H-12   Socio-economic Research on Long-term trends seen in the Waterside Environments of the World, through Studies of their Changes in Scenery

Contact person   Yukiko Kada
                          Professor, Kyoto Seika University
                          Department of Environment and Society
                          Kino-cho, 137, Iwakura, Kyoto, 606-8588 Japan
                          Tel:+81-75-702-5216   Fax: +81-75-702-5216
                          E-mail: kada@kyoto-seika.ac.jp

1. Introduction

21st century is considered to be the century of water shortage, followed by the sharp rise in world population, therefore," sustainable conservation and utilization of fresh water resources" has become one of the most important global environmental issues. Mainstream of fresh water resource conservation measures was legal management that depended on engineering technology, treated fresh water as material resource and was considered applicable to anywhere (global standard) till today, and actually it has been rapidly diffused in the world. With this type of management, however, both environmental and cultural values that are based on indigenous knowledge cultivated by the historical and ecological conditions are overlooked. First and foremost actors of environmental conservation are humans and its society, therefore, in order to translate policy instruments into action, consciousness, empowerment, social organization and motivation of people become the crucial components. Interactions between water and people are not limited to material convenience but also culture of everyday life, including religion and leisure. Without understanding this socio-cultural structure, global level technology transfer of water resource conservation policy will pose potential risk.

Representatives of this research project have been working, more than 20 years, on Lake Biwa and the Yodo Basin in Japan to analyze the transformation of water environment in consciousness of local residents by visual information, and developed "Data Presentation Style Deep Interview" (DPSDI) method (an interview method that allows interviewer to go deeper into environmental consciousness and motivation behind the behavior of informants by presenting local data, such as photography and maps, that are familiar to them). This method has been applied to help developing the comprehensive preservation plan of Lake Biwa.

We carried out the DPSDI method to examine indigenous "eco-cultural interaction system of water and human" through now and then photos that reveal transformations of waterside

landscape in ten diverse eco-cultural zones in the world, and will provide socio-cultural policy means for sustainable conservation of fresh water resources.

2. Research Objectives and Methods

Under the development of modern industrialization, the value of fresh water resource is rapidly changing in the world. Purpose of this research is to propose new policy instruments to evaluate fresh water resources by clarifying its eco-cultural valuation, embedded in the transition of waterside scenery, through photograph comparison and method of environmental sociology. In order to achieve the goal, we have identified three fields of research.

1) Research on development of comparative analysis method of waterside environments by collecting old photos and conducting DPSDI (Data Presentation Style Deep Interview).

Photographs allow us to develop means for understanding diverse structures of environmental recognition, that is often divided into physical (water quality and quantity) and subjective (sensibility and verbal) evaluation. This is the main pillar of this research. We chose 10 watersides in the world; representative of developed countries are Japan (Lake Biwa), Switzerland (Lake Leman), France (Seine River), England (Lake District), United States of America (Lake Mendota), of semideveloped country is China (Beijing and Thai Hu), and of developing countries are Nepal (Patan), Guatemala (Lake Atitlan), Malawi (Lake Malawi), and Kenya (Nairobi River).

2) Research on creation of the archives of transitions in waterside environments that is integrated with statistical and geographic information methods, and establishing the technique for its public presentation.

We conducted DPSDI while gathering the statistical and ecological data of each area, and the interview, statistical and photographic data were incorporate into "waterside integrated archives".

3) Research on methods for the development of environmental communication among diverse water related cultures and generations by two materials above.

We tried to understand social process of how the global standard is found in the local context through the environmental communication and tried to develop the experimental system, which can be applied for empowerment of people and the actual decision making process of local community. Japan (Lake Biwa), Switzerland (Lake Leman), France (Seine River), China (Thai Hu), Guatemala (Lake Atitlan), Malawi (Lake Malawi) became the subject of this research.
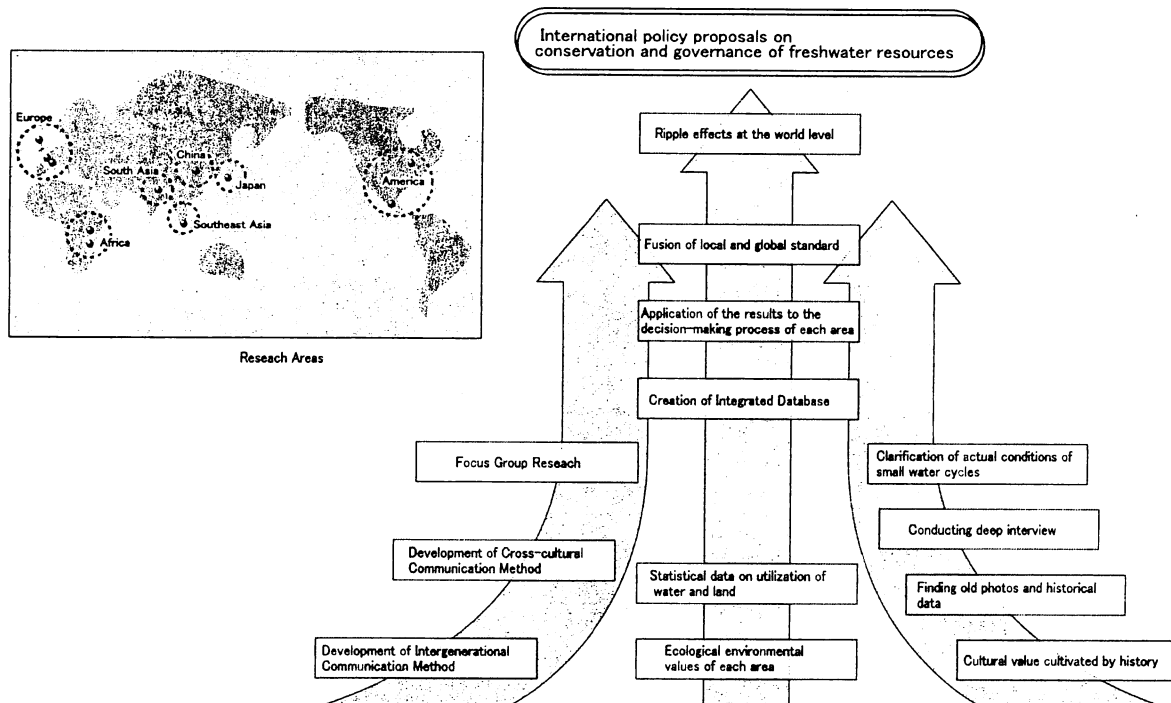
Fig. 1 Research areas and the investigation flow of the project

3. Results

(1) Collection of old photographs of the waterside and development of comparative method.

3 themes, "Waterside, water supply and sewerage systems", "Water area as ecosystem" and " Waterside as landscape", were set to explore "Ecocultural interaction system of water and human" hid behind transitions of waterside landscapes.

"Waterside, water supply and sewerage systems" connect us to water that are indispensable for living. We take water in to certain topology called human body, metabolize and excrete it as urine. It means that water supply and sewerage systems are the carrier which connects human body and consciousness to physical world of water.

Waterside have nurtured fish and other living things and created diverse"water area as ecosystem". Many people have lived on fish around the world and it helped natural ecosystem and physical cycle to stay healthy and sustainable water use had become possible. Also riparian life has attracted children to watersides.

The essential of "Ecocultural interaction system of water and human" is based on the fact that water exists in the form of container as lake, river or marsh. It means human being have created particular landscape desirable and fit to the local area.

We analyzed these 3 themes crossed with 4 important theories of Japanese Environmental Sociology; "Epistemology", "Theory of Subjectivity", "Theory of Organization" and "Theory of Ownership".

	Epistemology	Theory of Subjectivity	Theory of Organization	Theory of Ownership
Waterside, water supply and sewerage systems	Recognition of Pollution	Water management and subjectivity	Organization of water management	Ownership of Water
Water area as ecosystem	Knowledge of organism and fishery	Fishery and subjectivity	Fishery organization	Fishing rights
Waterside as Landscape	Aesthetic recognition	Landscape conservation and subjectivity	Organization of Landscape conservation	Landscape appreciation rights

Fig. 2 Research areas for waterside scenery analysis

Since it is impossible to mention everything of each area in this paper, themes that were considered significant by local people are selected and summarized.

We have searched for more than 8000 old photos of watersides at museums, archives centers, private libraries and universities of each area. With local researchers, we have examined meanings of the transitions of waterside environments then explored the structures of local standard in terms of the types of interaction between the people and waterside. The analytical comparison between local standard of the waterside valuation and so-called global standards were made.

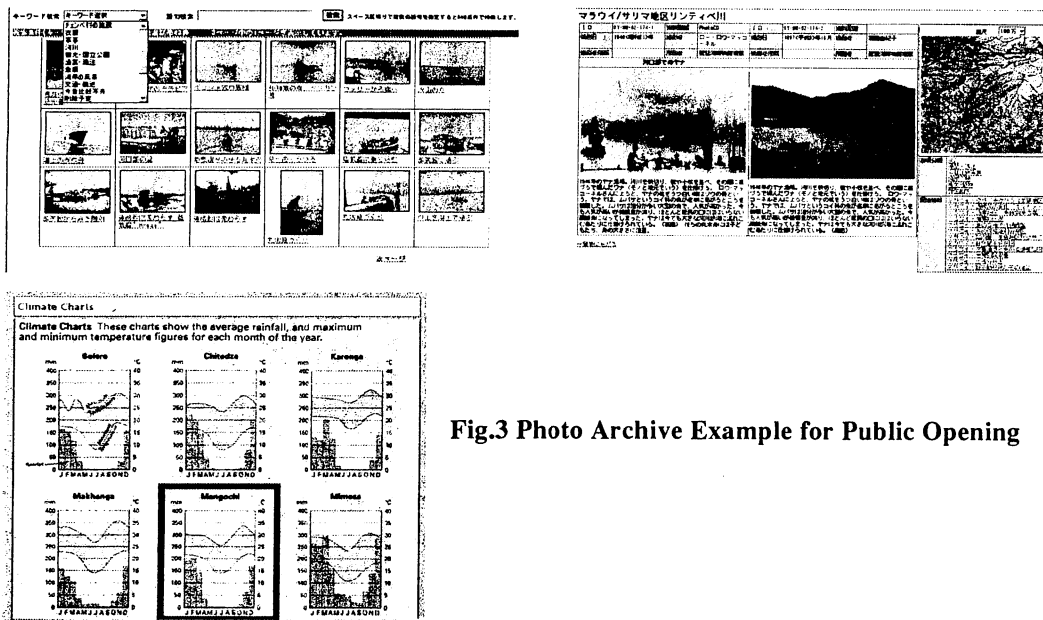## (2) Formation of waterside environmental archives and the development of publication methods.

Fig.3 Photo Archive Example for Public Opening

We started to establish software which permits the digitization of collected photos and construction of digital archives. We have cleared the copyrights of the photos and begun to collect and enter maps and statistical data for building basic part of integrated

database (Internet GIS) consists of pictures, maps and integrated data. During this process we have identified needs for the utilization of digital archives at the field, for the occasion of DPSDI research, and invented the mobile personal computer system which allows all the process of the photograph data retrieval through key words, interview data input and addition of key words. This system was especially helpful for the accumulation of real-time interview data. We also had to use printed photographs in Africa, Nepal and Guatemala, where the electricity was not available on a daily basis. The integrated database has been developed for the public communication purpose shown in the fig.2 where old pictures, new pictures, captions and the related statistical data are managed collectively for the data retrieval.

(3) Development of environmental communication methods among the different cultural and generation settings

We supposed that the desire for commitment and empowerment will grow only when people became aware of their own situation. We carried out the DPSDI by using gathered now and then photographs in Japan (Lake Biwa and Yodo River Basin), Switzerland (Lake Leman), France (Seine River), China (Beijing and Thai Hu), Guatemala (Lake Atitlan) and Malawi (Lake Malawi) where we could find a collaborator.

Each researcher went to their field with collected photographs, identified every location to take pictures from the same angle, and carried out deep interviews with local people by showing now and then pictures. We also used questionnaire survey in large cities where it was not easy to find local people who knew the past of waterside.

We have analyzed meanings of the DPSDI method by conducting focus group interviews and found out following four points.

(a) Old photographs are eligible to depict the total condition of the life environment, which is usually neither verbalized nor consciously perceived.

(b) Locally based old photographs helped to lift the inherent power structure between researchers and local informant by letting local people take initiatives in the dialogue.

(c) Pictures enhanced the communication ability among the illiterate people who are mostly women and children and usually the main user of the waterside area.

(d) Empowering the people's self image as the stakeholder of the local water environment by sharing the past experience of the waterside changes and helping to enlarge the possible alternatives of their own water environments.

4. Discussion

First we examine the structure of water supply and sewerage systems in terms of its separation and recycle. In China and Japan, human waste was traditionally recycled as fertilizer. We have named this tradition "feces-philia" culture. In Japan, for example, we

have discovered that traditional water utilization system which strictly classified water intake and outflow of human body into different systems. Human urine and excreta were never threw into the water space but rather fully utilized as the farming fertilization resource at the local community level. This custom allowed the neighboring streams and rivers to stay clean and ecologically healthy for washing kitchen utensils without catching waterborne infectious disease, and even for direct drinking.

On the other hand, we have found the persistent perception of pollution image of human excreta and people's denial of construction of toilet inside the house in Nepal. Only 23% of Nepalese households have toilet in their own house and others scatter their excreta in the open fields or water space. This tradition finally brings severe water born diseases and waterside garbage. We have named it "feces-phobia" culture.

In Malawi we have discovered "feces-phobia" culture similar to Nepal, where people want to neglect the existence of human excreta and want to throw them into the open fields or water. Although the nature of "feces-phobia" culture was different from the one of Nepal: Human excrement was denied because it could be subject to casting the witchcraft by envying neighbors once it is identified in Malawi.

We see tendency of "feces-phobia" culture in Guatemala but we could not determine either it was heritage of Maya tradition or Spanish colonial influence. Traditional under ground drainage system called Fosa Septica has contributed to maintain the cleanness of drinking water and the people's health condition.

As a matter of fact, modern sewerage system was born in Europe as a result of polluted living environment by the human excreta in "feces-phobia" context. Human waste was not actively collected and people preferred to dump it to somewhere if it was possible.

It must be mentioned that garbage and human feces end up in living space of the lower-class people in Nepal, Malawi and Kenya and this social structure is closely linked to the "feces-phobia" culture.

Sewerage systems have constructed almost all areas of the world. Flush toilet may be desirable for individual comfort but if we consider safety of waters and preservation of ecosystem, it is undesirable. Most of modern sewerage systems constructed in developing countries are not functioning because of the poor management of the pipe system. We must remember that 4 billion people live with 2 dollars a day in the world. In certain countries, the cost of maintaining the pipe line sewerage systems is too expensive to afford for the local people. The potential risk for the diffusion of diseases has increased because of the so-called global standard sewerage system based on pipe line technology.

Concerning preservation of ecosystem, we are not capable to present abundant data, but collected material shows in any areas, developed or not, ecosystems of coastal zones where waterweed and reed grow were destroyed and habitat of fish has been threatened. As we could see at Banks of the Seine, construction of paved roads along riverside and lakeside severely damaged coastal ecosystem in developed countries, and human waste and trash destroy ecosystem in developing countries as Kenya. Construction of roadways for automobile traffic created artificial space straightened waterside scenery, and weakened its

capacity of healing space.

Comparison of now and then photographs allowed us to analyze "desirable landscape system". As we can see in the historical mechanism of England, France and Switzerland, the structure of relation between social processes of how the representation system of a social group was born, diffused, and established, and how everyday life of people brought forth evaluation system of waterside became clear by this research project. We organize linkages of people and scenery, and discovered people have two ways of thought and sensibility (Fig.4).

Valuation System people can depend on are the elements of five senses, "eyesight, hearing, smell, touch, taste", based on corporal sense. On the other hand, Representation System is based on "reliance on science" and "reliance on religion" that are in spiritual domain, and "reliance on commerce (brand) must be added in the modern society. Among those systems, people use their empirical knowledge and habitus. This theory applies not only for traditional rural communities but also modern society.

Why do people of developed countries trust Evian more than tap water made by water system engineers living close to them? It can be considered as resistance of people to the water which became physically far, in other words "the water separated from a land". Even people in the developed countries trust "the water not separated from a land" such as spring, fountain and well. We discovered "the water not separated from a land" has been highly valuated in researched countries even after the introduction of the tap water system, and ironically enough, the bottled water had started to spread after the expansion of tap water system.
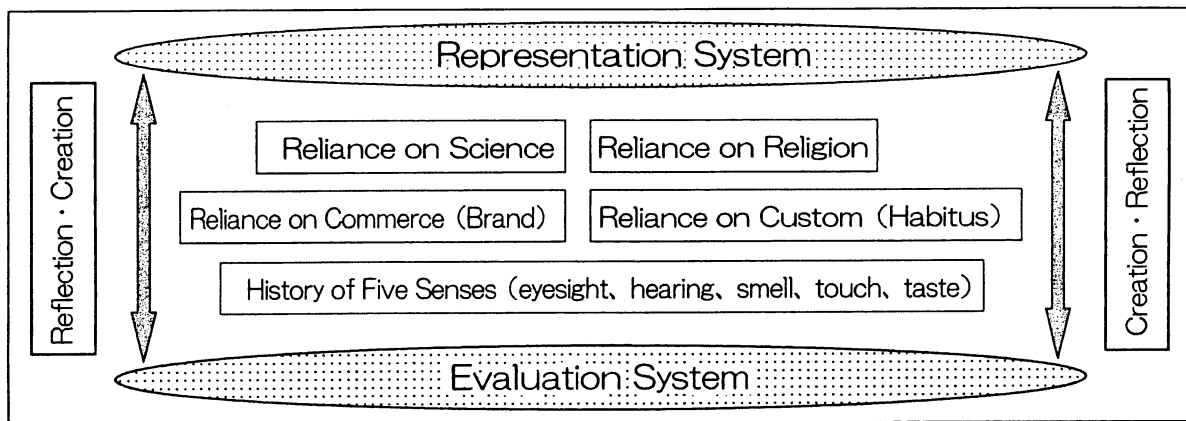
Fig 4. Relationship between Representation System and Evaluation System over Landscape

How water and waterside were governed and organized? Fig.5 shows 4 matrixes of social system, governance of "local community", "country and government", "commercial venture" and "NGO, NPO and volunteer", on domestic water and waste water regulations. Since the "discovery" of landscape and appreciation of water front scenery are rather recent, at most after 18th century, we couldn't gather enough information on past in certain areas, therefore, only today's organization is exposed. These figures are to suggest basic

models that can be object of discussion.

Indigenous community as village was historically the main body of water management in the world. The modernization of government gave birth to "Enterprise (market)" and "Nation (administrations)", so that community governance gradually shifted to administrative governance. However "community" as transitional structure still exists and it makes up "Public-Private-Common" sectors.

In Lake Biwa, for example, its governance has been passed from community to nation to NPO. Local people conserved the landscape without having an idea of governance. After 1980s, Landscape Regulation came into effect and it seemed the governance had been dramatically switching to the nation, however, local community always has an important role in reality and NPO has relatively small effect.

In Fig.5, we can see 5 tendencies of governance of water supply and sewerage systems by different social subjectivity, 1)"community to government": Lake Biwa and Thai Hu, 2)"Private/Commercial to Nation": Beijing and Lake Mendota, 3)"Nation to Commercial": Lake District and Seine River, 4)"Community to NGO": Atitlan and Patan, 5)"uncontrollable": Lake Malawi and Nairobi River.
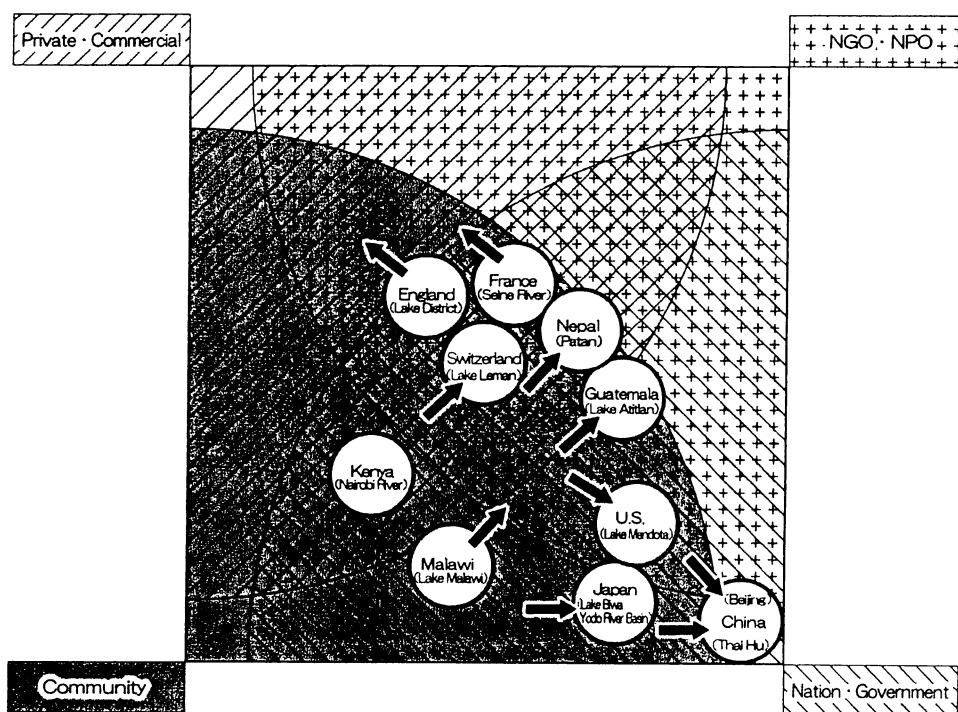

Fig 5. Governance of domestic water and wastewater considering historical transitions of social subjectivity

In Fig.6, we can find 3 tendencies of governance by different matrixes, 1)"National governance": Lake Biwa, Seine River, Thai Hu, and Lake Mendota, 2)"Complementary governance of Nation and NGO": Patan and Lake Atitlan, Lake Malawi and Nairobi River, 3)"Independent governance of NGO": Lake District, concerning landscape conservation.
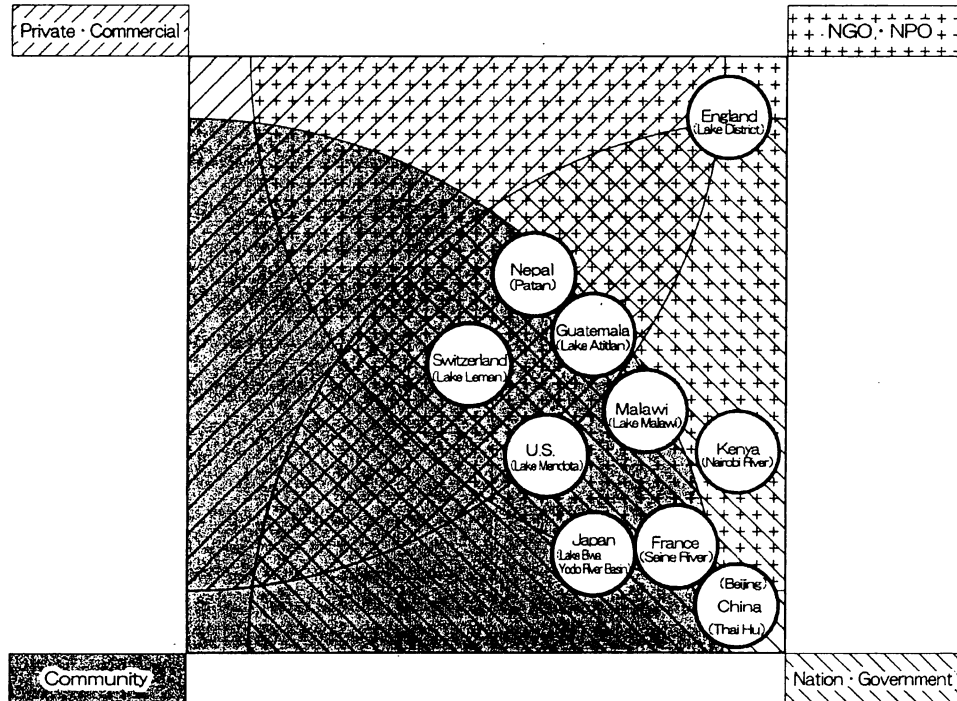
Fig 6. Landscape conservation and matrix of social governance

In order to manage global issues of freshwater, we must reexamine development philosophy and limits of technology. It is indispensable to find proper methods, which fit to each area, through investigation into meanings of traditional values. We have not yet found universal response. What we can say for the time being is we understood it is impossible to explain interactions between human and water by only physical theory and without sensibility and what we call sympathy. In other words, as sociologist Harbermas has mentioned globally demanded common challenges are "communicative knowledge" and "regeneration of communication between human and water".

We could confirm efficacy of the DPSDI method but we must mention the limit of it; the old photos were rare and extremely difficult to find in certain areas. We have invited more than 100 children from all over the world to the Shin-Asahi local communities in Japan, and held communication arena during the 3rd World Water Forum. There we have discovered intercultural communication through the photograph is more effective when we linked the discussion with the actual visitation of local environment.

<Reference>

KADA, Yukiko, "How have the local people reacted the rapid economic development?", *In Ancient Lakes –Its Biological and Cultural Diversity* (Ed. KAWANABE and et al.), 1999, Kenobi Production, pp.243-260.

KADA, Yukiko, and, TORIGOE, H., "Life Environmentalism", *Sociological Dictionary*, Blackwell (in print).