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**AFTER THE STATE FARM:
A WATER USER ASSOCIATION IN KAZAKHSTAN**

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Introduction

Among the many crises facing the former Soviet republics of Central Asia as they make the transition from centrally-planned provinces of the Soviet Union to independent states, none is more urgent than the management of water resources, both across national borders and within the new sovereign states. Inefficient use of irrigation water, combined with the Soviet collectivization of agriculture, has led to the disaster of the shrinking of the Aral Sea, to salinization of vast areas of once-fertile land, and to the impoverishment of thousands of Central Asian farmers. It is also the cause of ongoing and dangerous diplomatic strains between upstream and downstream countries.

In Kazakhstan, the largest of the Central Asian Republics, the economic and political reforms that followed the breakup of the Soviet Union in 1991 included the abrupt privatization of the huge collective farms that had produced a significant share of the Soviet system's cotton, wheat, and other crops. Although most of the state farms were initially privatized in name only, with workers becoming members of "private" cooperatives that remained unchanged from the state farms in every other way, over the past half decade thousands of individual workers have broken away to form their own small independent farms. Where a single state farm once managed everything from input purchasing to output marketing, dozens or hundreds of small farmers now strive to establish profitable businesses on their own—while still relying on infrastructure and institutions designed to serve the state farm.

In the past two years, the attention of the Kazakhstani government and of international lenders like the World Bank and the Asian Development Bank has focused on rehabilitating, and possibly privatizing, the irrigation and drainage infrastructure that services the newly private farms. Irrigation management transfer and cost recovery for the irrigation system are among the most difficult challenges facing the national government, local agriculture and water management officials, and, most of all, the farmers.¹

This paper describes one answer to the challenge of irrigation water management at the local level. In late 1996, a small group of independent farmers in Shu Raion, an agricultural district in southern Kazakhstan some 350 km west of the city of Almaty, came together to establish the Shu Water User Association.² Roughly a third of the independent farmers who possess irrigated land in Shu Raion belong to the Shu WUA. The members of the Shu WUA share a secondary irrigation canal that was once entirely within the boundaries of a single state farm. Forming a water user association was these farmers' response to the challenge of purchasing and allocating irrigation water after the disintegration of the state farm.

¹ Burger (1998) provides a good overview of the current status of irrigation management transfer in Kazakhstan.

² There is a good deal of confusion in Kazakhstan over the use of the terms "association" and "organization." Many international experts have concluded that groups of irrigators should be termed "water user organizations," rather than "water user associations," to avoid confusion with the legal meaning of "association" under Kazakhstani civil law. In this case study, we retain the commonly-used term "water user association," but it should be kept in mind that we are not using it in the Kazakhstani legal sense.

The Shu WUA is one of the oldest registered WUAs in Kazakhstan, perhaps even the oldest. Although it is a small organization with very limited responsibilities, our interviews showed that it is achieving its objectives and is providing measurable benefits to its members. At a time when Kazakhstan is taking on millions of dollars in debt to rehabilitate its irrigation and drainage infrastructure, a local farmers' organization that is successfully managing its own irrigation system is worth further investigation.

The rest of this case study is organized as follows. First, we trace the background of Jhambyl State Farm and describe how it was privatized. In the next section, we examine the irrigation system in the area, discuss water allocation and charges, outline the structure and functions of the government agency responsible for managing the irrigation system, and describe the relationship between this agency and the farmers. We then take a close look at the Shu Water User Association. The following sections discuss the agricultural economy in the Raion, focusing on agricultural production, incomes, debt, access to credit, and the use of barter. The case study concludes with some implications of the Shu WUA's experience for the future of irrigation management in Kazakhstan.

Privatization Of Jhambyl State Farm

Before the privatization of Kazakhstani agriculture began in 1993, there were fifteen *Sovkhozy* (state farms) in Shu Raion.³ One of the largest was Jhambyl State Farm, with an area of 9,728 hectares. Prior to 1980, Jhambyl State Farm irrigated about 1,500 hectares. After a reservoir was added on the Shu River, the farm expanded its irrigated area to 5,248 hectares. No drainage system was constructed, however, and salinization began almost immediately. In the following years some land was taken out of production as a result of salinization, particularly in the low-lying areas that had been irrigated the longest.

The main crop at Jhambyl State Farm was beets, which were produced primarily for processing into sugar. The farm also raised wheat and melons and kept 35,000 sheep, 1,800 cattle, and 700 horses. It employed some 630 workers, including engineers, agronomists, accountants, cooks, construction workers, farm laborers, and herders. If we assume an average family size of five (probably a low estimate), the farm provided a livelihood for more than 3,000 people.

Jhambyl State Farm began to break up in 1991, when Kazakhstan passed its initial legislation on agricultural privatization.⁴ By 1995, it had become the Jhambyl Cooperative Farm, a private, commercial corporation and one of nineteen cooperative farms that replaced the fifteen state farms in the Raion.⁵ Many of Jhambyl State Farm's workers broke away from the cooperative at this time to become independent peasant farmers. The Raion now has 613 independent farmers, and the number continues to grow. Only about a quarter of those possess irrigated lands, however (the rest are livestock herders).

During the privatization process, land belonging to the state farm was allocated to families according to a formula devised by a "land commission" created by the farm. Active and retired farm workers each received 2.63 irrigated hectares. Civil servants who worked on the farm (teachers, hospital employees, etc.) received 1.82 irrigated hectares each. Finally, children and people who lived on the farm but were employed elsewhere received 0.23 irrigated hectares each. The formula favored larger families, who received an allocation for each adult and child in the family. The farmers we interviewed had farms of 6, 8, 12, 14, and 20 hectares, for an

³ A *Sovkhoz* was a *Sovmestnoe Khozaystvo*, or state-owned collective farm.

⁴ Agricultural land in Kazakhstan cannot be privately owned. Instead, during privatization farmers received 99-year leases for their land. These leases can be bought and sold, as if they were private property. The state, however, retains the right to re-take land that has not been used for its intended purpose for three years. There have been no land sales to date in Shu Raion. The farms we refer to as "independent" have the legally status of peasant farms under Kazakhstani law.

⁵ A "production cooperative" is one of several possible commercial entities suitable for large farms under Kazakhstani civil law. A production cooperative is essentially a worker-owned collective farm. By law, all the members of a production cooperative have equal rights in managing the farm, are required to work on the farm, and are guaranteed work and wages. The production cooperative is thus a relatively inflexible format for making the transition from a *Sovkhoz* to a market-based commercial venture. It was one of the most popular corporate structures adopted by former state farms, at least in part because it continues to provide job security to all workers, including managers (Gaynor 1996). The Jhambyl Cooperative Farm has an elected chairman whose term in office is indefinite. The recently elected chairman, who was previously the chief government official (*Akim*) of the village, might hold his position for life if he does a good job.

average of 12 hectares. The quality of the specific pieces of land assigned to individual depended on the number of years he or she had worked on the state farm. In addition to land, each state farm worker received a nominal share in the farm's capital stock: buildings, equipment, tools, livestock, etc.

Workers who wanted to leave the state farm and establish their own peasant farms received land adjacent to one another along a single irrigation canal, so that independent farms now adjoin one another, rather than being interspersed among fields belonging to the cooperative. This created entire irrigation services areas that are occupied by independent farmers—and where the formation of water user associations is thus geographically feasible. Between 1993 and 1998, 128 workers left the state farm (or cooperative farm, after 1995) to become independent farmers.

Jhambyl Cooperative Farm now employs about 250 workers, distributed among 350 households, for a total of roughly 1,750 people. Despite the reduction in its workforce, it remains the largest farming entity in Shu Raion. It currently irrigates 2,500 hectares, which is roughly half of its irrigable land. The remaining land is left unused due to salinization and a shortage of equipment, fuel, and labor. As members of the cooperative leave to become independent farmers, taking their land with them, its area and assets are steadily shrinking. The cooperative has just 264 sheep and 53 horses left, from the former state farm's herds of thousands, and its capital stock and soil base are deteriorating. No new equipment has been purchased since privatization, and the existing equipment is poorly maintained. No commercial fertilizer or pesticides have been used for the past three years, because their cost exceeds the price of the crops produced.

Crop yields are down, though perhaps not as dramatically as might be expected. The former state farm produced an average of 1.1-1.2 tons of wheat per hectare, and achieved yields as high as 1.8-2.1 tons per hectare in good years. Last year, production on the cooperative plummeted to 0.55 tons/hectare, but it recovered this year to 1.0 tons/hectare.⁶ Beets, which were the main crop of the former state farm, have been entirely replaced with wheat, as beets have become too expensive to grow. In 1998, the cooperative produced 1,485 tons of wheat, along with melons, onions, and other fruits and vegetables. Last year these products were exported to Russia, but by the 1998 harvest the Russian financial crisis had eliminated the market there, and the melons and onions were left to rot in the fields.

Cooperative members also have their own land, and production on these individual plots—of crops and livestock—accounts for more than half of most households' total income.

⁶ The average wheat yield for Kazakhstan in 1998 was 0.6 tons/hectare, down from 0.86 tons/hectare in 1997. Drought is blamed for this year's poor yields (*Central Asian Post*, 10/26/98). For comparison, the average wheat yield in Australia in 1998 was 1.9 tons/hectare (FAO 1998).

Irrigation In Shu Raion

The Irrigation System

Shu Raion has both irrigated and non-irrigated agriculture. Irrigation water is drawn from the Tasotkel Reservoir, which was built in 1981 and is fed by the Shu River. Three main irrigation canals lead 39 kilometers north from the reservoir to the 36,000 hectares of irrigated farmland in Shu Raion. All irrigation is surface, and only one of the three main canals is lined. The chief engineer of the local water management authority estimates that an average of 30 percent of the water drawn from the reservoir is lost in these main canals.

Branching off the three main canals are a number of secondary canals. Some of the secondary canals are lined. Before the privatization of agricultural land, each secondary canal provided water to an area within the boundaries of a single large state farm. Each secondary canal now serves anywhere from one to several dozen private entities, including independent farms and cooperatives. As a result of a severe shortage of funds for equipment and labor, the local water management authority is not able to maintain the irrigation system adequately. The flow capacity of the canals is shrinking as they fill with sediment and become choked with reeds. The main canal, which is an earthen ditch with a concrete lining, has cracked in many places, leading to the level of water losses indicated above.

Salinization has become a problem in some parts of the Raion. Few farms have any drainage infrastructure. The oldest irrigated areas, which are in the lowlands along the Shu River, are seriously affected by salinization. In upland areas, where there is a natural drainage system and where irrigation began later, salinization is not yet a serious problem.

The Local Water Management Authority

The irrigation system in Shu is managed by the raion-level office of the Oblast Committee for Water Resources, which is in turn a branch of the State Committee for Water Resources, a department of Kazakhstan's Ministry of Agriculture. The raion-level office, called the *Raionnoe Upravlenye Vodokhozaystvennykh Sistem*, or UVS, has three responsibilities: delivering water to farms, maintaining the primary irrigation system, and collecting payment of water charges. To deliver irrigation water, the Shu UVS signs contracts with individual farming entities, including the 19 cooperative farms, the water user association, and the hundred or so other independent farmers. Before privatization, the UVS signed contracts with only the 15 state farms in the raion. The number of individual contracts for which it is responsible has thus increased by nearly nine times.

Ironically, the size of the UVS staff has varied inversely with the number of contracts for which it is responsible. The UVS's employees include engineers, hydrologists, canal maintenance workers, water delivery regulators, and drivers. Before privatization, the UVS employed 150 workers; its workforce is now down to 60. Most positions are seasonal, with salaries paid only from April to September. Many of the UVS's remaining employees are on involuntary unpaid vacations because the UVS lacks funds for their salaries. Those salaries that

are paid are done so entirely in kind, as the UVS simply passes on to its employees the in-kind payments it receives for water charges. The UVS currently owes 3 million Tenge (\$37,000) in back wages to its staff.⁷

One of the UVS's main tasks is to collect payment from farmers for the water delivered. Water charges, which are its sole source of revenue, are set by the UVS on the basis of the volume of water delivered to the diversion points along the main canals. In 1998, the UVS charged farmers 0.0492 Tenge per m³, down from .0783/m³ and .0538/m³ in 1996 and 1997, respectively. Few farmers paid their charges in full, however. In 1998, charges for the water delivered by the UVS totaled 9 million Tenge; payments, which were all made in kind, totaled only 3 million Tenge. A similar ratio prevailed in 1997: charges for water delivered were 16 million Tenge, but payments were only 6 million Tenge. The accumulated debt to the UVS for water delivered from 1996 to 1998 is now 35 million Tenge (\$437,000)—equivalent to about two years' operating expenses for the UVS.

According to the UVS chief engineer, most of the debt is owed by cooperative farms. Independent farmers have a better record of paying for their water. In 1998, the UVS delivered 12-15 million m³ to the Jhambyl Cooperative Farm, which had paid 70 percent of its bill as of October. The UVS has the right to cut off the water supply to farmers who don't pay, and it has cut off the WUA's water supply twice this year. It has also taken two cooperative farms to court to force them to pay, but without success.⁸

⁷ The exchange rate in October, 1998 was approximately 80 Tenge/U.S. dollar, and that is the rate used in this paper.

⁸ In addition to the water charges levied by the UVS, the government of Kazakhstan began this year to levy a tax on "water as a natural resource." For agricultural water users in Shu Raion, this tax is currently 0.0331 Tenge/m³. It is collected by the district tax inspectorate, not by the UVS.

The Shu Water User Association

Formation of the Water User Association

Thirty-seven of the 128 workers who have left the Jhambyl State Farm or Jhambyl Cooperative Farm to become independent peasant farmers over the past five years are located along a secondary irrigation canal on 450 hectares that were once a single unit of the former state farm. In late 1996, these 37 farmers established the Shu Water User Association, one of the first self-governing organizations of irrigators in Kazakhstan.

The WUA's canal and farms are laid out roughly as illustrated in Figure 1.

INSERT FIGURE 1 HERE

According to the president of the Shu Water User Association, the farmers had early on been thinking about working together on a number of tasks, such as managing irrigation water, purchasing inputs, and marketing produce, because they were finding it difficult to accomplish these tasks individually. They decided to establish a water user association after attending a seminar organized by the Harvard Institute for International Development (HIID), the U.S. Agency for International Development, and the Ministry of Agriculture. In late 1996, HIID gave a small grant to the WUA to cover the costs of registering the organization.⁹

Early in 1997, all the farmers on the canal met and elected as president a man who had spent ten years as an agronomist and seed production expert on the former state farm. He was given responsibility for drafting a charter, hiring a lawyer to prepare the necessary documents, and registering the new organization, which cost about 12,400 Tenge (\$155).¹⁰

The sole function of the Shu WUA is to secure irrigation water for its members. All the farmers we met emphasized that they are independent in everything except securing water, for which they rely on the WUA. The basic reason a water user association is needed in Shu is that there is no technology for metering water deliveries to individual farms on the secondary canal. Water deliveries are metered only at the diversion point from the main canal. Before the WUA was formed, each independent farmer had to sign a subcontract with the cooperative farm, which charged for water according to the crops and number of hectares planted. The farmers joked that they never bothered to pay the cooperative, but they still considered the arrangement unsatisfactory, perhaps because it forced them to remain partly dependent on the cooperative.

Once the WUA was established, it could sign its own contract directly with the UVS. The WUA now takes delivery of water, remits payment for it, and allocates the water and fees among its members. The members meet roughly twice a year, in the spring when requests for water have to be submitted to the UVS, and in the fall when charges must be allocated and paid.

⁹ HIID provided grants to two groups of farmers in Kazakhstan to serve as pilot WUAs. Shu was selected both because it was under consideration for a future World Bank irrigation and drainage rehabilitation loan and because it was the home district of one member of HIID's local working group on WUA development, who provided contacts with local officials and credibility among farmers.

¹⁰ There is no annual registration fee, but the farmers will have to re-register their organization in five years.

It is clear that the farmers regard the ability to sign a contract with the UVS as the main benefit conferred by the WUA. It is not the only one, however. The farmers acknowledged that even if they all had individual water meters at their farm gates and could thus sign individual water delivery contracts with the UVS, the water user association would be needed to handle maintenance of the canal and regulate the delivery of water to each farm. They pointed out, moreover, that with 36,000 hectares of irrigated land in the raion and an average independent farm size of 12 hectares, the UVS will never be able to handle its administrative load if each farmer contracts with the UVS individually.

Water Delivery along the WUA's Canal

The secondary canal that serves the Shu WUA is a raised, concrete trough. Each farm has a short ditch or pipe that leads from the secondary canal to the farm's own distribution network. Canals on individual farms are earthen ditches; none of them is lined. Due to cracks in the canal and other maintenance problems, about 30 percent of the water delivered from the main canal is lost in the secondary canal. There is no drainage system in the service area of the Shu WUA. Other farms in the raion do have drainage, but the WUA's land is located in an upland area, and the farmers said that salinization is not a problem for them.

Water delivered to the WUA's secondary canal is metered at the diversion point from the main canal, as noted above. To manage water delivery, the WUA employs one of its members as a hydrotechnician. Each day the hydrotechnician meets a representative of the UVS at the diversion point and records the amount of water delivered. WUA members have agreed that the gates to their individual farms will be opened only by the hydrotechnician, or with his approval. This ensures that farms will receive only the amount of water considered appropriate for their fields and crops, and it permits the WUA to allocate charges for the water. Each WUA member pays the hydrotechnician, who is the WUA's only employee, 15 Tenge per hectare per month for his services (or a total of about \$84 a month).

Ownership and Maintenance of the Canal

The WUA's secondary canal is owned by Jhambyl Cooperative Farm, as the successor to the former state farm. On the books, all of the irrigation infrastructure originally belonging to the Jhambyl State Farm is currently worth about 25 million Tenge. The WUA members we interviewed believe that the state farm's infrastructure was vastly overvalued, however, and that their own canal is almost worthless due to its poor condition. The cooperative would like the WUA to take ownership of the canal in exchange for the shares of the cooperative's physical capital still held by the WUA members. The WUA does not want to buy the canal, however, because it is on the verge of collapsing. Moreover, if the WUA owns the canal, it will have to pay property taxes on it. These taxes are instead incurred by the cooperative. The cooperative is thus saddled with property tax obligations for two secondary canals (its own and the WUA's), as well as for all the shares (because individuals hold the shares, but the cooperative owns them).

Although they do not own the canal, the WUA members who use it are responsible for its maintenance. The WUA assigns each farmer a section of the canal for cleaning, and small leaks have been repaired. No other investment in routine maintenance has been made, however, and

there have been no repairs to the canal since it was built in 1978. The cost of repairing the canal is now estimated at 3 million Tenge (\$37,500).

Paying for Water

The WUA contracts with the UVS for water deliveries and is responsible for the bill. Each member of the WUA is allocated a share of the charges based on the crops and number of hectares he planted. Charges for the water lost in the secondary canal are also allocated among members. In 1998, the WUA received about 2 million m³ of water. Its total cost for water was 129,000 Tenge (\$1,612)—an average of about 287 Tenge (\$3.59) per hectare.¹¹

As of November, 1998, the WUA had not paid any of its bill to the UVS. It had, however, paid all but 50,000 Tenge of last year's water bill, which gave it a similar payment record to that of Jhambyl Cooperative Farm, in percentage terms. The WUA's contract with the UVS states that if it cannot pay for water in cash, it must pay in kind (barter). Last year, the WUA paid its bill partly in cash and partly in kind. This year, it offered payment in hay and watermelons, but they were not accepted by the UVS. The farmers said that the UVS will accept only wheat flour as barter payment, and they hoped to deliver some flour later in the fall.

In August, the UVS cut off water delivery to the WUA for one week. At the end of the week, WUA members brought the UVS a written pledge to pay for their water, and delivery was resumed. The farmers said that their water was cut off again in October, hindering the growth of the winter wheat crop. They hoped to resolve this problem by spring, when the growing season begins. The WUA is not willing to cut off water to its own members who have not paid, however. The farmers explained that this would be too damaging to their neighbors, who have to produce crops if they are to survive.

The WUA's members argued that they receive no services—such as canal cleaning or other maintenance—from the UVS and should therefore not be obliged to pay the water charges. They also said that they have no idea how the charges were defined and complained that they had no role in the process. Despite this, the farmers all agreed that the cost of water is not a factor in deciding which crops to grow.¹²

¹¹ The charge for water in 1998 was 0.0492 Tenge/m³, as was mentioned above. At this rate, the 2 million m³ received by the WUA should have cost 98,400 Tenge. The reason for this discrepancy is unclear.

¹² The farmers we interviewed said that they will have to begin paying the tax on water as a natural resource next year, although collection of the tax officially began this year and some farmers in other regions are already paying it.

Agricultural Production And The WUA Farm Economy

Crops and Yields

The thirty-seven farmers who comprise the Shu Water User Association have farms ranging in size from 3 to 27 hectares, with an average size of about 12 hectares (or 450 hectares in all). Overall, about 15 percent of WUA land was planted in wheat this year, 30 percent in hay, 50 percent in melons, and the rest in barley and maize. The size, crop choices, and yields this year for three typical WUA farms are summarized in Table 1.

The differences in yields achieved by the members of the WUA are caused in large part by differences in access to machinery.¹³ One large WUA farm (*Farm 3* in Table 1) has a tractor and a planter. Owning their own equipment allows the farmers to plant and harvest at the right time, rather than having to rent equipment when its owners are not using it, and to harvest an extra hay crop. The farmers purchased the equipment second-hand, with cash obtained from selling their livestock. They make extra money by renting the tractor out to other farmers; the rate is 1,000 Tenge per hectare, and the renter must provide his own fuel. Equipment can also be rented from “equipment stations” run by the Shu Raion administration. Among themselves, the 37 WUA members own (individually) 12 tractors, 1 truck, and 10-15 planters. They also all own cars.¹⁴

Most of the farmers keep small numbers of horses, dairy cows, beef cattle, and sheep. It is more profitable to sell animal products than crops, which is why so much land is planted in fodder for livestock.

Prices and Marketing

Once crops are harvested, farmers have three options: consume them, sell them for cash, or barter them for other goods or payment of debt. The members of the WUA seem to be largely self-sufficient in food; they purchase only fruit, tea, and perhaps a few other minor items. We will look more closely at the role of barter in the local economy below.

Unlike the cooperative farm, the independent farmers sell a significant share of their production for cash. Wheat, the most important cash crop, sells for 5 Tenge/kg in the Shu market, or about \$62/ton. It is more profitable, however, to take the wheat to the mill and have it processed into flour, which sells for 16 Tenge/kg, even though the mill keeps about a third of the flour it produces as payment for its services. Hay, which the farmers sell to Shu town residents from their tractors, going door to door, sells for about 2,000 Tenge/ton in the summer and fall, and 3,000 Tenge/ton in the winter and spring, before the first crop is harvested.

The collapse of demand for Kazakhstani agricultural products in Russia this year was a serious blow for farmers in Shu Raion. In the past, the farmers exported most of their melons to

¹³ The farmers do not use purchased fertilizers or pesticides on any of their crops except melons, which they treat with herbicides.

¹⁴ Old, heavily used Russian-made cars, such as Ladas, can be purchased for as little as \$100 in Kazakhstan.

southern Russia. Each farmer arranged his own transport for his crop, hiring trucks and drivers and selling the melons to traders who would take the cargo to Russia to sell. This year, there was no market for melons there, and the farmers in the WUA left half their melon crop in the fields to rot. This loss was particularly harmful because sales in Russia were a source of cash for the Shu farmers, allowing them to pay for some inputs, such as water, in cash.

Marketing their produce is a problem for the independent farmers. Each of them must make his own arrangements for transporting his crops to a market and finding a buyer there. The WUA members agree that it would be more profitable to market their products jointly, but efforts to do so last year fell through. Joint marketing also requires synchronization of planting, so that products are ready for market at the same time. WUA members hope to improve their marketing practices next year.

Trucks are the main means of transporting products to the market, and there are many trucks and drivers available for hire. Although Shu is the main railroad junction for all of Central Asia—it is where the north-south line meets the east-west line—and rail service is both cheaper and more reliable than road transport in the former Soviet Union, the farmers do not use the railroad. Individual farmers do not produce enough to fill an entire boxcar and—perhaps more important—do not trust the railroad, as rail cargo has been known to disappear or to be held indefinitely at border crossings.

Incomes

Using the prices and yields indicated above, Table 2 estimates the maximum potential cash revenues of the three farms described in Table 1. Most of the farmers also have several other sources of household income, including livestock, gardens, casual labor for the cooperative or other farmers, and, if they own machinery, rental fees. Most of the farms support a large number of people—probably a minimum of one person for every two hectares, given the formula for allocating land from the former state farm. We were not able to get a good estimate of total household income or per capita income. The profitability of the farms described above is also uncertain. Costs—especially the cost of household labor—are not fully accounted for by the farmers. Of the three farms in Table 2, only the last one (*farm 3*) is “profitable,” according to its owner.

INSERT TABLE 2 HERE

For one 19.8-hectare WUA farm, financial flows in 1998 were as follows. The farm produced 22 tons of seed wheat, which was sold at the Shu market for 10,000-12,000 Tenge/ton. The farm also produced 15 tons of maize, but since there is no market for maize, it was stored on the farm for future sale or use. There was also no market for the melons the farm produced, and they were left to rot in the fields. The farm's total cash earnings for its crops were thus on the order of 220,000 Tenge (\$2,750). Its cash costs, for water, taxes, equipment rental, and fuel, were approximately 100,000 Tenge, leaving the family—16 or 17 people—about 120,000 Tenge (\$1,500) for consumer purchases during the year. The family also raises a few livestock, fruit trees, and a vegetable garden. Livestock products and fruits and vegetables probably allow the family to subsist almost entirely on their own production. In addition, the farmer receives a share of the cooperative's production, as he is still a cooperative member, and his wife receives a

pension of 4,100 Tenge per month (\$51). The farmer said that his farm is doing well: it is able to pay for its inputs, and it does produce an income for the family.

Barter, Debt, And Credit

In any conversation with farmers and local officials in Shu Raion, three issues come up immediately: the use of barter for payment of bills; the debt burden faced by independent farmers, cooperatives, and government agencies alike; and the dearth of credit for agricultural investments. All of these issues influence the ability and willingness of farmers and farmers' organizations, like the Shu WUA, to take over responsibility for the irrigation system.

Barter

According to both farmers and local officials, in-kind payments and trades constitute a large share of the agricultural economy in Shu Raion. Farmers pay for their inputs in kind and use barter to obtain the consumer goods they need; the UVS pays its employees in kind and obtains fuel and other supplies through barter.

The most common unit of barter is a ton of wheat, although many other goods are also traded. In 1998, Jhambyl Cooperative Farm produced 1,485 tons of wheat. Of this, 340 tons was traded for fuel, 200 tons was distributed to cooperative members as their salaries, and some went to the UVS in payment for water. The rest was used to pay off the cooperative's debt and for spare parts for equipment.

A ton of wheat is valued at 6,400 Tenge (\$80) as a barter good. When a cooperative worker receives wheat from the cooperative, in lieu of salary, he or she may consume it, trade it for other goods, or sell it at the market in Shu, either as wheat or as flour. At the market in Shu, families can sell their wheat for 5 Tenge/kg, or 5,000 Tenge/ton (\$62). The end consumer thus receives goods worth only 78 percent of their nominal value—without taking into account the transaction costs incurred in receiving, storing, transporting, and selling each ton of wheat.

A similar calculus applies to barley, another crop that is used for barter. The cooperative farms sometimes pay for water in barley, valued at 8 Tenge/kg, which is the price that the cooperatives negotiated with the UVS. The UVS, in turn, passes the barley on to an employee as part of his or her salary, again at a value of 8 Tenge/kg. If the employee decides to sell the barley at the market, rather than consuming it or bartering it for other goods, the price will be only 5 Tenge/kg. UVS workers' salaries are thus worth less than two thirds of their nominal rates.

The WUA farmers, whose hay and melons were rejected as payment for water by the UVS, then offered wheat flour, at a rate of 17 Tenge/kg. The UVS accepted this offer, despite the fact that the market price for flour is only 12-16 Tenge/kg. The WUA members pay for fuel, which is their other major purchased input, in cash.

There appears to be very little cash in the agricultural economy in Shu. The UVS does receive some cash from independent farmers and the WUA, but the UVS engineer estimated that cash payments total only 10,000-15,000 Tenge each year. When the UVS needs inputs for its own operations, it accepts them as payment for water bills. For example, the UVS receives fuel from the cooperative farms, which have obtained their own supply of fuel through barter.

There are several possible explanations for this reliance on barter in Shu Raion—and throughout Kazakhstan and the rest of the former Soviet Union. Farmers are short of cash and lack access to credit, and, as the only producers of value in the system, they can insist that suppliers accept barter values that are higher than market values. The use of barter also permits the farmers to avoid taxes, which would be incurred on cash receipts. Those who lose the most from the inflated barter values—the workers who receive the barter goods in place of their salaries—have little bargaining power, since they know that they will not in any case receive cash.¹⁵

Debt

Because farmers have no money to pay for inputs and do not produce enough to cover all their expenses through barter, both farms and the UVS have substantial debts. The Jhambyl Cooperative Farm currently owes 5 million Tenge (\$62,500) in back taxes, as well as 0.5 million Tenge (\$6,250) to vendors for fuel and other inputs. There is also an inherited debt of 700 tons of wheat owed to the state from 1994. One consequence of the cooperative's large debt is that the real value of shares in the farm's capital stock is probably effectively zero, and might be negative.

The Shu Water User Association still owes the UVS about 179,000 Tenge (\$2,237) for water. The WUA does not have any other debts, but some of the individual farmers owe back taxes to the state. The UVS, which does not have to pay for water from the reservoir but must rely entirely on farmers' water payments for its operating budget, is deeply in debt. As noted above, the amount owed to the UVS for water delivered from 1996 to 1998 is 35 million Tenge (\$437,000)—equivalent to its operating budget for about two years. The UVS, in turn, owes 3 million Tenge to its own employees, and it has simply stopped performing basic maintenance on the irrigation system.

Credit

No issue is of greater concern to the members of the Shu WUA than credit. Farmers in Shu have almost no access to credit, and none at all to long-term credit. The only source of credit available, according to WUA members, is from the raion agricultural bank. Farmers can borrow up to 50,000 Tenge for six months at an interest rate of 1 percent per month. Most are not interested in credit on these terms, however, because six months is not enough time to make a profit on an investment. The six WUA members who accepted the short-term credit used the funds for recurrent costs—seeds, fuel, equipment rental—rather than long-term investment. They did not obtain significantly higher yields as a result, and some are now having difficulty with repayment.

None of the WUA members has savings of his own, and they stated unambiguously that their lack of access to long-term credit is the most serious obstacle they face. They believe that

¹⁵ ADB (1998) argues that it is tax evasion, and not the lack of liquidity, that is the main reason for using barter. In our interviews, however, we heard relatively few complaints about taxes, and many about the lack of liquidity. For a different approach to explaining the use of barter in former Soviet economies, see Gaddy and Ickes (1998).

long-term credit—three years is the term they would like—would solve many of their problems. They said they have many ideas for improving the profitability of their farms—such as developing small food processing facilities, coordinating purchase and marketing activities, and producing their own seed—but that their hands are tied without access to long-term credit. It is not clear how carefully they have considered their own ability to repay long-term loans, however.

Conclusions

Although the establishment of the Shu WUA was a just one very small step forward for Kazakhstan's farmers, the experience of the Shu WUA has a number of implications for irrigation management transfer in Kazakhstan.

Perhaps the most valuable outcome of this case study is the discovery that the Shu Water User Association is working. While it might be modest in its size and ambitions, it is successfully performing the basic task for which it was created. The farmers' willingness to pay the hydrotechnician to regulate water delivery and to take some responsibility for canal maintenance indicates quite clearly that the WUA is providing some net benefits to the farmers. They recognize the necessity of having an association to manage their secondary canal, and they seem to be reasonably satisfied with the WUA's performance.

On the other hand, although the WUA is surviving, it would be hard to claim that it is flourishing. It has not paid for any water this year and, as a result, has had its water deliveries cut off twice. The WUA does not have procedures in place for dealing with non-payment by individual members, and so far the farmers have not been willing to cut off water deliveries to their neighbors or take other actions to compel payment. Moreover, although they rely on its services, the farmers seem to regard the WUA more as a necessary evil than as an institutional resource. This might reflect their displeasure at having to pay water charges to the UVS, which they do not believe is fulfilling its responsibilities, or it might simply reflect an aversion to anything that reduces their new-found independence. Either way, it suggests that water user associations, on their own, cannot change farmers' attitudes towards water charges and the government's water management agencies.

Another interesting finding is the attitude of the WUA members toward privatization of the secondary canal that serves their farms. They consider the financial value of the canal to be nil, and they are not willing to give even their virtually worthless shares in the cooperative farm's capital stock in exchange for it. The farmers see rehabilitation of the secondary canal as a government responsibility, and not their own. This view might make them somewhat reluctant to accept the kind of loans currently being prepared by international lenders, which requires farmers to repay the costs of infrastructure rehabilitation as well as the full costs of operation and maintenance.

The fact that most farms in Kazakhstan are loss-making is widely known. Policy makers and international lenders may be less keenly aware, however, of the obstacles facing efforts to introduce full-cost pricing of irrigation water. The members of the Shu WUA are either unable or unwilling to pay even the current low level of water charges and believe that they bear no responsibility for the cost of rehabilitating the irrigation system. So far, they have successfully forced the UVS, and perhaps other suppliers, to accept barter prices that are above the market prices of their goods. In any case, a certain amount of skepticism is due to proposals to raise current water charges significantly without first providing the credit the farmers believe they need to increase their output.

The farmers know that expanding the WUA's activities, either by increasing its role in irrigation system maintenance or by using it to coordinate purchasing and marketing, would be beneficial. While they talk of doing this next year, they do not seem to have any definite plans or strong aspirations in this regard. On the other hand, there is a good deal of momentum in Shu Raion toward the creation of independent peasant farms. Many people regard the demise of Jhambyl Cooperative Farm as inevitable, and just a matter of time. The cooperative's landholdings and human capital base are shrinking, as the workers who have the resources and ambitions leave to establish their own farms, but its debts are not. It seems likely that at some point the cooperative will simply vanish.

The Shu Water User Association was one of the first two WUAs in all of Kazakhstan. It has only 37 members and an area of 450 hectares—far fewer than the hundreds of members and thousands of hectares that are envisioned for the WUAs being set up by international lenders in other districts of Kazakhstan. We were encouraged by the discovery that the Shu WUA has survived for two years and is providing benefits to its members, as well as by the fact that independent farmers are doing relatively well in Shu Raion. We saw little sign, however, that the farmers who established the WUA share the international lenders' vision of the future. The farmers hold the government responsible for providing a sound irrigation system, and they believe they do not have the resources to pay more for water or infrastructure. Offering the farmers a source of short-term production credits and medium-term capital credits at a modest interest rate might change their attitude toward irrigation privatization. Whether they will then also be willing and able to repay loans used to rehabilitate the irrigation system is another question.

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