

Wearing Cultural Styles in Japan

Concepts of Tradition and Modernity in Practice



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Chapter 3



Rice Revolutions and Farm Families in Tōhoku

Why Is Farming Culturally Central
and Economically Marginal?

William W. Kelly

It may strike the reader as odd that in a volume on Japan's most archetypal rural region this is but the single chapter on agriculture. Where are the farmers and what happened to agriculture? To be sure, the 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 Tōhoku, agriculture falls behind manufacturing, construction, and service industries. Therein lies a crucial feature of contemporary Tōhoku: it remains agrarian in its imagery and identity but not in its political economy. Rice paddies and farm villages remain crucial to regional cultural style, but as elsewhere in Japan, the routines of farming no longer calibrate household and community social relations and economies. Farmers are few in number and agriculture is profitable for only a small number of them. How this has come to pass over the twentieth century is the subject of this chapter.

Twentieth-century Japan was 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 Tōhoku 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 six decades of this century at about 30 million people in 5.5 million families. By 1975, farm family numbers had dropped below five million, by 1990, they had dipped below four million, and in 2000 they had shrunk to just over three million. Even in 1990, however, 99.7 percent of all Japanese farm enterprises were classified as family farms. And the average cultivation acreage per farm family remained at roughly one 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 later argue 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 century, roughly from 1895 to 1920; the more recent was in the years, 1965 to 1980. I do not 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 growing preponderance of part-time operations. Official statistics divide farming households into three categories: "full-time 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, full-time 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 percent of Japanese farm families had only part-time involvement in agriculture.

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 deserves extended treatment, but here I emphasize 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. In hindsight, this is understandable, but it was certainly not intended. In both Rice Revolutions, powerful state and local interests held small holdings to be the root problem of Japanese agriculture and 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; if anything, smallholders emerged more emboldened and entrenched. And despite concerted efforts in recent decades to make agriculture a full-time occupation, part-time farming has become the agricultural norm—and agriculture has become a smaller and smaller component of the Thoku economy.

In the first of these two periods, from roughly 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 to 1980, 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.

This chapter offers an interpretation of the linkage of family operations, Green Revolutions, and part-time farming in modern Japan through the trajectory of experience in one particular Tōhoku region: Shōnai Plain in Yamagata Prefecture. This requires some details—a local narrative—but my aim is not to wallow in the minutiae of a field site. 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. Shōnai's experience demonstrates how politics and culture, as much as economics and technology, determined 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 Shōnai Plain, I examine each of these periods to identify the political and economic structures that framed these cultural idioms of technological and organizational change. While some of these particulars vary across Japan's major rice areas, the contours of Shōnai's experience are broadly representative of Tōhoku's major rice regions, indeed of Japan's modern farming experience.

Shōnai and the Aka River Basin

The region of Shōnai is centered on a small, low-lying coastal plain in the Tōhoku prefecture of Yamagata that is one of Japan's remaining rice bowls. The plain itself is about 50 kilometers in length, north to south, and about 15 kilometers wide in its southern half, narrowing to about six kilometers wide in its northern half (see fig 3.1). The broad Mogami River bisects the Shōnai plain midway as it crosses to the Japan Sea from its long course in the Yamagata interior. However, until only several decades ago, the Mogami River proved too wide in channel, too variable in discharge, and too prone to flooding to be controllable for Shōnai irrigation. Rather it was the smaller rivers, dropping out of the mountains around Shōnai Plain, that were exploited. Of these, the Aka River, whose drainage basin includes most of the southern portion of the plain, is by far the most important.

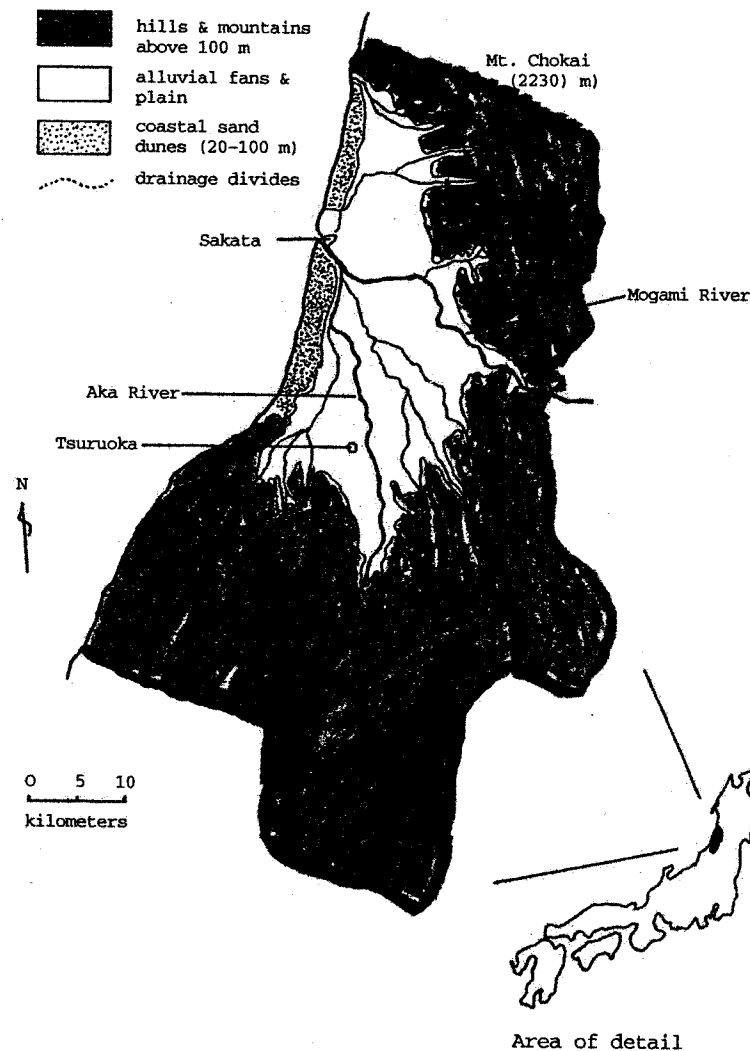


Fig. 3.1. The Shōnai Area.

The basin geomorphology of the Aka River (fig. 3.2) is a very common one in Japan. Its headwaters fall about 35 kilometers at a steep grade through the forested mountainous upper basin. Where the river meets the plain, it slows sharply, and the sediment it deposits there has built up an alluvial fan of moderate grade about ten kilometers in length. The river flows off this alluvial fan midsection and traverses, about 20 kilometers, across a very flat downstream plain (the center of Shōnai Plain) to the break in the coastal dunes that is its outlet to the Sea of Japan.

This tripartite basin environment proved less than hospitable to the cultivators who began to open up the plain in the early 17th century. The melting of winter snowfall in the headwaters could create severe spring flooding and damage to weirs and canal intakes, but the steep river grade and consequent fast runoff brought long periods of low water in the summer. There was high water consumption in the alluvial fan paddy fields as water percolated quickly through its large-particle, gravelly soils. Yet subsurface layers of the heavy clay soils in the downstream plain were often waterlogged, seriously affecting rice yields and field work. These, and other features of the basin environment, rendered water use and water control as problematical as it was essential.

By the early 19th century, nine canal networks used Aka River water. Their intakes were all close together on the alluvial fan. Each was a multi-level, dendritic layout. An unlined main canal, ranging in length from 3 to 20 kilometers led water from the river intake to a number of branch canals, which supplied even smaller tertiary canals, and finally, the capillary-like field ditching. Some of the bundled paddy parcels (whose acreage varied widely from less than 0.1 hectare to nearly 1.0 hectare) were directly connected to the field ditches, while others were irrigated with water from adjacent parcels. There was a reversed, agglomerating pattern for water drainage as the parcels drained back into the canals and, eventually, to the river in its downstream reach. By 1800, these networks served approximately 8000 water-user households in about 250 administrative villages. From 1623 to 1868, virtually the entire Tokugawa period, Shōnai Plain and its surrounding mountains were enfeoffed to a single line of domain lords, the Sakai family. The 10,000 hectares of Aka River basin paddy lands were central to domain fortunes.

In sum, this was a basin laced with multilevel, multivillage canal networks, sharing a common source and common drainage, and so favoring some potential coordination. It was also a basin of political and economic importance with serious water control and supply problems that would seem

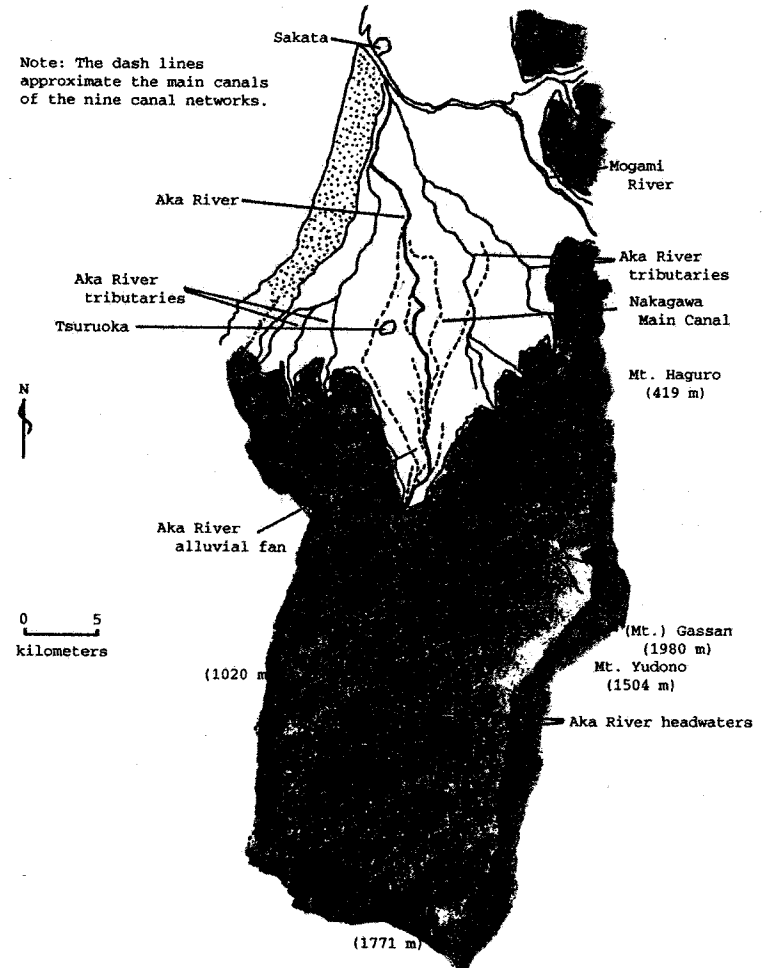


Fig. 3.2. The Aka River Drainage Basin.

to have invited a high level of management. In fact, Aka River irrigation-drainage represented a form of Tokugawa water management in which there was neither decisive elite control nor strong, local water user organization but rather management by a loose amalgam of domain officials, peasant cultivators, and large landholders. Of course, there were procedures and roles for building and repairing irrigation facilities, allocating water, resolving conflicts, et cetera—roles filled by domain officials, large landholders, and peasant cultivators. Yet their limited participation was striking. Throughout the 18th and 19th centuries, domain officials remained reluctant and reactive in their exercise of authority in irrigation affairs; large landholders seemed disinclined to intervene; and peasant cultivators were unable to assert any general control over basin irrigation. As a result, there was no centralized configuration of authority among irrigation roles—no clear articulation to the domain, no large landholder manipulation of irrigation, no effective, self-regulating associations of water users. It was a limited, cautious, divided management of the key agricultural resource, water.

Two 20th-Century Rice Revolutions

The burden of my argument in an earlier study of Tokugawa-period rice farming and irrigation in the Aka River basin (Kelly 1982) was that this 19th-century organizational stasis resulted from certain local features of land tenure, taxation, and political administration in which water use was embedded. I left unexplored the implication that changes in the Shōnai political economy would precipitate water management reform. The subsequent course of Shōnai's two 20th-century rice revolutions seems to bear this out. Table 3.1 charts their paths in a highly schematic way in order to emphasize some intriguing parallels and contrasts.

At the center of each revolution 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

Table 3.1. The Course of Shōnai's Two Twentieth-Century Rice Revolutions

<i>Background</i>	<i>Background</i>
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)
↓	↓
<i>Period One: 1895–1920</i>	<i>Period Two: 1965–1980</i>
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)

adapt programs and resources of the larger society. For example, the post-war land improvement districts successfully exploited jurisdictional squabbles between the Ministries of both 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 have been able to shape and mobilize local efforts in the service of broader policy objectives. In recent decades, for example, prefectural officials and extension service technicians have played on intergenerational

tensions within farming households to gain acceptance of a complete line of crop machinery. Nonetheless, local initiative versus central direction stands as 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 Shōnai as for many regions, this was the first comprehensive cadastre in 250 years, and it had several results of mixed consequence (see Kelly 1985:230–32, 252–53, 270–72). 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. By 1885, about 45 percent 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 (Naganuma 1983:180–499; Satō and Shimura 1966:202–55, 328–59; Satō and Shimura 1974:237–453). By 1892, such cooperatives were formed in the Aka River basin at three levels. There was an Aka River Irrigation Cooperative of landowners throughout the basin, which concerned itself with river conditions and flood control. Most of the main canal service areas organized into cooperatives, and a number of the branch canal areas also instituted formal associations. Most of these organizations 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 *nōbō* (Meiji Agricultural Methods), 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 Kyūshū. Shōnai cultivators immediately labeled the Meiji Methods the *kanden bakō* (drained field-horse plow) 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 required again.

The *kanden bakō* techniques spread rapidly across the plain in the late 1890s (Jinno'uchi 1977; Oba 1977). They were vigorously promoted by local *nōkai* (agricultural societies), companion organizations to the irrigation cooperatives. Landlords visited sites in Kyūshū, and hired those proficient in the techniques to return to Shōnai with them to establish demonstration plots and offer training sessions in various villages. By 1908, 94 percent of Shōnai's fields were dry-tilled by plow.

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

These complications provoked largeholders to initiate a second round of reforms during the first two decades of the 20th century: large-scale rearrangements of paddy lands and water channels known as *kōchi seiri jigyō* (arable land adjustment projects). 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 with hoe and shovel and straw basket, existing bunds were leveled and water channels filled in. Field areas were re-carved 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, 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 1874–1875 Land Tax Revision survey had uncovered most but not all of the underregistration 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 as well as the acreage required for the perimeter bunds. The result was an increase in actual rice acreage of about 10 to 25 percent (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 (Jinno 1977).

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 *ippyo-ba* (one-bale parcel), regardless of its size. With a landscape of 0.1 rectangles, landlords could use acreage as a meaningful measure of their holdings.

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 in what 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. The basin cooperative undertook construction along the river itself to straighten and train the river course by high embankments. One result was to increase the speed of the river across the plain and further exacerbate

bate the longstanding drainage problems of the downstream areas. Some relief was obtained by digging a new river channel through the coastal sand dunes to permit a direct outlet to the Japan Sea, a six-year construction project in the early to mid-1920s. 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 most upstream (and largest) network 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 in the basin distinguished between rights to receive *yōsui* (irrigation water), that is, Aka River water delivered through one of the canal networks along the river, and rights to receive a certain volume of irrigation water. The former water rights attached to land parcels were registered as paddy land in an administrative village that was within the official service area of a branch canal which had a formally acknowledged intake along 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 the registered yield of its service area parcels. Neither standard promoted an equal allocation of water among the tens of thousands of parcels with *yōsui* rights.

The reconfiguration of land and ditching did little to alter the notion of *yōsui*, although it did increase the service area acreage of the basin networks. But it also diminished 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 Shōnai. It stabilized yields and rents; improved rice quality; and ameliorated 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. This allowed 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 (e.g., Isobe 1977:208). Re-digging 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 (Isobe 1977:728–750; 1978:211–212).

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 20th 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 *tochikairyōku* (land improvement districts).¹ As a result, the existing irrigation cooperatives along the Aka River 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 was a bi-level ordering of a basin-wide Aka River Land Improvement District Association with four constituent land improvement districts encompassing the earlier nine main canal networks. The districts were managed by councils of representatives elected from and by all water user members. This council supervised a fulltime technical and administrative staff recruited from local residents.

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. Two dams were completed in the upper Aka River, in 1956 and 1958. Both were planned (1) to store water for irrigation, (2) for flood control, and (3) for hydroelectric generation. They remain property of the state, in the custody of the Ministry of Construction.

Aka River irrigators soon realized that there were incompatible aspects of these three purposes that seriously jeopardized agricultural water use. Disputes surrounding multipurpose 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, in Shōnai, the months of July and August are both the most likely time for drought and higher agricultural water needs, and the time of the 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 when sudden storms occur. Another fear is that drawing from the cold bottoms of the reservoirs and transporting the cold water through pipes to the generating stations would lower the river water temperatures to levels injurious to the rice plant (cold water temperatures are 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. By preventing the downflow of sediment, the dams 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 1980.²

Yōsui no gōrika (The Rationalization of Water Use)

The only feasible technical solution to the intake difficulties of the main canals proved to be the replacement of the nine separate weir gates with a unified headworks, a remote controlled, multiple-sectioned diversion weir, and a multigated intake channel at the top of the alluvial fan that would serve all irrigators in the basin. Ministry of Agriculture engineers designed the headworks and managed the project, 80 percent of which was funded by the state and 20 percent 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 full-time technical staff of the land improvement districts.

Basin waterworks 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.

Kiban seibi jigyō (Paddy Land Adjustment Projects)

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 the 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, earthmoving equipment. Like the earlier projects, however, village units were charged with arranging an exchange of parcels among residents to consolidate a household's holdings into two to four blocks.

Kikaika (Mechanization)

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 percent of arable land within the basin service area was planted in a *sasanishiki* (single variety of rice), which the agricultural cooperative vigorously promoted as a brand name variety through an expensive advertising campaign in Tokyo and other major cities.

Chiiki kaihatsu (A Real Infrastructure Development)

While the land and water projects were largely funded by the state, the 20 percent 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 1990). 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. *Bipasu* (bypass) 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 regional awaited completion of a regional facility that since the early 1990s has offered direct flights to Tokyo and Osaka.

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 staff of the Aka River districts 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 Shōnai and the other surviving agricultural regions of Japan a

farm crisis of overcapitalized, underscaled farming units that equally perplexes local people and national bureaucrats. To appreciate these mixed outcomes, we must review in closing the political-economic forces and cultural idioms during the two periods.

Shōnai'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 Shōnai 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 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.

However, the language of rationalization by which these programs have transformed Shōnai 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).

Thus, the paradoxical results of the rationalization of Shōnai rice agriculture have been highly responsive water-management and advanced rice-growing technology, an intractable farming system crisis, but a broader improvement in Shōnai infrastructure. Such an outcome was unpredictable in advance, but it is understandable in retrospect when we trace the interplay of the rhetoric of reform and the political and economic configurations in both of Shōnai'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, Full-Time Farmers

This chapter has argued that major Japanese agricultural regions like Shōnai have experienced two repetitions of Green Revolution 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,³ there is a radically new feature of Japanese agriculture in the last quarter of the 20th century, and it is overwhelmingly part-time in 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 nonagricultural pursuits has been an accelerating trend that most date from the mid- to late-1960s. By 2000, only about 14 percent of 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 (Mulgan 2000). Of the total farm household population of 13.4 million, only 2.4 million worked more than 150 days per year in agriculture, and of these, over 80 percent were age 50 or older. Full-time farmers are a miniscule segment of the Japanese population, perhaps equal in number to municipal bus drivers.

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. My own argument in this chapter grounds both the economic logic and the social logic of part-time farming in the persistence of smallholders that is a 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 full-time economically viable farming, but the resulting part-time smallholder rice growing in Shōnai and elsewhere can only be appreciated in retrospective analysis.

In closing, what I wish to emphasize is an aspect of this trend whose significance is often overlooked but which leads directly to subsequent chapters in this volume. That is, there is an intriguing gap between the precipitously declining numbers of full-time agriculturalists and the still large

number of rural households who insist on identifying themselves as farm families in official surveys and informal conversation. Seldom does 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? Moreover, this tenacious self-identification of farm families as such is matched by official and popular insistence on the continued existence of a rural Japan of rice farmers. What is producing this agrarian sentimentalism and locating it in areas like Shōnai, which have already lost much of their rural color?

This chimera is in fact a further outcome of the historical experience. In particular, five factors collude in sustaining this illusory image, and as the editors' introduction notes, they are amplified in the chapters to come:

- the class, gender, and generational dynamics within "farm families." 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 nonfarm employment as well as significant labor in household farming (Ōkado 2003).
- the domination of the national agricultural cooperative organization by part-time farming interests, often to the detriment of those individuals and households trying to devise full-time farming strategies.
- the pattern of regional development through state subsidies and public infrastructure investments rather than 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 regional political bases of many LDP politicians, ever more anxious and vulnerable since the 1990s, and the significant financial support that continues to flow to the LDP from the national Agricultural Cooperative organization.

- the cultural politics of heritage to 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 was orchestrated by organized partisan interests of an agricultural sector, but it was also shaped by enduring popular images of a farming way of life.

That, indeed, is the most striking irony of the Japanese countryside at the opening of the 21st century. As agriculture has been marginalized, in household, regional, and national economies, farming has been warmly sentimentalized, in personal identity and popular imagination. Japanese agriculture has a grim prognosis. Japanese farming has seldom been so well received. And as many of the following chapters show, Tōhoku, among Japan's regions, aptly illustrates this paradox.

Notes

1. The common translation "district" is really a misnomer for what is an association of all water user-cultivators in a service area, which by the 1949 law is to manage irrigation-drainage facilities and carry out land and water improvement projects. See Latz 1989 for a comprehensive study in English of land improvement districts.
2. This account of postwar programs is drawn from Naganuma 1983:501-775, Satō and Shimura 1966:361-541, and Satō and Shimura 1974:619-950, and from the author's fieldwork in the Aka River basin since 1976. Kase 2003 is a recent English-language overview of agricultural public works.
3. In English, Hayami 1988, Ogura 1980, Moore 1990, and Mulgan 2000 are comprehensive sources of agricultural policy and the emergence of part-time farming. Ino 1996 is a comparable source in Japanese.

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