Volume 5 | Issue 6 | Article ID 2454 | Jun 04, 2007

Why Is Japanese Farming Culturally Central and Economically Marginal? Rice Revolutions and Farm Families in a Tohoku Region

William W. Kelly

Why Is Japanese Farming Culturally Central and Economically Marginal? Rice Revolutions and Farm Families in a Tohoku Region

William W. Kelly

A longer version of this essay appeared in a volume (Thompson and Traphagen 2006) on recent scholarship about Tohoku, Japan's archetypal rural region, and the puzzle that intrigued me as I wrote it was why mine was to be the only chapter on agriculture. There are chapters about young women working and old people dying, about lacquer ware and Deer Dances and enka, and about internationalization and administrative amalgamation. But where were the farmers and what happened to agriculture, even in Tohoku?

To be sure, Tohoku's agricultural output of the region remains nationally prominent and economically important: Aomori apples, Yamagata cherries, and other fruits and vegetables; poultry and pork production; and above all the region's rice brands (Koshihikari, Haenuki, Hitome-bore, Akita-komachi). But as a proportion of prefectural and regional economy and as a contribution to individual household incomes, even in Tohoku, agriculture falls well behind manufacturing, construction, and service industries. Therein lies a crucial feature of contemporary rural Japan: it remains agrarian in its imagery and identity but not in its political economy. Rice paddies and farm villages are at the heart of regional cultural style, but as elsewhere in Japan, the routines of farming no longer calibrate household and community social relations. Nor do they organize local economies. Farmers are few in number and agriculture is profitable for only a small number of them. How this came to pass over the twentieth century became the subject of my chapter in that volume.

Twentieth-century Japan was long distinctive as the only advanced industrial society whose primary agricultural sector was irrigated rice. To me, there have been three outstanding features of its modern agriculture, and I take their mutual entailments as my starting point. The first is a much-remarked constant, the enduring "farm family." Even today, the Japanese agricultural sector in Tohoku and elsewhere is characterized largely by small-scale, family-labor farming operations committed primarily to irrigated rice cultivation. The farm population remained stable for the first 6 decades of the twentieth century at about 30 million people in 5.5 million families. By 1975, farm family numbers had dropped below 5 million; by 1990, they had dipped below 4 million, in 2000 they had shrunk to just over 3 million and by 2005 they were around 2.5 million (of which less than 2 million were now classified as commercial farmers, which includes all households with any reported farm income, however small). However, even in 1990, 99.7% of all Japanese farm enterprises were classified as family farms. And the average cultivation acreage per farm family remained at roughly 1 hectare for much of the century. The tenacity of the farm family is bemoaned by some and celebrated by

others, but it cannot be disputed, although I will argue here that it can be misunderstood for what it is and is not.

A second feature of modern Japanese agriculture is a much less appreciated cyclical dynamic: the enormous strides in both equity and efficiency that have been concentrated in two indigenous Green Revolutions. That is, major Japanese farm regions have experienced two "rice revolutions" in the past hundred years, two periods of radical organizational reform and technological innovation. The earlier of these was around the turn of the twentieth century, roughly from 1895 to 1920; the more recent was in the years, 1965-1980. I don't mean to imply that in other times there was no change; government policies and local practices have never been stable for long. It is more precise, then, to speak of gradual development punctuated by two intense periods of accelerated change, but it is important to emphasize the condensed event-chains of those brief periods and the enormous transformations they wrought on the Japanese countryside.

A third feature of Japanese agriculture has been the steadily growing preponderance of part time operations. Official statistics divide farming households into three categories: "fulltime farmers," "Class I part time households" (whose farm income exceeds its non-farm income) and "Class II part time households" (whose non-farm income predominates). Since 1950, the total number of farm families has declined only moderately. The real shift has been from full-time farming to part time farming. In the early 1950s, fulltime operations were in the majority; Class I part-timers became the numerical plurality in the 1960s and 1970s, and Class II part-timers became the statistical norm in the 1980s and 1990s. In 2000, 81.8% of Japanese farm families had only part-time involvement in agriculture, and it will likely be 9 out of 10 by the end of the decade.

Thus, a hundred years of Japanese farming may be characterized as a constant of family farming, a repetitive cycle of rice revolutions, and a linear growth of part time farming. Each of these three characteristics has drawn scholarly treatment (among many others, Mulgan 2006 and Waswo and Nishida 2003 are valuable resources), but what I emphasize here is how they conditioned one another. Agrarian reform has changed much of the physical, technological, and organizational landscape of the Japan countryside--except for the preponderance of farm families and national sentiments about rice-growing. In hindsight, we can find this understandable, but it was certainly not the intended outcome. In both rice revolutions, powerful state and local interests held small holdings to be the root problem of Japanese agriculture, and they did their best to encourage large-scale production. The consequences of these rice revolutions for local and national society and economy were profound, yet largely unanticipated by either participants or planners. Smallholders emerged, if anything, more emboldened and entrenched. And despite concerted efforts in recent decades to make agriculture a fulltime occupation, part time farming has become the agricultural norm—and agriculture has become a smaller and smaller component of the Tohoku economy.

In the first of these two periods, from about 1895 to about 1920, landlords in several major rice regions exercised prerogatives granted them by national legislation to create irrigation cooperatives and agricultural societies that sponsored extensive technical and procedural reforms in all phases of irrigation and drainage. This was done to facilitate new labor-intensive cultivation methods and improved rice seed varieties. There were immediate gains in crop yields, but the labor intensification and the assessment of tenants for project costs bred levels of discontent and forms of counter-organization that eventually discouraged most

subsequent landlord investment in agriculture. Instead, leverage in regional agrarian affairs shifted to smallholder owner-tenants.

The sweeping land reform in the years immediately following World War II consolidated these smallholders as a countryside of owner-cultivators. The second rice revolution, roughly in the years 1965-80, was spurred by the state's vigorous promotion of a second round of irrigation reorganization. Enabling legislation was passed, engineers were dispatched to local areas, and most project costs were heavily underwritten by the government to create the irrigation networks, procedures, and organizations it felt necessary for a complete mechanization of rice agriculture. Mechanization was intended to encourage outflow of excess labor from farming to industry, farmland sales, and a consolidation of holdings into a small number of larger, more efficient farming operations.

Instead, most farm families held on to their land and used the new machinery--and the generous government rice price supports--to continue small-scale farming on a part time basis at production costs four to five times the world market price of rice. National ministries remain mired in policy confusion and beset with rising surpluses while the subsidized and over-mechanized farmers persist, if not prosper. Rice agriculture, which contributed mightily to the country's early industrialization, has become one of the most technologically advanced yet economically inefficient farming systems in the world--a world leader in rice yields but a substantial drag on the national economy.

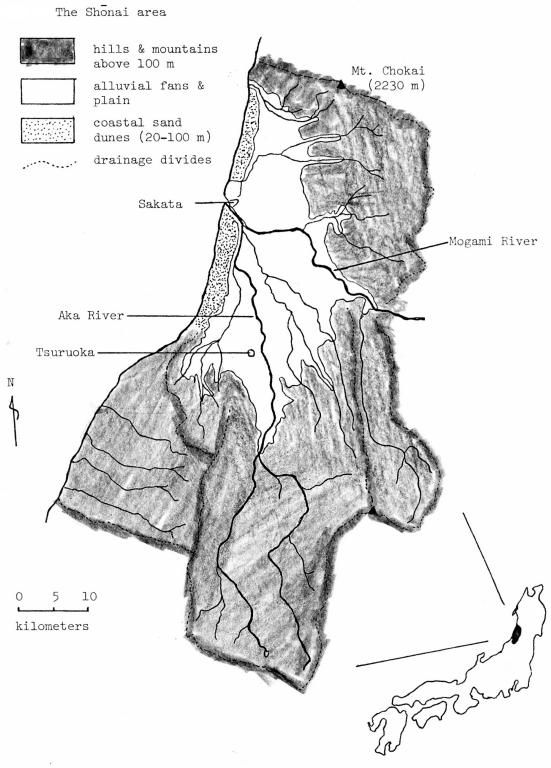
What I offer here is an interpretation of this linkage of family operations, green revolutions, and part time farming in modern Japan through the trajectory of experience in one particular Tohoku region, Shonai Plain in Yamagata Prefecture. This will require some details—a local narrative—but my aim is not to wallow in the minutiae of a field site, however tempting that is for an anthropologist like myself! Rather, historical ethnography is essential to show that the unstable trajectory of change and the contingency of the continuous are produced by the play of forces over a particular field of time and space. Shonai's experience demonstrates how politics and culture as much as economics and technology have determined the surprising and ironic outcomes. At the center of each "rice revolution" was a language of directed change--slogans of "improvement" in the first period and of "rationalization" in the second period. These were broad rubrics, and in an important sense, the course of each period was largely set by those who could impose particular meanings on these slogans. After some necessary background on Shonai Plain, I will examine each of these periods to identify the political and economic structures that framed these cultural idioms of technological and organizational change. And while some of these particulars vary across Japan's major rice areas, I do believe the contours of Shonai's experience are broadly representative of Tohoku's major rice regions, indeed of Japan's modern farming experience.

Shonai as ecological unit and its two 20th-century rice revolutions

Japan, in effect, is a country of some 200 small river basins, each composed of a plain and its surrounding mountains, and constituting a relatively contained and integrated ecological unit. The forests, scrublands, rivers, and fields within each small basin unit have had to be exploited and managed as a resource system. Shonai is one of these units, centered on a small, low-lying coastal plain in the Tohoku prefecture of Yamagata that is one of Japan's remaining rice bowls. The plain itself is about fifty kilometers in length, north to south, and about fifteen kilometers wide in its southern half, narrowing to about six kilometers wide in its northern half. It is surrounded by hills and mountains on three sides, including the Fuji-

san-shaped Mt. ChÅkai on the north and the Dewa sanzan, the sacred mountains of the pilgrims and priests of the Shugendo sect, to the southeast. The plain faces the Sea of Japan to the west.

A view of Shonai Plain looking north towards Mt. Chokai



A line drawing map of Shonai

The rivers that tumble out of the surrounding mountains were utilized in the seventeenth and eighteenth centuries for irrigation water as the flat plain was gradually developed as paddy land. As with most of the small watershed basins that constitute Japan's most common ecological unit, steep river grades and light soils at the plain's edges gave way to flat land and heavy soils in the center. The consequence has been to favor irrigation by canals that take off from the rivers near the edge of the plain and run by gravity out on to the plain, branching at many levels. The complex dendritic networks often connected tens of settlements and thousands of rice cultivators, upstream and downstream, some with supply and scarcity problems, others with drainage and surplus problems, and all implicated in multi-level of segmentary opposition and complementary alliance. The struggles around land and labor have been the staples of agrarian political and economic histories, but

given the ecology of rural Japan, more often than not, water use and water control have been even more consequential: technically complex, economically central, and politically contentious.

Shonai at the end of the 19th century had been an extensive rice plain for two centuries, whose production was the mainstay of the Sakai Domain that held the region continuously through the Tokugawa period (Kelly 1982). Yields remained uneven, technology was adequate enough to moderate but not ameliorate water scarcities and poor drainage, and the complex organization of cultivators, landowners, and domain officials functioned in a way that both provoked but contained serious conflicts of interests. It was the changes in the Shonai political economy in the aftermath of Meiji national forces that precipitated the first of Shonai's two twentieth-century rice revolutions. Figure 2 charts its path in a highly schematic way in order to emphasize some intriguing parallels and contrasts with the second period of concentrated change in the decades following another national tectonic shft after World War II.

Table 1. The Course of Shōnai's Two Twentieth-Century Rice Revolutions

Background	*Background*
new central government (1868)	reorganized central government (late 1940s)
national Land Tax Reform (1874–1875)	Land Reform/Land Improvement Law (late 1940s)
formation of irrigation cooperatives (1880s)	formation of land improvement districts (1950s)
↓	construction of multipurpose headwaters dams (1950s)
	↓
Period One: 1895–1920	*Period Two: 1965–1980*
new cultivation methods: drainage, dry tilling, and horse plowing (1890s–1900s)	construction of river headworks & reconstruction of main/branch canal net works (1960s/1970s)
paddy land adjustment projects, terminal ditching, land exchange (1902–1920)	paddy land adjustment projects, terminal ditching, land exchange (1970s)
facility construction and new procedures at river and canal levels (1910–1920)	mechanization of cultivation, hybrid variety monoculture (1970s)
	improvements in regional infrastructure: road network and utility grids (late 1970s–1980s)

At the center of both revolutions was a radical change in water use and management--both a reconstitution of physical networks and a procedural and organizational reform. Yet these were embedded in more thoroughgoing agrarian change that redrew the paddy landscape and brought new cultivation techniques and technology. And in both periods, this rice revolution was preceded and made possible by national land reform and, behind that, state reorganization.

Contrasts between the two periods are equally significant. The first was largely a revolution from below: the initiative, planning, and execution was local, with only modest financial subsidies solicited from the state. The second was a revolution from above, proceeding from vigorous government policy initiatives, technical inputs, and financing. It is true, of course, that both periods demonstrate how people at the local level can select and adapt programs and resources of the larger society. For example, in the 1970s and 1980s the postwar land improvement districts successfully exploited jurisdictional squabbles between the Ministries of Agriculture and Construction to maximize local modifications of the nationally standardized master plans of each ministry. It is equally true that in both periods, state bureaucrats and political leaders were able to shape and mobilize local efforts in the service of broader policy objectives. In the 1960s and 1970s, for example, prefectural officials and extension service technicians played on intergenerational tensions within farming households to gain acceptance of a complete line of crop machinery. Nonetheless, local initiative versus central direction is an appropriate first-order contrast between the two periods, which are briefly sketched in the following sections.

Ploughs, rectangles, and cement: 1895-1920

One of the first acts of the new Meiji

government that replaced the Tokugawa shogunate in 1868 was a national land survey and land tax revision. For Shonai as for many regions, this was the first comprehensive cadastre in 250 years, and it had several results of mixed consequence (see Kelly 1985). It doubled the registered paddy land acreage on the plain, yet political unrest forced new tax formulas that actually reduced total tax burdens below previous levels in villages. On the other hand, final ownership assignments of paddy parcels in the late 1870s and, even more seriously, the induced recession of the early 1880s drove many smallholders to mortgage tenancy while allowing some largeholders to increase their holdings further. By 1885, about 45% of the basin paddy lands were tenanted.

However, the Land Tax Revision had also largely equalized tax rates across the plain. The remeasuring and regrading of parcels narrowed the tax advantages of lands opened after the seventeenth-century cadastre, which were the bulk of most large holdings. With little or no tax obligations to the domain, these largeholders had tolerated the waterlogged soils and unstable yields of such paddy fields. Now, with fixed and (for those parcels) higher tax duties, they were less able and willing to ignore their liabilities. It was an impetus for organization.

The 1890 Irrigation Cooperative Ordinance offered a legislative basis for associations of tax-paying, paddy landowners within a common irrigation area. By 1892, such cooperatives formed in Shonai at three levels—at the level of its river systems, at the level of the main canals that took off from these rivers, and often at the level of the branch canals of most of the main canals. The cooperatives at each level were managed internally by small standing committees, selected by and from larger councils of member representatives. Analysis of committee rosters reveals a preponderance of landlords and cultivating largeholders. However, the charters of most of the cooperatives limited their jurisdiction to intake maintenance and allocation "by customary proportions." The cooperatives were mobilized for more fundamental water reforms only after two other sets of measures around the turn of the century had transformed rice work and the basin landscape.

The first of these was the region-wide adoption of the so-called Meiji Agricultural Methods (Meiji *noho*), a package of rice cultivation methods that included new higher-yielding seeds, better nursery bed construction, linear transplanting, and, foremost, an autumn tilling after harvest and a spring tilling with a horse-drawn plow (see Francks 1984:55-63). These were refinements of techniques developed in scattered regions during the 19th century, and recently promoted by several prominent farmers in western and southern Kyushu. Shonai cultivators immediately labeled the Meiji Methods the "drained field/horse plow" (*kanden bako*) program, reflecting their special interest in the package. That is, their longstanding problem had been the waterlogged soil over much of the flat central plain. They quickly realized that a plowing in the autumn after harvest could aerate the soil and improve field drying. Because this stiffened the paddy soil, it was less amenable to hoeing in the spring, and thus horse plowing was again required.

Tilling of paddy fields by horse (Shonai, early 20th century)

The *kanden bako* techniques spread rapidly across the plain in the late 1890s. They were vigorously promoted by local agricultural societies, companion organizations to the irrigation cooperatives. Landlords visited sites in Kyushu, and hired those proficient in the techniques to return to Shonai with them to establish demonstration plots and offer training sessions in various villages. By 1908, 94% of Shonai's fields were dry-tilled by plow.

Adoption of the Meiji Methods brought some stabilization of yields and improvements in the market reputation of Shonai rice by the turn of the century, but there were complications as well. The deeper plow depth required increased quantities of fertilizer, but the rice varieties more responsive to the increased fertilizer proved less resistant to certain common diseases. Greater quantities of water were now needed for the spring work, straining the capacities of the irrigation-drainage networks. And plow handling proved cumbersome and inefficient in the variably and irregularly shaped paddy parcels.

These complications provoked the largeholders to initiate a second round of reforms during the first two decades of the twentieth century: large-scale rearrangements of paddy lands and water channels known as "arable land adjustment projects" (*kochi seiri jigyo*). These were financed largely by assessments to the registered owners (with only minimal state subsidies), coordinated by the local agricultural societies and irrigation cooperatives, and carried out by the off-season labor of villagers. In village after village across the basin, with backbreaking labor by hoe and shovel and straw basket, existing bunds were leveled and water channels filled in. Field areas were then recarved into blocks of uniform, rectangular 0.1 hectare parcels. Bunds were reformed and water channels were re-dug so that each parcel was directly accessible by path and was fronted by a water delivery channel and backed by a drainage ditch.

These projects had significant consequences for landholdings, water use, and work relations. The 1874-75 Land Tax Revision survey had uncovered most but not all of the under-registration that provided a margin for the parcel holder against tax demands and for the tenant against high rents. Erasing existing field boundaries now eliminated any remaining excess. The rectangularization also reduced the total number of parcels, and thus the acreage required for the perimeter bunds. The result was an increase in actual rice acreage of about 10-25% (divided among the landowners of the project area in proportion to previous holdings), but a loss for cultivators who grew catch-crops of beans and other vegetables along the bunds during the growing year. Land leveling and improvements in terminal ditching allowed marginal lands to be brought into rice cultivation, and the basin was even more extensively rice-monocropped as a result.

The projects also provided landlords with an opportunity to revise tenancy agreements, by shifting the measure of rents and land values from rice volumes to acreage. Previously, rent standards (in effect, the rent maximum before the customary reductions) were expressed in bales of expected yield; a parcel for which rent was one bale was known as a "one-bale parcel" (*ippyo-ba*), regardless of its size. With a landscape of 0.1 hectare rectangles, landlords could use acreage as a meaningful measure of their holdings.

The "muscle women" carriers (chikara mochi onna) who worked in Shonai's largest rice granary in Sakata (1930's). A single bale weighed about 60 kilograms!

The increases in total acreage and in water use per parcel greatly inflated water demands -- by a factor of about 1.4. Thus, while main and branch canal layouts were not directly affected by the paddy projects, it was now necessary to improve and reorganize them. This became the third phase of this rice revolution. Turnouts from main to branch canals were rebuilt in stone or cement to reduce leakage and damage and enable more precise allocation. With mixed success, several of the cooperatives used this as an opportunity to adjust existing allocation formulas along the main canals. Main river cooperatives undertook major construction to straighten and train the river courses by high embankments, but this also increased the speed of the rivers across the plain and further exacerbated the longstanding drainage problems of the downstream areas. The new river embankments also necessitated rebuilding the intake gates to the main canals, and although the original dimensions were replicated, the use of cement for the first time proved to increase the efficiency of gate intake. Protests by downstream canal cooperatives against the upstream networks led to a procedure for negotiations during the dry summer months that prevented violence but did not defuse simmering dissatisfaction.

Not only were procedures of water management standardized, but rights to water use were also affected. By the early 19th century, water rights distinguished between rights to receive "irrigation water" (*yosui*, that is, river water delivered through a canal network), and allocation rights to receive a certain volume of "irrigation water." The former water rights attached to land parcels that were (1) registered as (2) paddy land in (3) an administrative village that was within (4) the official service area of a branch canal which had a formally acknowledged intake along (5) an established main canal. Allocation rights, on the other hand, attached to intakes by either of two standards of division -- by "customary" intake dimensions or in proportion to registered yield of its service area parcels. Neither standard promoted an 'equal' allocation of water among the tens of thousands of parcels with *yosui* rights.

The reconfiguration of land and ditching did little to alter the notion of *yosui*, although it did increase the service area acreage of the basin networks. But it did diminish the distinction between the right to receive water and the right to receive a certain volume of water by making allocation per unit of land area more plausible and allocation by "customary" intake dimensions more problematical. By 1915, irrigation cooperative dues and project fees were assessed on a per acreage basis, and that fueled demands for per acreage water allocation.

In sum, this three-stage, landowner-led rice revolution was generally successful in Shonai in

stabilizing yields and rents, improving rice quality, and ameliorating poor soil conditions. It established a network of local irrigation and agricultural improvement organizations, and systematized the procedures of property rights, land use, and water management. The benefits of the reforms accrued initially to those who sponsored them -- the landlords and largeholders. The demands of the new methods and the standardization of parcels into uniform rectangles greatly heightened competition among cultivators. Visible and invidious comparisons could now be easily drawn between work in adjacent parcels, allowing landlords to draw quick conclusions about the diligent and the careless.

However, their preeminence was short lived. Evidence from several villages suggests that these competitive pressures, together with other aspects of the reforms, in fact consolidated and advanced the position of the smallholders, both owner-tenants and tenants; Francks 1984, Smethurst 1986, and Nishida 2003 detail how sequences of agrarian reform in other major regions eventually worked to strengthen smallholder positions. The assignment of project labor to village units created feelings that they were literally making their land, as expressed in diaries of the time. Redigging the field ditching required village households to negotiate new and different water use procedures, and redrawing village boundaries and reassigning its parcels fashioned a closer coordination among village households that reasserted cultivator rights vis-à-vis landowner rights. Villages now demanded a role in overseeing land exchanges, protecting ceilings on rent levels, and mediating tenancy disputes. By the 1920s, many villages had framed these demands as written compacts between all resident smallholders.

Often the most assertive group within the settlement was not the community assembly of senior male household heads, but a new association of young adult males--the successors, who were the head plowmen and field managers of their households. They took easily to the idiom of "improvement," and in the plowing contests and harvest competitions forged ties of cooperation and plans for joint action as residents, cultivators, and tenants. Their plowman associations pressured the irrigation cooperatives for procedural and facility reforms that gave smallholders a de facto voice in water matters. By the 1920s, reinvigorated village units had checked landlord powers and secured permanent tenancy rights in the now more profitable rice farming system. The familiar thrust of agrarian capitalism by improving landlords had been parried in the midst of a rice revolution that produced more equity and efficiency than initially seemed likely.

Dams, permits, and tractors: A second rice revolution, 1965-1980

If the direction of change in the early twentieth century was from cultivation methods to field layout to water networks, the more recent period of change has moved in the opposite direction. It began with a reorganization of basin irrigation, which facilitated another paddy field readjustment, which enabled a full-scale mechanization of rice work. Yet these, too, have served to strengthen smallholder rice monoculture, against the intentions of the sponsoring state. Their 'revolutionary' outcome has proved to be rural prosperity and farm crisis.

Three state initiatives laid the basis for postwar agrarian reorganization. The first was the land reform legislation in 1946, which virtually eliminated tenancy and set limits on landholding and conditions for renting arrangements. The second was the Land Improvement Law of 1949, which established cultivation, not ownership, as the criterion for participation in land improvement schemes and membership in irrigation associations, now reorganized into "land improvement districts"

(*tochi kairyo-ku*). As a result, the existing river-level irrigation cooperatives reconstituted themselves in the early 1950s as land improvement districts; some of the smaller main canal cooperatives were folded into the larger cooperatives, and by 1960 there were Land Improvement District Associations for each of Shonai's main rivers, with constituent land improvement districts based the earlier main canal networks.

The third state initiative of the first postwar decade was multipurpose dam construction. Faced with food shortages, factory recovery, and urban growth, the national government embarked on a massive program of dam building in the headwaters of the country's major rivers. The Tennessee Valley Authority was a widely discussed model by the Ministry of Construction engineers, who went about the country with their blueprints and contracts. Several dams were completed in headwaters around the plain in the late 1950s to store water for irrigation, to provide flood control, and to generate hydroelectric power. They remain property of the state, in the custody of the Ministry of Construction.

The rice-farming irrigators soon realized that there were incompatible aspects of these three purposes that seriously jeopardized agricultural water use. Disputes surrounding multi-purpose dams were quite common in the 1950s, and directors and staff of the land improvement districts, through field trips to such sites, were sensitive quite early to potential problems. For example, the variable discharge for electrical generation to match hours of peak demand disrupted the constant flow necessary for smooth operation of intakes, and the seasonal needs of irrigators did not match the more constant monthly use volume of the electric company. Moreover, July-August in Shonai is both the time of most likely drought and agricultural water needs and the time of most serious flooding due to sudden, concentrated rainfall. The former requires holding a maximum reservoir volume during the summer, while the latter recommends a minimum reservoir volume in order to hold the runoff if and when sudden storms occur. Yet another fear was that drawing from the cold bottom of the reservoirs and transport through pipes to the generating stations would lower the river water temperatures to levels injurious to the rice plant (cold water temperatures were a longstanding problem for rice farmers throughout northern Japan). Some of these problems were negotiated through a joint council of the concerned parties, but yet another consequence of the dams proved less amenable to adjudication. The dams, by preventing the downflow of sediment, seriously disrupted the balance of deposition and scouring along the river channel and caused a progressive lowering of the river bottom. This made it increasingly difficult for the intakes to draw water.

The land improvement districts, faced each year with heavier outlays for higher diversion weirs to raise water for the intakes, prepared a suit against the electric company. In the late 1950s, they won a 260 million yen indemnity payment in an out-of-court settlement. This of course did not solve their intake problems, and it was in casting about for a solution that they precipitated massive changes in their water works and their entire agrarian system. Again, this second rice revolution may be schematized as a succession of four stages, concentrated in the years between 1965 and 1980.

(1) The rationalization of water use (*yosui no gorika*). For Shonai's principal river system, that of the Aka River, the only feasible technical solution to the intake difficulties of its nine main canals proved to be the replacement of their separate weir-gates with a unified headworks, a remote controlled, multiple sectioned diversion weir and multi-gated intake channel at the top of the alluvial fan that would serve all irrigators in the basin.

The headworks constructed on the Aka River, 1960s.

Ministry of Agriculture engineers designed the headworks and managed the project, 80% of which was funded by the state and 20% by basin water users with their indemnity payment from the electric company. The headworks project both allowed and required a comprehensive realignment of the basin canals, which were consolidated into a single network of straight channels, lined with concrete, with locked division gates operated under a central allocation plan by the fulltime technical staff of the land improvement districts.

An old unlined branch canal

The same canal after construction, late 1970s

Basin water works were restructured of course not merely in response to a local river channel problem. The "rationalization of water use" was a key phrase in government policy debates of the 1950s and 1960s, and the projects in the Aka River basin were one instance of a massive investment strategy by the state to make agricultural water use more efficient and make those savings available to industry and hydroelectric generation. Under the new River Law of 1964, the headworks and canal projects provided the opportunity for the Ministry of Construction to convert the customary water rights of the various land improvement districts--perpetual and ambiguous in claim--to a single, fixed term water use permit, by which maximum volume, use period, manner of intake, and other details are carefully specified. The holder of this use permit is actually the Minister of Agriculture because as public property the headworks is delegated to his ministry's jurisdiction. In actual practice, operating rights to the headworks and canals, together with the use permit, are assigned to the Aka River Land Improvement District Association.

(2) Paddy land adjustment projects (*kiban seibi jigyo*). When the engineers reached the fields themselves, they bulldozed them over, resculpturing the paddy landscape into even larger rectangles (of 0.3 hectares). They gridded them with entirely separate irrigation

and drainage ditching, such that water was only used in a single field and not later reused. This was necessary to enable fine tuning of water levels and fertilizer applications. That is, some ingredients of the chemical fertilizers dissolved in the water, and could complicate the calculations of downstream farmers should they attempt to reuse that water. This had not been a serious problem with smaller quantities of fertilizers and earlier rice varieties, but new hybrid varieties introduced by the extension service require as many as twelve, very precisely timed and measured fertilizer applications.

In contrast to the rectangularization projects earlier in the century, these were contracted to professional construction companies with heavy, earth-moving equipment. Like the earlier projects, however, village units were charged with arranging an exchange of parcels among their residents to consolidate a household's holdings into two-to-four blocks.

Paddy field surveying by construction company day laborers, 1980s

(3) Mechanization (*kikaika*). The combination of water and land reorganization allowed, and was intended to promote, a complete mechanization of rice work. With credit funneled through the regional agricultural cooperative, which thus could position itself as the principal sales and service agent, the state subsidized the purchase of a complete line of rice machinery--gas heaters for the seedling houses, tractors, transplanters, pesticide sprayers, combines, trucks, hullers, and gas dryers. These further standardized the work cycle and cultivation. By the early 1980s, over 90% of arable land within the basin service area was planted in a single variety of rice (*sasanishiki*), which the agricultural cooperative vigorously promoted as a brand-name variety through an expensive advertising campaign in Tokyo and other major cities.

Older method of drying the harvested rice, 1950s

Harvesting by combine, late 1970s [Note that the son is driving
the combine while his father is assisting on the side]

(4) Areal infrastructure development (*chiiki kaihatsu*). While the land and water projects were largely funded by the state, the 20% local

share caused some anxiety to marginal smallholders. Yet there was virtually no active opposition. This was due to the attractions of the fourth component of this agrarian infrastructure reform. While areas of the basin were under construction (and thus property rights suspended), project engineers could push through another kind of kiban seibi, a wholesale renovation of the regional infrastructure (Kelly 1990b). All major public roads were widened, straightened, and resurfaced; water supply piping and telephone cables were laid; electricity lines were upgraded; and other improvements were made to regional transportation and utility grids. "Bypass" (*bipasu*) was the word on everyone's lips in the late 1970s, as they eagerly awaited the completion of direct road links to the plain's major service centers that replaced the lanes that wound through the hundreds of compact settlements. Ten years later, the buzz word was "airport," as the region awaited completion of a regional facility that since the early 1990s has offered direct (but seldom full) flights to Tokyo and Osaka.

An aerial photo of central Shonai, with newly aligned fields and canals
[Note that at lower center is the factory of the largest cement company
in Shonai, which had most of the major project contracts]

"Improvement" and "rationalization"

The outcomes of this century of change have thus been most surprising. From the perspective of irrigation, the density of organization, accountability to users, and technical expertise of land improvement district staff are admirable examples of responsive and effective water management. And against the ambitions of the principal actors (the landlords at the turn of the century and the government planners more recently), both periods strengthened the political and economic position of the smallholders, guaranteeing a broad distribution of the benefits of agrarian reform. With an eye toward problems and prospects in other rice regions of Asia, one is tempted to applaud both results. Yet these same developments have produced for Shonai and the other surviving agricultural regions of Japan a "farm crisis" of overcapitalized, under-scaled farming units that equally perplexes local people and national bureaucrats. To appreciate these mixed outcomes, we must remember how political-economic forces intersected with cultural idioms during the two periods.

Shonai's first green revolution was set in motion by a combination of political, economic, and cultural factors. The reorganization of the national state gave political support and legitimacy to rationalized organizations and private property. The revised land tax formulas and improving rice market opportunities favored investments in rice production. And in Shonai as elsewhere, there was a longstanding openness to experimentation, communication, and pragmatic intervention in farming methods, a legacy of "innovation." Yet for several reasons, these idioms and infrastructure proved attractive and available to smallholders and tenants as well as landlords. The former were able to defuse the latter's ambitions, and turn the sequence of reforms towards a rather different agrarian capitalism of cultivating smallholders.

Following World War II, the national state was again reconstituted to provide even firmer

legislative guarantees to cultivators and generous subsidies to rice production and output. The networks of national and prefectural ministries, agricultural cooperatives, land improvement districts, extension services, and construction and equipment companies have provided the incentives and expertise for the recent reforms (Kase 2003).

However, the language of rationalization by which these programs have transformed Shonai and other rice regions has been as semantically slippery as it has been ideologically potent. "Rationalization" uneasily embraces two distinct themes, both of which ideologically reinforced smallholder commitments to farming: the "democratization" of the countryside (e.g., the land reform and the reorganized land improvement districts) and the "modernization" of agriculture.

It is important to recognize how anomalous has been postwar farming as a work identity. In the aftermath of the wartime defeat, most employment was effectively depoliticized. Shorn of fascist patriotism, the enticements and idioms of public service and corporate employment were quickly reformulated in terms of economic growth, job security, and organizational loyalty. Even when companies employed a Confucian familial metaphor, it was carefully sanitized of its former, imperial referents. But the farmer stands as a striking exception. Agricultural work, the subject of protracted prewar tenancy disputes, was effectively repoliticized after the war. The Land Reform transformed a countryside of tenants into one of enfranchised proprietors, and identified farming prominently with democratic principles; the 1947 Agricultural Cooperative Law emphasized the democratic association of these independent proprietors; and the political party reorganization of the mid-1950s linked farmers to a party machine, the Liberal Democratic Party. Under such circumstances, one can appreciate the resistance to yielding such an identity.

The other bundle of meanings under the rubric of rationalization, "modernization," initially meant increasing production to alleviate postwar food shortages and to facilitate industrial and urban recovery. It subsequently came to mean mechanization--farm labor savings that would allow expanding farm scale and transfer "excess" labor to manufacturing. At the same time, it has implied a redefinition of farming expertise along at least three dimensions: the professionalization of expert roles (the extension agent, the prefectural planner, the agricultural cooperative technician, the cement contractor); the bureaucratization of institutions of expertise (the land improvement districts, the agricultural cooperative, the project office); and the systemization of procedures (the pump house blueprints, the calibrated allocation formulas, the detailed water permits).

It was this new conception of farming, now seen as "modern agriculture," that appealed to a young generation in a region with few other opportunities for mechanized, "scientific" work. They were prompted to take advantage of the inducements and institutions of the green revolution to remain small-scale, increasingly part time rice farmers, fully mechanized and generously subsidized (Kelly 1986, 1992, Moore 1990).

Muscle women replaced by conveyor belts in new

rice granaries.

Billboards by local Agricultural Cooperative young men's
section, agitating for higher government rice prices, 1980s

Thus, the paradoxical results of the rationalization of Shonai rice agriculture have been highly responsive water management and advanced rice-growing technology, an intractable farming system crisis, but a broad improvement in Shonai infrastructure. Such an outcome was unpredictable in advance, was a product of the interplay of the rhetoric of reform and the political and economic configurations in both of Shonai's 20th-century green revolutions. It is, finally, as a case in the cultural politics of directed change that Japan's agricultural development experience has relevance for both Western and Asian debates.

Part time agriculturists, fulltime farmers

Thus, major Japanese agricultural regions like Shonai have experienced two repetitions of Green Revolutionary-change in the last one hundred years. During these periods, the struggles among contending intentions of actors in a structured field of policies, investments, technologies, and institutions reinforced the smallholder character of production. This would seem to be an argument for a century of homeostatic equilibrium--cyclical movements that restored stasis.

However, as virtually every commentary on contemporary agriculture attests, there is a radically new feature of Japanese agriculture in the last quarter of the twentieth century, and that is its overwhelmingly part time character. Farm by-employment has been an important contribution of rural household economy for over a century, but the preponderance of farm households whose income is largely derived from non-agricultural pursuits has been an accelerating trend that most date from the mid- to late-1960s. By 2000, only about 14% of the 3,120,000 "farm families" were classified as commercial farms with at least one family member under the age of 65 engaged primarily in farming (MAFF 2000). Of the total farm household population of 13.4 million persons, only 2.4 million worked more than 150 days per year in agriculture, and of these, over 80% were age fifty or older, a proportion that continues to rise each year. Fulltime farmers are a miniscule segment of the Japanese population, perhaps equal in number to municipal bus drivers.

A village joint labor group taking a break, Shonai, 1950s

The solo farmer tending his fields (the predominant scene since the 1980s)

The logic of the part time trend has generated debates that often divide along disciplinary lines. To the economist Koji Taira (1993), for example, it is a rational individual response to constraints (limited farm size) and opportunities (labor-saving technology and alternate employment). To the rural sociologist Raymond Jussaume (1991), though, the part time option is a collective strategy to preserve more intangible amenities of rural hamlet cooperation and community. While both are true, my argument here is to ground both the economic logic and the social logic of part time farming in the persistence of smallholders that was the quite unintended and controversial result of the second era of Green Revolution technological innovation and organizational reform (see also Brown 1986). Analytically, it reminds us that individual actions are seldom simply the product of the actors' social location, but neither is the product of individual actions simply the sum of those actions. Actions are often intentional, but they are worked out in a social matrix, and for this reason they frequently do not yield their intended results. As Foucault once put it aphoristically to Paul Rabinow, "people know what they do; they frequently know why they do what they do; but what they don't know is what what they do does" [Dreyfus and Rabinow 1983:187]. Politicians, bureaucrats, engineers, and farmers had clear ideas and interests in these periods of directed change, the preponderance of which was to foster fulltime economically viable farming, but the resulting part-time smallholder rice-growing in Shonai and elsewhere can only be appreciated in retrospective analysis.

There is a further aspect of this trend whose significance is often overlooked but which helps explain why my essay on Shonai farming was the only agrarian contribution to the 2006 volume on Tohoku. That is the clear gap between the precipitously declining numbers of fulltime agriculturalists and the still large number of rural households who insist on identifying themselves as farm families in official surveys and informal conversation. In the Shonai settlement which I have lived in and visited for three decades, only 5 of the ninety households make any significant income from farming and livestock but at least half of the households still consider themselves to be "farm families." Seldom do more than one of the three or four adults in such households have any substantial involvement in any agricultural operations, and farming typically contributes quite minimally to total household income. Why, we might say, are there so few agriculturalists and so many farmers?

This tenacious self-identification of "farm families" is matched by government insistence, media imagery, and popular belief in the continued existence of a "rural" Japan of "rice farmers." What is producing this agrarian sentimentalism and locating it in areas like Shonai, which have already lost much of their rural color?

The famous Kurokawa shrine festival Noh, celebrated for
preserving the "authentic" spirit of the aesthetic performances

This chimera is in fact a further outcome of the historical experience I have sketched here, and there are at least five factors that collude in sustaining this illusory image. There are, first of all, the class, gender, and generational dynamics within "farm families" themselves. This includes, for example, the divided class consciousness of farming households and the preference for playing up the more "bourgeois" nature of farm proprietorship and playing down the more "proletarian" nature of much off-farm employment. It is often the case, too, that male identity is more bound up in the family's farming than is that of female members, who may contribute more substantial and more regular cash earnings from non-farm employment as well as significant labor in household farming (Okado 2003). Secondly, the national agricultural cooperative organization has long been dominated by part time farming interests, generally to the detriment of those individuals and households who are trying to devise fulltime farming strategies. A third element has been the longstanding pattern of regional development through state subsidies and public infrastructure investments rather than through sustained, direct investment and job creation by the private sector. "Farm" interests keep areas eligible for project designation by the Ministry of Agriculture, Forestry, and Fisheries, and play to the rivalries between the two great patron-vehicles of rural investment, the MAFF and the Ministry of Construction (now, Ministry of Land, Infrastructure, and Transport). The government has been slashing subsidies to local municipalities for 15 years, since 1991 and the new Basic Law for Agriculture from 2005 is but the latest effort to do that for farm subsidies, but the sentimental disposition and political benefits of saving the “disappearing” rice farmers remain powerful. Entrenched may no longer be an apt description of the regional political bases of many LDP politicians, who since the 1990s and after electoral district reform are ever more anxious and vulnerable, but here too they still enjoy the financial support that flows to the LDP from the national Agricultural Cooperative organization. And finally, there are the enduring cultural politics of heritage that sustain metropolitan nostalgia for a rural world of paddy fields, village festivals, and community solidarity. The public alarm provoked by the opening up of Japanese rice markets during the 1990s and more recent measures like Japan’s 2006 ban on long-grain rice from the US after shipments were found to contain trace amounts of genetically-engineered varieties were orchestrated by partisan organized interests of an agricultural sector and the health concerns of urban consumer groups, but their broad support was driven by enduring popular images of a traditional farming way of life.

As I and others have noted before (Kelly 1986, Robertson 1988, and Ivy 1995), such metropolitan nostalgia is shared by many ruralites and often manipulated by regional interests. A current local development imitative in Shonai, for instance, is Shonai Movie Town, a complex of film production facilities opened in the wake of the success of Yamada Shoji’s 2002 film, “Tasogare Seibei” (The Twilight Samurai). This cinematic elegy to the genteel poverty and quiet desperation of the low-ranking samurai retainers was based on several

novellas of Fujisawa Shuhei, a celebrated Shonai-born author who modeled his fiction loosely on imagined life in mid-nineteenth-century Shonai Domain. Local location sets became a permanent movie production enterprise that has attracted Yamada's other two installments of the trilogy and several other jidai-geki. [Sentimental melodrama easily gives way to fantasy kitsch, however, and the most recent use of the Movie Town was for "Sukiyaki Western Django," Miike Takashi's homage to the 1966 Italian-Spanish spaghetti Western "Django," which he has set during the Genpei Wars but mixes swordsmen and gunslingers and has a cameo role for Quentin Taratino as a mysterious stranger named Ringo and inserts Kitajima Saburo singing an enka version of the original Django theme song! Due out in September 2007!]

That, indeed, is the most striking irony of the Japanese countryside at the opening of the twenty-first century. As agriculture has been marginalized, in household, regional, and national economies, farming remains warmly sentimentalized, in personal identity and popular imagination. Japanese agriculture has a grim prognosis. Japanese farming has seldom been so well received. Tohoku, among Japan's regions, aptly illustrates this paradox.

William W. Kelly is Professor of Anthropology at Yale University

This is a revised and abbreviated version of a chapter that appeared in a volume about Tohoku, edited by Christopher S. Thompson and John W. Traphagan (editors), Wearing Cultural Styles in Japan: Concepts of Tradition and Modernity in Practice*, pages 47-71. Posted on* Japan Focus*, June 20, 2007.*

References Cited

Brown, L. Keith

1986 "Agriculture in Japan: The Crisis of Success," Japan Society Newsletter 34(1):2-5.

Dreyfus, H.L. and Rabinow, P. (editor)

1983 Michel Foucault: beyond structuralism and hermeneutics. University of Chicago Press, Chicago.

Francks, Penelope

1984 Technology and Agricultural Development in Pre-War Japan. New Haven: Yale University Press.

Jussaume, Raymond Adelard, Jr.

1991 Japanese Part-time Farming: Evolution and Impacts. Ames, IA: Iowa State University Press.

Kase Kazutoshi

2003 "Agricultural Public Works and the Changing Mentality of Japanese Farmers in the Postwar Era." In Ann Waswo and Nishida Yoshiaki (editors), Farmers and Village Life in Twentieth-Century Japan, pp. 244-266. Routledge/Curzon, London and New York.

Kelly, William W.

1982 Water Control in Tokugawa Japan: Irrigation in a Japanese River Basin, 1600-1870. East Asia Papers #32. Ithaca: Cornell University China-Japan Program.

1985 Deference and Defiance in

Nineteenth-Century Japan. Princeton: Princeton University Press.

1986 "Rationalization and Nostalgia: Cultural Dynamics of New Middle Class Japan," American Ethnologist 13(4):603-618.

1990a "Japanese Farmers," Wilson Quarterly 14(4):34-41.

1990b "Regional Japan: The Price of Prosperity and the Benefits of Dependency," Daedalus 119(3):207-227.

1992a "Rural Society in Japan: Past and Present." In Myron L. Cohen (ed.), Guide to Asian Case Studies in the Social Sciences, pp. 127-136. Armonk, NY: M. E. Sharpe.

1992b "Tractors, Television, and Telephones: Reach Out and Touch Someone in Rural Japan." In Joseph J. Tobin (editor), Re-made in Japan: Everyday Life and Consumer Taste in a Changing Society, pp. 77-88. New Haven: Yale University Press.

Ministry of Agriculture, Forestry, and Fisheries

2000 Preliminary Statistical Report on Agriculture, Forestry and Fisheries.

Moore, Richard H.

1990 Japanese agriculture: patterns of rural development. Boulder: Westview Press.

Mulgan, Aurelia George

2006 Japan's Agricultural Policy Regime. London and New York: Routledge.

Nishida Yoshiaki

2003 "Dimensions of change in twentieth-century rural Japan." In Ann Waswo and Nishida Yoshiaki (editors), Farmers and Village Life in Twentieth-Century Japan, pp. 7-37. Routledge/Curzon, London and New York.

Nishida Yoshiaki and Kase Kazutoshi (editors)

2000 Kodo keizai seicho-ki no nogyo mondai: Sengo jisakuno taisei e no chosen to kiketsu (Agricultural Problems During the Era of Rapid Economic Growth: The Challenges and Consequences of the System of Independent Smallholders). Tokyo: Nihon keizai hyoron-sha.

Okado Masakatsu

2003 "The Women of Rural Japan: An Overview of the Twentieth Century." In Ann Waswo and Nishida Yoshiaki (editors), Farmers and Village Life in Twentieth-Century Japan, pp. 38-59. Routledge/Curzon, London and New York.

Smethurst, Richard

1986 Agricultural Development and Tenancy Disputes in Japan, 1870-1940. Princeton: Princeton University Press.

Taira, Koji

1993 Review of Jussaume, Japanese

Part-time Farming. Journal of Japanese Studies 19(1):185-188.

Thompson, Christopher S., and John W. Traphagen, eds.

2006 Wearing Cultural Styles in Japan: Concepts of Tradition and Modernity in Practice. Albany: State University of New York Press.

Waswo, Ann, and Nishida Yoshiaki, eds.

2003 Farmers and Village Life in Twentieth-Century Japan. London and New York: Routledge/Curzon.