Development of Participatory Managed Irrigation Systems: Lessons Learnt from ISP

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INTRODUCTION

Historical Background

After the establishment of a public sector agency called Canal Department in 1951 with the portfolio of handling irrigation development in Nepal, construction of irrigation projects began in a planned way. Until then, all the irrigation systems, except three2 or four schemes, were operated and maintained by the users' community. Also these systems were built by the community itself based on felt-needs of irrigation for survival. As such, almost all the irrigation needs in the past were catered by these Communal Irrigation Systems (CISs) also called Farmers Managed Irrigation Schemes (FMISs). Even today, about 72% of irrigated land of the country are under the command of these CISs.

Irrigation Development during 1951-1987

By 1987, within a period of three and a half decades, quite many schemes, mostly medium and large ones, were constructed by the agency. Their operation and maintenance were also carried out by the departmental officials and staff on the prevalent mode of colonial administration. However, the users of the system were kept aloof during planning and construction phases and they were hardly involved in post construction phase too. Rehabilitation and extension projects were also undertaken to become ultimately agency managed. In the large-scale schemes, because of high cost and technical complexity, financial assistance was sought from external agencies on project by project basis.

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2 The three schemes were; Chandra canal of Saptari district, Juddha Nahar (then Rautahat) and Jagdishpur reservoir of Kapilvastu and probably the Vijaypur canal in Kaski. All these systems commanded about 6,228 ha in all.

Until 1980s, the needs of farmers' participation at different phases of irrigation development and their potential for involvement in system O&M were not clearly envisaged in the projects1 constructed by the agency. Such an unconcern gave rise to poor O&M and performance of the completed schemes. Only after 1981, under command Area Development Project(s), the Department began to realize the vital need of farmers' participation in irrigation development by incorporating the users' committee and associations to be responsible for the O&M of the systems or part of the system together with agency staff.

By 1986 the Department of Irrigation (DOI) completed about 210 schemes covering a total area of 339,000 ha. In spite of considerable investments in the infrastructure development of these schemes, the overall performance remained far below the expectations. It was found that only about 50% of the area could be irrigated during wet season and only about 20% during dry season. Besides, crop yields were also below the targeted figures. The main reasons for unsatisfactory performance were poor O&M along with the lack of farmers' involvement in the management of the schemes and inadequate agricultural extension support services.

Felt Need for Rehabilitation of CISs, FMISs

The centuries old Farmers Managed Irrigation Systems (FMISs) reportedly provide irrigation facility to about 650,000 ha. The systems developed by the support of ADBN, MPLD, and FIWUD and concurrently brought under farmers' management cover about 101,000 ha.

The FMISs for sure were claimed to have better performance compared to that of AMISs under DOI management. Besides, the old FMISs were conceived to have potentiality of increasing their performance as these systems were rudimentary, lacked permanent structures, were susceptible to damages during floods and silt problems, and had high water losses. In consequence, farmers required to contribute large amount of labor and resources annually for the O&M of these systems. Only after 1983 that the Government realized the importance of the FMISs that they had been playing in the irrigated agriculture of the country. There was also recognition of the scope for improving the systems through their rehabilitation and extension of irrigated area that was possible due to minimization of water losses and enhancement of management efficiency. Besides, the O&M requirements (labor and cash) could also be reduced to a manageable level.

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1 **Source**: MOWR working policies or Irrigation Development for Fulfillment of Basic Needs, August 1988.

Government Policy on Irrigation

The Government agencies viz. DOI and others had been operating without any appropriate and coherent policy until 1988. The discouraging performance of AMISs and need of increasing irrigated agriculture to fulfill the basic food grains need of the growing population prompted the Government to formulate new unified policies on irrigation development in 1988 to address the major issues identified. The policy stressed the inevitable need of farmers' participation in the identification, design, construction and O&M of irrigation schemes.

Participatory Irrigation Sector Program

In 1988, the Government laid more thrust in the development of small and medium scale irrigation schemes giving emphasis to more flexible funding policy. This led to a shift to project to project funding approach.

The Sector lending strategy was aimed at the following:

- To make irrigation development more cost effective through adoption of appropriate technology using local materials, local irrigation know-how and available resources;

- To implement speedily small and medium scale irritation schemes with outside support to increase productive irrigated agriculture (both, farmers and Government's);

- To enhance indigenous institutional capacity of both agency and farmers to carry out the responsibility of appropriate schemes selection, design and construction and their onwards sustainable O&M and utilization;

- To minimize recurrent costs on completed systems through increased users' participation that would share a part of capital cost and take over the full O&M responsibility.

- To implement the above sector strategy two projects were taken up with the assistance of the multilateral donors;

1. In May 1988, World Bank approved an Irrigation Line of credit Pilot Project for Western Region of Nepal.

2. In October 1988 the AsDB approved a full-fledged irrigation Sector Project for Central and Eastern Regions of Nepal, the details of which are given in the following Chapter.

THE IRRIGATION SECTOR PROJECT (ISP)

Background

AsDB made the Project called ISP effective during March 1989. The original target was to provide irrigation facilities in 25,000 ha of cultivated land through rehabilitation of existing FMISs and construction of small and medium scale new irrigation systems in 22 districts of central and Eastern regions of Nepal. The targeted districts were of Terai and mid hills as they had relatively developed road infrastructure, good support services and high potential for productive irrigated agriculture. All these schemes were to be initiated by the actual user farmers who also needed to share capital cost of construction and resume the full O&M responsibility. The schemes were to be selected through a set of technical, social, economic and institutional criteria.

Process Followed

The District Irrigation Office (DIO) was responsible for selection, preparation of irrigation sub projects and their implementation using cost effective, appropriate and sustainable technology. In order to accomplish the objective, adequate attention was provided for effective construction management and timely completion of the sub projects. DIOs were also responsible for selecting sustainable sub project that could yield higher rate of economic return. The details of selection criteria as mentioned above are set-forth in the procedural manual including demand, identification, selection, prioritization, implementation, operation, and maintenance of the sub-project.

The DOI had to make certain institutional changes and in its working pattern in order to implement the ISP that is briefly given below.

Implementation Procedure

In order to ensure demand driven approach, with active farmers' participation in all phases of sub-project implementation, operation and maintenance of irrigation system, a thirteen step implementation procedure was prescribed to be adopted by the District Irrigation Offices of the Central and Eastern Regions. This was for the first time that an elaborate set of procedures was made mandatory for irrigation development.

The implementation procedures developed had adhered continual process followed by DIOs in strengthening the participatory approach in consideration to the appropriate technical and institutional assistance needed in the preparation of feasibility study, formulation of WUA, as well as construction/supervision and O&M.

Mobile Irrigation Team (MIT)

A Mobile Irrigation Team from senior officials of RIDs was formed. The MITs as "Back stopping" measures had to undertake field visits on continual basis for the verification of designs and validation of data collected and surveys conducted.

MIT's combined effort with DIOs is found to be instrumental in eliciting farmers' interest and in mobilizing the farmer beneficiaries for participation to realize the sense of self-ownership of the sub-projects. This process ensured active participation of the farmers at different stages starting from planning to the implementation of the sub-projects.

The MITs mainly provided the required assistance regarding the appraisal and approval of the sub-projects. MITs played important role by conducting useful training to DIOs staff and WUAs. They also effectively supervised construction activities and provided necessary guidance and assistance to DIOs during field visits to DIOs and sub projects.

Water Users Association (WUAs) Involvement

DIOs and beneficiary farmers are actively involved in survey, planning and design activities of the selected sub-project development.

In order to familiarize with HMG/N administrative and financial rules and regulation, DIOs invited some WUA's representative in the tender opening of construction works wherein 85 to 90% of HMG/N budget are spent for construction of structures like diversion weir or barrage.

In context to supervision of construction activities DIOs generally invited the WUA representatives to check and supervise contractors' works to maintain construction quality. The majority of WUAs construction supervision subcommittee members received on-the-job training on simple measurement of physical works and maintenance during the implementation of construction.

Association Organizer (AO)

DIO had to make provision of one Association Organizer (AO) in each district to liaison with farmers, to assist them mobilize their resources and in the organizational matter of the WUAs. AOs acted as intermediary between DIOs and the farmers.

AOs were also involved in the collection of basic social profile of the proposed sub project, in the formation of construction sub-committee and facilitation in the formulation of constitution and bylaws of the WUAs. In addition, the AOs facilitated registration of WUAs with the District Water Resources Committee (DWRC) under Water Resources Regulation (2050 B. S.).

In each Regional Directorate, farmers' organization section had to be established to coordinate AOs of all the districts. It was headed by a sociologist with the responsibility for coordination, supervision and monitoring of AOs' tasks and farmers' organization activities.

Management Information System (MIS)

The idea of turnover of the sub-projects to the users was to prolong the useful life of the facilities developed or handed over to the users. DIOs made some improvement regarding establishment of the inventory of physical facilities and their final cost of construction after completion of sub-projects. This improvement in the establishment of inventory is to be continued for their performance evaluation and further information through MIS process.

DIO-WUA Joint Account

Joint accounts were opened and operated in the bank by WUA and DIO. Farmers deposited their share of cash towards the cost of sub-project. Usually, they needed to contribute in the range of 10 to 15 percent. This arrangement created a sense of farmers' ownership towards the sub-project. According to Irrigation Policy, the amount from the joint account had to be spent in the construction works as agreed by DIO and farmers. In order to make WUAs responsible for the operation and maintenance of the sub-project, the balance amounts from joint accounts were to be transferred to WUAs' account.

Agriculture Extension Services

For the provision of Agricultural Extension Services in the sub-project areas, the Regional Agricultural Directorate (RAD) of the Department of Agriculture (DOA) was made responsible. RAD was to mobilize District Agricultural Development Offices for this purpose. For better coordination, memorandum of understanding between the Department of Irrigation and the Department of Agriculture was signed to ensure Agriculture Extension Services in the completed sub-projects. Both the departments at central, regional and district levels were made responsible to carry out collaborative activities during all stages: project design, planning, preparation phase and post construction phase. This coordinated approach of DIO and DOA gained wider acceptance

among the farmers in order to receive support services. Special efforts were needed to ensure supplies of necessary agricultural inputs in the sub-project areas.

The efficiency and effectiveness of these two departmental coordination would depend on sequential and inter linkages of their activity towards the involvement of farmers for irrigated agriculture development.

Project Targets and Achievements

1 ISP support to existing FMISs was aimed to extend assistance that was beyond the internal capacity of the farmers' group. These included the systems that were in problem and assistance would improve their performance. The scope of work included major or minor rehabilitation of the systems. However, major maintenance works or deferred maintenance works were admitted in the name of rehabilitation schemes.

The type of FMISs based on their origins that were considered for ISP assistance were;

i. Agency built but presently under farmers' management such as, schemes built under Minor Irrigation Project (DOI & MPLD) DOA's FIWUD program, DOI district level program, etc.

ii. Schemes built under loan assistance of ADBN, other banks, or NGOs completed or remaining uncompleted due to various reasons.

iii. Real FMISs that were built by farmers themselves on their cooperative efforts.

2 ISP supports for creation of new FMIS: New small and medium scale schemes were also to be jointly constructed on the assurances that the farmers would be capable for O&M after its development.

3 Demands: From 1989, the demands for rehabilitation and construction of new schemes poured in DIOs and RIDs so much that the original 25,000 ha target had to be revised several times with districts increasing from 22 to all the 35. The AsDB Loan amount was reduced from US$ 36.30 Millions to 26.5 Millions and project period extended from 31 December 1996 to 31 March 1997. The number of sub-projects so demanded raised question on their eligibility under the set criteria of ISP whether they were genuine for assistance.

The physical achievements till 31 March 197 are given in the following table.

Region/ (Districts)	Rehab. Sub-projects		New Sub-projects		Total		Numbers of sub-projects Taken over by WUAs
	No.	Hectares	No.	ectares	No.	ectares	
Central (19)							
1.Completed	165	20,746	53	5,417	218	26,163	135
Eastern (16)							
1.Completed	112	25,625	46	5794	158	31,419	124
Total	277	46,371	99	11,211	376	57582	259

Besides the above 376 sub-projects (57,582 ha), 9 sub-projects (5,865 ha) could not be completed and had to be carried over to SISP for completion. This means, altogether 385 sub-projects with a designed capacity of 63,447 ha were taken up under ISP.

By the end of FY 1995/96, a total Rs 1,063 Millions was spent under ISP.

Performance Evaluation

Performance Evaluation study was concluded by a team of Consultants led by Mr. S. K. Upadhyay during early months of 1997. The results are based on data collected from sub-projects of 20 districts of both Terai and hills and have revealed the following.

- The DIO technicians have well understood the 13 steps of implementation procedure of sub-projects.
- The construction quality of several sub-projects is maintained due to the WUAs involvement in construction supervision and ultimate ownership of the structures.
- Water allocation and distribution are still under the command of elite and influential farmers. The tail end farmers are facing problem in getting their due share of water due to overuse by upstream farmers.
- Only about 16% of the WUAs have been able to mobilize fund for O&M.
- The cropping intensity has increased to 208% in hills and to 169% in the Terai sub-projects. Yield of main paddy rose up to 3.4 mt in Terai and 3.3 mt in hills.

- As many as 48% of the WUAs were found passive.
- The constraint in boosting agriculture pursuit is lack of extension services, input supply, price and their non-availability in time.
- Actual irrigation coverage was between 70%-90% in monsoon whereas 42%-21% during winter and spring.

LESSONS LEARNT

To deal with the large number of small scale FMISs, a new "Sector Lending" approach was started. For this, a Procedural Guideline was prepared to follow strictly while selecting appropriate sub-projects. However, the guideline was not followed in its true sense and sometimes wrongly interpreted by the DIOs.

As a result, many more sub-projects were included in ISP thereby area coverage claimed to exceed the target by 300%. In some cases, this had effects on the overall quality of the sub-projects so included in the program.

The lessons learned from ISP may be taken into consideration in the following manner.

i. Under the ISP, while construction and improvement of FMISs were a major component, the focus was shifted to minor rehabilitation of small FMISs, and even deferred maintenance was admitted.

ii. The institutional building aspect of WUAs, which was more critical for successful operation of irrigation schemes, was to be focused. But this could not be attained to the extent possible.

iii. The strengthening of WUA capacity to operate and maintain the irrigation system has to be taken care of from the beginning. For this, beneficiaries will have to work closely with DOI, share their due contributions and assume O&M responsibility of the completed schemes.

iv. The lack of agricultural support service has been highlighted as a major cause for not achieving the appropriate targeted crop productions. It is essential to think about establishment of "Irrigation Support and Training Centers" in different part of the project area.

ISSUES

The following issues are mostly related with the proper follow-up of Procedure Guidelines for the project implementation. The issues are not inherent in principle of irrigation per se, but are often dogged with carelessness.

Demand For Assistance

Sub-projects for which assistance was requested were either fully operational or partly operational or non-operational schemes. Some of the demands are for new schemes also. The command area mentioned in the demands were not accurate and also not matching the available water from the source. Majority of schemes was loaded by non-essential works and the assistance requests were to a large extent, motivated by opportunist local leaders and contractors. Most of the beneficiary farmers were unknown about the request and their share of cost to be provided. It was therefore difficult to judge whether it was motivated by real needs for system improvement or merely an opportunity sought by potential local contractor. The vital issue is to identify "Genuine Demand" for sub-projects, otherwise scarce resources would be going to unproductive schemes.

Project Preparation

Once a demand was registered in DIO, there was a great pressure for the immediate implementation of the project. Hastily prepared designs and estimates were approved which resulted in frequent changes in designs and estimates. This also limited farmers' involvement in sub-project preparation. Not all criteria as outlined in the Project implementation procedures could be complied with during sub-project selection and its preparation.

Farmers' Organizations

Standard constitution and bylaws had been adopted. In general, the purpose of registration was not well understood by all. WUAs registered their associations with the DWRC under Water Resources Regulation 2050. The farmers and the executive committee members of WUA could not familiarize themselves with the content of the standard constitution and bylaws and the obligations mentioned therein. Many of the WUAs are defunct after construction. They have not been renewed even. The PCR revealed that 48% of the WUAs were defunct.

Cost Sharing

Farmers' contribution for irrigation development requested by them was determined as given in the working policy for irrigation development and consisted of partial cash contribution, and the rest contribution being labor or its equivalent value in cash. It was experienced that farmers' cost sharing was hardly fulfilled. In some cases, it was noted that WUA had given full responsibility for construction works accommodating farmers' part also to the contractor of DOI. The obligation of cash contribution was, in several instances, financed by one or two individual farmers in view of contract work they would get. In general, the way in which farmers participated in the project was not encouraging.

Degree of Intervention

Effective and appropriate intervention in participatory irrigation management that increases the sustainability of the systems has been one of the most problematic issues. To differentiate between essential and non-essential works proved to be difficult for the majority of engineers and technicians. In general, too much emphasis was given to construction of non-essential items such as canal lining and high levels of concrete and masonry uses in structural solution. It was further noted that the effect of environmental degradation on the sustainability of farmer-managed-irrigation systems, especially in the hills, is of greater magnitude than originally assumed. Majority of the sub-projects still need further rehabilitation works because of heavy erosion at intake sites, all caused by either excessive deforestation in catchment areas, and long canal alignments and poor drainage streams or by excessive excavation in canals' alignment. Awareness among farmers about environmental problem and future consequences is still very limited.

Turning Over

In ISP, the sub-projects completed on users' demand and as per the scope of works agreed in the mutual MoA, should have been automatically taken-over once both partners have fulfilled their obligations. After joint walk-through, many sub-projects have been taken over while several are not taken over by WUAs. They demanded for additional works or major repair works to be completed by DIO.

The idea of turning over indicates as if the system was developed by DIO (Govt.) unilaterally as has been done in the past. Joint verification of works carried out by each other is a good aspect but formal handing over has no meaning for a scheme developed on their demand, cost sharing and construction works supervised jointly. ISP and SISP are providing assistance to farmers.

The increasing dependency on the part of users for repair works through DIO has appeared as a negative point. In SISP, there is no provision for handing over and taking over of the sub-projects.

Environmental Degradation

The Book of genesis tells the story most succinctly:

> *The first tree plantation was irrigated by a river, which was divided into four channels. And man so lacking then as now in the knowledge of good and evil, was appointed custodian and entrusted with the protection of god's garden. Alas, greedy man soon abused the trust, succumbing to momentary temptation and becoming more a consumer (beyond his needs) than a preserver. He, and his descendants, must then a forth and forever suffer the consequences of this folly. Man's active relationship to the environmental is illustrated therein.*
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> *- Daniel Hillel-Advances in irrigation vol-1 Academic Press 1982.*

The above paragraph illustrates how man made disasters destroyed the nature in which he is living. In the context of irrigation, since its introduction has given short term gain in production followed by long term loss as water resources depletion and pollution as well as of soil erosion and degradation. The problem is generally left for future generation, which should not be allowed.

CONCLUSIONS AND RECOMMENDATIONS

As described earlier, the Government has gone through different irrigation development modules. Lessons were learned from the past and incorporated in ISP. As a result, the participatory approach in sub-project preparation, design and implementation have been established in DOI's district and regional offices under ISP. Objective-wise, the achievements of ISP can be said satisfactory. The importance of farmers' involvement in irrigation development has been well demonstrated. The project Benefit Monitoring and Evaluation study shows that, despite limited success at increasing agricultural productivity, ISP has had a profound impact of capacity building of both DOI staff and WUAs. It has also laid foundation of participatory or joint efforts in irrigation development.

However, some of the major areas for immediate attention and improvements are as follows:

- For the successful implementation of farmers' participation in Irrigation Management, there is an urgent need to develop a more close and productive

working relationship between the executing agency staff and farmer groups both partners maintaining transparency to each other.

- Develop a suitable mechanism for selection of right type of only needy Farmer Managed Irrigation Systems that are in need of assistance.

- More attention should be given to mitigate the environmental degradation, which is possible, only by the active support of the users (men & women).

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