The Strategies of Irrigation Management Transfer in Nepal

Dimyati Nangju[1]

ABSTRACT

SINCE THE ASIAN Development Bank (the Bank) provided the first loan for the construction of an irrigation project in 1971 in Nepal, the Bank has been pursuing the recovery of investment cost and/or operation and maintenance (O&M) cost in publicly managed irrigation schemes to ensure their sustainability. However, the traditional approach of collecting irrigation service fees or water charges from the beneficiaries by the Department of Irrigation (DOI) or other government agencies was a failure because the collection mechanisms were ineffective and there was a lack of legal sanctions or penalties for nonpayment of irrigation service fees. The Turnover and Joint Management Program (TJMP) which was launched by the government in 1990 with the technical assistance support from the Bank appears to be a promising approach for improving the cost recovery and the performance and sustainability of public irrigation schemes. The Bank is now considering a loan for the Irrigation Management Transfer Project to assist the government in the implementation of the program in specific irrigation schemes. The formulation of the project has been based on lessons learned from the past Bank-assisted irrigation projects and the United Nations Agency for International Development (USAID) financed Irrigation Management Project. This paper discusses the strategies for transferring the O&M of public irrigation schemes to farmers.

OVERVIEW OF DEVELOPMENT OF IRRIGATED AGRICULTURE

Nepal is a landlocked, rugged and mountainous country with limited exploitable resources. The total surface area of the country is about 14.7 million ha, and the population was estimated at 19 million in 1993. The country can be divided into three broad ecological zones-the mountains, the hills and the Terai. The Terai, which is a part of the Indo-Gangetic Plain, lies on the border with India. Although it accounts for only 23 percent of the total physical area, about 49 percent of the country's cultivated area of about 2.6 million ha is in the Terai, producing about 70 percent of agricultural output and containing 42 percent of the population. The Terai is generally flat and mildly sloping, usually with deep alluvial soils, which can be easily irrigated by the many rivers and streams flowing out of the Himalayas. The hills and mountains, which account for the remaining 77 percent of the total physical area, range from the low foothills bordering the Terai to the barren high reaches of the Himalayas. They are characterized by high population density relative to arable land, widespread erosion, poor soil productivity, chronic food deficits, and difficult terrain.

Nepal is one of the world's poorest countries. Poverty is both extreme and widespread. The incidence of absolute poverty is estimated at 60 percent of which 95 percent is in rural areas, dependent mainly on agriculture for their livelihood (World Bank 1991). Agriculture is the largest sector in the economy of the country and probably the only sector that has the potential to absorb the rapidly growing, largely unskilled labor force, which is estimated to be about 400,000 new entrants per year.

The country has abundant water resources for irrigation development, not only for surface (gravity) irrigation but also for groundwater development. It is estimated that about 2.17 million ha or 85 percent of the total cultivated area could be potentially irrigated, of which about 1.74 million ha are located in the Terai, 0.33 million ha in the hills and 50,000 ha in the mountains (Table 1). The need for irrigation development in Nepal is critical in order to reduce the vulnerability of crop production to the vagaries of weather, and to increase crop productivity and cropping intensity. The main crops in the country are rice and maize in the wet season, and wheat, pulses, oilseeds, and vegetables in the dry season.

Recent studies indicated that about 1,091,000 ha or 36 percent of the total cultivated area of 2.6 million ha, receive some form of irrigation, and of this, 72 percent is located in the Terai and 28 percent in the Hills and Mountains. Of the total irrigated area, 24 percent or about 267,000 ha was developed and has been managed by the Department of Irrigation (DOI), while the remainder (76 percent or 884,000 ha) is classified as farmer-managed irrigation schemes (FMIS), of which some 330,000 ha were developed through the assistance of DOI and the Agricultural Development Bank of Nepal (see Table 2).

The large irrigated area classified as FMIS reflects the heavy involvement of farmers in irrigation development in the country. The size of the FMIS schemes range from less than 50 ha to 15,000 ha, but most of the schemes fall into the category of small-scale irrigation. These schemes were constructed by farmers using simple designs and technologies, and locally available materials. Their distribution systems are rudimentary and lack permanent structures. Therefore, every year the schemes are often damaged by floods and they need to be rehabilitated before the start of

[1]Senior Agronomist, Asian Development Bank, Manila, the Philippines.

the next irrigation cycle. In addition, water losses in the system are high and the distribution systems are primitive. Their main strength is that they have well established and efficiently organized water users associations (WUAs) that are responsible for operating and maintaining the schemes.

Since early 1950s, the Department of Irrigation, the main government agency responsible for irrigation development in Nepal, has directed most of its efforts to developing, operating and maintaining publicly owned and managed large- and medium-scale irrigation schemes. To date, DOI has completed about 100 irrigation schemes covering a total area of about 267,000 ha. The main weakness of these schemes is the limited role of the beneficiaries and their WUAs in the planning, design, construction, operation and maintenance of these schemes. This weakness has contributed to the poor performance of existing public irrigation schemes.

PERFORMANCE OF PUBLIC IRRIGATION SCHEMES

Irrigation plays a major role in improving agricultural performance as it has a high potential for increasing crop yields, cropping intensity and farm income. During the past decade, irrigation in Nepal absorbed 10 to 11 percent of the government's development expenditures, and the planned allocation for the sector under the Eighth Five-Year Development Plan (1992/93-1997/98) remains much the same, at 10.5 percent. Despite this considerable investment in irrigation infrastructure, the performance of public irrigation has been far below expectations. Recent studies indicate that of the total planned command area of 267,000 ha, only about 57 percent was irrigated during the wet season and as little as 23 percent during the dry season (World Bank 1994). The under-performance of these public irrigation schemes has been attributed to the following factors: (i) lack of involvement of the farmer-beneficiaries in the O&M of the schemes, (ii) inadequate budget allocations for O&M, (iii) low collection of irrigation service fees (ISFs) on water charges and lack of legal sanctions/penalties for nonpayment of ISFs, (iv) DOI's corporate culture which is largely oriented to constructing new irrigation facilities as opposed to properly operating and maintaining the existing completed schemes, and (v) shortage of trained DOI staff to operate the irrigation schemes efficiently, and high turnover of those available. As a result most existing public irrigation schemes have deteriorated both physically and operationally. This deterioration has significantly reduced the schemes' performance and has contributed to inequalities and inefficiencies in the distribution of scarce irrigation water.

The Bank has assisted the Nepalese Government in the development of irrigation since 1971. To date, the Bank has approved 9 loans totalling US$178 million and 21 technical assistance grants totalling US$8.6 million (ADB 1994a). From the outset, the Bank has insisted that the government of Nepal should change its policy of total subsidy for irrigation development by requiring the farmer-beneficiaries to contribute toward the construction costs and to pay part or the entire O&M cost in publicly managed irrigation schemes. This would reduce the government's burden for irrigation development and ensure the sustainability of the irrigation schemes.

By 1987 it became obvious that DOI was not able to collect ISF from the farmer-beneficiaries as required by the Bank and other donors. In 1984/85, cost recovery in the public irrigation schemes averaged at NRs 9 per ha despite the minimum rate of ISF of NRs 60 in effect since 1974/75. The average collection rate of ISF declined from 60 percent in 1969/70 to 15 percent in 1984/85 (ADB 1988). The poor collection performance of ISF was attributed to poor collection mechanisms, lack of legal sanctions/penalties for nonpayment of ISF, unreliable supply of irrigation water, and lack of farmers' participation in the development of public irrigation schemes. Furthermore, the current O&M budget in most schemes is very low, about NRs 60 to NRs 100 per ha in most schemes, although the recommended level of O&M expenditure should be about NRs 300 per ha for surface schemes and NRs 1,200 for groundwater schemes. As a result, most of the public schemes are poorly operated and maintained which, in turn, reduces the farmers' incentives to pay ISF (ADB 1988).

To assist the government to improve the cost recovery of public schemes, the Bank in 1987 approved the technical assistance for implementation of cost recovery in government irrigation schemes (ADB 1987). The technical assistance (TA) was implemented in 1988 and the results of the TA were reviewed by the government and the Bank in 1989. Based on these results, the government decided to launch a Turnover and Joint Management Program (TJMP) in 1990 using a farmers' participatory approach. This program consists of two programs, i.e., the Turnover Program (TP) and the Joint Management Program (JMP). Under TP, the O&M responsibility of the small- and medium-scale public schemes will be completely turned over to the WUA, while under the JMP, the large-scale irrigation schemes will be jointly managed by DOI and WUAs. Based on these selection criteria, about 53,000 ha have been included in the TP and 212,000 ha are covered under JMP.

To enhance the efficiency of the public irrigation schemes, since 1988 the government has taken other measures, the more important of these initiatives are: (i) the introduction of a working policy on irrigation development in 1988 that emphasizes the importance of farmer participation in all stages of project implementation and O&M activities; (ii) the issuance of the Irrigation Policy of 1992 which absorbs and adds to the 1988 working policy, and which provides a policy framework for irrigation development such as uniformity in irrigation development and extension procedures,

promotion of water users' participation in all stages of irrigation development, conferring legal status of WUAs in the irrigation schemes, and organizational and management reforms in the government agencies to enable them to provide credible and effective services to farmers; and (iii) the reorganization of DOI in 1993 and the creation of a new Irrigation Management Division (IMD), which is responsible for the effective implementation of the new irrigation policy on O&M. These measures provide an adequate policy and institutional framework for undertaking TJMP.

STRATEGIES FOR IMPLEMENTING TJMP

Farmers in Nepal have played a major role in irrigation development since about 76 percent of the total irrigated area in the country was constructed and/or managed by farmers. In view of the limited resources of the government and the heavy burden of O&M budget, the most logical and effective approach in irrigation development will be for both the government agencies and farmers to work together for a common objective in increasing agricultural productivity and farm incomes. For this reason, the Bank considers the government's TJMP to be basically sound and deserving to be supported by the external funding agencies.

In December 1990, the Bank approved a technical assistance grant to prepare an Irrigation Management Transfer Project (the Project) aimed at assisting the government to implement TJMP. A team of consultants prepared the Project during 1993 by evaluating the existing public irrigation schemes, the lessons learned from the past irrigation projects, and the processes and strategies for O&M transfer which were being developed under the ongoing USAID-financed Irrigation Management Project (IMP). The results of the feasibility study have been utilized by the bank in formulating the Project (GITEC Consult GMBH 1993).2

The Project area consists of eleven subprojects located in five development regions and covers a total command area of 67,000 ha [(see Table 3)]. The subprojects have been selected on the basis of the following criteria:

i. The farmer-beneficiaries are willing to participate in the Project and to contribute toward the cost of the subprojects.

ii. The subprojects have been given high priority by DOI for implementation under the Joint Management or Turnover Programs.

iii. There are no major technical limitations in operating the subproject.

iv. Water availability at the source is not a major constraint during the dry season.

v. The investments in the subprojects are economically viable.

Due to physical and operational constraints, only about 32,000 ha or 47 percent of the total Project area are presently irrigated. In the Project area there are about 38,000 households or 210,000 persons. The average farm size ranges from 0.70 ha to 2.20 ha. Most of the beneficiaries are small farmers who live below the poverty line. All the subprojects are located in accessible areas.

The objectives of the Project will be to: (i) refine and institutionalize the processes and strategies for transferring O&M and/or ownership of public irrigation schemes to farmers, and (ii) transfer the O&M and/or ownership of eleven public irrigation schemes to farmer-beneficiaries, in accordance with their capacity to mobilize local resources. These objectives will contribute to the government's goals of improving irrigation system performance, increasing agricultural production and farm incomes, generating employment in the rural areas, and reducing poverty and the government's O&M budgetary requirements. To achieve these objectives, the scope of the Project includes the following components:

i. *Establishment of WUAs.* The Project will provide support for the creation of sustainable, effective and efficient WUAs in all the subprojects through formal training courses, farmer-to-farmer training and "hands on" assistance in leadership, administration, gender awareness, O&M, quality control, conflict resolution, water resource management, system management, and financial management. The WUAs will be formed and registered with the assistance of sociologists and farmers organizers engaged by DOI.

ii. *Rehabilitation and Improvement of Irrigation and Drainage Facilities.* The Project will support the rehabilitation and improvement of irrigation and drainage facilities covering a total area of about 67,000 ha. These facilities have deteriorated due to past inadequate maintenance by DOI or that which has been damaged by recent

[2]The Project is currently under consideration by the Bank. It is expected to be approved by the Bank in July 1994.

floods. In addition, the Project will provide support for the improvement of the 730-km long canal service roads by grading and graveling to allow traffic during the wet season. The existing local village road network will also be improved on a selective basis to enable the farmers to transport farm inputs and market their agricultural produce. The rehabilitation and improvement work to be carried out under the Project will be based on a Plan of Action which will be prepared jointly by the WUA and DOI staff.

The total cost of the Project is estimated at US$17.8 million, of which the government requested the Bank to provide a loan of US$12.9 million or 70 percent of the total Project. The remaining costs of the Project will be financed jointly by the government and the farmer-beneficiaries on a cost-sharing basis. In addition to the loan, USAID has agreed to consider a grant of US$3.0 million to finance the cost of a technical assistance which is aimed at strengthening the capacity of DOI to implement, manage, supervise, monitor and evaluate the Project. The Executing Agency for the Project will be DOI. The Project will be implemented following the procedures described in [Figure 1].

The Project is financially and economically attractive (ADB 1994). As a result of rehabilitation and improvement work under the project, it is projected that: the irrigated area will increase from 32,000 ha to 50,000 ha, the cropping intensity will increase from 167 percent to an average 197 percent, and the crop yields will increase by at least 10-20 percent. The Project is expected to benefit directly about 38,000 farm households (about 210,000 people) whose income will increase by amounts ranging from US$94 to US$318 per household per year. The Project is expected to generate substantial employment opportunities during and after the Project implementation period. During construction, the Project is expected to generate 7,000 person-years of employment of skilled and unskilled labor. Increased farm activities due to more extensive cropping will generate additional employment of about 15,000 person-years annually after Project completion. The economic internal rate of return (EIRR) of the subprojects ranges from 13 to 48 percent with an overall EIRR for the Project estimated at 22 percent. Other benefits of the Project includes the reduction of O&M budget of the government (estimated at NRs 59 million per year), and enhancement of farmers' capability to operate and maintain the irrigation systems.

The success of the Project will help the government to expand the coverage of TJMP to other existing public irrigation schemes.

LESSONS LEARNED

During the past 20 years, the Government of Nepal has received considerable financial assistance from external funding agencies in the irrigation sector. Most of these projects, however, have not been satisfactorily completed. For example, out of 9 projects financed by the Bank, four have been completed. Three of the completed projects have been classified by the Bank as unsuccessful (ADB 1993). To ensure that the proposed Project will be implemented satisfactorily, it is extremely important that the lessons learned from the past irrigation projects were taken into consideration in designing the Project. The measures taken in this regard are discussed below (ADB 1994b):

i. Before any improvement work is carried out in the public irrigation schemes, it is essential that DOI and WUAs agree in writing to their mutual responsibilities during implementation and operation of the schemes, the cost sharing formula and the type of management transfer (turnover or joint management). Under the Project, DOI and WUA will be required to develop a plan of action jointly and prepare a written agreement prior to any improvement work [(see Figure 1)].

ii. Establishment of viable WUAs in the public irrigation schemes is a long process requiring flexibility, patience and persistent effort to develop their management, technical and financial capability. Some irrigation systems will develop institutionally faster than others. Under the Project, investments in irrigation infrastructure will be made only in those schemes where WUAs are taking positive steps to improve O&M in a sustainable manner. The improvement works will be carried out in stages (corresponding to specified benchmark indicators) depending on the capacity of each WUA to organize itself and mobilize local resources.

iii. To achieve management transfer from DOI to WUAs, there is a need to create a sense of ownership in the farmers for their systems. This feeling can be created through involvement of farmers in all stages of irrigation development.

iv. The focus of Bank assistance in the past was on new construction and other "hardware" aspects of irrigation. Under the Project, the focus has been shifted to rehabilitation and improvement of the existing

irrigation schemes, and to "software," rather than "hardware" aspects of irrigation as "software" aspects are more critical for successful operation of public irrigation schemes.

v. In earlier projects, activities to develop and enhance the capacity of WUAs to operate and maintain the irrigation schemes were left as a residual activity after physical facilities were completed. Under the Project, these activities will be introduced at the beginning of Project implementation.

vi. The poor cost of recovery of O&M in the past was partly attributed to poor collection mechanisms of irrigation service fees by DOI and the lack of legal sanctions/penalties for nonpayment. Under the Project, this problem will be solved by transferring the responsibility for the collection of irrigation service fees to the WUAs since they are in a better position to collect the fees from their members and to impose penalties for nonpayment. The members of WUAs will be required to pay the irrigation service fees either in cash, kind or labor to give them some flexibility in paying the fees in case they do not have enough cash.

vii. To address the issue of inadequacy of reliable data during project preparation, the feasibility study of the Project will be complemented by the benchmark socioeconomic surveys and other surveys during the preparatory works of the Project. In addition, flow measuring network will be installed in the Project area to determine the actual availability of water in the different parts of the command area so that an effective O&M plan can be prepared.

viii. Bank's experience with Bank-financed Irrigation Sector Project (ISP) indicated that when farmer-beneficiaries are closely involved in the implementation of the Project and contribute toward the cost of the Project, the unit cost per ha will be kept at low levels since WUAs will scrutinize the scope of improvement work carefully and will insist on adoption of low-cost technologies whenever possible. The same implementation arrangements as in ISP will be adopted under the Project to ensure that the unit construction costs will not exceed the appraisal estimates.

ix. To enable the farmers to achieve the cropping intensity, crop yields and production as envisaged at appraisal, only accessible subprojects close to marketing centers have been included in the scope of the Project. The government has realized the importance of providing adequate support services to irrigated areas, and therefore; has agreed to strengthen the coordination between DOI and the agencies incharge of support services at the central and district levels. In addition, under the Project, WUAs will be trained so that they have adequate capacity to seek and obtain improved agricultural support services from the concerned agencies.

x. To minimize risks of failure resulting from inadequate institutional capacity of DOI and WUAs, the Project will be implemented in two phases. During the first phase of about three years, the Project activities will be mainly confined to three projects where preparatory works have been undertaken under IMP. In the second phase of about four years, the proven strategies and processes developed in the first phase will be expanded to the remaining eight subprojects.

PERFORMANCE RESULTS

Thus far, DOI has not transferred any of its irrigation schemes to the farmers, either partially or completely, although some attempts have been made by the government in the past. Under the proposed Project, four subprojects are expected to be completely turned over to farmers while the other seven subprojects will be jointly managed by DOI and their respective WUAs. Although the performance results of TJMP will only be known after the Project has been completed in 2002, all the possible risks of the Project have been taken into account in the design of the Project. Therefore, the government and the Bank are confident that the expected output of the Project will be achieved as envisaged at appraisal.

References

Asian Development Bank (ADB). 1987. Technical assistance for cost implementation of cost recovery in government irrigation schemes. Manila, the Philippines: ADB.

Asian Development Bank. 1988. Appraisal of the irrigation sector project in Nepal. Manila, the Philippines: ADB.

Asian Development Bank. 1993. Summarized post-evaluation results and findings for Nepal (1973-1992). Manila, the Philippines: ADB.

Asian Development Bank. 1994a. Loan, technical assistance and private sector operations approvals. Manila, the Philippines: ADB.

Asian Development Bank. 1994b. Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Kingdom of Nepal for the Irrigation Management Transfer Project. Manila, the Philippines: ADB.

GITEC Consult GMBH. 1993. Final Report for Irrigation Management Project. Kathmandu, Nepal: Department of Irrigation.

Poudel, S.N. and C.K. Sharma. 1993. Irrigation and water control. An Agriculture Perspective Plan Technical Paper. Kathmandu, Nepal: National Planning Commission.

World Bank. 1991. Nepal: Poverty and incomes, a World Bank country study. Washington DC, USA: World Bank.

World Bank. 1994. Nepal fiscal restructuring and public resource management in the nineties. Washington DC, USA: World Bank.

Table 1. Present Status of Irrigation Development (In '000 ha).

Ecological Belt	Mountains	Hills	Terai	Total
A. Physical area	5,170	5,140	3,410	13,720
B. Irrigable area	51	334	1,743[a]	2,128
C. Cultivated area	227	1,024	1,390	2,641
D. Irrigated area				
1. Farmer managed	51	238	535	824
2. DOI managed	1	15	251	267
3. Total	52	253	786	1,091

[a]Including irrigable area presently under forests.
Source: S.N. Poudel and C.K. Sharma. 1993. Irrigation and Water Control. Agriculture Perspective Plan Technical Paper.

Table 2. Breakdown of farmer-managed irrigation schemes (in ha).

	DOI assisted		ADBN assisted		Farmer-Developed	Total	
	Surface schemes	STW	Surface schemes	STW	Surface schemes	Surface schemes	STW
Mountains	9,639	--	619	--	41,071	51,329	--
Hills	42,229	--	8,870	--	198,344	249,443	--
Terai	97,160	34,962	29,126	108,898	253,107	161,248	143,860
Total	149,028	34,962	38,615	108,898	492,522	680,165	143,860

Note: STW = Shallow tubewell.
Source: S.N. Poudel and C.K. Sharma. 1993. Irrigation and water control, Agriculture Perspective Plan Technical Paper.

Table 3. List of subprojects selected for implementation.

Subproject a/	Location	Completion Date	Source of Funding	Gross Command Area (ha)	Irrigated Area (ha)		Farmers' Willingness to Participate
					Actual	Potential	
A. Phase I							
1. Kagheri	Chitwan District Central Region	1973	Government	3,900	2,100	3,500	High Formal WUA formed
2. Panchakanya	Chitwan District Central Region	1973	Government	600	400	500	High
3. West Gandak	Nawalparasi District Western Region	1978/89 b/	India/ADB	10,100	6,000	9,000	High Formal WUA formed
Subtotal				14,600	8,500	13,000	
B. Phase II							
4. Hardinath	Dhanusha District Central Region	1960	Government	2,000	900	1,200	High
5. Manusmara	Sarlahi District Eastern Region	1966/88 b/	Government/ADB	5,200	4,300	4,500	High Formal WUA formed
6. Kamala	Dhanusha/Siraha Districts Central/Eastern Regions	1960/80 c/	Government/ADB	25,000	6,500	14,000	Moderate
7. Chandra Canal	Saptari District Eastern Region	1928	Government/India	8,700	4,200	7,000	Moderate
8. Banganga	Kapilbastu District Western Region	1978/88 b/	Government/ADB	6,100	4,500	5,500	Moderate Formal WUA formed
9. Chaurjahari	Rukum District Mid-Western Region	1975	Government	600	400	600	
10. Pathraiya	Kailali District Far-Western Region	1971	Government	2,100	1,300	1,800	High
11. Mohana	Kailali/Kanchapur Districts Far-Western Region	1985	Government	3,500	1,900	2,500	High
Subtotal				53,200	24,000	37,100	
TOTAL				67,800	32,500	50,100	

a/ The subprojects are grouped into two clusters based on the phasing arrangements for the Project.
b/ Rehabilitated and improved under the Command Area Development Project (CADP) (Loan No. 560-NEP).
c/ Partially improved under the Sagarmatha Integrated Rural Development Project (SIRDP) (Loan No. 387-NEP).

Figure 1. Project implementation flow chart.