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Legal and Institutional Change in Irrigation Systems
of Soviet central Asia*

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Central Asia

Abstract

This paper discusses recent changes in the irrigation water management regimes of the republics of Soviet Central Asia. As centralized Soviet control over the water management regimes weakens, existing legal institutions must adjust to different channels of communication and decision-making. The theoretical framework to explain these changes is provided by two complementary approaches: current scholarship on the development of property rights in water (Rose, 1990); and the institutional choice model (Ostrom, 1990). Data collected in the Amu-Dar'ia and Syr-Dar'ia river basins of Soviet Central Asia forms the empirical basis for the research project. First, we conclude that Rose's model provides a useful theoretical explanation of the development of collective property rights in CPR institutions. Second, we find the level of decentralization of resource control achieved in the Asian republics is determined as much by local resistance to privatization as by the external political regime.

Legal and Institutional Change in Irrigation Systems of Soviet Central Asia

Economists have long recognized that privatization leads to optimal allocation of costs and benefits for some categories of goods and services. However, public goods, or those goods with public goods characteristics, create problems. Hardin defined one set of these problems as the "tragedy of the commons." (Hardin 1968) His prescriptions of either "central control" or "privatization" as remedies have been subject to reanalysis by a number of scholars representing such diverse disciplines as resource economists, political scientists, ecologists, and anthropologists. The most cogent reevaluation has come from "new institutionalists" who argue that Hardin's analysis is valid only for a limited number of situations. The new institutionalists argue that a wide array of cases which do not conform to Hardin's analysis. Empirical studies indicate that some forms of institutional design can solve the problems identified by Hardin and others without recourse to universal government solutions and without resource depletion.

The cumulation that has taken place has focused on relatively small resource systems. The application of the theory in larger resource systems is not as well defined, in part because large systems are subject to a more complex external environment. Ostrom notes that, among other omissions, current theories of collective action do not address satisfactorily "the importance of the characteristics of external political regimes in a n analysis of how internal variables affect levels of collective provision or rules" (1990: 191).

Our concern in this paper is how changes in the external political regime have affected the management of irrigation water in Soviet Central Asia. Circumstances in the USSR are unique in world history. A centralized Communist system, which imposed ideological constraints on resource allocation throughout the union, has fallen apart, and decision making has been decentralized to the republican level. The Asian republics of the USSR were were brought under the administrative control of the Tsarist government in the nineteenth century. They remained under centralized administrative control until quite recently. However, they are responding the the present ongoing decentralization quite differently than the European sectors of the USSR.

The external political regimes governing irrigation resources in the area have altered dramatically since 1988. Our inquiry is directed at the corresponding effects this will have on the institutions for water managment. The influence of this changed external political regime has been felt in two interconnected areas that are especially germane to the study of institutional design. The first is the development of property rights. The second is the impact of decentralization of Moscow's political control on the water management system in Central Asia.

I Property Rights

We discuss the theory of property rights only briefly here because it is the focus of a concurrent research project and is available in other papers. The research question we address in this paper is: what is the historical evolution of the present property rights system in the central Asian republics and why did that particular system evolve? Our response to this question stresses the independent influence of tradition and culture in the evolution of the local property rights regimes.

Property Rights in Central Asia

In the arid oases and river valleys of Central Asia, the value of land has always been inseparably linked to access to water. The success of local political officials in ancient times often hinged on their skill at managing local water resources. Streams and wells had to be protected from external threat, they had to be kept clean, irrigation canals had to be maintained, and highly political decisions regarding the distribution of water had to be made and enforced. These responsibilities also conferred a great deal of authority upon those charged with carrying out the relatively complex tasks of maintaining the irrigation networks. Not surprisingly, the watermasters of traditional Central Asian communities were often the most powerful local officials. Unlike the individualistic, participant-oriented political culture that developed in many water-rich agrarian societies, a collectivist and subject-oriented political culture developed in many arid agricultural societies. It has been suggested that many Central Asian traditions of deference to authority may have had their origins in the high level of socio-political organization required by the "hydraulic society" (Wittfogel, 1957). In the region, "irrigation appears as one of the principal functions of state power, its justification in a sense" (Carrère d'Encausse, 1988: 8).

The legal structures prior to the Russian conquest completed by the late 1860s were primarily feudal and, where any form of law we might recognize prevailed, Muslim. After the Russians assumed control of the region, Tsarist law was superimposed on a conquered people, but the Russian administration was basically one of occupation. The Russian system of administration left many of the indigenous customs in place. After the 1917 Bolshevik Revolution, Tsarist laws were replaced with a socialist system. This administrative system exerted a much more direct influence on the region.

Before the Conquest: Islam and Custom

The feudal system in the central Asia was a hodge-podge of emirates, small cities and villages, and loosely-knit, largely nomadic clans. The administrative system relating to land tenure was mostly Arabic, based on "taxation and tribute" (Wheeler: 43). As in the European feudal societies, the land belonged to the sovereign. Irrigation was essential; irrigation systems in the region are documented as far back as the first century A.D. (Wheeler, 1964: 3).

To insure the maintenance of the complex and sophisticated irrigation systems, the emirs gave land to individuals to encourage cultivation. The right to use the land was not a free; landholders then owed a tax to the emir, originally payable in kind but, by the time of the Russian conquest, usually paid in cash. The payment was not rent; rather it was tribute in the same sense that English lords paid a fee to the king for holding their property. Over half the land was distributed in this fashion. Peasants who lived on this land often paid taxes to both the emir and to the "beys" (local chieftans) or nomadic leaders to whom the emir had given the land.

The irrigation systems in place at the time of the Russian conquest were elegant and efficient. Smaller feeder canals branched off from a central "aryk" (irrigation canal) and then ran parallel to the original canal to provide water to the villages. Up to ten villages would be connected in sequence to the aryk. The canals were shallow and easily controlled even in times of plentiful water. Villages added feeder canals as necessary. The systems were administered by aryk-aksakals or "canal graybeards," men elected (in some sense) by the local farmers to oversee water distribution and to coordinate repairs (Wheeler: 3). In the Khanate of Khiva alone, there were "six main canals from 70 to 100 kilometers in length. About 75 per cent of the population was settled and carried on irrigated cultivation

in which the rotation of crops was extensively practised" (Wheeler: 46). Regional law reflected Muslim society, but this was not necessarily a constraint on irrigation systems. Although Muslim law controlled such land-sensitive issues as inheritance, in the development of irrigation systems the existing customs or civil regulations prevailed.

The Russian Conquest: Tsarist Law

By the 1870s, the Russians consolidated political control of Central Asia (then called "Turkestan"). The Russian presence in the area was primarily military, not civil. Administration was often inefficient and not very capable, run by military officers who themselves had often been assigned to this duty for reasons of corruption or incompetence. However, not all of the changes instituted by the Russian administrators were poorly conceived. "Crude and reactionary as the military system of government may have been, it certainly enabled [land tenure and taxation] reforms to be pushed through much more effectively and quickly than would have been possible under a civil administration" (Wheeler: 70).

All the land except that owned by the religious foundations was taken over by the Russians and given to the peasants who actually worked it rather than the absentee landlords (Wheeler: 73). Between 1850 and 1870, Tsarist officials were put in charge of the irrigation systems. Unfortunately, their salaries were generated in part by the fines they levied for refusal to maintain the canals, and it was to their advantage not to enforce canal maintenance provisions (Iskandarov, 1958: 17).

The irrigation systems, which in ancient times had been extensive, fell into disrepair. Although the Russians tended to look "askance at the seemingly primitive but ingenious and enduring native irrigations works," their efforts to improve and to modernize the systems were not successful (Wheeler: 71). In 1913, 4,758,000 desiatins (about 5,295,000 hectares) were irrigated in central Asia, of which only about 45,000 desiatins had been accomplished under the Russians. At fault were "lack of capital, technical backwardness, insufficient trained personnel, and poor organization" (MacKenzie, 1974: 186-187).

During the period of Tsarist control, Muslim law and the Tsarist system co-existed. The Russians simply took the place in civil society that had been occupied by the emirs, assuming control of the state land. However, the two systems did not always co-exist comfortably. "Often Russian officials had to adopt a passive, undignified role; they were not authorized to apply Russian law; yet to enforce shariat [Muslim religious law] would undermine Russian authority and prestige" (MacKenzie, 1967: 274). At this time, Russian law itself was customary law. Efforts had been made by Peter the Great to reform Russian law on the Swedish model, and by Catherine II to adopt a Natural Law approach. In 1832, a consolidation of Russian laws known as the Svod Zakonov was assembled at the order of Nicholas I, but this was not a true reform or modernization of the law. Russian law was based on the Roman system, primarily because of the influence of the Byzantine Church.

After the Revolution: Custom and Socialist Law

The victory of Marxist economic doctrine with the advent of the Bolshevik regime had little immediate effect on Central Asia. But eventually the Central Asian land reform redefined property relations, introducing the socialist paradigm. The socialist economic and political structures in the USSR created new forms of property management. In an effort to eliminate the socio-political structures that radiated incentives under capitalism (or, more accurately, feudalism in Central Asia) the new socialist system redefined private property as a collective good and established bureaucratic control over collective decision making.

To encourage the peasant revolution in central Asia, the Soviets ordered the return of land taken by Russian settlers to the Muslim peasants, hoping to turn the peasants against the pro-Monarchy Russian colonizers. In Central Asia there were no class distinctions in the Marxist sense of that term. The patriarchal system was so firmly established that the idea of seizing a landlord's property apparently did not appeal to the peasants. Moreover, in many parts of the country and particularly in Turkmenistan, the land was already communally owned by tribes or family unions. The notion of confiscating this land and distributing it to individuals seemed to the tribal leaders to not only be antagonistic to the goals of socialism, it also went against the grain of long established local practice. (Wheeler: 135)

On the other had, the peasants often resisted land reforms that were foisted from above. As the collectivization of Central Asian agriculture was carried out in the 1930s preexisting social arrangements were intertwined. In the period, at least some collective farms were organized around single clans or pre-existing villages. Many of the kolkhoz farms allowed private ownership of small plots of land or of livestock. In 1961, one kolkhoz reported 560 sheep and goats owned by the collective but 10,470 owned by the workers themselves (Wheeler: 168).

Why did the rights in irrigation water develop in this manner rather than becoming fully privatized? The natural history of property rights as laid down by Blackstone and followed by economists tells a story of decreasing resource availability and increasing individual rights. The record suggests that, originally, resources were in such plentiful supply that no need for individual rights in the resource existed, and people, not being given to invent social structures unnecessarily, simply allowed each person to take whatever was desired. As the resource became scarcer, either from acquisitions depleting the resource, or from increasing population, or from the development of more complex social and technical relationships, the community of users imposed restrictions on who might take what and in what quantity. Finally, even these restrictions were insufficient to protect the resource, and fully developed, transferable, individual property rights in the resource emerged. Users could then exchange resources and the resources would be put to their most efficient use.

Using analysis of water rights as her explanatory model, Rose suggests that the economic model be modified to allow for resources that exhibit public good characteristics and that have high transaction costs. The first stage of totally free access, which exists primarily in the Lockean mythology of a pre-societal group of users, is transformed into a community-controlled regime with two possible outcomes. Depending upon the actual characteristics of the resource, the regime may become one of fully privatized rights (such as the prior appropriation doctrine of water rights found in the western United States) or one of correlative rights. The new, reasonable use doctrine which reflected these correlative rights had three parts: "first, riparian owners had limited but more or less equal rights to use the stream; second, their various uses could cause some inconvenience to other owners; and third, those inconveniences were not actionable if they were merely minor" (Rose, 1990: 283).

While this may have reflected a new approach for the American jurists, the notion of correlative rights (although it does not bear this particular label) is well documented in the common property resource literature (Berkes, 1989; McCay and Acheson, 1987; National Research Council, 1986). This literature demonstrates that correlative rights regimes occur frequently, are often successful in managing water resources, and can be enduring. Thus, as Rose correctly notes, correlative rights are not necessarily a transition stage to fully privatized rights as the Blackstone/economic model would predict.

Rose provides a potential theoretical basis for one of the external variables that affect the internal collective action rules: an explanation of the development of non-individualized property rights in CPR institutions.

II Decentralization and Denationalization

Scholars have made significant headway in discerning advantageous and disadvantageous design features in institutions for the management of common pool resources. However, the "new institutionalise approach still lacks a theoretical framework for comprehending the relationship between decision-making within the local managers and external actors. It is clear that even when a successful local institutional design can be crafted, higher level governments may not be willing to countenance the degree of local control required for the continued functioning of the arrangement. In other words, higher authorities frequently step in with the intent of solving local problems, but in the process exacerbate difficulties. In the case of Soviet Asia, the higher authorities have rapidly withdrawn their influence over the past two years. In the ensuing vacuum of authority, local and central officials have little theoretical grounding for concluding at what level responsible institutions should be created. Should it be at the water district level? Should it be at the river basin level? Should it be at the republic level? Should it be at an inter-republican regional level? Should it be recentralized entirely?

In this section of the paper we address this issue by analyzing the countervailing influences urging, on the one hand, greater "disinterested" central control and, on the other hand, greater informed, local control of water management. We begin by hypothesizing that the extent to which the process of decentralization proceeds is determined by central actors. We find that the evidence does not support this hypothesis.

Centralization and Nationalization

Centralization of government power is one of the most obvious features of government in the twentieth century. A related but separate phenomenon is nationalization. Nationalization is the process of shifting from conventions of private property to those of public property, typically held by the state. In the USSR nationalization took place even before centralization. In many countries of the world, centralization has taken place with only minimal nationalization.

The process of centralization and nationalization are well understood. The same cannot be said for the reverse processes, decentralization and "denationalization" (or "privatization"). The transition from collective ownership to private ownership is an extraordinarily complex and highly politically charged one. In the sphere of property arrangements, the questions of who gets what, when and how, have been settled over long, disputatious, litigious centuries. In the Soviet Union we are witnessing this process as it is being telescoped into a very brief period. Privatization is a word that now frequently appears in formal Soviet and republican government documents, but the meaning attached to it by Central Asian political leaders appears to be different from that attached by Russian politicians, let alone market economists. We need, therefore, to reflect on the root meaning of privatization.

The historical record is of course clear that land can be privatized, but the privatization of water rights is a more problematic process. Since irrigation water is a fugitive resource, the privatization of water rights assumes a legal structure which recognizes the rights of a collective decision making body to provide for the

regular functioning of the irrigation system. With the withering of centralized Moscow control, the republican ministries have stepped in to solve problems of local monitoring, distribution, and enforcement.

Central Asian Water Management

In the days of Soviet power, a highly complex physical infrastructure for water management has been developed. The physical system involves large scale irrigation facilities, structures for interbasin water transfers, and numerous hydroelectric stations. The primary goal of most of this infrastructure was to provide irrigation support for local agriculture. The agriculture of the area has been dominated by one crop, cotton.

The growth in population plus growth in agricultural production and industrial development combined to place a heavy burden on Central Asia's limited water resources. Central Asia's meager precipitation is insufficient to support agriculture or habitation in all but a few areas. Oases fed by groundwater support agriculture and habitation in only a few restricted regions. The great bulk of Central Asia's water comes in the form of runoff from the high mountain ranges in the eastern parts of Central Asia. Most of this runoff feeds the major rivers of Central Asia which flow east and north across the deserts toward the Aral Sea. The average annual flow of the combined rivers of the Aral Sea basin totals approximately 125,000 cubic kilometers (Rakhimov, 1990: 7). Until 1960, and the rapid expansion of Central Asia's arid lands irrigation networks, about 45,000 cubic kilometers of water reached the Aral Sea annually (Rakhimov: 9). By 1982, the draws for human, agricultural and industrial purposes consumed this amount of water on an annual basis. Central Asia's rivers ceased to replenish the Aral Sea. Approximately three percent of Central Asia's water consumption was used in municipal areas. Roughly ten percent was consumed in the region's industry. The remainder, eighty-seven percent, was consumed in agriculture (Micklin, 1990).

Two main rivers within the entire Aral Sea basin, the Syr Dar'ia and the Amu Dar'ia, are responsible for irrigating roughly seventy-five percent of Central Asia's agriculture (Iuldashev, 1981; Lydolph, 1979). The construction of large scale irrigation networks in these two river basins was begun in the Tsarist period. In May 1918, the Sovnarkom passed a resolution on the expansion of the irrigation system by 500,000 desiatsins (about 556,455 hectares). During the period 1924-1926, a major land reform was undertaken in Central Asia. The land reform deprived the traditional watermasters of the Central Asian oases of decision making authority, transferring it to the Soviet government. Central Asia's water management system was extended during the 1930s by the construction of major canals in the Fergana valley, including the North Fergana Canal, the Andizhan Canal, and the Namangan Canal. Completed in 1962, the Kara-Kum carries water from the upper Amu-Dar'ia at Kerki near the Soviet-Afghanistan frontier for a distance of 900 kilometers to Ashkhabad, the capital of Turkmenistan.

The Central Asian irrigation management system consumed a large proportion of central government investment in Soviet Central Asia. Yet the system has not succeeded in meeting Central Asia's water needs for a number of reasons, primarily poor irrigation design and the high water demands imposed by cotton monoculture. There are a number of reasons for this. First, many of the features of the physical and institutional framework in Central Asia were created to be administered in a colonial context. The construction of large scale irrigation systems was begun in the Tsarist period. In Central Asia as in other colonial areas, the political structures inherited from the colonial period involved jurisdictions and area administrative divisions that made sense to the metropolitan planners but ignored

basis features of the colonized area. This is by no means a problem unique to Central Asia. For instance, the European colonial planners, accustomed as they were to northern European conditions where rainfall was plentiful, typically ignored the key importance of watershed boundaries when dealing with arid areas. In some water-rich colonial circumstance this proved not to be a problem. British hydraulic design in the Volta river basin in West Africa, for instance, was quite successful. Here agriculture was mainly dependent upon ample rainfall. The five countries involved in the transnational water district that succeeded the colonial administration suffered from few water conflicts. The states felt no obligation to regulate water flows among themselves through international agreements regarding water use (Petersen 1984: 44).

In arid agricultural areas, however, where water degradation occurs between head, middle, and tail users, the appropriators at the headwaters seek to draw as much as possible and to pay as little attention as possible to the effects of water degradations through salinization, runoff, and so on. Users at the tail are forced to accept this situation. In the case of Egypt, for instance, the British hydraulic engineers divided up the Egyptian irrigation system in terms of sequential management districts along the Nile. Thus the water moving along the Nile passes from one jurisdiction to the **next**. This management structure artificially created conflict points among local districts, thereby elevating the central government in Cairo to a position of the only authority capable of resolving interdistrict disputes. In a fashion similar to the English in Egypt, the Russian hydraulic engineers in Central Asia, drawing on their own experience of water-rich Russia, paid little attention to the special requirements of arid Central Asia. These irrigation system designers devised a water management system that took control away from local water districts and vested it in the remote bureaucracy of Moscow, economic ministries (Davis, 1932).

The second reason for the failure of the irrigation management system is the cotton monoculture. In the 1950s, Moscow planners, calculating upon economies of scale supposedly inherent in regional economic specialization, greatly expanded the "cotton first" agricultural development strategy in Central Asia. Since all Soviet cotton is grown on irrigated land, the cotton expansion program dictated a parallel expansion of the irrigation system. Particularly after 1957, cotton cultivation took precedence over all other areas of agricultural development in Central Asia. Cotton specialization was routinely heralded by local and Moscow politicians during this period as the "patriotic duty" of the Central Asian population and the key to Central Asia's success in "skipping stages" in economic development.

By the mid-1980s, however, the practice of extreme specialization in cotton came to be identified as the cause of disastrous social and economic conditions in the Asian republics. Cotton monoculture came to be seen as the principal cause of soil exhaustion, the degradation of the region's water quality and, ultimately, of the death of the Aral Sea. With the rise in public concern over the Aral Sea crisis, the reversal in attitudes toward cotton monoculture, and the new possibilities for local control resulting from perestroika, a consensus has emerged within Central Asia that the existing water management system is inadequate to meet the region's water needs. This consensus maintains that a new institutional arrangement for the management of Central Asia's water resources is a necessity. However, the question as to what shape this institutional arrangement will assume remains unanswered. The institutional designs associated with previous Marxist economic practice are largely discredited now as "administrative-command" approaches. The vast expansion of the physical irrigation system during the past four decades makes a return to traditional Central Asian irrigation systems of ages past impractical. The emergence of a new, trans-republican water management board

seems the most likely alternative. Such a management board will face a natural resource management problem that, judging from the state of development of Soviet economic theory and the statements of regional Central Asian politicians', is not at all well understood.

Political Decentralization in the Soviet Union

Centralization is a dominant trend in the organization of government in the twentieth century. Centralization, it has been suggested, is both a consequence of changes in technology and changes in political attitudes. At a certain stage in industrialization, great economies of scale were associated with larger governments. Moreover, public preferences seemed to mirror this in the attitude that centralized, highly bureaucratic governments were apt to be more resistant to being captured by special interests and subverted for the purposes of private gain. The role of centralized government in abstract Marxististics is unclear, but among the countries that adopted a Marxist rationale for their government, centralization was an unquestioned concomitant of the establishment of a system of rational production and distribution. Centralized planning required centralization.

The USSR's centralized planning system may be attributed with some successes. Between 1930 and 1940 the rate of industrial production was significantly higher than between 1920 and 1930. Such indicators as rates of growth in industrial production and agricultural production in the 1950s and 1960s compared favorably with those rates in market economies. The rate of increase in indicators of social development such as literacy rates and mortality rates surpassed those of most western societies for this same period. Despite these successes, however, by the mid 1970s the long-term consequences of collectivism appeared to cancel the gains of the earlier period. A good portion of the slow-down may be attributed to worker indolence and managerial indifference. The Soviet socialist system institutionalized, on a massive scale, many of the well-known problems associated with dilemmas of collective choice. The disproportionality between sacrifice and reward encouraged a general tendency to shirk, to free-ride, and to generally act opportunistically.

Gorbachev's "perestroika" modernization program introduced in 1986 was designed to rehabilitate Soviet socialism. However, the program soon encountered formidable bureaucratic obstacles. In an effort to reenergize the program, Gorbachev announced a program of federal reform in the summer of 1988. The reform included a thoroughgoing overhaul of the USSR's parliament. It called for free elections for seats both in the central parliamentary institutions as well and the local (republican) level parliamentary institutions.

To a degree unanticipated by its architects, the reform initiated a political dynamic that brought about a reorganization of the entire Soviet system of government. Late in 1988, the Estonian republic, one of fifteen of the USSR's constituent republics, declared sovereignty over the capital and resources located upon its territory. In a tense and complex series of escalating measures and countermeasures, a "war of laws" and "parade of sovereignties" ensued. By the end of 1990, each of the constituent republics had declared sovereignty. With the collapse of the moral authority of the central government following the August 1991 "putsch," Moscow recognized the inevitable in formally accepting the principle of decentralization of power and the transition to non-Marxist principles regulating property arrangements.

Decentralization means the creation of lower level centers of authority. It entails political pluralism. It assumes that the level at which decision-making takes places—that is the degree of decentralization—is connected in a logical way

to both community from which resources are extracted and the community of beneficiaries. Simply put, the question "who decides" is related to the question "who pays" and "who benefits." In decentralized societies, the clearing levels for decision-making structures were discovered by decades if not millennia of trial and error. In the Soviet case, the urgency of the situation means that the process will happen rapidly. Once decentralization has started, the most difficult question in the process is, when does it come to an end? In other words, when is a lower level government the properly constituted one to exercise its management authority over a particular public good?

In Soviet parlance, privatization refers to the transformation of property from central control exercised by Moscow bureaucratic structures (formerly the economic ministries and associated agencies) to local control either exercised by individuals, collectives, or republican structures. The process is now referred to in the USSR as "razgosudarstvlenie" (degovernmentalization). Privatization is, therefore, the opposite of nationalization, a process that took place in the USSR some fifty years ago.

Decentralization, Privatization, and CPRs

It is a widespread assumption in advanced democratic countries that "local control" is a natural, equitable, and economically efficient principle for guiding public policy decisions; a major finding of the empirically-oriented theoretical work that has been done by scholars of common pool resources over the last decade is that optimal institutional arrangements exist which make it possible to achieve both equity and efficiency in water use (Ostrom, 1990). If decisions are made at the level at which they are implemented, they are much more likely to have popular support and to produce the anticipated results.

The drive for economic decentralization that took place in the USSR between 1987 and 1990 was predicated upon such an assumption. In addition, Moscow officials were anxious to get the burden of unpopular decisions off their shoulders. During this period, a great deal of authority for decision making was returned to local officials. However, given the particular organizational and jurisdictional features in Soviet Central Asia, the transference of control over water resources to the localities will not only be unsatisfactory, it is also likely to result in violent conflict. The solution to this is a hierarchy of institutions that interact so as to solve both free-rider problems and retain the control for decision making in the hands of the knowledgeable (Ostrom, 1990).

A basic reading of the literature on decentralization claims that decentralization and privatization are linked because the progress of the decentralization determines the rate and extent of privatization. In other words, as decentralization proceeds, the equilibrium point at which a lower level government is established will be determined by the calculus of central interests. The "top-down" process will proceed by virtue of downward momentum until it expires.

We agree that decentralization and privatization are linked, but hypothesize that the process of decentralization does not come to an end but rather encounters an obstacle that is pushed upward from the bottom.

Decentralization of Resource Control

The centralized bureaucratic control of land arrangements, water management, and agricultural policy of previous decades has come under increasing criticism from Central Asians during recent years (Gleason, 1983; Rumer, 1989). For political reasons entirely unrelated to this criticism, however, Moscow leaders have embarked

on far-reaching changes in the degree of centralized decision making. The devolution of authority from the Communist Party of the Soviet Union (CPSU) to the USSR Congress of Peoples Deputies, the republican Soviets, and the local Soviets at the Autonomous Soviet Socialist Republics (ASSR), province (oblast) and district (raion) levels, has fragmented the ministerial decision making system in the Central Asian republics. New central and local statutes have been passed on land tenure rules (Law on Land, USSR, 1990 and UzSSR, 1990). New statutes on water regulation are scheduled to appear in the spring of 1991.

With the administrative changes, the future direction of Central Asian agriculture is being hotly debated in the Asian republics. Widespread popular dissatisfaction with the extreme specialization in cotton production led "informal groups" or neformal' leaders such as Abdurakhim Pulatov to assert that "the Uzbeks are not cotton slaves" (Gleason, 1990). The redefinition of land tenure has precipitated a scramble for advantage during this period of reassignment of land tenure rights. This led to the brutal Osh riots of June 1990 that left at least 300 people dead and more than one thousand injured (Rost, 1990; Safarov et al., 1990).

In the past, the job of accommodating differing interests between the upstream-downstream users was delegated to the central economic ministries located in Moscow. However, the various levels of ministries, committees, and agencies often issued competing and conflicting orders. Many official organizations are involved in land and water policy. The UzSSR ministries involved include the ministry of agriculture, the ministry of land reclamation and water resources, the ministry of power and electrification, the ministry of rural construction, and the ministry of state farms as well as other organizations. The UzSSR Supreme Soviet has a Water Resources Commission. The CPUz had a department for Agriculture as well as a Rural Water Resources Department. The Kirgiz, Tadzhik and Turkmen republics each have parallel organizations. The lead agency was Minvodkhoz (the Ministry of Land Reclamation and Water Resources), a union-republic ministry whose offices were located in Moscow. Minvodkhoz had primary operational responsibility for determining the timetables and the amounts of water to be discharged for irrigation purposes. Criticism of the pro-development approach of Minvodkhoz led to the reorganization of the ministry and the renaming of it as the Ministry of Water Management Construction (Minvodstroï) and the designation of it as a scientific research institute in June 1990. Even during the ascendancy of Minvodkhoz, disagreements regarding the distribution of water were often settled by Gosplan (the state planning committee abolished in 1990) which was said to have the final authority to establish limits on water withdrawal (Lashchenov, 1990). Even as Minvodkhoz, along with a score of other ministries and agencies, was being downgraded in relevance, the republican level institutions were being pushed forward by the transition to republican level sovereignty. All of the Central Asian republics maintained their republican level ministries of water economy.

Limits to Decentralization of Resource Control

Declarations of Sovereignty were passed in all the republics in the summer of 1990 (Sheehy, 1990). Each of the declarations asserted sovereignty over the land, water and resources of their respective republics. All of the Central Asian republics have announced plans aimed at "privatization." But, to an extent greater than in the other republics of the USSR, the Central Asian republics have retained control over the land and resources, in particular, water. The USSR Law on Land passed in February, 1990, in Moscow delegated to the republics the right to make local land arrangements. During the same year, the Central Asian republics all passed laws on

on far-reaching changes in the degree of centralized decision making. The devolution of authority from the Communist Party of the Soviet Union (CPSU) to the USSR Congress of Peoples Deputies, the republican Soviets, and the local Soviets at the Autonomous Soviet Socialist Republics (ASSR), province (oblast) and district (raion) levels, has fragmented the ministerial decision making system in the Central Asian republics. New central and local statutes have been passed on land tenure rules (Law on Land, USSR, 1990 and UzSSR, 1990). New statutes on water regulation are scheduled to appear in the spring of 1991.

With the administrative changes, the future direction of Central Asian agriculture is being hotly debated in the Asian republics. Widespread popular dissatisfaction with the extreme specialization in cotton production led "informal groups" or neformal' leaders such as Abdurakhim Pulatov to assert that "the Uzbeks are not cotton slaves" (Gleason, 1990). The redefinition of land tenure has precipitated a scramble for advantage during this period of reassignment of land tenure rights. This led to the brutal Osh riots of June 1990 that left at least 300 people dead and more than one thousand injured (Rost, 1990; Safarov et al., 1990).

In the past, the job of accommodating differing interests between the upstream-downstream users was delegated to the central economic ministries located in Moscow. However, the various levels of ministries, committees, and agencies often issued competing and conflicting orders. Many official organizations are involved in land and water policy. The UzSSR ministries involved include the ministry of agriculture, the ministry of land reclamation and water resources, the ministry of power and electrification, the ministry of rural construction, and the ministry of state farms as well as other organizations. The UzSSR Supreme Soviet has a Water Resources Commission. The CPUz had a department for Agriculture as well as a Rural Water Resources Department. The Kirgiz, Tadzhik and Turkmen republics each have parallel organizations. The lead agency was Minvodkhoz (the Ministry of Land Reclamation and Water Resources), a union-republic ministry whose offices were located in Moscow. Minvodkhoz had primary operational responsibility for determining the timetables and the amounts of water to be discharged for irrigation purposes. Criticism of the pro-development approach of Minvodkhoz led to the reorganization of the ministry and the renaming of it as the Ministry of Water Management Construction (Minvodstroï) and the designation of it as a scientific research institute in June 1990. Even during the ascendancy of Minvodkhoz, disagreements regarding the distribution of water were often settled by Gosplan (the state planning committee abolished in 1990) which was said to have the final authority to establish limits on water withdrawal (Lashchenov, 1990). Even as Minvodkhoz, along with a score of other ministries and agencies, was being downgraded in relevance, the republican level institutions were being pushed forward by the transition to republican level sovereignty. All of the Central Asian republics maintained their republican level ministries of water economy.

Limits to Decentralization of Resource Control

Declarations of Sovereignty were passed in all the republics in the summer of 1990 (Sheehy, 1990). Each of the declarations asserted sovereignty over the land, water and resources of their respective republics. All of the Central Asian republics have announced plans aimed at "privatization." But, to an extent greater than in the other republics of the USSR, the Central Asian republics have retained control over the land and resources, in particular, water. The USSR Law on Land passed in February, 1990, in Moscow delegated to the republics the right to make local land arrangements. During the same year, the Central Asian republics all passed laws on

Agricultural irrigation water users thus compete with water users for municipal and industrial purposes. The ability of local users to form enduring institutions to allocate water among themselves is diminished when external agencies or constituencies routinely intercede to satisfy their own interests.

The interbasin transfers result in a fragmentation of interests among Central Asian republics. The large scale of the system has been attained through linking different drainage basins through interbasin transfers. Interbasin transfers change the logic of the situation since interbasin transfers—unlike irrigation draws—are rivalrous transfers. That is, water that is diverted from one basin at an upstream point proportionately diminishes the amount of water available to downstream users in that drainage basin. Interbasin transfers, therefore, involve a different politics than typical common pool resource management.

The result of the restructuring on an all-union basis of the management regime and the physical changes that have taken place in the resource system, pit the interests of one republic and one river basin against the others. Always a contentious point, the problem of the management of water distribution in Central Asia rapidly threatens to become what Ostrom calls a "hydrologic nightmare" (1990: 214).

The dilemma is simple. If all rights should devolve to lower levels, it may prove catastrophic as local upstream districts begin to view their water use without any recourse to the rights of downstream users. Partly for this reason, decentralization has been arrested from below, not from above. The transition to locally-organized management was prevented. Accordingly, the various options available to a privatizing model, such as water marketing schemes and alienable water rights, are not being explored and probably will not be considered. Furthermore, since the value of land is inseparably tied to water, privatization of land in Central Asia has also been halted. Yet the higher level authorities lack the capacity to resolve the local problems. Consequently, in the past three years virtually nothing has been done to arrest the gradual deterioration of the irrigation systems or to prevent the further exhaustion of the natural resources of the region.

Implications of Findings

Two sets of conclusions may be drawn from this analysis. The first set concerns collective action theory as applied to CPRs. The second set concerns the implications of this theory for decentralization and privatization in Soviet Central Asia as well as other parts of the USSR.

It follows from the analysis of this case that decentralization is not a process uniquely determined by "constitutional choice." The influence of the external political regimes is being moderated by local forces. This may suggest the following general hypothesis: that the dynamics of institutional design, while they may be driven by powerful external actors, often find cut-off points that are determined exclusively by conflicts of interest at the local level.

With respect to the application of collective action theory to broader processes of decentralization and the changes in property regimes that we have (following the Soviet usage) termed "privatization," a number of points can be made. First of all, both analysts and policy officials in the USSR seem to be drawing on the same theories of centralized control that have been prominent for the past forty years. For instance, a leading Soviet public policy analyst commenting on the situation in Central Asia calls for massive international campaigns to "rationally restore" the ecological balance of the Aral Sea Basin through a comprehensive program of emergency measures implemented, presumably, by an omniscient board of

policy specialists (Glazovskiy 1991). Such a program, we contend, is more likely to produce more problems than contribute to a solution.

What prospects for the solution of these water problems does the current situation suggest? First, mainly because of the existence of large-scale interbasin transfers and resource exhaustion or near-exhaustion, the redesign of public policy instruments for irrigation management to reposition control at the local district level would appear to be impractical. Similarly, vesting control at the republican level (the current status quo) is also not advisable. If the republics attempt to manage the water system without a cooperative strategy and inter-republican "equity court" it is highly likely that this will bring to the foreground potentially explosive upstream-downstream disagreements among water users, pitting republics (and perhaps ethnically-based nationalist sentiments) against one another. Unresolvable disputes in the water arena may well then influence mutual animosities in other public policy arenas such as territorial and border disputes. Due to the nature of the resource system, republican level sovereignty is not a practical level for the solution of these CPR problems. An inter-republican, regional board would seem to offer the best solution to the current problems of water management in Soviet Central Asia.

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