

OFFICIAL AND POPULAR APPROACHES TO WATER RESOURCES IN JAPAN: THE FAILURES OF AN APPLIED GEOGRAPHY*

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In Japan from the institutional viewpoint, geography is firmly rooted in research institutes and in higher education. This fact does not however mean that geography is very influential in applied fields or that many geographers are engaged in jobs outside research and education, i.e. in business circles, regional and town planning and other public services. The source of the strong position of geography in academia consists mainly in its importance in school curriculum but not in the practices of geographers in applied fields (Takeuchi, 1984).

After World War II, especially from the 1950s, with the rapid growth of the national economy, various kinds of environmental problems emerged and several new institutions for environmental studies have since been established. Among geographers who came armed with their man-environment paradigms and who always purported to be specialists in environmental studies, only a few have been appointed as researchers at these institutions. Environmentalist discussions carried on by many geographers were too metaphysical to be applied in environmental questions; and for the analyses of environmental problems more specialized techniques and knowledge than geographers' skills could provide were perhaps necessary. Two exceptional fields where specialists in geographical formation have been able to exercise their talents are studies of natural hazards and water resources management. Here I would like to present some considerations in the case of applied geography in the studies of water resources.

Characteristics of Water Resource Use in Japan

Here we define utilized water and potentially utilizable water as natural resources, which are, in hydrological terms, a part of the circulating water and occupy a very small share of the total water of the earth. Here we exclude the utilization of sea water in marine navigation and cooling water for industrial use. The former case is far from the concept of resources because of its unlimited quantity, and the latter has come into use only recently.

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Hence the discussion concerns surface water (that of rivers and lakes) and underground water.

The attitudes to and the method of the utilization of water resources are naturally different among different peoples. Even among the same people or in the same culture we can find diverse approaches to the water resources according to different social classes and groups; the utilization of limited water resources always requires social control pertaining to the water utilization system and in this system the interests differ among social groups and are incompatible even among individuals or communities of common people, local authorities and central authorities.

Historically, and also in modern and contemporary times, in Japan the contrast between popular approaches and official or governmental approaches is strikingly different, especially where water resource management is concerned, because the official or governmental approach must, on the one hand, coordinate the interests of diversified social classes and groups in a vast territory and, on the other hand, represents the interests of specific social groups or classes, while the popular interests in the utilization of water resources reside at the local community level.

Generally, it was only in the utilization for the irrigation of paddy fields that water was regarded as a resource, in terms of limited quantity or scarcity. Traditionally, most Japanese perceived water as a free goods in the economic sense. The perception of water by the Japanese people is first of all characterized by an image of abundance and wildness. In fact, the sensitiveness of the Japanese to water, was exemplified, for instance, in Shigetaka Shiga's book *Nihon fukeiron* (Japanese Landscape) (Shiga, 1894), which extolled the wildness and natural beauty of water (Minamoto, 1984, Takeuchi, 1988a, 1988b). In fact, in the traditional Japanese garden, water is symbolically used in order to introduce nature, in an artificial ambience. In daily life, water for household use was, traditionally, easily obtained from wells and streams. Running water service did not exist except in very few parts of the big city, in spite, or because of, the lack of the prevalence of infectious diseases in Japanese history. River waters were not utilized, except for transportation on a very local scale, because of their torrential character. In Japan, the river system did not form a part of the territorial unity and the river itself constituted a hindrance to communication. In feudal Japan, rivers were very often administrative boundaries and the shogunate government prohibited the construction of long bridges, thereby causing the retention for a long period of the inconvenient and temporary ferry system, in order to prevent a possible revolt of local feudal lords against the central government.

In contrast with the image of nature or wildness in connection with the river, once action was taken whereby water was utilized for irrigation purposes, and even when the water was conducted or derived from the river through irrigation canals, this action came to be considered as a means of taming nature (Perelman, 1990). Since for technical and financial reasons, the construction of irrigation canals and reservoirs was beyond the capacity of individual farmers, the canals and reservoirs were generally realized and maintained by the cooperation of the village community. When an irrigation system comprised several villages, in order to coordinate the interests of these village communities, an irrigation association which covered the irrigation system area was founded. In Japan, customary water rights were identified with land utilization rights. The concentration of landed properties in a small number of private hands never occurred through either the privatization of the vast exten-

sion of irrigation systems or the intervention of a central political power that managed the construction of the irrigation systems.

The collective control of the irrigation system was the source of the imposing power of the village community over its constituent peasants, as was the collective control for the usage of the common forest upon which the peasantry depended for manure, fuel and construction materials. At the same time, it should be noted that, after the middle of the eighteenth century, the total acreage of paddy fields in Japan did not increase, except for the northeastern parts of Honshu and Hokkaido; in other words, except for the northern part of Japan, where rice cultivation has been extended in the last 150 years, thanks to the introduction of new rice species which resist a cool climate with short summers, in most parts of Japan the extension of paddy fields reached its limit in terms of the exploitation and utilization of water resources by the traditional customary irrigation rights system (Kitamura, 1950, 1973; Takashige, 1980). This customary water rights system naturally involved a huge quantity of waste and loss of water, but the opening up of any new paddy field necessarily ran counter to the existing customary water rights of village communities. Hence the result was the apparent saturation of the utilization of water resources.

Industrialization and Changing Water Resource Use

The modernization of Japan after the 1870s, particularly the industrialization process after the last years of the nineteenth century, resulted in the necessity of increasing agricultural productivity by means of opening new paddy fields, hence the new demand for irrigation water, and also in the radical increase in the demand for water for civic and industrial use, which was a new thing for Japan. A part of the city water and industrial water had been pumped up from ground water resources. But this system of water utilization soon began to demonstrate its limits by the continuous lowering of the water table level and by the consequent subsidence of the alluvial land surface, sometimes until it reached below sea level. This caused a potential danger of high tides for the inhabitants of the areas concerned, which in most cases were in the cities. In this context, the reallocation of water resources among diverse uses inevitably necessitated redistribution measures for water resources, involving the reorganization of the traditional customary water rights system, which had been formed through hundreds of years. In other words, modernization, especially in industrialization processes, had brought about explicit conflicts among the diversified interests pertaining to the utilization of water resources.

During the 1890s the construction of hydroelectric generation stations had begun, but almost all of the hydroelectric stations utilized irrigation canals. The water rights associations welcomed the partnership with the hydroelectric companies because the latter's small-scale hydroelectric generation did not disturb the water utilization for irrigation; and besides, the electric companies shared the maintenance cost of irrigation canals. Since the beginning of this century, technological innovation has made possible long distance power transmission and the scale of hydroelectric generation began to increase (Moritaki, 1982). At the first stage, the water of rivers and streams was deviated into a conduit pipe to the generation station, and in this deviated part of the river or the stream, it became impossible to utilize the water for irrigation purposes. Concurrently, the influence of the

hydroelectric companies became stronger and stronger under the state apparatus of government and parliament.

The conflict between agricultural and industrial interests became a sharp one when the construction of big reservoirs with dams was begun in the 1930s, in order to regulate the seasonal changes in the running water of rivers and to adapt the electricity supply to the variation of demand within a twenty-four hour period. The appearance of artificial lakes as the consequences of dam construction resulted not only in the submergence of settlements and arable lands but also in the accelerated sedimentation of debris in the river course above the dam site and accelerated erosion at the bottom of the lower reaches.

Reallocation of Water Resources

Before World War II, a certain indigenous tradition of physiocracy existed in Japan which attributed a high moral value to agricultural activity. Under such an ideological influence when the matter to be dealt with concerned the utilization of water, discussions were almost exclusively about agricultural use. In the so-called "urban socialist movement," from the end of the last century to the beginning of this century, there were some arguments for the construction of waterworks in cities but in prewar Japan they were minor opinions and the diffusion of water supply was very backward in Japanese cities (Katayama, 1898; Abe, 1911). Especially in the low-income residential districts people relied mainly on wells. Demand for water for industrial uses, including hydroelectric use, increased rapidly after the industrial revolution at the beginning of this century. But we cannot find any strong assertion for the necessity of an increase in the supply of industrial water at the expense of irrigation water either in governmental documents or in the writings of intellectuals. We can explain this fact partly by the absence of a strong conflict between agricultural and industrial uses of water and partly by the strong influence of agricultural interest on the power structure of prewar Japan. We have to take into consideration the fact that in prewar Japan newly developing industrial sectors certainly required a large quantity of water: directly, in the form of industrial water or, indirectly, in the form of hydroelectric power which, however, tended to be located in colonial lands particularly Korea and Manchuria.

After World War II, learning from the experience of the TVA (Tennessee Valley Authority), governmental authorities began to construct huge multi-purpose dams for hydroelectric power, control of the river flood, and the obtaining of water for agricultural, industrial and civic uses. Because it became almost impossible to practice the traditional customary irrigation system in the lower courses from the dam sites, the introduction of a new method of irrigation water utilization was indispensable, with the construction of pipelines and cemented water conduits and an underdrainage system. This system enables the saving of a huge amount of water which would otherwise be lost. In other words, the reallocation of an enormous quantity of water resources to newly emerging industrial and civic uses was made possible only through these measures of "rationalization" of water utilization which was actually an "enclosure" of water by central and local governments or a kind of "étatisation" of water. Though the acquirement of new water resources was categorically imperative for the national economy of postwar Japan, this caused, in many

cases, disputes between government authorities and local peasant communities. But the bargaining power of the peasantry decreased because their collective consciousness weakened after the postwar Land Reform, which caused Japanese peasants to turn into individualist-minded owner-cultivators.

Around the mid 1950s came the introduction of the new technology of thermo-electric generation, which depended on imported oil. Hydroelectric power had become relatively expensive in comparison with the cost of the thermo-electric energy and the purposes of dam construction shifted to the sole acquirement of water resources for industrial and civic uses.

Geography and Water Resources

Monographic, detailed and descriptive studies of irrigation systems were always one of the favorite topics of academic geographers in Japan and they continued studies of this kind, based on data obtained through direct observation in the field at the local community level. These continued even after the so-called "quantitative revolution" in geography and the increased proportion of the manufacturing and service industries in the national economy. In this way, very often geographers took a position favouring the interests of the local agricultural community. However, at the very most, they merely voiced criticisms against the governmental water resources reallocation policies and never presented counter-policies for the "just" redistribution of water resources. On the contrary, researchers in economics and political sciences generally took a position favourable to the governmental measures of the "rational" reallocation of water resources in order to answer the increased demand for industrial and civic uses.

We should here remark that, concerning the contradictions between official and popular approaches to water resources, it has not been ideology but the investigative method of researchers that decided the intellectual stance adopted. Very often populist viewpoints of small local communities are expressed in connection with the nostalgia for traditional rural life and the ecologist movement. It is an attractive point of view but is destined to remain in the minority as long as the majority of the Japanese continue to foster unbounded desires to raise the standard of living.

The intensified utilization of water resources and the consequent increase in the control of surface and ground waters, (or the advanced artificialization of the water) have resulted in a changing man-water relationship. The absolute increase in water consumption has exacerbated the conflict among the various social groups around the water resources, rural communities, business groups, beneficiaries of the water service and so on. But, the establishment of the integrated control of the utilization of water resources by the administrative authorities has produced the separation of common consumers from the water resources, or in other words the beneficiaries of the water have become alienated from the control of their own water resources; this is different from the period in which peasants were members of a local community for the control of irrigation water for paddy fields. Now every farmer turns on a spigot to conduct the water to his paddy fields and pays for his consumption. He does not know exactly from which reservoir the water is coming, in the same way that an ordinary city inhabitant ignores the origins of the water service and the electric

supply (even if he is against nuclear energy he may consume electric power generated at the nuclear station). In this sense, also, the antagonism among interested groups concerning the water resources has become remote from the daily life of the common people and the social contradictions pertaining to the utilization of the water resources barely affect the popular collective consciousness that is the compelling motive of social movement.

In this context I would like to emphasize that, by way of self-criticism, human geographers of Japan after World War II have failed in putting their discipline into practice, at least regarding the problems of the utilization of water resources, not because they have backed a wrong horse but because they have not succeeded in convincingly revealing the mechanism of the alienation of the people from their water resources. Some geographers such as Kenichiro Moritaki (1982) have exhaustively denounced the anti-democratic character of the allocation process of the water resources after World War II but his condemnation received support from only a small number of researchers in academic circles. General water consumers are indifferent to this problem.

One sure fact is that the advances in the exploitation of water resources, which always brings about an increased ecological disequilibrium, has resulted in frequent and acute natural hazards, which are actually disasters caused by the excessive artificialization of nature. In many places in Japan, people are now living protected by huge dikes from the high tide and the river flood and under the menace of the pollution of drinking water. In this ecological aspect water has assumed, at least in the perception of the people, a more hostile character than in the past.

In this regard we can point out the pioneering work of Japanese geomorphologists of 50s and 60s who warned against the dangers caused by the uncontrolled utilization of water resources. Fumio Tada (1964) and Takamasa Nakano (1963) convincingly showed the relationship between the utilization of underground water for industrial purposes and ground subsidence in urban areas. Masahiko Oya and his collaborators (Sato, Okuda & Takahashi, 1964, Oya, 1970) made detailed topographical maps of the Nagoya metropolitan area showing the risky areas which were later actually flooded when a typhoon hit the region. These geomorphologists did not conduct their researches out of a strong sense of the need to apply their discipline but only because they believed that the human factor was an important element for the physical geography of humanized landscapes such as alluvial plains and urban areas. In the studies in physical geography there perhaps still remains the excellent tradition of giving the human factor its due consideration. It would be more accurate to regard the so-called "natural hazard" essentially as an human one. However, as I mentioned at the beginning of this paper, environmental studies including those dealing with hazards are now not the monopoly of geographers; hence their contributions are relatively minor.

Conclusive Remarks

In Japan, the contributions of geographers in the practical application of geographical knowledge and analyses can by no means be considered remarkable, especially where human geography is concerned. In the fields of town and regional planning, resource management and other fields involving professional expertise, many past practitioners who have not

been formally trained in geography, have contributed, much more than professional geographers, to the enrichment of knowledge on the man-environment relationship and to the deepening of the theoretical consideration of social and spatial relations. Also in the case of water resource management, Japanese geographers' contributions to the study and to the practice have been relatively few in comparison with the contributions of specialists of other disciplines. This is not because the majority of Japanese academic geographers have confined themselves in the ivory tower of academia; a number of Japanese geographers, especially after World War II, have in fact been keen about the pursuit of social relevancy. The reallocation of water resources among conflicting types of uses, hence among various social groups became imperative in the process of industrialization particularly with the changing industrial structure of the Japanese economy after World War II. Regarding the ensuing resource reallocation measures, the official or governmental view point differed from, or rather, was contrary to the popular one. Geographers who committed themselves to the water resource problem generally took a stand in the interests of the traditional village community. This was not due to an anti-establishment or anti-governmental ideology on their part, but simply to their intellectual interest in the village community; hence, geographers often went along with the popular perception of the water resources and could not be consulted or sponsored by the official bodies. They were not, however, tough or consistent enough in proposing concrete the counter-measures. There have always existed geographers interested in the urban scene, but in the case of the village community, the majority of researchers and practitioners involved have been specialists in other disciplines. Another question is the increased alienation of the common people from water resources or the extinction, in this way, of the popular approach to water resources in industrialized and post-industrial society. If we speak of the failure of the applied geography of water resources in Japan, what we are referring to is the lack of a proper revelation of the mechanism of this alienation.

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