The Role of Land Improvement Districts (Tochi Kairyō Ku) in the Modernization of Japan's Agriculture Sector: A Preliminary Research Report

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I. Introduction

The aim of this paper is to summarize ongoing research regarding water management and rice cultivation in Japan's agricultural sector. Of specific interest is the formulation and implementation of a set of legislative decisions which established an institutional framework for agricultural resource management and development throughout Japan, including the *Arable Land Replotment Law of 1899*, the *Land Improvement Law of 1949*, and their related amendments.[2)] The 1949 legislation is considered to be especially important since it proposed the creation of small-scale administrative units for agricultural development known as Land Improvement Districts (Tochi Kairyō Ku).[3)] The present opportunity to conduct case study analyses of the operation of at least two of these Districts, one in Tōhoku and the other in the Kansai region, will permit the development of several propositions about the functioning of these political-administrative entities in relation to the land-use and water control requirements of irrigated agriculture. A long-range implication of this research is the possible comparison of the institutional structure for the modernization of agricultural regions in the United States and Japan.

It is significant to note that analysis of the political-administrative framework found in the agricultural sector is largely absent from the Western area studies literature on Japan. This lacunae in the literature presents certain research problems and opportunitie which might be summarized as follows. First, there is a need for careful

study of the 20th century legislation for land improvement in Japan: a central objective of preliminary research should therefore include the development of a detailed annotated bibliography on this topic, with special reference to the Land Improvement District (Tochi Kairyō Ku). A second need is to supplement study of the national legislation with analysis of the actual District concept adopted at the local level: we expect to trace the implementation of post-WWII legislation through field interviews and study of local documents in at least two case studies. A third objective is to evaluate critically the ways in which the methodology of this research either contributes or fails to support field work in Japan. These three points: a preliminary assessment of the literature; a summary of field work impressions regarding water management in areas of irrigated agriculture; and the examination (and re-examination) of certain questions raised by field work form the outline of the essay to follow.

II. Brief Discussion of Land Improvement Districts.

(a) Background

Before describing the policy concepts which are the object of our study, it is necessary to discuss briefly some of the salient features of the irrigation system and our approach to this resource management problem. These observations are based on ongoing field work in Japan.

The irrigation system, in general terms, is a method for moving water from a river, well, or reservoir to the actual site of crop production. This task is accomplished by means of a water distribution system composed of canals which pass more or less adjacent to each plot of arable land. In contrast to a typical drainage network which gathers water from many sources, ultimately forming into a single river, water for irrigation purposes is usually taped at a single point and dispersed across the land in an increasingly complex grid of channels. The resulting pattern of land-use and water control is one that has been influenced not only by such natural features as geomorphological conditions, but also the highly localized demands of human settlements. Historically, a key problem has been the equitable distribution of water: those farmers closest to the fluvial source have exercised much greater control over how and where water could be used.

How has government helped to organize and give direction to an agricultural régime where the availability of water cannot be taken for granted but must be consciously supplied according to the demands of rice production? This is the general policy question we wish to explore in this paper.

It is of interest because by asking how policy has coordinated the movement of water to (and from) specific sites for crop production we thus give explicit consideration to the spatial characteristics inherent to such organization of area. Traditionally, this question has been seen largely as a technological problem only, that of developing the infrastructure needed to both drain and supply water in an efficient manner. However, in the case of Japan's small-scale administrative units for land management (Tochi Kairyō Ku) we have an opportunity to clarify how technology and administrative organization are both relied on in the coordination of the complex physical and social variables which comprise the system of resource-use found in areas of irrigated agriculture.[4] We might summarize the perspective to be developed as an attempt to assess how land management institutions influence resource-use, particularly the water and land comonents of the irrigation system in a given agricultural area.[5]

(b) Legislation.

The purpose of the *Land Improvement Law of 1949* has been to both maintain and promote increases in the production of food and other farm produce through the improvement, development, and consolidation of farm land. The means for realizing this goal is the creation of a Land Improvement District (Tochi Kairyō Ku), at the request of at least two-thirds of the landowners and land cultivators of a given area, which is responsible for the execution of defined projects, collection of matching monies from participating farmers, and maintenance of the facilities established.[6] In the development of legislation which led to the establishment of these Districts, Japanese policy makers appear to have been primarily concerned with the size of farm blocks for modernization (replotment), and the rapid removal of those social and environmental factors which hindered the shift to more mechanized agricultural production. Types of projects include the following: construction of irrigation and drainage facilities, block readjustment, land reclamation, reservoir development, and resolution of disputes regarding legal rights to land and water facilities.[7]

Some idea of the complexity of these land improvement projects, especially since 1949, can be gleaned by considering several statistics. As of 1961, for example, there were 13,163 Land Improvement Districts (Tochi Kairyō Ku) in Japan covering an area of 3,229,000 Ha. At this time the percentage distribution of land improvement activity was as follows: forty-three percent of these projects were concerned primarily with irrigation and drainage; twenty-one percent concentrated on farm roads and bridges, etc., and sixteen percent were involved with land replotment.[8] The

average area of these Districts in 1962 was 250 Ha, although Unions of Land Improvement Districts (Tochi Kairyō Ku Rengō), that is, the establishment of a separate District and later unification with adjacent Districts in the interest of efficiency, totaled 139 (1961) and averaged 2,471 Ha.[9] A map of the distribution of Land Improvement Districts as of 1956 has been published previously by the senior author of this study.[10]

Several of the factors which influenced the development of the District concept in Japan's agricultural areas may be summarized as follows. Modern policies for land improvement can be traced back to the beginning of the Meiji period, although formal legislation for the improvement of agricultural areas was technically promulgated in 1899 as the *Arable Land Replotment*.[11] The 1899 Law was amended several times in the first decade of the 20th century, in an effort to encourage development of drainage facilities and to clarify subsidy procedures. A key factor subsequent to 1914 was the establishment of Land Replotment Associations (Kōchi Seiri Kumiai) which specified the percentage of landowners to be involved if the petition for cost-sharing with the National and Prefectural government was to be approved.[12] The association format was an important forerunner to the District concept adopted after the post-WWII land reform, as found in the *Land Improvement Law of 1949*. Some of the important changes in the more recent legislation include: (1) the decision to allow tenant farmers (as well as landowners) to participate in improvement projects; (2) the increasingly large scale of these projects due to greater national government involvement; (3) the expectation that facility maintenance costs would be borne largely at the local level, as distinct from the actual construction of facilities (such as dams and headworks) which was deemed to be a national government responsibility; and (4) low-cost loans and other programs were made available to farmers through provisions of the 1949 Law.

Questions about the purpose, complexity, and precedents for modern legislation for agricultural land improvement each represent important areas of study in the analysis of the modernization of Japan's agricultural sector. Essays in the Japanese literature address each of these points in terms of the regional characteristicts and the distribution of Land Improvement Districts (Tochi Kairyō Ku)[13] In particular, it has been noted that land improvement is one of the important factors which cause areal differentiation through changing dynamic relationships between man and land or through the functional reorganization of the human ecosystem in the area concerned.[14] In the pages to follow, we will continue to pursue this theme although

our objective in this case is the development of a methodology which might be applied directly to an assessment of the functional operation of individual Land Improvement Districts, leading to a more detailed understanding of this policy concept for efficient farm management in irrigated agricultural areas.

III. Field Study in Japanese Geography: Initial Impressions.

Policy concepts in isolation tell us little about the peculiar resource management problems found in areas of irrigated agriculture, or how (and whether or not) these Districts actually help to stimulate land management programs in Japan. Clearly, it will be necessary to develop a series of specific questions for assessing the functioning of these administrative units for resource management and development. We will illustrate this point briefly by summarizing several initial impressions of the operation of the Land Improvement District (Tochi Kairyō Ku).

The Japanese case presents at least two peculiar problems in the study of government policy for rice production. First is the long history of agricultural activity which has solidified both in practice and in common law a cooperative system of water-use between groups of farmers often located in different villages. This point, when considered in light of the paucity of Japan's agricultural land (less than fifteen percent of the country is arable), may help to clarify the common generalization that agricultural land-use, especially rice production, is highly intensive. Second is the distinct regional variation of agricultural land-use activity, as reflected by the geophysical units upon which production occurs, ranging from intermountain valleys and diluvial upland terraces to agriculture located on floodplains or elsewhere on the alluvial fans adjacent to coastal areas. These two points suggest that the previously reviewed legislation must in fact contend with very real social and physical impediments to the equitable distribution of water for rice production.[15)]

It has been possible to begin to address these points through preliminary field observations of rice production on both a diluvial upland terrace in Tōhoku (Kitakami River), and a coastal area of extensive land reclamation in Kyūshū (Kuma River, Heiya). Perhaps the most striking feature of these two agricultural sites is the sophistication of water control. The experience of walking through these irrigated areas focuses attention on a complex infrastructure which keeps water in nearly constant motion, not just in the rivulets leading to individual fields, but also between the agricultural villages either clustered on the footslopes of the mountains or stretched along improved rural roads. The impression that water control for rice production

is a problem that traverses village boundaries is supported by those aspects of the literature on rural Japan which discuss the historical water conflicts between groups of landowners or tenants depending on their location on a particular water course. A common theme is that modern rationalization of water supply has radically transformed the social relationships associated with those traditional irrigation systems incapable of supplying water on demand. The movement of water between villages also calls attention to the extensive nature of the irrigation system. This factor raises several important questions about the study of irrigation systems and village units which will be discussed in more detail below.

An important objective of contemporary work by social scientists has been the study of changes in the village social structure in Japan: the classic Beardsley, et al. study of *Village Japan* illustrates this point, as do a number of recently published books in Japanese rural studies.[16] However, the limitations of this method for analyzing the irrigation system has yet to receive careful scrutiny. It may be pointed out, for example, that although traditional studies of East and Southeast Asian society have been based on the village, this approach presents certain problems in the examination of irrigation systems which by their very structure extend beyond the village boundary.[17] We will illustrate this point by looking briefly at an example of contemporary Western research on rural Japan, Shimpo's study of Shiwa village in Iwate Prefecture.[18]

Shimpo's sociological study of economic development and social change in a Japanese farming community sheds new light on the tremendous changes in social relationships and community structure which have occurred with the modernization of the water distribution system. But it is also interesting to note three important factors that remain undeveloped in this monograph.[19] Absent from this book, for example, is an adequate description of the regional context of the village under study, including an appraisal of resource endowments (particularly water), which form an important backdrop for the problems faced in the modernization of this agricultural community. This study also fails to compare its findings with other agricultural areas in Japan, leaving students of the modernization of the agricultural sector with the difficult problem of attempting to make highly qualified generalizations based on only one case study. And finally, while reference is made in this book to the changing nature of policy requirements for government subsidization of land improvement projects, this information is used primarily to analyze changes in Shiwa at the community or village level.

These three criticisms of the Shimpo study, in combination, draw attention to an undeveloped aspect of Western research on rural Japan, that of assessing the administrative structure for water distribution in areas of irrigated agriculture. A more detailed examination of Land Improvement Districts (Tochi Kairyō Ku) would address this problem by identifying some of the regional aspects of this resource management problem, as found in at least two environmental settings, each of which have programs for water-use based on historical precedent. By means of detailed mapping, legislative study, and interviews, ongoing field work is attempting to define, in particular, how the boundaries of these small-scale administrative units have been established. Some of the questions which guide bibliographical and field research of the functional characteristics of the Districts concept are listed below:

(1) Land Improvement Districts (Tochi Kairyō Ku) are designed to resolve certain land-use problems—What sorts of problems were to be resolved in the particular site in question; (2) What kind of resistance was there by local landowners to the proposed attempt to modernize the given regional area; (3) Was there any adjustment of the detailed rules of the national legislation in response to local needs; (4) Has the District accomplished the goals it set for itself; (5) What peculiar problems occurred in the implementation of the District-idea in the area under study and how might these problems be compared and contrasted with other Districts in different agricultural areas; (6) Has urbanization of the region caused specific problems in the functional operation of the District—Specifically, are urban interests represented on the supervisorycommittee of the District; and (7) What are some of the differences between the pre- and post-WWII agenda for land improvement in a given agricultural setting? It is anticipated that this list of questions will be expanded as field work continues.

IV. Selected Problems in the Study of Water Resource Management Policy in Japan's Agricultural Areas.

It would be useful at this point to review briefly some of the problems associated with the attempt to grasp the functional operation of Japan's legislation for Land Improvement Districts (Tochi Kairyō Ku). The two areas that have comprised the the core of the past year's research agenda are: (1) a tentative definition of the institutional framework for agricultural resource management; and (2) language study and translation as they relate to field data collection. A brief review of work in these areas might provide us with a more refined agenda for the second year of this

research project.

(a) Geography and Resource Management in Areas of Irrigated Agriculture: How Might Theory Support the Inductive Approach?

A long-range goal of current research on the formulation and implementation of policy for Land Improvement Districts (Tochi Kairyō Ku) is to develop several propositions about the functional operation of these administrative entities. Thus, research in the field has led to further comparison of the operation of these administrative units and the theoretical approaches developed in Geography for the study of resource management problems. The dialogue that has been established with students of agricultural policy in Japan has suggested the necessity of reappraising and further elaborating the perspective to be developed: it now seems that a more detailed understanding of a geographical approach to the study of the administrative components of the irrigation system is needed in the year to come.

The study of natural resources and their management is well established in the field of Geography and might be sketched as follows. Traditionally, the field has been concerned with the pattern and distribution of natural resources and the interactions of associated phenomena in particular areas.[20] The resulting research in inventory and classification identifies a persistent theme in the geographical approach to such study, that of clarifying areal patterns in the analysis and use of natural resources.[21] Inherent to such geographical research is an appreciation of a complex functional relationship that organizes the definition of resources, namely, the recognition that the physical and biotic world is essentially 'neutral material' that is manipulated by cultural processes in order to satisfy changing human needs.[22] The appraisal of natural resources, the cultural application of technology, and changes in man's psychological and material needs are of fundamental importance to natural resource study: for geographers the regional pattern of such interaction is a distinguishing characteristic to be scrutinized carefully.[23]

Contemporary research in resources management has expanded on the regional perspective, both with regard to the actual decisions of society concerning resource allocation and development policy,[24] and continuing refinement of the geomorphological concepts which attempt to explain natural processes.[25] Work on the behavioral aspects of resource management decision-making, the question of the potential range of choice regarding resource-use, may be singled out for its wide-ranging implications for the field of study at present.[26] Research by Gilbert White illustrates this point in terms of two models, one concerned with identifying and evaluating risk and

uncertainty in the human adjustment to natural systems (natural hazard studies), and a second dealing with those elements which enter into the decision-making process regarding the actual and theoretical range of choice in resource management (a geographical policy model).[27] Particularly in the case of the latter policy model we have a comprehensive summary of the main components of contemporary resource management studies by geographers, including: (1) Perceived Range of Choice—the range of resource-use recognized by the resource manager; (2) Resource Estimates—judgements about the quantity and quality of the physical resources available; (3) Technology—as it is affected by future demand, production and actual use of resources; (4) Spatial Linkages—the relationship of a given use to other resource-uses in contiguous or functionally related areas; and (5) Social Guides—the customs, attitudes, education, and organizations of a society that influence (1) through (4) above.[28] The many studies which build on such analysis of the attitudes and perceptions of resource managers and consumers, and the application of behavioral methodology to prescriptive and descriptive critiques of resource management policy, are summarized in several reviews of the field.[29]

With specific reference to a geographical perspective on resource management policy for areas of irrigated agriculture, the basic question that has guided research to date may be stated as follows: How might we assess the institutional framework for water resource development in Japan's agricultural areas? Though general and perhaps overly broad this question served as a starting point for the study of the Japanese case. It was adopted, in large part, based on three sources: White's call for additional research in resource management; Ackerman and Lof's exhaustive study of technology and American water development; and Sewell's comments about water resources planning and policy making in Canada.[30] Research by other geographers that influenced early thinking, in addition to the work reviewed in this section, includes: (1) the work of Political Geographers such as Whittlesey, Kasperson and Minghi, and Stetzer regarding the study of the political organization of area at a scale smaller than the nation-state;[31] and (2) studies of agricultural areas in East and Southeast Asia by Ginsburg, Eyre, Vandermeer, Cantor, Spencer, and Nishikawa.[32] Work by the latter group in particular typifies a geographical perspective on irrigation systems that gives explicit consideration to the regional (and systemic) components of water resources management in agricultural areas.[33]

Ackerman's research can be singled out, however, because of its selective analysis, in part, of the administrative components of water development and management

in agricultural areas. A specific quote from this work which was used as an early definition of the kinds of technological and administrative problems Land Improvement Districts (Tochi Kairyō Ku) would be expected to contend with is as follows:

> Discretely considered, the problem of matching water supply and water demand is one of adjusting volume, flow, quality, and unit cost of production and distribution to the volume, nature, intensity and location of demand. Technology and administrative organization go hand in hand toward meeting this problem within a given cultural and physical environment... If technology is directed especially toward mastery of the physical environment, administrative organization may be seen as a means of facilitating or depressing the flow of services from that resource...[34]

Within the context of this water supply and demand question, three broad categories are listed which identify the general functions of administrative organizations for water resource development, including: Planning for Development; Realization of Development; and Operational Management. Ackerman and Lof's contention was that these three functions were universally applicable to organizational problems, an idea which they summarized as the study of "the geographical scope of administrative problems".[35] Specific questions are developed for each of these categories which will not be discussed here due to space limitations.[36]

In subsequent papers we will need to clarify further the apparently complex role of administrative organization in the management of the land and water components of agricultural production, particularly with regard to the functional operation of administrative units for management of the irrigation system. It is not at all clear, however, how to proceed with this objective without a far more refined definition of such terms as 'administrative organization' and 'institutional structure' for resource management. In a recent review of the field Mitchell addresses this problem in great detail, concluding that although the issue of institutional arrangements is a significant research question, a disturbing fact is that:

> little consensus has emerged regarding what is meant by 'institutional arrangements'. Individuals have developed their own operational definitions, making direct comparison difficult if not impossible. Lack of agreement over the nature of the research problem represents a serious weakness. Such a situation hinders replication and verification of findings.[37]

This problem of the range of definitions used has also been addressed by Wengert, who succintly notes that the institutional concept is, "an umbrella term to incorporate behavioral, social, and managerial variables".[38] Ackerman and Lof's analysis is useful inspite of these qualifications, but the huge body of literature that can be

found in Japanese regarding irrigation, when combined with the confusion surrounding terminology definitions, requires a more specific format for analyzing the way institutional arrangements influence the resource management process in areas of irrigated agriculture.

(b) Language Study and Field Data Collection.

Definitional problems, as outlined in the preceeding section, have direct implications for the second category of research in Japan, 'language study and translation as they relate to field data collection'. First, with regard to language study it suggests the need for a more thorough analysis of the institutional arrangements, and their definition, as found in the Japanese legislation for land improvement. Second, with regard to field work interviews it raises questions about how to most efficiently collect data when meeting with farmers, agricultural officials, etc. We will briefly discuss each of these points.

Ongoing reading of the Japanese literature points out the complexity of irrigation problems and the special importance that should be placed on a detailed historical evaluation of policy concepts for agricultural land improvement in Japan. It has been suggested by Japanese scholars that the historical dimension of the proposed research should be expanded but to date it appears best to limit this initial inquiry primarily to the latter half of the 20th century. One advantage of this approach is that it allows us to update previous work by the senior author of this study.[39] Although one is reminded of Whittlesey's comment that an important challenge to Geography is the possibility of observing the "process in which laws and regions figure as protagonist and antagonist," particularly the need for a "survey of a code or body of law in its environmental setting over a period of years",[40] this research project has not been designed explicitly in terms of historical questions. Perhaps this is a question we can address at a later date as noted by the questionnaire (page 59): at least one of the questions, number seven, is aimed at the collection of information relating to the similarities and differences of the objectives of land improvement projects both before and after WWII.

Prior to beginning research in Japan it was decided to attempt to develop a 'selected annotated bibliography' of pertinent reports, documents, and scholarly critiques of agricultural resource management policy in Japan. The objective of this project has been further delineated with the selection of the legislation for Land Improvement Districts (Tochi Kairyō Ku) as the primary topic of interest. Support for the continuation of research on this topic in the year ahead is strong. We

have recast the idea slightly and have now labeled it, tentatively, 'a Japanese-English dictionary of water resource management policy concepts—selected examples from agricultural areas'. It is anticipated that the format will be the same as that found in an annotated bibliography as illustrated by Harris' work in the field of Geography[41], although individual annotations will be expanded somewhat since this survey will be selective as opposed to comprehensive. Since work on this project has just begun it is not possible to comment in more detail at this time.

Continuing work on a review of land improvement has been crucial to the initial field trips to Tōhoku (Kitakami River) and Kyūshū (Kuma River). As part of research at the University of Tokyo, regional land-use maps and a tentative questionnaire have been developed for such on-site research. (In the case of the questionnaire, some of the questions are reviewed on page 59.) The questionnaire approach, we should emphasize, is at an initial stage of development. Its major problems seem to be two-fold: (1) the differing perspective of the researcher and local government employees and/or local farmers; and (2) lack of readily available material with which to prepare for the complicated problem of data collection in the field. The complexity of interviewing in Japanese, even when assisted by a native speaker, is very pronounced. It is clear, for example, that it is necessary initially to explain in detail the nature of a foreigner's interest in Japanese agriculture. The problem of encouraging people to be at ease with the researcher's questions was previously encountered by the junior author in an earlier study of agriculture in the United States.[42] But there are obvious linguistic and cultural differences to be confronted when conducting field work in Japan. There are also problems when questions regarding organizational structure touch on how 'representatives' are selected from local groups of farmers to act as leaders in the water distribution and drainage programs since the response may be 'political' in content. This problem was encountered, for example, in response to question five of the questionnaire, as listed on page 59.

Problems in the questionnaire's technical design, on the other hand, are in part related to resources available in Japan. It has been helpful to review Platt's *Field Study in American Geography*[43], as well as some of the materials used in Ginsburg's Geography of East Asia course, such as his memo regarding the *Reconnaissance and Analysis of Foreign Areas*, and his exercise and essay regarding the *Use of Topographic Maps*[44]. However, the scale of the Land Improvement District (Tochi Kairyū Ku) is so small, in many cases, that these research tools, though useful,

have been of limited help. Clearly, the question of field data cellection is at a different stage of development in comparison with the library-based annotated bibliography project and therefore requires more thorough evaluation in the year ahead through discussions at The University of Tōkyō and The University of Chicago.

V. Conclusion.

The preceeding essay is a preliminary assessment of research on the role of Land Improvement Districts (Tochi Kairyō Ku) in the modernization of Japan's agricultural sector, with particular attention to water resource management policy. Further clarification and expansion of this research project is anticipated, principally by means of the aforementioned dictionary of policy concepts and further development of a questionnaire for field study. In this fashion we expect to develop further a set of techniques which will facilitate the collection of data about the operation of the Land Improvement District (Tochi Kairyō Ku) in specific agricultural settings in Japan.

In a future paper we also hope to explore the possible development of a typological system for discussing regional differences in Japan's agricultural areas. This idea is now being analysed in terms of differences between the national legislation for land improvement and the actual operation of local Land Improvement Districts (Tochi Kairyō Ku). Further classification of the factors which influence resource-use in agricultural areas might include: (1) the importation and adoption of American legal concepts during the post-WWII occupation; (2) urbanization influences; and (3) international factors such as changing dietary habits in Japan. Each of these three points may also be discernible in the functional operation of Land Improvement Districts in Japan's agricultural areas.

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References

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2) In the Japanese literature these two pieces of legislation are referred to, respectively, as: *kōchi seiri hō*, Meiji sanjūni nen san gatsu, hōritsu dai hachijū go; and *tochi kairyō hō*, Showa nijuyonen, hōritsu dai hyakukyūjūgo go. See: Ogura Takekazu (1963), ed., *Agricultural Development in Modern Japan* (Tōkyō: Fuji Publishing Co., Ltd.), pp. 107–19, 388–409; Nishikawa Osamu (1966), "Nihon ni okeru tochi kairyo ku bumpu," (The Distribution of Land Improvement Districts in Japan) *Jimbunkagaku-ka Kiyō* (*Jimbunchiri-gaku*) Vol. 38: 17–24 including distribution map up to 1956; Hayami Yūjiro (1975), *A Century of Agricultural Growth in Japan* (Tōkyō: University of Tōkyō Press, 1975, pp. 44–83.
3) Nishikawa Osamu (1965), "Nihon ni okeru tochi riyō to tochi kairyō ni arawareta chiikiteki tokushoku," (Regional Characteristics of Land-Use and Land Improvement in Japan) *Jimbunkagaku-ka Kiyō* (*Jimbunchiri-gaku*) Vol. 34: S42-61; Nishikawa O. (1971), "Land Improvement and Rural Areas in Japan," *Proceedings of the Department of Humanities, University of Tōkyō* (*Human Geography*) Vol. 52: 13–16. Shirai Yoshihiko (1964), "Nihon ni okeru nōchi shūdanka chiiki no shosō," (Some Phases of Farmland Consolidation in Japan) *Chirigaku Hyōron* Vol. 37: 425–29; Shirai, Y. (1972), *Nihon no kōchiseibi* (Land Consolidation in Japan) (Tōkyō: Taimeido); Okabe Saburo (1979), *Zusetsu tochi kairyō 100 ko: Ashita no noson kensetsu o mezashite* (One Hundred Lectures on Land Improvement Districts: Goals for the Construction of Tomorrow's Agriculture) (Tōkyō: Chikūsha), p. 24; and Imamura, Naraomi (1977), et al., *Tochi kairyō hyaku nen shi* (A Hundred Year History of Land Improvement) (Tōkyō: Heibonsha)
4) Nishikawa, O. (1966), "Nihon ni okeru tochi kairyō ku bumpu," pp. 17–34; Kanazawa, Natsuki (1977), "Role of Government and Farmers in Irrigation Water Utilization and Management," in *Farm Water Management for Rice Cultivation* (Tōkyō: Asian Productivity Organization), pp. 17–36; Okabe, S. (1979), *Zusetsu tochi kairyō 100 kō: Ashita no nōson kensetsu o mezashite*, pp. 1–32; Imamura, N. (1977), et al. *Tochi kairyō hyaku nen shi*.
5) Gilbert F. White (1965), "Needed Research," in *Readings on Resource Management and Conservation*, ed. by Ian Burton and Robt. W. Kates (Chicago: University of Chicago Press), pp. 505–7.
6) Okabe, S. (1979), *Zusetsu Tochi kairyō 100 kō*, p. 25.
7) Nishikawa, O. (1971), "Land Improvement and Modernization in Japan", pp. 15–19; Nishikawa, O. (1966), "Nihon ni okeru tochi kairyō ku", pp. 17–18.
8) Nishikawa, O. (1971), "Land Improvement and Modernization in Japan," pp. 19–23.
9) Nishikawa, O. (1966), "Nihon ni okeru tochi kairyō ku," p. 19.
10) Nishikawa, O. (1966), "Nihon ni okeru tochi kairyō ku," includes a distribution map up to 1956.
11) Nishikawa, O. (1971), "Land Improvement and Modernization in Japan," pp. 15–18.
12) Nishikawa, O. (1971), "Land Improvement and Modernization in Japan," p. 16.
13) See, respectively, the 1965, 1966, and 1971 essays by Nishikawa, O. as noted in references 2 and 3.
14) Nishikawa, O. (1966), "Nihon ni okeru tochi kairyo ku," p. 24.
15) For a more detailed reveiw of these points, see: Tamaki, Akira (1979), "Development of Local Culture and the Irrigation System of the Azusa Basin," (Tōkyō: *The United Nations University*, Project on Technology, Transfer, Transformation and Develoment: The Japanese Experience (HSDRJE-4/UNUP-50), 32 papes.
16) Richard K. Beardsley, John W. Hall and Robert E. Ward (1959), *Village Japan* (Chicago: University of Chicago Press); Shimpo (1976), *Three Decades in Shiwa*); Edward Norbeck

(1978), *Country to City: The Urbanization of a Japanese Hamlet* (Salt Lake City: University of Utah Press); Ronald Dore (1978), *Shinohata: A Protrait of a Japanese Village* (London: Alleyn Lane); Robert, J. Smith (1978), *Kurusu: The Price of Progress in a Japanese Village, 1951-1975* (Stanford: Stanford University Press); Fukutake Tadashi (1972), *Japanese Rural Society* (Trnsl. by R. P. Dore, Cornell: Cornell University Press). For a historical study of changing relationships in the village see: Ann Waswo (1977), *Japanese Landlords* (Berkeley: University of California Press).

17) E. Walter Coward, Jr. (1977), "Indigenous Institutions and Irrigation Development in Southeast Asia: Current Knowledge and Needed Research," in *Farm Water Management for Rice Cultivation* (Tōkyō: Asian Productivity Organization), pp. 113-30. See also: Daniel W. Bromley, et al. (1980), "Water Reform and Economic Development: Institutional Aspects of Water Management in the Developing Countries," *Economic Development and Cultural Change*, Vol. 28, No. 2, 365-87; E. W. Coward, Jr. (1978), "Research Methodology in the Study of Irrigation Organization-A Review of Approaches and Applications" New York: The Agricultural Development Council, Inc., No. 18).

18) Shimpo M. (1976), *Three Decades in Shiwa* (Vancouver: University of British Columbia Press).

19) This observation is based in part on the following sources: Norton Ginsburg (1978), book review of *Three Decades in Shiwa* by Shimpo M., in *Annals of the Association of American Geographers* Vol. 68, No. 4, pp. 580-82; Edward A. Ackerman (1953), *Japan's Natural Resources and their Relation to Japan's Economic Future* (Chicago: University of Chicago Press); Glenn T. Trewartha (1965), *Japan A Geography* (Madison: University of Wisconsin Press). For a specific study see: John, D. Eyre (1955), "Water Controls in a Japanese Irrigation System," *Geographical Review* Vol. 45, No. 2: 197-216.

20) J. Russel Whitaker (1954), "The Geography of Resources," in Preston E. James and Clarence, F. Jones, eds., *American Geography Inventory and Prospect* (Syracuse: Syracuse University Press), pp. 226-39. See also: Introductory Notes, Chapters 1, 2, and 3 in Ian Burton and Robert W. Kates (1965), eds. *Readings in Resource Management and Conservation* (Chicago: University of Chicago Press), pp. 1-4, 155-57, 279-81.

21) Norton Ginsburg (1961), *Atlas of Economic Development* (Chicago: University of Chicago Press); Norton, Ginsburg (1965), "Natural Resources and Economic Development," in *Readings in Resource Management and Conservation*, ed. by Ian Burton and Robert W. Kates (Chicago: University of Chicago Press), pp. 404-21.

22) Erich W. Zimmerman (1951, rev. ed.), *World Resources and Industries* (New York: Harper and Brothers), pp. 3-20.

23) Edward A. Ackerman (1958), *Geography as a Fundamental Research Discipline* (Chicago: Department of Geography, University of Chicago, Research Paper No. 53), pp. 24-6; J. W. Birch (1973), Geography and Resource Management," *Journal of Enviromental Management* 1, p. 5.

24) Bruce Mitchel (1979), *Geography and Resource Analysis* (London: Longman Group, Ltd.), pp. 1-31; Bruce Mitchel (1980), "Models of Resource Management," *Progress in Human Geography* Vol. 4, No. 1: 32-56. See also: Marvin W. Mikesell (1974), "Geography as the Study of Environment: an Assessment of Some Old and New Commitments," in *Perspectives on Environmen* ed. by Ian Manners and M. W. Mikesell, eds. (Washington, D. C.: Association of American Geographers, Commission on College Geography, Publication No. 13), pp. 1-23.

25) Richard, J. C. (1969) *Introduction to Geographical Hydrology*, ed. by (London: Methau and Company); L. B. Leopold, et al., *Fluvial Processes in Geomorphology* (San Francisco: Freeman and Co., 1964); T. Dunne and L. B. Leopold (1978); *Water in Environmental Planning* (San Francisco: W. H. Freeman and Co.); K. W. Butzer (1974), "Accelerated Soil Erosion: A Problem of Man-Induced Relationships," in I. Manners and M. W. Mikesell, eds. *Perspectives on Enviroment* (Washington, D. C.: A. A. G., Comm. on College Geography, Public. No. 13), pp. 57-78; R. U. Cooke and J. C. Doornkamp (1974), *Geomorphology in Environmental*

Management (Oxford: Clarendon Press).

26) T. O'Riordan (1976), *Perspectives on Resource Management* (London: Pion Press); T. F. Saarinen, *Environmental Planning: Perception and Behavior* (Boston: Houghton Mifflin); G. F. White (1969). *Strategies of American Water Management* (Ann Arbor: University of Michigan Press).

27) These research categories are discussed in more detail in: B. Mitchell (1980), "Models in Resorce Management," pp. 47-49; and G. F. White (1965), "Contributions of Geographical Analysis to River Basin Development," in I. Burton and R. W. Kates, eds., *Readings in Resource Management and Conservation* (Chicago: University of Chicago Press), pp. 375-94. See also a review of American land-use policy by one of White's students: Rutherford H. Platt (1978), "Space and Authority: The Dimensions of the Institutional Response," in *Sourcebook on the Environment* K. A. Hammond, et al., eds. (Chicago: University of Chicago Press), pp. 101-22.

28) B. Mitchell (1980), "Models in Resource Management," pp. 47-49; G. F. White (1965), "River Basin Development," pp. 375-94. See also: G. F. White (1965), "Needed Research," in I. Burton and R. W. Kates, eds., *Readings in Resource Management and Conservation* (Chicago: University of Chicago Press), pp. 502-11.

29) J. W. Birch (1973), "Geography and Resource Managament," *Journal of Environmental Management* 1: 3-11; B. Mitchell (1979), *Geography and Resource Analysis;* T. F. Saarinen, *Environmental Planning.*

30) G. White (1965), "Needed Research," *Reading on Resource Management and Conservation,* I. Burton and R. W. Kates, eds. (Chicago: Univ. of Chicago Press), pp. 502-11; Edward, A. Ackerman and G. Lof (1954), *Technology and American Water Development* (Baltimore: John Hopkins Press); and D. Sewell (1974), "Water Resources Planning and Policy Making: Challenges and Responses," in *Priorities in Water Management,* ed. by F. M. Leversedge (Vancouver: University of British Coloumbia, Department of Geography, Western Geographical Series No. 8), pp. 259-86. See also: W. R. D. Sewell (1978), "The Changing Content of Water Resources Planning: The Next Twenty-Five Years," in *Water in a Developing World; The Management of a Critical Resource,* ed. by Albert E. Utton and Ludwick Teclaff (Boulder, Colorado: Westview Special Studies in Natural Resources and Energy Management), pp. 57-71.

31) D. Whittlesey (1941 rev. ed), *The Earth and the State* (New York: Holt and Co.); E. Ackerman and G. Lof, *American Water Development* (1959), 461-650; N. Ginsburg (1959-60), "The Regional Concept and Planning Regions," in *Housing, Building, and Planning,* Nos. 12 and 13 (New York: United Nations Department of Economic and Social Affairs), pp. 31-45; D. F. Stetzer (1974), *Special Districts in Cook County: Toward a Geography of Local Government* (Chicago: Deparment of Geography Research Paper Series No. 169, University of Chicago), pp. 2-19; J. N. H. Douglas (1973), "Politics," in *Evaluating the Human Environment: Essays in Applied Geography,* ed. by John A. Dawson and John C. Doornkamp (London: Edw. Arnold Ltd.), pp. 159-83; R. E. Kasperson and J. V. Minghi (1969), eds., *The Structure of Political Geography* (Chicago: Aldine Publishing Co.), see especially the section, "Environment", pp. 423-96; National Academy of Sciences/National Research Council (1965), *The Science of Geography* (Washington, D. C.: NSA-NRC), pp. 4, 37-8.

32) Norton Ginsburg (1958), ed. *The Pattern of Asia* (Engelewood Cliffs, N. J.: Prentice Hall, Inc.); Norton Ginsburg (1973), "Geography and Area Studies: The Case of Japan," in *Geographers Abroad,* ed. by M. W. Mikesell (Chicago: Department of Geography Research Paper No. 152, 1973). See also: references 2, 3, 19 and 33 in this paper, as well as The Association of Japanese Geographers, ed. (1980), *Geography of Japan* (Tokyo: Special Publication Number 4, Teikoku-Shoin Co., Ltd.)

33) J. E. Spencer (1974), "Water Control in Terraced Rice-Field Agriculture in Southeastern Asia," in T. E. Downing and M. Gibson, eds. *Irrigation's Impact on Society* (Tuscon: The University of Arizona Press, Anthropological Paper No. 25), pp. 59-65; Canute Vandermeer (1971), "Water Thievery in a Rice Irrigation System in Taiwan," *Annals of the Association of*

American Geographers 61: 156-79; Leonard Cantor (1967), *A World Geography of Irrigation* (London: Oliver and Boyd); J. D. Eyre (1955), "Water Controls in a Japanese Irrigation System," *Geographical Review* 45, No. 2: 197-216.
34) Ackerman and Lof (1959), *American Water Development*, p. 462.
35) Ibid., pp. 465-66.
36) Ibid., pp., 504-75.
37) B. Mitchell (1979), *Geography and Resource Analysis*, p. 281.
38) Ibid., p. 282.
39) See references 1 and 2. Work in progress is to include an update of aspects of data from the 1960s as well as more explicit consideration of: *Japan's Agricultural Basic Law of 1961* (Tōkyō: Ministry of Agriculture and Forestry, (Law No. 127), 1961 Nōgyō Kihon Hō, Senkyū-hyaku rokujūichinen rokugatsu nijūichinichi hōritsu dai hyaku nijunanagō.
40) D. Whittlesey (1941), *The Earth and the State*, pp. 590, 565.
41) Chauncy D. Harris (1980, 4th ed.), *Annotated World List of Selectced Current Geographical Serials* (Chicago: Department of Geography Research Paper No. 194, University of Chicago).
42) Gil Latz (1978), *Accelerated Soil Erosion and the Implementation of Conservation Techniques: The Black Creek Project, Allen County, Indiana* (Unpublished Masters Paper, Deparment of Geography, University of Chicago).
43) Robert S. Platt (1959), *Field Study in American Geography* (Chicago: Department of Geography Research Paper No. 61, University of Chicago).
44) Norton Ginsuburg, Course exercises, Geography of East Asia, University of Chicago.

日本農業の近代化における土地改良区の役割

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この研究の目的は，日本の米作の近代化に対して基本的な役割を果してきた一連の立法措置，とくに水と土地資源の開発と管理に制度的枠組を与えてきた耕地整理法と土地改良法とに着目し，それらが個々のかんがい農業地域において具体的にどのような効力を発揮してきたか，またどのようにして法自体が修正されてきたのか，これらの点について解明するための方法論的準備にある．そこで，土地改良区において行政組織と技術の両者が，資源利用と管理のシステムを構成する自然的ならびに社会的因子の複合をいかに調整しているか，この点に関する研究を効果的に行うための若干の方法論的検討を試みた．

これまでの欧米人による日本の地域研究に大きく欠けていたのは，農業の近代化に関する政治・行政的枠組の分析であった．しかも農村の研究はコミュニティー区域に限定され，村域をこえる規模のかんがいシステムに即した資源管理の地域組織の考察はなおざりにされていた．

著者らは，このような土地改良区に関する政治・行政地理学的研究を日本の事例に即していくつか実施した上で，将来は日本と米国における，さらに東南アジアにおけるかんがい農業政策の比較研究へ進むことを目指すものである．

西川は，本学理学系研究科地理学専門課程の研究生であるラッツの指導数官として，その研究計画の内容に若干の改訂を加え，とりあえず予報の形でここに掲載することにした．ラッツは，この問題に関する研究成果をふまえて，近い将来シカゴ大学へ PhD の請求論文を提出する予定である．また，それに付随して，農業水利関係の術語の小和英辞典を編集する準備も進めている．これらの国際的共同研究の進め方に対して山口岳志助教授から適切な助言を受けた．記して謝意を表する．