

Pakistan's Institutional Reform of Irrigation Management: Initial Conditions and Issues for the Reform

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In 1997, Pakistan's Provincial Assemblies passed bills to implement an institutional reform of the country's irrigation sector. The reform is necessary to cope with the new situation of increased water demand and social changes. Decentralization will take place in the reform, and new organizations will be set up to take irrigation management responsibilities. However, there are varying reactions and oppositions to the reform plan, and a consensus is not found in Pakistan except at a national policy level. Many controversial issues are still at an operational level. Such issues concern whether a farmers organization can manage both software and hardware of irrigation systems. The organization will be an agent for such collective actions of water users as organizing farmers themselves, collecting water fees, resolving water conflicts, and managing irrigation canals. These are new endeavors for farmers, who have to overcome socio-political obstacles to success. Another issue is to overcome opposition in the provincial government and among the largeholder farmers. This paper provides analyses of the controversies and makes suggestions to promote the reform.

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Introduction

A century old irrigation system in Pakistan had been problematic when people started in the early 1990s to talk about an institutional reform of the irrigation sector. The operation and maintenance (O & M) of the irrigation system has not been meeting the financial requirements. The O & M expenditures are a financial burden of the government, and the government wants to remove the problem by reforming the irrigation sector. The World Bank presented a report in 1994 to propose a reform in the irrigation sector. The Pakistani central government put a very high priority on the reform. A task force

group, consisting of policy makers and professionals, prepared the reform program.

The Pakistani Provincial Assemblies passed Provincial Irrigation and Drainage Authority Bills for Provinces of Pakistan. This legislation is to implement an institutional reform in the irrigation management, which has been practiced for more than a century with the world's largest irrigation system. The reform, however, is very controversial and it is uncertain whether its progress will be realized smoothly or not.

The author conducted a study on the reform mainly in Punjab Province. Field interviews were conducted in early 1998 to learn how the reform was initiated, where the reform is heading, and how

people concerned are looking at the reform. The Provincial Irrigation Drainage Authority was in the process of being organized in early 1998, and was not fully functioning yet in late 1998.

The reform involves important issues of decentralization, public and private partnership, farmer's participation, and resource governance. Resource governance is a common interest for many countries and societies for sustainable development. Pakistan's attempt will offer a useful example for those countries pursuing a similar goal.

This paper will first introduce how the reform was initiated with the World Bank proposal. Then, it will describe Pakistan's reform program and highlight the controversies still remaining in the country. The essential element of the reform rests on an approach of farmers' participatory irrigation management. A few suggestions will be made from this standpoint with regard to the controversies. Finally, the paper will put forth necessary conditions to promote farmers' participation.

I. Present situation of the irrigation sector

1. Pakistan's irrigation system

(1) Agriculture in Pakistan

The importance of irrigated agriculture to the Pakistan economy is explained by the fact that irrigated land supplies more than 90% of agricultural production and agriculture accounts for 26% of the GDP and employs 54% of the labor force (World Bank, 1994). Major crops are cotton, rice, and sugarcane in the rainy season and wheat in the dry season. The former crops are produced in the irrigated areas and the latter is produced in both irrigated and non-irrigated areas. In the dry season fodder crops are produced in the irrigated areas because of the high importance of livestock agriculture.

In spite of the land reforms implemented in the past, landholding is unevenly distributed among farmers. For example, the top 10% of farmers own 53% of farmland and the bottom 47% own only 9%, according to the 1980 agricultural census (AICAF, 1990). Pakistan's feudalistic rural society and agriculture is supported by such a landholding pattern of landlords and tenant farmers. This is one of the

causal social factors behind the inequitable water distribution, influenced by the rich farmers. The institutional reform of the irrigation sector became necessary due to the inequitable water supply, and the reform will have to overcome the obstacles brought about by the feudalistic rural society.

(2) The irrigation system and 'warabandi'

The irrigation system of Pakistan is the largest integrated irrigation network in the world. Its development was started in the mid 19th century by the British ruler in the Indus River Basin, covering both the Pakistan and Indian territory. The system encompasses an irrigable area of 17 million hectares in Pakistan. The original design of the irrigation system assumed fallow areas of 40% of the total irrigable area. The design capacity guaranteed only 60% of the total irrigable area with irrigation water, and therefore water shortage is inherent to the system. This became a major source of the problems in irrigation practice as explained in the next section.

Traditional irrigation water rights are defined by a "warabandi" system, where water supply is determined by rotation and an individual's water allocation is measured by the time of water intake proportional to the size of farmland irrigated. Therefore, the traditional water rights are based on a time-equitable system. Water users are called "shareholders" in Pakistan since they hold time-share for the rotation system. In this way the water rights are linked with the farmland and cannot be separated from its land holding. The *warabandi* system has been operated for 100 years by farmers, with official recognition of the government.

Farmers used to observe traditional *warabandi* by themselves without interference of the government. The government (Irrigation Department) interferes when farmers have a dispute and cannot solve it by themselves. In such a case, the farmers go to the Irrigation Department for help in deciding rules of water distribution. With the government interference, "*Kaccha Warabandi*" is a rule of trial basis, and it becomes "*Pucca (final) Warabandi*" after the trial yields satisfactory results. Traditional *Warabandi* controls about 50% of water users, and government-enforced *Warabandi* about 50%.

Farmers pay "*abiana*," a water charge for the

irrigation, to the government. The Irrigation Department makes crop assessments four times a year: two major assessments for winter and summer crops and two assessments for short-term crops like vegetables. During each crop season, assessment is made three times: at the time of first irrigation, in the middle of maturation, and at the final stage of crop maturity. The assessment results are sent to the Revenue Department, having offices in Districts and *Tahsils* (Subdivisions), for water charge collection. Finally, a headman of the village collects the water charge.

The rate of *abiana* is very low since irrigation is a government service, e.g., Rs. 100/acre. The *abiana* of 1998 was 2.5 times the 1993 rate. The rate of annual increase from 1993 was 10%, but there was an additional 25% increase 2 times. As the O & M costs have become higher, the Irrigation Department is now short of income.

The irrigation water is supplied by an outlet structure called "*mogha*." A *mogha* is an intake point from a secondary irrigation canal to a tertiary irrigation canal, called in Pakistan "a distributary" and "a watercourse," respectively.

2. Problems with the existing system

(1) Deterioration in the system

There is a built-in weakness in the system, as the system capacity initially assumed one third fallow land or 60% of cropping intensity. However, the actual cropping intensity is more than 100% as a whole and 150% in some areas. There are problems that originate from the physical aspect of the system, as found in structural deterioration. Other problems originate from the institutional aspect of the system, as found in operational problems such as inequitable water distribution. These physical and institutional problems are related and not independent of each other.

There has been a serious physical problem of waterlogging and salinity. The cause of the problem is a lack of drainage canals, as the system in the beginning was not equipped with drainage facilities. Irrigation without drainage in an arid or semi-arid climate environment leads to rising groundwater tables and salinity. One estimate indicates that about 8% of the gross irrigable area is severely salt-

affected and another 6% is moderately affected (World Bank, 1994).

Irrigation water demand has been increasing due to agricultural development and population growth, as indicated by the cropping intensity having grown to more than 100%. Cash crop production and modern agricultural technology require more water than traditional agriculture for subsistence. In order to supplement insufficient canal water, saline groundwater is mixed with surface fresh water and used for irrigation. Such irrigation water with high salt content worsens the salinity problem, caused by a lack of drainage facilities.

Groundwater use is important in the areas where canal water is insufficient, and it is a major factor underlying raising agricultural production in the past two decades. However, in some areas groundwater is over-exploited and the groundwater table is excessively lowering, causing danger of saline water intrusion into fresh water aquifers. Fresh groundwater may become unusable in such a case. These problems are caused by the insufficient design capacity of the supply system, as well as growing irrigation water demand.

(2) Water supply by community tubewells

To prevent salinization and to supply irrigation water by groundwater pumping, public tubewells were installed by the SCARP (Salinity Control and Reclamation Project) program. The program was first implemented in 1962. The SCARP Transition program is a transfer of SCARP tubewells to individuals or communities. The first Transition program started in 1992 and was completed in 1997. The program was implemented because the maintenance and operation cost of big SCARP pumps became unbearable for the government. It was also because the rates charged for canal water were not commensurate with operation cost of the pumps, while the government policy was keeping judicious equitable water distribution.

There are now, in Punjab Province, 2,100 individual tubewells and 2,300 community tubewells, transferred by the program. A community well supplies water to about 15 farmers. One outlet (*mogha*) of a distributary feeds water to about 45 farmers, which is divided into 3 groups of 15 farmers.

This establishes 3 community well groups for the farmers served by one outlet.

The groundwater is sold to members of a community tubewell at the rate of Rs. 35/hour with 1.5 ft³/second. There is no actual ban on sale and purchase of water pumped by the tubewells. But, due to high prices of pumped water, the market for non-member is very limited. There is a study on the groundwater market (Kurosaki, 1996), which indicates the groundwater was priced at a reasonable rate in terms of economics.

(3) *Inequity in water distribution*

Inequity in irrigation water distribution is the most serious problem for the farmers. Along an irrigation canal, there is generally inequity in water uses between its upstream and downstream sections. Such inequity is very keen in Pakistan. The International Irrigation Management Institute (IIMI) made a study on the practice of *warabandi*, the water distribution rule. Its observations revealed that traditional *warabandi* no longer held. The principle of equitable water distribution, underlying the design of *warabandi*, has been eroded by an increasing variability in the water flow in the canal and nonadherence to standard operational rules, both of which are in turn related to a combination of physical and institutional factors. Maintenance-related physical deterioration of the canal system and operational deviations caused by power and influence of some water users characterize this practical field situation (Bandaragoda, 1995).

There are three categories of farmers receiving canal water. The categories are: 1) farmers getting more water than their due rights, 2) farmers getting the right share of water, and 3) farmers suffering from scarcity of water. The categories 2 and 3 are non-satisfied farmers since the basic system is designed for an inadequate supply of water and even the right share is not sufficient. According to an official source, 20% of farmers fall in category 3 in Punjab Province. Out of this group, 10% are severely hit farmers, receiving negligible or no water. Some farmers at a downstream canal have not received any water for many years. On the other hand, some influential (rich) farmers obtain more water from the canals by tampering with the intake point of *mogha*,

while poor farmers are afraid of coming close to a *mogha* (JICA, 1977).

(4) *Credibility gap between the government and water users*

There are farmers who pay the *abiana* to the government even though they receive negligible or no water. This is because the government does not admit the fact of a dry watercourse, since it must supply water and cannot recognize the negligence of official duty. The farmers would not trust the government officials, when they are faced with such unfair treatment.

The Irrigation Department makes a crop assessment to charge *abiana*. If a crop fails, the assessment will be made in such a way that there will be no *abiana* collection. However, the present practice involves such an inefficient bureaucracy that a farmer has to wait 6 months if he wants to get a zero *abiana* rate after his crop fails to germinate. Thus, he does not want to wait long, rather, he would immediately choose to plant a new crop.

Moreover, there are complaints of malpractice by the Irrigation Department officers. For example, the farmers have reported such cases as bribes extracted regularly for illegally increased water intake (JICA, 1997). The farmers can not appeal to the court, since they are not the owners of the water. The Irrigation Department is the owner of the water and it can appeal any misuse of water. The Department can enforce a punishment against those officials; however, with the lack of sanctions, such corruption is now said to be widespread.

The government corruption started with the emergence of politicians, after the 1971 election. Big landlords became politicians and started to put pressures on the Department. The public officials had to submit to the pressure; otherwise, they were transferred or ousted from their positions. There exists an institution for filing a suit against illegal conduct, through the court system. However, the present system takes years to process a suit against an offense, and farmers often find another way to get around the proper process. This makes the present legal institutions meaningless.

The Irrigation Department is criticized by people, regarding its institutional capacity, for having

lost the spirit of serving the community; and for, instead, having given in to hunger and greed. A socio-political problem of the Department is that the technical people surrendered political power; that is, the Department lost technical ethics and accepted the political influences.

As a result, a serious problem between the Department and the farmers is the existence of a credibility gap. The farmers have a lot of distrust in the Department, which may be the biggest problem in the irrigation sector. On the other hand, the Department officers also have distrust in the farmers, for example, looking upon them as ignorant and incapable of participatory irrigation management. Therefore, such distrust is a mutual phenomenon between the government officers and the farmers.

Considering its social, administrative, and physical significance, the present situation of irrigation management cannot continue. That is, there could be a social disaster if the present system continues long in the future. Thus, there is the necessity of institutional reform for technical and social reasons.

(5) *Financial problems*

The irrigation fees had been sufficient until the irrigation sector started to deteriorate beginning in the 1970s. The maintenance of irrigation systems became poor due to an inadequate budget. The gap between O & M expenditures and recoveries through water fees is 44% in 1992, which is rather high and increasing (World Bank, 1994).

The irrigation fees became insufficient, as a matter of fact, partly due to introduction of SCARP tubewells in 1970s. The water charges were not commensurate with the O & M costs for tubewells, as the electric tariff kept increasing and the water charges remained rather constant.

The Pakistan government has implemented irrigation improvement projects for the past 40 years and found themselves receiving not enough benefits out of the projects. It is considered unwise to keep spending on irrigation, if the existing government organizations are not capable of taking care of the facilities after the project is completed.

With the increase of O & M costs for irrigation facilities, the Irrigation Department cannot properly maintain the canals, and the central government

wants to remove the financial problem by handing over a part of responsibilities to farmers' organizations. A primal motivation of the institutional reform, in this way, seems to remove the government financial problem; and the reform may not be motivated to provide benefits for irrigation users and improve irrigation efficiencies.

II. Institutional reform to be implemented

1. *World Bank proposal*

In 1994 the World Bank presented a proposal for irrigation management reform in the report entitled "Pakistan Irrigation and Drainage: Issues and Options" (The World Bank, 1994). Salient features of the proposal were as follows:

- to treat water as a tradable commodity rather than a public good,
- to create private water markets by giving farmers water property rights disconnected from land,
- to divide the four Provincial Irrigation Departments into 43 autonomous Public Utilities (PUs, one each for 43 canal commands) and to create Farmers Organizations (one for each distributary), and
- PUs should have company style management and be registered with the Corporate Law Authority under the Companies Act.

The World Bank proposal is based on the idea that Pakistan's irrigation problems are caused by a wrong government policy: to treat irrigation water as a public good, whereas it is a private good. According to the proposal, irrigation water is not a public good, because the irrigation water disaccord with the key defining characteristics of a public good, which are "nonsubtractability" and "nonexcludability." The two terms can be understood as follows: the former is nonrival consumption — the ability to consume as much of a good as desired with no reduction in the amount available to others, and the latter is the inability to exclude specific individuals — e.g., users who fail to pay a share of the costs — from consuming a good.

However, it seems rather simple minded to judge irrigation water is a tradable commodity, even though the explanation is correct. This is because, even if irrigation water is a tradable good, it has other social

and environmental utilities, and it is not confined to purely economic utility.

If irrigation water is treated as a private good, the irrigation users must have legal water property rights to ensure a free market in water. Water rights are said to be necessary to realize the advantages: to gain efficiency, to improve equity of distribution, to legitimize water sales, to reduce conflict, and to promote long-term investment. The Pakistan's *warabandi* is a water distribution rule that entails a sort of water rights, albeit connected with the land to be irrigated. It is rather too simplistic to say that individual water property rights (disconnected from the land) are essential to obtain these advantages. The water market issue is discussed in the following section.

2. Reactions to the World Bank proposal

(1) First reactions

The proposed reform was inaccurately reported by the media; for example, it was stated that the government was going to sell the irrigation canals to the World Bank. People did not like, above all, the idea of a utility company which would disconnect a water supply just because water charges were not paid properly. Farmers cannot sacrifice their crops on the ground as a result of such an action.

There was strong resistance to the proposed reform program by: 1) the Provincial Irrigation Department who would lose some responsibilities, 2) influential farmers who were obtaining more water than authorized, and 3) poor farmers who feared water rates would go up and influential farmers would exploit them. The Pakistani government did not accept the World Bank recommendation and started discussions for a better program.

(2) Possibility of water market

Pakistan is in a semi-arid climate and water is essential for agriculture. If water were traded and removed from the land, the land would become useless and farmers could not live there. People believe that it is not practically possible to operate a water market, where water is separated from land and treated as a commodity.

Now 77% of farmers in Pakistan are cultivating only 28% of the land, and a majority of farmers are

poor. If water trade were permitted, poor farmers who are in need of money would sell their water rights to rich farmers. A water market would benefit only rich farmers. The rich would obtain more water, and there would be more problems with equity. The poverty issue is too important to ignore in Pakistan.

Moreover, a water market would create water monopolies, and the monopoly would raise the water price when water is in short. There are various examples in Pakistan where utility prices have gone up and they gained over-profit after privatization. Most Pakistani people, if not all, are concerned that water trade will disturb rural societies, and believe that a water market concept is not acceptable for the present situation of the country.

Water trade is not feasible also from a technical viewpoint: the canal systems are designed for 60%-crop intensity, and it is not appropriate to carry more and/or less water than the design capacity, since changes in velocity and depth will upset the hydraulic regime in a canal. This irrigation system is called supply based, as it is not feasible to accommodate varying demands.

In most cases of the SCARP Transition Project, water market has not emerged in the area the private tubewells were installed. This is because farmers usually irrigated their own land only. However, such an outcome may not always be expected, considering actual practices where a water market is observed to trade groundwater (Kurosaki, 1996).

Although there is apprehension in Pakistan about a water market concept, water market may be possible if specific conditions are satisfied. First, there has to be an irrigation sub-system where a hydraulic regime can accommodate varying flow demands. Second, there has to be an institutional frame that will not allow a water monopoly, and third, a safety net should necessarily be prepared to save poor farmers from losing their livelihood.

(3) Imposition of reform by an outsider

People have a negative feeling that the reform program was imposed by the international financial organization, the World Bank. If the reform fails, Pakistan's economy will suffer due to reduced agriculture products, but the organization will not pay for

the loss caused by the failure. There is a doubt about foreign donors or consultants in the sense that they are not responsible for Pakistani matters. Moreover, the views and ideas of the international organizations are those of an outsider, looking down from the top without precise understanding at the grassroots level.

Millions of farmers should be involved in executing the reform as members of farmers' organizations, but they were not asked any opinions about the reform. The World Bank proposal did not assume farmers' representation in the Provincial irrigation organization (PIDA). The Farmers Associates Pakistan (FAP) was against the proposed reform. The FAP approached the Federal government, had many meetings to discuss the method of reform, and changed it to a more implementable program. The people of FAP, however, are big farmers and majority of them are absentee landlords, and the real farmers or landholders, having up to 12 acres of land, have never been approached and nobody knows their views about the reform program.

The World Bank proposal was a top-down approach, trying to change the whole system at once. Pakistan's irrigation system, however, is so large that it is not easy to make a big change to the whole system. Such an approach is dangerous, since, if it fails in the reform, it will upset the irrigation system and harm the whole country's agriculture. This fear made the government experiment with the reform on a pilot basis.

The institutional reform program is financed by the international organizations as part of the National Drainage Program (NDP). But the reform and NDP programs could have been separated. There are many conditionalities in the NDP, to be met during the implementation, which will be difficult. Thus, if the NDP happen to be suspended for some reason, then, its component, the institutional reform program, will also have to be suspended. The NDP was designed in such an unnatural way that there is danger that both the institutional reform component and other NDP components come to grief. Such a design of combining the institutional reform and NDP programs may be a strategy of the World Bank, making the reform a compulsory condition for financ-

ing the whole NDP.

3. Pakistan's model of the institutional reform

(1) Institutional frame of the reform

Pakistan's central government, in consultation with the Provinces, gave careful consideration to the reform model proposed by the World Bank. The concept of privatization, with introduction of water markets and individual water rights, was not accepted; but the government adopted the concept of decentralization and participatory irrigation management. To implement this concept, it is desirable to adopt a bottom-up approach, but the government adopted both a top-down and a bottom-up approach. This is because the top, as some of which may not want success in the reform, can destroy a bottom-level reform, if there is no reform in the top-level. In other words, it is necessary to create a favorable environment at the top-level to promote the reform at the bottom-level.

The viewpoints of the Provinces and professionals were accommodated in the PIDA's ordinances. The objectionable clauses were deleted from the initial concept (Ministry of Water and Power, 1998) including:

- authority's unilateral power to fix water charge,
- delinking land from water,
- disconnection of irrigation water supply to defaulters,
- company-style management, and
- dispute resolution through regulatory commissioner.

From April to July 1997, Pakistani Provincial Assemblies passed the bills of Provincial Irrigation and Drainage Authority (PIDA) for Provinces of Pakistan, i.e., Punjab, Sindh, Balochistan, and North-West Frontier Provinces. Principal features of the legislation are the same, although there are some differences among Provinces, due to the autonomy and the different situation (Provincial Assembly of the Punjab, 1997).

An agreement was made between Pakistan's government and the World Bank with regard to the institutional reform. Implementation of the institutional reform started in 1998 and will continue on a

pilot basis for 7 years. The reform is a part of the National Drainage Program (NDP). The NDP has many other investment components, such as drainage works and rehabilitation of irrigation systems. The total amount is US\$ 785 million, of which US\$ 525 million is by external funding: US\$ 285 million by the World Bank, US\$ 140 million by the Asian Development Bank, and US\$ 100 million by the Overseas Economic Cooperation Fund of Japan.

The institutional frame consists of three entities: Provincial Irrigation and Drainage Authority (PIDA), Area Water Board (AWBs), and Farmers' Organizations (FOs). The PIDA, transformed from Provincial Irrigation Department (PID), is an autonomous body having independent revenue collection and spending authority with proper accountability. Below the PIDA in each Province, a financially self-accounting Area Water Board (AWB) will be created on a trial basis around a canal command. Additionally, below the AWB, FOs will be formed, again on a pilot basis, along a distribution channel (secondary level). The AWB receives water from the PIDA and delivers it to FOs, and the FOs operate and maintain the distribution channel with the autonomy of financial self-sufficiency. The FO will consist of Water Users' Associations (WUA), where each WUA operates a watercourse (tertiary level).

An Area Water Board will cover about 1 million acres, and an FO will cover 1,000 to 10,000 acres. Each canal command has one AWB, which includes about 120 to 140 distributary systems. In Pakistan, there are 43 canal commands and 43 Area Water Boards will be established altogether. The AWB will have a function similar to a utility company. The AWB will be in charge of a particular area and composed of the representatives from such groups as Farmers' Organizations, the PIDA, the Agriculture Department, and the WAPDA. The farmers' representatives should include those of the head and tail-end farmers as well as large and smallholder farmers. One Farmers' Organization represents one distributary, and one Water Users' Association represents the farmers below a *mogha* and along a watercourse.

(2) *Direct link between water service and water charge*

A problem associated with *abiana* (water charge) collection is the functional separation of assessment and collection, made by the Irrigation Department and the Revenue Department, respectively. After crop assessment, the *abiana* is collected by the Revenue Department, and then the money is reallocated to the Irrigation Department. Because the allotted amount is not adequate, financial problems are being causal for O & M.

However, the PIDA, after the reform, will generate their own financial resources (not reallocated by the Revenue Department), and the financial resource for O & M of the system will be improved. This implies the Irrigation Department can have a motivation to move forward with the reform. Under the new system, money is collected and spent by the same organization, and therefore farmers (payers) can recognize how the money is spent for the irrigation system. Moreover, farmers will not pay the water charge if they do not receive water.

The new organizations, PIDA, AWB, and FO, need financial resources to operate the system and have to make their best efforts to distribute water to all farmers to secure their financial income. Such a direct link between irrigation service (benefit) and water charges (cost) should make water distribution more efficient and equitable among head and tail-end farmlands. If water distribution improves, then the *abiana* can be raised little by little so that O & M expenditures will be covered by the income.

(3) *Implementation of PIDA Act*

The PIDA is now the owner of irrigation facilities by the PIDA Act, but there is no legal coverage relating the Irrigation Department and the PIDA, the old and new agencies. Transformation will be made from the Irrigation Department to the PIDA. The PIDA will be made up of the Board of Directors and the Board of Management; the former was already set up, but the latter was not in March 1998. The PIDA Act explains the composition of the Board. The Minister of the Provincial Irrigation Department is the Chairman of PIDA's Board of Directors, and the Ministry's Secretary is the Managing director of PIDA's Board of Management. The farmers' repre-

sentatives will be on the Board of both the PIDA and AWB to ensure participatory irrigation management. Three members of PIDA's Board were nominated in Punjab Province by the government from among the members of the Provincial Assembly; all 3 were influential farmers. There are 6 farmer's positions in the Board and the remaining 3 positions had not been appointed yet in March 1998.

To operate the PIDA, the government's rules and regulations have to be made. Rules and regulations are necessary for the management of irrigation systems, staff posting, water allocation, etc. Some Water Users' Federations, organized by farmers, are ready for turnover of the distributary systems, but such rules and regulations have to be in place to do the business including the turnover. By these rules, the government can ensure no political influence will be imposed and any mismanagement from the past will be removed. These would involve technical and legal matters, and the government constituted a sub-committee for making the rules, composed of various agencies such as law department, agriculture department, and irrigation department. Such formation of the rules and regulation is a part of the NDP. It is also necessary to create rules and regulations to link the new organizations, i.e., PIDA, AWBs, and FOs. In Punjab, the first meeting of PIDA was held in February 1998 to discuss these issues.

Within 1 year after initiating the reform, 4 pilot AWBs will be established in 4 Provinces and operated for 7 to 10 years to see which AWB composition would work best. In addition, within 1 to 2 years, pilot Farmers' Organizations will be established on all distributaries included in the canal command of the AWBs. The pilot AWB will be evaluated, and if it is successful, the reform will be extended on a nation wide scale. It will take 6 years to complete the pilot projects, which will cover 25% of Pakistan's irrigation system. The fate of the rest (75%) will depend on the evaluation of the pilot projects. If the pilot project is successful, the reform for the rest may start sooner than the projected 6 years after the initial project.

III. Controversies still remaining in the reform

1. A fear of the unknown

The reform will bring an institutional change to the century-old world's largest irrigation system. In the Federal and Provincial governments, the top officials are supporting the reform, but most of the public officials in the Irrigation Department seem to be resisting or opposing it. This is primarily because of "a fear of the unknown," that is, the large system is going to be changed without any guarantee that the new system will be successful. It is probably correct to say most people agree with the necessity of improving the present irrigation management but are not convinced the new system will be successful.

Such a fear of the unknown may be reinforced by the size of the irrigation system. Mexico's irrigation management reform is sometimes exemplified as a model of similar reform; however, the size of Mexico's irrigation system is much smaller and considered not comparable with the Pakistan's. There is a sentiment against a removal of responsibilities from the government. Part of irrigation management (distributary system) will be transferred to the Farmers' Organizations, including a *mogha*, a key point for socio-political interface. Another new institutional set-up, Area Water Board, will also take over part of the present responsibility of the Irrigation Department.

The influential farmers, who are ruling Pakistan's rural society, also share the fear of the unknown. Those farmers receive more water than authorized and are benefited by the present irrigation management. They are not sure what will happen with the reform, and familiarity with the present system is important. It is very natural to observe varying apprehensions and resistance to the reform, when people are facing an unknown future. If they do not see the benefits, they are not convinced by the reform. They will be convinced when they see some benefits from the pilot projects.

The reform is a part of administrative efforts toward downsizing in Pakistan. Government organizations involved in the reform are the Water and

Power Development Authority (WAPDA, 12,000 employees in the water sector) at the Federal level, the Provincial Irrigation Department (similarly 30,000 employees), and Provincial Agriculture Department. Altogether, 110,000 permanent government employees are in the irrigation and water sector. Downsizing of the government agencies has been carried out, as a hiring freeze has been imposed upon the Irrigation Department and the WAPDA. During the last four years (1993 to 1997), the WAPDA employees have been reduced by one third from 18,000 to 12,000. Such a downsizing effort inevitably increases the negative reaction and momentum against progress of the reform.

Attitude toward the reform is different between the Irrigation Department and the Agriculture Department. The Irrigation Department may not want the reform to succeed, but the Agriculture Department wants it to succeed. This is because the Irrigation Department will lose some responsibilities, but the Agriculture Department will gain responsibility during the next decade or so, by the essential approach of participatory irrigation management. Building Water Users' Associations has been a responsibility of the Agriculture Department since the 1980s.

2. Fixing water charges

(1) Water charge collection

Collection of water charges is an important issue of the reform. The Revenue Department collects water charges with the assistance of village heads, who receive a reward of 5% of the total amount collected. After the reform, the government wants Farmers' Organizations to collect water charges. Farmers, however, would not comply with it if such money collection does not bring benefit to them. If farmers can control the money or can see the benefits from improved O & M, then they would collect the water charges. In case FOs do not collect water charges after the reform, the farmers want water charge assessors and collectors to be under the authority of FOs.

The FOs may have a problem in collecting water charges from influential farmers, since ordinary farmers are in a disadvantaged position as compared

with the influential farmers in a rural society. It would be necessary to figure out how to handle influential farmers who do not pay the water charges. A village head, who is nominated by the government based on the social structure of the village, would not have such a problem. There should be a mechanism to monitor and prevent defaulters. Social pressure alone will not be sufficient, and other means also will be necessary to implement FO's decisions regarding water management, including water charge collection.

There is generally an upstream and downstream conflict in any irrigation system. With the reform, the downstream farmers receiving no water will not pay the water charge, and then FOs and WUAs will suffer from shortage of income and funds for O & M or investment. If this is the case, upstream farmers will have to be more cooperative in distributing water to the downstream farmers; thus, the upstream-downstream conflict will be mitigated to some extent.

The FOs have to keep some portion of collected water charges for O & M of distributaries. Collected money should be shared by the farmers' and governments' organizations. The Kissan (Farmers) Board of Pakistan proposed the shares of the collected money to be 60% for the farmers' organization, 20% for the technical agency (PIDA), 10% for the Agriculture Department, and 10% for the relevant Departments. There has to be legal protection for such an arrangement. When most of the funds are controlled by the FOs, the farmers will be sure of the appropriate use of such funds, which will facilitate farmers' participation and water charge payment.

(2) How to fix and charge water rates

The process toward the institutional reform began in 1993; since then the government raised water rates, but there was no improvement in water distribution and no benefit for farmers resulting from the higher rates. Farmers are now afraid that the new organization of PIDA or AWB will become a utility company, and the rates will start rising further like those of other utilities.

In fact, water rates will have to be corrected to balance with O & M expenditures for the irrigation system, and the rates are expected to increase in this direction. The farmers understand they have to pay

only the O & M cost, since the investment costs were already recovered in the past 100 years of operation. The farmers will undoubtedly show resistance when the government tries to raise water rates.

The water rate has been eroded by inflation by more than 20 times since the 1950s. The fiscal adjustment would be made easily, if the farmers can be assured a regular water supply, since the cost of inferior quality groundwater is 10 to almost 30 times the present rate of canal water. This gap will help lift the rate of the water charge. However, the compatibility between groundwater and surface water should be noted. The surface water charge will not coincide with the groundwater price, since groundwater is applied when surface water is not sufficient and moisture condition is critical to crop survival. The two modes of irrigation have different functions for irrigating crops.

Although the water rate has to be increased, it will be politically difficult. The rate is now so small that a five-time increase for example is not a big amount, but its political implication could be hazardous. This is because politically oriented people will take advantage of it and exaggerate the rate increase, in order to mobilize farmers to gain political power. Therefore, the FOs will have to be careful not to mix the agricultural business with political affairs, particularly when a rate increase is proposed. When the water rate is raised, there will be some farmers who cannot afford to pay. The rate has to be kept at a level within a farmer's capacity to pay.

Another controversy with the water rate is whether it should be flat rate (uniform) charging or crop-wise charging. Water rights are given by time under the present law, and water is distributed by time and charged by crop and acreage. The *abiana* in 1998 is Rs. 175/acre for sugarcane, 95 for cotton, and 75 for wheat. Crop-wise charging is an existing system, but this charging method is misused now, through arbitrary corrupt assessment of crop maturity. Such a charging method is very unpopular among the farmers.

Reflecting the negative experiences with the present crop-wise charging, some people support flat rate charging, claiming that it will not only reduce the

administrative cost by eliminating the staff for crop assessment, but it will also give flexibility to the farmers to grow any crop on their land. It is believed that uniform or flat rate charging will stop all corruption related to the crop assessment for water rate charging. However, there are other people who insist the water rate should be crop-wise, since production income and water use volume vary significantly with the kind of crop. In fact, water is used most efficiently if irrigation is charged by water volume, not by irrigated area and crop as under the present *warabandi* system. But it is not easy to measure the water volume, and charging for water by its volume may increase corruption, since there have to be staff to measure the volume. Based on these arguments, a flat rate charging seems to be a better option to eliminate the corruption.

3. *Is farmers' participation possible?*

(1) *Do farmers want the reform?*

There are both positive and negative reactions to the farmers' participatory irrigation management. The author asked some farmers about the institutional reform: what they think of the idea of a farmer's organization to take over a water distributary. There were various responses expressed by the farmers. For example, the farmers can manage it, if the number of villages involved is not more than ten. There will be too many conflicts (even killings) and disputes, if the farmers manage a water distributary by themselves. It is very difficult for them to collect water charge from farmers, particularly from influential farmers. Electing a leader may create fights among tribes. The farmers' organization needs to have authority to control the disputes, and so forth. As introduced here, there were more negative reactions than positive ones, which might originate from "a fear of the unknown."

A landholding pattern is a factor affecting the performance of a participatory approach. Large landholders may not care much about land productivity, since they produce enough output for their own living, while tenant farmers also may not take good care of the land as it is not their own property. Moreover, tenant farmers do not want to make the landlord angry by their own activities; otherwise they

could be ousted and replaced by other tenants. These are reasons that agricultural productivity is low in Pakistan, compared with India and other countries. India has higher productivity than Pakistan, because their land holding is more equal, as a result of the past land reform. Indian farmers, moreover, are said to have better participation due to more equal landholding.

A negative fact is that beneficiary farmers were not asked whether they want the reform. The World Bank officials do not know much about local conditions and farmers. There has not been significant farmers' participation in preparation of the NDP, except the FAP and the Kissan Board. This seems to be rather self-contradictory, since NDP requires participatory irrigation management. The NGOs could be involved in disseminating the idea of reform, since farmers are suspicious of the government.

Well-informed small landholding farmers are keen to promote the reform, since they are not receiving water at all or enough water. The small landholders are voicing their anger and opinions, since people are now more aware of their rights than before.

(2) *Is rural social system an obstacle?*

There is assertion that participatory irrigation management would cause a conflict in the Pakistani rural society. Such an idea is widely believed by those opposing the reform. For example, *Biraderi* is a traditional tribal system in Pakistan, which is a kinship group or subdivision of a caste group. Such a traditional social system — for example, a one-man village system, where a influential person dominates a rural society — might lead to a conflict with the proposed farmers' organization and its leadership. The influential farmers always try to obtain more water, and equity among farmers is not important for them. The poor farmers may be afraid of participatory management, as influential farmers may exploit them.

When farmers try to organize themselves and elect their representatives in a faction-ridden society, their village society may be disturbed or divided and create a political conflict. There might be a difficulty in water distribution after the conflict. The winner's side may monopolize water, and the loser's side may

not receive water. This would cause water disputes and even drive people into violence. As voting for the election may cause such a serious problem, a unanimous agreement seems to be more ideal and necessary. Farmers could figure out a wise way to choose their leaders by avoiding the dangerous mode of election.

On the other hand, the traditional social system will not necessarily hinder a farmers' organization from functioning properly, but it can promote, in a constructive way, the farmers' organization through strengthening members' relationships in the water users' communities.

Those people opposing the reform insist that rural farmers are not mentally prepared for a new system, and that democracy in Pakistan is not mature enough to elect farmer's representatives. Such assertion emphasizes the current low level of education and illiteracy in rural Pakistan. However, the past and present experiences of participatory irrigation management provide positive evidence for the future of reform. The farmers supporting the reform insist that the criticism about rural farmers — being ignorant or uneducated and can not manage the irrigation system — are propaganda by the conservative people.

(3) *Is social pressure effective for common property management?*

Traditional rural society used to demonstrate social pressure and monitoring to observe their internal rules. It was said that in Pakistan social pressure was especially effective when people were illiterate and ignorant about politics and the strong authority of village leaders frightened them. But now people are more educated about politics (and corruption), and they can find ways to get around socially sanctioned mechanisms. As a result, effects of social pressure are now less obvious or may be gone; and there are free riders and water thieves.

The Irrigation Department is concerned that many farmers, after the reform, may not pay the water charge, especially influential farmers. There is a rule of sanction, a fine of Rs. 100, against those who do not participate in the collective work of watercourse cleaning. However, the sanction is not applied, since people usually try to avoid possible conflicts, caused by enforcing sanctions. This results in social pres-

sure being ineffective.

These are rather negative and pessimistic views of the effectiveness of social pressure. The views do not apply to all cases. Any society has some kind of social pressure, and experiences have demonstrated the effectiveness of social pressure in a participatory irrigation management pilot project. Absence of external authority helps a society create internal rules and social pressure to observe the rules. By transferring the power to control a distributary system from the Irrigation Department to a Farmers' Organization, a water users' community can create internal rules to manage the irrigation system. And, the social pressure in a rural society promotes farmers' participation. The FO should hold the authority of handling an offense and providing sanctions, and as a last resort there should be a kind of "Water Court" for quick processing.

4. Delegation of authority

There is great potential of farmers for participatory irrigation management (PIM). However, a farmers' organization may go wrong because of actions by the influential people. It is necessary to invent a mechanism that will prevent farmers' representatives from misusing their power in the PIDA, AWB, and FO, so that they will not gain political power along water distributary systems and watercourses. The representatives will have constituencies, but they should work for the whole organization.

Although the PIDA came into existence, the PIDA Board in Punjab seems not appropriate at present, since the government nominated only influential farmers to the position of representatives and neglected ordinary farmers. There is a high possibility that the PIDA can be no better than the Irrigation Department and there will be the same triangular structure between the government at the top and the poor at the bottom. If the politicians and influential people take over the organization, then success will be doubtful. Therefore, it is very important to design the organization of the PIDA/AWB and to include a mechanism to prohibit influential people from manipulating their power. In this respect, farmers' representatives in the Board are most important: who represents which class of farmers, large

landholders or small landholders.

There should be consideration for more representation by ordinary farmers, rational sharing of authorities, and justice. Farmers' representation can be made according to the criteria: first, social structure or social groups; second, size of land holding; and third, location of farmer's lands (head or tail-end of a distributary and watercourse). In order to achieve rational sharing of authority, due representation should be determined by the combinations of these criteria but not a single criterion. If voting power is distributed equally among farmers, a minority group of large landholders will be in trouble, and the role of large landholders in the national economy will be neglected. On the other hand, if voting power is distributed based on the size of land holding, then small holders will be eliminated.

The Kissan Board Pakistan is very active and trying to make sure small farmers will be represented in the PIDA. The organization does not want government nomination of the PIDA Board members, since it will lead to political manipulation. The Kissan Board and Farmers Associates Pakistan are important organization to build participatory irrigation management. It is essential to involve these organizations in designing pilot projects of the Area Water Board and Farmers' Organization.

5. Conditions for farmers' participation

Farmers' participation in managing the irrigation facilities and water is essential for the basis of reform. The key to participatory management is existence of farmers' organizations for collective action. Water users' organizations were formed in the past in Pakistan and many other countries; however, there was a tendency for them to become inactive after a few years' operation. This is because most of the organizations were created to implement some project, and after the project was completed and the incentives were eliminated, they usually disappeared. Therefore, sustainability is the most important with such organizations.

The primary factor for sustainability is to devolve power over irrigation resources on its users. The power is the authority to control users' resources of water and physical facilities. Without having the

authority to govern the resources, there would be few benefits or incentives for organizing the farmers and continuing users' activities. Such authority has to be institutionalized and protected by law (Ostrom, 1990). The benefit of users' autonomy is clearly observed in the case of Mexico's irrigation management reform (Nakashima, 1998).

There are some necessary conditions to make such power effective and enhance sustainability of the users' organization, e.g., transparent information and skills training. Provision of information about water availability is particularly important, since for cultivation farmers first need to know how much water there is, how much water they are entitled to, and when they can receive it. Without transparency and circulation of such information, decentralization of the irrigation sector will result in disintegration of irrigation management throughout the sector.

A farmers' organization is a vehicle for social empowerment. Through various activities of the organization, people can gain the power to negotiate internally or externally with others, to cope with uncertainties, to overcome poverty, etc. Therefore, a farmers' organization may be looked upon as the social foundation helping enhance the farmers' welfare.

There is no universal model for the users' participation, applicable to all countries and societies, since each society has a unique background of tradition, social structure, economic and political environment, and natural conditions. It is a common tendency to try to replicate a successful model without considering differences in a social background. Instead, a participation process must be flexible enough to adopt any local advantage.

Conclusions

The irrigation system in Pakistan was operated and maintained well for many years, and the irrigation charge collected from farmers was used to cover the necessary cost of O & M. Before deterioration in the system's O & M took place, there was increasing pressure for water, more than the irrigation system could supply (Haq, 1997). Such increasing water demands were the results of modernization and

economic development of the past decades.

The current hardware of the irrigation system cannot meet the increased demand, and the software also cannot cope with it. The software consists of institutions on both the users' side and the supplier's side. The water users' institution is a traditional water distribution rule, *warabandi*, among farmers. The rule had been working properly before the increases in water demand put pressure on the institution. The supplier's side institution is the century-old rules and regulations of the government, enforced by the Provincial Irrigation Departments.

These institutions on both sides were not able to keep their own discipline, when the farmers were faced with the needs of more water and the government officers were faced with the pressure from influential farmers demanding more water. Due to weakened discipline, the collection of the irrigation charge from the farmers declined, and the revenues fell short of the government O & M expenditure. Consequential deterioration of the hardware system, together with the eroding software institutions, has brought irregular water distribution to the canals, resulting in inequitable irrigation water available for farmers.

The World Bank made recommendations for an institutional reform to remedy the problems in the irrigation sector, and arguments were brought about in the country with objections and partial agreements by various groups. The Federal and Provincial governments and concerned groups have seemingly agreed on Pakistan's model of the reform. The reform started on a trial basis, and pilot projects were supposed to take off in 1998.

There are still varying reactions and objections to the reform in the different agencies and organizations, and, there is not a consensus yet among the organizations. Controversies regarding fixing and collecting water charges, farmers' participation in a water users' organization, and delegation of farmer's authority to the PIDA are difficult issues to find agreeable answers to all parties concerned. This paper provided clarification of these issues and made some suggestions.

In order to find agreeable solutions in the controversies, efforts for the consensus building are neces-

sary, involving the government officials of the various agencies concerned, particularly the Irrigation Department and the nation-wide farmers' organizations. Better mutual understanding between proponents of pro and con arguments will make the reform a more feasible endeavor that is more beneficial to farmers.

To cope with new situation of increased water demand and social changes, irrigation management institutions will have to evolve into those of a new age. Mexico's institutional reform has achieved financial self-sufficiency. In Pakistan, the reform has just started and it will take several years to see how the reform will proceed, and even more years to see whether the pilot model can be extended to a nation-wide scale. The key for its success would be a political will in support of the reform at the top level, and a local flexibility for betterment of people's welfare at the grassroots level.

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