

Article

Lessons from Japanese environmental reform movement: The risk communication between grass-roots experts and local people

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This paper attempts to show the importance of the risk communication between grass-roots experts and local people from Japanese Environmental Reform Movement. The paper also tries to illustrate that this risk communication causes spontaneous education and keeps the local people and environment from risk, as Beck mentioned in his book "Risk Society" (Beck, 1992). Spontaneous education means the understanding of environmental problems by ordinary local people that comes from grass-roots experts. To analyze this risk communication, the following two hypotheses have been created: 1) the crucial role played by intermediary organization, Environmental NGOs etc; and 2) the crucial role of "Grass-Roots Experts", scientists and other professionals not from the governmental missions or business establishment. By showing the importance of the above two factors, the paper tries to clearly indicate why government sponsored development programs is because they cannot be sufficient by themselves, but must involve direct citizen activation and participation. In this paper, this is explained through a case study, a revolutionary local research group, the Matsumura Research Group, in the Mishima-Numazu-Shimizu (MNS) movement in 1964 in Japan from present points of views.

Key words: Risk communication, grass-roots experts, intermediary organization, MNS movement.

INTRODUCTION

Science and technology are more prevalent in our present societies and have greater effects on our lives, so we need to realize and recognize the system to avoid environmental risks in our lives, which tend to be more complicated today. We normally depend on experts to inform us about the risk.

Beck says "risk reflects class pattern. Risk is inclined to exist in the lower class. In other words, poverty attracts risk. The wealthy classes can purchase safety and are free from risk because they have income, power and education" (Beck, 1992: 35). The paper focuses on the power of education, the spontaneous education, to avoid the risk in the local industrial development context. In particular, the paper seeks to answer two questions: "Who conducts the education?" and "How is this education disseminated?" by evaluating the example of a Japanese environmental reform movement, the MNS movement.

To answer these questions, the following two hypotheses are set up: 1) the crucial role played by intermediary organizations; and 2) the crucial role of

"grass-roots experts", scientists and other professionals not from the government or business establishments.

In order to examine and verify the above two hypotheses, the paper looks at the local research group (The Matsumura Research Group) which was revolutionary and was raised from the local people in Japan.

Literature review

Japanese scholars describe the MNS movement as "The first failure of capitalist thinking" in Japan. Since the birth of the MNS movement, there has been much research carried out on different study areas after the Movement. There are three main areas of study about the MNS movement: Political Economics, Education, and Sociology.

In regards to Political Economics, Kenichi Miyamoto analyzed the successful elements of the Movement. Jun Ui evaluated the movement in the economical context.

Table 1. The Scale of the 2nd Plan.

Company (Location)	Use	Amount	Scale
Fuji Oil Company (Mishima city)	Oil refinery	150 thousand Barrels/day	One of the Biggest Plants
Sumitomo Chemical Company (Shimizu town)	Ethylene production	200 thousand Tons/day	The Largest Plant
Tokyo Electric Power Company (Numazu city)	Thermal Power	1.40 million Kw	Annual heavy oil consumption 2 million kl

Source: Kogai to Kyouiku Kenkyukai Gakusyu no Tebiki Hensyuiinkai-hen (1977), Gakusyu no Tebiki Kankyo-Kougai (The Text Book on Pollution Studies). Porupu Kyouiku Kaihatsu Kenkyusho.

With reference to Education, Seiichi Miyahara found the role of school teachers for regional society and Tatsuo Fukushima gave attention to Mr. Nishioka, a high school teacher at Numazu Technical High School. Sadahiko Fujioka stated that the movement led to the beginning of environmental education in Japan.

In respect of the Sociological research, there are a few studies. The sociologists looked at this movement from the prevention aspects and participant's variety. Takahashi ed. have described monograph study on Shimizu town in this movement. Nobuko Iijima located this movement in the context of environmental sociology.

Theoretical review

The paper examines this movement from three different theoretical viewpoints of sociology. The first is Zyukuken/Zyukiken (Japanese theory), the second is Risk Society and the third is STS perspective.

Japanese theoretical framework of environmental sociology, Zyukuken/Zyuekiken is very useful to analyze massive industrial developments. Kajita shows this theoretical framework in his "Technocracy and Social Movement" (1998). Zyukuken means "suffering spheres". It represents the areas affected by development negatively; they mainly indicate the affected local people. On the other hand, Zyuekiken means "profit spheres". It shows the positive side of development; they mainly imply the interest groups, especially companies and technocrats. Depending on the theory, massive industrial development problems can be analyzed by "Local people's Viewpoints" and "Technocrats' Viewpoints". Local people's viewpoints mention feelings of repression. The affected local people think of the development as human rights issues. On the other hand, technocrats' viewpoints indicate management thinking. Technocrats have a tendency to think about the development as relative problems against the total society's benefits.

Secondly, the paper tries to use Beck's "Risk Society". The system of our society tends to be complicated and vague, just like a black box. Risk society, as Beck system which Giddens presented (Giddens, 1990:27). The paper tries to see the point that shows the

importance of the risk communication between grass-roots experts and local people in this risk society.

Thirdly, the paper tries to access from an STS (Science, Technology and Society) perspective. This perspective is very effective to analyze the risk communication between experts and society. This paper used the points that Hirakawa indicates (Hirakawa, 1998:5). The following three points which he mentioned represent the difficulties in communication among experts and between experts and society: 1) Conflicts among different majors of experts' groups, 2) conflicts between experts and society and 3) conflicts between experts and bureaucrats. The suggestion means the levels of understanding are different. Experts find it difficult to monitor the level of understanding of local people. That risk communication also is the same among experts and between experts and bureaucrats who give the budget to them.

Methodology

The evidence from the persons who participated in the environmental movements during the Japanese rapid economic growth after the WW□ is decreasing as time passes. It has also been difficult to collect primary data. Moreover, it is apparent that qualitative and quantitative research is decreasing from the point of present views

For that reason, this research is mainly conducted by means of fieldwork, collecting primary documents and carrying out in-depth and extensive interviews from 1997 to 2003.

RE-EXAMINATION OF THE MNS MOVEMENT

The area this paper deals with is in the southeastern part of Shizuoka prefecture. Shizuoka prefecture is situated between Nagoya and Tokyo. The National government and local councils proposed in 1963, the building of an oil refinery, a chemical factory and an electric power station in an area of outstanding natural beauty near Mount Fuji (Table 1). The national government intended to join three cities into one large industrial complex. The cities destined for this dubious honor are Mishima, Numazu and Shimizu.

The paper indicates the outline of the MNS movement by following chronological table (Table 2). The paper also tries to clarify the revolutionary events in the MNS movement and the main impacts of the MNS movement on the environmental movements and environmental policies in Japan.

Table 2. The MNS movement.

	Background
September, 1960	Masuo Saitoh, Governor of Shizuoka prefecture, proposes the building of a Petrochemical complex: The first plan consists of four companies (Arabia Oil, Sumitomo Chemical, Showa Denko and Tokyo Electronic Power). The first plan is abandoned due to unfavorable economic conditions.
May, 1963	Shizuoka prefecture's government suggests the union of Numazu-city, Mishima-city and Shimizu-cho into one giant industrial complex.
July, 1963	National government appoints this area as a "Kogyo seibi tokubetsu chiiiki (Special Area for Industrial Development)"
October, 1963	Proposal of a Second plan. The governors of Shizuoka prefecture launch a seven-year plan.
December, 1963	The petrochemical Complex Plan is announced by the chief officer of Shizuoka prefecture in Numazu city. <Local citizens action groups started> -Many meetings are held and environmental education seminars are enacted. -Inspection tours to Yokkaichi city are conducted. -Bribing problems concerning land sales in Nakazato area.
18 May, 1964	Taizo Hasegawa, Mayor of Mishima city, announces the result of Matsumura's EIA (Environmental Impact Assessment).
23 May, 1964	Mayor of Mishima city refuses to accept the plan.
1 July, 1964	A Plenary session was held in the Council building in Shizuoka city.
27 July, 1964	The results of Kurokawa's (Government Research Group) EIA are released and the figures suggest that pollution would not be an issue.
1 August, 1964	Discussion between Kurokawa research group and Matsumura research group in Tokyo Metropolitan Area (It becomes evident that the Kurokawa's optimistic evaluation of July 27 th is evasive and ambiguous) (Iizima, 1979).
13 September, 1964	A large demonstration is held in Numazu city attended by a third of its voting population. (25,000 people).
18 September, 1964	Public pressure forces the Mayor of Numazu city to reject the proposed complex.
29 October, 1964	The Mayor of Shimizu follows suit with the Mayor of Numazu.

Source: Kan (1966) "Mishima-Numazu Sekiyu Konbinat Hantaiundo to Kougyoukoukou no Kyoushitati" (The Anti-Petrochemical Complex Movement and the Teachers of Technical High School) Gizyutushikenkyu Gendaigizyutushikenkyukaikaishi. Sakai (1984) Mienaikogaitono Tatakai (Fight against Invisible Pollution) Mishimaminposha.

Revolutionary events in the MNS movement

There were outstanding events in the MNS movement. One was the survey carried out by students of Numazu Technical High School and East Numazu High School. The other was a few hundred education programs (mainly for local citizens).

In regards to the student's survey, the survey carried out by students of Numazu Technical High School consists of three types by using local materials which were KOINOBORI, empty bottles and thermometers. The KOINOBORI were used in the air current survey that was conducted by about 300 students. The students made some air current maps that showed that the government's appraisal of wind direction was incorrect. These maps gave decisive data to the Matsumura research group. Empty bottles were used for the water current survey. Thermometers enabled the students to make some maps showing the variation of temperatures.

On the other hand, the results of the survey reported by students of East Numazu High School which were called "Petrochemical Complex Project in Numazu and Mishima Area" was conducted by a Local Research Club. They researched it by using social scientific methods (including the survey in Yokkaichi City). The MNS activists used this report.

With reference to the education programs, many education programs were conducted by Numazu Technical High School teachers. They were held at schools, at the town halls and in the streets, because of the programs, local citizens (including farmers and fishermen) became eager to learn. Local citizens wanted to know what was going on in their locality.

The main impacts of the MNS movement

The following is the main impacts of the MNS movement on the environmental movements and environmental policies in Japan.

In regards to the environmental movements, the MNS movement has provided a lot of experience as follows: the prevention movement against pollution, local government reform movement, legality action in the movement, conducting of independent research and implementation of environmental education programs (Kimiya, 1974: 201 - 202). After the movement, Kawasaki City, Tokyo Metropolitan Area and Kyoto City became reformist local governments, which tried to control pollution more seriously than the national government. (Kogai to Kyouiku Kenkyukai Gakusyu no Tebiki Hensyuiinkai-hen, 1977:45)

With reference to the impact on the government, a high-ranking government officer, Mr. Michio Hashimoto, confessed as follows:

"We (the government) thought we had lost when the Numazu citizens flew those KOINOBORI (carp-shaped streamers) for research purpose. Besides that we also realized that we needed to make laws governing pollution. If we had not done it, we could have not been able to set up any MNS type projects" (Hashimoto, 1988:70).

This reaction shows that the national government was afraid that this type of movement would spread all over Japan. Consequently, many environmental laws were enacted after the establishment of the movement. For example, The Kogai Boshi Jigyodan

Table 3. Matsumura research group.

Commissioner	Taizo Hasegawa (Mayor of Mishima City)	
Representative	Seiji Matsumura (Director of the genetic variation division)	
Research Members	Sachio Torita (Industrial Chemistry)* ²	Numazu Technical High School
Research Members	Shiro Nagaoka (Industrial Chemistry)* ³	Numazu Technical High School
Research Members	Akio Nishioka (Meteorology)* ⁴	Numazu Technical High School
Research Members	Toru Yoshizawa (Water)* ⁵	Numazu Technical High School
Research Members	Ei Matsunaga(Public Health)* ⁶	National Institute of Genetics
Research Members	Seiji Matsumura(Botany)* ⁷	National Institute of Genetics

Source: Sakai (1984) *Mienaikogaitono Tatakai* (Fight against Invisible Pollution) Mishimaminposha.

(Environmental Pollution Control Service Corporation) was established in October 1965 and The Basic Law for Environmental Pollution Control was promulgated in August, 1967.

THE FORMATION OF THE MATSUMURA RESEARCH GROUP AGAINST THE KUROKAWA RESEARCH GROUP

To answer "Who could conduct the education?", the paper refers to the birth of the Matsumura Research Group, outlines of the two research groups and the formation of the Matsumura Research Group as follows:

The birth of the Matsumura research group

The citizens of this area launched the MNS movement (Mishima, Numazu and Shimizu) which was opposed to massive industrial development, as the paper has already shown, because they believed the result would lead to severe levels of pollution. Out of the MNS movement, the Matsumura research group was formed by the Mayor of Mishima city in March, 1964.

At first the national government which proposed industrial development in Shizuoka prefecture organized the national research group to explain the development to the local people. After that, the Mayor of Mishima city organized the local research group to stand up to the national government. The results of the two different research groups were quite different and conflict between the two research groups broke out. The conflict between the national research group (The Kurokawa Research Group) and the local research group (The Matsumura Research Group) resulted in the victory of "self assessment" by the local research group in 1964.

It showed that the "self assessment" by the local research group overcame the "official assessment" by the national research group. It was a rare case not only in 1964, but still every where in the world now.

This fact affected not only the MNS environmental movement but also other Japanese environmental movements and environmental policies after 1964.

This paper tries to analyze the formation of the local research group in the social context.

Outline of the two research groups: National and Local levels

"The Kurokawa Research Group (the national research group) is reliable. It consists of the country's most respected specialists of various fields. They could be called the nation's best brain. On the other hand, the

Matsumura Research Group (the local research group) is unreliable. The members are 2 doctorates of Agriculture and 4 high school teachers. How could they carry out reliable research? In addition, I heard the budget of the Matsumura research group is about 100 thousand yen. So the research could be regarded as a non-scientific thing" (Nishioka, 1970).

At a Plenary session in the Council in Shizuoka Prefecture, Mr. Shiramatsu (Liberal Democratic Party member) criticized the Matsumura Research Group as seen above. The following is the outline of the two research groups.

The Kurokawa Research Group carried out the first largest ever Environmental Impact Assessment (EIA) by the Japanese government in 1964. The representative was Dr. Masatake Kurokawa and the staff consisted of national academics. The budget was about 20 million yen (about 180,000 USD) at that time. The research was carried out by using helicopters and high-tech machines. The Kurokawa Research Group was nominated by the Minister of International Trade and Industry and the Minister of Public Health.

On the other hand, the Matsumura Research Group carried out the EIA by getting the cooperation of local people, including high school students. The representative was Dr. Seiji Matsumura and the staff consisted of two researchers with international experience and local high school teacher (Table 3). The budget was about 100 thousand yen (about 900 USD) at that time. The research was conducted using readily available materials and low-tech manpower. It meant that research people, as well as the local people and high school students, used their own ideas. The Matsumura research group was nominated by the Mayor of Mishima city, Mr. Taizo Hasegawa.

The Formation of the Matsumura Research Group

This paper analyzed the formation of the Matsumura Research Group as follows: 1) Education seminar about pollution held by two high school teachers and a professor. 2) Explanation of estimated pollution levels given to NIG (National Institute of Genetics) by Mr. Nagaoka and Mr. Nishioka (Teachers). 3) Decision by NIG members to reject the petrochemical complex plan. 4) Advice given to Mishima city's mayor (Hasegawa) from NIG members to establish the research committee for EIA. 5) Decision by Hasegawa to reject the proposed petrochemical complex. 6) Acceptance by Numazu Technical High School and NIG to do EIA in the area.

The following are the details of the formation of the Matsumura Research Group. They mainly consist of intensive interviews held with former members of the Matsumura Research Group and primary documents (Table 4).

Table 4. The two different types of research groups.

5th Feb.1964	First educational seminar on pollution is held at Numazu Technical High School (Mr.Nagaoka and Mr.Nishioka give lectures. They are teachers at Numaza Technical High School).
19th Feb.	Mishima citizens' meeting on pollution starts.
14th Mar.	Messrs Nagaoka and Nishioka give lectures at the National Institute of Genetics in Mishima city.
17th Mar.	The Mayor of Mishima city, Hasegawa, presents his idea of how to establish a local research group at a regular council meeting.
24th Mar.	The Minister of International Trade and Industry proposes to the Prefecture's government to dispatch a research group for EIA (Environmental Impact Assessment).
26th Mar.	The national government commissions the Kurokawa Research Group as the executor of the EIA.
1st Apr.	The Mayor of Mishima city, Hasegawa, commissions the Matsumura Research Group for EIA purpose.
6th Apr.	The first meeting of the Matsumura Research Group is held.
10th Apr.	The first meeting of the Kurokawa Research Group is held.
3-5th May	Survey by students of Numazu Technical High School (KOINOBORI air current survey) is conducted during successive national holidays.
13-23 May	The Kurokawa Research Group conducts EIA in the field.
18th May	The Mayor of Mishima city, Hasegawa, announces a midterm report made by the Matsumura Research Group.
23rd May	The Mayor of Mishima city, Hasegawa, makes a proclamation rejecting the petrochemical complex plan.
27th July	The results of Kurokawa's EIA, "The Kurokawa Report" (The Research Report on Industrial Pollution in Numazu-Mishima Area) are released.
29th July	Bid-winning companies' rally begins.
1st Aug.	The discussion between the Kurokawa Research Group and the Matsumura Research Group in Tokyo Metropolitan Area.
1st Sep.	The officers of Numazu city distribute "The Kurokawa Report" to every citizen of Numazu city. The association of Liberal Democratic Party's members makes a statement to the press that the companies are welcome.
13th Sep.	A large demonstration is held in Numazu city attended by a third of its voting Population. (25,000 people)
17th Sep.	Public pressure forces the Mayor of Numazu city to reject the proposed complex.
24th Sep.	The prefecture's governor, Masuo Saitoh, announces his uncertainty about the petrochemical complex plan.
29th Oct.	The Mayor of Shimizu follows suit with the Mayor of Numazu.
16th Jan.1965	The election of Mishima city. Mr. Taizo Hasegawa is re-elected.
15th Apr.	The new principal of Numazu Technical High School, Mr. Takamura, gives his policy platform speech. The oppression of the former Matsumura Research Group's members begin.

Source: 1. Iijima, 1979. Pollution Japan: Historical Chronology. Asahi Evening Press. 2. Kan, 1966. "Mishima-Numazu Sekiyu Konbinat Hantaiundo to Kougyoukoukou no Kyoushitati (Petrochemical Complex and the Teachers of Technical High School)" *Gizyutushikenkyu Gendaigizyutusenkyukaikaishi*. 3. Matsunaga, 1989. *Zinruidengakutotomoni 40nen* (Accompanied with Anthropological Genetics). Midorigizyutsu.

Education seminar about pollution held by two high school teachers and a professor

A first ever educational seminar about pollution was held at Numazu Technical High School, which became the starting point of the Matsumura Research Group. This first seminar for local people was conducted under the Auspices of the Autonomous Association of Shimokanuki area.

The people who lived in Shimokanuki area played a key role in the MNS movement at Numazu city. Especially Gyuga Neighborhood in Shimokanuki area was a center place. The Gyuga neighborhood was a proposed site for an electrical power station. The leader of the neighborhood was Mr. Nishioka, a teacher at Numazu Technical High School. Mr. Nagaoka and Mr. Torita, teachers of industrial chemistry at Numazu Technical High School, explained the impact of sulfur dioxide emissions from a proposed plant to Mr.Nishioka. This event was the origin of the first educational seminar about pollution.

Explanation of the estimated pollution levels given to the NIG (National Institute of Genetics) by Mr. Nagaoka and Mr. Nishioka (Teachers)

Some staff of NIG (National Institute of Genetics) called the Numazu Technical High School teachers, Mr. Nagaoka and Mr. Nishioka, to their office to confirm the estimated pollution levels of a proposed plant. There were two main reasons why the two different institutions, Numazu Technical High School and NIG, became connected.

First, there was the educational seminar about pollution held at Numazu Technical High School as mentioned above. The department of industrial chemistry at Numazu Technical High School was a source of human resources for companies that advance to the area, because of that, the staff of the department could easily get data about the scale of the plants and the amount of oil consumption. Mr. Nagaoka and Mr. Torita calculated the amount of sulfur dioxide emissions. After that, Mr. Nishioka, whose

major was meteorology, researched the impact from his point of view. They gave lectures to the local people about the research results during the mentioned educational seminar. Some staff of the NIG wanted to learn about their research because they did not have enough knowledge of industrial chemistry. This was the first reason.

Secondly, Mr. Nagaoka participated at an Area Meeting of Mishima City on Pollution. The reason was the meeting members wanted to know the impact of sulfur dioxide emissions because there were no experts at Mishima City at that time. So, Mr. Nagaoka was connected with Mishima citizens including NIG members.

Owing to these above mentioned reasons, NIG members knew the activities of the high school teachers, and they proposed to the principal of the high school to dispatch the teachers as lecturers.

Decision by the NIG members to refuse the petrochemical complex plan

"The smog will go into the endless universe" (Fukushima, 1968:33). The following were the two main reasons for the NIG members to make a decision. First were the research problems of NIG members that they would encounter in their study. They easily anticipated the impact of pollution during their research because many members could have known the impact of pollution from their experience while they were studying abroad. It could be shown by Mr. Nishioka's confession as follows:

"They listened to the lectures and compared the contexts with the foreign cases" (Fukushima, 1968:33).

Second was their concern as researchers about the impact of pollution on the citizens. The concern was caused by inaccurate explanations given by prefecture's staff at the meeting in Mishima city as mentioned above. They also said:

"The Japanese have been familiar with the smog since ancient times" (Kogai to Kyouiku Kenkyukai Gakusyu no Tebiki Hensyuiinkai-hen, 1977).

NIG members lost their patience with the explanation by the staff.

Advice given to Mishima City's Mayor (Hasegawa) from the NIG members to establish the research committee for EIA

Dr. Tajima, Dr. Matsumura and Dr. Otomo, managers of NIG visited the Mayor of Mishima city on 17th May, 1964. They proposed that the Mayor should establish the committee for EIA (Environmental Impact Assessment). They said,

"As researchers, we were worried about the anticipated level of pollution. So, we held a study meeting to discuss it. After that we decided to give advice on establishing the research committee for EIA to the Mayor of the Mishima city" (Tsuchiya, 1989:52).

Decision by Hasegawa to reject the proposed petrochemical complex

During the regular meeting of Mishima city on 17th May, 1964, Mr. Taizo Hasegawa, the Mayor of Mishima city, said the following:

"I can propose to some specialists to research the anticipated level of pollution. After the announcement of the research results, I think, we should take into account the reactions of the citizens" (Hoshino et al., 1993: 84-85).

Finally the Mayor, Mr. Taizo Hasegawa, dispatched the independent research group on 1st April 1964.

Acceptance of Numazu Technical High School and NIG to do EIA in the area

The attitudes of Dr. Matsumura, the representative of the Matsumura Research Group and Mr. Nakamura, the principal of Numazu Technical High School, were meaningful in establishing the independent research group.

The reason for the acceptance by Dr. Matsumura as the representative of the Matsumura Research Group was because of his mindful judgment. Dr. Matsumura thought it was dangerous for teachers of a prefecture high school to become the representative of the Matsumura Research Group. This was because the Matsumura Research Group had the possibility to oppose the prefecture's government. Since the NIG was an independent research institute, Dr. Matsumura agreed to become the representative of the Matsumura Research Group. Moreover, Dr. Matsumura never allowed the media to release the names of high school teachers listed in the Matsumura Research Group.

The judgement of Mr. Nakamura, the principal of Numazu Technical high school, enabled the teachers to participate in the Matsumura Research Group. Mr. Nakamura thought it was no problem for the teachers to participate in independent research within their private lives. His judgment also enabled the students to participate in independent research. So, the "KOINOBORI research" was realized.

Conclusion

To examine "How could we have the education?", "How do we live in the risk society?", the paper investigates the circumstances that brought about the creation of the Matsumura Research Group by looking at the life history as researchers and activists of the group's members.

The paper also tried to discuss the meaning of the Matsumura Research Group by theoretical viewpoints and two hypotheses the paper has already shown.

Conditions responsible for the establishment of the Matsumura research group

By deep-reaching interviews, the paper indicates the three reasons of social circumstances for the establishment of the Matsumura Research Group:

Mutual openness between local institutions and the general public

The citizens of Mishima city had given the researchers of NIG the name "Idenken no Sensei", and they put their trust in the researchers. When citizens requested it, the NIG sometimes held meetings on nature observation. At the same time Numazu Technical High School served as an academic center for the citizens of Numazu city because the city lacked a university. For their technical problems the citizens required much information from the

high school teachers. Through this policy for more openness, the local citizens had felt that they could completely rely on both of the local institutions.

The sharing of ideas among experts

The members of the Matsumura Research Group were not only knowledgeable in their specialties but they also had broader horizons. The attitudes of the members were clearly shown by Dr. Matsunaga and Mr. Nishioka. Dr. Matsunaga was a pioneer who had established the Anthropological Genetics and also tried to combine Philosophy with Genetics. Mr. Nishioka played a key role not only in the MNS movement but also in other activities on pollution control after the establishment of the movement. Dr. Matsunaga always went beyond the area of his work as a high school teacher of physics, and tried to pass his knowledge to the citizens outside the school. Through the educational seminars and many meetings, the members increased their knowledge that is not about their specialties.

A distrust of government by members of local institutions

NIG had stayed in contact with many foreign institutes, because of the influence, the members could use their own discretion in various activities as researchers. They were, as it were, researchers with a cosmopolitan outlook. Numazu Technical High School played a role as an academic center for the citizens as mentioned above. So, the citizens had absolute trust in their high school teachers. In addition, Numazu Technical High School was well-known for its liberalism. The link between NIG and Numazu Technical High School enabled the members to "Think globally, act locally". This allowed them not to follow the government policy blindly.

Discussion by the theoretical viewpoints and the hypotheses

From Kajita's viewpoints, the MNS movement can be analyzed that Zyukuken (Suffering Sphere) and Zyuekiken (Profit Sphere) cover large areas and are separated from each other. Moreover, the Kurokawa Research Group can be seen as an actor represented by Zyuekiken, which has bureaucrats and technocrats. They looked at the development as a management issue. On the other side, the Matsumura Research Group can be seen as an actor represented by Zyukuken. The group was established from the Zyukuken, which included the local people. They looked at the developments as a human right issue.

In Beck's words, the paper could say that the Matsumura Research Group succeeded in avoiding risk

which would come to the local area by bringing out the local people's spontaneous education. It originally came from the risk communication between grass-roots experts in the intermediary organization and local people. In brief, the paper can indicate the important aspects in overcoming the conflicts from the STS perspective the paper has already mentioned. That is the risk communications. It could be important not only between experts and local people but also among experts and between experts and bureaucrats.

The following are the examination and validation about the hypotheses which the paper has created: 1) the crucial role played by intermediary organizations; and 2) the crucial role in environmental movements of "grass-roots experts", scientists and other professional people not from the government or business establishments, and the conclusion that this paper discovered.

The crucial role played by intermediary organizations

Environmental problems are the issues of people who have to live and work in the affected area. So the populace who are facing an environmental risk must take action and not rely on government agencies blindly to dictate the management of their surroundings. Therefore, the paper indicated "How the intermediary organization can protect the issues of the local citizens" and "How the (local) government supports the organizations?" by showing the Matsumura Research Group.

The crucial role in environmental movements of "grass-roots experts", scientists and other professional people not from the government or business establishments

Environmental problems are more complicated today, for example, we have to depend on experts to inform us of specific dangers such as dioxins. The paper showed not only technocrats but also their subordinates must ensure that relevant independent research is carried out. The Matsumura Research Group indicates that making a deep relationship between experts and local people is a crucial aspect to succeed in the research.

Finally, the paper came to the conclusion that the risk communication between the grass-roots experts in intermediary organizations and local people can create spontaneous education and this process could be a key for sustainable development.

Notes

1 KOINOBORI: Japanese people fly fish (carp)-shaped streamers to celebrate National Children's day (May 5).

2 Mr. Sachio Torita (Numazu Technical High School

teacher): He was a colleague of Taizo Hasegawa (the Mayor of Mishima city) and also a senior to Mr. Nishioka at Numazu High School. He calculated the amount of sulfur dioxide that would be produced by the petrochemical complex and gave the results to Mr. Nishioka. Following this, disclosure education seminars come into being.

3 Mr. Shiro Nagaoka (Numazu Technical High school teacher): He was a leader of the high school teachers who opposed the petrochemical complex. He also contacted some researchers in the NIG. So, he was a vital link between the NIG and Numazu Technical High School.

4 Mr. Akio Nishioka (Numazu Technical High School teacher): He played a key role in the MNS movement and the Matsumura research group. He had always lived in the "Shimokanuki area" (proposed site for the electric power station). He organized the students' KOINOBORI research. Also, he was the prime speaker at the educational seminars.

5 Mr. Toru Yoshizawa (Numazu Technical High school teacher): He was well known as a specialist of water resources. After the MNS movement, he separated from the environmental movement.

6 Dr. Ei Matsunaga (5th director of National Institute of Genetics): The main reason for Dr. E. Matsunaga becoming a member of Matsumura research group was his specialty in Anthropological Genetics. So, he was well positioned to study the effects of pollution on the public. He received the prize Shu Ju Ho Sho (Japanese Nobel Prize) in 1986 for his contribution to knowledge in this field.

7 Dr. Seiji Matsumura (representative of the Matsumura research group): Dr. Matsumura has already contracted leukemia probably through his pioneering research in his chosen field (Genetic Botany). So, this may also have been a factor in his desire to start this revolutionary research group which incidentally drew various threats and intimidation to his family from the groups in favor of the petrochemical complex. Dr. Matsumura died of leukemia on the 19th of February, 1967.

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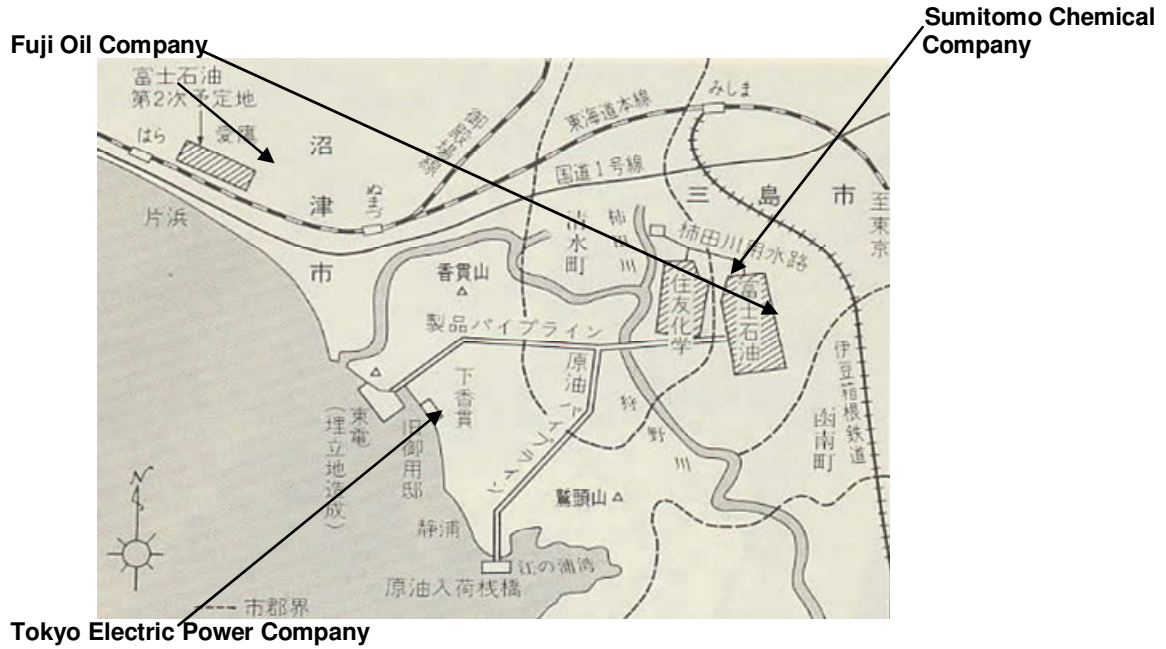


Figure 1. A proposed industrial development plan from National and Prefecture Government (Source: Miyamoto, 1979).

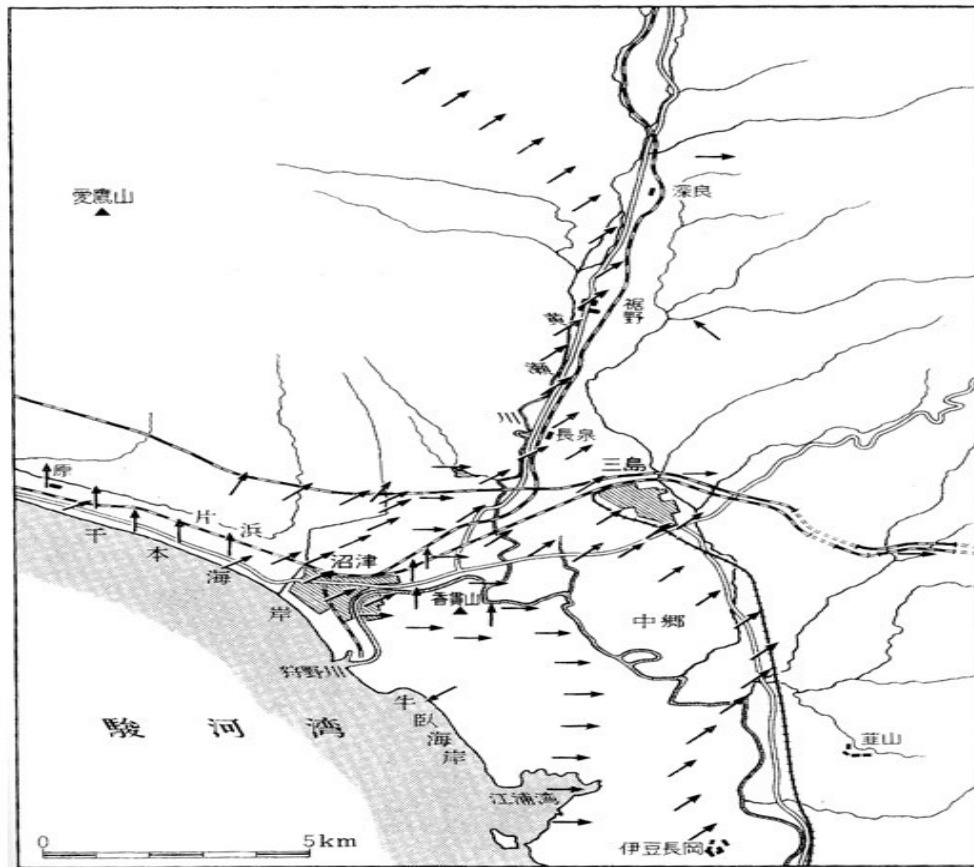


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