

Environmental Implications of Communal Property Management around
Lake-Biwa Area, Japan

Kada, Yukiko
Lake Biwa Museum Project Office

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513 NORTH PARK
INDIANA UNIVERSITY
BLOOMINGTON, IN 47408-3895 U.S.A.

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<ABSTRACT>

The main aim of this paper is to analyze the environmental implications of the change in river management in modern Japan, i.e., from self-management of communal property to governmental management. For this, historical documents are analyzed and deep interviews with village people around Lake Biwa area are conducted, where water environmental problems of eutrophication have been wide spread in the last thirty years.

River environments have played multi-dimensional roles in rural community life, such as supply of water resource for paddy field as well as domestic water use, supply of various aquatic resources, bamboo or woods at river banks for fire and construction. At the same time, river had brought frequent severe flood problems to local communities, which in turn promoted local self management systems for flood control.

Through these profound relationships and sense of "our-belongings", each local community has developed an self autonomous use-management system of rivers and the lake, which in return resulted in the maintenance of the Lake Biwa ecosystem. The integration of resource use and resource management is the key concept of this issue.

1. Purpose and Method of the Research

Even looking from a global perspective, Japan has endured difficult conditions of small size and high population density, while sustainably using the same land for thousands of years; this makes Japan's history a special one. This sustainable use of the environment has been based in village community, especially water(rivers, ponds, lakes) and land (agricultural land and forests) management, which has been carried out cooperatively in Japanese rural society. This rich experience should provide us with important suggestions as we think about direction of environmental management from hereon.

Even amongst all of this, the Lake Biwa area, also known as Ohmi, from ancient times has had a history of well developed rice paddies. Especially in the Edo Period, it housed the creation of an intricate system of environmental management based on village organization.

After the Meiji Period this kind of environmental management system and tradition, which depended on village community organization, has been changing greatly due to the modernization process. The basic tone of this flow of events is that the independent use and independent management traditions of local village organization have

been narrowed qualitatively and quantitatively. Private use of resources and governmental management have taken over much of the village organizations' former responsibilities.

The purpose of this article is to analyze, from a social history perspective, this process of government taking over resource management, along with increased private resource management. We analyze the institutional and social processes surrounding these changes, and also analyze the meaning of these changes for the present environmental problems occurring in Lake Biwa and its surrounding area.

The research method has two characteristics. One is that it utilizes a case study of Chinai Village, on the shore of Lake Biwa; we pull together and analyze documentary evidence and a "village diary" spanning over 250 years-- also we sketch the dynamic interaction of internal village organization and external organization. The second characteristics of this research is, added to the documentary evidence we provide an information from the village people themselves, as they tell us about their perspectives on the management of the communal resources and how that management changed with the time; thus we add the perspectives of village resident to our analytical framework.

2. Overview of Lake Biwa Situation

Lake Biwa is over 670 square km in surface area, 104 meters at the deepest point, and is the largest lake in Japan. Over one hundred rivers and more than 400 streams flow into the lake with only one, the Seta River, flowing out from the lake. The lake itself was originally formed several millions years ago, and assumed to be the third-oldest lake in the world.

Surrounding the lake more than one million people are living and more than 60,000 hectares of agricultural land(mostly paddy field), are cultivated. The lake water is utilized for drinking water of about 14 million people of western Japan.

Because of its size, depth, and age, the lake has maintained an ecologically stable system and been the bed for various species of fish and shellfish, including a number of indigenous species.

Along with the rapid economic development since 1960s, however, the lake has suffered from the water degradation problems of eutrophication. In spite of various policy measures to counter such environmental issues over the last 30 years, the eutrophication process is still going on, to the extent that appearance of fresh-water red-tide continues, and so does smelly water problems with tap water.

The author tries to analyze how the eutrophication of Lake Biwa has been spreading relation to the internal changes of resource management of local communities surrounding Lake Biwa. Here we show a village community, Chinai, as a case study of this analysis.

3. Chinai's Rivers and Land Classification

Chinai is on the northwestern shore of Lake Biwa; at present it is one of several villages that belongs to the Township of Makino. It is a village community comprised of about 120 households. Its number of households has not changed much from the time of the Edo period. Its main occupations have traditionally been agriculture, fishing in Lake Biwa and the rivers which empty into it, and assorted small businesses. But, after 1970, in tandem with the development of the transportation network, part-time agriculture increased greatly--most farmers are part-time at present.

Chinai is a village community surrounded by water (see figure 1). Chinai river runs along the north of the village, and in the south runs Honnogawa, a small river. There are many Ayu-fish and Lake-Biwa-trout in the Chinai river, which are important fishing resources. And the trees, including bamboo, on the river levees, are used as construction resources and fuel. In the middle of the village, the river bottom is higher than the roofs of the houses; this is a so-called "ceiling river", the Momose river. This river levee's trees, including bamboo, have been used as construction materials. The Shorai river was used for agricultural purposes, and the Maekawa river, which runs between villagers' houses, was used for drinking water supply, and for washing of dishes and vegetables, as well as for fishing and a children's playground. The Umagusoku river and Hitodoori river were also used for everyday water supply, and for fishing. And, in front of this village community, Lake Biwa spreads out far and wide; it is another supply of household water, and another fishing ground, another transportation route--boats and ships have been important transportation for village people for many years.

In this way, Chinai is a village community which is deeply connected to water, in daily life and daily production activity, on rivers and the lake.

The territory of Chinai can be divided into 3 categories, based on land ownership and use: (1) Private zones, (2) Communal zones; and (3) Public zones.

In private zones, each household has rights of ownership and use on agricultural lands and residential (occupied by a house) land. In communal zones, the village community possesses group rights of ownership and use; the community's adults use and manage such land cooperatively. Agricultural waterways, roads, rivers, shrines, shorelands: all are communal zones. Water is used, water plants are used, trees are felled in these communal zones. Such zones are called "iriaichi". Public zones are areas managed by some national or prefectural government body.

The above type of classification system is more or less conceptual ones. However, in actual practice, resource use is said to be an interactive

process and varies according to time and place and peoples' relationship. We will go into this in more detail later in this article.

4. Japan's Changing System of Localities and Chinai

The meanings of these three kinds of "land zones" have changed as the national system has changed; this is more or less external factor for the village. Let us first make these points clear.

Edo village communities were strongly integrated internally. Each had its own village officials (*murakata sanyaku*: lit. "three village officers"), sub-units consisting of five families (*goningumi*), and the smallest unit, the family (*ie*). Each village also had its own financial administration (*muranyuyou*) for the support of village public works, village events and the payment of village officials. The required contribution to village finances was based on the social stratum to which each family belonged, with higher-status families paying more. In addition, many of village community had its own income source for village finances such as forests, fishing ground, or paddy fields. The taxes levied for the village territory (including private land and communal territory like rivers, lakes) were combined, and the village as a whole was responsible for tax payment. Thus, the village community was a unit of asset-holders as well as being an asset-manager. The custom of payment of tax and utilization of territory by the village community itself contributed to the fostering of the "we feeling", communal feeling, toward village territory.

In addition, village community was able to initiate a suit or juridical dispute, which meant it was qualified as juridical person. Disputes about fishing ground, village territory border, and water dispute were the three common types of dispute among adjacent village communities.

Chinai village was no exception. After Meiji Restoration, these traditions of village community organization were changed by the national policy. The first change occurred in 1889, when the Municipal-Amalgamation Law(1889) was enacted with the aim of strengthening municipal financial bases. Several village communities were amalgamated into so called "administrative villages". In the case of Chinai, it became a part of Momose Village after 1889, and Chinai became a voluntary community (*ooaza*) with no juridical public rights of its own territory.

In the everyday village life, however, the administrative village played only the roles of local schools management and residents' registration, which meant the other roles of public works like territory management remained on the shoulders of village community.

After WWII, Japanese Government tried to make a second Amalgamation policy in the 1950s, and Momose administrative village was amalgamated to Makino Town, along with 3 other adjacent

administrative villages. Table 1 and Figure 2 shows these changes during the past 120 years.

5. Flood Control and River Management in Chinai

Even after 1889, when Chinai legally lost its public rights of self-government, it continued on in the tradition of the Edo period, holding its own budget as a village community (including income from its residents, and income from its assets). Chinai still designated village officials, and, as in the Edo period, paid them salaries. In name, Chinai could not retain ownership of communally-held assets, so individuals or fishing cooperatives were listed as the owners. Yet, in actual fact, Chinai maintained an organization that enabled it to continue functioning as a village community. Even now, 100 years or more after Chinai lost its legal certification, in terms of everyday life and production, though the village organizations have lost some importance, this same kind of village awareness continues.

One can see a part of this awareness in the fact that the village diary, which was begun 250 years ago, is still being written by local officials.

The village community played many important functions which could not be done away with; one of these is flood control. In other words, this is the type of activity which, even if the outside system and circumstances changed, is indispensable to life and livelihood; thus, the town's independent ability was maintained. However, due to external changes in both institutions and economy, flood control is qualitatively changing. Let us take a look at some concrete examples.

Chinai is a village community surrounded by water. Because of this, it historically had two main kinds of troubling flood: one resulted from the rising of the lake level, and the other from the breaking of levees that protect the village from river waters. According to the Village Diary of Chinai, the Chinai or Momose river would break the levees about once every 2-3 years.

The village community people took two kinds of measures to counter floods. One was immediate response at the time of the flood. At the end of the Meiji period, in the Chinai Village Charter, the following were listed as the duties of village leaders and residents:

"The village leaders are to inspect the levees and bridges when it rains. When they perceive danger, they are to sound the village bell, gather people together, and take emergency measures. Usually there should be 30 bundles of straw rope, 300 piles of chestnut logs, and 300 bags of straw prepared."

"...The village people, when they hear the danger bell, should respond as follows: men between 17 and 60 years old should take up tools, run to the site, and aid in flood protection..."

This is free labor, a duty which the village people fulfill for the community.

The second response type is to repair or restore levees destroyed by floods. Chinai village gathered its own people to do such construction and reconstruction work. Most of these construction were paid on daily base.

If we look carefully at the Chinai Village Record from the Meiji period to the present (Table 2), in terms of annual expenditures, we see that the "construction works" accounted for about 20-40% of annual expenditures. These expenditures decreased dramatically in the 1960's, which of course means that the national and prefectural burden increased dramatically at this time.

And as we have seen, levee repair and restoration work is not just a financial burden, but also deeply connected with village people in terms of labor power. In Table 3, we see other village record information organized to offer a comparative view of levee construction work on the Chinai river, over 3 time periods: (1) From the end of the Meiji period to the Taisho period (1911-1925); (2) Showa 20-Showa 30 (1945-1955); and (3) Showa 40-Showa 50 (1965-1975).

From the end of the Meiji period to the beginning of the Taisho period, we see modifications to a curve in the river where floods often occur: preventive construction. In 1956, there were repairs of levees destroyed due to a typhoon. In the last period, there was additional construction to straighten the river and prevent floods. We can also see here that the party responsible for construction changed, from Meiji-Taisho when the village was responsible (for preventive action), to the prefectural government being responsible in the 1960's and 1970's. The village government's responsibility is no longer.

On the one hand, for the village community, this appears to be a lightening of the financial burden. At the end of the Meiji period, about 40% of the costs of construction were shouldered by the village people. In 1956, the prefecture shouldered the entire burden, but the responsible party was the village, and the records of work and payment were left in the village. In the 1968-78 period, the river construction was carried out with almost no contact with villagers.

How do the village people see the struggle with flooding? Let us now present interviews with village people carried out by the researcher.

6. River Management, As It Is Remembered

Kada: In the past, levee construction was done by the village...For example, have you heard about what was done at the end of the Meiji period?

N-san ("san" is the Japanese title roughly equivalent to Mr. or Ms.): Yes. My father was in charge of it. We have memorial photographs of construction completion.

F-san: In those days, the river leaders would go out in samurai clothes to look at the river, when water started rising.

N-san: I heard from my father that there was a village official who cut the levee on the other side from him when things got rough...

F-san: Poor people would hope for the levees to break....It'd be selfish to have it break every year, but they said that the poor people hoped for a break once every 3 years or so.

N-san: Yep, 'cause they didn't have work. In the old days, they'd even want to cut the levee. So big storms were needed, and so was cutting the levee...in a way.

F-san: The people who owned land paid the costs. The poor didn't have to pay. Nowadays everyone is always sayin' "Equals, equality", and even the poor have to pay for things. But back then it was different....Poor people already had it so rough...they didn't have to pay.

In this kind of daily way, the village that lived next to the dangers of flood damage housed a deep relationship between the rivers and its village people; the need to respond to floods was an important one, and the river was an indispensable common resource, like the soil and trees.

When one traces the last 120 years of Chinai village's flood control and river management, one sees the process of centralization of government control. Around 1968, almost all of Chinai's rivers were designated "First Class Rivers", including the Chinai, Momose, and Maekawa rivers. First Grade river designation means that the local burden to maintain levees decreases, but that the prefecture or national government must now approve all river uses--ranging from withdrawal of water for use, to using trees around the river. Let us hear again from N-san and F-san.

N-san: In the old days, the levees were all owned by different families. If you have the Gensuke Dike, then the Gensuke family owned it. The chinai river and the Momose river were both like this. Almost all owned by individual people. Us, too, 'cause we were using the Momose river dike. We borrowed it, but...

F-san: There were rice paddies below the levees, so...probably the people who owned the rice paddies took care of the levees above them. They might plant trees there. And when they got big, they'd cut'em down and use'em for firewood.

N-san: Yep. They managed it. And the boundary of the rice field was exactly matched to the boundary on the levee. There wasn't any fuel around there, so they planted a lot. They took grass and kunugi trees....they'd cut some, leave some....

F-san: Plant'em themselves, manage'em themselves...take in firewood and use it....Now the Chinai river and Maekawa river are all first class rivers...all of 'em are, now....now the national government does everything (laughter).

N-san: We opposed it at the time. Who's gonna clean a first grade river?

F-san: Get mocked for that....

N-san: If it's a first grade river, you just want to build one little sluice and you can't do it on your own. Just a little sluice to put water in the field. So I opposed it. You gotta get a permit from the government now. That kind of restriction is just ridiculous. I said that and they got mad. But that's the way it's happened...

"Grow trees themselves, manage and work the levees themselves". The levees used to be managed directly by individual families. But it was possible, in cases of levee repair or levee cleanup, to pull the village people into dutiful, cooperative labor. People from outside the village could not use the levees as individuals. In this way, within the "communal space" of the village, and the system of autonomous management surrounding it, there existed "individual space"; and because you were an adult of the village, you could use the communal resources of the village.

The first class river designations took away the power of autonomous management from the village people. But even now, when it rains, the village community leaders walk around and check, then take appropriate steps if there is a problem. The traditions continue. This shows that the consciousness of "our rivers" has not completely vanished.

The centralization of power, or the bureaucratization in government of resource management, is not limited to flood control. Let us now look at the case of water utilization.

7. Water Use and the Village Community

The people of Chinai village used the water of the river running through the village, the Maekawa river, directly as drinking water. They washed dishes and clothing in the river as well. Rice paddy boats were used for transport on the river, and children played in the river. Water use was varied then, ranging from drinking to agriculture to fire prevention use. Figure 3 shows the water use and management situation for the Maekawa river before the introduction of modern water works.

In accordance with the seasons, all kinds of fish would travel up the Maekawa river from Lake Biwa. These fish were sought by adults and children both, as main dishes for meals. There were many weeds, too, in the water, which were removed during yearly river cleanings. They were put up for bidding among residents, who used them as fertilizer.

To preserve uses of river water, then, people maintained the water flow and river structure (i.e., levees), and also made several agreements on preserving water quality. The first of these had to do with time. People did not do laundry early in the morning. When the sun got high, then laundry would begin. But diapers or other soiled things were not washed in the river. These were washed in basins, and the water was

emptied into the toilets, to be used later as fertilizer. In this way, looking at things from our present vantage point, this lifestyle of returning nutrients to the land for reuse in local production ultimately avoided the eutrophication of Lake Biwa. These agreements were unwritten, but passed on from parent to child, from child to grandchild, by word of mouth.

There was also a religious meaning to the people's relationship to the river. On the first of every month, the people threw purifying salt into the river. This related to the water spirits. And, on the last night of the year, it is said that the head woman of each household said a prayer "to send along the blessings of the river." And the children were told that "if you go to the bathroom in the river your (genitals) will get swollen".

Amidst all of these multi-faceted meanings of the river, the people in fact created a river "management culture". The main principle of this management culture was that use and management were normally intertwined. Follow the practice of not dirtying the river; participate in the management activity of river cleaning; use the river: these were all one set, as it were. Each house used the water in front of it directly, engaged in individual use. At the same time, the river as a whole was managed cooperatively, as a communal space of the village. The village people played their various roles within this larger framework, and, at the same time, were able to use and hold "individual space." Communal resources were preserved by two layers of social organization, the family and the community, as people carried out their roles as users and managers. The Maekawa river became a first class river in 1968, managed by Shiga prefecture, no longer by local residents. And modern water works had spread by this time, so that river use had decreased; thus, the Maekawa river, by 1968, had become a waste water receptacle. Yet even now, once a year, river cleaning is carried out, and many village people remain saddened by the pollution of the Maekawa river. Concern remains high.

Here, let us touch on the change in agricultural water use. Formerly in Chinai, agricultural water was taken from the Chinai and Maekawa rivers. But, in the late 1970's and 1980's, "farm facilities improvement" was carried out. Now farms rely on water pumped up from Lake Biwa. The management of agricultural water has been transferred, then, from village responsibility to that of a public agency, the Land Improvement Agency. In other words, the villagers use the water, and specialists, technicians, and agency officials manage it.

In addition, here there appeared a cycle of agricultural water use that did not consider carefully environmental problems. Namely, water use and waste water routes were separated; water that once enters a rice paddy comes out immediately as waste water, into the waste water way, and soon Lake Biwa. More water can be used than in the past, so that waste water amounts have also increased, and Lake Biwa's eutrophication has accelerated.

F-san put it this way:

F-san: The prefecture says, on the one hand, don't pollute Lake Biwa. On the other hand, it does this farm equipment improvement, so what's going on? Land and fertilizer: aren't they leaking out of the fields like crazy? In the old days we had a pot at the exit from the field. After work, we'd wipe off our legs and feet in the pot, to not take any soil from the fields. That'd be a waste. So totally different from today...

8. The Structural Changes of Communal Resources

When one reads the diaries from 120 years of village history, walks the village streets, and pursues the thoughts and memories of village people about various kinds of happenings, one comes to accept the following two transformations.

The first is the change to government management, centralized and bureaucratized. Japan, as it becomes a state of centralized wealth and power, has transferred control of local rivers and water bodies, flood control and water utilization. The hands of local villagers no longer reach to these; they are in the province of the so-called "public world." And, at the same time, individual families and persons have increased "privatization", in what they manage privately.

Villages of the past, with the organization called the "village" as intermediary, housed the "user" and "manager" of the resource, tied together as one unit. Here, people used the river while taking care to recycle and reuse the resource; they protect water quality, and ultimately undertook many acts of environmental preservation.

But government/bureaucratic management separates sewer systems, household water supply, agricultural water supply, and so on. We have moved to specialized work groups of specialized ability. And such managers focus on particular users' needs. The household water supply office says it wants clean water, but the sewerage agency and the agricultural water agency may give priority to convenient use, with less consideration given to waste water. And the environmental office, which should mediate among bureaucratic interests, does not have sufficient authority to do so. This kind of contradiction between use and management, generated among government agencies, has made the eutrophication of Lake Biwa a good deal more serious.

In other words, in the cooperative local society, the "communal space", in terms of both function and consciousness, has been split up; a two level split between private and public space has been demanded. Now, unlike in the past, in both private and public space, the management is not done well enough, at least in the sense of environmental preservation. One aspect of today's environmental problems is that we can no longer do independent self-management of some limited territory, as we are fighting to put ourselves first.

The other key change is that in values, or environmental consciousness, in the realm of private space. In the past, human excrement was used as fertilizer. Water weeds in rivers, mud from the lake bottom, all were valuable resources. Even household waste water "must not be wasted", and after allowing solids to precipitate out, such water was returned to the land once every 2-3 days. As a result, Lake Biwa's eutrophication was prevented (or its purity was preserved).

But with the spread of modern water works, the increase in chemical fertilizer, and expansion of cash income, the fertilizers of the past have become today's cause for eutrophication.

Japan, a country which traditionally has had insufficient resources, is now wealthy thanks to foreign goods. It can import large amounts of fertilizer from abroad. Half of Japan's food and fertilizer nutrients come from abroad at present. Nutrients that were always returned to the land in cyclical use are not sent into the water to cause eutrophication.

When the situation is seen on a global scale, and when resources from abroad are seen in a global sense as common resources, such luxury and waste of resources cannot be condoned.

In the past, rivers and lakes were "ours"; they were connected to people. This sense was passed down over so many generations. Is it not possible to develop such a sense on a global scale?

The relationship between humans and environment is not simply a problem of facilities, equipment, and institutions. It is deeply connected to values systems and culture. I would argue that one direction to be seriously pursued in local environmental preservation is to call back to local people's consciousness of managing their resources for themselves--awareness which has been weakened at present.

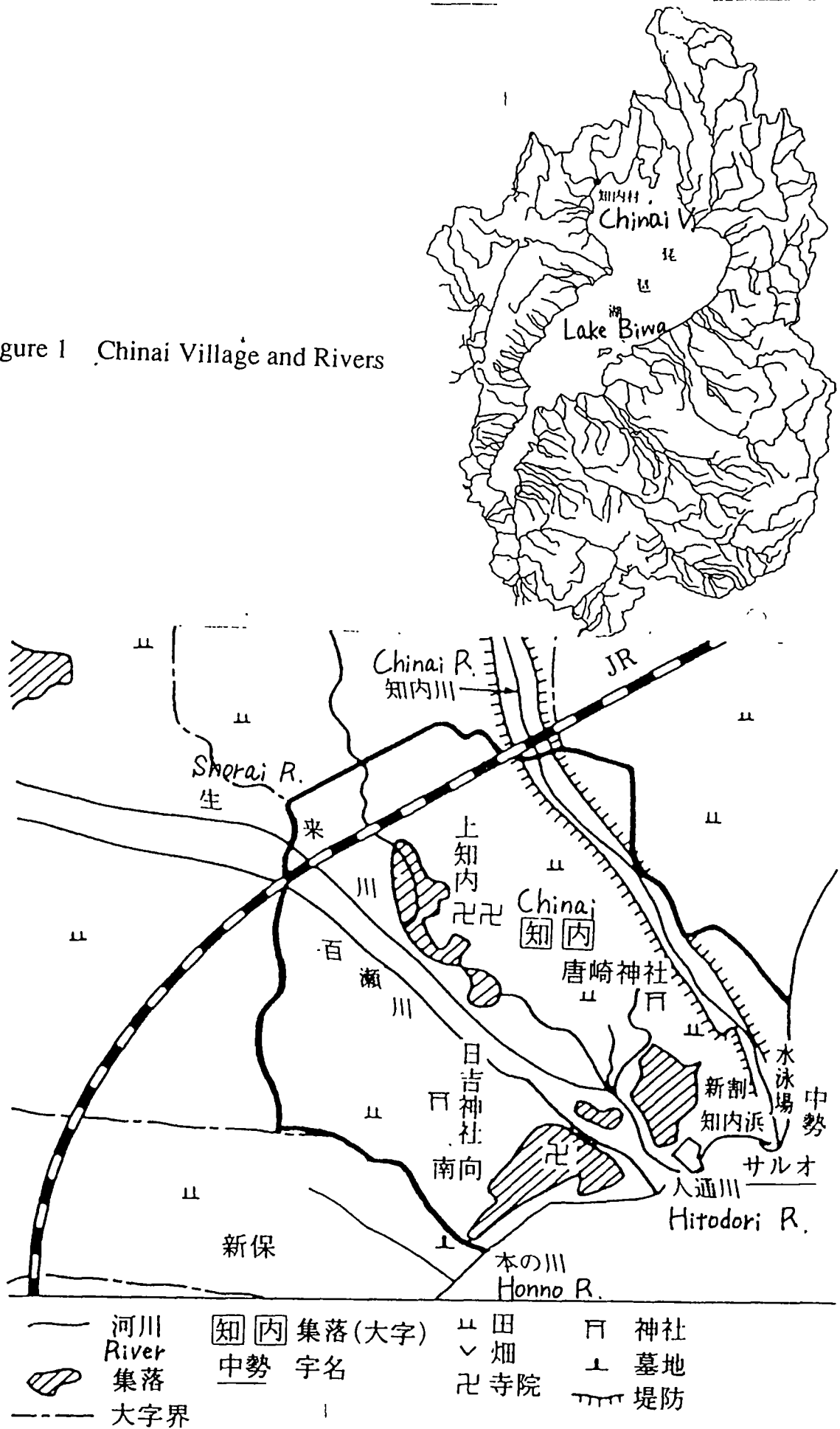
At the same time, there is a need to create a way to unite use and management of global resources as well, and to generate a global community awareness. In fact, a new management culture is needed, one that links local society and global society in the environmental management of common resources.

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Figure 1 Chinai Village and Rivers



(原図 大槻恵美)

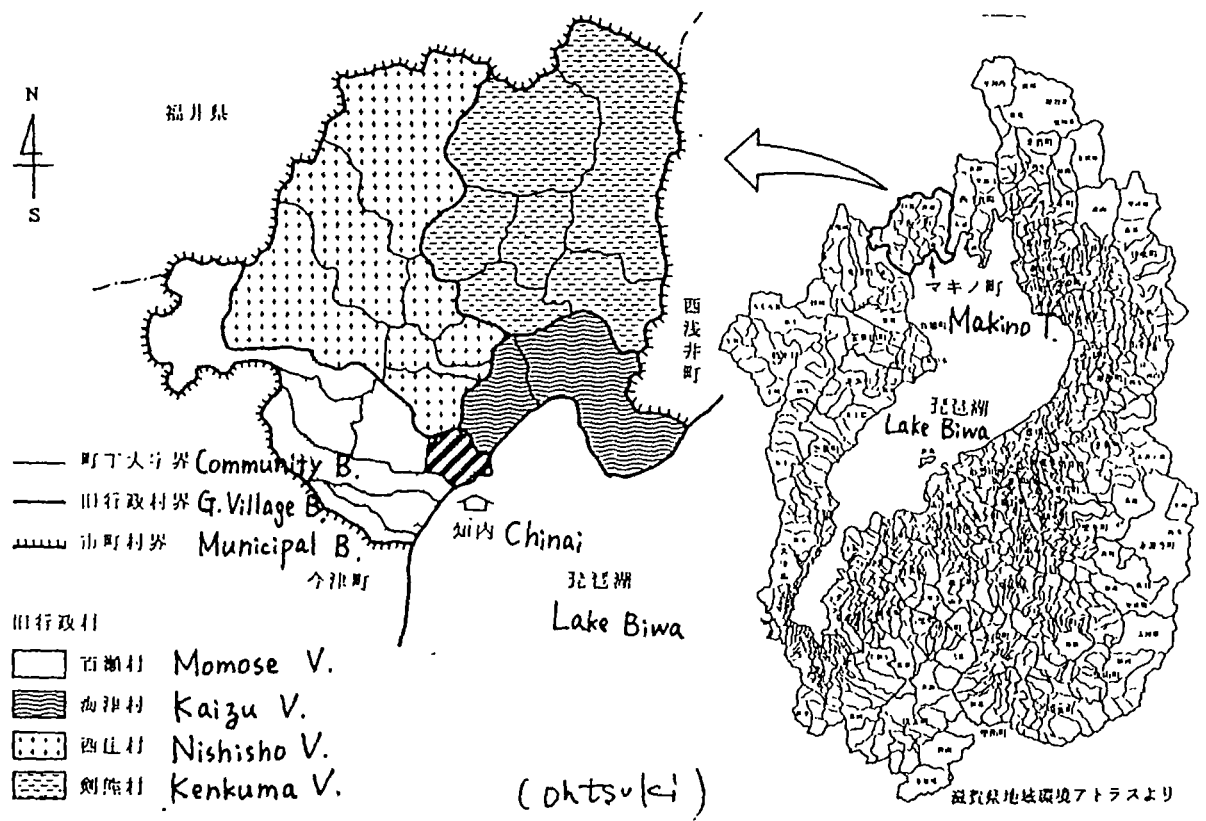


Figure 2 Change of administration unit around Chinai

	element	purpose	facilities insitutuions	
Maekawa	utilization	1)space	traffic-----boat, bridge place-----geer, bukhet	
		2)water	drinking-----kawata(steps) paddy fields-----geer fire prevention-----geer	
			3)living things	fish, shell-----fishing geer water plants-----competitive sell
				4)flow
	maintenance	1)reguration	outlet-----water pool washing-----small ditch	
			2)physical management	river cleaning competitive sell of water plant
	(water spirit)			(Furukawa)

Figure 3 Utilization and Management of Maekawa River

Table 1 Changes in the Local Community Policy at National Level and Chinai Village Level

Year	Period	Local Community
Edo period Mura (1603-1867)	Han-system	Independent Chinai-
*Meiji Restoration(1867)		
Early Meiji Mura (1876-1889)	Transitional Stage	Semi-Independent Chinai-
*Municipal-Amalgamation Law(1889)		
Meiji-Showa (1889-1956)	Ooaza Period (Gyose-Son Period)	Momose-Mura Ooaza-Chinai (No legal right)
*Second Municipal-Amalgamation Law(1950)		
Showa-Present (1956-)	Ooaza(Chiku)Period Chinai-Chiku (No legal right)	Makino-Cho

Table 2 Changes in the Content of China Village Expenditure (1893-1985)

conten year	1893	1904	1923	1929	1942	1948	1962	1975	1985
meeting	13.1	9.8	17.7	16.3	8.9	19.4	6.4	12.5	11.2
salaries	33.5	15.9	38.2	36.2	37.1	35.2	37.2	61.4	51.1
office ex.	5.6	4.6	10.6	12.4	9.0	20.2	8.3	10.0	9.2
assests man.	7.6	2.2	2.8	4.2	6.2	8.6	2.1	6.6	3.3
construction	37.4	20.9	29.4	20.0	14.3	8.9	38.3	2.2	2.3
sanitation	0.7	0.9	0.7	0.6	1.0	1.8	0.7	0.5	0.0
education	0.0	24.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
industry	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.5	0.0
subsidies	0.0	0.0	0.0	5.2	7.7	3.0	5.4	2.1	2.0
street ramps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	8.0
sports promotion	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.7
others	2.1	20.8	0.6	5.1	15.8	2.9	1.0	0.4	5.2

Table 3 Comparison of Flood-Control Public Works among Three Periods

content	period (1) 1911-1914	(2) 1953	(3) 1965
purpose	prevention	levee destroy by typhoon	prevention
inside group	work comm. erected by the village mem	village community itself	land owners comm.
responsible body	Ooaza Chinai	Ooaza Chinai	Prefecture
cost payer	village household	prefecture	prefecture
total cost	¥ 5,000	¥ 1,400,000	¥1,100,000,000
labor body	village people	village people	outside people
work method	manual work	manual work	machinery