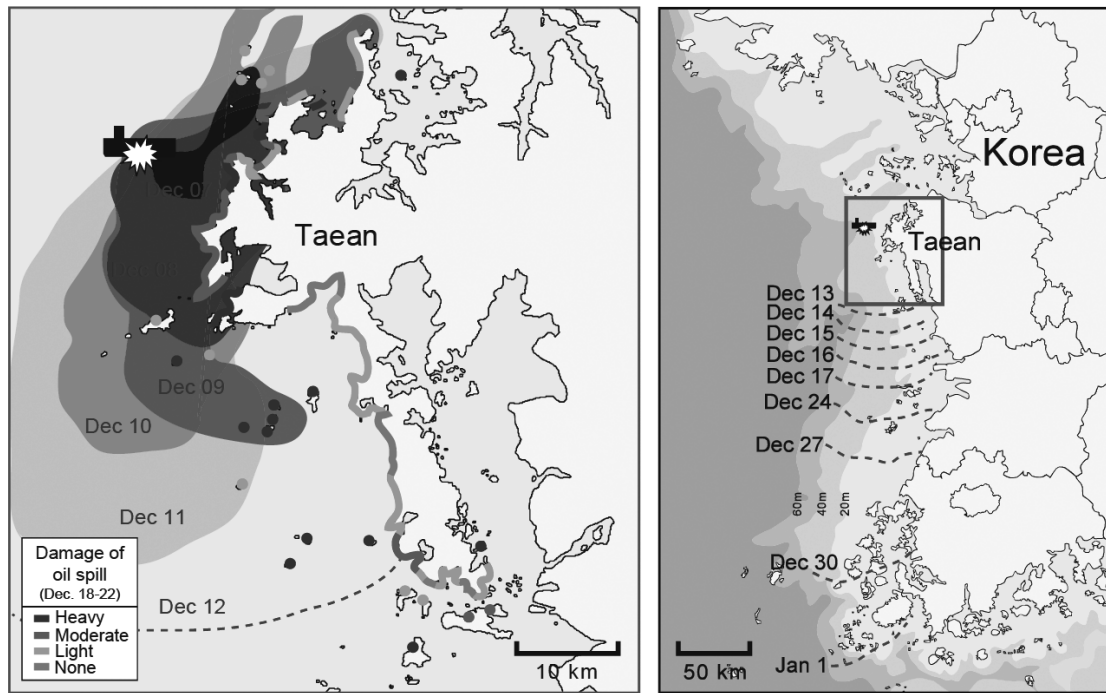


Figure 1. HSOS damages and dispersion of spilled oil. Data from Hong et al. (2014)

Data analysis

The court records of individual economic damages from the HSOS were classified by business type. Businesses classified as “fishery” included fishing cutter, cultivation, and fisheries (artisanal and others), whereas “non-fishery” businesses included restaurants, hotels, markets, manufacturing, and so on (Table 1). The analysis encompassed how many individuals were affected and the monetary values of claimed damages in total, within counties, and within business sectors. Separate statistical descriptions of the claims were produced for settled compensation versus court-granted awards (Table 1).

Community recovery was evaluated by questionnaire surveys administered by the government from 2008 through 2010. The results of the 2008 and 2009 surveys (which involved slightly different questionnaires) were adjusted and standardized for the present description (Kim et al., 2014). The 2010 survey employed a wholly different questionnaire and was not used in the present description. A total of 850 individuals responded over a 6-month period to the 2008 survey and over a 20-month period to the 2009 survey.

Results: Damage, Response, and Recovery

Damage

The term damage here refers specifically to damages to fisheries ground. The spilled oil touched 375 km of coastline, including public beaches, rocky shores, and 101 islands (Fig. 1), damaging 15 coastal counties in the process. The aerial spill coverage encompassed 13.5% (347/2574 km²) of the total fishery grounds. A total of 42,862 fishery-dependent households declared damages to the authorities.

Ecological damages are depicted in the Recovery section.

Response

Institutional arrangement

The chief ministry responding to the HSOS was the Ministry of Ocean and Fisheries (MOF) with cooperation of other ministries when the accident was declared a national disaster. Ministries are legally bound to disaster mitigation responses, including the mobilization of facilities, personnel, finances, and operation units. The Ministry of Government Administration and Home Affairs designated the HSOS a 'disaster situation' and authorized its management as a national disaster on the day following the spill. The corresponding legislation was the Framework Act on Management of Disasters and Safety. On December 11th, 6 out of 15 coastal counties (Fig. 1) were classified as 'disaster areas'. A Disaster Management Headquarters (DMH) and Central Safety Management Committee were established by the MOF according to ministerial decree on the day of the spill. The DMH was the major body managing the disaster relief efforts; DMH coordinated central and local agencies, the coast guard, and cleanup-support organizations. The cleanup scope was bound by HSOS monitoring, which determined the location and magnitude of oil reaching shorelines as part of their responsibility to assess ecological and fishery damages. The MOF launched a five-year monitoring team (2008–2013) under the Marine Environment Management Act.

Societal response: Voluntary cleanup participation

Peculiarity in response at DRR of HSOS was observed at the cleanup activities. The HSOS was widely accepted as a disaster risk by media, and there was a perceived public obligation to relieve damages to coastal ecosystem and human community. Heavy oils stranded on shores were targeted for rapid removal, but thick oils had been pasted on rocky shores, edged cliffs, and engulfed shorelines where removal was only possible individually and manually. The nationwide consensus for the need of strenuous efforts mobilized the massive voluntary participation of citizens, residents, and even soldiers. Statistics showed the tremendous involvement of voluntary citizens (1,226,730 workdays), residents (563,896), and soldiers (152,695), which was totaled to 2,132,322 workdays (MLTM, 2013). Intensive physical removal continued through January of the next year. Long-term cleanup was terminated in October of 2008, although the justification was debated and criticized among experts. The extremely high number of volunteers who participated in the HSOS cleanup indicated that the HSOS was perceived as a grave problem nationwide and society was obliged to respond. Social solidarity was clearly shown. It became a social issue that permeated the society.

Individuals and households in economic view

Aside from the insurance compensation measures, the central government established additional financial programs for individuals and households, and community. The MOF enacted the Special Act on Support for Residents and Restorations for HSOS Damages (Special Act) in June of 2008 by ministerial enforcement ordinance. It designated eleven coastal counties as 'damaged areas' eligible

for support by legally bound programs. Financial support by the Special Act totaled about US\$1,164m during the 2008-2012 periods; it was dispersed on two societal levels: individuals/ households, and counties. The former consisted of direct financial aid, whereas the latter was indirect support through facilitation of local economies through public projects. A total of about US\$450m in funding was given to support contingency aid programs for urgent subsistence of individuals and households, Provisional compensation for economic losses of individuals and households summed to about US\$83m, and public works at the county level reached about US\$630m.

Litigation data from the Seosan local court provided an economic view of individuals and households damaged by the HSOS (Seosan Local Court, 2013). A data matrix of individual damage claims was sorted into settled and granted (court-ordered) cases for fisheries and non-fisheries (Kim et al, 2014). Settled claims across the 15 coastal counties where oil spills had reached encompassed 127,471 cases and US\$3,990m in total compensation, with an average settlement of US\$31,000 per case (Table 1). Meanwhile, 63,201 cases were resolved by way of court-granted awards amounting to US\$695m in total, with an average award of US\$11,000 per case. The fractions of granted to settled were 50% in number of cases, 17% in total monetary amount, and 35% in average amount per case, respectively. The mean value of US\$11,000 comprised to only about 52% of the average household income for a fisherman with a household size of two family members in 2007 (KOSIS, 2014).

Cases of claims settled at Taean county reached to 25,721, and this number comprised to 41% of the entire population of Taean county (62,915 in 2007), and corresponded to the total number of households (25,343 in 2007, Taean Statistics, 2010). 53% of Taean population worked in the agricultural sector (~10,000) and fisheries (~3400). Every household including non-fisheries business seemed to settle the claim in Taean, and 80% of the total was awarded, representing higher percentage compared to other counties. Massive oil spills on the shore of Taean appeared to bring out high numbers of settled and awarded claims which distinguished Taean from any other coastal county.

Statistics on business sectors might distinguish the economic characteristic of household at fisheries-agricultural villages in rural areas. Table 1 showed numbers of cases, sub-total of compensation granted, and average amounts per case of damage claims assigned to fisheries (fishing cutter, fisheries integrated, fisheries artisanal, and cultivation), and non-fisheries (restaurant, hotel, sales, and manufacturing). Sub-total here included others businesses beside in parenthesis.

The ratios of fisheries to non-fisheries by number of cases, sub-total, and average amounts were about 10:1, 5:1, and 0.5:1, respectively. The fisheries sector doubled the non-fisheries sector in number granted, but halved in subtotal. A large number of fishery-based residents made claims, but because they were predominantly small-scale operations, the average amount per case was half that granted for non-fishery group.

Table 1. The number of granted cases (No Cs), amount in 10³US\$ (Amt), and average amount in 10³US\$ (Mean) per case. Data from Kim et al. (2014, Manufactures (M-F)).

| | Fisheries | | | | | Non-Fisheries | | | | |
|--------|-----------|-----------------|-------------|-------------|-------------|---------------|-----------|--------|-------|-----|
| | Sub-total | Fishery artisan | Cultivation | Fish cutter | Fish-integr | Sub-total | Resturant | Hotel | Sales | M-F |
| No. Cs | 57,180 | 49,468 | 729 | 3,743 | 89 | 5,923 | 1,285 | 2,078 | 1,477 | 67 |
| Amt | 351,629 | 218,107 | 45,494 | 14,337 | 1,182 | 74,862 | 8,932 | 15,178 | 5,934 | 419 |
| Mean | 6 | 4.4 | 62.4 | 3.8 | 13 | 13 | 6.9 | 7.3 | 4 | 6.2 |

A striking feature in the fisheries subsectors is the extremely high number of artisanal fisheries among the claims granted (Table 1). Their granted claims (49,468) amounted to 87% of the total number (57,180). Aquaculture was considered an important fisheries industry on the Korean shores, but the number of awarded claims was relatively low (13% of the total). Although the artisanal fisheries accounted for a high number of entitled claims, and the subtotal of about US\$218m was highly proportional (62%) to their representation in the fisheries sector (which granted about US\$352m in total), their averaged compensation value per case was extremely low (US\$4,400 per granted claim) and occupied only 7 % of the aquaculture compensation which was averaged as US\$62,000 per granted claim.

Recovery

Coastal ecosystem

Hong et al (2014) demonstrated the process of coastal ecosystem recovery. Notably, they found that water quality of coastal seas recovered quickly, followed by bioaccumulation of oil spill remnant in marine organisms, whereas benthic communities on rocky shores and bottom sediments took about three years to recover. They found that sediment quality in terms of concentration level of oil spill origin substances and potential toxicity of these substances to organisms were not fully recovered five years after the accident.

Community

Community here termed because of survey questionnaires which were distributed within a geographic limitation, in Taean county in particular, and covered a variety of recovery sectors of a community. The sectors of livelihoods, fisheries, tourism and social conflicts applied in the survey can be considered as community attributes which may expose a peculiarity of a certain community contesting with others.

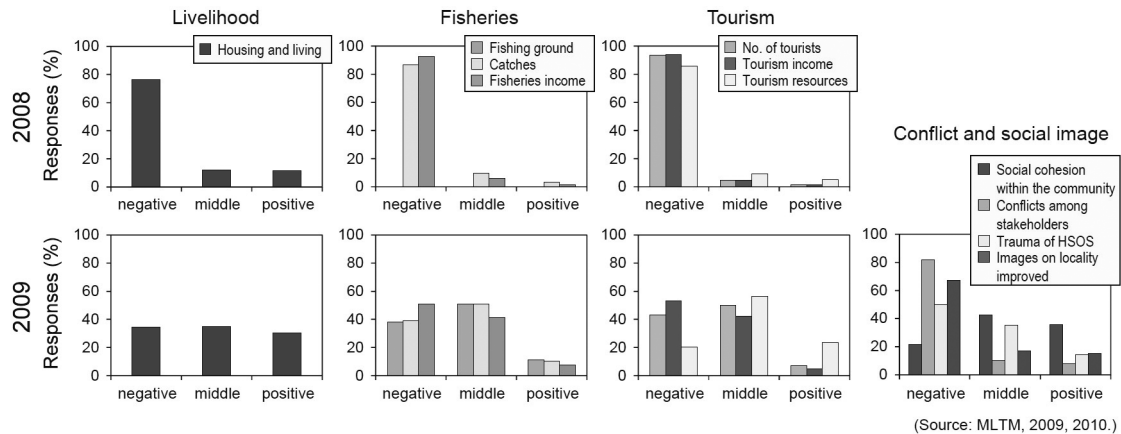


Figure 2. Community recovery responses to government questionnaires. Modified from Kim et al. (2014).
Source: MLTM, 2009, 2010.

The government questionnaire results for the 2008 and 2009 community surveys are summarized in Figure 2 (the 2010 survey applied a dissimilar methodology). Taeon residents had highly negative responses for their household situations in the 2008 survey, but the negative responses decreased from 76% in 2008 to 35% in the 2009 survey (Fig. 2). Questionnaires for fisheries sector showed extremely negative responses (~90%) with very few positive responses (~3%) in 2008. The 2009 survey showed an improvement in the fisheries sector (40% negative, 10% positive). Tourism showed a similar trend: 90% negative in 2008, 40% negative in 2009. Regarding social conflict and social image (limited to 2009), there was a very high rate of negative responses for conflict among stakeholders (82%), as well as high rates of negative responses for trauma (50%) and locality image (68%). These social recovery indices were far more negative than the ecosystem recovery indices 20 months after the HSOS. As shown in Figure 2, water quality and bioaccumulation were fairly recovered in 2009, although some other indices indicated delayed recovery.

Discussions and conclusion

Discussions

The present examination indicates that community recovery, in Taeon county in particular, lagged behind coastal ecosystem improvement. Massive help and the social solidarity shown during the 'emergency-period' should mobilize the local communities to get vital. Then the question here is whether the individuals responded to questionnaires had shown an affirmative reaction to their physically disrupted situation. The present investigation revealed extremely negative reactions of individual respondents until after 8-10 months of the disaster event (Fig. 3). Also during the 'post-impact period', individuals seem to be remained vulnerable. The indices survey on social conflicts among residents returned highly negative feedback until after ~20 months of the disruption. Even the social cohesion indices were negative as recently as September - October of 2009. The vulnerability to a sudden, unexpected disruption of HSOS appears to be latent and even inherent to the local community. The economic compensation and financial aids generated through purposely designed

legislation seemed to not fully cover the poor economy of remote coastal regions at the West Sea, RO Korea. The observed dissatisfaction on community recovery should also be socially constructed. However, framing the social weakness which can background the dissatisfaction is a subject beyond the current investigation. We scrutinize further our economic aspects sharpened by the litigation data.

The satisfaction level of economic compensation for the residents who encountered sudden disruption of their lives is difficult to estimate. As one standard, we calculated the ratio of CVM values for ecosystem services to asserted and granted households compensation in litigation. The CVM values applied in this study was stemmed from different coastal areas and cases, and were extrapolated to the present HSOS damaged coasts (Kim et al., 2014). The CVM estimation of ecological services on the entire HSOS damaged shores based on the survey of the Boseong intertidal flat amounted to be about US\$7,810m over three years (Kim et al., 2014). The total claimed HSOS compensation requested by individuals and households amounted to ~51% of that value and the claims granted corresponded to only ~6%. The entire contingency aids financed by Special Law entailed 15% of the CVM value, and the IOPC and expanded IOPC represented 2%, and 4% of the CVM value, respectively. All of the financial aids including the Special Law supports and entitled damage claims summed to ~27% of the CVM value. Artisanal fisheries occupied the major portion of damage claims, but approved an average of only US\$4,400 per case. The low compensation alone indicates the vulnerable situation in which these rural households were left.

Conclusion

We observed that the physical disruption caused by HSOS on the Korean coastal waters had developed further to biological disruption. The sequence from biological to ecological deterioration encompassing ecosystem functions and ecosystem services was manifested. The physical and biological disruptions were interlinked then with economic losses and further with social disruptions in corresponding local communities, whose households were sustained based on the ecosystem services. This sequential coupling was evidenced by ecosystem data and litigation data demonstrated in Results section. The ecological-economical-social interlinkage appeared to be persisted latent to daily social life, but emerged with extreme event. Under the depressed circumstance, unsatisfactorily cared large social groups featured clearly, who nourished their households through poorly gaining artisanal fisheries dependent on ecosystem services.

'Disaster' declared by government had 'geographical' confinement to certain counties, but the 'inclusion of interlinked functional process from physical to social' should be officiated in the disaster declaration. Disaster should include location and a structural and functional unit from ecosystem to human society in the location as well. Social resilience was more or less decoupled from ecological resilience, and the economic vulnerability inherent to remote fisheries villages was considered as a cause. The extreme physical disruption in coastal waters represented reality oriented empirical data, but developed to a socially constructed manifestation. The social construction of disaster, or associated crisis in the society was processed by involvement of different social groups encompassing public agencies, businesses, public, and NGOs. Social solidarity from outside was clearly demonstrated by

massive volunteering cleanup, while social cohesiveness within communities was relatively weak.

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Community as the resilient factor?

The diverse role of communities in the recovery process from the 2011 tsunami in Japan

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1. Purpose

Through a case study of Kitakami area, Miyagi prefecture, Japan, this study investigates the function (or, in certain cases, dysfunction) of several communities in the recovery process in the 2011 tsunami.

Kitakami is a rural area in northern Japan. Its 20 small communities or villages had a total population of 3,700 prior to the tsunami, of whom 30% were over age 65. The area's primary industries are fisheries, agriculture, construction and manufacturing.

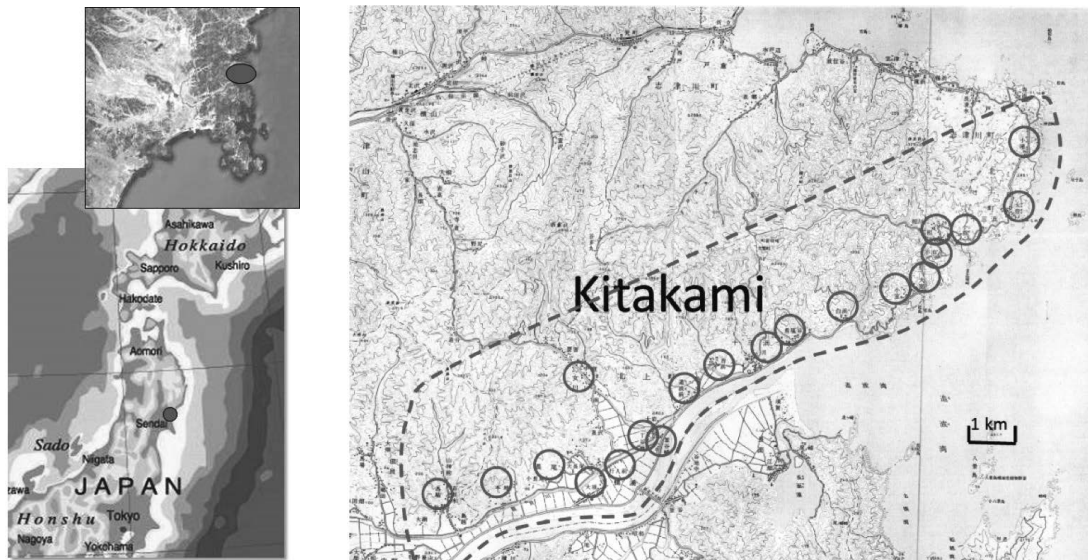


Figure 1. The research area

Kitakami was one of the areas that was most severely affected by the 2011 tsunami, suffering numerous casualties; out of its 3,700 residents, 265 individuals died as most of the houses were swept

away or destroyed. Since the tsunami, the survivors have struggled to rebuild.

When I facilitated workshops as part of the tsunami victims' rehabilitation in 2011, I often heard the word 'community'. The victims tended to use the Janglish word 'komyuniti', although the Japanese language has several equivalent words. It seemed to me that 'komyuniti' comprised in one word their lost hamlets, traditions, social links and hopes for the future.

Even when the victims talk about their days living in shelters after the tsunami, they emphasise on the term 'komyuniti'. They stated that one shelter in the area was well organised by community leaders, and it contributed to their rehabilitation. They seemed proud of the level of community cohesion.

However, the scale and boundary of their 'community' varies depending on each individual's perspective. Sometimes it is equal to the hamlet (the residential community). Sometimes it encompasses several neighbouring hamlets. Sometimes it includes their friend and kinship network. What is community for these people? What aspects of their community can help their post-disaster rehabilitation process?

This study examines how communities serve, fail to serve or in some cases even impede the process of disaster recovery. First, it investigates the system of traditional neighbourhood communities, with special reference to natural resources and rituals. Second, it illustrates how several communities have functioned in the recovery process and how they have assisted individual recovery strategies. Third, this study determines how the communities have changed and how some communities have emerged or disappeared, before and after the tsunami. Furthermore, it examines the strong relationship, both positive and negative, between people's recovery strategies and their communities' role.

2. 'Traditional' communities

One notable feature of the area is that a strong community organization, or *Keiyakuko*, has existed for each hamlet. This is a self-governing body that holds an assembly once a year for decision making. Everyday governance takes place through the *Keiyakuko*'s elected leaders.

The *Keiyakuko* plays crucial roles in natural resource management. For example, it decides who can harvest rock seaweed, which is a revenue-producing resource, and when. It also manages forest resources. The rules of the *Keiyakuko* are strictly binding on village members.

Additionally, the *Keiyakuko* plays important roles in managing the various rituals and festivals held in each hamlet.

The *Keiyakuko* is certainly the preeminent organization in each village, but several other organizations exist as well. The *Kannonko*, an organization of young married women, is involved in traditional rituals and mutual aid. Older women have similar organizations.

Kinship is also important. The area has two types of kinship systems: *Shinrui*, or a clan that consists of some related households, and *Shinseki*, the kinship network. Both *Shinrui* and *Shinseki* are crucial to everyday life.

The *Shobodan*, or community fire brigade, plays a major role in building community cohesion among young men. Its members serve as community firefighters and disaster relief staff. It also functions as a

men's neighbourhood group.

The bodies mentioned thus far function within a single village, but inter-village communities also exist. One of these is the *Gakku*, or school area community. Kitakami is divided into three school areas, each of which consists of several villages. Social networks developed during the educational years play key roles in people's lives.

3. Temporary housing sites

After the tsunami, Kitakami's victims were housed in several evacuation shelters for the initial few months and then moved to three temporary housing sites. One site has served 167 households and 440 people from all the affected villages of Kitakami; another site has held 39 households, while the other site has comprised 13 households.

The large temporary site has functioned as a big community, bigger in fact than the traditional communities. Although the victims had some complaints about the inconveniences associated with temporary housing, they generally expressed positive attitudes, mainly because of the good community atmosphere. One woman said:

'This temporary housing site is composed of people from different villages. But we are from the same area. We are linked. I could feel at home. Good atmosphere'.

Some of the residents even enjoyed making new friends, as illustrated by another woman's comments:

'I am from an agricultural village. But some friends here are from fishermen's villages. I like talking with them. Their stories are so interesting. I feel happy to have a variety of friends. Without the disaster, I could not have become acquainted with some friends here'.

The community found in the temporary housing sites has several layers: groups from the same village, circles of people who share the same hobby and so on. Yet, some are not connected with these communities, and they feel alone.

4. New types of communities

Some new communities have arisen after the disaster. For example, one active young woman set up a women's group dedicated to community revitalisation. She organised a major tourist event that involved many people, forming a new type of community in the process.

In another case, a young man successfully revived his village dancing festival (*Kagura*) and then included dances from other villages. His effort linked several villages and has formed a new type of wider community.

One child care circle, founded before the disaster, has functioned well in supporting young women through the rebuilding process. The circle is also a new type of community, which is unrestrained by village boundaries.

Such organizations have had an impact on people’s understanding of community. One woman’s comment is representative:

“We” used to refer to people in the same village. However, we now call the whole Kitakami people “we”.

5. Communities in the relocation project

The area’s relocation project, seeking to place victims in new communities, began in 2011 with national government funding and is still in process. Some relocation sites in the area will serve people from particular villages, while others will contain people from multiple villages, and some people will move to sites outside Kitakami.

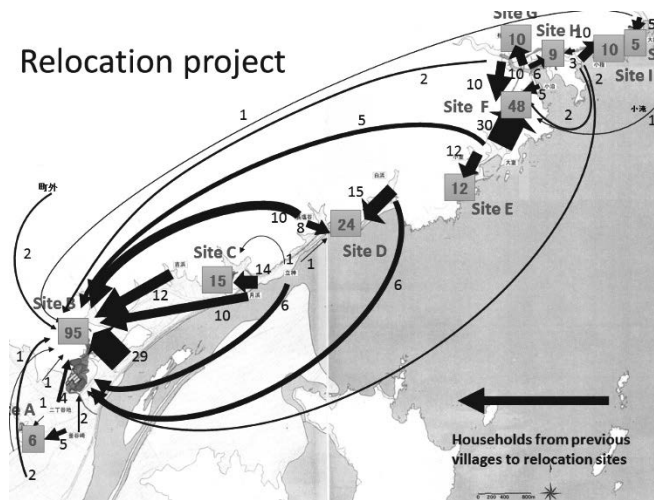


Figure 2. Movement of households from previous villages to relocation sites

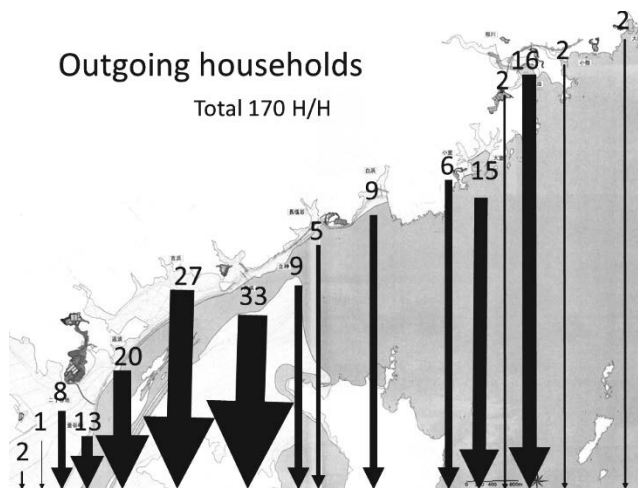


Figure 3. Households leaving the Kitakami area

The relocation project is reshuffling the communities. Most of the traditional villages, though not all, will be disbanded through this relocation process. One village decided to disband after the

tsunami, and some households will combine with people from other villages to join one relocation site. Since most people in this village have jobs outside the area, it seemed natural for them to dissolve their traditional community. However, other villages are disbanding without any community-wide discussion of how the people will relocate.

Another village experienced internal conflict after the disaster. Half of the victims, whose houses were entirely destroyed, went to temporary housing, while the other half, whose houses were partially destroyed, rebuilt and remained in their original location. Each group feels suspicious of the other, e.g. regarding access to financial support from the government.

Among the people participating in the relocation project, other problems have arisen regarding the formation of new communities. Two different opinions exist on this matter: some want to pursue the continuity of traditional communities, and others seek rapid formation of new communities.

Those holding the former opinion emphasise their attachment to traditional culture including rituals and festivals, saying that these activities are deeply rooted and should not be neglected. In addition, natural resources have been managed by the traditional communities and this management system is hard to change.

Although most of the victims feel this type of attachment, they also feel the need for a new community system in the relocation sites. But many of them would agree with the following statement by one local leader:

‘For the time being after the relocation, we should behave as members of the previous traditional villages. It seems hard to form a new community quickly. We will gradually become linked through common themes or common hobbies. This move will soon lead to the formation of new communities at the relocation sites. One good theme to be emphasised is disaster prevention. Group tours originating from the relocation sites would be good as well. The theme of shrines and festivals is hard to deal with for the time being. We should take time and discuss this issue over a long time span’.

Yet, even for the people whose villages have decided to dissolve, problems regarding the old community persist. A significant issue apart from the rituals and shrines is how to handle assets such as the community forest or community-owned land, on which the property tax must still be paid even if the community organization is disbanded. The people are wondering who will pay the tax and how. These assets were of significant value to the traditional communities but have turned out to be a major problem after the tsunami and the reshuffling of the community.

6. Conclusion

To conclude, three findings can be determined:

First, traditionally Kitakami's community system is multi-layered (the *Keiyakuko* and some other village organizations, some inter-village networks, etc.). Social change has altered the forms and functions of these entities, on which all individuals and households relied. Since the disaster, the function of communities has changed and become even more multi-layered.

Second, some implicit and explicit conflicts over communities have occurred, due to differences among the people about the communities' perspectives and direction.

Third, as an implication for community policy, diverse communities should be revitalised, so that people can use them to enhance their stability and rehabilitation.

Changes in Perception of Disaster Risks and Attitudes Toward Nuclear Energy Policy: Trends in Public Opinion Surveys and Analysis Using JGSS Data

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Our presentation examines the trends in people's perception of disaster risk, fear of nuclear accidents, recognition of pollution issues, and their attitudes toward nuclear policies based on nationwide public opinion surveys which have been carried out by the government (cabinet office), major media (national newspapers and NHK), Japanese General Social Surveys, and the Atomic Energy Society of Japan. The Great East Japan Earthquake and the Fukushima nuclear accident has heightened people's perception of disaster risks, fear of nuclear accidents, and increased recognition of pollution issues, and has changed public opinion on nuclear energy policy.

- Seventy-eight percent of people felt some fear that a major earthquake would occur a half year after the disaster and three years later.
- More than two-thirds of people believed the number of nuclear power plants should be reduced or abolished one year after the Fukushima nuclear accident and four years later.
- The opinion gap on nuclear energy policy between specialists and lay people has widened by the accident and has not been reduced after 3 years.
- A majority of people opposed the re-opening of the nuclear power plants in which their safety has been confirmed four years after the accidents.
- Eighty-one percent of people think it possible that a nuclear accident requiring an evacuation of the residents would happen even with the nuclear power plants that meet the new regulation in Oct.2014.
- The proportion of people who refrain from buying produce grown in Fukushima is 23% while 72% of people do not care four year later.

- The demand for electrical power was 906.4 billion kWh in 2010 but it decreased 5.1% in 2011, another 1.0% in 2012, 0.4% in 2013 and 3.0% in 2014 to bring it to 823.0 billion kWh. Both household use and commercial use has decreased. The level of commitment to energy saving is found to relate to opinions on nuclear issues (JGSS-2012).

We will also discuss the results from JGSS-2015, which were conducted in February to April this year, and more recent results of the opinion poll. We will also examine the factors related to people's attitudes toward nuclear policies based on JGSS-2012 and JGSS-2015 data.

Please refer to the following paper regarding the previous results. The paper does not include results from JGSS-2015.

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International Collaboration of Environmentalists in East Asia

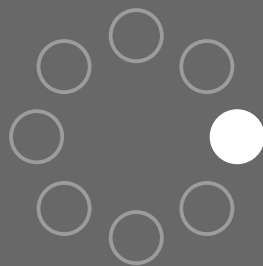
Ku Dowan and Lee Cheol-Jae

Environment and Society Research Institute

East Asia is closely related to each other in terms of economy and ecology. The people in this region share ecological risk. The environmentalists in East Asia have collaborated with each other for environmental protection. This article aims to analyze how international collaboration of environmentalists in East Asia was performed from the 1970s to the present by case studies. We analyze cases such as anti-pollution export movement in Japan, anti-nuclear waste export movement from Taiwan to North Korea, South Korea-China collaboration for the prevention of desertification, and anti-nuclear collaboration in Asia. These cases can be interpreted in terms of 'methodological internationalism and cosmopolitanism' of Ulrich Beck. This article tackles the issue of ecological global citizenship on the basis of ecological cosmopolitanism.

REGULAR SESSION 4

ADAPTATION TO ENVIRONMENTAL
CHANGE IN COMMUNITY



ISESEA-5

Embodied carbon in China's foreign trade: A review

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Abstract

This paper systematically presents a survey of the empirical literature on the embodied carbon in China's foreign trade (ECCT). The latest publications regarding ECCT in peer-reviewed journals are summarized based on the bibliometric method and the online versions of Science Citation Index-Expanded (SCI-E) and Social Sciences Citation Index (SSCI). Publications referring to ECCT are assessed with respect to quantities, most productive countries, institutions, authors, citations, and disciplines. By using synthetic analysis of keyword frequency, this study reveals the most popular methodologies applied to measure the ECCT; it also discusses the variation of numerical results in the literature, as well as the reasons and countermeasures for the uncertainties in the results. Continuous investigation of the literature suggests that the methodology employed to measure the ECCT has become more reasonable, with the results becoming more critical. However, the numerical results of the ECCT have shown great discrepancies within a given year because of different considerations on methodology specification, accounting principles, and data sources and processing. For instance, the estimates of CO₂ emissions embodied in the exports of China in 2007 changed from 478 Mt to over 3,000 Mt, whereas those for its imports ranged from 140 Mt to over 1,700Mt. Moreover, the results with respect to the balance of CO₂ emissions embodied in the foreign trade of China in 2007 varied between over 100 Mt and 2,900 Mt. Hence, overcoming the inherent data limitations in China and improvements in calculating the ECCT should be urgently considered.

Keywords

Climate change; Bibliometrics; Keyword frequency analysis; Embodied carbon; Foreign trade; China

1. Introduction

Climate change has been widely recognized as the global major environmental issue. It is impossible to fully determine whether global warming is an anthropogenic phenomenon nowadays. At the same time,

however, the tremendous surge in the amount of CO₂ in the atmosphere has been attributed to global industrialization. According to Intergovernmental Panel on Climate Change (IPCC) anthropogenic greenhouse gases (GHGs) emissions are the main causes of global climate change [1, 2].

The embodied carbon in international trade plays a crucial role in global climate change [3]. With the research outputs expanding substantially in recent years, the embodied carbon in China's foreign trade (ECCT) has attracted growing attention throughout the world. Although carbon emissions in China declined in 2014 with the implementation of carbon mitigation measures [4], this country has remained the top CO₂ emitter since 2007 [5], contributing 23.43% of global CO₂ emissions in 2014 [6].

As the largest developing country and top energy user in the world (BP, 2011), China should be actively responsible in addressing the repercussions of global climate change. However, to obtain more rational and effective climate policies for China and the rest of the world, the following questions need to be answered: How much should China be charged for its global carbon emissions? How should carbon responsibilities be defined and measured reasonably for one country? Should we be suspicious of the current international principles used in calculating carbon emissions responsibility? How does foreign demand contribute to the carbon emissions of China? Why is China the top carbon emitter in the world? Who should be responsible for the CO₂ emissions in the ECCT? A satisfactory response should be obtained from China and its trade partners rather than from China alone because of the increasing global economic integration and fragmentation of production as well as the emergence of global value chains (GVCs).

The current study was carried out guided by the following objectives: to survey the quantitative results of the ECCT from the existing empirical studies; to discuss the methodologies employed and the variation of the quantitative results; and to analyze the potential reasons and countermeasures of the uncertainties in the results. Using EE-IOA, we focused on studies that measured the ECCT rather than those that examined environmental issues in China compared with the work of Hawkins and Ma [17]. Furthermore, *vis-a-vis* the research by Sato [15], we particularly reviewed and compared the variation of the ECCT with respect to current literature and the possible discrepancies (e.g., in terms of data collection and processing, the regional economic imbalance on carbon emissions, etc.) in measuring the ECCT. To the best of our knowledge, this is the first singular survey to focus on the ECCT.

The rest of the article is organized into sections. Section 2 provides the methodologies used to search for existing studies on the issue of the ECCT in SCI-E and SSCI databases. Section 3 describes the latest research using bibliometric analysis, including quantities statistics, journals statistics, authors' statistics, institutions statistics, article citations statistics, and disciplines statistics. Section 4 presents a summary of the methodologies employed, accounting principles, data sources, and the variability of the empirical results on the ECCT obtained by keyword frequency analysis. This is followed by a discussion on the potential reasons and countermeasures for such uncertainties. Section 5 concludes the study.

2. Methodology

The data used in this study were obtained from the online versions of the SCI-E and the SSCI from 1981 to April 2015 and from 2002 to April 2015 respectively. The data were collected on May 1, 2015 on the Web of Science. Although China opened its economy to the world in 1978, we set the beginning year in 1981 when the input-output data was made available in China [28, 29]. Only studies from the English peer-reviewed journals were obtained, and studies analyzing the embodied carbon for or referring to China were included. It should be noted that "China" in this paper pertained to mainland China only; Hong Kong, Macao, and Taiwan were excluded.

Defining which article should be included is important in this study. First, we used keywords, title, and abstract to search for specific journals. Second, we paid attention to the key authors and the references of the key papers with high citations. Following the method proposed by Hoekstra [30], we obtained the articles using the descriptors "embodied carbon," "China," and "international trade or foreign trade." The corrigenda, errata, announcements, and books referring to economic impacts of environmental issues and environmental account structure and construction were excluded. However, papers discussing Chinese energy intensity or domestic carbon emissions were also excluded, whereas those that calculated the global carbon flows and leakage referring to China were included.

To investigate the differences in results, the frequency analysis of keywords was conducted. This was done to discover the keywords containing the empirical results [e.g., the volume of embodied emissions in exports (EEE) and imports (EEI)] in the abstract, the contexts, and their corresponding references. Fig.1 shows the research framework of this study. We first obtained the results using frequencies of keywords for each year and the key authors. Second, we summarized the results by publication year, methodologies, and data used. Finally, we discussed in detail the variability of the empirical results, the reasons behind the uncertainties in these results, and the countermeasures to decrease these uncertainties.

3. Literature overview

3.1. General statistics

According to the results, 212 articles referred to the ECCT. The highest number of literature was released from 2010 to April 2015 (Fig. 2).

Fig.3 illustrates the number of publications and the percentages of most productive countries in terms of global publications on the ECCT. China is significantly the most productive among the top six countries. Different from the previous studies, we not only show the worldwide timeline of papers (Fig.2), but also illustrate the quantities and dramatic increase of papers from China (70%), which dominated the rest of the world (Fig.4). The US and England also focused on the ECCT with over 28% of global publications (Fig. 3).

The academic development process of studying the ECCT can be divided into two stages. Stage 1 is from 1981 to 2009, in which the number of publications is few and stable. Stage 2 is from 2010 to April 2015, in which academic publications increased at a high rapid growth rate. The result shown in Fig. 3 is lower than the result in Hawkins and Ma [17], because the current study only obtained

papers related to the ECCT but Hawkins and Ma [17] collected all publications that employed the EE-IOA method in China. In addition, in terms of studies that solely focused on the ECCT, the number of publications covered in this study is more helpful in investigating the variability of numerical results for the ECCT from literature compared with that surveyed by Sato [15] who compared the quantitative results of embodied carbon in trade from a global perspective.

3.2. Journals statistics

Among the top ten journals with the most publications in this topic, four are from the Netherlands, three are from the USA, two are from the UK, and one is from China (Table 1). All journals originally focused on the issues of environmental sciences, energy consumption, emissions, and environmental engineering. The top three journals (Energy Policy, Renewable & Sustainable Energy Reviews and Environmental Science & Technology) are the most productive journals publishing 21% of the papers on the ECCT from 1981 to April 2015.

3.3. Authors statistics

The ten most productive authors in this field are listed in Table 2. The results show that Chen GQ from Peking University is the most productive author publishing 22 papers with the highest H-index. Chen GQ and Chen ZM belong to the same institution, the State Key Laboratory for Turbulence and Complex System in the Peking University. In addition, the top academic centers in China are sponsored by research grants from the Chinese governments (Table 3). Scholars from Singapore and the UK also published papers on the embodied carbon emissions of China (Table 2).

3.4. Institutions statistics

According to our results, nearly 100 different institutions all over the world have shown research interest in the ECCT. The University of Chinese Academy of Sciences from China is the top institution with 37 productions. Academic centers from China also comprised 60% of the research centers and 90% of all publications among 212 papers on the topic. Furthermore, institutions from the UK (University of Leeds, University of London, and University of Cambridge) published 17 papers, whereas those from the National University of Singapore and Harvard University published a combined 12 papers (Table 3).

3.5. Article citation statistics

The ten most cited articles in the body of the literature, the journals, the time of the citations, and countries addressed are shown in Table 4. The most cited article was published in Proceedings of the National Academy of Science of the United States of America in 2010, and was cited 219 times (Table 4). This article was co-authored by Davis and Caleira from the Department of Global Ecology, Stanford University. In addition, the literature citation from 2007 induced that China is the top carbon emitter in the world [31] and the most important contributor to global climate change [32]. Based on the results, the embodied carbon of China has become a popular topic in the past decade [9, 11, 31-37].

3.6. Disciplines statistics

The study of the ECCT is an interdisciplinary subject. From the selected SCI-E and SSCI databases in this study, over 30 subject categories are found to be related to this topic, including environmental sociology ecology, energy fuels, business economics, engineering, science technology other topics, and geology, to name a few. Moreover, articles from the discipline of environmental ecology such as [9, 38, 39] account for 51.89% of all the publications.

4. Discussion

4.1. The quantitative results from the literature

Based on the results of the keyword frequency analysis, the empirical results of the ECCT are tracked from the key papers (and their references), authors, and organizations, and the empirical results for the ECCT are summarized individually. The aggregate results are summarized in Appendix A following previous studies [15, 17, 30]. Studies with different research motivations showed that the uncertainties in the ECCT process, including the volume of production-based CO₂ emissions (PBE), consumption-based CO₂ emissions (CBE), the CO₂ emissions embodied in exports (EEE), the CO₂ emissions embodied in imports (EEI) and the net CO₂ emissions embodied in export (EEB), can be investigated using various methodologies, data, and assumptions. The ECCT results show a high volatility in the same year with the same calculating principles yet different data sources and processing techniques. As shown in [89] and [90], which use different sources of IO data in the same year, different ECCT estimates can be obtained with the same assumption on the carbon emissions coefficient.

4.1.1. The fluctuation of EEE and EEI

The EEE and EEI estimates of the ECCT from 1987 to 2011 (see Appendix. A), showed a huge volatility. On the one hand, the EEE in 2000 is increased from 350 Mt CO₂ emissions [93] to 1,000 Mt CO₂ emissions [90], and the same or even a bigger difference could be observed in 2002, 2003, and 2004. On the other hand, the EEE in 2001 is increased from 2,849 Mt CO₂ emissions [93] to 2,930 Mt CO₂ emissions [10], and small variations can be learned in 1997 and 1998. However, the EEI of the ECCT in 1997 changed from 102 Mt CO₂ emissions [7] to 700 Mt CO₂ emissions [74]. Huge fluctuations in EEI could also be observed in the remaining years.

Meanwhile, the EEE of the ECCT in 2005 changed from 422 Mt CO₂ emissions to 3,357 Mt CO₂ emissions, and its EEI changed from 120 Mt CO₂ emissions to 2,333 Mt CO₂ emissions.

Although China has higher carbon intensity than most countries/trade partners, the country does not always have a higher EEE than EEI. Different from other results, Weber and Peters [74] obtained a higher EEI than EEE in 2005 by using the SRIO model and the IO table from NBS-PRC (Table7). They found that China avoided large CO₂ emissions from 1987 to 2005. To explain such abnormal estimate, they noted that the EEI in 2001 should be estimated as 216 Mt CO₂ emissions. However, an EEI of up to 1,170 Mt CO₂ emissions was observed in 2002.

The changes in EEE and EEI significantly differ across all models in the same year. Most wave characteristics for EEE and EEI can be determined by checking the EEE and EEI from the reported

results in Appendix. A. As shown in Fig.9, the variability of the EEE and EEI from MRIO are smaller than SRIO in 2005. The average fluctuation of EEE and EEI based on BTIO are smaller than those of EEE and EEI based on SRIO. Each model shows that variations may also exist in the same year. For example, in terms of the EEE and EEI in SRIO, the values of EEE and EEI from [9] are larger than the others which means that the carbon embodied in China's exports are larger than that embodied in China's imports as the increasing foreign demand for the energy-intensive goods produced by imported or domestically produced high carbon embodied intermediate goods. Contrarily, the EEE and EEI values from [98] do not significantly differ from the findings of other studies that applied the SRIO model. The data on the volume of domestic and imported goods in the inter-sector input and the final use in the IO table were obtained from the Customs Statistical Yearbook of China Customs.

Lin and Sun [9] measured the EEE and EEI of the ECCT in 2005 using the SRIO and BTIO models respectively. They argued that the EEE and EEI should be calculated by using the emission factors of the exporting and importing countries to avoid overestimating the imported and re-exported emissions in China, because the producing process in China is more carbon intensive than that of its trade partners. Fig.9 shows an obvious difference in the EEE and EEI values in 2005, which have been estimated using the two methodologies. By considering the impact of global vertical specialization on the ECCT and by using the IO tables from the WIOD (with 1995 as the base year), Zhao and Zhang [80] measured the ECCT by differentiating the domestic-sourced CO₂ emissions from the foreign-sourced CO₂ emissions and the re-exported emissions embodied in international trade. Their estimated EEE and EEI in 2005 are similar to the results obtained from the MRIO model (Fig. 9).

4.1.2. The fluctuation of EEB

The EEB estimates of ECCT are calculated and reported in Appendix. A by using the equation $EEB = PBE - CBE = EEE - EEI$ and empirical results obtained from the literature. As mentioned in the Sections 4.4.1 and 4.4.2, the variations of EEB for the ECCT can be indirectly assumed. Figs.10 and 11 show the variations of EEE, EEI, and EEB in 2002 and 2007, respectively. By checking its trends, EEB trends to demonstrate huge variations every year, which should not be ignored. The EEE in 2007 changed from 478 Mt CO₂ emissions to over 3,000 Mt CO₂ emissions, the EEI changed from 140 Mt CO₂ emissions to over 1,782 Mt CO₂ emissions, and the EEB ranged between 102 Mt CO₂ emissions and over 2,900 Mt CO₂ emissions (Fig.11). The same observations can also be made in 2002 (Fig.10), 2004, and 2006. The estimated fluctuation in 2007 is smaller than that in 2002.

The largest EEB in 2002 and 2007 are estimated by [90], who obtained the IO table data from the OECD database and replaced the IO tables in 2001- 2004 and 2006-2010 with the tables in 2000 and 2005, respectively. Based on the emissions avoided by the imported (EAI) assumptions, the authors obtained the adjusted technical factor for China's imports by assuming China as a single "virtual country". Based on the plotted EEI in Figs.10 and 11, a higher EEB could be obtained for China, when a higher EEE is also present. As mentioned in Section 4.4.2, the smallest EEB in 2002 and 2007 were obtained by Zhang [98], followed by Weber and Peters [74], who avoided double counting the goods and services in the bonded areas by referring to the customs data in the IO table.

The EEB estimate is affected by the assumption of the importing country per se and its trade partners. Xia and Fan [75] used the technical coefficients of South Korea as those of the trade partners of China to study the ECCT. This is because such coefficients could measure the avoided carbon emissions via imports. China is considered a net importer of embodied carbon in 2001-2005, and a net exporter in 2006-2009, and a net importer again in 2010. However, the technical coefficients of South Korea could lead to the underestimation of the EEI of the ECCT. In other words, with a consistent EEE, a higher EEB of the ECCT would be obtained, and China would become a net carbon exporter.

The fragmentation of global production and consumption has attracted increasing research attention, along with the development of international trade. Fig.10 shows that a similar EEE may lead to an entirely different EEB with the different consideration on EEI, thereby indicating that the assumption of the imported goods may greatly change the EEB. Wiedmann [43] reviewed the MRIO model for consumption-based emission, and argued that the adjustment of imported goods consumed in domestic inter-sector input and final consumption could lead to biased estimates to a large extent. The carbon emission embodied in the re-exported goods produced by the imported intermediate input should be differentiated from the domestic inputs. Therefore, the accuracy of the MRIO and the more complex extended IO models should be deduced to handle the uncertainties in estimating the embodied carbon in trade.

5. Concluding remarks

The mitigation of domestic carbon emissions and the ECCT are not only economic issues, but also a political game for China. The Chinese government has exerted much effort to control the carbon emissions. Although uncertainties in the numerical investigation of the ECCT continue to exist, the estimates remain reasonable and practical in providing valuable insights and policy implications on Chinese carbon reduction in international trade. Most articles on the ECCT published by Chinese authors are financially sponsored by the Chinese government. Before the international climate change negotiation reaching an agreement, as the largest developing country and top carbon emitter, China should handle its high carbon emissions and balance its economic growth with its environmental protection.

The increasing numbers of ECCT studies enable researchers to compare the ECCT-related methodologies, data sources, and estimations. To assess the present numerical understanding of the ECCT, this study provides a comparative review of the quantitative estimates by surveying the empirical ECCT results from previous studies using the online version of SCI-E from 1981 to April 2015 and SSCI from 2002 to April 2015. It should be noted that only the English peer-reviewed journal articles are surveyed, the conclusions on the ECCT that are drawn herewith cannot be extended to Chinese or other non-English-language literature. In the discussion, we learn that studies on the ECCT are robust in the past decade, and the series of IO approaches are considered the dominant methodologies for analyzing this topic. However, inconsistencies and uncertainties can be observed by comparing the results from these studies.

The uncertainties in the ECCT estimates can be addressed in three ways. First, the Chinese

government must create a high-quality database. Second, future studies must focus on minimizing the uncertainties that result from the differences in methodologies, assumptions, and data processing techniques. Third, data verification and spatial aggregation or disaggregation must be applied practically. For a large country such as China, the imbalance in regional economic development can lead to regional variations in energy intensity; therefore, the carbon emission factor must be estimated regionally [101, 115]. An accurate estimate of regional ECCT can describe the regional carbon flows between China and its trade partners, which can facilitate the allocation of regional carbon responsibility and fulfill the carbon mitigation target of China effectively [64].

As a summary, the carbon emissions from China have been a topic of interest in international climate change. More in-depth insights on model modification and accurate ECCT estimates should be uncovered in the near future. Future studies should be conducted by adopting various perspectives, methodologies, and databases. With the upgrade of the global processing trade and the adjustment of the trade structure in China, the ECCT should be estimated at the regional, provincial, sectoral, and product levels in the future. Besides, large-scale computer systems must also be employed to track the worldwide carbon flows and to understand further China's embodied carbon in foreign trade.

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Enhancing Capacities for Building Climate and Disaster Resilient Cities in Asia

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1. Introduction

The rapid urban growth, climate change and natural disasters poses a huge risks to quality of life, economic and social stability of the cities, especially in developing countries where one out of seven people is living in informal settlements and urban slums (IPCC, 2012; Mitlin and Satterthwaite, 2013). Evidence also suggests that investing in resilience programming that reduces exposure to risk is significantly more cost effective than post-disaster responses in local governments (WMO, 2008). These realities have led to significant international commitment to enhance capacity for building resilient cities than ever before in achieving sustainable development. The Sendai Framework for Disaster Risk Reduction (2015-2030), a successor of the Hyogo Framework for Action (2005-2015) called for urgent actions on achieving disaster risk reduction and resilient cities (UNISDR, 2015). In addition, some other global initiatives, such as the Making Cities Resilient Campaign of the United Nations International Strategy for Disaster Reduction (UNISDR), the Asia Pacific Adaptation Network (APAN), the Annual Global Forum on Urban Resilience & Adaptation of ICLEI-Local Government for Sustainability and the 100 Resilient Cities of the Rockefeller Foundation (100RC) are also advocated widespread commitment by local governments to build resilience cities and increasing support for strengthening local capacities.

Reflecting these trends, drafting a local resilience action plans by integrating disaster risk reduction and climate change adaptation is getting more importance in order to reduce current threats of disasters and emerging impact from climate change (Pelling 2003, Prabhakar et al., 2009). Despite this growing recognition, developing cities in Asia are not yet receiving adequate attention for introducing effective measures for planning resilient cities. Drawing on the experience of four Asian Cities, including Cebu (Philippines), Nonthaburi (Thailand), Ho Chi Minh (Vietnam) and Shanghai (China), this paper aims to examine how developing cities can effectively plan and take specific measures to enhance climate and disaster resilient cities. The paper begins with an overview of the recent evolution

of theoretical and conceptual issues related to resilience in development practice. Then, the key factors influencing risks and enhancing resilience capacities of cities will be discussed based on the case study analysis, especially focusing on local context, risks (shocks and stresses) and capacity to deal with climate and disaster impacts. Finally, paper concludes by discussing key challenges and identifying some policy recommendations to enhance resilient cities in Asia.

2. Theoretical framework and methodology

2.1 Resilient city

Resilience is gaining increasing prominence within the literature on cities and climate change. The term of resilient was first introduced to the field of ecology nearly four decades ago by Holling (1973): "...resilience is the persistence of relationships within a system and the ability of these systems to absorb changes" (Holling, 1973). Currently, the concept has also been applied to human social systems (Leichenko, 2011). Resilience means the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions (UNISDR, 2010). The United Kingdom Department for International Development's (DFID) definition also links resilience with long term development: "...disaster Resilience is the ability of countries, communities and households to manage change, by maintaining or transforming living standards in the face of shocks or stresses - such as earthquakes, drought or violent conflict – without compromising their long-term prospects" (DFID, 2011).

This shows that there are many definitions of a resilient, though no single definition has yet to be adopted by all development and humanitarian actors. However, there appears to be general agreement that resilience is more than just the ability of a system (such as a household, community or city) to bounce back to its pre-disaster state. Rather, it is an ability to adapt the dynamic conditions and put in place mechanisms that enable longer-term, systemic responses to the underlying causes of vulnerability (Barrett and Constan 2013).

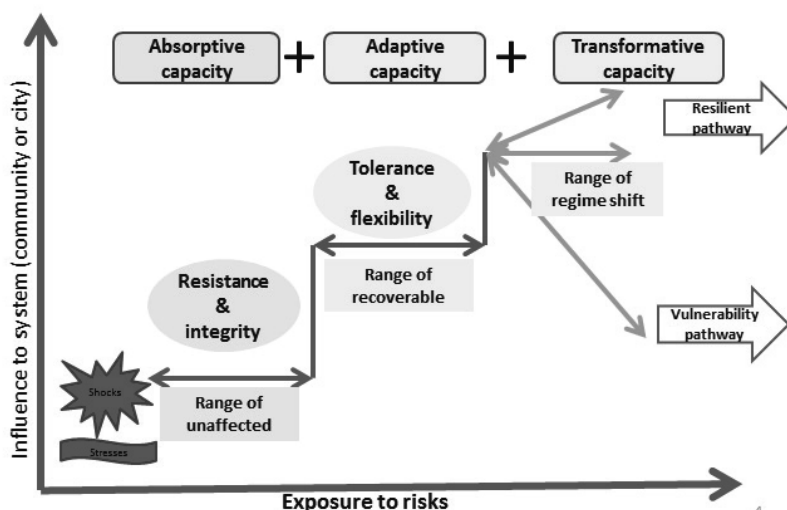


Figure 1. Three capacities in building resilient cities

Source: Adopted from Baba and Tanaka, 2014; Frankenberger, et al. 2012

2.2 Planning resilient cities

Baba et al. reveals that when risk exposure exceeds a certain level, effects on urban systems will begin to appear in a discontinuous manner (See Figure 1). The measures that can be taken to this point include precautionary measures and adaptive measures to draw out the adaptability of the systems. Furthermore, when risk exposure surpasses a certain threshold, a regime shift (or revolutionary phenomenon) takes place, breaking down the existing framework of urban systems and demonstrating the transformative ability to create fundamentally new systems (Baba et al., 2014). DFID in its resilient city programmes identifies that the cities those who collapse or recover but are worse than before are likely to fall deeper into a vulnerability pathway. However, those who bounce back or bounce back better can be said to be on a resilience pathway (DFID, 2011).

In this regards, we identified that a resilient city is one that is able to cope with disaster and climate impacts now and in the future, thereby limiting the magnitude and severity of those impacts. Thus, building resilient cities requires understanding the constantly changing relationship between context (city overview) and risks (disaster and climate change) on the one hand and three critical capacities (absorptive, adaptive, and transformative) on other. *Context* is particularly understanding how the city works and examining its current status and future trends, such as environmental, political, social, economic, and demographic conditions that affect, and are affected by adaptive capacity of the city to cope with disaster and climate impacts (Frankenberger, et al., 2012). *Absorptive capacity* is the ability to minimise exposure to shocks and stresses where possible and to recover quickly when exposed (Frankenberger et al., 2012). *Adaptive capacity* involves making proactive and informed choices about alternative strategies based on changing conditions (Frankenberger et al., 2012). *Transformative capacity* relates to governance mechanisms, policies/regulations, infrastructure, community networks, and formal safety nets that are part of the wider system in which households and communities are embedded. These capacities enable more lasting resilience and often challenge the status quo in a substantial way (Béné et al., 2012).

2.3 Methodology

We selected four Asian cities for case study analysis based on their population size, urbanisation and economic growth, exposure to climate hazards, and a track record of disaster management efforts. Further, it was also taken into consider about the political interest of local governments about the subject and the accessibility and availability of relevant information in selecting these case study cities. As Figure 2 describes a participatory method was utilised throughout the process of data collection and field facilitators were selected in each country to conduct the workshop with the help of city officials in the respective cities. A series of focus group discussions were conducted during the period of 2013-2014 with citizens, city officials and city councillors to ensure that all the key groups are represented as much as possible to gain a better understanding regarding the risk context in the city. A timeline method and risk matrix was elaborated with community members to identify the main hazards and prioritise them concerning their intensities and frequencies. Second, a detailed analysis of existing capacities was carried out and prioritised. After the risks and capacity assessments, two city

consultation workshops were organised (2014-2015) inviting different stakeholders (local leaders, non-government organisations (NGOs), government agencies, the private sector, academic, and department heads) to make a resiliency plan identifying key barriers preventing the impact being reduced and priority measures (both short-term and long-term) to reduce the impact of these risks. Some of these workshops were chaired by the Mayors of the respective cities (Cebu and Nonthaburi) ensuring political leadership for the implementation of the plans. In the following section, the case studies will be introduced and the main findings are summarised.



Figure 2. Methodology of case study analysis

Source: by Author, 2015

A series of focus group discussions were conducted during the period of 2013-2014 with citizens, city officials and city councillors to ensure that all the key groups are represented as much as possible to gain a better understanding regarding the risk context in the city. A timeline method and risk matrix was elaborated with community members to identify the main hazards and prioritise them concerning their intensities and frequencies. Second, a detailed analysis of existing capacities was carried out and prioritised. After the risks and capacity assessments, two city consultation workshops were organised (2014-2015) inviting different stakeholders (local leaders, non-government organisations (NGOs), government agencies, the private sector, academic, and department heads) to make a resiliency plan identifying key barriers preventing the impact being reduced and priority measures (both short-term and long-term) to reduce the impact of these risks. Some of these workshops were chaired by the Mayors of the respective cities (Cebu and Nonthaburi) ensuring political leadership for the implementation of the plans. In the following section, the case studies will be introduced and the main findings are summarised.

3. Discussions: building climate and disaster resilient cities

In this section, we discuss the results of case study review in four Asian cities and look at in-details how these cities are managing risks to build long-term resilience involving three objectives, such as characterise the city context, risks associated with natural disaster and climate change at the city-level, and the city's ability to adapt to anticipated change in climate.

3.1 Understanding Context and City overview

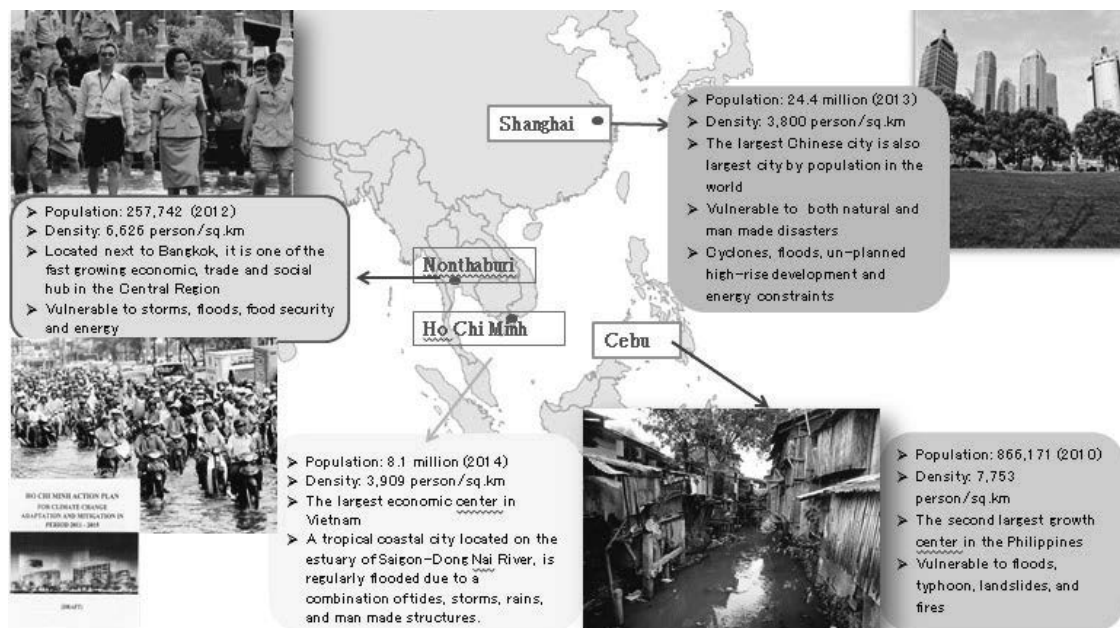


Figure 3. Overview of the case study cities

Source: by Author, 2015

Understanding how the city works and examining its current status and future trends, such as population and economic growth is important because these are affected by adaptive capacity of the city to cope with disaster and climate impacts. The case study analysis revealed that all selected cities are rapidly growing cities have higher vulnerability to disaster risks and climate change impacts. For example, Cebu City is the second largest growth centre in the Philippines after Manila and the total population of the city has been increased from 718,821 in 2000 to 866,171 in 2010 with 1.9% annual population growth (Cabrera, 2015). Nonthaburi Municipality is also the most urbanised centre of the Nonthaburi Province of Thailand and functions as a city centre of administrative, business and residential purposes (Pornsrri, 2015). Ho Chi Minh City has a population of 10 million people in 2014 and contributes about 30% to total national income of the country (Viet, 2015). Shanghai is the largest Chinese city and the economic center with a major administrative, shipping, and trading. It is one of the four direct-controlled municipalities of the People's Republic of China, with a population of about 25 million as of 2014 (Hu, 2015).

It was also revealed that if not properly accounted for in disaster preparation and response plans, the rapid population growth in these cities with large numbers of migrants cannot be fully integrated

into the formal systems, increases in informal settlements and pressure on the city's infrastructures is likely, consequently making the cities even more vulnerable to the impacts of climate change and natural hazards. In Cebu City, about 30% of its households are occupied in informal settlements in the risky areas with lack of basic infrastructure, services and the livelihoods (Cebu City, IGES and A2D, 2014).

Moreover the larger the area a city occupies and the denser a city is also impacts the resources required to adequately protect the population against climatic events and natural hazards. It was identified that Shanghai has 36,055 building blocks over 8 stores within its total land area of 6,787 sq.km (Hu, 2015). Since 2010, the energy demand in Cebu City is expected to grow at 4.5% annually and the existing transport, water supply, drainage and solid waste management systems are also poor maintained and not adequate (Cebu City, IGES and A2D, 2014).

Further, the case study analysis revealed that climate change impacts and disaster risks management are linked to city location and geography. According to Nonthaburi, most of its development areas are located on the flat, low-lying floodplain of Chao Phraya Basin with a height varying from 1 meter to 3 meters. When the water level in Chao Phraya River and major canals are already high, this usually results in a stagnant flood situation, especially when there is a heavy rain (Nonthaburi Municipality and IGES, 2015). Located in the downstream of Dong Nai river basin, 60% of Ho Chi Minh City's land area was less than 2 metres in elevation and was influenced by tides and sea level rise. Like most cities situated in deltas, Ho Chi Minh City faces serious challenges due to climatic change with increasingly natural disasters such as typhoon, floods, droughts that occur regularly. Shanghai City is also located in the Yangtze River Delta in East China and its old city and modern downtown are formed by the Yangtze's natural deposition and by modern land reclamation projects (Viet, 2015).

3.2 Understanding Climate and Disaster Risks in the Cities

A comprehensive climate and disaster risk assessment is necessary to understand the hazards faced, manage growth while systematically addressing disaster risks, and adapt to the local impacts of climate change. The case study analysis recognised that there are some differences of the data availability in these cities. The scientific data and information on climate change projections and disaster risks are readily available in Shanghai and Ho Chi Minh cities. Unfortunately, a data on climate risks and hazards did not exist in Cebu and Nonthaburi cities. Carrying out a comprehensive risk analyses and data gathering was also identified as costly and local government staff in these two cities lack scientific background and expertise. Thus, the community-based, participatory risk analysis adapted to understating the risks better and reduces both costs and time required for data collection.

The participatory consultative method engaged city experts and stakeholders in each city in the risk and capacity assessment process also help to develop local adaptive capacity. The qualitative data gathered from participatory methods later integrated with scientific data of national and global disaster and climate models providing a deeper understanding of risks and the scientific foundation for planning efforts by city-decision makers and other stakeholder groups.

The most common climate risk across all case study cities are extreme events resulting from weather related hazards and the most common threat is flooding. According to the geo-hazard maps prepared by Mines and Geosciences Bureau (MGB 7) of Cebu, 26 (out of 80) barangays in the city at high risks to flooding. Flood is also the most existing disaster risks in Nonthaburi Municipality. The Great Flood in Thailand in 2011 was a severe flooding in last 70 years and has caused an enormous damage to life and property of the Nonthaburi Municipality.

Changing weather patterns and extreme events result in damage to housing, ports, roads and rail networks, which in turn creates other indirect problems, such as a lack of access to goods and services, or an inability to travel to work. All of these cities include informal settlements or slums, and the ability of poorer communities to cope is limited by their lack of access to basic infrastructure such as potable water, drainage, sanitation and health services, education, and employment opportunities. According to Ho Chi Minh City, about 62% of the citizens may be affected by extreme weather events if there is not enough appropriate flood control projects in place by 2050 (this figure at the present is 26%). Rural communities and poor households in urban area are the most vulnerable groups because their livelihood will be damaged and more difficult to be recovered when facing climate change impacts, simultaneously, the low incomes also restrict them from covering losses and paying the bills for recovery. Urban flooding also affects industrial manufacture, especially reducing transport capacity and production efficiency of the industrial zones. If taking the labour forces affected by flooding as a criterion for the vulnerability assessment of the city's economy and industry, then there is about 41% of the labour forces is encountering the impacts of extreme floods. This number may be increased up to 60% by 2050 (Viet, 2015).

Shanghai City is also threatened by floods, storms, earthquakes and other climate and natural hazards. According to the Mind the risk A global ranking of cities under threat from natural disasters in 2013, Shanghai is ranked as the eight most vulnerable cities in the world for its potential disasters such as typhoon, storms and flood (Hu, 2015).

3.3 Understanding Climate and disaster risk management capacities in the cities

Resilience building relies on integrated programming—a cross-sectoral approach with a long-term commitment to improving the three critical capacities, such as absorptive capacity (disaster risk management), adaptive capacity (longer-term climate change adaptation), and transformative capacity (improved governance and enabling conditions). The case study analysis identified that Cebu and Nonthaburi Cities are more focused on actions for building absorptive capacity with adopting disaster risk reduction measures, including risk assessment and preparedness planning, disaster response, relief and recovery programmes. Both cities have established disaster management committees, early warning system and command centres, information and education campaign for its citizens to well prepare and response to disasters. Also they have well established organisational mechanisms at community-level for sudden response (volunteers and training) and emergency equipment.

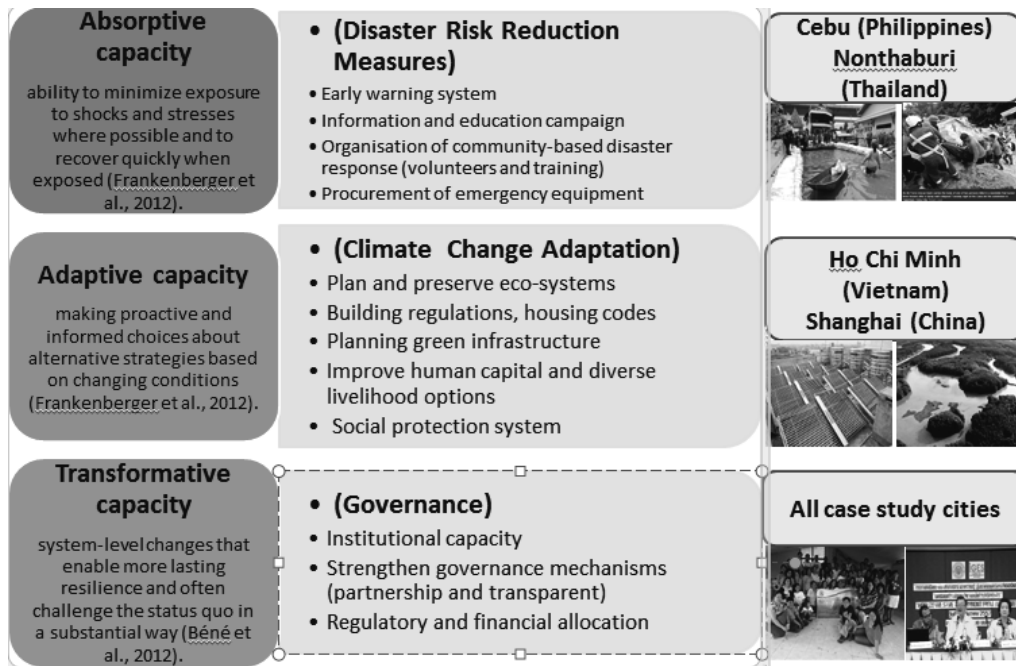


Figure 4. Climate and disaster management capacities in the cities

Source: by Author, 2015

However, Ho Chi Minh and Shanghai Cities have begun to recognise the importance of strengthening adaptive capacity under the resilience capacity-building initiatives to address the current threats and those emerging from climate change. The built and ecological environment of these cities significantly makes climate change impacts and Green House Gas Emissions. For example, the presence of lack of street trees and parks, coverage of flood retention areas, extent of wastewater and drainage system, waste disposal to drainage and encroachment and illegal construction can intensify flooding in the cities. For responding to these issues, local governments identified both structural and non-structural initiatives that can be pursued through legal and political system, zoning regulations, infrastructure and urban services specifying change building codes and restrict land use in areas subject to climate change impacts such as flooding, increase urban tree coverage and vegetation, plan and manage the river-basin and upper land's vegetation, cleaning of the channels and construction of new drainage system if necessary.

Further, this study found that all city governments face many challenges in their efforts to planning resilient cities due to fiscal and policy making limitations. In order to effectively address the challenges faced by the cities in integrating resilient plans into daily decision making and long term development plans of the cities, emphasis was given on enhancing the transformative capacities, which would be needed in order to facilitate systemic changes in the structural constraints (such as those of ecological, political, economic, or social structures). To bring typical changes into local policies, institutional and administrative process and planning systems where the changes are often most needed, four key factors are identified, such as effective political leadership, efficient financing, jurisdictional coordination and citizen participation.

4. Conclusion and recommendations

This study identified that local governments have great potential to lead on building resilient cities, despite the political, technical and financial constraints that they are faced in day-to-day operation. In order to effectively address the challenges of natural and climate change disasters, cities need to incorporate risk assessment and resilient measures into daily decision making and long term development plans and investments. Following are some recommendations for building resilience capacity in developing cities:

Integrating climate change adaptation with existing efforts in disaster risk management:

Case study cities are growing quickly, where built-up areas are projected to increase more rapidly in the coming years. The locations and built construction patterns of these cities often place their citizens and assets at greater risk for natural disasters, including those expected to worsen with climate change. Considering this close links between disaster risks and climate risks, efforts are required to build resilience in cities by integrating climate change adaptation with existing efforts in disaster risk management. For the risks analysis, a participatory, community-based methods can utilised with the scientific, quantitative data gathered from other sources. More innovative donor funding mechanisms are needed in order to support local governments for building capacity to conduct comprehensive risk analysis and design appropriate interventions to address underlying causes of vulnerability and risk.

Long-term, integrated approaches to resilience programming:

A cross-sectoral approach with a long-term commitment is required in order to improve the absorptive, adaptive, and transformative capacities of cities to shocks and stresses. Local governments need develop both short-term and long-term resilience plans, but many more need to bring them into their everyday operations. However, many local governments are reluctant or unaware of how to mainstream disaster and climate concerns in their political and development agenda, and how to address them in their investment plans and their citywide strategic thinking. Developing a local resilience action plan, as described in this paper is an important proactive adaptation measure in this regard.

Strategic collaboration to enhance transformative capacity:

Local governments face many development challenges in their efforts to building resilient cities due to lack of transformative capacity. Tackling disaster and climate risks should not be seen as a competing agenda but one that should be mainstreamed into existing development goals—recognising that without such mainstreaming, the achievement of these goals may themselves be threatened. Collaborative efforts, alliances, or high-level task forces that involve donors, UN agencies, and national governments can more effectively improve transformative capacity at local level, greatly enhancing local government's initiatives to improve the resilience in their respective cities.

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Assessing the Prospects for a Sustainability Transition in Seoul, South Korea

An Analysis of Grassroots Innovations

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1. Introduction

Five years ago, the South Korean government began to promote green growth as an alternative to traditional development paradigms. The endorsement of green growth was supposed to offer countries an alternative to development models fuelled by capital accumulation to ones powered by resource-saving technologies. Advocates of green growth, however, were largely silent on the role citizen participation played in this new approach. The absence of participatory dimension was particularly conspicuous in South Korea's capital, Seoul. More than four decades of rapid growth had transformed Seoul into a thriving metropolis that had become ever more disconnected from the natural environment upon which it was built. The evidence of this detachment was most readily apparent in the concrete tunnels that entombed the city's rivers. More discouraging still was the disenfranchisement of a citizenry who would arguably be the greatest beneficiaries from a closer affinity with nature.

But in 2011, the Seoul Metropolitan Government (hereafter Seoul), under the leadership of newly elected Mayor, Won-Soon Park, began to introduce a series of administrative reforms that opened a two-way dialogue between the citizens and local government. These reforms nurtured the development of a grassroots movement that either directly or indirectly enabled a series of innovative initiatives. Prominent examples of these innovations included the sharing city project, urban agriculture, one less nuclear plant, participatory budgeting system, and the listening open forum. To varying degrees, these innovations placed an important participatory dimension at their core. By all accounts, this participatory elements has helped Seoul transition from a nominally green city into one that comes closer to preaching and practicing sustainability. For many observers, Seoul had begun to take critical steps in a sustainability transition.

How far and to what extent Seoul will be able to maintain this transition nonetheless remains an

open question. A growing body of sustainability transitions literature can help answer this question. A core insight from the transitions literature is that the critical first step in a transition is the creation of a niche wherein new innovations begin to take root and spark change. The formation of a niche can then pave the way for longer lasting and higher level regime and landscape changes (Frantzeskaki & Loorbach 2010; Rotmans et al. 2001; Kemp et al. 2001, 2007a, 2007b; Loorbach 2007; Smith et al. 2005). A complementary body of work on grassroots innovations suggests that “intermediary” change agents can support and scale not simply technological but social innovations (Hargreaves et al. 2013; Howells 2006; Seyfang and Smith 2007; Seyfang 2009). While the transitions literature can shed light on the drivers and the process underlying transformative change, it is based chiefly on national level experiences in Europe. This article employs work on transitions and grassroots innovations as a lens to assess how far Seoul has progressed as well as prospects for expanding the transition as the city reforms.

The case of Seoul underlines the importance of citizen engagement in augmenting the impacts of grassroots innovations. It further underscores how three key enablers in the transitions process—social learning, social networking, and reflexive governance—that can help scale changes to and within higher-level regimes. It also, however, illustrates the importance of distinguishing between organizational and institutional change within the regime level. As will be seen, some of the key innovations in the transformation of Seoul—namely, the listening open forum—have yet to become institutionalized. The article also discusses why some innovations induce organizational while others reach a higher level of institutional change. This distinction not only has implications for the transition in Seoul, but a broader literature on transitions.

The remainder of the article is divided into four sections. The next section synthesizes literature on sustainability transitions and grassroots innovations. A third section then begins to apply insights from that literature to illuminate the drivers and prospects for transformational change in South Korea. The final section discusses the implications of the case of Seoul for the study and practice of transitions in other parts of the world.

2. Literature Review: Sustainability Transitions and Grassroots Innovations

More than three decades of advocacy for sustainable development has brought vast and varied attempts to formulate roadmaps detailing paths to a sustainable future (Smith et al 2005; Frantzeskaki & Loorbach 2010). The strength of the work on sustainable transitions is that it can help lend structure to the often messy multi-stage processes that can lead countries down such a path. The point of departure for much of the transition work is the root source of change is innovations. Innovations, moreover, was not solely about creating and disseminating new technologies. Economic and social considerations need to be carefully factored into attempts to induce and scale technological change (Kemp, 1994).

Reflecting on such economic and social considerations has led to several theories delineating the main stages of a transition. One of the more important set of claims envisages sustainability transitions as unfolding across three levels: the niche, regime, and landscape levels. This multi-level perspective

holds that transformative change occurs in micro-level niches where radical innovations originate and gain ground. Niche innovations can then transform and be transformed by meso-level regimes consisting of both softer economic and social structures and harder institutions and infrastructure. Regime change can then induce or be induced by shifts to wider landscape comprised of meta-factors such as cultural values and political systems (Geels & Schot 2007; Lachman 2013). In sum, innovative change at the niche level can support more fundamental change in regimes, which, in turn, can transform more all-encompassing landscapes (Kemp et al. 2001; Geels 2002).

The transitions literature has also shown that putting these changes into motion is not easy. Established interests may prefer incremental to radical change. The incumbent technological and social systems may, moreover, further place a drag on significant departures from the *status quo* (Sanden & Azar 2005; Frantzeskaki & Loorbach 2010). In fact, work on strategic niche management (SNM) (Kemp et al. 1998; Schot & Geels 2007; 2008), a precursor to the multi-level perspective, has looked at “how niches grow, stabilise or decline in interaction with the dynamics of prevailing systems” (Hoogma et al. 2002; Kemp et al. 1998). Meanwhile another related branch of transition management (TM) literature has focused on the challenge of altering that prevailing system by arguing for an open-ended process that does not prescribe what needs to be done but allows stakeholders to determine what could be done to move a transition forward (Markard et al. 2012; Loorbach 2007; Loorbach & Rotmans 2010). In a slightly ironic twist, a unifying theme running through different branches of transitions theory is how a transition that is intended to making societies sustainable can itself be sustained? To use the language of the multilevel perspective, how do societies move within and from one level to the next?

To varying degrees, the three branches of literature converge on three important sets of factors that can enable progressively larger scale changes. The first, social learning, involves providing stakeholders with opportunities to learn from each other. This often consists of creating enabling environments that encourage “experimentation and pilot projects, the exchange of experiences, [and] training and competence building” (Kemp 2007: 327). As emphasized in a complementary strand of grassroots innovations literature, it further entails engaging NGOs, businesses, consumers, academics as ‘intermediaries’ in niche development who at each step and help adjust the direction of the transition (Hargreaves et al. 2013; Seyfang & Smith 2007; White & Stirling 2013). A second set of factors, social networks, consists of collaborative platforms that allow discussion and negotiations to take place. These platforms often help bring together fringe actors with established players to identify and promote mutually beneficial innovations. A third set of factors, reflexive governance, involves forging partnerships between varied actors with diverse beliefs. These partnerships can then help stakeholders arrive at shared visions of a sustainable future through a well-managed process of deliberation and decision-making.

While the transition literature has helped illuminate pathways and enablers of change, it has not escaped critique. One set of criticisms has focused on the rather deterministic reasoning underpinning the transitions logic. Even while acknowledging the challenges to transitions, there is an air of inevitability implicit in many of the claim’s main arguments; that is, change will happen regardless of who is participating in and leading the charge. A notable blind spot in the transitions work is the

relatively limited attention to agency. Another shortcoming of the transitions work is it still tends to focus on technological as opposed to social innovations. Social considerations are important for enabling change but are not necessarily the source of innovations. Here the aforementioned parallel literature on grassroots innovations, which allows “room for people to design lifestyles that may be different from the mainstream but more adapted to their needs” (Akenji 2014: 21). Bringing in the grassroots can help balance the technological orientation of the transitions studies, as they focus on “social, ethical, and cultural rules and values” (Vergragt et al. 2014).

A third set of particularly salient concerns involves how agents supporting change work at the boundaries of softer organizational and harder institutions to enable wider scale reforms. Particularly at the second regime level, mediating agents who work at this boundary between organizations consisting of loose congeries of affected stakeholders and institutions consisted of more consolidated policies, legislation, and administrative structures play a potentially critical role in influencing the prospects for wider scale social innovations. As illustrated in Table 1, it then might be important to think of transitions operating on three levels, but to focus closely on how important agents of change manage to translate the human resources making up organizations into the rules and structures making up institutions. It might further be worthwhile to consider how change agents deploy the three aforementioned enablers of change—social learning, social networking, and reflexive governance—to work toward these ever wider scale ends.

Table 1. A Simple Analytical Framework Based on Transitions Theory

| | Niche | Regime | | Landscape |
|-----------|-------|----------------------|---------------------|-----------|
| | | Organisational Level | Institutional Level | |
| Project A | √ | √ | √ | √ |
| Project B | √ | √ | √ | |
| Project C | √ | √ | | |

In South Korea, a country once lauded for a development miracle that was guided by a relatively autonomous technocratic bureaucratic elite, focusing on the interaction between organizational and institutional change maybe particularly revealing. For the degree to which social innovations alter administrative structures in South Korea can give arguably an even greater sense of the prospects for broader change than Europe. This is particularly true since in many contexts in Europe the bureaucracy is not as autonomous and entrenched as South Korea. From here, the paper examines the role of a key agent of change, the Mayor of Seoul, who employed some of the aforementioned enablers to push forward wider scale change for some but not all social innovations. In so doing, the study employs sustainable transition and grassroots innovations literature as a lens to analyse a process that begins at the niche level and led to some changes that crossed a critical juncture at the regime level.

3. Research Methods: Case Study and Process Tracing

The article relies chiefly on qualitative case studies to trace this transition process. The case studies are focused on primarily project level innovations supported to varying degrees by the Seoul administration. The data used to analyse this process shaping these project's future is chiefly but not exclusively qualitative^[1]. Between 2013 and 2014, authors conducted a series of face-to-face interviews with relevant government officials and representatives from key non-governmental organizations (NGOs)^[2]. To solicit views from a broad cross section of involved parties, the interviews were conducted with at least one official and at least one member of the municipal assembly; for instance, a member of the municipal assembly on the 13th of January 2014 and an action officer of the Listening Open Forum on 27th of December 2013 were interviewed.

In addition to interviews, the authors carefully examined municipal ordinances, city policies, white papers, and related government data. Seoul's recently passed information disclosure policy made it possible to access and review key documents and arguably made it easier to understand drivers and enablers of change. To help structure the analysis, the narrative that follows begins with a brief introduction to the Mayor Park and the life experiences that made him a strong advocate of grassroots innovations; examples of the innovations he helped foster then follow.

3.1 Won-Soon Park as an Agent of Change

Mayor Park has been a strong proponent of grassroots movements to remedy social problems for much of his professional life. His abiding belief in said remedies is arguably a by-product of his experience as a human rights lawyer and a founder of the non-governmental organization (NGO) 'People's Solidarity for Participatory Democracy' in the 1990s. His work at the 'Hope Institute'—a citizen run think tank established in 2006 to empower communities to drive socioeconomic change—also informed his thinking on these matters. His publications based on field research helped evince his support for innovating from the ground up (Park 1999; 2001; 2005; 2009; 2010; 2011). Some of the key messages from those publications help cast those beliefs into sharper relief, namely: practice in the field can avoid the unnecessary accumulation of paper; building communities is critical to fostering creativity; and multi-stakeholder communication can supplant top-down one-way decision making. It is these and other similarly themed beliefs that have led Mayor Park to take a distinctly different approach to public administration, supporting the transition of many initiatives from a niche to regime level change.

There have been dramatic changes in Seoul Metropolitan Government since Won-Soon Park was

[1] We suggest that following research should update the 'results' of the current innovative policy process with more concrete quantitative data analysis based on our research leaning to focus on 'process', as the evaluation for the completed 35th Seoul Mayor's term in June 2014. Additional research could follow to investigate how the 'process' of new term bridges and develops organisational level transition to concrete institutional level transition.

[2] To balance both opinions, the interviews conducted at least one from related officials and one from member of municipal assembly for each agenda; for instance, member of municipal assembly on 13th of January 2014 and an action officer of the Listening Open Forum on 27th of December 2013 were interviewed for the participation area; for the welfare area, two Seoul welfare officials were interviewed on 16th and 24th of January respectively and four members of municipal assembly of the representative of citizens were interviewed on 20th, 23rd and 24th of January. For the communication area, a public service activist on 6th and one official on 9th of February were interviewed respectively.

elected in 2011^[3]. It is not easy to reform administrative structures in Korea but Mr. Park's embrace of deliberative decision-making, public consultation and information sharing have helped to do just that. The changes go beyond simply improving the performance of government agencies. Rather, they have fundamentally altered the practice of public administration. It may also wider change since when Seoul endorses innovations other cities often follow. It is therefore important to analyse this new approach affected several "sustainability projects."

3.2 The 'Sharing City, Seoul' Project

Korea is a rapidly growing country. A side-effect of this growth is the collapse of social spaces. It was the disappearance of these spaces and the resulting sense of malaise that led Seoul under the leadership of Mayor Park to develop its 'Sharing City, Seoul' Project. The primary aim of the project was "creat[ing] new economic opportunities, to restore reliable relationships, and to reduce the waste of resources..." (ref). The project got its name from with the belief that happiness could be created by sharing between the ten million inhabitants of Seoul. Sharing was not only about promoting the collective use of spaces and buildings but also the exchange of experiences and wisdom. This latter exchange could be a powerful source on information for raising children, locating employment, improving livelihoods, and ultimately finding happiness. From environmental perspective, sharing can reduce waste and curb environmental degradation.

To help strengthen this movement several institutions were created. For example, the Seoul Sharing Hub was established to archive, disseminate, and diffuse information while building networks with relevant domestic and overseas organizations, enterprises, media, and other pertinent organizations. To construct infrastructure for village restoration, Seoul established the Community Building Division under the Seoul Innovations Bureau in January 2012; two months later it announced the Ordinance for Town Community Support. In the months that followed, this same Bureau convened seminars and conferences with experts and citizens to lend more shape and substance to the project. Research was also conducted by the Seoul Institute, which served as the Basic Plan for Seoul's Town Community which was introduced in September 2012. In addition to crafting the legal basis for the project, nine Town Community Support Centres were opened to provide in-kind support and counselling for different needs when residents applied for support for the plans they drafted. The results of this work were clear: the numbers of village community projects registered doubled from the 2,233 in 2012 to approximately 4,400 in 2013; 68 per cent of the projects were initiated by residents.

Interestingly, the implications of The 'Sharing City, Seoul' Project extended beyond the project itself. As part of the project, the city government shared detailed information with citizens on how to communicate, negotiate and reach acceptable conclusions more generally. To a certain extent, this process proved costly and time consuming (confirming some of the claims in the transition literature i.e. Kemp 2007b). But viewed from a longer term vantage point, it also cut the rising costs of preserving unsustainable systems and the reduced the likelihood of conflict between local government and citizens.

[3] Mr Park was elected on October 2011 at Korean by-elections and re-elected on July 2014 at the 6th local election. This research limits to cover only his first term of office as the research conducted between October 2013 and February 2014.

3.3 Urban Agriculture Festival and One Less Nuclear Power Plant

Seoul has also adopted several policies that illustrate the mutually benefits when nature and the surrounding community come together. The Seoul campaign 'Blooming Flower, Seoul' was created to motivate citizens to become involved in the cultivation of trees and flowers in their daily lives. It also launched the Urban Agriculture Festival in 2012 that gave rise to similar festivals featuring information exchange and hands-on demonstrations. To highlight two of the more visible examples, Seoul planted rice paddies in *Gwanghwamun* Square in the city centre and raised honeybees on city hall's rooftop gardens. These activities were part of the urban agriculture master plan under Urban Agriculture Fostering and Supporting ordinance. These efforts also created an environment favourable to low-impact urban lifestyles. By blurring the lines between urban and rural development and by drawing upon ideas and experience implementing grassroots innovations in Seoul i.e. direct trade cooperatives, farmers' market, informal civic farming community groups, these efforts provided tangible example of how to move away from material-intensive lifestyles in Korea that have since spread nationwide.

Another illustration of an interesting project that brought relatively significant organizational and institutional change was the 'One Less Nuclear Power Plant'. Beginning in May 2012, the program aimed to save 2 million TOE energy saving or a reduction equivalent to one nuclear power plant by December 2014. The proposed goal was to be achieved through the development of energy self-sufficient villages, photovoltaic power plants, cooperatives' sharing power plants project, car sharing systems and other small-scale innovations. The initiative owed its success to diverse groups of citizens actively participating in the implementation of community-based energy conservation program (i.e. 1.7 million eco-mileage membership, energy clinic programme for individual household, energy guardian angel club at schools, good shop dedicated as leading energy saving commercial places etc.). The end results of these efforts were impressive in both their speed and scope: the project energy savings goal was actually reached six months ahead of schedule and average power consumption of Seoul decreased 1.4 per cent in 2013; while nationwide energy consumption average increased 1.76 per cent. Urban environment area illustrated the possibility of niches becoming institutionalized i.e. one less nuclear plant and urban agriculture.

3.4 Participatory Budgeting and Listening Open Forum

Another set of reforms provide examples of wider scale as well as potentially less lasting change. The Participatory Budgeting System (PBS) is an example of the former. Seoul allows citizens to participate in the multiple areas of the planning of policies, including budgeting. For instance, the budgeting committee is comprised of citizens that review community proposals to ensure financial transparency and equitable resource allocations. Importantly, the commitment to implementation has encouraged yet additional waves of participation as demonstrated by a sharp 80% increase in citizen participation in the budgeting committee. Moreover, the citizen-participatory system selected 223 projects (funded with the equivalent 50.3 billion KRW) in 2013 and the Seoul government underwrote 202 of the proposed projects. The reliability of budgeting under the citizen-participatory system is strengthened further with a review system that consisted of 25 districts' meetings, sub-committee reviews, and

general assembly meetings. As Seoul's PBS has been supported by the Local Finance Act, the PBS Ordinance and a budget of 50 billion Won (equivalent to 50 million USD), it is now institutionalized. It generated broader civic participation and encouraged the introduction of open decision making. A possible challenge, however, may lay in conflict with Seoul municipal assembly's own budgeting process.

The Listening Open Forum (聽策, *Chung-chech*, literally means listening policy rather than 政策, *Jung-chech*, which means policy more generally) illustrates a slightly less advanced of stage of change. The Listening Open Forum was a place where Mr. Park's attendance was all but guaranteed; it thereby offered citizens as well as civil servants a chance to voice their concerns directly to the city leadership. It also drew attention due to its regular scheduling; this enables allowed citizens from different backgrounds with varying levels of political sophistication to become a source of inputs. Held 71 times annually over the nearly two year period of November 2011 to December 2013, the Listening Open Forum became a critical component of the participatory decision-making process. Listening Open Forum has yet to be institutionalized. It offers a good example on deliberation; it still focuses on daily lifestyle issues rather than resolving critical social conflicts.

3.5 Assessment and Discussion

The five cases presented in the previous section illustrate various degrees of progress along a transition beyond the niche and within the regime level. It is relatively clear that all five cases have expanded both softer economic and social structures and begun to bend harder institutions and infrastructure that constitute the regime. They further illustrate the importance of having intermediary agents that helped to carry forward the change—and offer the possibility for even broader change moving forward. Perhaps, most interestingly the case of the Listening Open Forum exemplifies change that is currently in place but may fail to retain its standing after Mayor Park leaves office. This innovative is not pegged to larger set of harder institutional and administrative reforms. Its prospects for sustainability are therefore arguably more fleeting.

Table 2. Analysis of Transition Process

| Policy | Niche | Organisational Level | Institutional Level | Landscape |
|-----------------------------------|-------|----------------------|---------------------|-----------|
| The 'Sharing City, Seoul' Project | √ | √ | √ | |
| Urban Agriculture | √ | √ | √ | |
| One Less Nuclear Power Plant | √ | √ | √ | |
| Participatory Budgeting System | √ | √ | √ | |
| Listening Open Forum | √ | √ | | |

Another set of questions relate to how and why some of the innovations have moved up from the niche level. This was not solely a function of strategic interventions from Mayor Park. Rather, they involve the three enablers of change manifesting themselves in varying forms. For instance, in the

case of the Sharing City Project—arguably the most institutionalized of the grassroots innovations—there is influence of social learning, social networking, and, to some extent, reflexive governance. In the case of the urban agriculture, there is also visible evidence of social learning and networking among and within grassroots innovations and citizens. To point to yet a third example, the case of PBS gained momentum from reflexive governance and some networking. In sum, the five cases reinforce arguments that governance, networking, and social learning are critical drivers of sustainability transitions.

4. Conclusions

This article began from the observation that Seoul, like many other rapidly growing cities in Asia, found itself in rather precarious state approximately five years ago. With the national government endorsing green growth, the city itself was losing connection with the natural environment as well as its residents. Beginning in 2011, the city began to reclaim that connection due in part to the astute manoeuvring of Mayor Park. It then raised the question about the prospects of the reforms that Mayor Park helped introduce for maintaining momentum. To help analyse these prospects, the paper employed a lens based on transitions and grassroots innovations. That analytical lens used to assess five projects under Mayor Park's which suggest that the prospects for a more sustainable future in Seoul are, on balance, relatively strong. This is particularly the case for four out of the five appraised initiatives – Sharing City Project, Urban Agriculture, One Less Nuclear Plant, and Participatory Budgeting. Moreover, the development of these initiatives from a niche-level innovations to regime-level shift in organizations and institutions is owing to something to social learning, social networking, and reflexive governance. That these enablers of change left their impact in Seoul suggest the possibilities of extending this literature's insights more outside Europe.

To a certain extent, the notion of extending this framework points to other related areas for research. One such area would be to look more at changes to the landscape level and their influence below. This article, while acknowledging the dynamic interplay between different levels, focused chiefly on change moving from the bottom up. It would be interesting to see how changes in more encompassing cultures or political systems make some reforms feasible while proscribing others. It would similarly help to look at the potential for whether changes in Seoul can help lead to changes in other Korean or even other foreign cities. A similar set of potentially revealing inquiries would bring in more cases from Seoul with possibly fewer degrees of success moving from one level to the next.

In addition to expanding the scope of the cases studied, another area for strengthening the analysis would involve incorporating more precise measures of progress from one level to the next. Admittedly the judgement on what is a regime and niche level change is rather subjective at this point. This is partially a function of the transitions approach itself and its reliance on describing an interactive process that is ongoing and does not lend itself to single snapshot of achievement. It is also partially attributable to the authors' decision to rely chiefly on qualitative as opposed to quantitative data. Future iterations of this work would potentially benefit from the inclusion of more hard numbers to support qualitative observations. Time series data, illustrating the rise and fall, of measures of

sustainability as well as the key enabling reforms would be particularly welcome in this regard.

A third potential need area that relates to transitions work more generally is translating the rather abstract language it uses into prose that can communicate with policymakers. As a post-2015 development agenda is likely to be set this year, it is imperative that both transitions theory and practice can be assimilated by those who do not speak in terms of niches, regimes, and landscapes. In fact, there appears to be ample room for using actual case studies like the ones featured in this article to translate transitions theory into a language that is more accessible to policymakers.

A final point relates to the green growth discussed at the onset. With the growing interest in new development paradigms have come a surfeit of slogans for new approaches to development. It is not uncommon to see the development community push for climate resilient, low carbon, green growth. In addition to potentially perplexing policymakers, these slogans also run the risk of overlooking the interests of people that growth is supposed to benefit. To make sure that these slogans do not ring hollow, there is a need to make suffuse new approaches to development with often overlooked provisions for participation and engagement.

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Dealing with Risk

An Analysis of Local Community Adaptation in Small Island

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Abstract

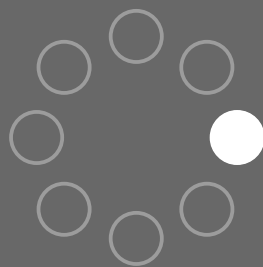
Widespread ecological change is a critical issue for coastal commons in Indonesia's small islands. As in other developing countries, ecological changes in Indonesia pose significant risks to local livelihoods, like happens in Panjang Island, South Kalimantan.

Ecological change in Panjang Island refers to loss of fishing ground, land degradation and land conversion. Panjang Island coastal areas likewise support diverse marine resources and biodiversity, as well as serve as a source of energy and environmental services. Given their small size, the regulation of Panjang islands is at times ambiguous and open to conflict. On one hand, Panjang Island may be defined as a conservation area locally. On the other, however, the same island may be defined as a mining area at the national level. This contradiction poses a serious threat to local livelihood and ecological conservation, and can lead to opportunities for exploitation by e.g., mining corporations. At the same time, climate change has become an urgent threat that is most felt by Panjang island societies, via changing fishing seasons and fish availability, given their dependence on coastal-marine resources. Continuous land conversion further compounds these effects. Taken together, these ecological changes contribute to the degradation of Panjang island ecosystems. However, the capacity of local societies in Panjang Island to adapt herein is generally low (although there has been some resilience in past cases).

This paper seeks to analyze local community adaptation strategies in Panjang Island as a way to cope with ecological changes noted above and to overcome ambiguous regulatory settings in Indonesia's small island.

REGULAR SESSION 5

NUCLEAR SECURITY, RISK
AND DEMOCRACY



ISESEA-5

Nuclear Security in China

Idea & Status

Fang Yang

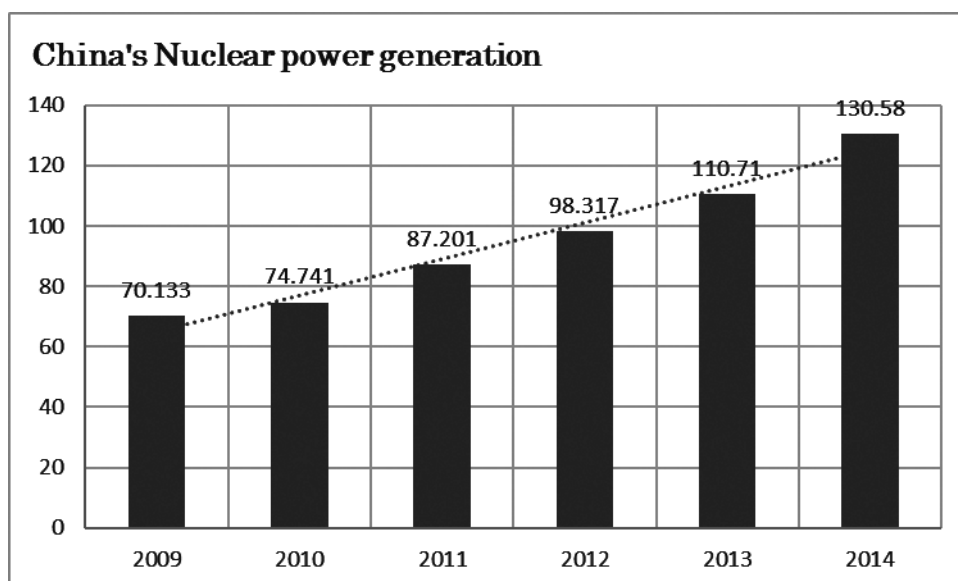
Hohai University

Abstract

China is speeding up the development of nuclear power industry. Although the Chinese government declares that China's nuclear power plant is safe. There are many challenges, such as the public's doubts and non-acceptance of nuclear projects, the coexistence of multiple types of reactors and diverse nuclear power technology, nuclear power plant developed so fast that related technical personnel can't meet the demand, lacking experience to deal with nuclear accidents etc. In response to this situation, the Chinese government had taken kinds of measures to prevent nuclear risks.

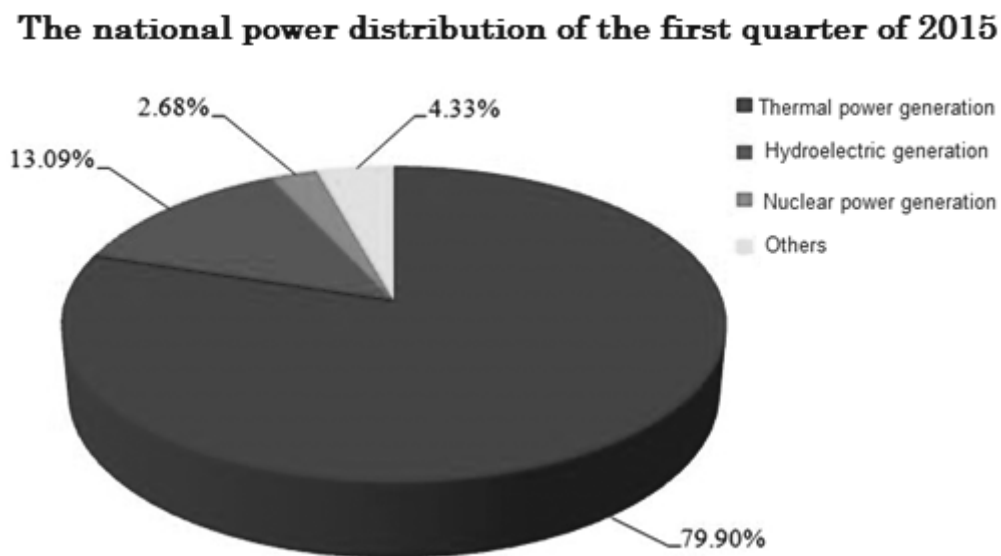
China's nuclear power development

In 1991, the first nuclear power plant of China began to run. At present, China has 22 units of nuclear power plant reactors at work, and there are other 26 units under construction. The quantity of under-building nuclear power plant reactors of China is the largest in the world.



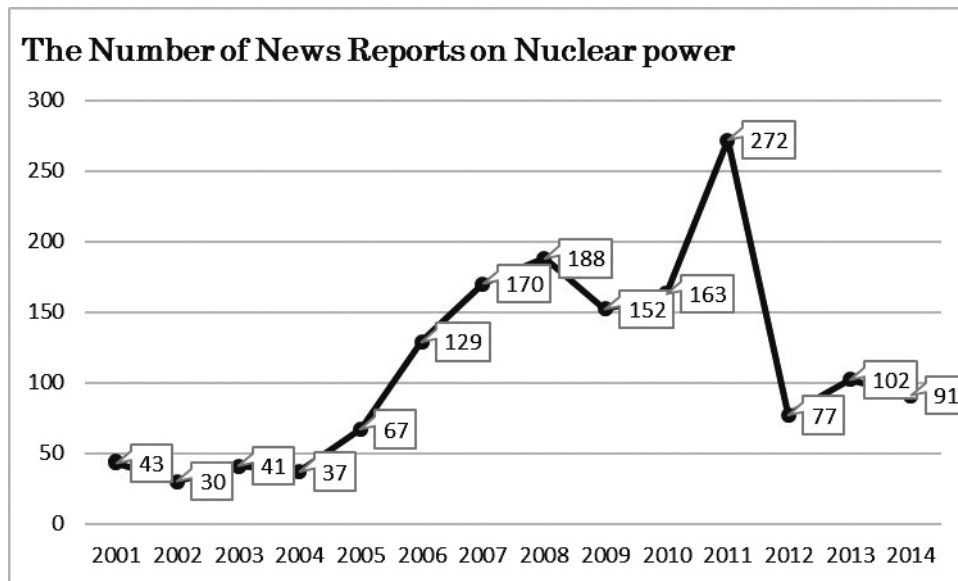
According to the figure above, China's nuclear power generation have been increasing steadily. Nuclear power generation of 2014 reached 130.58 billion KWh, which almost doubled the figure of 2009. In response to the growing demand for energy and the pressure of global greenhouse gas emissions, China is to speed up the development of nuclear power industry. According to the newest nuclear power development program, China's nuclear power unit capacity will reach 88 million kilowatts in 2020, and more than 30 nuclear power units will start construction in the next five years.

Even so, the proportion of nuclear power generation in the total generating capacity is still low now. In 2013, the global nuclear power generation was 2.359 trillion KWh, which accounted for 11% of the global power generation. In China, the proportion of nuclear power generation in the total generating capacity was 2.1%, lower than the average. The following figure shows the Chinese electric power distribution at present.



The Coming Crisis of Nuclear Security

The status of China's nuclear security is not open to the public. By retrieving the Chinese Important Newspaper Full-text Database (including 154 national newspapers and 449 local newspapers), we can find that the number of news reports on nuclear power reached its peak in 2011.



After the Fukushima nuclear accident, there were a short-period attention of the mass media on nuclear security. In view of the public anxiety about nuclear security, the Chinese government has issued many statements and declared that China's nuclear power plant is safe. According to a statement from the director of China Nuclear Security Supervision Department in April 2015, so far China's nuclear facilities have been running well, and hasn't happened nuclear incidents above level 2 according to the international nuclear event scale (INES).

It should be concerned whether China's nuclear plant be always safe as the officials say. In fact, China couldn't avoid from nuclear incidents either. In 2007, there are 23 running incidents in China, including 18 level 0 incidents and 5 level 1 incidents. In 2012, there happened 10 running incidents in the Daya bay nuclear power plant, which is said to have been safely running for 20 years. Unit 3 and unit 4 of Ling-ao nuclear power plant were put into operation in August 2011, there are 20 running incidents happened in the first year. These data shows that it is arbitrary and overconfident to declare China's nuclear security. Furthermore, all these events mentioned above were not openly reported.

By retrieving the Chinese Important Newspaper Full-text Database, we can find that there is only one nuclear incidents been openly reported in China's domestic mass media after the Fukushima nuclear accident. The event happened in Ling-ao nuclear power plant on February 2, 2012. It was said to be a level 0 event according to the INES and have no security influence. Restricted by domestic political environment, Chinese mass media have to report news on domestic nuclear plants in positive ways. So far there is only one level 1 running incident be openly reported, which happened in Daya bay nuclear power plant on October 23, 2010. It was reported on an oversea newspaper and was announced 10 days after the incident occurred.

It is apparent that the Chinese government don't want the public know much about relevant incidents, because the public acceptance of nuclear power project is already very low. And it makes it difficult to construct more nuclear power projects in the future. Two months after the Fukushima nuclear disaster, a newspaper called "the China Energy News" carried out a questionnaire survey on

the public's perception of nuclear power and nuclear security. It shows that 88.7% of the people think that the nuclear power is "potentially dangerous" and should be careful to use, which is only 58.5% before the Fukushima nuclear disaster. Only 1.9% of the people still support that nuclear power is a "clean and economical energy".

In addition to the public's doubts and non-acceptance, there are other factors that would lead China's nuclear power into risk. At present China's three largest nuclear power operators respectively adopted nuclear power technology from the United States, France and Russia, thus resulted in the chaotic situation that multiple types of reactors and diverse nuclear power technology coexist. In addition, there are other issues worthy of attention, such as lacking experience to deal with nuclear accidents, nuclear power plant developed so fast that related technical personnel can't meet the demand, etc.

With the rapid development of nuclear power in China, various problems and potential crisis may emerge. China is facing a huge risk in nuclear security.

Management Idea and Public Awareness of Nuclear Security

In Chinese official documents, nuclear security refers to the necessary security measures to monitoring nuclear facilities, preventing accidents caused by any technical reasons, human reason or natural disasters, and reducing the consequences of nuclear leakage accident. This definition reflects that Chinese government narrowly identifies nuclear security within the enterprise organization, which lead to the underestimation of the social risk of nuclear power plants.

After the Fukushima nuclear accident the public awareness of nuclear power risk was awakened. The uncertainty of the occurrence of nuclear accident and its tragedy influence make the public concern more and more about the nuclear risk. However, in China, many important problems, such as the reactor safety, radiation, nuclear fuel and waste disposal problem, have hardly been discussed openly in the development of nuclear energy. As a result, few Chinese people know about nuclear energy and its risk. A survey carried out by "the China Energy News" in May 2011 shows that 66.3% of the Chinese people almost know nothing about nuclear power and nuclear security.

Related studies have shown that public's concern about modern environmental risk is based on relevance information transmission process, rather than scientific evidence or the possibility of risk. Douglas, M. A. & Wildavsky, A. 1982 [1] Mass media reports on nuclear events and accidents construct the public's experience and cognition of nuclear power. In China, the mass media reports are required to report relevant events in positive ways. Thus the public awareness of nuclear risk is very weak.

Besides that, the public and the government judge the nuclear risk in different ways. Technical experts and policy makers make decisions based on the objective scientific data, but non-experts make judgment based on intuition. (Slovic 1987[2] Horlick-Jones 2005[3] suggested to pay attention to the phenomenon that interest or benefits may sometimes displace the risk and become the focus of public attention. By interviewing the residents nearby Tianwan nuclear power plant, we find that the affected residents are often concerned with the immediate interest, such as the compensation they can get from the construction of nuclear power plant, while not caring about the environmental risk. When people

face the risk of nuclear power, at first they will assess the situation and judge whether it is associated with themselves, then decide whether they need to master certain knowledge to maintain their own interests. The public awareness of nuclear security depend on the calculations based on self-interest.

Response to the Risk of Nuclear Security

The Fukushima nuclear accident shocked the whole world. When the accident happened, the Chinese government took some emergency measures to prevent domestic nuclear risks. In response to public panic and anti-nuclear sentiment, the government carried out stress tests for all nuclear power units at work, modified power supply plan to deal with special situation such as tsunami and earthquake, reassessed security standard for all pre-construction nuclear power projects, and evaluated the effectiveness of emergency system of the under-construction nuclear power plants. After that, the government modified the nuclear power development program and suspended the examination and approval of all new projects. Now China is to speed up the development of nuclear power industry. Forward on the road, it is necessary to insure nuclear security.

Practice experience shows that human error accounts for 50% to 80% of all nuclear security events. Equipment failure is a kind of cause of the serious nuclear accidents, but in the case of technical reliability has been improved significantly, human error has become the main nuclear accident cause factor. Therefore now the Chinese government tends to establish a comprehensive and effective management system in the nuclear enterprise to control the risk of nuclear power. The system may include organization management system, security supervision system, employees' security education and psychological counseling system, problem report & feedback mechanism.

In addition, the government also takes measures to improve the external environment of the nuclear enterprises. Such as, to improve the project design and planning at every stage (including site selection, construction, operation and decommissioning etc.), to improve relevant laws and regulations (e.g. the Nuclear Accident Emergency Management Regulations), to strengthen the communication between the government and people and improve public awareness and acceptance of nuclear power project, to promote public participation and improve the ability of severe accident prevention and emergency disposal.

Acknowledgement

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Disasters, Risks and Sustainable Communities

Comparison of European and Japanese approaches to Risk

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In the European discourses on risk a major starting point has been the assumption that modern societies have reached a stage “where we live in an industrial society organised according to nation-states, but we are already no longer living in it.”^[1] Furthermore, the Beckian understanding of risk is based on such assumptions as risk having become more difficult to calculate and control, crossing national and socioeconomic borders and therefore having become glocal, both global and local at the same time. Risk society is essentially a world risk society and the perspective is global and assumes a certain type of global citizenship or community. With the breakdown of traditional certainties societies have been transformed to something quite new. In the process new risks are created and old ones are given new meanings. Everything from family lives to working life and international relations has been affected by these social changes. Beck makes much use of the concept of individualisation to describe how people deal with risk and have personal concern about risks that have entered their everyday lives. For Beck the natural reaction of people is to seek critical knowledge about risk and make their personal decisions based on the knowledge that they have acquired.

Against this background, Japanese society superficially appears as a bastion of trust and obedience to authorities. In other words, European-type of ideas of a post-traditional or cosmopolitan era look strange in a Japanese context and for most Japanese observers. However, it should also be noted that in terms of political participation and deference to authority in Europe (and elsewhere) there is plenty of diversity. Despite of long and close cooperation and common institutions even within the European Union political cultures concerning citizen participation often make common policy making difficult, as has recently been vividly and publicly demonstrated by the policy-making or cultural clash concerning Greek economic crisis, when the Greek government’s reliance on the public opinion and referendum found little understanding in the Northern European countries. The political cultures

[1] Beck, Ulrich, 1999, *World Risk Society*, Polity; p. 87.

in Europe are far from identical although such fundamental concepts as 'democracy', 'human rights', 'equality' and transparency are very much cherished. Anyway, Japanese ideas on nationalism are particularly strongly based on ideologies that emphasise the uniqueness of Japanese society and the legitimate authority of prevailing power structure. The so-called Japaneseness discourse (*nihonjinron*) includes rather extreme manifestation of these beliefs, but a far more important role is played by the more widely accepted intersubjective practices that define normal and deviant behaviour. As for changes in Japanese social traditions and institutions, the Beckian analysis does, indeed, also make sense in the Japanese context: there certainly is an awareness of great transformations taking place in the basic institutions of Japanese society. In Japan the triple catastrophe of earthquake, tsunami and Fukushima nuclear plant crisis demonstrated that the political leadership and the so called specialist epistemic communities were caught totally unprepared to face risks that are, after all, very predictable especially in Japan. Technically speaking earthquakes are not man-made risks and could be dismissed as something outside the scope of regular planning – or the risk society discourse. However, in Japan the occurrence of earthquakes should not be a surprise to anyone: they come as surely as the sunrise and even with the big ones the issue is not whether they come but when they come. The Japanese society is only slowly waking to the new reality of a new kind of reflexive relationship with nuclear power and, more generally, the use of modern technology and the social risks linked with modern life. In Japan, the idea that Japan's very own catastrophe is, instead, a catastrophe of global significance has not really sunk in and it may still take many years before Japanese communities and policies move to a more modern reflexivity in terms of risk-consciousness.

The predominant Japanese responses toward risk are linked to a willingness to resort to 'risk assessment' and 'risk management' in order to solve problems that are hindering economic and administrative planning. Environment is the field where technocratic solutions are relatively easy to apply since the "objective" evaluation of risks is easier when the decision-makers can claim to possess the best 'objective' or 'scientific' knowledge about the relevant issues and when the environment does not argue back, unlike occasionally when the decision-makers are dealing with 'social' risks and people where any individual can more easily claim to possess worthy insights about their own lives. There are quite a few general obstacles to "rational" and comprehensive common solutions for such issues as evaluating risks and making this evaluation part of decision-making process. In environmental policy co-ordination has usually been fragmentary. Moreover, in evaluating environmental risks the decision-makers tend to rely on bureaucratic, engineering and scientific expertise and if there are other concerns the policy-makers want to either ignore them outright or delegate to 'relevant specialists' who represent value systems and understanding about the environment, which is strongly influenced by their epistemic community.

Since the environmental issues are everywhere deeply politicised and contested there is nowhere in the world such specialists who can take a neutral position and devise policies to the benefit of whole nations or the whole world. In Japan, the traditional hierarchical structures have further contributed to

lack of open discussion, strong argumentation and transparency. Furthermore, the lack of transparency has often made it easier to subjugate environmental concerns to economic interests, when the majority of policy-makers having prioritised perceived economic impacts over environmental concerns. This may be related to collusive power relationships or lack of real environmental awareness, but the result is clear: Japanese politics is dominated by such 'hard' issues as economy and defense and environment seldom stays long in the center of political debate.

In the Japanese case the administrative systems at municipal, prefectural and national levels all tend to nurture generalists. Most bureaucrats are rotated within their organisations and their education or specific skills often have very little to do with the actual tasks they are assigned to deal with. In the absence of deeper experience and knowledge of many issues the bureaucrats often want to have hard facts and figures even in cases when that approach does not lead far and may only obfuscate. Many environment-related risks have to do with ever changing natural conditions. The experts may often easily agree on technical issues but it is far more difficult to make decisions about acceptable levels of environmental destruction or desirable margins of safety. For instance, when a dam is built there can never be certainty about such factors as floods, earthquakes or terrorist attacks. Moreover, people seem to have very different ideas about the importance or worth of continued existence of unspoiled environment. Instead of admitting that low 'probabilities' must often be coined in simplistic ways and that they do not tell much about 'safety' or 'risk', the professionals often claim to have accurate figures/statistics and clear understanding to back their recommendations. The decision-makers also have an interest in showing that things are under control and that all risks are well covered - even when they personally have only a superficial understanding of the 'technical' issues and are actually hiding behind the backs of 'specialists' who themselves have understood their roles as finding an acceptable solution to legitimise the already chosen policy, whether it is building a nuclear plant, a dam or changing the Japanese constitution.^[2] The Japanese river committees, for instance, casually make classifications about the probability of the occurrence of floods (e.g. once in 100 years) and the very vagueness of such threat figures helps to make them useful to back almost any kind of public construction scheme, if there is yet another reason for supporting construction. The more complex issues of sustainable management and conservation of riparian environment are hidden behind the rather simple probability calculations, which anyway tend to miss the mark in a world where it is increasingly difficult to predict weather or floods, due to such man-made factors, including the global warming.

With earthquakes there was already a major controversy after the Hanshin Earthquake which destroyed much of the city of Kôbe in 1995. Most people in Japan had regarded Kôbe as an unlikely location for a major jolt. After this earthquake some scholars spoke honestly and revealed that there is very little consensus about the earthquake mechanisms and about the possibility of predicting the location of major earthquakes in Japan. The Japanese government has deployed considerable

[2] Cf. Beck 1999: 59-60 and Douglas 1992: 38-40.

resources in earthquake research and in monitoring seismic activity. If prediction turns out to be almost impossible that would easily move the emphasis away from research into preparing for earthquakes everywhere – or, for instance, to start training search and rescue dogs, an activity that is surprisingly underdeveloped in Japan. The problem in this case is that for most people, including the decision-makers, it is difficult to form an opinion about the latest earthquake related research while most earthquake specialists have an obvious interest in explaining their research results in such a manner that their funding is not cut and their status as earthquake specialists is not diminished. With earthquake research it is equally difficult to obtain unbiased opinions from other countries since Japan is without doubt among the top countries in this particular field of research and in the end it may be true that there is nowhere in the world good enough knowledge to predict earthquakes with much certainty. Of course, the difficulties of prediction are multiplied when the earthquake risk is combined with water construction related risks and all the possible risk scenarios involving nuclear energy. This was the reality of the 2011 Tōhoku earthquake and all the people who were involved in the process of building the Fukushima nuclear units should have realised the very high probability that the plants may have become destroyed by a combined force of an earthquake and a tsunami. In fact, the location with a clearer regular pattern of large earthquakes should have been less of a surprise than the location of Kōbe earthquake.

For Japan year 2011 was the year when risks became reality and risk awareness became an unavoidable fact of life rather than a distant inconvenient truth possibly related to modern life and reflexivity. In other words, what happened with the triple shocks, earthquake, tsunami and Fukushima nuclear plants, was not something that came as a total surprise, but it surely changed everyone's attitudes to modern Japanese state and lifestyle. There is well-established pattern of similar size earthquakes and tsunamis in the region and there is plenty of knowledge about risks of nuclear energy and, therefore, we are not dealing with a divine punishment striking helpless people but with a series of tragedies where humans are an active party. The big question is why so little was done to prepare for the kind of disaster that actually struck and what people everywhere in the world can learn from this disaster. Furthermore, the teachings of the crisis are bitter for Japan. What can be done to ensure that Japanese society does not repeat its mistakes and what should be done to make sure that Japanese society uses the opportunity to seriously investigate what went wrong? The answer to these questions is that surprisingly little has been done.

The Democratic Party administration which was in power when the disaster stroke included politicians such as Prime Minister Kan, who were critical of technocratic elites and collusive business relationships which explain much of the risk-taking creating the dangerous situation in Tōhoku. However, the DPJ wasted its opportunity to make lasting changes to Japanese political system by focusing mostly in intraparty infighting rather than making real reforms. The DPJ Prime Ministers were essentially weak politicians who did not feel strong enough to antagonize too many people, especially the other members of political elite who kept them in power until the elections where the

Party lost miserably in December 2012 and paved way to a new Abe administration, which is far more friendly to nuclear power and power companies. An administration that uses every opportunity to restart as many nuclear reactors as possible is not the one that will start asking difficult questions about past mistakes and safety myths in that field. Interestingly the political mood in Japan changed markedly and the LDP under the Prime Minister Abe gained steady support from overwhelming majority by focusing on economy under the slogan of 'Abenomics' and strengthening defense under the threat of increasingly assertive and aggressive China. Prime Minister Abe started to lose popularity significantly only after he started to erode the cornerstone of Japanese Post-War system, the Peace Constitution. What is remarkable that in Post-Fukushima Japan the majority of Japanese people still regard nuclear energy as a rational, cheap and safe choice, while in such countries as Germany the lessons of Fukushima were crucial in turning the public opinion permanently against nuclear energy. In Germany earthquakes are less of a risk but discussion there turned more towards the long-term risks of nuclear energy, especially to the problem of disposal of nuclear waste.

In Japan, it is commonplace that decisions are legitimized by meetings where, in principle, members of the group (workers, residents, etc) can speak out if they have concerns (*nemawashi*, prior consultation or literally "root binding" as in *bonsai* horticulture tradition). This practice usually leads to frequent and long meetings. However, in politics a serious problem of *nemawashi* practice is that decisions are often made behind the scenes, instead of out in the open. Even if *nemawashi* is extended to all people (e.g. workers or residents) it does not mean that all participants are in an equal setting during discussions or that they would dare to say what they think. In fact, the public pressure usually forces the less powerful to obey the leaders. One can see clear parallels with Konrad Lorenz's studies on the Jackdaws, who have a linear hierarchical group structure with higher-ranked birds dominating lower-ranked birds, rather than rational argumentation leading to most optimal choices.^[3] In Japan, when decisions really matter, very often before an open meeting there is an unofficial meeting where the real powerbrokers make their deals. Therefore there is a good reason to regard *nemawashi* as an undemocratic process instead of one promoting participation and consensus-seeking. However, the leaders in Japan tend to expect that all the members of the group stand behind the decisions once they have been "commonly accepted". However, wise leaders in Japan are wise enough to cultivate their own sources of real information as they know very well that they can not expect to hear real opinions in meetings or larger gatherings where most people are wisely keeping quiet or saying just what they think they are expected to say.

What about the European traditions of democracy and decision-making, are they any better when it comes to rational decision-making in the face of lurking risks? The European Union was founded to shelter Europe from the largest risk of all: the war. The European integration has been based on rather technocratic or functionalist recipe that was by design pragmatist and simple enough to explain to people with different cultural ideas and values. Theoretically European Union is based very much on

[3] Lorenz, K. (1949). *Tiergeschichten. Er redete mi dem Vieh, den Vögeln und den Fischen*. Wien: Verlag Dr. G. Borotha-Schöler.

the ideas that were already presented by such people as David Mitrany,^[4] at a time when the risks of nuclear power and nuclear warfare were not yet present and when the risk society theorists had not yet been born. In other words, the European Union is not very democratic and participatory system although the European Parliament keeps up the façade or hope of democratic decision-making. On the national level European modern politics much of the passions and fervour has been spent on populist issues, such as immigration policy, where populist politicians skilfully play with xenophobia and ignorance of people who are seeking easy solutions to complicated issues and are looking for good old days when things were less complicated. However, the ideals of participatory politics, transparency and subsidiarity principle are far from dead in European politics and it may be possible to make European integration more democratic while maintaining the achievements of more technocratic decision-making. In environmental politics it is clearly the Green parties, which have done their best to keep the environmental issues on mainstream political agenda, with some clear successes, as well as struggled for more direct and democratic decision-making. However, it seems like much of frustration and opposition to technocratic decision-making in Europe has in recent years been channelled to the populist and nationalist new parties, which prosper due to perceived and real hardship of their voters but which are thin in sustainable solutions for future.

Of course, no real specialist could ever have taken at face value any childish “safety myth” about earthquakes, tsunamis and nuclear power in Japan. Most who knew better simply kept quiet in public, because they wanted to keep their jobs or in many cases were directly or indirectly rewarded by power companies. It may be that some politicians lacked the basics to understand the risks and never bothered to find out what the real opinions of specialists were. If that is the case, the some politicians may even today fail to understand how the system has failed and what kind of risk society Japan has become.

I have elsewhere written at length^[5] about the Japanese risk society discourses and the influences from German discourse and especially the reception of the work of Ulrich Beck. Beck’s *Risikogesellschaft* (1986) was translated into Japanese in 1988 by Azuma Ren under the title *Kikenshakai* (danger society)^[6] and still it seems that even the most important idea of the book – the distinction between risk and danger – along with the idea of reflexivity was to some extent lost in translation. Shimamura Ken’ichi’s translation of Beck 2003 sets the keywords right but it seems like Beck’s work is still regarded by many in Japan as simply work discussing modern environmental “dangers”.^[7]

[4] David Mitrany 1975. *The Functional Theory of Politics*. St. Martin’s Press.

[5] See e.g. The Japanese model of risk society: challenges to Japanese public policy

Mika Merviö 2014, The Japanese model of risk society: challenges to Japanese public policy. In Merviö (ed) *Contemporary Social issues in East Asian Societies. Examining the Spectrum of Public and Private Spheres*. Mika Merviö (ed); IGI Global.

[6] Beck, U. (as Bekku Ururihi, 1998b). *Kikenshakai- atarashii kindai e no michi*. Translated by Azuma Ren and Itô Midori. Tōkyō: Hōsei daigaku shuppankyoku.

[7] Beck, U. (as Bekku Ururihhi, 2003). *Sekai risuku shakai*. Translated by Shimamura Kei’ichi from German original *Weltrisikogesellschaft, Weltöffentlichkeit und globale Subpolitik*. Tōkyō: Heibonsha.

Ulrich Beck was no stranger to sharp political debate and controversy. In his last years he also commented Japanese situation directly. As Beck was invited to the Safe Energy Ethic Commission (*Ethikkommission für eine sichere Energieversorgung*), which played a significant role in the decision to abandon nuclear energy in Germany in spring 2012 he directly influenced the German policy with such specialists of Japanese environmental policy as Miranda Schreurs and a list of other well-known academic, religious and political thinkers (for the list, *Der Tagespiegel*, 22 March, 2012). After the Fukushima crisis he has gave number of interviews about the situation in Japan.

In his interview to *Augsburger Allgemeine Zeitung* he told about his trip to Hiroshima peace museum in autumn of 2010 and how he had been wondering how the Japanese can cope with the “cultural schizophrenia” of having the trauma of Hiroshima at the same time with the naïve belief in nuclear energy and that there is no alternative to it in Japan (*Augsburger Allgemeine Zeitung*, 7 April, 2012). Japanese newspaper *Asahi Shimbun* interviewed Beck in July 2012 about Fukushima, but did not even mention his recent political role in Germany. In the interview Beck pointed out that the German Green party was was invented as a consequence of Chernobyl and emphasized the role of social movements and civil society. As for the atomic energy in general, Beck argued that the atomic energy and atomic industries are socialist industries because the state, the population, the citizens are paying if something goes wrong. The Fukushima catastrophe was, “on the one hand, man-made, but on the other hand, geographically, socially and in the time dimension, unlimited. It doesn’t have a limit.” As a new kind risk Beck was comparing atomic energy to climate change, global financial risks and problems of terrorism (*Asahi shimbun*, 6 July, 2012).

In July 2011 Beck also published as a foreword to a book on a Japanese book on risk society his recent ideas about Japan and especially nuclear power after Fukushima and in his chapter and comments commented about the theory of individualization and its relevance in Japanese context. The book really was focused on individualization and only the title promises a broader analysis of Japanese risk society. The contributors of the book share a belief that Japan and East Asia are good examples how globalization and cosmopolitan era & “cosmopolitanization” (*Kosmopolitisierung*) have changed societies.^[8] What is striking for me is that for a book published so soon after 3-11 triple catastrophe there is so little about the dramatic events in Japan and about the issues that make Japan different from the rest of the world in terms of risk society. Beck now having passed away makes it even less likely that the direct political influence of risk society discourse will be limited.

Beck over year continuously warned about the militarisation of international relations. If the right of the mightier becomes the rule there will be no end to self-fulfilling prophecies of conflicts being

[8] Suzuki & Itô (Ed) 2011, *Risukuka suru nihon shakai*, Iwanami shoten, and Ulrich Beck, 2011: (as Bekku Ururihhi, 2011b). Kono kikai ni. Fukushima, arui wa. Sekai risuku shakai ni okeru nihon no mirai. In Suzuki M. & Itô M. ed. *Risukuka suru nihon shakai*, Tôkyô: Iwanami shoten, 1-12, and *Kojinka suru nihon shakai no yukue*. no kikai. Komento ni taisuru komento. In Suzuki M. & Itô M. ed. *Risukuka suru nihon shakai*, Tôkyô: Iwanami shoten: 245-274.

solved by military power. In this way terrorism would lead to a militarisation of the world. If these are the alternatives, then the future of the world rests especially on Europe. The other actors that Beck recognises as the shapers of the future world are the NGOs (such as Greenpeace, Attac and Amnesty International). In short, Beck believes that some kind of cosmopolitan Europe (*das kosmopolitische Europa*) will stand for democratic values and for ideals of peaceful international relations (continuing the tradition of serving as the antithesis to nationalism in Europe) (Beck 2002 and ZDF TV interview by Wolfgang Herles, where Beck explains outspokenly the main ideas of his book soon after it was published, interview removed from the Internet). From Japanese perspective these ideas certainly look most Eurocentric, but are they wrong? Is there any hope for Japan turning to cosmopolitanism, democratic values and sustainable environmental ideas? I hope the answer is yes, but the present political situation does not give much support for optimism.

Between Incentives and Principles

An Effect of Local Government's Finance to a Deal with High-Level Radioactive Waste

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1.Introduction

1-1.Questions and its background

How do we deal with high-level radioactive wastes (HLW) produced by nuclear reactors and reprocessing plants? Is geological disposal the only option? What should be the procedure for determining the best answer to this question? The aim of this presentation is to examine one decision making process regarding HLW management in Japan in terms of principles and incentives.

The Japanese government has been seeking appropriate sites for geological disposal of HLW but to no avail. The Science Council of Japan convened a committee, which included some sociologists, which suggested a new method of HLW's management in September 2012. This recommendation proposed the idea of temporary storage instead of geological disposal, the control of total amount of HLW generated and a multistage decision-making process. These ideas imply that we must revise the current procedure from the viewpoint of principles of fairness and equity.

The current process is based on using incentives, such as property taxes, grants and job opportunities, which are given to local governments and communities if they accept risk and bads. Incentives, however, can spoil the principles of fairness and equity in the decision-making process. Incentives should be distinguished from rewards or compensations.

We will approach the current procedure for HLW management looking at the principle and incentive models. These aren't alternative models but combined improperly now. We need to identify the best way of mixing them. For consideration, we will use the concepts of the management system and domination system (Funabashi 2014). These concepts allow us to analyse the difference between incentives and rewards.

First, we will review the influences of incentives on the decision for placing nuclear facilities; the choice of the locations for power plants and interim storage sites for spent fuel for reprocessing. This impact is huge and often a local government's budget and community cannot ignore the financial

incentives no matter the risk. This effect, however, is not sustainable and decreases gradually.

Second, based on the concept of a management and domination system, we are comparing the current procedure for siting a geological disposal facility of HLW with the Science Council's suggestion. A lack of fairness and equity make the management of HLW more difficult.

Finally, we will review some findings about the best way of mixing of the principle and incentive models. The establishment of a public sphere where discussion about principles is taken and the sharing of those principles are most essential.

1-2. The management and the domination system

We are analysing the difference between "incentive" and "principle" models through a review of the concepts of the management system and the domination system (Funabashi 2014). "The notion of management system is constructed by generalizing the relation of cooperation, and the notion of domination system be generalizing the relation of domination"(ibid: 31).

Both systems occur within the same social system. Every management system is composed of leader(s) and followers. The management system involves constant efforts to fulfil multiple management tasks such as the allocation of finite resources. The leadership team organizes their followers to fulfil these tasks. These interactions between leaders and followers are "horizontal" communication.

The domination system is composed of the ruler and the ruled. They occupy congruent positions with the leader and the followers in the management system. However, interactions between the ruler and the ruled are "vertical". Within the vertical political structure, the ruling and the ruled stratum make conflicts on the distribution of powers and goods.

For understanding the function of social systems, the interrelation of these two systems should be evaluated. The domination system can define how the management system works. On the one hand, a well-functioning management system depends upon a stable social order that is guaranteed by the domination system. On the other hand, many management tasks are defined through negotiations between these two political strata. The interrelation of these systems is essential to the distribution of risk and bads such as HLW.

2. Two cases for siting a nuclear power station and an interim storage facility of spent fuel for reprocessing

2-1. A cycle of addiction: the case of Hamaoka Nuclear Power Station

The first case is about nuclear power station for finding a cycle of addiction of nuclear facility's benefit. Table 1 and figure 1 show this cycle. The data is from the budget of Omaezaki city where the Hamaoka Nuclear Power Station is located, in Shizuoka prefecture, in central part of Japan (Figure2, Hamaoka town and Omaezaki town combined into Omaezaki city in 2004. Data to 2003 is from Hamaoka town and from 2004 is combined as Omaezaki city).

In 1970 when the former Hamaoka town accepted placement of the No1 Reactor, the amount of income and financial capability indicator for the municipal office budget had been rising drastically.

By accepting a nuclear power station, the municipal office budget receives two kinds of benefit. The first is a grant from the national government called Dengen-Sanpo-Kofukin (the “Grant of Three Power Resources Laws”). Another is property tax from the facilities. The grant is mainly delivered from the acceptance of the location so that the planning for the start of the reactor’s operation may begin. Property tax comes to the budget when the operation of the reactor is started. These benefits come to the budget in the next year of acceptance and operation exactly.

The graph shows sharp increases and decreases of financial capability indicators whereas the amount of income had been increasing with small up and downs. The property tax is included in the financial capability indicator but the grant was not. Therefore, the indicator rose sharply after the operation of reactor 1 had started. In 1977, 1979, 1988, 1994 and 2006, the second year of each five reactors’ operation, the indicator reached its peak. In the next year following its peak, the indicator decreases. This is because the amount of property tax is going down gradually due to the decrease of evaluation of the property.

After starting operations, the indicator must go down due to depreciation. If the size of the budget extends to the maximum receipts, it is very difficult to face any losses. The maintenance cost for buildings is typical. For making job opportunities, a municipal office constructs roads, gymnastics, music halls etc., when it has a big budget. These buildings need maintenance costs. When budgets shrink, these ongoing costs become a burden.

If a municipal office would like to keep maximum taxes, the only option is to accept another nuclear reactor. As the result, five reactors have been situated in Hamaoka station. Table 1 and figure 1 shows the completed cycle of addiction.

2-2. The case of an interim storage facility in Mutsu city

For the second example, we will review a case for an interim storage facility for spent fuels. That facility owned by Recyclable-Fuel Storage (RFS) Company is in Mutsu city, Aomori prefecture where is located on the most northern part of main island called Honshu (Figure 3). RFS was established by the Tokyo Electricity Power Company (TEPCO) and Japan Nuclear Fuel Limited (JNFL). The main role of this company is to store spent fuels from nuclear power plants owned by TEPCO for 50 years in future. These spent fuels ought to be sent to the reprocessing plant owned by JNFL in Rokkasho village which is located near Mutsu city (around 100km away). This is because the Japanese government has sent its policy for nuclear fuel cycling.

To date, however, the reprocessing plant at Rokkasho has never been fully operational. Thus, spent fuels have been accumulated by the Japanese government, TEPCO and JNFL. They require a facility to store their spent fuels until the reprocessing plant starts to function. However, the current reality is that for the nuclear industry, this storage facility is not a final disposal facility but storage interim.

Why is that facility sited in Mutsu? In June 2000, the Nuclear Reactor Regulation Law was amended to store spent fuels outside the sites of nuclear power plants. In November 2000, the mayor of Mutsu city invited TEPCO to conduct a survey for siting an interim storage facility. After submitting two reports (one from TEPCO and another from a special committee in the city office), Mutsu was deemed

technically suitable for a storage facility. In 2003, the mayor of Mutsu city announced the acceptance of a storage facility and in 2005, RFS was established. At this time, the facility has been completed and under safety review and examination.

It is clear that Mutsu city, especially the mayor and city office were very enthusiastic about accepting the proposal for a storage facility though some local residents had requested to have a referendum. This is mainly because its budget has been tight in recent years. In Japan, a municipal (city, town or village) office has a big responsibility for management of its jurisdiction. The management of a general hospital is a typical example. Local areas including Mutsu have been suffering from the decrease of its population and poor economic conditions. This is a reason that no private general hospital has been established. However, in Japan, prefectural or municipal offices have to establish and manage general hospitals. This is a losing proposition as often, the balance sheet for this kind of hospital is in the red. Those budget shorthalls have to be covered by the local government. Its costs around 800 million JPY which is 2.4% of the 33 billion JPY that is Mutsu's annual general budget. With a decreasing population and tighter budgets, any issues might trigger bankruptcy. Mutsu officials determined that the cost benefits for the interim storage facility would ease these budget issues.

2-3. Function of the local public finance system

Former Hamaoka town and the current Omaezaki city are also located in local area such as Mutsu city. In both cases, it is clear that the local public finance system promotes siting nuclear facilities in local regions. However, we need to check big differences between nuclear power station and disposal facility.

3. Discussion of HLW

3-1. Current procedure of Geological Disposal Facility (GDF) siting

The nuclear waste management organization of Japan (NUMO) was established in October 2000, after the prohibition on ocean disposal. Its task is to carry out the geological disposal of high-level radioactive waste. To do this, NUMO must find appropriate sites for this HLW disposal. The siting process begins with open solicitation of volunteer host municipalities. That process started in December 2002.

The siting process has three stages: literature surveys, preliminary investigations, and then detailed investigations. If a municipality applies and its proposal is received, the process starts. After the detailed investigations, a repository construction site is selected.

The only applicant for the literature survey has been the town of Toyo in the Kochi prefecture. In 2006, the town mayor submitted application documents and a large protest occurred in the town. The mayor had submitted it based on an arbitrary decision of his own doing. He ended up resigning because his constituents in the town had prepared to recall him. He then ran as a candidate for the next mayoral election but lost. The new mayor announced the town's withdrawal from the GDF siting process.

About 15 municipalities have shown interest in having a GDF, shown by having meetings with

NUMO or holding symposiums on GDF. However, it has mainly been municipality officials who have shown keen interest. Many of residents of those municipalities are opposed to having a GDF, leading to the withdrawal of plans. Financial crisis of municipal offices, especially in rural areas, is a reason for the interest shown by government officials. Just for applying to the literature survey, a municipality can receive a grant of 200 million JPY (about 2 million USD) from the state. Thus, the grant itself may be the strongest incentive for municipalities to apply. However, people fear that they might not be able to stop the process once it starts.

The strategy of using grants as incentives, particularly to entice rural governments with budget issues, has been effective for siting nuclear power stations in the past. The opposition to GDFs, however, is much stronger than the opposition to nuclear power stations. People think of a nuclear power station as a plant, but a GDF is just a garbage repository. For many residents, hosting a GDF means that their region has been degraded due to radioactive waste. This is one of the most essential differences between the consideration for nuclear power stations and interim storage facilities. The interim storage facility in Mutsu is officially not a final disposal facility because of the nuclear fuel cycle policy. Mutsu and Aomori prefecture have been also strongly refusing to site a final disposal facility like a GDF.

We call the case where an incentive like a grant has a strong influence “the incentive model.” In this case, risk and bads are being distributed via the domination system. Especially in Japan, it is via the unequal system of local public finances.

3-2. Proposals by the Council

In September 2012, a committee with the Science Council of Japan proposed the idea of temporary storage instead of geological disposal, the control of total amount of HLW and the multistage decision-making. We will examine the temporary storage model in this paper.

The temporary storage that is not premising reprocessing is different from the interim storage that is premising reprocessing of spent fuel. Furthermore, this idea does not premise GDF. This idea reveals that we can find another way of management of HLW instead of GDF for the duration of temporary storage for 50 years. The council also suggested that some facilities for temporary storage throughout Japan, in contrast with GDF, in that just one facility is required.

This suggestion that require multiple facilities seeks to satisfy the principle of fairness. If just one GDF is constructed, just one area must receive all risk and bads from HLW in Japan. On the other hand, those who are living in all parts of Japan have been accepting the benefits of nuclear energy. We find here the separation of a benefit zone and a victimized zone (Funabashi 2014). The councils’ proposal to construct some temporary storage facilities deals with this problem. The proposal includes an idea that we should divide Japanese jurisdictions into some area and construct a temporary facility in each region.

We call the way proposed by the council a “principle model” because this way intends to make a decision making process and the distribution of risk and bads fair.

4. Remarks

As mentioned above, the local public finance system works as a part of domination system for siting nuclear power plants and an interim storage facility but not for siting a GDF. If the ruling stratum has a strong power and can easily force risk and bads to someone else, this solution is the cheapest for the management system. If the power of the ruling stratum is not so strong, the cost is not so cheap for forcing risk and bads to the ruled.

However, for those who live in potential candidate sites such as Aomori, GDF is just garbage, while power stations are facilities that produce something. If the government decides a site of GDFs based on the same method of nuclear power plants, they should strengthen the domination system. It probably must exercise their political power for forcing risk and bads to local regions with increasing grants. As a result, the procedure would become oppressive not democratic. The function of the public sphere can be spoiled.

To avoid this way, we must do two things. At first, we must improve the current local finance system that works as a part of domination system. However, this improvement requires a structural change that requires time. Second, as the Science Council of Japan pointed out, we need a new principle for the management of HLW. The idea of temporary storage and construction of some facilities are useful proposals for making the procedure fairer. More democratic discussion and generating new principles in the public sphere can put the brakes on working within the domination system and improve the interrelation of two systems. Under this condition, benefits work as rewards or compensations not incentives.

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Table1. Transition of Financial Indicators of Omaezaki City*1
(Source: Documents by Hamaoka town and Omaezaki city office)

| Year | Reactor number | Condition | AI*2 | II*3 | FCI*4 | Year | Reactor number | Condition | AI*2 | II*3 | FCI*4 |
|------|----------------|--------------|------------|--------|--------|------|----------------|--------------|------------|--------|--------|
| 1970 | | | 849,769 | 100.0 | 0.348 | 1990 | | | 12,834,494 | 1510.4 | 1.726 |
| 1971 | No.1 | Construction | 1,216,540 | 143.2 | 0.552 | 1991 | | | 10,746,848 | 1264.7 | 1.578 |
| 1972 | | | 1,504,948 | 177.1 | 0.403 | 1992 | | | 12,569,476 | 1479.2 | 1.551 |
| 1973 | | | 1,934,849 | 227.7 | 0.441 | 1993 | No.4 | Operation | 11,915,916 | 1402.3 | 1.569 |
| 1974 | No.2 | Construction | 2,990,617 | 351.9 | 0.427 | 1994 | | | 13,354,299 | 1571.5 | *2.327 |
| 1975 | | | 2,463,773 | 289.9 | 0.469 | 1995 | | | 13,745,974 | 1617.6 | 2.069 |
| 1976 | No.1 | Operation | 2,913,880 | 342.9 | 0.559 | 1996 | | | 15,865,942 | 1867.1 | 1.900 |
| 1977 | | | 3,733,526 | 439.4 | *1.021 | 1997 | | | 16,875,866 | 1985.9 | 1.763 |
| 1978 | No.2 | Operation | 3,428,493 | 403.5 | 0.879 | 1998 | | | 16,701,986 | 1965.5 | 1.713 |
| 1979 | | | 4,569,463 | 537.7 | *1.669 | 1999 | No.5 | Construction | 14,767,914 | 1737.9 | 1.392 |
| 1980 | | | 4,700,984 | 553.2 | 1.497 | 2000 | | | 13,508,602 | 1589.7 | 1.368 |
| 1981 | | | 4,783,973 | 563.0 | 1.234 | 2001 | | | 15,615,671 | 1837.6 | 1.378 |
| 1982 | No.3 | Construction | 7,427,320 | 874.0 | 1.492 | 2002 | | | 16,331,063 | 1921.8 | 1.413 |
| 1983 | | | 7,366,736 | 866.9 | 1.343 | 2003 | | | 14,849,636 | 1747.5 | 1.414 |
| 1984 | | | 7,830,021 | 921.4 | 1.271 | 2004 | | | 21,574,715 | 2538.9 | 1.196 |
| 1985 | | | 7,360,979 | 866.2 | 1.413 | 2005 | No.5 | Operation | 17,837,167 | 2099.1 | 1.228 |
| 1986 | | | 10,158,985 | 1195.5 | 1.301 | 2006 | | | 20,011,092 | 2354.9 | *1.642 |
| 1987 | No.3 | Operation | 7,684,455 | 904.3 | 1.311 | 2007 | | | 19,650,000 | 2312.4 | 1.574 |
| 1988 | | | 8,721,406 | 1026.3 | *2.188 | 2008 | | | 19,518,185 | 2296.9 | 1.482 |
| 1989 | No.4 | Construction | 10,180,687 | 1198.1 | 1.984 | 2009 | No.1&2 | Stopped | 18,867,429 | 2220.3 | 1.392 |
| | | | | | | 2010 | | | 17,539,774 | 2064.1 | 1.195 |

*1 In 2004 Hamaoka Town and Omaezaki Town combined into Omaezaki City, Data to 2003 is on Hamaoka Town, from 2004 is on Omaezaki City.

*2 Amount of Income (thousands JPY)

*3 Index of Income (1970=100)

*4 The term "financial capability indicator" is used to indicate the financial strength of local public bodies, and is calculated as the past three year average of the figures derived from dividing basic financial revenues by basic financial needs (In this presentation, this indicator is calculated every year). A higher figure for the financial capability indicator means that the local public body can be said to have a greater margin for revenue sources. Local public bodies which have abundant revenues from local taxes etc. and therefore do not receive ordinary local allocation tax are called "local public bodies not in receipt of ordinary local allocation tax", and their financial capability indicator exceeds 1.

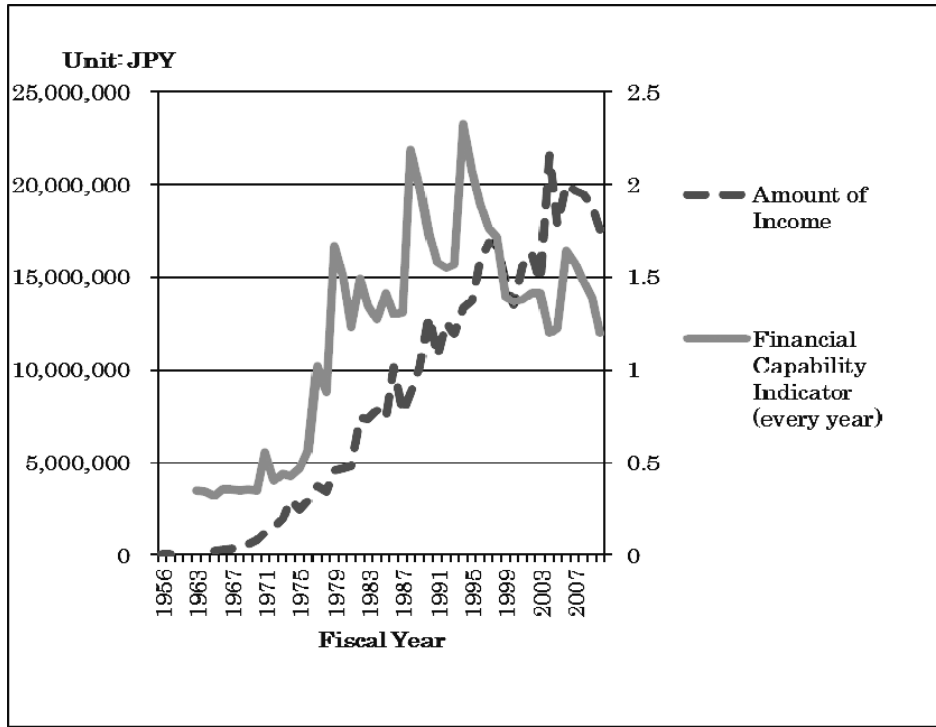


Figure1. Transition of Fiscal Indicators
(Source: Documents by Hamaoka town and Omaezaki city office)



Figure 2. Location of Hamaoka Nuclear Power Station



Figure 3. Location of Mutsu city

Production of riskscapes and evolution of democracy

Focusing on the case of local referendum on cancellation of hosting nuclear power plants in Samcheok, South Korea

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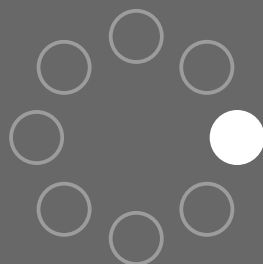
The purpose of the paper is to explain how the production of riskscapes can be articulated with evolution of democracy in empirical manner. Samcheok city, the old mining industrial town which is located at scenery ocean area has been waned after the restructuring of coal industry during 1980s. The 4th and 5th elected mayor of the city had tried to revive the regional economy through hosting energy industry cluster, LNG complex, comprehensive generation complex, and clean energy complex. Moreover, he wished to host nuclear energy cluster including nuclear power plants. However, citizens of Samcheok city have experience of rejecting the plan of locating nuclear power plants in 1999 and constructing radioactive disposal site in 2005 through strong demonstration and struggles. Again, they began to protest against the unilateral effort of mayor to host nuclear power plants. They tried to recall the mayor but failed. Finally, on 9th October 2014, they did local referendum on cancellation of hosting nuclear power plants and over 80% of voters support the cancellation of the plan. Around the energy related facilities, the riskscapes have been produced in Samcheok and various actors have been involved the process and produced different discourses. This paper analyzes the discourses of the process of riskscapes production focusing on the case of local referendum and tries to show that how local movement for protecting local autonomy has been evolved towards ecological democracy.

Keywords

nuclear power plants, energy clusters, riskscapes, ecological democracy

REGULAR SESSION 6

MANAGEMENT AND USE OF
NATURAL RESOURCES



ISESEA-5

Corralling Contract Between Farmers and Herders in Nigeria

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Introduction

In West Africa conflicts over the use of scarce natural resources between farmers and herders are said to be on the increase in recent years. This perspective justifies direct intervention and implies new structure for natural resource use and conflict management. Case materials from the Nupe farmers and the Fulani herders in Nigeria, however, suggest a different perspective. Even though limited natural resources are shared and their production systems are gradually converging, the cooperative relationship between the two groups remains cordial. The traditional institutions governing natural resource use and conflict resolution are being preserved and are functioning well. This paper focuses on corralling contract, which is one of the most important traditional institutions between farmers and herders practiced down through the ages in sub-Saharan Africa. Corraling contract refers to the contractual agreement between farmers and herders to maintain livestock on croplands for a specified time period. Fieldwork has been conducted in 2005 and 2006 on the Nupe farmers and the Fulani herders in the Bida area of Niger State of Nigeria to investigate the implementation of this traditional institution. Following the great reduction since mid-1980s and finally the withdrawal in 1997 of fertilizer subsidies by the Nigerian government, the corraling contract has become more important for resource-poor African farmers who cannot afford fertilizer. Meanwhile, the decreasing availability of grazing resources due to expansion of cultivated area outpacing population growth also makes African herders rely more on the corraling contract as the tool to ensure access to resources.

Corraling Contract

Corraling contract is an indigenous fertilization system commonly practiced in the semi-arid area of West Africa (Asanuma, 2004; Neef, 2001). When individual or group of farmer and herder enter into the contractual agreement, the herder has to corral his cattle overnight on the farmer's field for a specific period of time at the farmer's request. In return the farmer pays the herder in cash or in kind and allows livestock to graze on the crop residues on his fields. Land scarcity and degradation

from insufficient nutrient cycling increase the demand for manure in sub-Saharan Africa. In Nigeria, the lack of accessibility to good quality and affordable fertilizer and the unavailability of fertilizer in time of need make farmers rely on cattle manure. Demand for manure increased especially after the gradual reduction of the fertilizer subsidy since the mid-1980s and the liberalization of the fertilizer sector in 1997 (Nagy and Edun, 2002; Shimada, 1999). Farmers have to rely on cattle manure to retrieve productivity of their lands when fallow system for long-period is difficult. The benefits of use of manure in crop production are the improvement in soil physical properties and the provision of N.P.K. and other mineral nutrients. The application of livestock manure increases soil organic matter content, which leads to improved water infiltration and water holding capacity as well as increased cation exchange capacity.

Many researches have proven the effectiveness of corralling livestock on cropland for improving soil fertility (Schlecht et al, 2004; Achard & Banoin, 2003). It is more effective in maximizing nutrient cycling of soil comparing with merely applying manure transferred from other places. Based on TropSoils (1991), the ecological benefits from manure applied by corralling animals can last for 10 years, which is much longer than that of transported manure which can last for only 3 years. The corresponding crop yields are also significantly higher. The difference is proven to be brought by cattle urine, which is difficult to be transported (Powell & Williams, 1993). Urine and manure together can effectively raise the PH level of soil and accelerate the decomposition of organic matter and termite mounds (Brouwer and Powell, 1998). Many farmers regard the corralling contract with herders a better mean to fertilize their fields than the application of fertilizer by themselves.

Exchange between farmers and herders is very common (Grayzel, 1990; Wilson, 1984; Ogawa, 1998). Corraling contract is an important reciprocal arrangement that facilitates the complimentary relationship of the two groups. Nevertheless, changes caused by economic, environmental and political factors are making the contract less accessible to some farmers. Heasley and Delehanty (1996) point out that corraling contract has turned into tools and symbols in broader struggles among communities over access to land for field and pasture. The research of Neef (1997) in south-west Niger finds out that richer and more influential farmers obtain greater access to manure through corraling contract than poor farmers. On the other hand, higher demand for manure enhances the bargaining power of herders and enables them to get a better position in the politics of manure. Many pastoralists use the contract as a trump in case of land conflicts (Loofboro, 1993) and as a strategy to obtain and secure permanent land use rights from private landowners or local leaders (Neef, 1997).

The Nupe Production System

The Nupe studied are subsistence farmers (Hirose, 2002). Because of increasing population density, farmland is becoming scarce. Fallow period is largely shortened on uplands and lowland fields are being cultivated annually. Few Nupe farmers use inputs such as chemical fertilizers, insecticides, pesticides, improved seeds or imported agricultural equipment. In 2006, a bag of 50kg fertilizer (NPK:15-15-15) is estimated at NGN 3, 000 (USAID, 2007), which is expensive relative to return and credit for purchase was unavailable. Despite of the introduction of the Land Use Act in 1980 which

took over the legal ownership of all land to the state, communal land right still prevails in most part of Nigeria including the study area. Due to history of Fulani conquest in the 19th century, customary land tenure system of the Bida area is complicated. There is a three-layered structure of pattern of control over land and land related activities (Masuda, 2002). On the top level is the local king *Bida Emir*. In principle all territories of the Bida Emirate are under the control of the *Emir*. Under the *Emir* there are primary landlords which were created by the feudalistic system of the old Nupe kingdom. At the bottom of the structure there are secondary landlords whose powers over village lands are restricted to allocation of farmland and management of vacant land. Under the customary land system, pastoral Fulani do not have guaranteed access to land as they are still regarded as strangers even though some of them have been cohabitating with Nupe in the area for over a century. Grazing lands in the study area are regarded as open access resources. The peaceful coexistence and mutual understanding with their Nupe hosts grant pastoral Fulani unrestricted access to any fallow lands either during the rainy or dry season.

Pastoralist Fulani in Bida

At about 1800, Fulani mallams and Fulani cattle owners began to settle in Nupe country (Ismaila, 2002). The first group of pastoral Fulani that settled in Bida country was the *Dindima'em* group led by *Abdul-Maliki*. They migrated from an area named Machina located somewhere north-east to the Sokoto country near Niger. During the colonial era, Fulani from the *Dindima'em* group was selected by the *Emir* as *Dikko*, the chief of all pastoral Fulani in the emirate for the convenience of cattle tax collection. By 2005, the current *Dikko Bida* estimated that there were about 1450 Fulani groups under his domain in the whole Bida Emirate, and 350 groups were in Bida region. The main pastoral Fulani lineages are the *Dindima'em*, the *Boodi* and the *Fittoji*. Pastoral Fulani in Bida sustain their subsistence by raising cattle, sheep and chicken. Some of them begin to carry out small-scale upland farming in recent years. They form small groups composed of several families and live in cooperation with one another. A Fulani group normally composed of several *baade*, which refer to a family headed by a married man with an independent herd of cattle and his wife and children. The Fulani call their camp as *wuro*. The spatial structure of a Fulani camp in the study area is long and narrow rectangular in shape extending from south to north. A Fulani camp consists of a residential section for Fulani people and an enclosure for their cattle herd which is called *hoggo*.

Corralling contract between Nupe and pastoral Fulani

The brief record of the practice of corralling contract in the study area can be found in the ethnographies of Nadel (1942:206) and Shikano (2002:353). Nadel described corralling contract as “an interesting cooperation” between villagers or landlord and nomadic Fulani herdsmen. It was an accepted arrangement among the Bida landlords to place one’s fallow land at the disposal of the Fulani herdsmen before leasing it to a new tenant. The landlord could then obtain a much higher price for his land. The records of Nadel and Shikano were very brief, but they indicate that corralling contract has been an arrangement being practiced at least for half a century in the study area. The pastoral Fulani

groups studied have diverse migration patterns and degree of closeness with Nupe villages. They arrange corralling contract with the Nupe in different ways in response to their unique circumstances and needs. In this study four patterns of corralling contract adopted by the Fulani have been identified. Each pattern is illustrated below with a representative case study.

Corralling contact as a local political tool

As the chief of all pastoral Fulani in Bida Emirate, the group of *Dikko Bida* needs to act as a role model regarding the practice to sit for Nupe villages. The group of *Dikko Bida* began to sit for villages north to Bida town for the rainy season since 1990. The group moved northward as the *Dindima'em* lineage expanded so it moved northward to explore new grazing resources. For rainy season, the group rotates among four Nupe villages, namely Kologa, Bube, Akote and Emigbari. Meanwhile for the dry season, the group has been sitting for just one village – the Eyagi village, for all the last 90 years. For *Dikko Bida*, corralling contact is a local political tool to symbolize the harmonious social relationship between pastoral Fulani and Nupe farmers, as well as to maintain the linkage with the *Emir*. Eyagi village is the birthplace of the mother of the late Bida *Emir* and the village head of Eyagi has always been the Village Area head, *Etsu Yenkpa*, who is responsible for dispute settlement at community level. Sitting for Eyagi can be regarded as an annual virtual to acknowledge the allegiance of pastoral Fulani to the Bida Emirate. Corralling contract with villages does not bring economic benefits to *Dikko Bida's* group, but it has an important local political meaning for the maintenance of cordial social relationship between Nupe and pastoral Fulani at a whole.

Corralling contract as an economic tool

Informants from the more popular groups which receive multiple invitations describe the corralling contract as a kind of “exchange”. They regard it as a kind of service provided for farmers to achieve better yield, and in return they can take some advantage from it. The popular groups receive higher payments and more gifts from farmers for the contract. However, they are not absolutely utilitarian in their consideration for village selection. The long term harmonious relationship with various villages is a more important consideration for them. The groups with higher popularity usually have higher social status, such as belonging to the ruling house or led by respectful Islamic *mallam*. The group of *Aliyu Abdullahi* is one of the most popular groups in the area. It is the second largest group in the area in terms of population and it sits for various villages south to Bida town in the rainy season. In the dry season, the group migrates to the basin of Gbako River and rotates among a few villages. The informant of the group points out that, “It is good to maintain relationship with various villages because it gives you more freedom and bargaining power.” When deciding which village to select, informant says, “You cannot follow money, you need to follow cattle.” Financial benefit is just one of their considerations, what really matter to them are the welfare of their cattle and the good relationship with villages which made grazing on farmers’ land an easier task. To avoid conflict among villages, the group needs to rotate. To run the corralling contract is similar to running a “business” to those popular groups. They care about financial benefit, but they also need to maintain “customer relations” with various “clients”

and to prevent them from “fighting among themselves”.

Passive corralling contract

Some Fulani groups are not so eager to engage in corralling contract with villages. They value freedom of mobility higher than the close relationship with certain Nupe communities. *Adamu Iya* belongs to the *Boodie* lineage group which began to settle in the Bida area in the 1930s from the Sokoto region. Unlike the *Dindima'em* group, most of the *Boodie* groups studied do not formally engage in corralling contract with Nupe villages. They usually settle on a particular village continuously for several years during the same season. For example, until 2005, *Adamu Iya* has been setting up his camp in Fakunba village during the rainy season for five consecutive years, and in Gaba village for the dry season for ten consecutive years. *Adamu Iya* does not actively engage in corralling contract with villages although a few villages always show welcome to host his group. He prefers to be flexible so that he can explore new environment for his cattle any time he wants. The precondition for him to stay in a village is that the villagers have shown welcome and have ever forgiven him for minor destruction caused by farm encroachment.

Fixed corralling contract

There are a few groups studied that do not carry out seasonal migration. They settle both in the rainy and dry seasons in a particular village for years. Their life-style can be regarded as semi-settled, but they do not own permanent shelters and need to move their cattle enclosure frequently within the village following the request of their hosts. The villages they stay are usually larger in scale, with large area of vacant land and possess water resource even during the dry season. Groups prefer not to migrate but just sit for a particular village because it is “too much suffering” to move among villages. The group of *Aliyu* moved into the Bida area from the Sokoto region about 45 years ago. *Aliyu* has never moved out of Gbanchitako village for over a decade. The stable relationship with the village enables him to get a relatively large plot to do his own farming. *Aliyu* moves his cattle enclosure following the wishes of farmers in the rainy season. In the dry season, he can let his cattle to stay on his two farms for two months respectively. *Aliyu* is not interested in getting financial benefits by corralling contract. Stability is more valued and by sitting for a village all year round for long term, he is able to sustain a semi-settled life.

Utilization of pastoral Fulani camp site

Cattle manures are accumulated inside the *hoggo* during the season. Fulani do not use cattle manure as fuel or construction material. In the next rainy season after the group have moved away, Nupe farmers spread the faeces all over the previous camp site and transfer part of the manure to their other farms as well. The arrangement for corralling contract of Nupe farmers can be categorized into two: hosting by collective effort of a whole village and hosting by single household of a village. When arrangement is made by collective effort of a whole village, the land for past Fulani camp site is divided into many small plots and distributed to village members according to village norms and rules. Dividing the

field into many long and narrow small plots does not comply with the principle of economics of scale, but for Nupe farmers the notion of fairness in community is highly important. That is the reason why larger group is more desirable by Nupe farmers. By hosting a bigger Fulani group, they can ensure members of every household of the village can get a share of the manured land.

Conclusion

The corralling contract has enhanced the mutual dependence of Nupe farmers and Fulani herders in central Nigeria. It is especially essential to Fulani who, under the customary land system, has no guaranteed access to land. With the failure of the government in providing grazing reserve, the corralling contract has remained as their most important asset that assists them to access to resources. It is also the most important antifriction for the social relations between the two groups. Most of the interviewed farmers answered that they would forgive pastoral Fulani for minor crop encroachment for the sake of the cattle manure. Village heads are expected to assist their Fulani guests when they have disputes with other villages. In the study area, most of the disputes caused by cattle encroachment into farms can be settled by village heads, rarely do cases reach to *Dikko* or the *Emir*.

Despite the history of Fulani conquer in the early nineteenth century, Nupe farmers generally are not antagonistic toward pastoral Fulani. Although they do not form marital relations, the Nupe and the Fulani have a wide range of social interaction. The camps of Fulani are generally close to homestead of villagers. Fulani men often gather in village and pray in mosque with their Nupe fellows. The corralling contract has a positive impact on the social relation of the two groups. They see each other as partner: the Nupe need the Fulani for manure while the Fulani need the Nupe for land and fodder. The corralling contract is not a casual arrangement, but a dynamic and functioning traditional institution that facilitates the collaboration of the two groups. It is an important example of local adaptation and innovation that allows balance to be maintained when limited resources are being shared. Statutory efforts to draw territorial distinctions between agriculture and livestock production have created social rifts in many regions in Africa. Technological solutions, such as chemical fertilizers, have not halted the decline in agricultural productivity. Corralling contract should be advanced as a part of the complex set of social and biophysical conditions in agropastoral regions. Instead of working in vain to simplify the system with statutory and technological solutions which separate agriculture from livestock production, efforts should be focused on removing constraints of corralling contract implementation on both sides and facilitating this institution to enhance the association between agricultural and livestock production.

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The relationship between the continuation of natural resources use and the renewal of local landscape

-A case study of “Sotetsu” (*Cycas revolute*) use in Kanami community,
Tokunoshima Island, Japan-

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1. Purpose

This study investigates the social mechanism for renewal of local landscape through the analyzing plural motives for continuing “Sotetsu” (*Cycas revoluta*) use in Kanami community, Tokunoshima Island of southern Japan.

Landscape studies of environmental sociology in Japan have been conducted from the perspectives of the difference of position between the actors, the cooperativity in historical relationship with environment, the practice creation of landscapes conservation by the people of community (Minoura, 2011). Besides, many studies report that the community is continuing the relationship with local landscapes by continuing of the natural resources use (Seki, 2003). In addition, some studies point out that one of the motives in environment conservation is the inheritance of local landscape to the next generation (Takenaka, 2008). However, most of the previous researches have analyzed conservation of local landscapes in present generation and few researches have analyzed plural motives for passing down of local landscapes to the future generation. Thus, the social mechanism has yet to be determined.

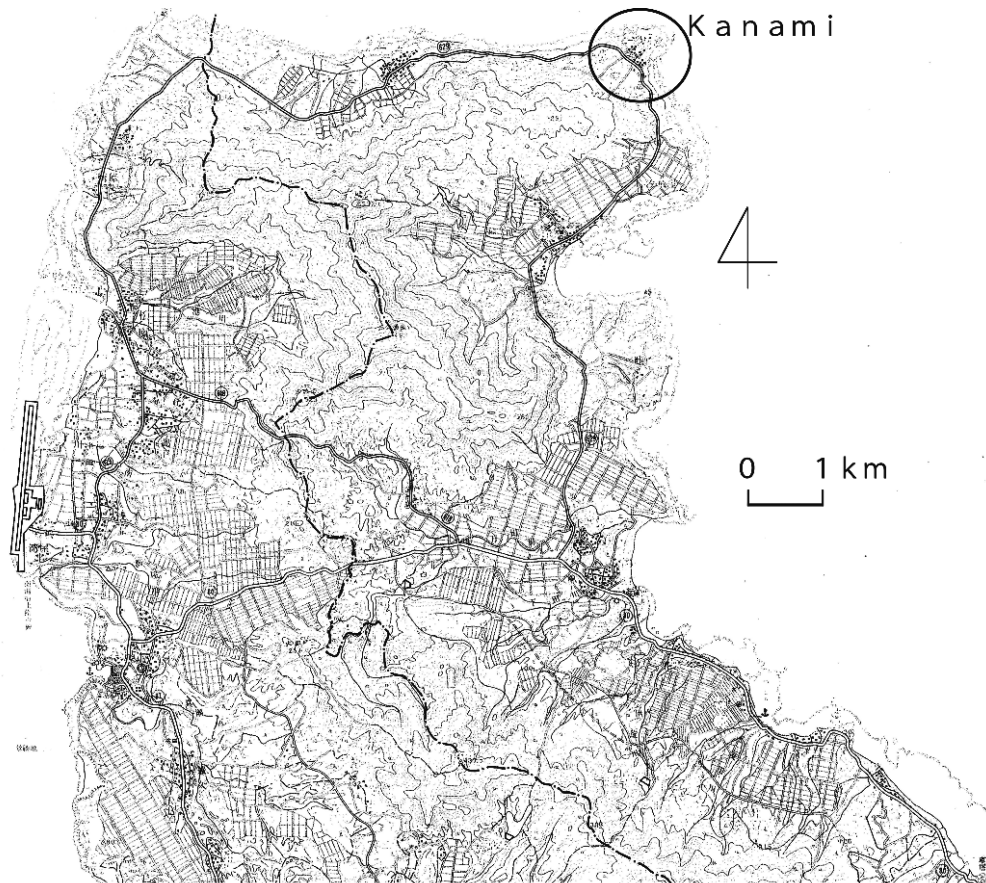


Fig.1. Map of the research site

2. Method

We have researched in Kanami community since 2011, in collaboration with some of our colleagues. We have conducted qualitative research, mainly semi-structured interviews. We have interviewed more than 10 people who produce “sotetsu”. We have also collected material, both historical and statistical.

3. Overview of “sotetsu” use in Amami region

Tokunoshima Island is one of the Islands in Amami area. Kanami community is located in northwest area of Tokunoshima. The community have a population of 95 and the number of households is 45. Their primary industries are agriculture, fishery, and livestock industry, among others.

“Sotetsu” landscape seen around farmlands or forests is one of characteristic landscapes in Amami region.

“Sotetsu” are natural resources that have been used in various applications in Amami region: mainly used as eatables, besides that, as medicines, for ritual, and toys. In particular, people of Amami region had staved off hunger by using the starch made from seeds or stems of “sotetsu” in the era of food shortage. “sotetsu” had been important resources to support their lives.

However, the agricultural land improvement projects and the modification of institute for land

use conducted from 1950s onward. These projects impacted “sotetsu” landscape in Amami region. In particular, agricultural land improvement projects and land readjustment projects that are one of improvement ground works for agricultural productivity had a great effect on “sotetsu” use in Amami region. “Sotetsu” had been removed from around farmlands in most of communities through these projects. In addition, “sotetsu” planted around farmlands or forests have been no longer managed and have become a nuisance in some communities from high economic growth period onward. As a result, farmlands and forests planted “sotetsu” devastated, and it has been more and more difficult for some communities to maintain the local landscapes.

But, in recent years, to improve these situations, the movements for discovering “sotetsu” use are seen in various places of Amami region. For example, the movements intend to activating the community by product development using of “sotetsu” starch, and managing the “sotetsu” landscape by re-evaluating as a horticultural crop and developing new distribution channels. These movements create the social mechanism for adding a monetary value to “sotetsu”, then regenerating relationship between “sotetsu” and community. And by that, the people attempt regeneration of “sotetsu” as a natural resources, and maintenance of local landscapes.

Therefore, the relationship between “sotetsu” and community in Amami region have built in history of the loop with the degeneration and the regeneration over natural resources use and some of regional developments. With that, the situation of relationship between “sotetsu” and community in Amami region is regenerating in recent years.

Kanami community in Tokunoshima Island has been placed in similar situation as the other communities in Amami region. However, Kanami community keeps “sotetsu” around farmlands and forests by continuing the “sotetsu” use, and by that, “sotetsu” landscapes are renewed even now.

Furthermore, Kanami community is not only continuing the use of ancestral “sotetsu” but also conducting some activities for passing on the scenery of “sotetsu” to the next generation by renewing “sotetsu” landscape with planting new “sotetsu” or transplanting ancestral “sotetsu”. Therefore, we investigate the social mechanism for renewal “sotetsu” landscape to the next generation through the analysis of the historical relationship between “sotetsu” and Kanami community.

4. The relationship between Kanami community and “sotetsu”

4.1. Value of “sotetsu” in daily life

In Kanami community, people had been cultivated rice, sugar cane and sweet potato as a main subsistence activity. However, in 1970s, the rice fields have been converted into sugar cane fields with the policy of trimming rice production. Moreover, in recent years, livestock industry has also been developed.

“Sotetsu” in Kanami community have been used avocationally by combining with major subsistence activities all through the ages. And “sotetsu” planted along the farmlands or in forests of Kanami community are the ancestral natural resources that have been used in various applications in the daily life as with other communities in Amami.

For example, starch made from seeds or stems of “sotetsu” had been used as an ingredient in rice

gruel, bean paste and distilled spirit. It was crucial for making preservative foods, seasonings and favorite foods. In particular, in the era of food shortage, people had staved off hunger by using the starch as food. In the era of using fire woods as main fuel, the dead leaves and the dried shells of "sotetsu" had been used as lightwoods.

"Sotetsu" seeds were also used as medicine. The grinded "sotetsu" seeds have antiseptic effect and allow pus to drain. The leaves of "sotetsu" were used to grow crops as a fertilizer. When people treaded the finely-chopped leaves of "sotetsu" in rice paddy field, the leaves became a good fertilizer. And when people scattered the coarsely-chopped leaves of "sotetsu" on dry field, the leaves prevented bottom weed from growing, and the leaves became a fertilizer after running dry.

Besides, the leaves were used as windshields for crops. The people in Kanami community set some leaves on edge around the immature crops to limit the damage from winds. Moreover, the leaves were used for ritual and daily necessities. It were used as the drumsticks in the community festivals, and also used as the dry broom by tying some leaves together.

The seeds and leaves of "sotetsu" became the material of daily necessities and the recreational things. The seeds were the material of water wheel, doll, ornament, and used for beanbag toss in sports day. The insect cage made from the leaves of "sotetsu" and the temari ball made from the seeds and cottons of "sotetsu" became children's toy. The "sotetsu" were used not only in daily life, but also in extraordinary scenes.

In this way, the "sotetsu" were used in various applications in the daily life and extraordinary scenes by the people of Kanami community until the permeation of commodity economy. That is to say that the "sotetsu" are natural resources having multiple meanings for the people of Kanami community, and the knowledge and technology for "sotetsu" use have been passed down from their ancestors.

4.2. Monetary value of "sotetsu"

This study showed the relationships between "sotetsu" and the people of community in daily life. The reasons of continuing "sotetsu" use till today are that "sotetsu" have monetary value all through the ages and have been placed as a resource supporting economic life for the people of Kanami community.

The seeds, stems and adventitious buds of "sotetsu" were the objects to be traded for money with external community since old times. They had much economic value. For example, in the era that people faced food shortage and difficulty getting needed cash, the people of Kanami community build the social relationships with internal and external community by mediation the exchange of the "sotetstu" seeds, rice, pigs, or cashes.

Before World War II and right after the war, the people of Kanami community sometimes get the cashes by selling the seeds, small stems, and adventitious buds of "sotetsu" to the merchant who came from overseas to buy "sotetsu". Thus, the "sotetsu" trading was the valuable opportunity to gain cash income during the era of difficulty in getting cashes.

However, after 1970s, the people of Kanami community could get goods and foods from the

outside of the island with relative ease. With the era progressing, the use of “sotetsu” starch, such as making paste, moved into decline and the value of “sotetsu” as a preservative food and seasoning also decreased gradually.

Though, in recent years, the demand of “sotetsu” seeds from domestic and abroad has been increasing and the seeds are shipped through middlemen. In the early period of “sotetsu” shipping, “sotetsu” were bagged up in a bag by the 60 kilogram and the price per bag was 10,000yen at its peak. Nowadays, its price fluctuates between 2,500–3,000yen per 30 kilogram. So, “sotetsu” trading is still the valuable opportunity to gain cashes. However, the trading has always been conducted to complement the income from main subsistence activities all through the ages.

Therefore “sotetsu” of Kanami community have importance meaning in livelihood strategy and making a living, but have not been positioned in major subsistence. “sotetsu” have been sequentially-used in “second major subsistence” (Kinjo and Terabayashi, 2012) that support major subsistence activities.

From the economic aspect of “sotetsu” use, it is possible to say that “sotetsu” always have had monetary value by changing and being changed the way of use in repeated social change. In this way, “sotetsu” have supported life of the people, and contribute to renewal “sotetsu” landscape continually in Kanami community.

In Amami region, most of communities lost the “sotetsu” landscape through the improvement ground works for agricultural productivity. However, in the same situation, Kanami community has kept “sotetsu” around the farmlands and forests. The back ground is that “sotetsu” have been passed down from ancestor and constantly become resources to support their lives, and additionally, “sotetsu” always have had monetary value in second major subsistence.

5. Contemporary meaning of “sotetsu”

5.1. Ease of management

The activities of transplanting “sotetsu” have seen around farmlands or new farmlands in recent Kanami community. The activities derive from some motives. Such as “sotetsu” have been used from a long time ago or they have created monetary value in all ages. Besides that, such as “sotetsu” are fuss-free plants or they have multilateral functions or the relationship with maintain of living environment in the community.

Management of “sotetsu” is only conducted artificial pollination during May to June, harvest seeds during November to December and weeding around “sotetsu” in free moment by each owner. Therefore, “sotetsu” are fuss-free natural resources as compared to major subsistence activities, such as “sotetsu” are costless to cultivate and they are extremely low-maintenance after planted.

The activities of the planting new “sotetsu” or the transplanting in Kanami community are supported by ease of management to “sotetsu”. “Sotetsu” which are newly planted or transplanted are replanting by plant seeds of previously-existing “sotetsu” or stumps separated from stems.

The activities have purposes of stable harvest of the seeds, and what is more, “sotetsu” are recognized as fuss-free plants or costless plants after being planted once. By these ease of management,

“sotetsu” are reproduced even now.

5.2. The relationship with living environment in the community

“Sotetsu” are managed at some level by the people of Kanami community to increase the productivity of “sotetsu” seeds.

“Sotetsu” needs sunlight to bear the seeds. By devastating farmlands and forests planted “sotetsu”, trees around “sotetsu” block the sunlight and “sotetsu” don’t send out the leaves or bear the seeds. Therefore, the people of Kanami community get rid of weeds and branches around farmlands and forests planted “sotetsu” at fixed intervals for increasing amount of the seeds.

However, the reason of managing “sotetsu” tightly is not limited to promote growth of “sotetsu” or increase amount of the seeds. Besides that, management of “sotetsu” tightly lead to reduction of bird and beast damages.

The devastating farmlands and forests planted “sotetsu” attract some mice and they sometimes bite the peel of “sotetsu” seeds. That is not seriously damage, but mice’s smell attract poisonous snakes (*trimeresurus flavoviridis*). That is serious problem.

The people of Tokunoshima island are damaged by poisonous snakes even today. Therefore, each town offices in Tokunosima island are conducting projects for extirpation of poisonous snakes and save crude venom by provide a financial incentive to catch poisonous snakes. The damage of poisonous snakes is serious problem for farmers who work in the nearby habitat of poisonous snakes. “Sotetsu” management is also important to avoid damage by the poisonous snakes.

Thus, the motives for “sotetsu” management by the people of Kanami community are not limited to promote growth of “sotetsu” or increase amount of the seeds. The management of “sotetsu” have meaning of maintenance of better living environment. The people of Kanami community prevent the farmlands and forests from devastating by management of “sotetsu” tightly even now. And by that, “sotetsu” landscape has been maintained.

5.3. Multiple meaning of “sotetsu”

“Sotetsu” use in Kanami community have been changing with the progress of ages. Today, “sotetsu” are hardly use as eatables, medicines, and daily necessities at all. Actually, the farmlands and forests planted “sotetsu” have multiple meaning today, such as function as a borderline between the farmlands, prevent the farmlands from sliding, and protecting the crops from winds.

Thus, multiple meaning attach importance to “sotetsu”, and “sotetsu” have been planted in Kanami community. The function of “sotetsu” as a borderline clarifies the partition of adjacent farmlands, and prevents the conflicts over land and resource use. In addition, by using “sotetsu”, the people of Kanami community can prevent many kinds of damages to their crops from specific natural disaster in semitropical region, such as typhoon, and salty winds that often happen only in islands surrounded by sea. These indirect functions of “sotetsu” are also important for the people of Kanami community. Therefore, “sotetsu” are reproduced by multiple meaning attached to “sotetsu”.

5.4. The foresight of the relationship with “sotetsu”

As seen from the above, we revealed motives for renewing “sotetsu” landscape in Kanami community from the aspects of historical relationship with “sotetsu”, economic potential, ease of management and multiple uses. These relationships over “sotetsu” create the foresight within the people of Kanami community.

“Sotetsu” take a long time to grow, thus, newly planted “sotetsu” can’t use in present generation. Nevertheless, “sotetsu” have been planted by the people of Kanami community, the reason is that “sotetsu” passed down from ancestor and support current life.

The people of Kanami community have the recognition that “sotetsu” have been supported life of the people in Kanami community through passing down of the importance of “sotetsu” for a life from ancestor. “Sotetsu” have monetary value all through the ages and have been placed as a resource supporting economic life for people of Kanami community, thus, “sotetsu” will have monetary value and become resource of supporting life in the future.

“Sotetsu” have been provided the benefits to the community from old times and even now. Thus, it is assumed that “sotetsu” will be used in future generation and provide some benefits to the people of community. And by that, the people of Kanami community predict that “sotetsu” will continue in existence in the future.

The foresight is created by historical and social facts over the relationship between the people of Kanami community and “sotetsu”. From the expectation of “sotetsu” in the future, “sotetsu” are planted, and by that, “sotetsu” landscape is renewed continually. In case of Kanami community, this is the social mechanism for renewal of local landscape.

6. Conclusion

As a result of analyzes to the relationship between the continuation of “sotetsu” use and the renewal of local landscape, we reveal the presence of the foresight, such as “sotetsu” will be also used in next generation, will bring benefits to the community in the future, and will continue to exist in the community in the future. This foresight is not optimistic or wishful thinking. It is backed by historical relationship between the community and natural resources or local landscape.

As a background of the foresight, “sotetsu” have been passed down from ancestor and constantly become resources to support their lives; therefore, there have been fostered various relationships between the community and “sotetsu” such as economical possibility, multiple use, and so on. Such perspective is embedded in the “sotetsu” landscape, and succession of the landscape to the next generation is important for people in Kanami community even now.

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Social-Ecological Systems Analysis in the Concept of World Heritage

Fisheries Management in the Shiretoko World Natural Heritage Site

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Introduction

Japan is one of the most environmentally diverse countries from an ecosystem point of view, with habitats ranging from subtropical to subarctic. On the most northern Japanese island, Hokkaido, the point where the last seasonal sea ice reaches the land, is the Shiretoko Peninsula. This subarctic ecosystem, is characterized by high biodiversity and it constitutes the habitat for various endangered species, ranging from large terrestrial predators, such as the brown bear (*Ursus arctos*), and terrestrial and marine mammals, such as the Yezo deer (*Cervus nippon yezoensis*) and Steller's sea lion (*Eumetopias jubatus*), to birds of prey, such as Blakiston's fish-owl (*Ketupa blakistoni*), and fish, including various anadromous salmonids, such as masu salmon (*Oncorhynchus masou masou*) and chum salmon (*Oncorhynchus keta*)^[1, 2]. In addition to the endemic species, several migratory species, ranging from cetaceans, such as sperm whale (*Physeter macrocephalus*), to birds of prey, such as Steller's sea eagle (*Haliaeetus pelagicus*), among others, feed and rest in the area^[3]. Mostly due to the fact that anadromous species moving upriver in order to spawn, become prey to the local terrestrial predators, the ecosystems under examination are characterised by a feedback cycle of constant interactions between the marine and terrestrial nodes that constitute them^[4]. One of the most prevalent aspects of this feedback cycle are humans. Human activity in the area dates back to the prehistorical ages, with evidence of several civilisations that have existed there. Settlers are presumed to have ventured into Shiretoko from Siberia, forming the unique Okhotsk culture, a maritime civilization that inhabited Shiretoko from the 6th until the 12th century AD^[5]. During the 13th and 14th century, the

Ainu civilization developed in the area, and descendants of that indigenous population still live in Shiretoko ^[1]. During the Edo Era (1608-1868) settlers from southern Japan that had moved to Hokkaido Island, began to suppress the indigenous people who still had no concept of government, based on the increasing nation-wide commercialization of their fishing activities ^[6].

Fisheries co-management

The fisheries management regime in Japan, is based upon decentralisation and participation of fishermen in the decision-making process, enforcement and monitoring. Major fishing villages have their own Fisheries Cooperative Associations (FCAs) and membership in the FCA is obligatory to anyone who intends to fish in the coastal areas, as the FCAs hold the strong priority on the fishing rights for the area under their jurisdiction ^[7, 8]. The members of the FCAs establish the majority of fishing regulations in their jurisdictional area and they enforce and implement their regulations. In order for the FCAs to adopt scientifically appropriate measures, research institutions provide them with scientific information and conduct constant evaluations of the stock levels of major resources and the state of the marine environment. On the prefectural level, elected members of the FCAs comprise the Area Fisheries Coordinating Committees (AFCCs), which operate as consulting bodies to the prefectural government ^[7]. The AFCCs also elect members that compose the Wide-area Fisheries Coordinating Committees (WFCCs) which advise the central government on the coordination of resource use and the management of highly migratory species ^[9].

Apart from the production of regulation, the FCAs have a large variety of other functions. According to the FCA Law (Article 11), FCAs may engage in various economic activities, such as fish marketing, granting credit, issuing insurance, supplying products, ice-making, processing, running cold storage, and guidance, as well as in non-economic activities such as lobbying, environmental protection, member education, consultation and resource management ^[7].

Nevertheless, in the case that, within a group of Japanese local fishermen (usually belonging to the same FCA), develops the need for more case-specific measures against the overexploitation or degradation of the marine environment, they may form an autonomous body called Fisheries Management Organisation (FMO), in order to implement those measures ^[7, 8]. This situation falls within the Japanese notion of Resource Management Fisheries ("*Shigen Kanrigata Gyogyo*") that centers on the fact that in the Japanese fisheries management, the fishermen are the main actors and the main decision-makers ^[10].

As the fishing right (right of common fishery or common-of-piscary right) is authorised to each FCA in a 5-year basis, it forms a collective right of the FCA members. As such, it also forms a right of every individual member. Along with the right, the FCA members also shoulder significant responsibilities towards the conservation of the fish stocks and the marine environment ^[7]. In order to fulfil their responsibilities, each FCA holds regular meetings of its members, during which they set their regulations and make important decisions. The most significant characteristic of the operational way of the FCAs is the fact that democracy among members prevails. Especially for vital issues, the decision is often required to be unanimous in order to be adopted ^[11]. By seeking consensus through

the unanimity of the vote, the FCAs also minimise the risk of future conflicts.

Ecosystem conservation - Shiretoko Approach

In order to achieve fisheries sustainability and implement a management framework that would protect the local environment and the well-being of the communities in Shiretoko, solutions towards an effective ecosystem-based approach were sought out. Based on the common decentralised Japanese fisheries management system, the Shiretoko area stakeholders developed a unique model for ecosystem conservation, the Shiretoko Approach [8].

The Shiretoko Approach incorporated the fisheries management system in a holistic framework that takes also into account the terrestrial parameters of the area [12]. This type of management is pivotal for the sustainability of a marine ecosystem, as its conservation should take into consideration several sectors involved, as well as multiple activities taking place in the area under examination. The adoption of this management approach was also in complete accordance with the plans of the Japanese government to achieve the status of World Natural Heritage Site (WNHS) for Shiretoko (fig. 1).



Figure 1. Shiretoko World Natural Heritage Site Map.
Source: Ministry of the Environment of Japan, 2009 [1]

This resolution led to the establishment of several institutions for the promotion of the area as a location suitable to become WNHS, based on a mentality of collaboration and cooperation between the local actors. As there is no specific legislation regarding the conservation of World Natural Heritage Sites, the Shiretoko conservation plans are decided and implemented by several authorities together, based on a range of laws, creating thus, a new integrated management system based on cross-sector collaboration [2, 12]. The first of these institutions was the Shiretoko World Natural Heritage Site Regional

Liaison Committee, the aim of which is to bridge the differences between the various stakeholder groups, as it is made up of members that belong to several different bodies, from National Ministries, to FCAs and NGOs. The Committee's main role is the coordination of policy decision-making among the administrative bodies [8].

Following up, the Shiretoko World Natural Heritage Site Scientific Council was established, with the aim to provide scientific advice and support to the Committee [8]. The Scientific Council is comprised by four Working Groups (WGs), each one specialising in a different research area: the Ecotourism WG, specialising in the sustainable touristic exploitation of the area, the Yezo Deer WG, specialising in Yezo deer management, the River Construction WG, specialising in the improvement of river infrastructure and, finally, the Marine WG, specialising in marine ecosystem management (fig. 2). Similarly to the Committee, in addition to scientists, representatives from governmental and private bodies participate in the Scientific Council and its WGs [8].

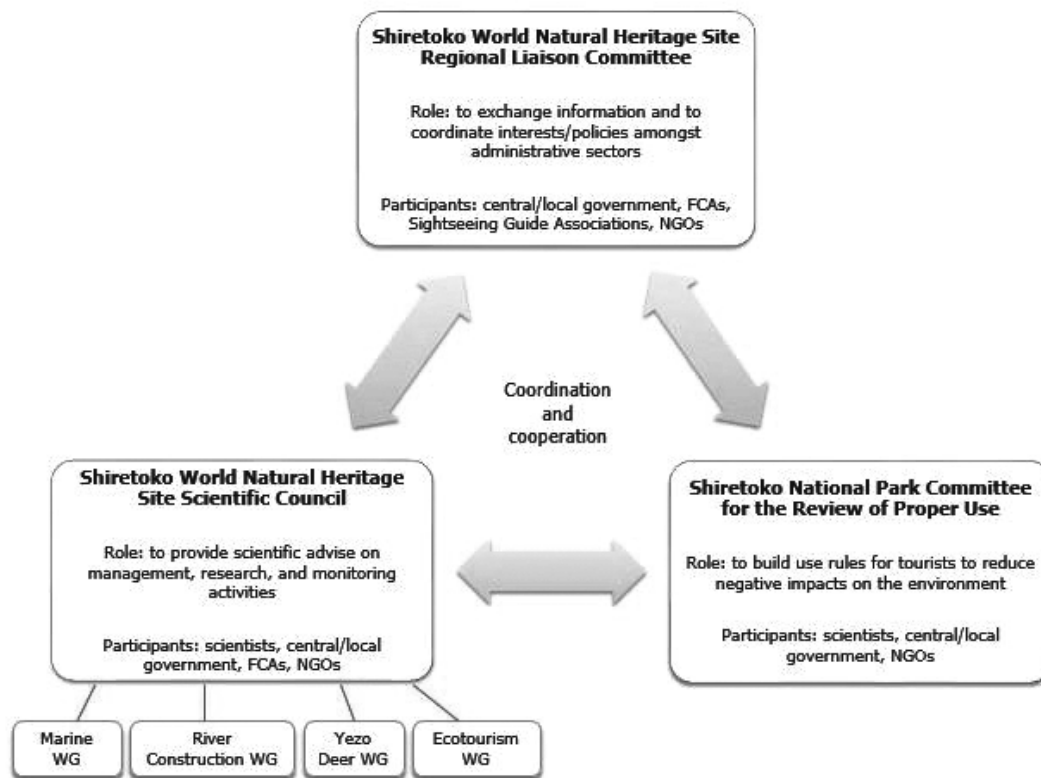


Fig. 2. Coordinating system in Shiretoko WNHS.

Source: Makino et al., 2009 [12]

All the institutions that constitute tools of the Shiretoko WNHS, base their operation upon stakeholder participation, extensive collaboration and mutual recognition, and aim at the promotion of information exchanges and the formation of an opinion-exchange and consensus-achievement forum for the various user groups. Through the adoption of such an approach, the legitimacy of the decision making increases considerably, and this arrangement forms the nucleus of the Shiretoko Approach [12].

Through this process, the current marine management target has been established as “to satisfy both conservation of the marine ecosystem and stable fisheries through the sustainable use of marine living resources in the marine area of the heritage site” ^[13] (p.1).

The unique nature of the Shiretoko Approach and its potential as a global best practice case have been perfectly highlighted in the Report of the Reactive Monitoring Mission, Shiretoko Natural World Heritage Site, Japan, 18-22 February 2008 ^[14], (page 9):

“The mission team also applauds the bottom up approach to management through the involvement of local communities and local stakeholders, and also the way in which scientific knowledge has been effectively applied to the management of the property through the overall scientific Committee and the specific Working Groups that have been set up. These provide an excellent model for the management of natural World Heritage Sites elsewhere.”

Social-Ecological Systems discourse in the Shiretoko case

Despite the widely applauded consensus seeking management framework, there are still some sore spots in the Shiretoko case, with most profound the issue of the Steller’s sea lion population management. Even though Asian Steller’s sea lions in general are ranked as ‘near threatened’ in the IUCN Red List ^[15], the population of Shiretoko are not endangered, as their numbers remain stable, showing even a small increasing trend of 1.2% annually ^[8]. Due to the fact that the sea lions, in search for food, damage the fish caught in the nets, the fishermen see them as competitors for the use of the fish stocks and voice their demands for population control. In order to accommodate these demands, at least partially, the Japanese Government has deployed a culling programme. As the fish stocks decrease, however, and the sea lion population remains the same, the competition between the marine mammals and the fishermen intensifies. Thus, the local FCA is constantly pressing for the increase of the culling limit, a request that contrasts with the WNHS prerequisites, as the IUCN is concerned about the viability of the Steller’s sea lion population ^[16]. In contrast with the IUCN’s prevalent ideas and in support with the fishermen’s demands, several academics approve of the culling practices, based on the idea of Balanced Harvesting, meaning the distribution of “a moderate mortality from fishing across the widest possible range of species, stocks, and sizes in an ecosystem” ^[17]. On the other hand, other groups, especially among the nature conservationists, are against the culling practices, as they believe that human control should not be enforced within the WNHS, but rather they should “let nature do the job”, a viewpoint consistent with the general vision of the WNHS as a real wilderness cluster. However, the general worldview of the society is that “we should protect the economy first” and supports the demands of the fishermen for sea lion population control.

In general, fisheries co-management suffers in terms of efficiency, especially time-wise, as overcoming interest conflicts and reach long term consensus may prove particularly challenging tasks, particularly in cases where multiple stakeholders are involved. The unique aspect of the Shiretoko case, and the one that makes it so interesting research-wise, is the fact that the fishermen are not only involved in the decision-making, but rather they constitute the primary decision-makers, with the stately actors and NGOs playing an advisory role ^[8, 18]. Nonetheless, the fishermen take

into serious consideration the research outcomes and scientific advice provided by the supporting research institutions. Although they are responsible for the adoption and implementation of fish stock regulations, they value scientific input highly in order to ensure the validity of the decisions that they make.

The SES lens focuses particularly on the notion of the stakeholders' motivation; in the case of Shiretoko, the motivation for conservation is particularly high, for various reasons. First of all, the fishermen take pride in the fact that they have maintained a long tradition of protecting the local ecosystems, as their livelihoods rely heavily on the environment. In addition, the various stakeholder groups see the potential of Shiretoko habitats as the source of several alternative income choices, and most profoundly tourism. WNHS nomination enhanced the resolve of the local communities to conserve their area, and gave the stakeholders additional motivation to negotiate among themselves the solutions and compromises in order to reach multilateral agreement.

Significantly, the importance of scientific input is present throughout the examination of the case study, as the fishermen, despite the fact that they are the primary decision-makers, they regard highly academic advice and welcome collaboration with research institutions. Evidently, there is always space for improvement, especially in the data collection and the negotiations area, but the Shiretoko Approach has proven to be an excellent starting point.

The innovation in the Shiretoko management is based on the fact that it is not limited to fisheries. The Shiretoko ecosystem is not composed by the marine and coastal habitats only, but it includes the terrestrial aspect as well. As multiple terrestrial species feed on marine species, conservation conducted in one area, inadvertently affects others. Moreover, as tourism has been developing considerably since the nomination of Shiretoko as World Heritage Site, the terrestrial and marine aspects cannot be separated. The inflow of tourists is based on the good maintenance of the environment of Shiretoko as a whole, making it thus impossible to radically divide the conservation activity in terrestrial and marine. In contrast with most fisheries self-governance cases, in Shiretoko, through the unique management arrangement, multiple opinions are heard during the meetings and information from different sectors is gathered. As the WGs collaborate and work closely together, in cases that more than one WG is involved, the decision is made collaboratively with all the WGs concerned. Thus, the decision made is more holistic and less likely to cause conflicts in the future.

Overall, the nomination of Shiretoko as World Natural Heritage Site greatly improved the local ecosystem management. As the awarding bodies remained adamant about their positions on good resource management, the stakeholder groups involved strived to keep up with the requirements, resulting thus in up-to-date decision-making. Besides the awarding bodies, the local government also played an important role in attaining success. At the beginning of the long journey towards nomination, it stated that the management objective was not only conservation, but also effective fisheries. The fact that it did not go back on its declaration, and supported the local fishermen in their effort to maintain the fish stocks, created an environment of trust between the state and non-state actors, from which cooperation highly benefited. The meaning of conservation from an SES perspective in the case of Shiretoko is portrayed perfectly in the amended objectives of the Marine Management

Plan (p.1): “to satisfy both conservation of the marine ecosystem and stable fisheries through the sustainable use of marine living resources in the marine area of the heritage site” [13]. In other words, in Shiretoko, in the concept of conservation governance, marine conservation and local livelihoods (fisheries) are of equal value and should not be pursued separately. Effort must be put in the stability and long-term maintenance capacity of the exploitable resources, as well as the habitats sheltering them.

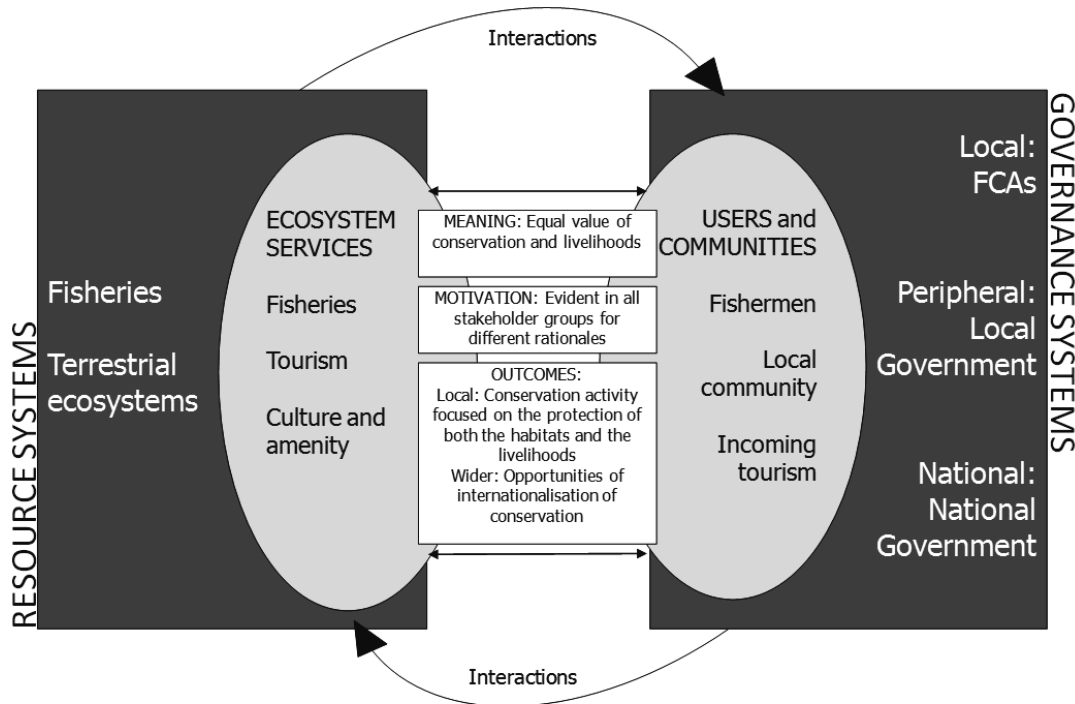


Figure 3. SES Analysis of community conservation in Shiretoko.
 Adapted from: Berkes et al., 2014 [19]

Finally, the governance path followed in Shiretoko can be considered a very close to perfect SES governance example. Through long term adaptation to change in the SES, the governance has succeeded in matching the profoundly complex local system and is guiding it forward, along with all its aspects, towards sustainability.

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Explaining the regional differences in the distribution of women divers' population in Jeju Island

A socio-ecological perspective

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Abstract

This paper aims at explaining regional difference in the distribution of women divers' population in Jeju Island, South Korea. As of 2012, there were about 5 000 women divers in the island. They are among key players for the island's economy through their work of harvesting sea plants and seashells by deep diving, this being made without a breathing aid. Women divers' work is a long standing, ancient profession in the island's labor history. However, their existence is now waning with significant reduction in their numbers and aging trend with most of them being over fifty.

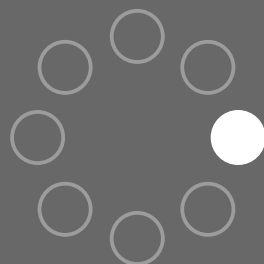
Women divers along with fishers are members of fishing community associations that form along the about 200 kilometers long coastal lines of the island. There have formed 100 fishing community associations that are regionally demarcated by villages that are dependent upon fishing-agricultural activities. It is reported that there are significant differences in membership size and economic output from fishers and women divers working at sea. Of particular, number of women divers across the associations significantly varies in size that ranges from 11 to 150. This paper aims at clarifying factors that can explain the different membership size of women divers. I consider three factors important to explain the difference: (1) differences in fishing ground in terms of marine diversity and health; (2) job availability for women; (3) transmission of diving profession through generations (i.e. mother-daughter). For an empirical reasoning, three fishing community associations are to be examined upon the three aspects.

Keywords

Jeju Island, women divers, fishing ground, women's work

REGULAR SESSION 7

ENVIRONMENTAL BEHAVIOR



ISESEA-5

Energy Democracy and People's Power Plant (PPP) Movement in Taiwan

post-311 Perspectives of Environmental Sociology

Juju Chin Shou Wang

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Abstract

After 311 Fukushima Disaster, risk trigger has been proven to be more powerful and complicated than what human being thought. Energy issues also become a risk amplifier accompanying with other disasters. As compared with top-down energy policy-making, environmental sociology has paid more attention on bottom-up "social energy" focused on energy's paradigm shift from "energy democracy" to "energy" democracy. One of the social energy projects has been named People's Power Plant (PPP) movement. Through the discourse and action of environmental sociology, PPP movement put her emphasis on "energy democracy" associated with daily-life environmentalism and anti-nuclear movement. Other than energy's environmental facts, this paper also addresses social facts so that PPP movement could be glocalized in a family or community base. This paper aims at "bring the energy back in" in terms of perspectives of environmental sociology. In turn, grassroots action of PPP movement, covering eight communities in Taiwan, is taken to generate social energy by promoting energy democracy such as citizen science, fun theory of empowerment and so on.

Keywords

social energy, energy democracy, energy democracy, People's Power Movement (PPP), fun theory

The Resentment Psychology Research in Environmental Action

Tao Chen

Lanping Wang

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In the accelerating period of social transformation, it is of great importance to strengthen psychological research of the underlying group. The dimensions of resentful psychology include psychological abuse, verbal expression, and will eventually appear as action dimension. Louis Island's environment action research shows that economic loss caused by environmental pollution is the starting point of resentful psychology. Local government's improper behavior leads to the resentment toward ConocoPhillips Company extend to the local government. Besides, psychological sense of relative deprivation and "the Court Dismisses the Case" lead the reproduction and spread of resentment. Resentment psychology has specific evolutionary logic and regenerative mechanism, including from blame to hate, from individual to group, from scattered to gather, from the primary to the secondary. This psychology has caused dominant social consequences and could also lead to potential behavior of outside system. As for government departments, it is urgent to attach great importance to the resentful psychology of the underlying group, preventing "mass resentment" turning into "mass incidents".

Key words

environmental action; underlying group; social mentality; resentful psychology; anger venting

The Historical Roots of China's Ecologic Crisis*

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Abstract

Lyn White argued that the historical roots of American ecologic crisis lay in the religious culture. Having no such religious tradition, what, then, are the historical roots of China's ecologic crisis? In the pre-modern society, population propagation is so stressed both in the official Confucian ideology and in daily practice that the anxiety "Having No Progeny" influenced the production and reproduction of China's population, which in turn influenced the environment. The lasting influence of this anxiety still influences contemporary Chinese society. In the modern society, the anxiety "Lagged Behind" and the desire to catch up with more advanced economies drive contemporary China, and have led the state and the nation's people to begin up a radical process of economic catch-up with the West. As a result, China now has an even more serious environment problem than the western society of Schnaiber's "treadmill".

Introduction

In 1967, Lyn White published a paper titled *The Historical Roots of Our Ecologic Crisis* in the journal *Science*. In this paper he argued that the historical roots of American ecologic crisis lay in the religious culture of the Judeo-Christianity ^[1]. Three years later, Lewis W. Moncrife published a counter-argument in the same journal, titled *The Cultural Basis for our Environmental Crisis*. In his view, the Judeo-Christian tradition is only one of many cultural factors contributing to the current environmental crisis ^[2]. White's proposal is that Judeo-Christian tradition stimulates the progress of science and technology which further leads to environmental degradation. While Moncrife argues that Judeo-Christian tradition influences the capitalism with the attendant development of science and technology and democratization, which further leads to the urbanization, increased wealth, increased population and individual resource ownership. And all these cause the environmental degradation. Moncrife argued instead for approaching a history of the American environmental crisis through a study of American institutions. So, Moncrife has not answered or couldn't deny the question put forward by White.

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Thanks for Dr. Terry Woronov's efforts of improving the English expression.

In yet another counter-argument, Allan Schnaiberg, et al^[3] explains the reason of environmental problems through political economy, and the concept of the *Treadmill*. Schnaiberg and his colleagues see *the treadmill* as the modern production process. For them, “the treadmill” is a metaphor for capitalism; the modern economy is like a treadmill, starting slowly but picking up speed over time. People produce ever more goods ever more quickly on the “treadmill of production”; they consume ever faster on the “treadmill of consumption.” Only through a cycle of continual production and consumption can the economy run normally; ever-increasing production requires ever more consumption, and the cycle gets worse.

They note, however, that the excessive production and consumption required by the economic treadmill has caused environmental problems. The tremendous amount of raw materials required for ongoing production has caused depletion of natural resources. A large number of waste produced in the production process has led the pollution problem. The continuous production promotes consumption continuously, and the excessive consumption produces a large number of offal and thus pollutes the environment ^[3]. Because of this, they argue, the economic “treadmill” is not sustainable. Our planet has limited resources, and cannot support the ongoing economic treadmill; ever-increasing capitalist consumption and production cannot continue over the long run.

Taking Schnaiberg’s argument as my starting point, in this paper I wish to examine a question that he and his co-authors do not address, namely, the problem of why people get on this treadmill in the first place. I suggest that we consider linking Schnaiberg’s political economy approach, White’s original argument about the West’s Judeo-Christian heritage, and Max Weber’s analysis of the “spirit of capitalism.” From this perspective, the tendency of Western capitalist economies to form “treadmill” systems stems from the Protestant ethic and individuals’ desire to achieve before God. This anxiety before God is what I call a “primary anxiety”^[4]; the discussion below will introduce a “secondary anxiety” as well. According to Max Weber, in order to be favored by God, religious believers began to hold strong anxieties, particularly after the Reformation. Believers, he argued, confirmed the existence of God and verified their special favor in God’s eyes through economic achievement. Capitalism and Protestantism were thus intertwined, as occupational activities became a basis for religious belief and activities.

Moncrife’s paper in *Science* ends with the following quote from Jean Mayer^[2]:

It might be bad in China with 700 million poor people but 700million rich Chinese would wreck China in no time...It’s the rich who wreck the environment...occupy much more space, consume more of each natural resource, disturb ecology more, litter the landscape...and create more pollution.

These words were written before the four decades. Since the reform and opening policy of the late 1970s, China’s economy and rate of industrialization have grown rapidly. As a result, the ecosystem has also deteriorated rapidly. Some rivers are black with pollution, and the residents of many areas no longer have water to drink. Desertification and sandstorms are increasingly serious problems. There are shortages of energy and mineral resources. Problems such as global climate change due to increased energy consumption are also more obvious every day. At the same time, the world ecosystem is entirely inter-related; with one-fifth of the world’s population, China’s environment problem has an

incomparable impact on the entire planet.

What, then are the historical roots of China's ecologic crisis? China has no Judeo-Christian tradition, and the influence of Protestantism is very slight. Moreover, the market system of China is not mature. What, then, are the cultural and historical origins of China's serious environment problem? I argue that we can understand the China's environment problem by looking closely at two different aspects of Chinese society: the institutional systems that are in place in the Chinese economy, and the cultural traditions that still govern many aspects of Chinese society. Rather than trying to analyze the roots of China's environmental crisis from the perspective of individual actors, this paper will instead look at structural forces that have contributed to the current state of ecological deterioration. To do so, I will divide my discussion of Chinese history into two sections. The first is pre-modern society, represented by Confucian culture; the second is modern society after China began being influenced by the western world or globalization. The assumption of this paper is in China's pre-modern, the primary social anxiety was not having enough children; this anxiety influenced the production and reproduction of China's population in pre-modern time, which in turn influenced the environment. Moreover, I argue that the lasting influence of this anxiety still influences contemporary society.

In modern Chinese society, the pressure of the Western imperialism meant that China's most serious anxiety was to survive as a nation or perish. The concern about lagging behind Western society and the desire to catch up with more advanced economies drives contemporary China, and has led the state and the nation's people to begin up a radical process of economic catch-up with the West. As a result, China now has an even more serious environment problem than the western society of Schnaiber's "treadmill."

"Having No Progeny": Chinese Historical Anxiety^[5]

There are two schools of thought about the relationship between human beings and the environment. One is "anthropocentric" or "egocentric". The other considers that human beings are a part of the ecosystem.

Although there have been many influences on Chinese traditional culture, Confucianism, Buddhism and Taoism were the three main sources of what is now considered Chinese tradition. Confucianism was espoused by Confucius and Mencius, while Taoism's main thinkers were Lao Tse, Chuang Tse; all came from China originally. Buddhism originally came to China from India; however, Buddhist thought in China was strongly influenced by local Confucian and Taoist ideas, just as they were transformed through contact with Buddhism. Buddhism and Taoism both strongly emphasized that human beings should live in harmony with nature. Taoism, as represented by Lao Tse and Chuang Tse, places supreme value on human beings' integration with the environment. Lao Tzu's world view is nothuman centred, but instead views that humans as a part of the ecosystem. In this school of thought, Man takes should follow natural laws that derive from the Earth; the Earth derives its natural laws from Heaven, while Heaven takes its natural laws from the Tao. In Lao Tse 's words:

There was something undefined and complete, coming into existence before Heaven and Earth...Therefore the Tao is great; Heaven is great; Earth is great; and the (sage) king is also great. In the universe there are four

that are great, and the (sage) king is one of them. Man takes his law from the Earth; the Earth takes its law from Heaven; Heaven takes its law from the Tao. The law of the Tao is its being what it is. ^[6]

The attitude towards desire of human beings influences the Taoist's understanding of the relationship between human beings and nature. In Lao Tse's view, human's behavior in and towards nature should always be appropriate. He emphasizes that *human should be content with what they have and stop to avoid danger and to enjoy free long life.* ^[7]

For individual, the thought of *being content and stopping* advocates people to be indifferent to fame or gain, to have a natural, simple and unadorned life and to keep in good health. As regards to society, he puts emphasis on being governed by doing nothing that goes against nature, praises highly the sovereign in the little country, and not visiting each other all their lives. For this reason, Taoism was frequently criticized by Confucianists. However, Lao Tzu's thought played an important role in political ecological practices in China.

The central tenets of Buddhism including mandates to cherishing life, not kill lives, these concepts helped protect animals and plants, and also helped maintain ecological balance. Other Buddhist customs such as maintaining a vegetarian diet, or freeing captive animals, also contributed to the natural balance between man and the environment in pre-modern China. Confucianism comes from Confucius. Developed by Mencius, it was adopted as China's official state ideology during the Han Dynasty (BC206-AD220). For over 2000 years, Confucianism was China's leading ideology, and has had a deep and lasting impact on Chinese society. On the question of people's relationship with the natural world, Confucianism calls for an approach firmly grounded in the observable universe. For example, when one of his disciples asked him to define "wisdom," Confucius replied:

To give one's self earnestly to the duties due to men, and, while respecting spiritual beings, to keep aloof from them, may be called wisdom. ^[8]

Confucius not only advocated keeping ghosts and gods at a respectful distance, but also avoided discussing them:

The subjects on which Confucius did not talk, were-extraordinary things, feats of strength, disorder, and spiritual beings. ^[9]

Doesn't like the Christian tradition, Confucianism does not emphasize people to be antagonistic to nature. Compared with Taoism, Confucianism is active. However, it influences the environment mainly through the population factor^[10].

Confucius very strongly concentrated on filial piety, which was mentioned 19 times in *The Analects*. Maintaining that the younger generation should care and provide for their parents, Confucius emphasized that the younger generation had to respect their elders emotionally.

Tsze-yu asked what filial piety was. Confucius said, "The filial piety nowadays means the support of one's parents. But dogs and horses likewise are able to do something in the way of support;-without reverence, what is there to distinguish the one support given from the other?" ^[11]

Confucius emphasized that people should not only be filial to their living elders, but also had to show appropriate respect for deceased ancestors:

That parents, when alive, be served according to propriety; that, when dead, they should be buried according

to propriety; and that they should be sacrificed to according to propriety.^[12]

Generally speaking, Confucius emphasized the younger generation's obligation and responsibility to the older generation. To fulfill these obligations and responsibilities required that each generation produce heirs. Without sons, how could the younger generation carry out their responsibilities to their elders?

Historically, Mencius took Confucius' concept of filial piety even further, stating: *There are three ways to be unfilial, the worst is to not produce off-spring.*^[13] Throughout Chinese history this was not only a quote from a philosophical classic, but a very common saying in daily discourse.

There is a large literature explaining the importance of flourishing population in Chinese folk proverbs and customs. For instance, there are many sayings such as *the more sons, the more blessing*. In another example, in Chinese tradition guests gave Chinese dates and peanuts^[14] to newly-married couples, symbolizing "we wish you the quick birth of a son" and "may many children be born to you, not only the male, but also the female". These traditions point to two aspects of the emphasis on population in Chinese traditional society. The first is the total amount of the population; namely the more children, the better. The second is gender partiality, regarding men as superior to women.^[15]

In traditional China, focusing on offspring had a social function. First of all, there were no material or social welfare systems, so children were responsible for supporting their parents when they aged. Without offspring, the older generation had no one to rely on when they became physically weak, sick, and lost their ability to labor. At the same time, this functional need drove the development of traditional Chinese cultural systems. For example, village culture – the main social form of Han Chinese people in pre-modern times – has had a tradition of male domination and preference for sons for over two thousand years.

There are many other examples of how Confucian ideology influenced population growth. Two examples are given below.

In China, the influence of Confucianism was weaker in minority areas than the areas dominated by the Han majority. My research confirms that China's minority peoples evince less desire for many children than Han people. For example, the central government has loosened family planning requirements among minority groups in China, who are legally allowed to bear two or more than two children. However, according to studies I conducted in the Hulun Buir Mongol communities in Inner Mongolia and the Aba Tibetan communities, some minority families voluntarily have only child. In rural Han communities, however, in spite of the central government's extensive efforts to implement its one-child only policy, many couples still chose to be punished by the government and bear two children. Some families even have three or four children, continuing to bear more progeny until they have a boy.

Gender ideology about male domination is also a clear difference between Han and minority areas. In some ethnic Mongol communities in China, women hold political power, serving as local village cadres with wide public acceptance. In Tibetan communities, women have higher status and more power than men in the domestic sphere. If Tibetan families have both a son and a daughter, parents prefer to keep the daughter at home in the family, and bring a son-in-law to live with them, rather

than marrying their daughters out into their husband's families, as is the case in Han communities. It is also common in Tibetan families for young men to marry into their bride's families, a phenomenon impossible for a normal family in rural Han areas.

Shandong Province, the historic home of Confucianism, provides another example, for population density is higher there than in other parts of China. The historical facts of migration from central China towards the Northeast China can explain this. At present, ethnic Han people constitute 97.6% of the total population of the three northeastern provinces of Liaoning, Jilin and Heilongjiang ^[16]. Historically, the residents in these regions were not ethnically Han, and the population density there was low. A large number of ethnic Han people from central China began to immigrate to the region starting in the mid-17th century; Shandong people accounted for up to 80% ^[17] of this immigrant pool. Although Hebei and Shanxi provinces are better located for immigration to the Northeast, Shandong, the home of Confucius and Mencius, generated far more migrants than other provinces. I argue that this stems from the stronger influence of Confucianism in Shandong, which led to greater desire for large families, producing a high population density that led to pressure to immigrate ^[18].

Thus, on one hand, the preference for bearing multiple sons was central to traditional Chinese society, rooted in both official state ideology and folk tradition. On the other hand, during pre-modern times people had limited ability to control nature. Because of floods, famines, and other natural disasters, families could not guarantee that they would have male offspring to carry on caring for the next generation and conducting ritual ancestor worship. From this came the anxiety of "Having No Progeny". As a result, China has a history of a high population growth rate. Chinese historians and statesmen already noted the cycle of Chinese dynasties' boom and wane. ^[19] In the early years of every new dynasty, social and political stability led to high rates of population growth. Eventually, this growth rate would exceed the rate of land development. Later in the dynastic cycle, however, problems of land annexation, political corruption would develop, generating social and political conflict. Finally, a peasant uprising would form to challenge dynastic authority. The wars that ensued would greatly reduce population, until a new cycle began. The contradiction between population and land (environmental capacity) is thus the reason for as well as the result of cultural competition and the subconscious drive of the Chinese people towards population production and reproduction.

The base of China's population of the Hans is huge. This influences the modern Chinese society too. All the contemporary China's social problem including environment problem, can find the influence factor of China's huge population base.

Lagged behind: Chinese Modern Anxiety

There is a long history of China's environmental problem. For example, the banks along the upper and middle reaches of the Yellow River were once lined with forests. However, due to deforestation, the Yellow River has long been heavily sedimented. In history, many areas of China were once elephant habitats ^[20]. However, the elephant long ago retreated to very limited areas such as Xishuangbanna in Yunnan Province in the southwest China at present. These examples clearly show that environmental degradation has long been a problem. However, comparatively speaking, the speed of the

environmental degradation in pre-modern society has been calculated in millennia or centuries, while the speed of present environmental degradation is calculated in decades or even years. So although there are long historical antecedents, today's rate of environmental change deserves to be called an ecological crisis. And if the environmental problems of pre-modern society were caused mainly by population growth and agricultural overexploitation, then the present ecological crisis is the result of trying to catch up with modernization.

If American ecological crisis stems originating from the primary anxiety of Protestants to obtain special favor from God, it can be argued that China's present environmental problems stem from what I call a secondary anxiety, produced by China's modern society. I call it a secondary anxiety because it is secondary, having no relation to China's pre-modern anxiety of having no progeny, or the western Protestant anxiety or the relation between man and God.

It has taken around 200 years ^[21] — essentially from the mid 19th century to the mid 21st century — to complete its drive towards modernization, with 1949 — the year the Chinese Communist Party founded the People's Republic of China — as a watershed. During the first century of this process, China mainly sought to preserve its independence from western imperialism, while after 1949 it moved the country began to strive for strength and prosperity. During these 200 or so years, China has faced strong external pressure to modernize. In the first century, China faced the threat of colonization, while in the following 100 years it was the specter of poverty, lagging behind the rest of world, and even its ability to exist as an independent nation have driven China's push to modernize. China's long history and national pride made the nation unwilling to be colonized by others or to remain mired in poverty. The path of developing independently and becoming prosperous was seen as the country's only choice. In its long history, China had never faced these kinds of double pressures — external threats and internal anxieties — and in response it chose the route of radical modernization.

The Leap Forwards (the concept Leap Forward is from the historic event Great Leap Forward <1958-1960>) are good examples of China's modern *secondary anxiety*^[22]. I describe the path of China's *Leap Forward* (abbreviated as LF) in the following figure, where I summarize the course of China's development. The first peak in the figure describes *Plans for National Reconstruction* put forward by Sun Yat-sen (1866-1925). These plans were never implemented, so they are drawn with a dotted line. The second peak shows the *Great Leap Forward* from the end of 1950s to the beginning of 1960s. The amplitude of the graph is greatest here, and the event had the most violent impact on Chinese society. I call the subsequent development phases the *Post-Leap Forward Movement*. There have been several *Post-Forward Movements* since the Great Leap Forward event. However, the total trend is that the amplitude declines gradually.

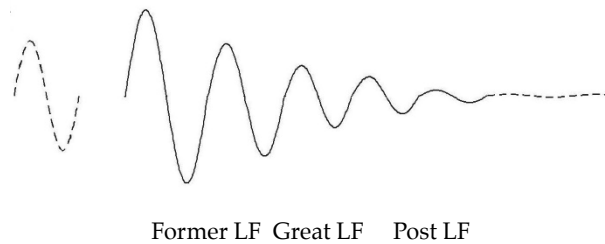


Figure1. Leap Forward Movement of China

The ideology of the *Great Leap Forward* can be traced back to a document called: *Plans for National Reconstruction* which *Sun Yatsen* wrote at the beginning of last century. Sun Yat-sen, the first president of the Republic of China (1911-1912) was a western-educated medical doctor who lived abroad for many years. He had a deep understanding of western countries and Japan, as well as the national conditions of China. In Sun Yat-sen's view, it had taken more than a century for America to become prosperous and strong, and only half a century for Japan. Therefore, he predicted, it would take only ten years for China to become prosperous and strong as well:

By the 8th year of the Republic of China (AD1919), it had only been 143 years since [America] declared independence on July 4, 1776. However, the US has already become the most prosperous and strongest country in the world. At the beginning of Meiji Reformation (1868), the population of Japan accounted for less than 1/10 of that of China, and its landmass was not even as large as China's Sichuan Province. Its technology at that time was still not as good as China's is today. But Japan quickly became aware of its role in the world. Knowing that isolated countries could not be stable, Japan changed its tactics from repelling foreigners, to instead trying to learn foreign technology and make full use of it and to overpower it. It employed technologically skilled personnel from various countries, adopted American-European practices, and then carried out reforms. It took more than a century for America to be prosperous and strong, but it only took half a century for Japan, accounting for only a third of that of the U.S. According to this logic, ten years will be enough for China to become prosperous and strong^[23].

Sun Yat-sen's goal hadn't been achieved. But nearly half a century after Sun's proposal, the Chinese Communist Party began to implement a plan in an organized way. The original goal of *Great Leap Forward* was to surpass Great Britain and catch up with the United States. The overall plan was surprisingly similar to Sun's original plan. In the 1950s, steel output was the key index of industrial development, and a key indicator of the economic achievement. In 1956, the Chinese government published its Second Five Year Plan. This plan determined that steel output increase to 10.5 million-12 million tons by 1962, and that grain yields reach 250 billion kilograms^[24]. In actuality, in 1957, the steel output was 5.35 million tons, while the grain yield was 185 billion kilograms. However, after the *Anti-right Deviation Movement*, a revised *Second Five-Year Plan* was announced on August 3, 1958. According

to this new plan, steel output would grow to 80 million - 100 million tons, and the grain yield would reach 650-750 billion kilograms by 1962 ^[25]. In this plan, steel output would be much higher than that of the original plan "exceed the Great Britain's within 7 years, and catch up with the United States within 15 years". The planned steel output in 1962 would 14.9-18.7 times that of the actual steel output in 1957, with an average annual growth of 71.6-79.6%. In fact, China's steel output exceeded 100 million tons for the first time in 1996, 35 years later. The planned grain yield for 1962 would be 3.5-4.1 times that of 1957. It is a myth that grain production could quadruple in five years in conditions where land development is already sufficient. During the Great Leap Forward, in order to reach the steel output goal, people disregarded the cost and ignored the conditions of production, and attempted to carry out a policy of "everyone in society becoming steel makers." At the same time, agricultural production was invented the "satellite launching" ^[26].

During the Great Leap Forward, China did complete some important infrastructure projects. But it has since been proven that the Great Leap Forward did not achieve the goal of rapid economic growth, but the methods it employed instead caused serious economic recession and famine. Meanwhile, environmental disruption was very serious, due to the big-scale steelmaking and widespread culling of forests. Today, even the Chinese government has acknowledged that the action of Great Leap Forward was wrong.

The Great Leap Forward is now history, but if we look closely at the underlying logic, we can see that, both the ideology and the processes of the Great Leap Forward have not disappeared today. After the Great Leap Forward, China has carried a series of "Post Great Leap Forward Movements". Examples include the Emulating Dazhai in Agriculture Movement (1960s-1970s) ^[27], and the Development Zone craze across the whole country after 1993. To illustrate, I take the Development Zone craze as an example. By August of 2004, there were 6,866 development zones of all kinds across country, encompassing 38,600 sq. km. To the end of 2004, the government reduced the number of development zones by 70.1%, to 2,053. These zones now are limited to 13,700 sq. km., a 64.5% reduction ^[28]. In other words, the needed quantity and area of development zone actually account for about 1/3. This excludes the data of clearing up incompletely.

From the perspective of individual or organizational action, the most important characteristic of the *Post Leap Forward* Movement is of raising GDP for GDP. The country has the goal of raising GDP at every administrative level, and some lower local governments were assigned GDP index sometimes. In some cases, when local areas have not met their quotas for economic development, local officials simply invent the data they submit to the authorities above them. It is similar to the "satellite launching" of the Great Leap Forward. This has led to a new saying in China: "officers make up the data, and the data produces the officers".

From the viewpoint of the social psychology, both the Great Leap Forward and the subsequent Post Leap Forward stem from a long-term national anxiety of being left behind. This psychology has had some common characteristics across recent history. China greatly values its own historical achievements. Through the middle period of Qing Dynasty (AD1616-1911), Emperor Qianlong (AD1711-1799) still saw his county as a realm of paradise. But after a series of failures including Sino-British

Opium War (1840-1842), the retributions for the Boxer Rebellion in Beijing (1900), and the Sino-Japanese War (AD1894-1895), the Chinese realized that the nation lagged behind the rest of the world. Subsequently, it is been haunted by this sense of being left behind.

The second feature of this anxiety is the urgency Chinese feel about achieving their development goals. To Chinese, this goal is very clear. For Sun Yat-sen, the goal of Leaping Forward was to catch up with newly developed countries of America and Japan. The goal of the Great Leap Forward was to surpass Great Britain industrially and catch up with the United States. The key goal of the Post Leap Forward period has been to catch up with the GDP per capita of the developed countries. This, of course, is not an easy goal to achieve, but Chinese people are very impatient to reach this economic level.

The third feature is the motivating forces that have produced these visions of China's future and the institutional framework in which these plans have been executed. The Leap Forward Movements stem from both external pressures from developed countries that have already modernized, and internally, from the national psychology that drives the determination to be as developed as others. Institutionally, these plans have been made possible because of the extremely powerful hierarchy that exists in China, which has been able to mobilize tremendous resources towards this end. Since the Movement to form rural People's Communes (AD1958), the government has been able to totally control and mobilize the rural communities, which until then had been very loosely organized and governed.

It was difficult to avoid the ecological crisis when the radical movement represented by the Great Leap Forward combined modern industry with science and technology. Modern science and technology has strengthened people's abilities, including their destructive abilities towards nature. For example, with an axe, chopper, traditionally person cut only several bundles of firewood per day. With the high-efficiency machinery, today one can cut down several hectares of forests in one day. Across several generations, a traditional smithy could only pollute his own immediate environment – smoking his own house black, and polluting the pond in front of his door. However, a large-scale enterprise, can pollute the water an entire watershed, virtually overnight. By the means of the Leap Forward Movement, a lot of locally environmentally irrational actions have been adopted because of centralized decision-making, and single-mindedness of development targets that did not take the entire environmental system into account. The environment was considered an easy to sacrifice on the way to achieving the historical goal of development, and the resulting pollution was inevitable. We notice that a large amount of forests were cut down in the Great Leap Forward in China. In the period of the Post Great Leap Forward, the river system has been seriously polluted by industry because of technological progress and expansion of the scale of industry. Today, all the main great rivers and lakes of China have already been polluted.

Conclusion

Here I make a connection between Lyn White, Max Weber and Allan Schnaiberg and his co-author to explain the American's ecological crisis. According to Lyn White, the Judeo-Christian tradition has caused people to be antagonistic to the nature, while the spiritual characteristic of Christianity

has promoted the development of the scientific realm. Based Max Weber, that after the Reformation, especially in American society, the Protestant ethic has required economic achievements to confirm the existence of God and verify their special favor in God's eyes. This resulting anxiety placed them in a treadmill, the "treadmill of the production." I argue here that the Treadmill of Production and the Treadmill of consumption are the typical expression of the Protestant's anxiety. Thus, the treadmill of production and the treadmill of consumption, derived from the former, have caused America's ecological crisis.

Chinese society does not have a Christian tradition. After the foundation of the People's Republic of China in 1949, Marxism has been the dominant ideology. On this development path, Marxism tries to avoid the existing problems of capitalism, including environmental problems. Unfortunately, China has veered onto the path of "pollute first, and then control it later". From the viewpoint of the traditional Chinese thought, China's Buddhist and Taoist traditions emphasize the harmonious relationship between human and nature. Confucianism also had an objective vision of the relationship between people and nature, but the Confucian ideology of filial piety negatively influenced the relationship between humans and nature. The huge population base in China has interacted with other factors in modern society, which has had a continuous influence on this relationship. China has been caught up in globalization since the middle of the 19th century, and later chosen the radical route of catching up with modernization. The *primary anxiety* of *Having No Progeny* in the culture of two millenniums and the *secondary anxiety* of catching up with modernization in the nearly two centuries is the total origin of the present Chinese environmental problem ^[29].

According to White, "What we do about ecology depends on our ideas of the man-nature relationship. More science and more technology going to get us out of the present ecologic crisis until we find a religion, or rethink our old one."^[1] And he thinks that Zen Buddhism, which conceives of the man-nature relationship is very nearly the mirror image of the Christian view. ^[1] Contemporary China has already been deeply involved in globalization. And radical actions have been produced due to China's anxiety. China can not accept western culture totally. Moreover, it is necessary to review the western legacy constantly that we have accepted intentionally or unintentionally. Likewise, it is impossible and meaningless to resume China's traditional culture totally. However, it is very necessary to comb and scrutinize the traditional thought resources of China. Under the influence of the west, China is forming the new culture in its own practical exploration. It is of great importance to reflect the practice route that we have already passed by and widen clear our goal constantly. Only in this way, we may avoid the graver ecological crisis.

(All References and Notes are reduced. If anyone needs the References and Notes, please contact the author ajichen@vip.163.com)

Double-diversion of Pollution Based on the Behavior Perspective

Xing Yixin

Abstract

With the growing of the contradictory relationship between man and nature, localized and regional environmental problems have been intensified as global and central problems. Most discussions focused on the overall or average influence of human activities to the environment, while Freudenburg and his colleagues noticed that a surprisingly small fraction of the relevant social actors. As for environmental problems, human beings have a dual identity—they are both the triggers of the problems as well as the victims of the pollution, which makes it important to study human beings environment behaviors. This study was based on the theory of double-diversion, hoping to expose the distinguished pollution caused by a small fraction of social actors as well as the way of double-diversion through analyzing the mode and character of the environmental behavior of the government, the company and the mass media. The paper is divided into three parts, the main contents are briefly outlined below. The first part is an introduction, in order to introduce the background, the purpose, the importance of the research. The second part is about theoretical interpretation of double diversion theory. Through describing what does disproportion looks like in different levels, this part will then explain how does disproportion maintained through four kinds of methods based on the analysis of the Hurricane Katrina. The last part is about discussion of double-diversion in China, trying to explain the particular mode and reason of the environmental behavior performed by the government, company and media, and explain how these three actors have distracted people to make the pollution legalized. The government was stimulated by the promotion tournament, which has caused government failure. The company has been motivated by the short-span profit, running too fast on the “treadmill” to stop, only focusing on the mandatory targets while ignoring long-term benefits of environmental protection. The accordingly environmental behavior has been manifested as excessive and illegal emissions of the pollutant, which has been covered up by the operation of the relations, including treat and gift, bank-enterprise union and social sponsorship. As to the media, it is controlled both externally by the policy, the economy and readership, and internally by the CEOs and workers. All these factors have contributed to the decline of the media’ role as the social-justice-speaker, resulting in the trend-

following, biased and false report, which has successfully caused the distraction.

1. Introduction

Since 20th century, science and technology has been greatly developed, human practice activity has achieved leapfrog development in breadth, depth and strength, and living conditions and quality of life has improved greatly. However concomitant with that was large and growing environmental problems. Excessive consumption of natural resources and the discharge of pollutants without restraint makes the earth scarred, and environmental issues have become a global concern from a regional one.

Environmental sociology has taken the responsibility of study of environmental problems, and there has been amounts of theories to explain environmental-social relationship, among which double-diversion theory has provided a brand-new theoretical perspective. Recent studies of environmental-social relationship focused on the all or average influence of human activity to the environment, while Freudenburg and his colleagues noticed that actually environmental damage normally is characterized by high level disproportionality, which is that most or the overwhelming majority of the harm being created by the diversion of environmental rights and resources to a surprisingly small fraction of the relevant social actors. The disproportionality appears to be made possible in part through the second diversion, namely distraction—the diversion of attention, largely through the taken-for-granted but generally erroneous assumption that the environmental harm “must” be for the benefit of us all.^[1] This is what they established as a theoretical framework named Double-diversion. It is no doubt that double-diversion is a new discussion of environmental behavior.

2. The concept of Double diversion

2.1 What does disproportionality look like?

Nowark has put forward three areas of social science where disproportionality has been examined. Firstly, environmental justice. “How negative environmental conditions disproportionately impact certain groups, classes, or minorities”. Secondly, research on the patterns of social sanctions and interaction. “How certain minority groups may be disproportionately subjected to state sanctions or other forms of social discrimination such as racism or sexism”. The third area is ecological footprint of different social groups. Disproportionality is used when examining the relative ecological footprints of different groups.^[2] The theory of Growth Machine has some similarity with disproportionality, in which city is referred to as the growth machine, and local elites enjoy the absolute interest of local development while the common citizens bear the absolute cost.

In order to make the theory clearer, Freudenburg and his colleagues compared disproportionality in different levels of states, economic sectors and companies. In the national-level comparison, data showed that there was disproportionality in resource acquisition and environmental damage. For example, American’s average per carbon dioxide emission was 30 times of that in India (Stern 1993:1897). In economic-sector level comparison, Freudenburg researched on the statistics of Toxics Release Inventory of the year 1993 and 2000, and he found that when calculated by the index of

GNP and employment rate, there showed great disproportionality. For example, about 60 percent of toxics reported in Toxics Release Inventory of the year 1993 have come from Chemical Industry and Primary Metal (Mineral excluded), while these two sectors only contributed to less than 5 percent of GNP and 1.4 percent of employment. In company-level comparison, Freudenburg pointed that about one third of toxins emitted by chemical industry could be traced to DuPont and Freeport-McMoran. He also used gini coefficients to describe the disproportionality, and showed that if calculated with emission (pounds), gini coefficient could be reached as high as 0.775, which released high level of disproportionality.

2.2 How is disproportionality maintained?

This disproportionality (the “first diversion”) is expected to be made possible in part because of the “second diversion,” or the diversion of attention, involving the widespread but generally unchallenged expectation that such environmentally harmful activities will be “necessary” for jobs and the economy, or for capitalism (Freudenburg, 2005, 2006).^[2] In the social constructivism, Hannigan focused on why certain environmental condition was defined as a problem while others were not, but he ignored social construction of the privilege. Compared with him, McCright and Rily Dunlap have studied non-problematicity of environmental problems, which is related to diversion. One example is the study to Hurricane Katrina. According to Freudenburg’s study, “the losses were not due to ‘nature’.....they had a range of causes, including oil and gas exploration activities in the marshes themselves, and the building of dams and levees upstream, and to the southeast of New Orleans, the key factor was a single navigation canal know as the Mississippi River Gulf Outlet.”^[3] The construction of the canal devastated the wetlands here, which was so “important shock absorbers for hurricane storm surges”. But the local elites described the building of the canal as to increase trade and export and be beneficial to the citizens. The reality was that it was only for the elites’ interest consideration, and the whole society has borne the cost.

Davidson has researched a series of articles of Freudenburg and his colleagues, then he concluded four main particular ways of diverting public attention: magicianship, de-legitimization of critics, construction of non-problematicity and scientific certainty argumentation methods.^[4] Magicianship refers to that “certain professions and industry proponents have developed an expertise akin to that of magicians, in that they have the ability to hide key information while operating in plain view of the audience, through skilled forms of distraction or mis-direction, by drawing attention elsewhere.” De-legitimizing is a form of question reframing. As the author (Freudenburg and Alario) stated, “attacks on the legitimacy of others might be especially effective in diverting attention away from questions about one’s own legitimacy.” Non-problematicity refers to that “certain seemingly quite problematic conditions come to be defined as non-problematic.” Scientific certainty argumentation methods is that “the outcomes of scientific/technological controversies may depend less on which side enjoys the benefit of the doubt”. Davidson has integrated the framework of double diversion as Fig. 1.

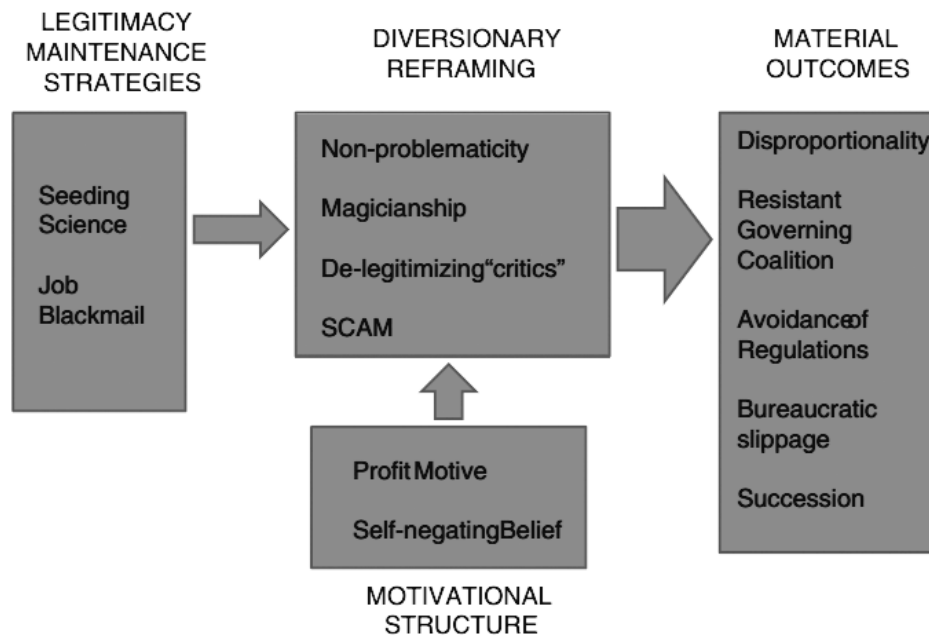


Fig. 1. A Conceptual Map of The Double Diversion

3. Discussion about Double-diversion in the context of China

3.1 Extension of disproportionality

As to the environmental pollution released by companies, this paper extends disproportionality to another side, that is social cost of pollution. Carp once has made a long list of social cost of pollution, including physical and mental damage of the workers, unemployment, scrapping of resource and energy, unrecoverable damage to animal and fish resources, etc.. Zhang Shiqiu has calculated economic cost of pollution from environmental pollution losses and ecological degradation, and the statistics showed that environmental pollution has brought great cost into Chinese economic development. The cost of course including direct economic lost in terms of the machinery equipment, pollution-control measures, pollution-preventing measures, etc., and indirect cost included either, for instance unemployment. Companies will start a project with requisition of land, where is the villagers be born and be brought up, employment and life security become an important problem to land-lost farmers. Although some farmers become workers of the company, but some kinds of enterprises are high-polluting, so the workers' occupational health becomes another important issue.

3.2 Regulation VS Pollution diversion

Argument for the inevitability of environmental pollution has been mentioned in many ways, and Freudenburg has concluded six hypotheses to divert public attention. The first three ones addressed the importance of pollution, thinking that high-pollution enterprises played an important role in economic development regardless of its size. The other three ones argued that supervision to the enterprises would lead to economy recession or pollution transfer to countries with slack supervision. These six hypotheses have been proved by empirical researches that pollution was not necessary to

economic development.

But for the discussion of environmental regulation and pollution diversion, we should recognize that transferring of pollution-intensive industries from developed countries to developing countries still exists, and the developing countries have environmental consequences while the western countries have economic profits from them. What is optimistic is that we are more aware of that at the moment, and much more transparency is disclosing what different countries or what companies in different countries are doing.

3.3 Particular measures of diversion from behavior perspective in China

If you look at China, what is very different is that in China there is very particular relationship between local environmental authority and national environmental authority. China's administrative system is a concentration of "centralization" and "decentralization". On one hand, China is relatively political concentrated. Since the Qin's war of unification, system of prefecture and counties has replaced system of enfeoffment, and centralized bureaucratic system preliminarily established and came to its flourishing period in the Ming and Qing Dynasty. One of the features of centralized authority is that the right of personnel administration is also highly centralized, and local officials are appointed directly by the centre. So relation operation is especially prominent. On the other hand, fiscal decentralization is another feature of China, which made local government have the ability to control some of the management authority. Especially after implementing of fiscal system with separate categories of taxes, designed scope of revenues and expenditures and responsibility contracts at various levels, local governments made their own arrangements of expenditure according to their own financial situation, and profits of local enterprises are directly handed over to the local finance, which made the government become more concerned about economic benefits. In short term the index of GDP is the most prominent one to quantify the officials achievement, and economic performance turns into the main indicator of cadre promotion, therefore environmental problems and environmental benefits are ignored, or even been trade for economic growth.

4. Relations Operation

Marx once has said that, "Society does not consist of individuals, but expresses the sum of interrelations, the relations within which these individuals stand." In the process of market economy activities, social capital is very important to the enterprise in addition to the necessary human capital and material capital. Bourdieu was the first to mention social capital. He thought that today's society was a highly differentiated one, massive and independent small fields with their own operational logic have formed the whole society, and capital was the dominant power of field operation. social capital is the expected collective or economic benefits derived from the preferential treatment and cooperation between individuals and groups.^[5] On the micro level, social capital existed in interpersonal relationship. As to the enterprise, if the relation network was operated properly, not only could the enterprise save labor cost and monitoring cost, but also could it translate the relation capital to marketing performance, thus earning fat profits.

There are three measures that the enterprise operate its relations. Firstly, dinners and gifts. Dinners is one of the most common method when asking for what one want. What to eat is not important, it is more like a kind of investment and trading method, aiming to solving what can't be achieved with informal rules. Gifting is another unwritten relation operation method in modern society. Giving the gift makes the givers occupy a subtle advantage and look forward to be thanked; being given the gift makes the recipients feel owed to the giver and intend to return. So the unity of the giver and recipients has been achieved, gifting and returning will be done in a loop for a long time. Secondly, strategic bank-enterprise alliance. Molotch said that, local industrial and commercial elites, including enterprise, bank, real estate developers, etc., formed the "regional growth coalition", and reached a consensus on that "economic growth can be reached at the cost of environment". Then they lobbied the government by means of indirectly participating in policy-making, or even directly allying with the government. Once the government has been persuaded by the temptation of economic growth, regional growth coalition would make every effort to divert public attention to "pollution is inevitably the price of economic development". The most common one of the regional growth coalition is bank-enterprise alliance. Based on resource sharing, risk sharing and complement each other's advantages, the bank and the enterprise form long-term stable alliance in the form of equity participation or nexus of contracts. As a result, the bank and the enterprise developed a kind of lateral credit relations, which was critical credit capital for enterprise's further development. This not only ensured a smooth financing channel and provided support for production expansion, but also ensured the stable bank credit service and maximumly reduced information flow. Thirdly, sponsoring to the society. Wang Wei's research revealed that if the enterprise want to survive with a long-term stability, it must pay attention to form good relations with neighboring residents. For the residents, especially for those who still have subsistence problems, what they care about is not the development of local economy or the government's record, may be just is the land harvest, living standards. So sometimes as long as the environmental problems not significantly affected their production and life, or what they get from the enterprise is greater than the cost to protest the pollution, they would ignore or acquiesce what has happened. And providing living allowance, improving public facilities, donating to schools and supporting the poor are the enterprise's main method to operate relations with residents.

5. Discursive construction

The discussion on discourse can be traced back to western philosophy. Heraclitus said, "Wisdom is to speak the truth and act in keeping with its nature", and this is the first time that cognition and action being integrated in one framework by means of language. Later researched by Parmenides, Plato, Hegel and Heidegger, new reflexive perspectives have been developed. From the perspective of a more intuitive research background, the study of discourse can be traced back to structural linguistics in 20th century, which is represented by Saussure and Levi Strauss. They advocated to study the whole language system, namely the relationship between language phenomenon and movement rules. ^[6] On the basis of critical thinking and grasping of the achievements of predecessors and contemporaries researcher, the French sociologist Foucault

connected discourse with power, interpreting microscopic operation of power by means of discourse. He thought discourse is not something “has-been-in”, but a kind of something to know the world and produce meaning, and to form a kind of hidden power in interpersonal network. In environmental communication, different environmental discourse means different environmental views, and the powerful one can guide the trend and construct the reality. In this kind of “discourse competition”, the media is the main position. Through the process of coding, decoding, reproduction and encapsulation, the media has promoted de-contextualization of social events, or pulled the event away from its background and created news by re-contextualization. Through this kind of discourse transformation, the mass media successfully diverted the audience’s attention to what they want to be focused on.

There are two measures to divert the audience’s attention. Firstly, following the trend. Guerrilla tactics, the most popular way, namely that the environmental column setting is mobile, if there are hot topics, such as Yangtze River flooding disaster in 1998, Wenchuan earthquake in 2008, etc., the environmental news increased significantly. But if there are no hot topics, the amount of news decreased sharply. So like birds migration, environmental communication is characterized of short-term, seasonal and occasional. Secondly, transferring of narrative theme. When there is a black dot on the white paper, you can say that the dot is black, you can also say that the rest of the paper is still white, it depends on your narrative tactics. Likewise, in environmental reporting, government, enterprise, citizens are all involved in environmental issues, but their roles and function can be absolutely distinguish when using different narrative strategies. Government can be praised for strengthening environmental supervision instead of criticized of inadequate governance; enterprise can be praised for economic and social contributions instead of making environmental pollution; citizens can be described as environmental protectors in daily life instead of lacking environmental rights. Professor Huang He once has used content analysis method to analyze People’s Daily from Jan. 1st 2003 to Dec. 31st 2012, China Environment News and Southern Weekly(green version) from Jan 1st 2012 to Dec. 31st 2012. He found that routine issues, such as pollution preventing and ecological protection, has accounted for 95 percent of the whole environmental issues. Moreover, 77% of the reports had a positive view to the government and only 6% of that held a negative attitude; 47% of China’s Daily reports mentioned increasing environmental concerns of the citizens, while less than 20% of that referred to strengthening environmental rights of the citizens. [7]

Devra Davis once has said that, in many areas of public life we should admit that we can’t wait for the collapse of buildings or bridges before reinforcement and examination of safety, we can’t wait for the ship sank before putting on the survival suit. In the face of environmental changes, sociologists should not just focus on the average or overall environmental problems, but have to pay attention to the privileged mode of social construction.

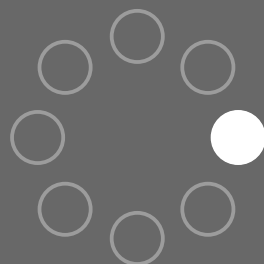
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REGULAR SESSION 8

ENVIRONMENTAL PERCEPTION



ISESEA-5

Social perceptions on the risks and benefits of tidal flat restorations

Weakness identified in the past research literature

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Abstract

This presentation analyses what kinds of discourses have been identified regarding perceptions of tidal flat restoration projects in past studies in different parts of the world, what kinds of conclusions have been drawn so far, and what kinds of contributions environmental sociological approaches could make in future studies in this field.

Various tidal flat restoration projects have been conducted in recent years in an attempt to revitalize fish stocks, prepare for sea level rise or for mitigation purposes. Coastal wetland restoration projects, such as coastal realignment or re-flooding farmland, still represent a new concept. Due to the need for long-term social support and investment in such schemes, as well as avoiding potential conflict, it is becoming increasingly important to take into account the various perceptions that exist in the community. When looking at the existing study results, although they clearly list what kinds of opinions have been expressed by citizens, they lack investigation into aspects of environmental justice, and risk communication. Citizens are sometimes branded as self-interested, hoping to receive short-term and tangible benefits but not caring for tidal flat environments or future generations.

This short paper explores the patterns of social perceptions of the risks and benefits of tidal flat restoration projects in the existing research findings and discusses the potential contributions environmental sociological approaches could provide in making future analyses of perception studies more meaningful. This paper is part of a Japanese government-funded (grant-in-aid) research project looking at how the 'risks' and 'benefits' of tidal flat restoration projects are communicated and perceived by different stakeholders in case studies from Japan, the UK, the Netherlands and Malaysia (2015-2018).

Key words

Social perception; tidal flat restoration; coastal realignment; risks; benefits

1. Introduction

This short paper looks into what kinds of discourse have been identified regarding perceptions of tidal flat restoration projects in the past studies in different parts of the world, what kinds of conclusions have been drawn so far, and what kinds of contributions environmental sociological approaches could make in future studies in this area.

Tidal flat is a shallow, often muddy, part of seashore, which is covered and uncovered by the rise and fall of the tide. It supports not only an immense variety of wildlife, but also has an economic value, including providing a source of food, water purification, erosion control, and reducing damage from tsunamis. Among conservationists, tidal flats are regarded as one of the most important areas to conserve for the health of the wider coastal and oceanic environments. International convention documents, such as those produced by Ramsar, emphasize this (e.g. Ramsar Convention Secretariat 2008). It might not look particularly attractive, but due to the various important functions, they are also called as “rain forests of the water”, “womb of the sea” and “kidney of the earth”. Yet, the importance of it has not been recognized widely by public and decision makers, and it is said that 50% or more tidal flat have been lost for developments and land use changes all over the world.

In recent years, however, various tidal flat restoration projects have been conducted in the world in an attempt to prepare for sea level rise or revitalize fish stocks. A wetland scientist, Mitsch (2010) notes that ecological restoration is becoming common practice to improve ecological quality of many degraded ecosystems. Coastal wetland restoration projects, such as coastal realignments or re-flooding farmlands still represent a new concept. However, it is believed to become one of the important environmental conservation activities in the future. Due to the need for long-term social support and investment in such schemes, as well as avoiding potential conflict, it is becoming increasingly important to take into account the various perceptions that exist in the community.

2. Methods of literature review study

To search the existing literature in this field, I have I have searched the articles in the data bases in: Web of Science; EBSCO; SöderScholar; CiNii (Japanese academic article database); and National Diet Library of Japan. The search key words included: tidal flat; restoration; coastal realignment; social perception; risk; and benefit. My aim was to look for peer-reviewed journal articles in this field, so that hopefully the peer review system helps to make sure the reviewed research activities being conducted with a certain standard. The combinations of the keywords in the Table 1 were used to search in for each database (12 searches in each database) to ensure the thoroughness of the search.

Table 1. Combination of keywords used for searching literature on academic journal article databases (combination of the terms on the first column and the first row)

| Keywords search | Social perception | Risk | Benefit |
|------------------------|-------------------|------|---------|
| Tidal flat | ① | ② | ③ |
| Restoration | ④ | ⑤ | ⑥ |
| Coastal realignment * | ⑦ | ⑧ | ⑨ |
| Tidal flat restoration | ⑩ | ⑪ | ⑫ |

(*coastal realignment: The term used to describe coastal restoration activities. This term is often used in the UK. Another term used in Europe for coastal realignment is de-polderisation, but the term coastal realignment covers de-polderisation articles)

The total of 110 journal articles which links to social perception of tidal flat restorations directly or indirectly. Among 110, only 9 articles were directly about social perception studies on tidal flat restoration projects, and I have looked into those articles closely for this review.

3. Patterns of the existing perception studies on tidal flat restoration projects

This section looks at the findings from the review of 9 main articles (see Table 1 in Appendix section for the summary of each article). All studies but 1 employed questionnaire methods. One study employed questionnaires together with 5 minute interview with participants (Curado et al. 2014). One study used in-depth interview methods with 15 respondents (Roca and Villares 2012).

3.1. Importance of the perception studies mentioned in the literature

Aims of the restoration projects varies, for example, climate change mitigations, creating bird breeding areas, and increase of biodiversity. However all the reviewed studies mentioned how important for the researchers and project contractors to look into social perceptions of tidal flat restoration projects for future restoration work.

Curado et al. (2014) notes that “only a few restoration projects incorporate public perception in their monitoring” (p.668). England et al. (2008) agree that once a restoration project has been carried out, good monitoring is essential to improving the restoration methodology for future applications; however, monitoring of public perceptions has been conducted very little. Many of the existing studies are confident that by studying public perceptions, engineers, planners and policy-makers will have a better understanding of the public’s reactions, concerns and issues of tidal flat restoration projects.

3.2. Public perceptions of tidal flat restoration projects and “deficit model”

Most of the studies noted that citizens recognized the benefits of coastal marshes and tidal flats. Yet they identified various reasons why citizens are not 100% happy about their tidal flat restoration projects. Myatt et al. (2003a, 2003b, 2003c) noted the trust issue between citizens and a government agency. They used a postal questionnaire composed of attitudinal statements to canvas opinion regarding managed realignment at Brancaster on the North Norfolk coast. Generally the respondents with the lowest regard for the government agency charged with implementing the scheme were less

accepting of the proposal. There were many other conflicting views and attitudes noted towards a variety of issues including sustainability, hard and soft defenses, costs and benefits and the wider environmental gains.

Goeldner-Gianella (2007) concludes that the constraints and obstacles associated with de-polderisation included: insufficient financial compensation for the landowners; overly strict environmental legislation; the loss of valuable land; and a lack of public support coupled with an absence of public consultation. Social perception is therefore only "one of the conditions for the acceptance and success of any de-polderisation process" (p.1220).

One of the strong commonalities across these perceptions studies' conclusions is that citizens' lack of knowledge of the importance of tidal flat environment. Curado et al. (2014) mentions that "citizens reorganized the benefits of coastal marshes [tidal flats], a perception which increased with increasing educational level" (p.674). Goeldner-Gianella (2007) uses the very direct term "the public' scant knowledge" and says the knowledge of the environment and physical context must be improved if citizens are to better understand and accept any future de-polderisation project (p.1228).

Myatt et al (2002, 2003a, 2003b, 2003c) agrees the lack of public understanding on tidal flat environment and projects, and suggests education and communication as key revision areas for project implementers. They suggest that "regular newsletters or mail-drops (with diagrams) would be welcomed, thus reaching and informing wider audience and those who are more reliant on this type of media as their only source of information." (Myatt et al. 2003a, p.285). Esteves (2014) recommends improving education efforts to reduce negativity associated with 'give in to the sea' perception.

All of above research findings unfortunately encourage one way communication: from those who know to those who do not. It is a deficit-model which claims that citizens would understand the importance of restorations if they understood the information or knowledge "correctly". In this situation, citizen consultation opportunities are also regarded as one way communication opportunity, rather than two ways. Roca and Villares (2012) claim that "more educational intervention and the provision of opportunities for participation are necessary to overcome the general lack of trust in institutions and fears regarding innovative coastal intervention methods" (p.46). Myatt et al. note that "In general, respondents agreed that the consultation process was a good opportunity for residents to express their interest and allay their fears to the 'expert'" (2003b, p.580), yet do not emphasize the importance for institutions or implementers to obtain knowledge from citizens who are 'expert' in their own right on their environment and their perceptions of benefits and risk of a particular project.

4. Discussions

Looking at the existing study results and recommendation, although they list what kinds of opinions there were in a community towards tidal flat restoration projects, they lack the investigations on why citizens expressed particular perceptions and oppositions. The fact that most of the studies (7 out of 9) employ solely questionnaire methods might have also contributed to those findings not touching formations of citizens various opinions. Only 1 study employed in-depth interview method, which started to reveal some of the elements of citizens' reasoning.

Personally, perception studies need interpretivism approach, rather than positivism approach: understanding of human behavior, rather than explanation of human behavior. Interpretivism concerns “with the empathic understanding of human action rather than with the forces that area deemed to act on it” (Bryman 2008, p.16). For example, my pilot study looked at citizens’ perceptions towards tidal flat restorations in the UK revealed the existence of discourse of “environmentalists”. Many citizens interviewed clearly differentiate themselves from “environmentalists” who are promoting the tidal flat restoration scheme. They said they understood environmentalists’ claims and the logics (e.g. we have to protect environment for future generation), but they felt they knew their environment best, and conservation of environment can be achieved without the restoration project. Of course this claim’s validity depends on how they define nature and environment, and how much they feel confident in their knowledge and reasoning.

When it comes to local people knowing more about tidal flats than so called “experts”, fishermen come to mind especially in South East Asian researchers. Fishermen who accumulate very direct experience with tidal flats in them often become advocates for restoring tidal flats and tell their own stories, and some restoration cases in Japan or Malaysia for example depend on their input and local knowledge. Unfortunately at the European restoration project sites those inshore fishermen seem to have been long gone, and that might have contributed for the reviewed studies to stand by the ‘deficit’ model to persuade people to understand their specialized environmentalists’ logic.

Environmental sociology has been making contributions to analyze environmental issues especially on the basis of “fairness” and possible “equal distributions” of resources. Tidal flat restoration projects provide numerous questions of judgments and distributions of benefits and risks which have various geographical (site-local-regional-national-global) and time dimensions (past-present-future).

Communication of risks also needs to be looked into further: how people are responding and weighing up different kinds of risks, such as dread/un-dread risks, acute/slow risks. Only one reviewed study mentioned about uncertainty of these benefit/risk argument put together when trying to increase supports for their tidal flat restoration project: “...although it might be true that wetland restoration could contribute to mitigate some storm damage, it is likely not enough. Therefore misperceptions on wetland restoration benefits against storm damages can potentially give a false sense of security to Louisiana residents, thus increasing the potential risk” (Kim and Petrolia 2013, p.1053).

Future social perception studies in this area need to kick out researchers’ perception on citizens being self-interested, hoping to receive short-term and tangible benefits, and not caring for tidal flats, and develop methods to investigate deeper reasoning of their judgments and experiences which back their claims.

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Appendix - Table 2: Summary of the existing studies on social perceptions of tidal flat restorations

| | Reference | Place | Research method | Main results | Key discussion |
|---|------------------------------|--|--|---|---|
| 1 | Curado et al. (2014) | City of Huelva, Spain, 8.37 ha restored salt marshes by re-flooding the area | 2 page questionnaires with 10 questions, plus 5 minutes interviews; 383 completed questionnaires from the residents of Huelva (non-probability sampling: quota sampling and systematic sampling) | 75% of the respondents considered salt marshes as a beneficial ecosystem; 82% reported that salt marshes were a habitat for mosquitoes; 23% thought that marshes were source of disease; Most of the citizens interviewed thought salt marshes offers beautiful landscape (80%); Visits to the area was increased by 27% after the restoration; | “Most of Huelva’s citizens recognized the benefits of coastal marshes, a perception which increased with increasing educational level”; “in view of our results, environmental education campaigns should be carried out in Huelva to increase its citizens’ knowledge of the values and services provided by salt marshes, a threatened ecosystem that virtually surrounds the city”; “...our study shows that restoration of salt marshes in combination with the construction of a walkway increases the visitor rate to the restored area”; “our findings about salt marsh public uses help to focus the design of future restoration projects to responses to people’s preferences and to adapt the ecological restoration to them”. |
| 2 | Esteves and Thomas (2014) | Across all UK regions | BUS (Bournemouth University Survey)(n=139) and EAS (Environment Agency Survey)(n=16) were conducted | Opinions toward de-polderisation varied considerably from one assessment to another, ranging from overt opposition to strong approval. Opposition to de-polderisation increased with age and was more pronounced | In the UK only 38% of all respondents (n=122) agreed that that managed realignment represented a promising strategy. However, 31% of all stakeholders (n=13) responded that it was too early to judge as to whether a project was performing well against objectives with 23% indicating that projects were not performing well or performing well in some aspects but not in others, suggesting that more time is needed to understand the direction in which perceptions will shift (Esteves 2014). |
| 3 | Goeldner-Gianella, L. (2007) | Comparison of five opinion surveys in France and the UK | Descriptive statistical techniques such as frequency counts and cross-tabulations | French survey shows that “the population’s interest in the biological component of marshes is poor...British researchers insist that this is because of a knowledge deficit...This initial analysis leads us to question why people are so little “marsh conscious.” (p.1225) | “A statistical analysis showed that those most hostile to the de-polderisation process were generally older and possessed little knowledge of the marsh and polder environments...The public’ scant knowledge of the environment and physical context, which must be improved if it is to better understand and accept any future de-polderisation project. The importance of landscape to today’s society, which should lead planners during the decision-making process to be very conscious of visual aspects” (p.1228) |

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|---|-------------------------|---|---|--|---|
| 4 | Kim and Petrolia (2013) | Louisiana, USA | Random sample of 3,000 Louisiana households, with 681 responses (May 2009) | 89.3% of the respondents were aware of the wetland loss problem in the area, yet 78% were aware of ongoing restoration efforts. | <p>“...this research found that public perceptions of wetland restoration benefits such as hurricane protection and environmental protection play a major role in explaining support for restoration.” (p.1053)</p> <p>“...although it might be true that wetland restoration could contribute to mitigate some storm damage, it is likely not enough. Therefore misperceptions on wetland restoration benefits against storm damages can potentially give a false sense of security to Louisiana residents, thus increasing the potential risk...policy makers, project managers, and/or educators must work not only to ascertain the right risk information, but also to convey the risks effectively both to motivate widespread support for restoration and to minimize potential damages.” (p.1053)</p> |
| 5 | Myatt et al. (2003a) | Blanchester, Norfolk, UK; 38 ha of freshwater grazing marsh being re-flooded by breaching existing defenses | 8 page self-administrated 'Coast & You' survey with largely of tick boxes and attitude rating scales (standardized questionnaires across 3 case study sites). Questionnaires sent to 342 households as pre-determined by the sample size (randomized sampling), 105 responses received. | <p>Personal experience of flooding did not have any significant influence on the response towards questions on coastal flooding; “...scheme awareness does not necessarily equip respondents with sufficient knowledge to make informed opinions” (p.261); Respondents who distrust the project implementer (Environment Agency) would prefer earlier consultation; Trust to the implementer increased away from the site;</p> | <p>“It may be necessary to reassess the mechanisms of disseminating information for some schemes. The Brancaster results have suggested that regular newsletters or mail-drops (with diagrams) would be welcomed, thus reaching and informing wider audience and those who are more reliant on this type of media as their only source of information.” (p.285)</p> <p>“...the conflicting views and attitudes towards issues such as sustainability, hard and soft defences, economics, the environment and consultation. The lack of public understanding on these issues has been identified as a key revision area for the Environment Agency [the implementer].” (p.285)</p> |
| 6 | Myatt et al. (2003b) | Freiston Shore, Lincolnshire, UK; | 8 page self-administrated 'Coast & You' survey with largely of tick | <p>“Freiston respondents were considerably less aware of the managed realignment scheme when compared to respondents at</p> | <p>“In general, respondents agreed that the consultation process was a good opportunity for residents to express their interest and allay hear fears to the 'expert'...They also acknowledged that scientists need to improve</p> |

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|---|--------------------------|--|---|---|--|
| | | 70ha of saltmarsh including mudflats and a lagoon created by breaching of old sea wall | boxes and attitude rating scales. They were sent to 262 households (in 2002), and 88 responses received. | Brancaster... the scheme at Greiston does not appear to be as controversial as that at Brancaster... Both Freiston and Brancaster respondents who live closest to the scheme have the highest awareness. Consequently, respondents are more likely to take an interest in a scheme if they believe it will impact on them in some way, and are equally more inclined to read leaflets or attend public meetings." (p.578) | communication with media and business, as well as translate the uncertainty of climate change into more realistic time frames, given that the views of many individuals and businesses are from a short-term perspective" (p.580) |
| 7 | Myatt et al. (2003c) | Orplands, Essex, UK; 38ha of agricultura l land to become saltmarsh with artificial creek networks and wave breaks | 8 page self-administrated 'Coast & You' survey with largely of tick boxes and attitude rating scales. (standardized questionnaires across 3 case study sites). They were sent to 244 households (in 2002), and 97 responses received. | "As a mature site, Orplands has a more natural appearance with the establishment of some vegetation and lack of heavy machinery... Ten years have passed since the inception of the Orplands scheme, and there is a possibility that residents who would have been aware of this may have moved house. The Orplands scheme was not as controversial as the Brancaster West Marsh project, thus adopting a much lower media profile. | "Residents at Orplands were not overly anxious about the likelihood of future flooding in their area; however it was difficult to make a definite association between increased risk perception and personal experience with flood events, given the few residents who had experienced inundation... Criteria should be developed so that the Environment Agency can assess the basic consultation or participation needs of a local community." (p.180) |
| 8 | Myatt-Beil et al. (2002) | Brancheter, Norfolk, UK; 38 ha of freshwater grazing marsh being | Exploratory pilot study conducted at a public exhibition and meeting in the community, 42 questionnaires collected | The majority of respondents (59%) considered the 'effectiveness of managed realignment as a flood defence' to be a very important issue. Brancheter respondents include impacts on access (40.5%), conservation (40.5%) and personal property (38.1%) as 'very | "The results demonstrated that many variables influence public perceptions of managed realignment, including personal experience, lack of information and media influence." (p.45) " ..this pilot study has demonstrated that there are many variables influencing the public perception of managed realignment. As there is no apparent formula to calculate which variables come into play, it would be reasonable to |

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|---|--------------------------|---|--|---|---|--|
| 9 | Roca and Villares (2012) | re-flooded by breaching existing defenses | 15 in-depth Interviews which lasted 45-90 minutes were conducted. Transcribed data was interpreted using content analysis. | <p>important' issues. "therefore, it may be reasonable to assume that these issues have the potential to influence respondents' perceived effectiveness and acceptance of the scheme.</p> <p>A widespread perception that a hard engineering approach would be much more effective to coastal protection than a managed realignment approach.</p> <p>"The low level of awareness of the managed realignment approach is an aspect that needs to be addressed from the outset of the planning phase through the use of communication, and education strategies." (p.45)</p> <p>Place attachment and mistrust of public authorities: Land owners and rice sector representatives were the most resistant to change.</p> | <p>conclude that studying the perception of managed realignment schemes should be investigated on a case-by-case basis." (p.56)</p> | <p>"...the dominant perception emerging...is that the restoration of dunes and wetlands is not as efficient for coastal protection as hard-engineering measures" (p.46)</p> <p>"...mistrust of public authorities and a feeling of abandonment arising from past episodes generate suspicion regarding proposals coming from public bodies" (p.46)</p> <p>"More educational intervention and the provision of opportunities for participation are necessary to overcome the general lack of trust in institutions and ears regarding innovative coastal intervention methods" (p.46)</p> |
|---|--------------------------|---|--|---|---|--|

Trial of a short environmental education programme at an area devastated by the tsunami disaster in Minamisanriku, Miyagi, Japan

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Introduction

The Tohoku region in northern Japan suffered a massive earthquake and tsunami on 11 March 2011; approximately 15,000 lives were lost in the disaster. Since '3.11', various environmental education activities to address the earthquake and tsunami have been intensively conducted in the Tohoku region. Taisho University in Tokyo, Japan, has conducted various activities in the area for its students in response to the disaster, some of which have involved visits and volunteer activities.

The university's field programme, conducted at Minamisanriku in Miyagi Prefecture, one of the most heavily devastated areas, usually comprises several parts, such as field visits to and observations in the devastated area, interviews with local people, volunteer and assistant activities for recovery, and discussion and reporting on lessons learnt in and around the area.

Objective

This paper aims to introduce a prototype environmental education programme for university students in an area devastated by a tsunami disaster in Japan. Towards this aim, this paper attempts to analyse the meanings and effects of the fieldwork in the devastated area and clarify some key elements of a prototype model for an environmental education programme in the area.

Methods

In order to develop a suitable environmental education programme in the devastated area, university students conducted action-orientated research and quantitative/qualitative data collection were conducted along with a field trip on 18–20 February 2014 at Minamisanriku. See Tables 1 and 2 for the fieldwork schedule and programme content.

This field trip programme focused on identifying the effects and influence of the earthquake and tsunami. The programme included a field visit to the devastated area, interviews with several local

people, brief supporting works and activities to help with disaster relief, and discussion and reporting of lessons learnt during the field trip.

Participants in this fieldwork were requested to submit a short programme review and complete a questionnaire following the programme's completion. A total of 29 participants were involved; each of these submitted a questionnaire, and 27 participants submitted short programme review papers 2-3 weeks following completion of the programme.

Based on these data, quantitative and qualitative analyses were conducted. In particular, textual analysis was completed using the revised-original SCAT method ^{[1][2]} and by utilizing NVivo software ^[3].

Table 1. Time schedule of the fieldwork on 18–20 February 2014

| Date | Start | End | Place | Topic Number | Topic |
|--------|-------|-------|-----------------------|--------------|--|
| 18-Feb | 8:00 | 15:00 | Bus | | From Taisho Univ. to accomodation |
| | 15:00 | 17:00 | Training Room | 1 | DVD viewing, interview, and field visit |
| | 18:00 | 19:00 | Dining | | Dinner |
| | 20:00 | 20:30 | Training Room | 2 | Workshop about next day's activities |
| | 20:30 | - | Accomodation | | Free time |
| 19-Feb | 8:00 | 9:00 | Dining | | Breakfast |
| | 9:00 | 11:00 | Training Room | 3 | Lecture about afternoon activities |
| | 11:00 | 12:00 | Dining | | Lunch |
| | 12:00 | 13:00 | Go to Areshima island | 4 | Field work at Areshima island |
| | 13:00 | 16:00 | Town | 5 | Field work at Shizugawa town |
| | 18:00 | 19:00 | Dining | | Dinner |
| 20-Feb | 19:00 | 22:00 | Training Room | 6 | Workshop to prepare presentations at wrap-up session |
| | 8:00 | 9:00 | Dining | | Breakfast |
| | 9:00 | 11:00 | Training Room | 7 | Wrap-up session: Presentations about field work at Shizugawa |
| | 11:00 | 12:00 | Walking programme | 8 | Call at Iriya community and YES atelier |
| | 12:00 | 13:00 | San-san Market | 9 | Lunch at Sun-sun Market |
| | 13:30 | - | Bus | | From accomodation to Taisho Univ. |

Table 2. Detailed content of several parts of the programme

| Programme | Title and Content |
|-----------|---|
| | DVD viewing, interview, and field visit |
| 1 | Since it is very difficult to understand the reality of 3.11 because several years have already passed and rapid recovery work has been conducted since then, participants were requested to view a short DVD programme about the day of the disaster. Then, they resumed observing the current status of the town. After watching the video and conducting field observation, they interviewed local people on their experiences and feelings during and after the disaster. |
| | Fieldwork at Areshima island by all the participants. |
| 4 | Minamisanriku is surrounded by a natural environment. Areshima island is a local area of high biodiversity, covered by old-growth forest; therefore, students observed the island and were told about its ecosystem by local people. |
| | Field work in Shizugawa area by each group member |
| 5 | Based on programme part 1, each group develops plans for where they should visit. They walk around the devastated area with a map to find evidence of the disaster and current recovery situation, in a range of around 5 km ² . |

Result (1): Quantitative analysis of the questionnaire

The participants assigned the programme high scores; the average score for the level of satisfaction with the fieldwork programme was 88.3 out of 100 points (Figure 1). Most of the participants were interested in being included in future programmes at Minamisanriku (Figure 2). Therefore, this programme can be evaluated as an appropriate example for this analysis.

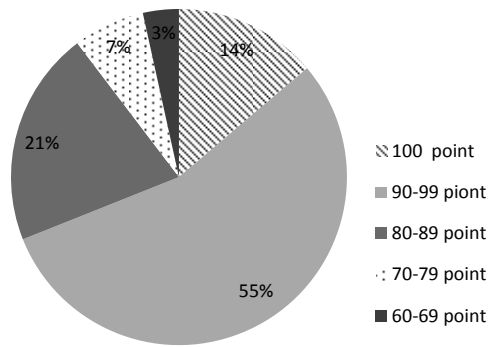


Figure 1: Ratings of programme by participants

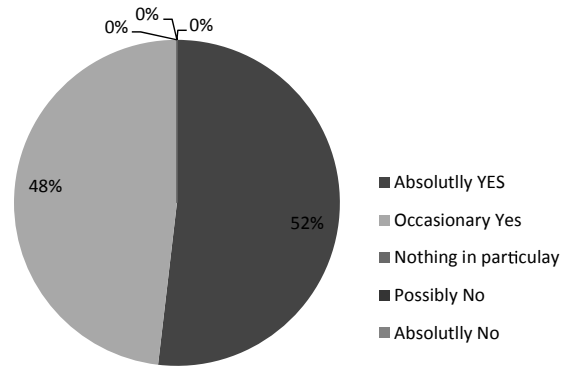


Figure 2: Expectation of participation in the programme

The participants selected a maximum of three parts among the nine included in the programme and evaluated them positively or negatively (Table 3). Parts 1, 4, and 5 showed significant differences using Fisher's exact test. Therefore, these programmes were evaluated as the most important parts according to the participants.

Table 3. Evaluation for each part of the programme

| Part | Positive | Negative | |
|------------------------------------|-----------|-----------|---|
| 1 | 10 | 4 | * |
| 2 | 2 | 4 | |
| 3 | 3 | 2 | |
| 4 | 18 | 5 | * |
| 5 | 24 | 2 | * |
| 6 | 6 | 10 | |
| 7 | 7 | 7 | |
| 8 | 7 | 3 | |
| 9 | 8 | 8 | |
| Total number of respondents | 29 | 29 | |

* significance level .05

Result (2): Qualitative analysis of the questionnaire

The data analysis included coding each comment that appeared in the questionnaire. As a result, in particular for parts 1, 4, and 5, three key elements of experiences and lessons learnt from the fieldtrip emerged. These three elements are 'learning in the midst of/about grief', 'learning about healing', and 'learning about recovery'. Those also represented the stages of learning in the field programme at the devastated area.

Programme part 1: Learning in the midst of/about grief

A total of 13 sentences (in Japanese) were included in the 'free comment' space in the questionnaire

regarding part 1 of the programme. Careful coding and highlighting of important sentences/word transformations were carried out for those 13 sentences. Two key concepts (depicted within square boxes in Figure 3) and five groups (enclosed in circles) were obtained through this analysis (Figure 3).

According to the key concepts and groups, there seems to be two streams of 'learning in the midst of/about grief'. One is positive attitude and readiness towards learning processes and the other is negative attitude and lack of readiness. These two attitudes are clearly in opposition to one another.

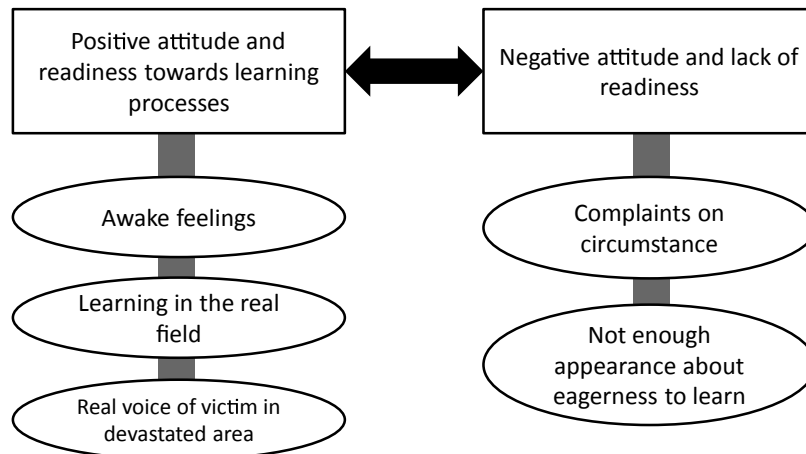


Figure 3. Structure of 'Learning in the midst of/about grief' stage

Programme part 4: Learning about healing

A total of 22 sentences (in Japanese) were included in the 'free comment' space in the questionnaire regarding part 4 of the programme. The same procedures as those outlined above for part 1 were conducted for those 22 sentences. Two key concepts and five groups were identified through this analysis (Figure 4).

According to the key concepts and groups, there seems to be two streams of 'learning for healing'. One is adjustment to the unique nature of the activities experienced, and the other is difficult feelings, such as maladjustment to the nature of the activities experienced. These two key concepts also represent a conflict in the participants' minds regarding how they evaluate the nature of the educational programme.

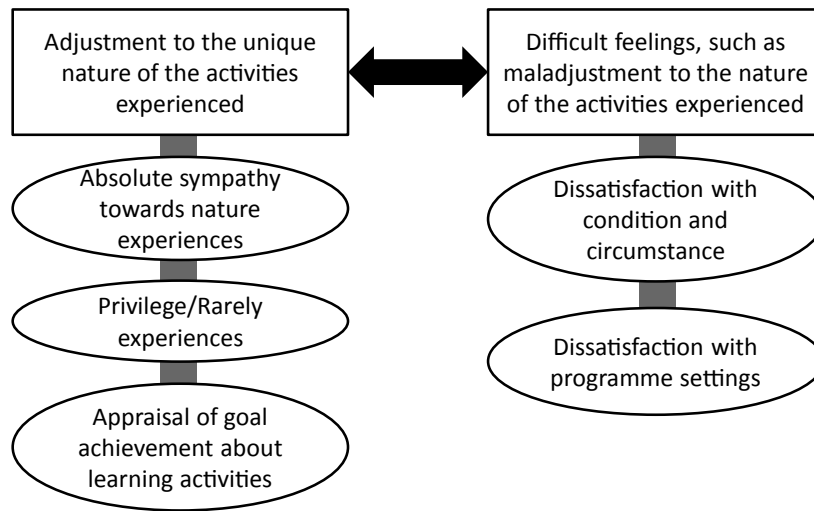


Figure 4. Structure of 'Learning about healing' stage

Programme part 5: Learning about recovery

A total of 25 sentences (in Japanese) were included in the 'free comment' space in the questionnaire regarding part 5 of the programme. The same procedures as those outlined above were conducted for those 25 sentences. Two key concepts and seven groups were identified through this process (Figure 5).

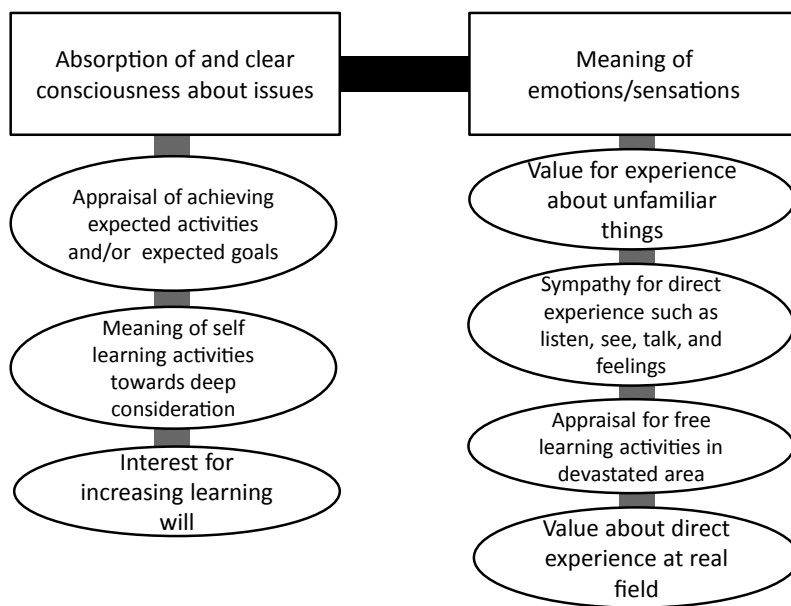


Figure 5. Structure of 'Learning about recovery' stage

According to the key concepts and groups, the participants assigned two different evaluations to this part. One was absorption of and clear consciousness about issues and the other was meaning of emotions/sensations. These two key concepts are not in opposition to each other, but do represent different evaluative points of view.

Short summary of result (2)

As a result of the analysis, participants of the programme highlighted three types of response. One was a sense of grief in response to the tsunami disaster, one was a sense of healing from local nature, and the other was a drive to overcome grief and an eagerness to recover from the situation.

Result (3): Qualitative analysis of the programme reviews

The textual analysis was conducted using QSR NVivo 10, based on the description provided in the programme reviews. All the submitted programme reviews were written in Japanese. Therefore, this analysis was implemented based on Japanese language. The Japanese characters that appeared frequently in the texts are shown in Figure 6. Then, the Japanese keywords were translated into English (Figure 6). The participants used several important keywords in their programme reviews, such as 'capability', 'consider', 'disaster', 'feel', 'fieldwork', 'interview', 'listen', 'observe', 'programme', 'sense', 'think', 'visit', 'volunteer', and so on. This meant that participants had similar impressions of the fieldwork programme, as reflected in the keywords.

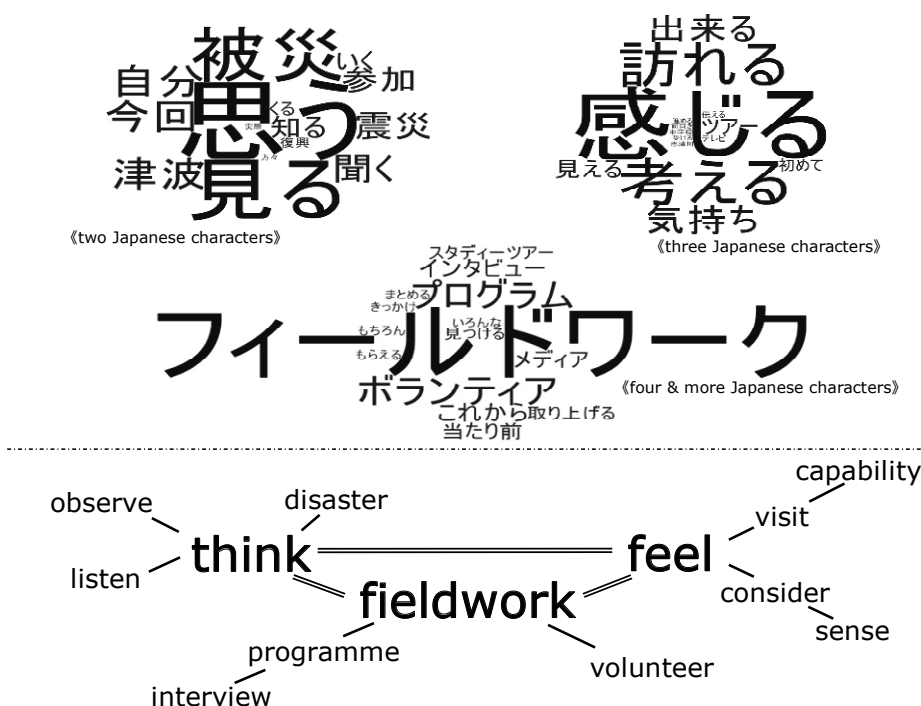


Figure 6. Main keywords appearing in programme reviews by participants Discussion

Environmental education programmes in areas devastated by tsunamis and other disasters should last several days in length, and should comprise several parts. These parts should include both field programmes and seminar-type activities. The participants in this prototype programme highlighted several important elements that need to be considered carefully and incorporated into the programme. These elements are 'learning in the midst of/about grief', 'learning about healing', and 'learning about recovery'.

The section pertaining to 'grief' began from touring the location of the tsunami disaster and then listening to people's experiences of 3.11 in order to grasp the reality of the disaster. Watching video records of the disaster and tsunami damage was also an important way to make participants understand the disaster. In particular, direct interviews with local people in which they spoke about their experiences and feelings during the disaster had a great impact on the participants. Field activities in the devastated areas provided vivid images to the participants and reminded them of their conversations with interviewees, and thoughts about the 'grief' arising from the devastation.

The 'healing' part, although not directly related to the tsunami disaster, addressed the local nature through short field observations. This part targeted learning about the local environment, while taking into account nature or a sense of wonder arising from nature. It is important to note that this part arose between the 'grief' and 'recovery' parts. This meant not only understanding the miserable reality pertaining to the tsunami-disaster area through the 'grief' part, but also feeling calm and learning about the abundant natural resources, which gave participants a mind-set through which they were eager to overcome the disaster.

The participants were all requested to prepare short presentations about what they learnt through the programme. Close to the presentation on the last day of programme, group work was conducted to complete reports. Therefore, during the 'recovery' part, intensive group discussion and collaborative reporting was conducted, and this strengthened the participants' experiences and improved their attitudes and drive to participate. In particular, discussion among group members emphasized each participant's thoughts and feelings about overcoming 'grief'. This was a continuation of the 'grief' part. The assignment reminded participants of the viewpoints and conversations that arose during the 'grief' stage, and kept them motivated to complete action-orientated considerations and activities.

The discussion described above highlights several important points of view that need to be considered when developing future fieldwork programmes in tsunami-devastated areas. According to those views, the programme framework is outlined as a learning process in the area in Figure 7.

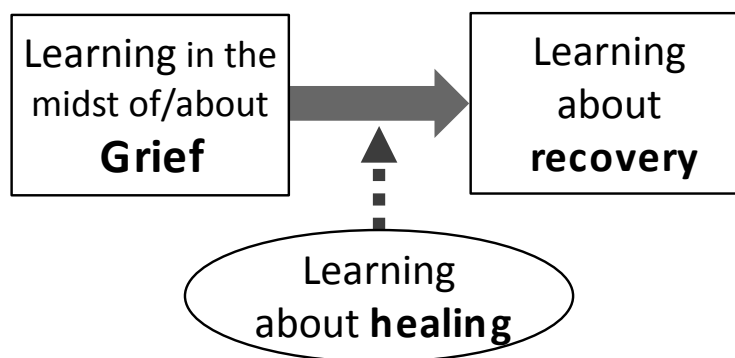


Figure 7. Key elements of environmental education programmes at devastated areas

Conclusion

The analysis of quantitative and qualitative data collected through a short trial programme for university students in a tsunami-devastated area showed that there is a need to bear in mind specific considerations when developing programmes in these areas. This paper provides important suggestions for field programmes as environmental education in such areas. Providing suitable experiences and opportunities for participants can reinforce these programmes as environmental education. These programmes will then achieve their core objectives, such as ensuring the participants' interest, knowledge, attitudes, and participation, as described in the Belgrade Charter in 1975^[4].

Environmental education programmes need to pay a great deal of attention to transforming the attitudes of participants. In order to meet this objective, programmes also need to ensure they make a great psychological impact on participants, so that they will be moved to start considering more, and willing to participate in, social development in and around devastated areas in future.

The trial programme and its evaluation in this case can be seen as a sort of model for a tsunami-devastated area. Nevertheless, it is impossible to completely replicate this type of programme continuously into the future. It may not be easy to follow the application of this programme to the affected area at the present time, because several years have already passed since 3.11 and rapid recovery works have been conducted around the area. Thus, elements of the programme need to be adapted continuously in future. Such challenges will be addressed in future research.

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Creating a Buddhist Recycling Actor-Network

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In November 2012, I visited the Taiwan Products Fair in Beijing. One exhibition booth, among over one hundred others in this fair, caught my attention immediately. This booth was so impressive to me because it displayed some simple, well-designed, and elegant apparel made from used PET bottles. These environmental friendly products were produced by DA.AI Technology, a nonprofit company based on the recycling program of a Buddhist community, Tzu Chi, which had about eighty thousand recycling volunteers in Taiwan then.



Figure 1. DA.AI Technology's products and Tzu Chi's recycling volunteers

Source: DA.AI Technology, 2012b: 8; 2012a: 5

This article investigates into the foregoing Buddhist recycling program. I first locate my study in the academic context of religious environmentalism. Then, adopting the methodological guidelines of actor-network-theory, I follow program builders at different levels of the community to depict the way Tzu Chi incorporates local and global environmental problems, Buddhist teachings, volunteers, street corners, domestic waste, recycling companies, textile technologies, the media, governmental policies,

and so on to form an ever-expanding recycling actor-network. In short, the purpose of this research is to reveal Tzu Chi's religious creativity and to make contributions to the literature of religious environmentalism and recycling practices.

Religious environmentalism

The importance of religion to environmental problems has interested scholars from many disciplines. This new field of research was emerging quickly because of a series of books from Harvard University Press, entitled *Religions of the World and Ecology*. As revealed in "Series Foreword," these books shared several assumptions: 1) People's worldviews influence their behavior; 2) religious traditions have been major factors that shape people's worldviews; and 3) due to current environmental crisis, scholars should reexamine the relations between religious traditions and ecological ideas so as to develop more sustainable religious worldviews. As a result, the studies of ecological worldviews in different religious canons have become the prevalent approach to the field of religion and ecology.

Many scholars have questioned the above worldview approach and offered alternatives. Roger Gottlieb is one of them. He shifts his attention away from an abstract idea of ecology for religious reform, and towards the role of religion in concrete action. His primary interest is the connection between religion and environmental activism. For him, religion is a rich resource to mobilize people for environmental protection action. People with sacred faith now play a crucial role in secular environmental movements. He labels these phenomena "religious environmentalism" and puts them in the center of the field of religion and ecology (Gottlieb, 2006a).

Religious environmentalism emphasizes the need to understand the experience of religious communities that participate in various kinds of environmental protection action. Hence, there is a natural affinity between Gottlieb's approach and environmental sociology. Inspired by Gottlieb, my study focuses on the environmental practice rather than worldview in Tzu Chi's recycling program.

Actor-network-theory as methodological guidelines

Tzu Chi's recycling program connects the sacred and the secular, and links the human and the non-human. This heterogeneity reminds me of Bruno Latour's actor-network-theory, which is summarized as the following methodological guidelines: 1) An actor-network is a term not to designate human communities, but to describe a trajectory of connections between humans and things. 2) Sociological researchers need to incorporate non-human actors into their studies. They should trace the constant movements or processes whereby new types of associations between human and non-human actors are generated. 3) Sociological researchers do their jobs by sketching how the actors themselves create and order their social worlds. And 4) The most important actor of an actor-network is its spokesperson who speaks on behalf of a long chain of other heterogeneous actors (Latour, 1987; 1996a; 1996b; 2005).

Following the above methodological guidelines, I divide Tzu Chi's recycling actor-network into three levels. The first one is a general level at which Dharma Master Cheng Yen, the leader of Tzu Chi, is its spokesperson. I studied this level of Tzu Chi's recycling program by analyzing Tzu Chi's journal, *Tzu Chi Monthly*, and Cheng Yen's books. The second level consists of over three hundred

recycling stations in Taiwan. Each station has some devoted recycling volunteers (or employees) who play the role of spokespersons. I selected Guandu Recycling Station in Taipei City as my research field and worked there for three weeks as a recycling volunteer and a participant observer in the summer of 2014 to collect relevant information. The third level of Tzu Chi's recycling actor-network is DA.AI Technology. Its staff is spokespersons and I investigated the company by interviewing its managers in the spring of 2013 and analyzing its journal, *Green Bodhi Quarterly*.

The initiator and chief builder of Tzu Chi's recycling program

Cheng Yen is the initiator of the recycling program. Interestingly, this program started not from a deliberate plan but from a casual suggestion. In the early morning of August 23, 1990, Cheng Yen went through a closed night market in Taizhong City and was shocked by the amount of trash people left on streets. In the evening of the same day, she was invited to give a speech. When the audience applauded her for her speech, she recalled the scene of the night market and said,

In many people's view, Taiwan is a treasure island. For me, Taiwan is a beautiful land with green mountains and clean water. If we all care for our homeland, it will become a better place. I expect that you can use your clapping hands to do something for Taiwan. I encourage you all to sort and recycle your domestic waste.

Cheng Yen, 2012, pp. 92-93.

One month after her speech, Cheng Yen went to Taizhong City again. A young lady told her that she and her neighbors had followed Cheng Yen's instruction to sort their trash and sell it to recycling companies, and that they would like to donate their recycling earning to Tzu Chi's charities. Surprised at and inspired by this young lady's and her neighbors' action, Cheng Yen publicized their recycling story everywhere and encouraged her followers to do similar things. As a result, more and more followers all over Taiwan engaged in waste sorting and recycling, and Tzu Chi's recycling program emerged (Cheng Yen, 2012: 92-93).

Cheng Yen is not only the accidental initiator of the recycling program but also its chief builder. In Latour's terms, she is an excellent spokesperson who is very good at continually translating various, heterogeneous elements into an actor-network. The following is several examples among many.

In the early phase of Tzu Chi's recycling program, Taiwan was troubled by the problem of excessive amount of garbage. Many municipal landfills were overused and some were closed down. When one municipal government tried to move waste in its area to other ones, the "trash war" broke out. A lot of domestic waste was left on streets and many citizens' daily lives were disturbed. At this moment, Cheng Yen successfully enrolled the conflict of waste and the Buddhist faith in pure lands into Tzu Chi's recycling actor-network. She claimed that because of people's greed and desire, they consumed too many things and generated too much garbage, and that waste sorting and recycling were a useful method to make people reflect on their greed and desire, to purify their minds, and thereby to

contribute to the establishment of a pure land on earth.^[1] The trash war and Buddhist pure land faith became two elements of Tzu Chi's recycling program. They changed the meaning of the recycling program from cleaning environment to practicing Buddhism. More recycling volunteers were attracted to the program because of this change of meaning.

When DA.AI Television, one nonprofit company of Tzu Chi, operated in 1998, Cheng Yen connected it with the recycling program. On the one hand, she suggested that all recycling earning be used to support DA.AI Television so that Tzu Chi's recycling volunteers could have a clear aim to pursue. On the other hand, DA.AI Television was asked to make a series of TV programs, Grassroots Bodhi, which reported moving story of individual recycling volunteers and disseminated Tzu Chi's values about environmental protection.^[2]

Cheng Yen also associated Tzu Chi's international humanitarian aid with the recycling program. In 2003, some entrepreneurs established Tzu Chi International Humanitarian Aid Association to improve the logistics of Tzu Chi's international humanitarian aid.^[3] Cheng Yen encouraged those entrepreneurs in Taiwan's textile industry to develop processing procedures in which tents, blankets, and clothes could be made from used PET bottles collected by Tzu Chi's recycling volunteers (Cheng Yen, 2013: 136-137). This was the origin of DA.AI Technology, which is discussed in more detail in an upcoming section.

Recently, Cheng Yen even incorporated global warming, climate change, and the Bodhisattva way into Tzu Chi's recycling actor-network. In her view, the Buddha came to the world in order to save and care for all living beings on earth; however, our earth has seriously been hurt by waste, pollution, global warming, and climate change (Cheng Yen, 2012: 275); therefore, protecting our earth is the task of modern Buddhists, and Tzu Chi's recycling stations are ideal places for practicing the six paramitas of the Bodhisattva way (Cheng Yen, 2013: 182-184). Cheng Yen emphasized,

Recycling volunteers are "generous" in giving their time, energy, and money. They must obey the "precepts" of Tzu Chi. When sorting and recycling waste, they are cultivating their "inclusiveness," "perseverance," and "meditative concentration." Many volunteers forget their worries and recover from their melancholia. This purification of minds is "wisdom." The six paramitas are implied in recycling stations where volunteers can improve the health of their bodies and minds.

Cheng Yen, 2013: 184.

Program builders at Guandu Recycling Station

When Cheng Yen shaped Tzu Chi's recycling program at a general level, many program builders made their contributions at specific recycling stations, the basic units of the recycling program. In this section, I trace some of these contributions at Guandu Recycling Station in Taipei City.

Guandu Recycling Station was in a corner of Tzu Chi's Guandu Cultural Park, in which the

[1] *Tzu Chi Monthly*, 307: 43; *Tzu Chi Monthly*, 309: 8; *Tzu Chi Monthly*, 313: 26; *Tzu Chi Monthly*, 329: 24.

[2] *Tzu Chi Monthly*, 424: 8.

[3] http://www.tzuchi.org.cn/index.php?option=com_content&view=article&id=326:2009-07-30-06-46-06&catid=99:2009-07-30-08-11-53&Itemid=2 (retrieved on July 20, 2015)

building of DA.AI Television was located. The recycling station was run by four employees and about fifty volunteers. Cheng Yen's portrait and teachings were on the walls of the station. Also, there were a secondhand TV set and radio at the station. Recycling volunteers watched TV programs about Cheng Yen's instructions every morning before they started to work. Usually, they watched DA.AI News during their lunch time. Sometimes, they sorted waste, listening to radio programs about Tzu Chi. Guandu Recycling Station was the operation center of over sixty substations around it. People who supported Tzu Chi's recycling program usually took their roughly sorted domestic waste to nearby substations. Then, three trucks periodically moved the waste from these substations to Guandu Recycling Station. Recycling volunteers at the station were responsible for dividing the roughly sorted waste exactly into 37 categories. Finally, the three trucks moved the exactly sorted waste to relevant recycling companies to make money. Besides, there was a charity shop within the station selling secondhand books, clothes, domestic appliances, and articles for daily use.

According to my participant observations and interviews with key informants, I discern several events that are interesting and significant to the birth and growth of Guandu Recycling Station. Tzu Chi's recycling practices in the area of Guandu started in 1997. Originally, recycling volunteers did not have a stable place for waste sorting and recycling. On weekends, they used community parks and street corners as temporary spaces to collect people's roughly sorted domestic waste, sort it further, and immediately move it to recycling companies. The amount of sorted and recycled waste was limited because of the lack of a permanent working place. Then, a window of opportunity was opened when Cheng Yen's two followers donated a piece of land in Guandu to Tzu Chi foundation. In 2000, this piece of land became the construction site of the building of DA.AI Television. One devoted recycling volunteer proposed that a corner of this construction site might be the permanent place for waste sorting and recycling. His proposal was approved by Tzu Chi foundation, and thereby Guandu Recycling Station was born. Once the corner of the construction site was translated into the permanent place for waste sorting and recycling, Tzu Chi's recycling practices in Guandu was thoroughly reorganized. The system of a central station with substations was formed. The number of volunteers increased. The ways to deal with waste were improved. And the amount of sorted and recycled waste enlarged.

After the birth of Guandu Recycling Station, volunteers had a stable working place. More and more aged recycling volunteers worked at the station on weekdays. They boosted the amount of exactly sorted waste, and how to quickly load trucks with the waste became a problem. Thus, a recycling volunteer who was a construction subcontractor transplanted a loading system from a construction site to Guandu Recycling Station. This system consisted of one electric chain hoist, several flexible freight bags, and two hand hydraulic carriers. Due to this system, the task of loading trucks needed only a few young volunteers and took a very short period of time. Consequently, a new way of cooperation between the aged and the young became possible. In the morning, many aged volunteers exactly sorted waste at the station. Then, in the afternoon, a few young volunteers came to the station to load trucks with the waste and moved it from the station to recycling companies.

How to recruit more recycling volunteers from young people was another problem for the

development of Guandu Recycling Station. Most young people had their own work in the daytime and could not participate in waste sorting and recycling at Guandu Recycling Station. In order to overcome this limitation, the heads of Guandu Recycling Station launched an evening recycling project. Every Wednesday evening, some devoted volunteers selected suitable spaces near their homes, such as community parks, street corners, small squares in front of local temples, the backyard of a hotel, and so on, as temporary working places and invited their neighbors to take their toughly sorted domestic waste to these places to sort it further. When the sorting jobs were down, trucks of Guandu Recycling Station were called to move the waste back to the station. Through the evening recycling project, the heads of the station directly enrolled more domestic waste, young and old people, space, and time into Tzu Chi's recycling program and indirectly made the program known to the public.

The last interesting event was relevant to DA.AI Technology. Used PET bottles collected by volunteers of Guandu Recycling Station would be the raw materials of DA.AI Technology's products. Due to the characteristics of these bottles, they needed to be processed at the station before they were moved to the recycling companies cooperating with DA.AI Technology. Volunteers removed these bottles' caps and neck rings, categorize them according to their colors, stomp them flat, and then load trucks with them. These processes were easy for most people but time-consuming, so the heads of the station associated these processes with community activities, psychotherapy, and environmental education. Every Wednesday morning, about one hundred community volunteers came to the station to process used PET bottles. This activity was also an important social event in which participants chatted with their friends and neighbors. Sometimes, about twenty residents in a psychiatric nursing home joined the activity. Their supervisor said that volunteering outside the nursing home made these residents confident and healthy. Furthermore, Guandu Recycling Station was an environmental education station with tour guides. Many tourists and students visited the station to learn knowledge about waste sorting and recycling. Whenever they had enough time, they took delight in processing used PET bottles so as to get some personal experience.

Program builders in DA.AI Technology

DA.AI Technology, which buys PET bottles from Tzu Chi's recycling stations all over Taiwan to manufacture environmental friendly products, is another important part of Tzu Chi's recycling program. As mentioned above, Cheng Yen encouraged Tzu Chi International Humanitarian Aid Association to made relief materials from used PET bottles in 2003. Thus, the chief convener of the association created a special department in his own company to integrate existing textile technologies, Tzu Chi's recycling stations, recycling companies, spinning mills, and weaving mills into a system that could realize Cheng Yen's expectation. In 2006, the first batch of blankets made from used PET bottles was produced and used in projects of Tzu Chi's international humanitarian aid. In 2008, the chief convener, together with other four conveners of the association, established a new company, DA.AI Technology, for mass-producing recycled PET blankets and clothes. In 2010, this company was officially donated to Tzu Chi foundation as a part of Tzu Chi's recycling program.^[4]

[4] <http://www.daait.com/index.php/tc/aboutus/2012-05-25-07-42-47> (retrieved on July 25, 2015)

Obviously, the operation of DA.AI Technology drew more Tzu Chi's resources into its recycling program. The managers of the company preferred to recruit employees from Cheng Yen's followers because they understand the values of Tzu Chi. The designers of the company used the original colors of PET bottles to design products whose styles were usually simple, elegant, traditional, and compatible with Cheng Yen's philosophy of dressing. They also designed products, such as shoes with sturdy soles, caps with LED, and travel bags, which were attractive to Tzu Chi's volunteers who participated in the projects of international humanitarian aid. Moreover, when DA.AI Technology attended trade fairs in different cities, its sales representatives often cooperated with Tzu Chi's local volunteers. Normally, these local volunteers became the fans of the company after the fairs (DA.AI Technology, 2014b). Recently, the general manager of DA.AI Technology even arranged a series of programs at DA.AI Internet Radio Station to publicize the core values of the company (DA.AI Technology, 2014c).

Also, the staff of DA.AI Technology persistently enrolled heterogeneous elements outside Tzu Chi into its recycling actor-network. Those simple, elegant, and well-designed apparel usually caught both domestic and foreign consumers' eye; then, salespersons of the company could make use of this opportunity to introduce Tzu Chi and its recycling program to them; some consumers would be converted into supporters of the recycling program. The business department of the company associated with other enterprises, schools, and local governments by offering tailored products (DA.AI Technology, 2013b; 2014a). The department of quality control won endorsements from various certifications and awards, such as Cradle to Cradle Certified^{CM} Silver, ISO 14045: 2012, the Best in Waste Management in GCCA Later Stage Awards, the 2014 Taiwan Excellence Award, and so on (DA.AI Technology, 2013a; 2015a; 2015b). The department of research and development cooperated with university laboratories and got research funding from the central government to develop new fabrics and products.

Conclusions

Gottlieb defines religious environmentalism as "one part of a global movement that seeks to integrate the most creative, humane, and hopeful parts of both secular society and religious tradition" (Gottlieb, 2006b: 80). Resonating with his definition, my investigation shows the amazing creativity of Tzu Chi, which connected the sacred and the secular, and linked the human and the non-human in its recycling program. Cheng Yen, the initiator and chief builder of the recycling program, continually associated it with her followers, Tzu Chi' charities, Taiwan's trash problem, global warming, climate change, Buddhist faith in pure land, and the six paramitas of the Bodhisattva way. Furthermore, devoted recycling volunteers (and employees) at Guandu Recycling Station (and other recycling stations) creatively enrolled Cheng Yen's influence, domestic waste, space, time, volunteers, machines, recycling companies, community activities, psychotherapy, and environmental education into Tzu Chi's recycling program. Finally, the staff of DA.AI Technology connected the recycling program with the worlds of industry, business, research, and governmental policies, drawing more elements within and without Tzu Chi into the program. Because of these program builders' ingenuity, the Buddhist recycling actor-network, as an example of religious environmentalism, thrived.

The study of Tzu Chi's recycling program contributes not only to the literature of religious environmentalism but also to that of recycling practices. Existing research has already discerned several factors that influenced recycling practices, including convenience (Park & Berry, 2013), economic incentive (Park & Berry, 2013; Yau, 2010), residents' environmental awareness (Park & Berry, 2013), the informal recycling sector (Agarwal, Singhmar, Kulshrestha, & Mittal, 2005), and civic participation in policy making (Charuvichaipong & Sajor, 2006). Nevertheless, religious influence on recycling practices is a factor rarely touched by scholars. This article offers a case study in this area and invites scholars to explore this area further.

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Two Kinds of Environmentalism in a Post-Industrial Society

An Exploratory Study of Hong Kong Youth Population

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Introduction

The emergence of “post-materialist values” has been widely accepted by scholars and journalists as the major cause of the rise of environmentalism. Scholars from the Global South argue that, however, the theory of post-materialism can only be used, at best, to explain the emergence of “full-stomach” environmentalism in post-industrial societies and it is largely inapplicable to the “empty-belly” environmentalism in poor nations. This paper argues that these two kinds of environmentalism (i.e. one focuses more on universal values and the other focuses more on livelihood and justice issues) may actually co-exist in a post-industrial society like Hong Kong.

Based on the data from a public opinion poll conducted in 2010 among the young population in the region, this paper will compare and contrast the social bases of the two types of environmental concern, namely, “universal environmentalism” and “grassroots environmentalism,” in Hong Kong’s context, and to assess the relative merits of the theory of post-materialism in explaining their emergence. This paper will also probe into the local institutional factors, and to evaluate their importance in explaining the variations in environmental concern among the young people in Hong Kong.

Environmentalism in Hong Kong

Entering the new millennium, political action on environmental causes shows a downward trend in most advanced industrial societies. In contrast, “softer” conservation behavior, recycling behavior for instance, has become more commonplace in both established and developing democracies (Dalton 2015). Hong Kong seems to be of no exception. Despite their earlier active involvement in social mobilization for environmental justice, green groups in Hong Kong have undergone the process of institutionalization and professionalization since the mid-1990s. The role of public advocacy of the

local green groups has also been gradually replaced by the role of governmental in-house consultancy (Lai 2000).

Approaching the end of 2000s, however, there was a series of social movements demanding the conservation of local communities and the rethinking of how people are related to land, for instance, the movements against the demolition of the Star Ferry Pier in 2006 and the Queen's Pier in 2007. The Anti-Express Rail Link (XRL) movement in 2010 was another prominent example. The campaign began with the resistance from villagers living in Choi Yuen Village who were forced to vacate their homes in order to make way for the construction of the XRL. Young people, mostly born after the 1980s, were also the active participants of the campaign (Chiu and Li 2014).

Scholars and journalists attempted to explain the resurgence of grassroots social movements in Hong Kong with a particular concern over local identity and indigenous communities by using Inglehart's post-materialism theory (Inglehart 1977). Ma (2011), for instance, put forth the "value change" thesis, alongside with the Inglehart's theory, in analyzing the legitimacy crisis of the post-colonial Hong Kong government and the emergence of a new wave of grassroots social movements. Also making use of the recent survey results, Ma linked the re-emergence of the movement for environmental and heritage protection to the gradual increase in post-material values among Hong Kong citizens (p.706-707). Nevertheless, the association between the rise of post-materialism and the (re) emergence of grassroots social movements is actually not yet empirically examined.

One of the objectives of this paper is to empirically examine whether post-material value is the major driving force in the rising concern of grassroots environmental issues, or the "grassroots environmentalism," among the young population in Hong Kong. Meanwhile, we will also evaluate to what extent the theory of post-materialism can be used to explain the variation in the "softer" side of environmental concern, i.e., the "universal environmentalism".

Literature Review

Dimensionality of Environmental Concerns

Although environmental concerns have been the major focus of social scientists for decades, it is still inconclusive that whether environmental concern is a unidimensional and coherent construct or whether environmentally related attitudes and beliefs are always issue specific and inherently multidimensional. In order to solve this puzzle, Xiao and Dunlap (2007) conduct confirmatory factor analysis (CFA) by using the data from two national probability samples of the citizens from Canada and the United States so as to test a comprehensive conceptualization of environmental concern. Their study suggests that attitudes toward environmental issues on the whole are relatively well organized into a broad and coherent sense of "concern for the environment." However, the "perceived seriousness of community environmental problems" in particular does not fit quite well into a so-called "unidimensional" construct. Xiao and Dunlap suggest that "researchers should begin to recognize the multifaceted nature of "environmental concern" and employ operationalizations that do justice to the complexity of the concept" (490-491) because the consistency of the concept may vary

over time and across population.

Taking the debate between “environmental movement” and “environmental justice movement” in the United States as an example (Sandler and Pezzullo 2007), despite efforts in reconciling the relationship between the two, some scholars argue that the conceptual underpinnings and prioritized values of these two movements are still disparate. Environmental justice movement consistently criticized the “mainstream” environmental movement as racist, classist, and with limited activist agenda. There is thus a significant conceptual lacuna in the operationalization of “environmental concern” if we ignore those concerns that have been woven into the framework of social and economic justice.

In fact, if we take a closer look at the grassroots environmental movements in East Asia, most of them are also intermingled with larger and even more complex controversies. Alongside the objective of protecting the “living environment” (Szasz 1999), those movements were induced more by the “threat to traditional means of livelihood” or the problems of “livability” in most of the cases (Evans 2002).

In short, although the concept of environmental concern is still largely a coherent system of environmental attitudes and beliefs, even across different cultures (see e.g., Xiao, Dunlap, and Hong 2013), we argue that those concerns related more to justice, livelihood and community issue are still needed to be introduced on some occasions so as to examine as fully as possible the whole spectrum of the concept.

Limitations of the Theory of Postmaterialism

According to Inglehart, the increase in economic affluence after World War II in many developed countries has led to a shift in individuals’ attention from material needs to concerns related to quality of life, such as environmental quality. As postmaterialist values are far more prevalent in affluent than in poor countries, residents from rich countries should exhibit higher levels of concern for environmental quality than do residents from poor countries.

Contrary to Inglehart’s claim, however, a number of studies reveal that citizens in industrialized and developing countries both exhibit a high degree of concern for the environment (Brenchin & Kempton 1994; Dunlap & Mertig 1995; Dunlap & York 2008). In other words, the concern for environmental quality is not limited to wealthy nations but has become a global phenomenon. Scholars from the Global South (e.g. Guha and Martinez-Alier 1997), and several scholars in environmental justice (e.g. Szasz 1994; Pellow and Brulle 2005) provide an alternative explanation to the rise of environmentalism by arguing that poor environmental conditions also have an effect on concern for the environment in both developing and developed areas. In a cross-national study using data from the World Value Survey, Knight and Messer (2012) substantiate such claim and show that environmental degradation is positively associated with environmental concern, while the level of affluence is either negatively or not associated.

In sum, as Dunlap and York also put it, the shift in values may have been useful for explaining the emergence of modern environmentalism in post-industrial society, but is clearly inadequate for explaining the global spread of environmental activism and concern (2008: 551). There should be many

other factors involved, such as seriousness of environmental degradation in stimulating awareness, concern and activism regarding environmental issues within and across different nations.

Social Bases of Environmentalism

Apart from the value-based explanation, research on environmental concern has extensively tested the predictability of different sociodemographic variables in different contexts. For instance, Marquart-Pyatt (2008) shows that the effects of sociodemographic determinants on environmental concern are fairly consistent across a sample of 19 industrialized countries. In general, research suggests that women are more concerned than men about the environment. Education and income are positively related to pro-environmental attitudes, while age is usually negatively associated with environmental concern.

In a recent study by Liu and his colleagues (2014), employing three national public survey conducted in 2004, 2007, and 2013 in the United States, they reveal that the predictability of some sociodemographic determinants are actually not consistent over time. Their analysis confirms the findings of previous studies on the significance of political ideology, fundamental beliefs about human-nature relations, and certain sociodemographic factors such as gender and race in explaining citizen's environmental concern. The effect of age, however, is positively related with environmental concern in the regression models using the two recent surveys. Education level also seems to have little effect on citizen's environmental concern.

The existing research on the social bases of environmental concern in China also reports highly inconsistent findings. Xiao, Dunlap and Hong (2013) explain that such inconsistency in empirical findings may be due to diverse and often limited samples surveyed, and to the diver range of conceptualizations and measures of environmental concern used in the surveys. In their own study, using the data from the 2003 Chinese General Social Survey, they find that education is positively related to environmental concern, while age and income is not related. Gender is also significant but males are slightly more environmentally concerned than females.

In a study about the determinants of environmental concern among the Hong Kong population, using two waves of data in 2000 and 2008, Wong and Wan (2011) find that sociodemographic factors (including age, gender, education, income, and class identification) have negligible influence on the priority on environmental protection, except for gender in the data of 2008, which shows that women are more likely than men to emphasize environmental protection as a priority. Wong and Wan's study also reveals that other than sociodemographic determinants, institutional factor turns out to be the most influential determinant of environmental concern in Hong Kong. The evaluation of government's performance in environmental protection, in particular, is found to be the most significant factor negatively correlated with citizen's environmental concern (p.247).

Methodology

The telephone survey was conducted from 24 May to 25 June 2010 by the Telephone Laboratory of the Hong Kong Institute of Asia-Pacific Studies at The Chinese University of Hong Kong. The target

respondents of the study were Hong Kong youth born between the year 1970 and 1995. Thus the target population included those aged between 15 and 40 during the time of survey. The procedures to select this sample followed a strict probability sampling method. Landline household telephone numbers were generated by computer and then calls were made by interviewers. If a household contacted had more than one eligible respondent, a random process was used to select only one respondent from that household. If the chosen individual was not at home or not free to answer, follow-up calls would be made.

A total of 2,003 respondents completed the survey. The response rate for the telephone survey was 72.1%, which was calculated from all telephone calls with known eligible respondent(s) present in the households. Telephone numbers without any eligible respondent (i.e. no household member aged between 15 and 40) were not included when calculating the response rate.

The Dependent Variables

Environmental concern has been conceptualized in a number of ways in past studies. Dunlap and Jones, in a review chapter, define environmental concern as “the degree to which people are aware of problems regarding the environment and support efforts to solve them and/or willingness to contribute personally to their solution” (2000:485). In this paper, we shall mainly focus on two types of environmental concern. One is the concern for the general environmental condition, the other is the degree of approval to grassroots environmental movement.

The first dependent variable, “universal environmentalism,” is measured by the following item: “Do you agree that environmental protection is more important than economic growth?” The responses are coded on a four-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree).

The second dependent variable, “grassroots environmentalism,” is measured by the following item: “Do you support the environmental concern groups or the government over the recent conservation controversies?” The responses are coded on a five point scale (1 = fully support government, 2 = support government more, 3 = half-half, 4 = support environmental concern groups more, 5 = fully support environmental concern group).

The Independent Variables

To account for sociodemographics, four indicators are included: age (1 = 15-19 years old, 2 = 20-24 years old, 3 = 25-29 years old, 4 = 30-34 years old, 5 = 35-40 years old); gender (0 = male, 1 = female); education (1 = no schooling/illiterate, 2 = primary, 3 = junior secondary, 4 = senior secondary, 5 = vocational education/higher diploma level/undergraduate, 6 = postgraduate); monthly household income (HK\$) (1 = below 10,000, 2 = 10,000 to below 30,000, 3 = 30,000 to below 50,000, 4 = 50,000 to below 100,000, 5 = 100,000 or above).

To measure postmaterialist value, we follow Cheung and Leung’s study (2004) and employ a rating scale instead of forcing the respondents to prioritize between materialist and postmaterialist values owing to the limitation of telephone survey (the original forced-choice format is usually administered through face-to-face interview). Respondents are asked to rate the importance of the following

postmaterialist value orientations on a four point Likert scale, ranging from 1 (very unimportant) to 4 (very important): having more say in government decisions, a more humane society, protecting freedom of speech, and progressing toward a society in which ideas count more than money.

As poor environmental conditions may also stimulate environmental concern, we also measure respondents' level of satisfaction with environmental conservation by the following item: "Are you satisfied with the environmental conservation in Hong Kong? The responses are coded on a five-point Likert scale, ranging from 1 (very unsatisfied) to 5 (very satisfied).

Two facets of the contextual institutional factors are also included. The first one is "trust in the government" which is measured by the following indicator: "Do you trust the Hong Kong Government?" The responses are coded on a four-point Likert scale, ranging from 1 (strongly distrust) to 4 (strongly trust). The second one is "the evaluation of democratic progress in Hong Kong" which is measured by the following indicator: "Do you find the democratic progress in Hong Kong since 1997 too slow, about right, or too fast?" The responses are then coded on a three point scale (1 = too slow, 2 = about right, 3 = too fast).

Data Analysis

We used OLS regressions to conduct our data analysis. The two types of environmentalism are regressed on respondents' sociodemographic factors (age, gender, education, and household income), postmaterialist values, perceived environmental conditions, and the institutional factors (trust in the government and the evaluation of democratic progress). To discern further the specific effects of the independent variables, six regression models are performed for each type of environmentalism. Model 1 is the baseline model which includes respondents' sociodemographic variables only, other independent variables are then added one by one to Model 1 (Model 2: postmaterialist values, Model 3: perceived environmental conditions, and Model 4: institutional factors). Model 5 includes postmaterialist values and perceived environmental conditions with sociodemographic variables. Model 6 includes all of the independent variables with sociodemographic variables.

Table 1 reports the regression results. To explain the variation of universal environmentalism among the respondents, postmaterialist values and perceived environmental conditions both show significant influence on the regression model (Model 2, Model 3, and Model 5), while the two indicators of institutional factor (trust in Hong Kong Government and the evaluation of democratic progress) does not appear to be a statistically significant factor (Model 4 and Model 6). Sociodemographic factors show only limited explanatory power (adjusted R squared of Model 1 = 0.005) in explaining the variation of universal environmentalism. By adding postmaterialist values to this baseline model, the adjusted R squared increases to 0.084 (Model 2), while adding perceived environmental conditions, the adjusted R squared only increases to 0.036 (Model 3). Comparatively, postmaterialist value is a stronger factor than perceived environmental conditions in affecting respondents' universal environmentalism. Comparing Model 5 with Model 6, there is no improvement in adjusted R squared by adding the institutional factor (the two indicators are also not significant).

To explain the variation of grassroots environmentalism among the respondents, postmaterialist

values, perceived environmental conditions, and the institutional factors are all significant determinants in all Models. Sociodemographic factors again show only limited explanatory power (adjusted R squared of Model 1 = 0.015). The improvement in the explanatory power by adding the three sets of independent variables varies. The adjusted R squared improves more significantly by adding the two indicators for the institutional factors to the baseline model (adjusted R squared of Model 4 = 0.173), while the adjusted R squared increases to 0.096 (Model 2) by adding postmaterialist values and to 0.064 (Model 3) by adding perceived environmental conditions respectively to the baseline model. Comparatively, institutional factor is a stronger factor than postmaterialist values and perceived environmental conditions in affecting respondents' grassroots environmentalism.

In many previous studies, age is a significant predictor of environmental concern with an inverse relationship showing that younger people are more concerned about the environment. In our data analysis, however, age shows negative relationship only with grassroots environmentalism but not universal environmentalism. Gender, education, and household income have no significant influence on both types of environmentalism. On the whole, as we have already seen in Wong and Wan's study, sociodemographic factors seem to have negligible influence on the priority on environmental protection in Hong Kong, with only younger people showing more concern on grassroots environmental issues.

Concluding Remarks

Based on the data from a public opinion poll conducted in 2010 among the young population in Hong Kong, this paper shows that the causes of the rise of the two kinds of environmentalism, namely "universal environmentalism" and "grassroots environmentalism," are largely different. Post-materialistic values could fairly explain the emergence of "universal environmentalism" among the young people in Hong Kong, while the emergence of "grassroots environmentalism" is better explained by the local institutional factors, such as trust in the local government and respondents' democratic values. This finding suggests that the study of environmental concern in the context of post-industrial society should put more emphasis on the "livelihood" politics and the notion of "justice" within the environmentalism discourse in the future.

Table 1. Regression Analysis of Universal Environmentalism and Grassroots Environmentalism

| | Dependent variables | | | | | | | | | | | |
|------------------------------------|----------------------------|----------|-----------|---------|-----------|-----------|-----------------------------|-----------|-----------|-----------|-----------|-----------|
| | Universal Environmentalism | | | | | | Grassroots Environmentalism | | | | | |
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
| Age | -0.054* | -0.047 | -0.040 | -0.050 | -0.035 | -0.023 | -0.097*** | -0.105*** | -0.078** | -0.113*** | -0.089*** | -0.097*** |
| Gender | -0.002 | 0.001 | -0.011 | 0.000 | -0.007 | -0.020 | -0.017 | -0.020 | -0.022 | 0.018 | -0.027 | 0.007 |
| Education | 0.058* | 0.027 | 0.027 | 0.048 | 0.005 | 0.002 | 0.047 | 0.008 | 0.007 | -0.007 | -0.021 | -0.045 |
| Household income | -0.49 | -0.021 | -0.044 | -0.053 | -0.021 | -0.035 | -0.075** | -0.066* | -0.068** | -0.032 | -0.063* | -0.031 |
| Postmaterialist values | --- | 0.287*** | --- | --- | 0.261*** | 0.301*** | --- | 0.284*** | --- | --- | 0.255*** | 0.193*** |
| Perceived environmental conditions | --- | --- | -0.182*** | --- | -0.133*** | -0.155*** | --- | --- | -0.226*** | --- | -0.188*** | -0.099*** |
| Trust in Hong Kong Government | --- | --- | --- | -0.040 | --- | 0.053 | --- | --- | --- | -0.284*** | --- | -0.220*** |
| Democratic progress | --- | --- | --- | -0.012 | --- | 0.054 | --- | --- | --- | -0.199*** | --- | -0.163*** |
| Adjusted R ² | 0.005 | 0.084 | 0.036 | 0.005 | 0.096 | 0.111 | 0.015 | 0.096 | 0.064 | 0.173 | 0.127 | 0.218 |

* p < 0.05, ** p < 0.01, *** p < 0.001.

The numbers in the table are standardized coefficients, unless otherwise specified.

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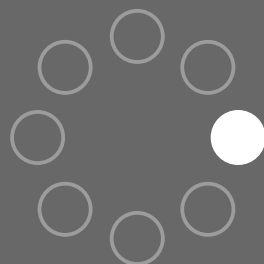
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REGULAR SESSION 9

RIVER PROJECT AND MEMORY



ISESEA-5

Building Memory: Why and how to shape the Memory of a River Valley before building a new dam?

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Large dams reshape landscape and activities in a drastic manner that is widely described by the authors of the reports of the World Commission on Dams (WCD, 2000, Scudder 2005). A large number of people are displaced by development projects, although no firm number exists. The *World Disasters Report 2012*, focusing on forced migration and displacement, offers a rough estimate of 15 million displaced individuals per year. Around the world, many rivers are dammed multiple times, one dam built after another. Sometimes, one generation has passed when the new dam is built. Every time a new project is announced, the memory of the effects of the former project is reactivated among the local communities (e.g. the displacement of the people, the change of landscape and activities). This memory may need to be reassessed before a new dam is built, specifically, when the displacement has been poorly implemented, with poor participation on the decision-making process, with low compensation, and without a resettlement program. This paper presents the creation of a memory program in France as a cultural heritage along the Dordogne River where 5 large dams were built between 1929 and 1955. This program called “100 Witnesses from the Upper Dordogne River, the Valley and the Dams” was completed before the eventual building of a new reservoir on the Dordogne Gorges, for a water-pumped storage system. The paper will analyze the context of the memory of displacement along rivers of France and the current challenge of building new infrastructure that environmentalists and activists may confront. It will present the methodology of this research, the outcomes, and the perspectives offered by ICT tools for the future.

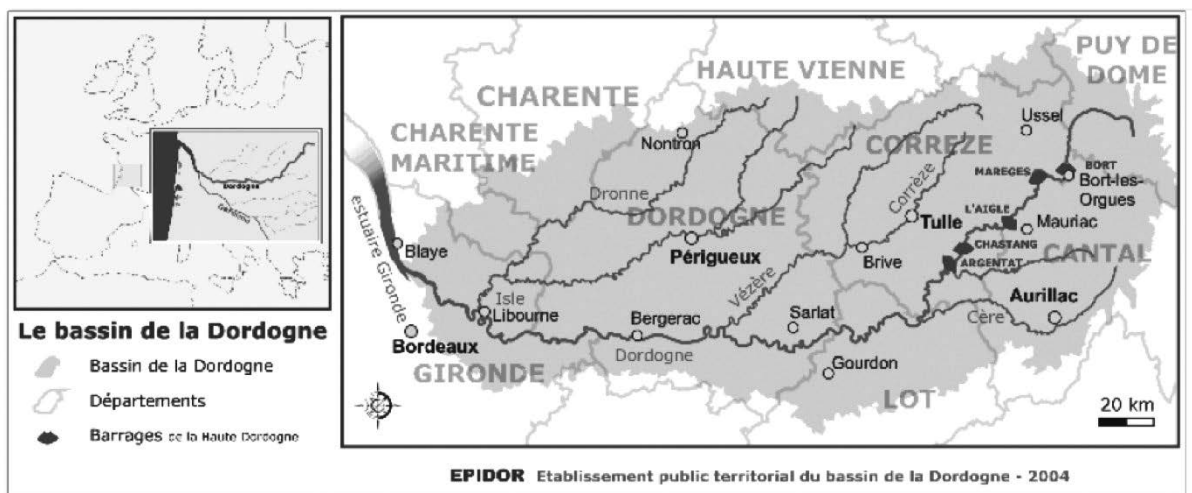
Anthropologists have worked extensively, with or without historians, on memory and the construction of history (Nora 1989, Foucault 1969). Regarding large dams, often books and celebrations have promoted the feat of engineering, forgetting the fate of the local population : those who had to

be displaced or those who had to face the downstream impact. This program reverses the usual focus and puts people and their needs first (Cernea 1985). Many cultural projects can be completed in order to rebuild a memory: museums, folklore memorial parks, books, documentary films etc. This program aims to reassess the symbol of a dam and to improve the status of the local people, who are considered victims of industrial development and of governments that have caused drastic changes to their lives. This sentiment is transmitted to the following generations, which are opposed to the damming of the river. For example, in England, such a transmission needed an official apology for flooding the Tryweryn valley in North-Wales to supply water for the city of Liverpool (Griffiths 2014).

Understanding the context

Most of the hydropower dams in France were built after WWII. Like all post-war countries, France was impoverished and badly needed electricity, both for industrial purposes and for the improvement of housing and transportation. There was no social policy regarding displacement and no resettlement program. Most dams were built in remote rural areas, where people lived a harsh life, especially in the winter. They were mostly pastoralists and fishermen, attached to the land and to the houses of their ancestors who resisted urban attraction. Many refused to be displaced. Some French people still remember the failed attempt of the inhabitants of Tignes to oppose the displacement of their cemetery and their registered archives, before the authorities forced them to leave the area. In the Upper Dordogne, the fight of Port-Dieu villagers forced new social policies and they obtained the first rebuilding of a village uphill, by the company Electricite de France (Faure 2008, 2009). The current context, 60 years later, is significant. In 2010-2015, environmental activists and anti-market driven advocates were opposed to the decisions of the French government to build new infrastructure i.e. an airport in the west and a small reservoir in the south.

In such circumstances, in order to build a new power project on the river, the memory of the local people has to be taken into account, even 60 years after the displacement. This heritage program, among other actions, aims to improve the local perception of the hydropower company.



A map of the 5 dams on the Upper Dordogne River in France, Europe

Methodology

At the initiative of the local governments, a triple partnership was established with the archives of Correze and Cantal, and the Electricite de France Group. An anthropologist designed the project and the stories of 100 people have been recorded. All of these people have known the river before and during the building of the dams. Most of them were displaced, and some were young engineers who had worked to build the dams. Because of their ages (from 75 years to 103 years old) they are the last, living people to have witnessed it. The approach is participatory. The families give written narratives, drawings, photographs, court documents, paintings and films. Family histories are recorded one by one, in the comfort of their own homes and not in a studio environment or within a group.

Objective

This program aims to produce knowledge and first-hand data concerning the sentiment of the displaced (Downing 2009). It is not a collection of nostalgic memories, although the witnesses describe techniques that belong to the past, like the former ways of fishing and boating. The program aims to give the local families ownership of their history, during the needed upgrading of the French electrical system after WWII. The cathartic approach that was adopted, aided the participants in their recovery from the trauma created by the mandatory displacement order. The witnesses and their families were consoled when they received the book with their portraits and the pictures of their family (Faure 2012). During a ceremony organized by the power company they also received a Compact Disc of recordings of their own voices. Their voices are conserved in the archives for the future, and they are also used during exhibitions and theatrical performances. This gives a new status to these formerly voiceless families surnamed "the people of the valley".

Results and challenges

Currently 100 voices have been recorded, and they are available on a web site. The former community is rebuilt thanks to the program. The next challenge is to include the new generation in the participatory program. This will be done with ICT techniques which help to re-create an identity among the people that were, at one time, vibrant river communities which were destroyed by their displacement and by the large artificial lakes that have caused a physical separation of the two sides of the former valley. The strong attachment of the "people of the valley" to the Dordogne River allows for such an aim.

Conclusion

The cultural heritage of "100 witnesses..." corpus comes as late compensation. It repairs the disastrous effects on the community in an industrial context, 60 years after the poorly mitigated impact of their displacement. It can also be counted as a non-monetary benefit shared with the local community for the building of the new hydro project. At a time of strong competition between hydro companies over the Dordogne River that want to acquire the management of hydropower, the result of this cultural program is of symbolic value for the company that built the dams and is presently managing them.

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The Memory and a Mid- to Long-term Evaluation of a Development Project: An Analysis based on the Survey Data Collected 50 Years after the Construction of the Miboro Dam

Atsushi Hamamoto

1. The Objective of this Report

How was this development project perceived and talked about within the regional community after its implementation? Also, what types of stories have been passed and what types have been forgotten from all of the various events that were related to the project? This report will investigate these questions for the case of the Miboro dam project that has already seen 50 years pass since its completion in 1961. This dam was constructed by the J-Power Electric Power Development Company (below J-Power) at the top of the Shogawa River in the Hida region of Gifu Prefecture. It is one of the hydroelectric dams that are representative of post-war Japan.

In the research into the memory of this project, the term 'collective memory' refers to a reconstruction of the past from the present that is constructed within the framework of society. In this type of memory, the past events can be changed, reinforced or forgotten. Although earlier literature have been studied mainly in the field such as war, ethnicity, nationality, and disaster, this report does not discuss memory merely to add another case to those that comprise the theory of collective memory. Rather, the purpose for discussing memory is to conduct a mid- to long-term evaluation of this development project. This is because when attempting to grasp how local residents perceive this development project that was completed more than half a century ago, it is absolutely essential to grasp their perceptions from the perspective of memory. First, this report will give an overview of the progress of the dam project and the opposition movement to it.



Map: the location of Miboro dam

2. The Progress of the Miboro Dam Project

After the war in May of 1951, Kansai Electrical Power established an investigatory office and conducted a boring survey for the Miboro Dam. However, in September of 1952, the plan for the construction of the dam was decided on by the national government, and the business entities involved in the Miboro dam project were switched over to the newly established J-Power. The government's energy policy at that time had already been established as 'primarily based on heat generation supplemented by water generation'. While there were 9 of the power companies mainly developed heating power, J-Power was expected to take on the hydroelectric power generation to supplement the 9 power company structure in generating electricity. However, the plan for the construction of the dam did not go at all smoothly. Prior to dealing with the opposition movement that will be mentioned later, there was a fault fracture zone on the planned dam-site, and issues with the geological features of the land became a large potential problem. Due to this, President T. Takasaki declared that the project would be suspended in December of 1953, and further investigations were carried out by inviting dam engineers and geologists from abroad.

As a result, in the spring of 1954, it was decided that the dam would not be of concrete construction as initially planned but rather would be a rock fill dam. Then, in June of 1957, construction was started on the power generating dam. In 1960, there was a water retention trial, and in 1961, the construction was completed. Due to the appearance of the dam being built by piling up rocks, it was described as a '20th century pyramid', and thus, it became one of the power generating dams that were representative of Japan's post-war reconstruction period. The total expenses for this project were approximately 40 billion yen in 1960. An overview of the dam is listed below.

Dam height: 131 m

Total amount of water retained: 370 million m³

Dam lake surface area: 880ha

Start/completion of construction: June 1957 / January 1961

Purpose: Power generation (maximum output 215,000kW)

Style: Rockfill

Number of people relocated: 301 households and 1364 people

(245 households and 1156 people from Shokawa village / 56 household and 208 people from Shirakawa village)

3. The Relocation of Locals from and the Opposition Movement to the Miboro Dam

On a different note, there was an intense opposition movement to this project that developed over the course of approximately seven and half years until November of 1959. The progress of this movement will be described below.

Around 1952, local rumours started circulating about the plan for the development of electrical power sources at the top of the Shogawa River. At this time, people put their expectations on the wages that would be paid for the labour required for the construction work on the dam. However, the welcoming mood completely changed when it came to light that area that would be submerged largely crossed over to within the Shokawa village. In particular, there was a strong feeling of opposition from the outset of the project in the populous Nakano district. In June of 1952, the first large meeting of locals opposed to the construction of the dam that assembled 213 people was held. This event took place prior to the official decision to start the construction of the Miboro dam. In November of that same year, there was the agreement that a total of 33 houses would be moved (11 houses from Shokawa village and 22 from Shirakawa village).

Facing this situation, the organisation opposed to the dam who were afraid the project would become a reality renamed themselves as the '*Shishukai*' (The Group Defending to the Bitter End), and this organisation was comprised of 174 houses. The main actions taken by the '*Shishukai*' were making appeals to the relevant offices and insisting on the alternate plan of 'making the dam on a tributary of the Shogawa River and not on the main river itself'. The alternate plan involved creating a 100 m-150 m dam on a tributary. If this plan had been adopted, it would have left little arable land submerged and only 2 houses would have needed to be relocated. After the plan was temporarily suspended because a problem was found with the foundation of the planned site, the plan for building the dam on a tributary was also advocated for based on the "safety of the dam."

The appeals of the '*Shishukai*' were made not only to the business entities and the people relevant in the local administration. They actively appealed by visiting the capital, and there were 13 times on record where they went to make these appeals. This primarily took the form of direct appeals by the official representatives, but in October of 1953, 108 members formed a large lobby group and went to the capital. They flew banners that said 'Absolutely against the Miboro Dam', and they marched around Tokyo starting at Tokyo station. At this time, they met with President T. Takasaki and several

people on the executive staff of J-Power and asked for the tributary plan to be adopted. In addition, when some engineers from the World Bank went to the work site, the *Shishukai* brought their petitions and called for the consideration of the alternative tributary plan.

Even as this type of an intense opposition movement continued, in May of 1955, the Ministry of International Trade and Industry announced that construction would be started on the Miboro dam. Then, in May of 1956, the 'Shishukai' that had consistently taken the stance of absolute opposition to the dam transitioned to the negotiation of conditions and settling on compensation when J-Power completed their 'memorandum of good fortune'. In November of 1959 when the peak of the negotiation of compensation was done, the 'Shishukai' held its disbandment ceremony.

When people are ever forced into eviction because of the construction of the Miboro dam, the company promises that they will be responsible for making a plan where all of the locals will consider themselves as happier than they currently are.

The 'Shishukai' opposition movement that was examined above had several characteristic points. The first such point was that even though they claimed to be 'absolute opposition', they were not opposed to the construction of the dam itself. The second such point is that they did not trust the business entities, and the Miboro dam's investigatory office in particular. The specific attitudes of the business entities that strengthened feelings of opposition were deciding on a plan without consulting with the affected persons, giving a delayed response to the alternative plan, and attempting to start the operation by dividing the locals by paying money for cooperation. The third such point was that the parties in charge of the opposition movement were comprised only of local people. The 'Shishukai' garnered national attention through their appeals in Tokyo, and this led to many offers for support from outside groups. However, the 'Shishukai' turned all of these offers down. The fourth such point was that by having female leaders like Yoshie Wakayama take an active part in their movement, it is recognised that they contributed to tenacious negotiations. The fifth such point is that the frequently carrying out of the petitioning activities in the capital signifies that the Shishukai pinned a certain type of trust and hopes on the J-Power headquarters and executives.

4. Results of the Survey

The data that was concretely examined in this report was the 'social survey on the social impacts and community development by Miboro dam' that was conducted by the present reporter, which targeted a total of 600 people from Gifu Prefecture's former Shokawa village in Takayama City and Shirakawa village (November - December 2010). The valid response rate was 66.8%.

This survey first (1) handled the perceptions surrounding the "Shokawazakura" (Cherry Blossom, a symbol of the region) that were transplanted from the sites planned for submersion. Next, it (2) looked at and asked questions about the memories of the dam project while focusing on the individual events related to the opposition movement. Furthermore, the perceptions about the people who were

relocated and the evaluation of the dam by the local community were added to the set of questions. The survey also asked about (3) the usage and evaluation of the various facilities for the revitalisation of the community and about (4) the relationships with neighbouring areas and the creation of a wide area for tourism. The primary results that were ascertained from the total of 36 questions that were asked are shown below.

① Evaluations of the Dam Project

The number of positive evaluations (28.9%) rivalled the number of negative evaluations (27.0%) in Shokawa, but the largest number of responses was 'I don't know' at 42.8%. In contrast to this, the results of the survey on the people of Shirakawa obtained a lot of positive evaluations (59.6%). It is assumed that the reason for there being many people who responded that they 'did not know' was not necessarily because the project was difficult to judge as it had both positive and negative aspects. Rather, this response was given because people did not have a good understanding of the dam project itself (lack of materials to make evaluation judgments).

② The Fading of 'Memories'

Of the events that were concerned with the dam project, the 'story about the transplant of the Cherry Blossom trees from Shokawa' had been frequently passed around. However, it was ascertained that the 'story of the opposition movement' tended to be forgotten by the people. In Shokawa, the number of responses stating that 'I remember/ I know of' the 'proposal by T. Takasaki to transplant the Cherry Blossom trees' accounted for 83.6%. However, the number of responses concerning the 'story surrounding the opposition movement' stopped at relatively low percentages. For example, people who responded that they knew about or remembered the 'formation of the Shishukai' was 45.6%, the 'Shishukai visiting the capital' was 26.4% and the 'memorandum of good fortune' was 17.3%.

③ The Revitalisation of the Area Near the Dam Lake and the Utilisation of the 'Shokawazakura'

The responses about the necessary actions for the utilisation of the dam (lake) that stood out was 'the utilisation of the Shokawazakura' (66.8%) in Shokawa. In Shirakawa, the responses to this were 'the opening of the power plant to the general public' (42.0%), 'utilisation of the Shokawazakura' (41.5%) and the 'full usage of the dam-site park' (39.4%). People in their 20s and 30s were the age groups that most frequently selected the 'utilisation of the Shokawazakura'.

④ The Presence of the Dam in Everyday Life

There was a conspicuous difference in the perceptions of the people of Shokawa that were upstream from the dam lake and the people of Shirakawa that were downstream from it on the questions that asked about the settings where people become aware of the dam in their everyday lives. The response that stood out in Shokawa was the setting 'when the Shokawazakura were blooming' (70.7%). However, in Shirakawa it was noticeable that the response of 'when the water level of the dam was elevated' (40.9%), and 'when there was an earthquake' (23.3%); these response rates were much higher than in

Shokawa (this survey was conducted prior to the Great East Japan Earthquake).

5. Conclusion

Based on the aggregation of the above data, it became apparent that there were intergenerational differences in perceptions and memories; there were also regional differences between Shirakawa village that received many of the benefits of the dam construction and the former village of Shokawa that made many sacrifices for the project. Also, it was ascertained that the 'story about the transplant of the Cherry Blossom trees from Shokawa' was relatively frequently remembered while the 'story of the opposition movement' tended to be forgotten by the people. However, on the other hand, it could also be noted that a time period of 50 years makes it difficult to evaluate the dam project itself in the local community.

In addition, it became apparent from the interviews conducted on the locals and people who were relocated that their moving because of the dam is perceived as a 'successful experience'. However, this is not to say that these perceptions were unchanged for the past 50 years. In this report, it would be desirable to also conduct an examination of the factors that impact the formation of memory and the passage of time.

Retrieval of a River

A struggle of the Residents Seeing the Life and Death of Kuma River

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This paper will show an impact of Japanese conventional disaster damage prevention policy by taking the case of a resident's opposition to a flood-prevention dam project as an example.

Now Japanese government tends to change course and setting in place of infrastructure especially equipment and materials more than before for the reason that Great East Japan Earthquake and annually flooding. Just after the Earthquake, people reflected on too much trust in such kind of infrastructure, so it was big issue. But nowadays, only few people discuss about it.

Japan has a few flatlands which an alluvial plain and a temperate and rainy region, so people abundantly blessed with nature, on the other they have faced to the harsh force of nature. Therefore people got close to nature to understand, and took reasonable natural disaster damage prevention for the working of nature. But people never overcome disaster damage completely with that way. In that respect, modern technology as disaster prevention structure imported from the West in Meiji Era could decimate disaster damage. The technology developed more efficient so that large-scale damage prevention structure would harm or destroy nature. However such structures were consistent execution nationwide especially after WWII.

That situation has given rise to various undesirable effects anywhere. This case is one of conspicuous example. Despite the flood-prone area, people have been living thousands years in Kuma-river basin. In this basin, dam for flood-control and hydropower-generation was built on upstream and that for hydropower-generation on downstream after WWII. Moreover after 10years, dam for flood-control and irrigation planned at upstream biggest tributary of Kuma, Kawabe-river. Then interestingly, resident opposition occurred in "the most beneficiary area" of the plan.

Social Construction Based on Long-distance Water Diversion Projects

—A case study on the Yuqiao Reservoir in Tianjin^[1]

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Abstract

The exploding population in megacities and large cities has led to increasingly tight water supply, and large-scale cross-regional water diversion projects have arisen accordingly. A long-distance water diversion project creates environmental, economic and social connections between the water supply and demand areas. In this article, the Yuqiao Reservoir in Tianjin is taken as an example. Its severe situation of environmental pollution is introduced, and the weakness of its current management measures is public service and social relation building. This article proposes the key concept of water relationship, defines it as a new-type, peer-to-peer inter-area connection, and suggests that building should be from the four dimensions of social base building, balancing mechanism design, and environmental information communication and mutual-aid environmental actions. This article suggests that an environmental protection concept should be specifically directed, an action plan that gives balanced consideration to public and private interests should be available for environmental actions, and environmental programs should be based on internal needs of participants.

Keywords

water relationship, environmental community, long-distance water diversion project, social construction

I. Introduction

In traditional society, people acquired water resources by taking advantage of natural distribution and geomorphological structure, and met their needs for drinking, flood control and irrigation through water resources works, such as digging wells, and building dams, canals and reservoirs using current

[1] This paper is the initial results of “on Coastal Industrial Pollution Risk in Jiangsu, Zhejiang and Shanghai “(Approval number: 13BSH026)

technologies. The population migration pattern then was to farm and reside with water. In traditional society, the water supply and demand areas are the same area, residents in the water supply area are water users, protecting the water source is for their own benefit, and the safety of water supply is protected by local rules and village social networks^[2].

The exploding population in megacities and large cities has led to increasingly tight water supply. For complex political, economic and social reasons, China is unwilling to adjust urban pattern, but anchor hope in the strategy of “water going with people” to relieve the tight supply of water resources. As a result, many large-scale cross-regional water diversion projects have arisen, such as the Water Diversion Project from the Luanhe River to Tianjin City, South-to-North Water Diversion Project, Huai River Diversion Project, and Water Diversion from Han River to Wei River Project. Long-distance water diversion has broken the former watershed concept, restructured inter-area connections, and imposed a huge challenge to and great pressure on water source protection. In this case, the water supply and demand areas no longer belong to the same administrative division, residents in the water supply area are no longer water users, and residents in the water demand area no longer have access to the water source in daily life and can no longer urge residents in the water supply area to protect the water source, thereby losing control over the water source indirectly.

Water demand areas are often economically developed large cities, where highly profitable secondary and tertiary industries are concentrated. Water supply areas are often undeveloped, remote rural areas, where people deal mainly with farming and sideline operations with low added value, or mining with high pollution. They supply both human and water resources to cities, and have to restrict their production pattern and lifestyle for the sake of water source quality, such as ecological resettlement, and prohibition of cage culture and paddy rice cultivation^[3]. Due to great economic and social disparities between cities and rural areas, residents in the water supply area are likely feel depressed and become mentally unbalanced. In this state of mind, can farmers protect water source quality self-consciously? From this perspective, the water supply system for a water demand area is at risk. For example, the water quality of the Yuqiao Reservoir in Tianjin declined from Classes I-II in the 1970s-80s to today’s Classes IV-V. This is worth a think-through. Therefore, how to make residents in the water supply area protect water source self-consciously in face of the social and environmental reality? How to establish an interest balancing mechanism between the water supply and demand areas to realize their collaboration? Building new-type water relationships is urgent institutional building for long-distance water diversion projects in China.

The significance of exploring the connections between the water supply and demand areas from the perspective of social relation building lies in: First, give the best play to long-distance water diversion and ensure safe, stable water supply in the water demand area; second, confront the difficulties facing the water supply area, and seek a path of comprehensive ecological, economic and social development; and third, promoting the excellent collaboration between the water supply and demand areas, and

[2] Chen Ajiang: Sociological Interpretation of Water Pollution—A Case Study on Dongcun Village, *Journal of Nanjing Normal University (Social Sciences)*, 2000(1).

[3] Yan Bingzhou: Establishing Ecological Test Zones to Serve the South-to-North Water Diversion Project, *Journal of Yuanyang Teachers’ College*, 2010(2).

realized their balanced development. For this purpose, the Chinese-Norwegian joint task force on environmental research^[4] conducted a field survey on 11 administrative villages in two towns north of the Yuqiao Reservoir in Tianjin in May 2012, sampling 55 residents in each village, and interviewing 41 persons, including village heads and accountants.

II. Current situation of environmental pollution and management of the reservoir area

The Yuqiao Reservoir is located 4 kilometers each of the Jixian county town, Tianjin City. It was first completed in 1959, and was later expanded for the Water Diversion Project from the Luanhe River to Tianjin City. Currently, it is intended for flood control and water supply mainly, and also has the irrigation, power generation and aquaculture functions, being an important water supply area for Tianjin City. The Yuqiao Reservoir has a watershed area of 2,060 km², accounting for 96% of the whole Zhouhe River watershed. This watershed has an annual average rainfall of 750mm, an average runoff of 300-500 million m³, a storage capacity of 1.559 billion m³, an inundated area of 86.8 km² at normal pool level and a maximum inundated area of 250 km². The main inflow rivers are the three branch rivers of Shahe, Lihe and Linhe. The main pollution sources are wastewater and slag containing heavy metals from over 1,000 heavy chemical enterprises and over 140 iron concentrating mills in Zunhua City, Hebei Province, poultry and livestock feces from 68 natural villages around the reservoir, excess pesticides and fertilizers from farmland and orchards, and domestic sewage from a resident population of over 120,000^[5]. At the end of 2013, there was no shallow groundwater of Classes I-II in this watershed; the distribution area of Class III water was 40.0km², accounting for 1.9% of area under evaluation; that of Class IV water 1,720.9km², accounting for 80.3%; and that of Class V water 381.7km², accounting for 17.8%. If TN and TP are excluded from evaluation, the overall water quality of the Yuqiao Reservoir is good, being Classes II-III, and can largely meet the water quality requirement for water function zones; if TN and TP are included in evaluation, its water quality is Class V-. Since this study focuses on agricultural and rural pollution sources, pollutant losses of different pollution sources are shown in Table 1. It can be seen that the main source of non-point source pollution is stockbreeding, in which COD and ammonia nitrogen account for almost 2/3, and total phosphorus is slightly above half.

[4] This project is jointly financed by the Chinese Academy of Sciences, and the Research Council of Norway "Watershed eutrophication management in China through system oriented process modeling of pressures, impacts and abatement actions", <http://www.mn.uio.no/kjemi/english/research/projects/sinotropia/>.

[5] Qin Zheng, Zheng Lina: Trend Analysis of Eutrophication of the Yuqiao Reservoir and Contingency Measures, Science & Technology Information, 2008(24).

Table 1 Pollutant Losses and Percentages of Different Types of Pollution Sources

| Pollution source | COD | | Ammonia nitrogen | | Total nitrogen | | Total phosphorus | |
|----------------------------|------------|----------------|------------------|----------------|----------------|----------------|------------------|----------------|
| | Loss (ton) | Percentage (%) | Loss (ton) | Percentage (%) | Loss (ton) | Percentage (%) | Loss (ton) | Percentage (%) |
| Rural life | 7631.2 | 26.6 | 447.4 | 17.3 | 1055.1 | 12.0 | 383.6 | 15.3 |
| Stockbreeding | 19995.4 | 69.8 | 1697.4 | 65.7 | 4186.2 | 47.8 | 1291.3 | 51.7 |
| Fertilizers and pesticides | 1026.2 | 3.6 | 437.3 | 16.9 | 3515.8 | 40.1 | 824.8 | 33.0 |

Source: Tianjin Lonwin Technology Development Co., Ltd., Study on Non-point Source Pollution in the Zhouhe River Watershed and Measures (2014 Report)

For the environmental pollution pressure of the reservoir, the key measures taken by the reservoir management authority are functional planning, closed management and ecological countryside building.

1. Functional planning: In order to control the environmental pollution of the reservoir area, key and ordinary control areas have been established. The key control area includes the Yuqiao Reservoir and farmland within 1 kilometer around it, while the ordinary control area includes the area out of 1 kilometer around the Yuqiao Reservoir, and key areas of water loss and soil erosion. In the key control area, necessary water resources, planting and other ecological measures are taken, and the use of agricultural chemicals is prohibited in the waterfront and strictly controlled in other parts. In the ordinary control area, the structure of agricultural production is optimized and cultivation pattern is improved to reduce the amount of agricultural chemicals applied gradually, the use of highly toxic and high-residue pesticides prohibited, biological, physical and agricultural control measures encouraged, degradable mulch films extended, and old agricultural films recycled^[6]. These measures restrict industry development in the water supply area, and are poorly supported by local residents if there is no supporting compensation, supervision and service.

2. Closed management: Closed management is a common means of reservoir management, used to avoid human interference in the core part of a reservoir area, and is regarded as a key aspect of ensuring water quality. In the Yuqiao Reservoir area, a mesh fence over 2 meters high, with a total length of 112 kilometers, is provided at the level of 22 meters, and 105 warning signs at junctions between the mesh fence and roads, isolating the reservoir management area from the outside. Digital video monitoring and patrol systems have been installed to monitor key gates, water intakes and river entrances of the reservoir around the clock, collect information from patrollers, and integrate hydrological, water resources, ecological and environmental data to form a digital platform^[7]. The mesh fence and video monitoring devices affect the landscaping and educational functions of the reservoir objectively, and break the historical intimate relationship between nearby residents and the water source. The advantage of these high-tech measures is to ensure that the management authority obtains the latest and most comprehensive data, and its disadvantage is that it does not take into account negative impacts on nearby residents, and reinforces the opposition between reservoir administrators

[6] Shanghai Foxin AJ River Treatment Co., Ltd.: Non-point Source Pollution Control of the Yuqiao Reservoir in Tianjin, 2004.

[7] Sun Honglei: The urban water supply area of Tianjin City to be fully closed to ensure drinking safety, December 31, 2013, http://news.xinhuanet.com/local/2013-12/31/c_118773889.htm.

and nearby residents by showing distrust. The management authority takes advantage of its strong position to control the watershed space, collect information, set obstacles and changes the way in which water resources are utilized in the name of environmental protection, resulting in hostility toward nearby residents.

3. Ecological countryside building: In addition ordinary environmental projects, the local government has also initiated ecological countryside building in nearby rural areas, including relocating about 15% of rural households, developing efficient ecological agriculture (honeysuckle, blueberry, walnut, green vegetables, etc.), using the eco-bed technology to improve stockbreeding, cleaning up fishponds, cultivating poplars, willows and aquatic plants on forests and wetlands^[8]. Although these projects have been successful to some extent, they have not improved farmers' environmental awareness and behavior in general.

Residents in the water supply area are another key player. Based on the field survey, their educational levels are low, where 60% of them have received primary school or below education, and only 20% have received senior high school or above education. Neighborhood support is quite frequent, where 80% of residents say they often receive neighborhood support, and 26.8% have encountered neighborhood disputes. 3/4 of them like their hometown for the environment, social relations and housing; 70% of them do not have a clear future goal; 48.8% of them expect to be relocated and 43.9% do not. Those who are no longer attached to their hometown generally do not have the idea of improving the environment of their hometown. The other residents expect to improve their hometown through village planning and environmental management, and are mostly willing to assume the responsible for environmental improvement. Generally, most residents have maintained the merits of simplicity, diligence and practicality, but are short-sighted and undisciplined. Although they accept restrictive or prohibitive rules negatively, they do not recognize such rules in the heart.

From the perspective of farmers, non-point source pollution is attributed to the following causes mainly: 1) Weak environmental awareness: Young people focus on urbanization, while old people can be easily satisfied but do have needs for environmental improvement. They regard the reservoir as a burden of development and expect to take advantage of its economic value, but do not truly care for its safety and water quality. 3/4 of residents are pessimistic about the prospect of agriculture. Farmers have an urgent need for ecological compensation and are active about exchanging environmental protection for interests. 2) Weak field management capacity: Farmers choose crops based on output, income, habit and purpose mainly, and purchase pesticides of relatively low price, high toxicity and quick effect. 73.2% of farmers no longer use manure. The new sources of cultivation knowledge include: self-learning (43.9%); seed, fertilizer and pesticide companies (29.3%); television (9.8%); and agro-technical stations and skilled members of production teams (17.1%). Data shows that skilled farmers are no longer respected. During fertilizer application, 51.2% of farmers do not consider phosphorus content, and 53.7% do not observe fertilizer consumption. When they encounter insect infestation, they mostly resort to "past experience" or consult "pesticide traders on the market", while only 11% of them

[8] Jixian County Government: Progress of the Yuqiao Reservoir Water Source Protection Project in Jixian County, 2015-01-06, http://www.tj.gov.cn/zwggk/zwxz/zwdt/qxdt/201501/t20150103_256408.htm.

would consult professionals. They often apply pesticides excessively other than as instructed, because they think this is more “secure”. Extensive farming has resulted in low availability and high loss rate of fertilizers and pesticides, and become an important source of reservoir eutrophication. 60% of farmers say explicitly that they need agro-technical guidance but are unwilling to assume risks. 3) Alienation between farmers and the reservoir: 95.1% of residents think they have not utilized or are unrelated to the reservoir. There is no effective interest connection between farmers in the reservoir area and the reservoir management authority, so farmers still act at will. As Zhai Xuewei’s social exchange principles in feeling and reason society indicate, there is a lack of “empathy” and “common feelings” between residents in the water supply and demand areas^[9], so that environmental actions have nothing to do with “fairness, justice, favor and payback”. Although the ecological deterioration of the reservoir is already on the verge of danger, there are still no consistent actions for the purpose of environmental protection.

In sum, the production behavior of farmers in the reservoir area is almost the same as that of other areas, which is abnormal. There is an interesting issue here – it seems that problems that have been solved by science or successfully experimented plans cannot succeed as expected, because the organizational system is unsound, and scientists have not worked with farmers to assume responsibility. The common nature of such problems is lagging public services. The specific forms include: (1) China’s agricultural non-point source pollution management institutions are short of policy incentives^[10]; (2) Public actions fail to solve practical difficulties arising from the drastic transformation of production pattern and lifestyle for residents in the water supply area to protect the water source carefully; (3) There are insufficient interactions between public projects and residents, including the absence of investigation and consultation before implementation, the absence of supervision and inspection during implementation, inadequate means of technical guidance, and the absence of subsequent management and maintenance; and (4) Information needed by residents is undersupplied, such as environmental situation, water quality information, pollution migration pattern, management institutions, and agro-technical services. Without effective public services, “industrial agriculture” will be the inevitable trend of development.

III. Water relationship: Starting point of water ecological civilization building

In face of contradictions in water resources utilization and conservation, if they cannot establish a good social relationship, a conflict will be likely to occur. The water supply and demand areas are interconnected on the basis of environmental resources and natural geography, but there does be a coincidence of several conditions. If the water supply area has no surplus water resources, the water demand area is self-sufficient, or the water resources project is technically or economically infeasible, they will not be interconnected. The people in the two areas are connected due to the water diversion project by luck, and ought to develop a social relationship, which is called “water relationship” in this

[9] Zhai Xuewei: *Reproduction of Human Feelings, Face and Power—Social Exchange Pattern in Feeling and Reason Society*, Sociological Research, 2004(5).

[10] Liang Liutao, Ma Shuyi, Qu Futian: *Formation Mechanism of Agricultural Non-point Source Pollution: Theory and Demonstration*, Chinese Journal of Population Resources and Environment, 2010(4).

article. When two areas operate on a water relationship to conserve a healthy ecological environment, an “environmental community” accepted by the people of both areas can be created.

From a sociological perspective, an action is the role play of an actor in a social network. Therefore, determining a social relationship that includes environmental responsibility and action rationally is critically significant for the further development of environmental programs. The water relationship is an ecological relationship arising from the “disembedding” of a drinking water source, and a new social connection derived from modern society, and has to be facilitated by organizations and individuals subsequently. A firm water relationship will be a starting point to start ecological civilization building. Specifically, it can be summed up as follows:

First, a water relationship is a new social connection that is different from traditional basic social relations, such as blood relationship, geographic relationship and business relationship. It is relatively close to a geographic relationship, because they are both space-based. However, they have different foundations. A geographic relationship is based on common living experiences, words, habits and feelings, while a water relationship is based on public water resources, in which two independent areas are connected by the medium of a water diversion project. Any act of residents in the water supply area that affects the environment will affect the water quality available in the water demand area. Geographically, a water supply area is usually a relatively remote rural area, while a water demand area is usually a central city, where the former is relatively economically and socially backward, and sparsely populated, while the latter is economically and socially developed, and densely populated. The former may either long for or be dissatisfied with the latter. From a resource perspective, the water supply area acts as a morally elevated benefactor, while the water demand area as a thanks-giver. In terms of relationship dynamics, at the planning and construction stages of a water diversion or reservoir project, the water demand area is dominant, but at the operation stage, residents in the water supply area can choose environmental behavior actively. Therefore, a water relationship is a complex connection of economic, social, moral, mental dimensions, etc., and a tool essential to modern social system integration.

Second, a water relationship is an acquired peer-to-peer relationship. Since the environment has no sense and cannot communicate, the relationship between mankind and the environment is asymmetric, and mankind is always understanding, transforming, utilizing and adapting to the environment actively, though sometimes “revenged” by the environment. The so-called “revenge” just refers to environmental phenomena adverse to mankind occurring according to the law of nature. A water relationship is a non-market partnership established between the water supply and demand areas through equal communication and dialog in the same environmental community, in which they are reciprocally active. Although the geographic locations of the water supply and demand areas are acquired, and their development is ahead of the water diversion project, the water relationship is an engineering and market connection beyond areas, and connects them economically, socially, mentally and ecologically to a broader extent, and avoids segregation arising from social division of labor or geographic zoning, and hostility arising from interest distribution. It has been proven by practice that the water supply and demand areas are often mutually closed and indifferent due to the absence of

appropriate relationship positioning.

Third, the unit of a water relationship is an area. All social relations are run by social organizations or individuals. As discussed above, a water relationship is an inter-area connection created by the supply and demand of water resources. Therefore, individual actors cannot create such a relationship freely, but have to conserve water resources and share development results in the name of an area. The boundary of a water relationship based on a water resources project depends on the range of the water source watershed and the impacts of the project. The water supply area has to maintain water quality, and the water demand area has to restrict consumption. The environmental community composed of the water supply and demand areas will propose structural requirements for different areas based on internal natural requirements. Any community member should accept such requirements, otherwise it will be punished by institutions and blamed by public opinion. Since institutional rules are from the common will of the members and can become an internal restraint mechanism for all parties to the water relationship, they serve to improve the enforceability and sustainability of the institutions. With such a foundation and common understanding, the rights and responsibilities of the floating population in the water demand and supply areas in relation to water resources can be easily defined. The floating population should take on concerted actions with local residents, and the community is obligated to guide the floating population to follow the water conservation and use rules, and supervise and prevent violations.

Finally, a water relationship is a form of community of shared destiny. A clean water source is something essential to modern society. It is hard to imagine what will occur if a highly developed city has no clean, stable water source. Firemen can do nothing about fires, residents have to buy drinking water at high prices (usually over 10 times), and the water crisis will become a source of social risks. Isolated, utilitarian subjects of a water relationship will worsen the supply risk of water resources. For public hazards made by residents in the water supply area for economic interests (e.g., overuse of pesticides and fertilizers) or convenience (e.g., throwing waste about), the water demand area has to pay tens of times of cost and effort in pollution control, and sometimes an irrecoverable catastrophe may occur. These hazards often arise from unconscious habits or incidents, or proper economic development, and are mostly unintended, i.e., residents in the water supply area do not have the subjective motive to harm residents in the water demand area. Even competent authorities can hardly monitor non-point source pollution, and resulting social losses cannot be made up. On the contrary, a good water relationship enables both parties to do their best to ensure the safety of the water source, so the water relationship is also a lifeline.

A good water relationship is of significant value for social and ecological construction, which is shown in three aspects: First, the water supply and demand areas should communicate and collaborate with each other, and realize that they belong to one "environmental community". Residents in the water supply area recognize the fact that residents in the water demand area rely on "water resources", conserve water resources actively, save water treatment expenses for the water demand area, and improve confidence in clean water supply. Residents in the water demand area recognize the contribution of residents in the water supply area to the conservation of water resources, provide

assistance to the underdeveloped water supply area actively, and share some development results to realize emotional and rational unity. The accurate positioning of the water relationship can handle the conflicts of information, interests and collaboration among all stakeholders during the conservation and use of water resources. Second, it will arouse environmental responsibility to ensure the safety of the water source. Modern people are faced with an information load than they can normally handle, and often ignore environmental information. Water relationship building can make residents in the water demand area aware that saving water can reduce the environmental pressure on residents in the water supply area, and make residents in the water supply area aware that their environmental behavior can reduce water treatment costs of the water demand area, thereby arousing people's environmental responsibility, and causing people to exhibit effective, continuous environmental behavior. Third, it increases social capital indirectly. Mankind cares for and protects the environment for egoistic reasons (for themselves and their offspring). In water relationship building, stakeholders of water source protection are sought for to convert the relationship between mankind and the environment into an interpersonal relationship mediated by the environment. This can present interpersonal responsibilities and rights, implement peer-to-peer checks and balances, and expand social networks to allocate economic and environmental resources in a greater area, and handle interest and social conflicts between areas.

IV. Conclusion

In sum, the discussion of water relationships enables us to evolve the abstract concept of environmental protection into a directed social connection, so that a more operable action plan can be generated to turn environmental programs from external requirements into internal needs, and from a compulsory, purely public ethical responsibility to a social responsibility that gives balanced consideration to public and private interests. Water relationship building can reveal the external impacts and ecological connections of members of the "environmental community", define their environmental roles, understand habits, needs, difficulties and risks of stakeholders, and ensure that urban residents use water safely and sharing the economic interests of the community. Balancing mechanisms of rights and obligations are utilized to inspire people's internal motives for environmental protection, enhance the cohesion of the environmental community, and overcome local difficulties jointly.

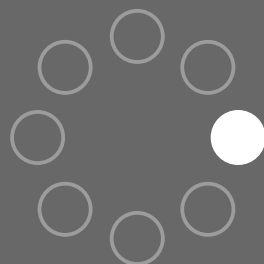
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THEMATIC SESSION

DISASTER, RISK AND
SUSTAINABLE COMMUNITY



ISESEA-5

Networking and Citizen Science in Low-Recognized Disaster Affected Areas: Local Governance of Nuclear Energy

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Keywords

Local governance, Tokai Village, JCO accident, Fukushima tragedy

Introduction

After a severe technological disaster, opposition against nuclear energy is likely to increase rapidly (Okamoto, 2004). However, it is not always the case that this opposition brings out changes in local governance over nuclear energy production, even after local communities hosting nuclear power plants were extremely affected physically, psychologically and economically by nuclear accidents. In fact, an undamaged nuclear power plant at Three Mile Island in the U.S. is still under operation at present.

In Japan, nuclear energy policy has been promoted as a national policy. Once a municipality became a community hosting a nuclear power plant, the municipality itself and its local economy have depended on the nuclear power industry more and more, especially with large grants to host communities. Then how has the Fukushima nuclear disaster had an impact on other communities hosting a nuclear power plant, if any?

We will examine the case of Tokai Village in Ibaraki Prefecture, the birth place of Japan's nuclear industry. Also, Ibaraki Prefecture is one of Low-Recognized Disaster Affected Areas in the Great East Japan Earthquake Disaster and tsunami. Tokai Village, south of Fukushima, narrowly escaped a severe nuclear accident in the Great East Japan Earthquake Disaster and tsunami on March 11, 2011. We would like to see how the interdependence of Tokai Village and the nuclear energy industry has been established in the latter half of the twentieth century and reconstructed through the two major nuclear accidents since the 1990s.

Realities faced in Fukushima

In March 2011, nuclear meltdowns occurring one after another in Fukushima were the beginning of the tragedy. Following the devastation caused by tsunami, huge areas of east Japan were contaminated by radioactive materials due to accidents at the Fukushima Nuclear Power Plants. People living within 20 km of the plants were eventually ordered to evacuate, and people located between 20 and 30 km from Fukushima No. 1 plants were ordered to shelter in place.

In addition to those who left their hometown because of the evacuation order, many families chose to evacuate voluntarily from Fukushima prefecture to avoid radiation exposure. It has been four and a half years since the start of the Fukushima nuclear tragedy, but there are still more than 100,000 people who live far from their hometown both in and outside of Fukushima.

In the last four years, many displaced families have already taken positive steps, such as getting new houses with the compensation which is provided for those who were forced to evacuate. However, half of the displaced people, especially the old, answered in a survey they don't have any friends in the communities they moved to with whom they can talk about their worries (Haraguchi, 2015). Monetary compensation helps displaced people to recover a physical living environment, but they face deep isolation in their new social environments.

Some of the displaced people suffer a stigma over being "evacuees" who are perceived as having lost their houses, hometowns and jobs. Due to the nuclear accidents that occurred there, very few young families tell their new friends that they are from Fukushima. They hide their roots to protect their children from the prejudice and discrimination that result from being seen as "evacuees".

The Japanese government announced this year that the evacuation order would be entirely lifted by March 2017, except for the most severely polluted areas. That means that compensation for mental stress due to evacuation will be provided by March 2018 and discontinued after that, a year after lifting the evacuation order. It will be very hard for those victims who lost their jobs after the 3.11 disaster and are still looking for jobs and places to live in.

Professor Nobuko Iijima pointed out that the suffering of the victims of pollution problems was amplified during the social and political processes through which they sought to recover their rights and claim compensation for their damages (Iijima, 1984). After the nuclear meltdown, a broad area of Fukushima and neighboring prefectures was polluted by radioactive materials, and the standard for radiation regulation was set twenty times as high as it had been pre-3.11. The reason is that if we followed the pre-3.11 standard, a much broader area would have to be designated as a mandatory evacuation area, including a part of Fukushima City, the capital of Fukushima.

Many families, especially those with small children, chose to evacuate voluntarily at their own expense. In some cases, mothers and children were evacuated to safer places, while fathers remained in Fukushima to earn a living. It is reported that differences between a husband and wife in understanding the situation sometimes resulted in divorce (Hino, 2015). In other cases, fathers (and mothers) quit their jobs and left Fukushima for less polluted areas.

According to Kai Erikson, technological disasters are contested disasters. There is a great deal of ambiguity and uncertainty when determining the level and scale of impacts or who the responsible

parties are, and so forth, and these matters will be contested by all interested parties (Erikson,1991). It will be very difficult to determine whether or not the Fukushima nuclear disaster will cause health problems for people in the long term, while the Central government and Fukushima Prefectural government have already taken the stance that health problems have not been detected. Exposure to radiation is not only the cause of health problems. Since 3.11, more than 50 Fukushima citizens have killed themselves in desperation after losing hope and their sense of identity.

We call it the Fukushima tragedy, but the radiation plumes from the power plants didn't stop at the borderline of the administrative district. So actually it is not only Fukushima, but other neighboring prefectures that are affected as well. The Japanese government admitted that radiation contamination was widespread outside of Fukushima. So decontamination efforts, such as replacing radioactive soil with clean soil in school playgrounds and residents' gardens, have been carried out not only in Fukushima but also in other neighboring prefectures, including Ibaraki.

The most affected people have the less say

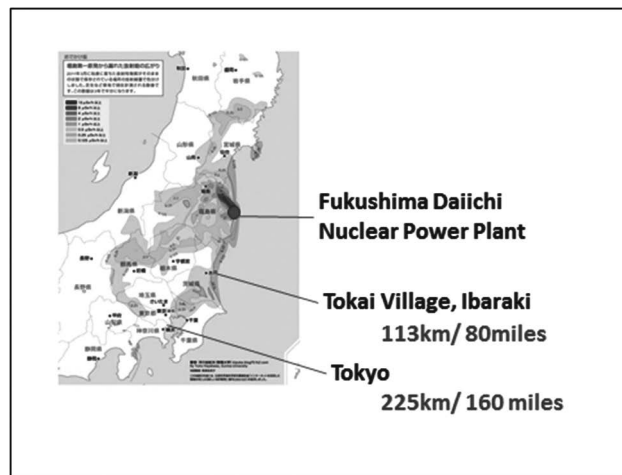
How people recognize the causes and effects of the Fukushima tragedy would be the baseline when considering how to utilize nuclear energy in the future. It should be noted that people affected by the Fukushima nuclear disaster are not necessarily opposed to nuclear energy for the future. Rather, it is a small number of people among the affected and displaced people who are outspokenly against nuclear power in the post-3.11 period. Many of the displaced people live near the Fukushima No.1 and No.2 power plants. Their relatives and friends used to work at the nuclear power plants. Even though they have been drastically affected by the nuclear accidents, the number of Fukushima citizens taking part in the anti-nuclear movement has been surprisingly low. I would like to point out that the most affected people in the Fukushima disaster are those who live very close to the benefits provided by the nuclear industry. It seems to be sometimes difficult for them to take the step to join anti-nuclear activities.

This reminds us of the aftermath of the Three Mile Island accident in 1979. It is often said that no nuclear power plant has been constructed in the U.S. since the TMI accident. However, when we look at Middle Town where TMI is located, another undamaged reactor at TMI was restarted in 1985, six years after the severe accident. TMI had deeply affected public opinion on the nuclear industry at the national level, while local political leaders in Pennsylvania gave permission to restart the reactor even though there was strong opposition from local people (Walsh, E.J., & Warland, R.H., 1988). Local governance hadn't changed much, even after the worst nuclear accident in history at that time.

After the Fukushima nuclear accident in March 2011, however, Fukushima prefecture, the prefectural assembly, the Fukushima Conference of Mayors, and four coastal towns hosting nuclear power plants have each requested that TEPCO decommission all ten nuclear reactors in Fukushima.

Outside of Fukushima, we haven't seen such a transition in local governance of nuclear energy. One exception was former mayor of Tokai Village, Mr. Tatsuya Murakami, who was outspoken in his criticism of the central government and utility companies. In the following section, we would like to examine how Tokai Village has been transformed in its relationship with the nuclear industry due to

the impact of major accidents.



Graph1. Map of East Japan Showing Cesium Contamination

Table 1. Status Comparison of Tokai No.2 and Fukushima No.1

| | Tokai-2 | Fukushima-1 |
|---------------------------------------|------------|-------------|
| Number of Reactors | 1 | 6 |
| Distance from the Seismic Center (km) | about 250 | about 180 |
| Tsunami Height Recorded on 3.11(m) | 5.4 | 15.7 |
| Expected Tsunami Height (m) | 4.8 (2002) | 5.7 |
| | 5.7(2009) | |

Birthplace of Japan's nuclear industry, Tokai Village, Ibaraki

There were nuclear power plants in areas affected by earthquakes and tsunami in eastern Japan which were not as severely damaged as Fukushima No.1 plants were. Tokai No.2 nuclear power plant, owned and operated by the Japan Atomic Power Co. (JAPC), is one of them.

Tokai Village in Ibaraki Prefecture, located just south of Fukushima and north of Tokyo, is the birthplace of the nuclear industry in Japan. The Japan Atomic Energy Research Institute (JAERI) was established in 1956 to research and develop nuclear related technologies, especially for the development and utilization of atomic energy. In August 1957, JAERI succeeded in achieving the first criticality of JRR-1, Japan's first nuclear research reactor.

Following the national nuclear research institute (JAERI), the Japan Atomic Power Co. (JAPC), owned jointly by the country's electric utilities, started to operate the first commercial nuclear power plant with a generating capacity of 160,000 kW, Tokai No.1 plant, on July 25th, 1966. Now Tokai Village hosts multiple nuclear energy facilities, such as those manufacturing nuclear fuels.

The population and economic growth of Tokai Village has steadily grown over time since the 1960s as the backbone of nuclear energy production, and its research and development in Japan. JAPC, a utility company in Tokai specializing in nuclear power generation, was always the pioneer of the nuclear energy industry in Japan. JAPC constructed and started to operate Japan's first 1 GW nuclear

power plant with a generating capacity of 1,100,000 kW. This success was followed by other utility companies constructing bigger power stations than those constructed in the early stages.

Tokai Village is unique among municipalities with nuclear power plants in Japan, most of which tend to be located in underpopulated areas without major industries other than nuclear facilities. Tokai Village is a town which attracts the younger generation due to its nice environment and good welfare policy. The rate of population growth is higher than its neighboring cities. Even though the nuclear industry seems to be a major industry still, village people are able to find jobs in Tokai and nearby cities, including Hitachi and Mito City, the capital of Ibaraki. For these reasons, Tokai Village is not a typical municipality with nuclear power plants, which usually face a declining population and depend deeply on the nuclear industry in terms of jobs and tax income. We aren't saying that Tokai Village does not depend on the nuclear industry. It does. However, people there have more opportunities and choices in finding jobs in nearby industrial cities, compared to other communities in Japan hosting nuclear power plants.

JCO accident in the late 1990s

Many local people have always been proud that Tokai Village was the birthplace of nuclear energy and its research, and that it has continued to be so for such a long period of time. However, its harmonious relationship with the nuclear industry seems to be changing because of a series of accidents they experienced in the 1990s.

One is the JCO accident in Tokai Village on September 30, 1999, which was the first criticality accident in Japan, classified as a level 4 major accident according to the International Nuclear and Radiological Event Scale (INES) rating. JCO, a wholly owned subsidiary of Sumitomo Metal Mining Co., Ltd., is a nuclear fuel cycle company that processes uranium fuels. This accident resulted in the death of two workers caused by exposure to a high level of radiation, and many residents close to the facility were forced to shelter in place.

After the JCO accident, Tokai mayor Tatsuya Murakami, faced the challenge of community rebuilding after radiation pollution. Mr. Murakami was deeply shocked by not only violations committed by the nuclear-related company JCO (which let workers ignore working procedures at the uranium facility), but also by the institutional incompetence of responsible parties, such as the company and regulatory agencies, in dealing with the severe accident. Under the law, it was the central government that was supposed to be responsible for taking initiatives to protect residents from exposure to radiation. However, it took hours and hours before the central government ordered nearby residents to evacuate or shelter in place. On his own, Mayor Murakami, who couldn't wait for the central government's decision, ordered residents who lived near the JCO facilities to shelter in place.

Mr. Murakami, a mayor who was likely to take a more cautious view on nuclear energy, warmed to the idea that Tokai Village would be an international center for nuclear research utilized in material science and medical science. This idea was criticized by some anti-nuclear energy groups. However, promoting nuclear science, not nuclear energy, as the core of the village's future designs implied that Tokai Village would not expand nuclear energy production any more. While Mr. Murakami didn't

mention anything about anti-nuclear energy or decommissioning the nuclear reactor, his proposal signaled a big shift in the history of local industry development.

Some local business leaders, who had made strong demands for constructing another nuclear power plant, supported a candidate in the village mayoral election who promised the installation of a new plant. In 2009, Mr. Murakami barely won the mayoral election with 9,860 votes to the rival candidate's 9,299. Before 3.11, Tokai Village was split in half on the issue of nuclear energy.

Narrow escape from another crisis on 3.11

On March 11, 2011, Tokai No.2 nuclear power plant was in operation when it was hit by the great earthquake and tsunami. It was severely damaged and lost its external power supply. It barely escaped from a worst-case scenario, such as the explosion of a reactor. The seawall protecting Tokai No.2 plant was elevated from the original estimated tsunami height of 4.9 m to a reevaluated height of 6.1 m, according to new findings concerning the impact of tsunami in the area in history. The height of the tsunami reaching Tokai on March 11, 2011, was 5.4m above sea level. Without the elevation of the seawall, Tokai No.2 plant would have undoubtedly suffered the same fate as Fukushima No.1 plant did. In addition, construction to elevate the seawall had just been completed on March 9th, 2011, only two days before the tsunami hit.

For Tokai, it was a really narrow escape from a reactor explosion, as we saw above. If the height of the tsunami had been 70cm higher, or if the great earthquake and tsunami had hit Tokai 6months earlier when construction of elevating the seawall had not been fully completed yet, Tokai No.2 nuclear power plant would have exploded. Tokai No.2 plant is the closest one in the nation to the Tokyo metropolitan area, which is 120 km from Tokai in Ibaraki Prefecture. The population within a 30 km radius of Tokai No.2 plant is about 980,000 people, the highest number of people living close to a nuclear power plant in Japan. After knowing what happened at the Tokai plant, strong emotions such as deep fear and great relief welled up among local people.

We would like to take a very brief look at how JAPC elevated the seawall, while TEPC denied the need for elevation in Fukushima. There were at least three steps of initiatives taken before the elevation of the seawall at Tokai-2. First, officials of Ibaraki Prefecture took the initiative of proposing to re-estimate tsunami heights along the Ibaraki coast after 2004 Indian Ocean tsunami. Then, by faithfully reviewing new findings in the fields of history, paleogeography, seismology and so forth, the Ibaraki Tsunami Reviewing Committee, set up by Ibaraki Prefecture, reached the conclusion that the estimation of tsunami heights along the Ibaraki coast should be increased according to the new findings. From that conclusion, JAPC made the decision to elevate the seawall after its own evaluation. A lack of any of these initiatives would have resulted in an explosion at the Tokai No.2 plant.

Then, why did JAPC decide to elevate the seawall while TEPCO decided not to take actions after reviewing similar kind of risk information? There would be several reasons for this. One of them would be that enhanced sense of crisis had been shared in Tokai village after JCO accident. Tokai village, with an initiative of mayor Murakami, came to emphasize the significance of risk communication activities. Tokai village set up a committee to check activities of nuclear industry in

village from a view point of local citizens in 2000, one year after the accident. Since then, JAPC had not been able to ignore risk management consciousness by Tokai village and citizens. Risk communication among JAPC, Tokai village and citizen groups might have push JAPC forward to constructing higher seawall due to a request by Ibaraki Prefecture.

Changes in opinion occur?

1) Local citizens

The Fukushima nuclear accidents revealed that nuclear power plants really can explode in a technologically advanced country, that the information that people needed was not released in time in this information age, and that actual evacuation was totally different from the evacuation drills which were carried out every year.

In the post-3.11 period, “evacuation” has become a new symbolic term that local governments and ordinary citizens take seriously when considering emergency planning. The formulation of evacuation plans is one of the requirements for the restarting of a nuclear power plant. One anti-nuclear activist said as follows.

“We can’t sit at the table with local pro-nuclear politicians to talk about restarting Tokai No.2 since nothing is negotiable. But we can talk with them about how emergency evacuation after an accident should be carried out. Local pro-nuclear politicians admit that evacuation is worth considering.” [1]

Now, anti-nuclear members in Ibaraki raise the question of whether it is possible for local governments to formulate effective evacuation with a surrounding population of 1,200,000.

If Tokai No.2 plant were not allowed to restart due to the difficulty of making evacuation plans, then it would pose an environmental justice question in the nuclear policies of Japan. It means that a smaller population makes an easier evacuation possible. It is not a racial issue, but a rural versus urban issue where rural areas have been “sacrifice zones” for development of urban areas (Bullard, 1990=1994). Again, rural, remote, and less industrial areas that seemingly have no options outside of nuclear energy will be the target for the site of a nuclear power plant while urban areas enjoy the benefit of risky energy production. It is necessary to consider emergency evacuation, but we need to be concerned about its implication.

Locals in Tokai Village and neighboring cities who realized the nuclear accidents would result in the destruction of their ordinary life are more opposed to the restart of Tokai No.2 plant. As Figure 2 shows, the results of a survey conducted by Ibaraki University in 2014 showed that over 40 % of the respondents think that Tokai No.2 should be “prepared for decommissioning while it has stopped.” The second most common answer (26.1%) was that it shouldn’t be restarted until there are thorough measures for earthquakes and tsunami. On the contrary, the number of respondents who agreed with “constructing a new type reactor” (8.3%) and “restarting the reactor as soon as possible”(5.9%) fell below 10%.

[1] Interview by author with a local activist in July, 2014.

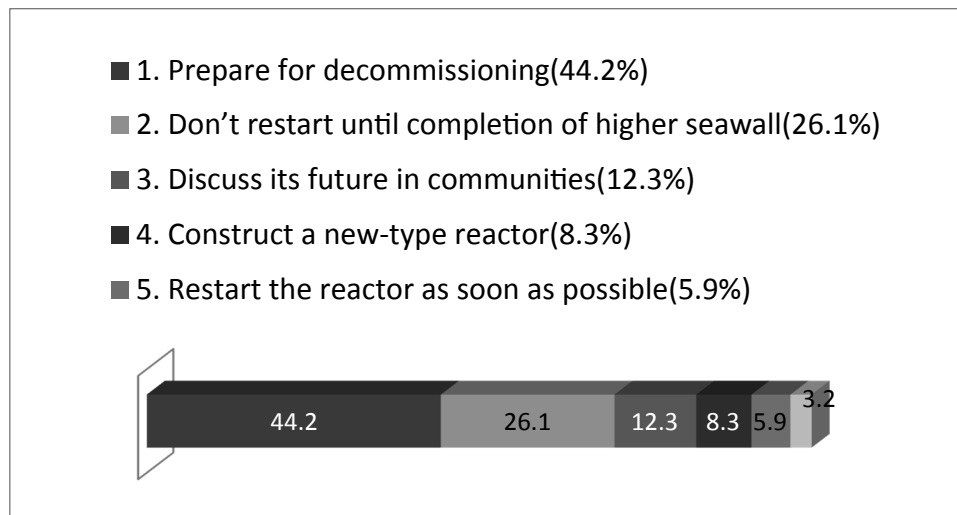


Figure 2. Local Opinion over Suspended TOKAI-2(2014)

Source: Shibuya (2014)

2) Local industry

Tokai Village and the Tokai Commerce and Industrial Association jointly conducted a survey with the help of Ibaraki University in 2014 to grasp the status of the local economy in Tokai Village, which had tended to be stagnant since the great disaster of 2011. Answers were collected by 349 companies. The response rate was 46.6%. The results of this survey were supposed to provide basic information to make policies for reconstructing the industry in order to achieve further economic growth in the village. The results show that local industries have different opinions among them in regard to the reoperation of Tokai No.2, which has been shut down since 3.11, 2011, although the focus of this survey was not limited to the issue of the reoperation of nuclear power plant Tokai No.2. We would like to emphasize that it is not only the local citizens and anti-nuclear activists but also some of the local industries that have the opinion that Tokai No.2 should be decommissioned, even though the local economy has been sluggish and become worse than that of neighboring cities. Although local economic leaders strongly support restarting Tokai-2 plant, local industries as a whole no longer have a united voice concerning nuclear energy.

Citizen Science

One of new emergent actions in Tokai and neighboring communities at post-3.11 period is citizen science. Local mothers organized anti-nuclear groups in Tokai and nearby cities, and they are connected each other for sharing information.

For example, they collected and mapped information of nuclear wastes located in Tokai through information disclosure and showed it to the local people. Another group successfully set up the fund to support health survey for children and adults in Kanto-area, such as Ibaraki, Chiba, Tochigi and Gunma. This group has been conducting medical examination of the thyroid gland by their own with support of doctors. Now it hasn't been odd any longer for ordinal people to buy and use the radiation

meter in their living environments. Individuals and many groups measure the radiation level of air, soil and foods, sometime the human body now. These citizen science activities seem to foster citizen empowerments by many aspects.

Networking of neighboring municipalities

New participants in the debate on restarting Tokai No.2 plant are neighboring municipalities, which claimed to have a voice in decisions made about nuclear power plants. Before the 3.11 disaster, it was only government bodies hosting plants, like Tokai Village and the prefecture, that had safety agreement with utility companies. In the Fukushima disaster, those areas to which residents were forced to evacuate from their hometowns were not limited to municipalities hosting nuclear power plants. Due to the fact that Tokai No.2 almost exploded, not only Tokai Village, but also neighboring municipalities took the matter very seriously.

In Ibaraki, Tokai and fifteen neighboring municipalities required JAPC to conclude the Safety Agreement with these cities, towns and one village, claiming the right to have a voice on the issue of restarting the Tokai-2 reactor. Interested parties seeking to have a voice are not common in Japan since 3.11. It is seen only in Tokai, Ibaraki and Onagawa, Miyagi, which were both seriously affected by earthquakes and tsunami.

Conclusion

Since 3.11, concerned citizens formed anti-nuclear groups in many communities in Ibaraki, and they exercise citizen science to understand and evaluate situations of polluted environments from the perspective of ordinary people. The local political leader of Tokai Village declared his stance against nuclear energy, while local commerce and industries have eagerly sought to restart Tokai No.2 plant and operate it as before. In Tokai Village, even though no one can say whether the local government will accept or deny having nuclear energy production again, they are discussing the possibility of community development without nuclear energy promotion. Neighboring municipalities are networking each other to have a voice over restart of a nuclear power plant. These are whole new situations in Tokai in its half-century history.

As I mentioned above, it seems that Tokai Village and neighboring municipalities are having difficulties in formulating evacuation planning because Tokai No.2 plant is located in an industrial and more populated area. We need to consider evacuation seriously as long as nuclear facilities are located in communities. However, as we saw above, evacuation as a requirement for the restarting of a reactor implies an unfair policy for less populated, remote areas. This is an environmental justice issue. We need to observe carefully which nuclear power plants are reopened, and which are not.

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Challenges to overcome social gaps through coproduction

– Practical action research in Kashiwa and Iwaki

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1 Circumstances Surrounding Kashiwan Farming Products after 3.11 and the launch of the Roundtable for “Kashiwan Products for the Kashiwan People”

This paper does not aim to describe the whole picture of the tsunami or nuclear disaster, but instead introduces a unique local civic action and its evaluation in which I was deeply involved as an action research.

The main field of my paper is Kashiwa city in Chiba prefecture, well known as a bedroom suburb 40 km away from central Tokyo. Kashiwa is also known as an important urban farming area that includes, for example, the biggest turnip crop in Japan. After the radioactive contamination in rainwater on March 21, 2011, Kashiwa and its surrounding area lapsed into the most serious “hotspot” of radioactive pollution within the greater Tokyo region, even though Kashiwa is 200 km away from the Fukushima Daiichi Nuclear Power Plant.

Although Kashiwa city government had started recording the radioactivity measurements for local farming products from the end of July, it did not lead to restoration of consumer confidence, and many parents were anxious about school lunches made from local farming products. Citizens’ reluctance to buying local farming products reached a peak in November 2011 after the media coverage of the “Nedo case,” which reported the existence of a “hyperconcentrated hotspot” in the midst of a residential area in Kashiwa. During this critical period, Kashiwa’s biggest farmers’ market suffered an almost 40% drop in sales relative to the previous year.

Under these circumstances, my friends and I convened the Roundtable meeting for “Kashiwan Products for the Kashiwan People” to resolve problems through consumer–producer coproduction. We called on various local stakeholders with different interests to become involved in this meeting, which included four local farmers, two supermarket owners, two restaurant chefs, three consumers, including housewives in their childbearing years who had already been actively transmitting information about local radioactive pollution, and an NPO for radioactive measurement. The organizer of the Roundtable

was *Street Breakers*, a local civic group for city development, which had managed monthly farmer's market events in central Kashiwa from 2009, and myself, a core member of *Street Breakers*, as the director.

Our most important motivation to start the Roundtable was to avoid the needless confrontations between consumers and producers within our hometown, which could be easily found on twitter or internet bulletin boards during that period. We recognized that the most tragic result of the nuclear disaster was the social divide within the community, and we hoped to remedy the gap through coproduction from a wide range of citizens.

However, the atmosphere of the first meeting of the Roundtable was very gloomy, resulting in one farmer representative assuming that the consumers who proclaimed the risk of the radioactivity must have been hostile to farmers.

Behind the difficulty establishing mutual understanding between the consumers and farmers, I found an essential difference in their sense of mobility. If consumers could not make the costly choice to move from the polluted Kashiwa city, they could easily transfer part of their body to a safer area; that is to say, the free choice of food products from international products on the shelves of supermarkets. On the other hand, farmers could not so easily imagine leaving their ancestral farms. They felt that the well-meant advice encouraging farmers in the Kashiwa area to move to a safer area and reestablish their farming operations there was heartless harassment. As Zygmund Bauman noted in *Globalization*, what made the social gap in this situation was the highly asymmetric nature of mobility between the consumers and producers; in Bauman's words, "tourist" or "chooser" and "locally tied people."

2 Goal of the Roundtable

As I will discuss in detail shortly, we had to foster step-by-step trust and mutual understanding by finding attachments to our hometown, Kashiwa, which were shared by all members of the Roundtable. Only then could we determine goals and courses of actions of the Roundtable.

First, the Roundtable members confirmed that our actions should have been based on the ALARA principle, that is, the levels of radiation had to be "As Low As Reasonably Achievable," because radiation was always considered harmful with no safety threshold; "acceptable" risk and the standardized limit of radioactive contamination had to be both scientifically and socially determined. We defined the purpose of the Roundtable as a challenge to the social and deliberate discussion of an independent limited standard of radioactive contamination and the confidence of measurement method for Kashiwan farming products. We aimed to arrive at an agreement within the Roundtable like "consensus conference" which consisted of the various local stakeholders with different interests.

Second, the Roundtable members engaged in face-to-face risk communication with the philosophy that "local production for local consumption". We thought this would surely appeal to the consumers because direct measurements of radioactivity contamination with the consumer's own eyes might bring a greater feeling of safety than merely choosing a production area.

Third, the Roundtable members determined to cope with this crisis through coproduction of

local consumers and farmers, fostering a trusting relationship between them. What counted most here was building trusting relationships with consumers, which had been essential for small-sized urban farmers before the nuclear disaster occurred. Furthermore, Roundtable members thought that this crisis could be turned into an opportunity for urban farmers if they could transmit adequate information of radioactive contamination of their own farming products and show their loyalty.

Fourth, the Roundtable members aimed to present a second opinion about radioactive contamination using a measurement method that was independent from the local government's inspection. We thought there must have been a demand by local consumers for a second opinion on the basis of the questionnaire presented by the Roundtable to mothers of three kindergarten children in Autumn of 2011, which revealed the following findings: the more local farm products a customer had bought before the disaster, the more reluctant they are to buy the products after the disaster because they had naturally been food-safety-oriented customers; those customers had a strong tendency to rely not on inspections conducted by the local government but on those conducted by local citizens or themselves. In addition, some of these respondents even chose to elaborate on their ambivalent feelings, indicating their regret about their reluctance in buying local farming products.

These results indicated that parents with very young children who had significant anxiety about radioactivity were still potentially good customers for local farmers if the Roundtable could show convincing measurement data that was independent from local government's announcements. However, the Roundtable was not attempting to deny the quality of the government's radioactivity inspection system and its data. As we firmly believed, what was more important for the solution was to complement the government's insufficient inspection system adequately rather than to accuse the government's failure. Therefore, we aimed to show the farm-to-farm measurement data as an independent second opinion, which only locally rooted civic actions like us could form.

3 What we have done in Kashiwa — “Find Your Farmer” Project

After approximately six months of deliberate discussions, we finally developed an original and convincing radioactivity measurement system and started to post the results of the measurements farm-to-farm and item-by-item on the Roundtable's website beginning from March 2012—nearly one year after the disaster. We named our independent measurement project “Find Your Farmer” with our message that the Roundtable's intent was not to make a radioactive-free declaration for Kashiwan vegetables, but to introduce reliable local farmers who were loyally checking their own vegetables and farm fields. What made Roundtable's independent radioactivity measurement method highly convincing was linking the measurements of individual farmer's vegetables with the measurements of soil of every farm field, in turn preventing the exceptionally highly polluted crop from slipping through the cracks.

Next are photos of the Roundtable's actual method of radioactivity measurement. By battery-driven “Becquerel Monitors,” we measured the five samples of soil taken from the four corners and the center of every farm from which an individual farmer grows one vegetable, and identified the most radioactivity contaminated spot in that farm. Using this soil data and some other factors, such

as kalium concentration in the soil or the type of soil texture, we identified the vegetables with the highest polluted risk in that farmer's farmland. Then, we picked the vegetable as the sample and submitted it to the measurement institute managed by the NPO for more detailed examination.

Another important characteristic of "Find Your Farmer" project was that citizen or consumer volunteers participated in all stages of radioactivity checks, from the farm field to the measurement institute. By this, the Roundtable aimed to make our measurement process transparent, and the 15 local farmers who accepted this open process of radioactivity measurements earned a by-product beyond their expectation. The cooperative measurements with consumer volunteers itself became the best opportunity for communication and mutual understanding between local consumers and producers, and the farmers who showed their sincerity through this measurement processes began to win the sympathies and support from local consumers.

The Roundtable then began publishing the local farmers' vegetables on our "Find Your Farmer" website farm-to-farm and item-by-item, which were confirmed by our method as strictly below 20 Becquerel per kilogram. For farmers, 20 Becquerel could be a target level their vegetables had to clear even for exceptional outliers, and for consumers who had learned about radioactivity scientifically, 20 Becquerel per kilogram could be the "acceptable" risk. Supermarket owners thought that local vegetables below 20 Becquerel could compare with any other regions' products, and the NPO could technologically and scientifically certify this level of radioactivity measurement within their limited budgets. As a result, our independent standard was accepted as a kind of compromise among Roundtable members with different interests after three months of deliberate discussions. The value came from the process of deliberate determination itself rather than the scientific basis of this figure of 20 Becquerel. I think that the Roundtable could take pride in this process as a localized actual practice of the ALARA principle, which no one has tried in any other areas.

4 Evaluation of the project — Possibility and limitation of local community-based Coproduction

Then, I would like to make a self-evaluation of the Roundtable's project. Throughout this project, I have felt the possibility of locally based coproduction useful for overcoming the social gap between people with different interests. To recognize that all members of the Roundtable shared an attachment to Kashiwa as people belonging to the same community was the first step toward mutual understanding. By highlighting locality, farmers could create the human relationship, which was more than just a consumer-producer relationship. This could provide the impetus for dialogue with local consumers. For example, a farmer representative in the Roundtable who had suffered a 60% loss of his customers began to find new customers among the parents of his son's kindergarten friends through face-to-face everyday communications as same parents. Furthermore, through these processes, the consumer representatives in the Roundtable got the opportunity to shift their purpose for participating in this project from "helping the local farmers" to "getting back fresh veggies from my own town." In other words, they became subjectively involved with the contamination problem of farming products keeping their consumer's viewpoint in mind.

Another important factor of the Roundtable's accomplishment was to narrow down the target of the project. The strategy of the "Find Your Farmer" project was to overcome the gap between consumers and farmers by building the locally based sense of solidarity. In essence, this project's aim was not to recover the confidence for the Kashiwan farming products as a whole, but rather to link potential local consumers with the local distribution-oriented farmers. This project fits perfectly for small-sized urban farmers who originally targeted a kind of niche market by the SIPS marketing model, a current Japanese marketing jargon meaning the sales strategy of making customers sympathize with, identify with, participate in, sharing and spreading the commodities.

Thus, this narrow targeting project of the Roundtable in Kashiwa should not be regarded as a universally "righteous" civic action. Since the members of the Roundtable fully realized that condition, we were careful not to step into "scientifically correct" risk judgments and, therefore, avoided absolutes within our standards, imposing them on customers in general. However, this policy also led to an essential limitation of the project. While "Find Your Farmer" project was a successful local coproduction specialized for the small-sized urban farmer who required a limited market, the Roundtable had no means to communicate with people outside the local community who did not share the locally based value and who had very different risk judgments. This is clearly insufficient as a social action for overcoming the serious social gap in general after the nuclear disaster. Therefore, I think it would be ideal if many Roundtables of local stakeholders like Kashiwa's case are launched in many areas and deliberately determined the inspection system fitting for each area, then the social gap in general are gradually remedied as the accumulation of many attempts in each localities.

It can be said that the efforts of the Roundtable in Kashiwa is showing a possibility of a sociological solution and intervention in the problems around radioactive pollution. Finally, I would like to discuss other sociological questions that have been realized as a result of this project in Kashiwa.

First. What is "ethical" for consumers after a nuclear disaster? Now that scientists and honest farmers in Fukushima have thoroughly revealed the pollution situation and mechanism of radioactive transfers, is it better to choose farming products just by the name of the production area or just shut one's eyes to the farmers' effort and leave the consumer-producer divide?

Second. How can we protest against the nuclear power plant without exaggerating the future health impacts of radiation, which might ultimately lead to "discrimination" against farming products and farmers in Fukushima or "hotspots"? After the experiences of directions of the Roundtable, I have begun to think that it is possible to unite people with different interests and risk judgments for radioactivity again by redefining the nuclear disaster as what breaks the community with its inevitable uncertainty.

5 Another Ongoing Challenge in Iwaki –Applicable to Fukushima's Fishing Industry

Finally, at the end of this paper, I would like to introduce an ongoing project, which I have been involved in since the autumn of 2013, after the completion of the Roundtable in Kashiwa. This new project is in Iwaki, a coastal city of Fukushima prefecture, and it is called *Umi-labo*, which means "Ocean Lab." The aim of *Umi-labo* is to have citizens research and publish on the situation of the area of the

ocean near the site of the nuclear power plant accidents. These citizens would include local residents as well as local sport and professional fishermen, all supported by academic experts. As an academic advisor, I have been urging the *Umi-labo* project to take some important points into consideration, in the light of the lessons learned from the Roundtable in Kashiwa, which is previously stated.

First, independent radioactivity measurement may be an important step to open a dialog among people with different risk evaluations. Citizens, boarding fishing boat sailing out from the fishery harbor of Hisa-no-hama, Iwaki, collect soil from the sea bottom and coastal fishes such as flounder, greenling and rockfish in waters just 1.5 kilometers away from the Fukushima Daiichi Nuclear Power Plant. They then measure the radioactivity contained in these samples at the Aquamarine Fukushima aquarium in Iwaki and publish the results on the Internet. That is to say, in the *Umi-labo* project, with their own hands, citizens take samples from waters where exclusively TEPCO (Tokyo Electric Power Company) had previously investigated, measure them in a politically neutral and generally familiar institution, and publish the data for the public to review to check data from other sources, that is to take a second opinion. The attitude underlying *Umi-labo* is now also broadly supported by people in the anti-nuclear movement who take the radioactivity risk in Fukushima quite seriously and are quite suspicious of TEPCO's accountability.

Second, the most important thing I gained from the Roundtable project in Kashiwa is in-depth understanding on the characteristics of the area and the object of investigation that the project focuses on. Although both the Roundtable in Kashiwa and *Umi-labo* are motivated by the desire of local people to retrieve the precious local environment and its food products, the target strategy of Kashiwa's agricultural project needed to be altered to apply to the Iwaki fishery project due to differences in local characteristics. In Kashiwa, a suburban area, "Kashiwan Products for the Kashiwan People" was the key motto, but in Iwaki, 200 kilometers from Tokyo, *Umi-labo* must build not only a locally based sense of solidarity but also sympathy and understanding over a greater geographic area. Therefore, *Umi-labo* has emphasized the recruitment of participants from Tokyo, including influential journalists and community leaders, by making its marine survey a type of "study tour," in cooperation with the tourism industry, including Aquamarine Fukushima.

Regarding the characteristics of the object of investigation, consumers normally have much less knowledge about coastal fish such as flounder, greenling, and rockfish, compared with their knowledge of agricultural crops. Meanwhile, the extent of radioactive contamination differs for each fish species, but this risk cannot be understood without knowing the feeding habits, mobility, and growth rate of each fish species. Thus, when *Umi-labo* publishes the data of measurements of radioactivity for these fish, it will be essential to have this type of bionomic knowledge transmitted to the audience. Communication of radioactive risks of fish can thus appear difficult, but it may be a case of a crisis that can be turned into an opportunity. For the Japanese fishing industry, one of whose long-standing concerns is the consumer shift away from a fish diet; hence, now would be a good time to attract the attention of the many consumers eager for information about the contamination of marine products from Fukushima to the bionomics of various fish species, marine ecology, and the fascination of various fish-eating cultures. I am certain that this epoch-making and citizen-led project, *Umi-labo*,

can play a key role in not only the communication of the risk of contamination of fish from the coast of Fukushima but also the formation of a good consumer–producer relationship in the field of the fishing industry.

