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REHABILITATION OF COMMUNAL IRRIGATION SCHEMES IN NEPAL

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ISSN: 0951 189X

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**REHABILITATION OF COMMUNAL IRRIGATION SCHEMES
IN NEPAL**

Nasiru'ddin Ansari

SUMMARY

Nepal is a landlocked country lying between Tibet (China) and India, and the terrain is mostly hilly and mountainous except for a narrow strip of plain area (the Terai) in the south along the Indian border. About 90% of the present population of 17.5 million depend upon agriculture. Therefore, since time immemorial farmers of Nepal have developed thousands of irrigation schemes mostly on their own initiative. These systems have been functioning in different ecological settings. Some systems in the hills are several centuries old. These are being improved to the extent possible by farmers themselves, but most of them need rehabilitation and improvements to increase their performance. Irrigation systems built and operated by farmers in the Terai are thought to be among the largest communal systems in the world. The use of these communal systems is diminishing due to environmental degradation in the catchment area.

Out of a total land area of 14.72 million ha, only 3.0 million are cultivated. Out of this, only 1.979 million ha are potentially irrigable. During the last three decades, the Government-developed irrigation basic infrastructures command 434,000 ha, whereas the age-old communal schemes command about 650,000 ha. Government agencies have been implementing schemes without farmers' participation at any stage resulting in problems in O & M, allocation and distribution of water. In

general, government operated schemes have performed at a low efficiency, whereas communal schemes perform more efficiently

Seeing the potentiality of intensifying irrigated agriculture in a short time through rehabilitation and improvements to farmer-operated systems, a Government agency, the Department of Agriculture, launched such a programme. During the last five years, several small communal systems have been renovated, rehabilitated, and even enlarged, through a participatory approach where costs have been shared 75% and 25% by the Government and the farmers' group. Such completed projects have shown increasing performance and use. Recently His Majesty's Government of Nepal has launched a programme of fulfilment of basic needs of the population by 2000 AD in which increased stress is laid on intensifying irrigated agriculture. Hence, the Government has adopted a new participatory approach and a strategy of improving the existing communal schemes to extract benefits in a short while.

1. REHABILITATION NEED OF COMMUNAL IRRIGATION SCHEMES

1.1 Need for rehabilitation and improvement

It has been mentioned above in the summary that in Nepal, traditional farmer-managed irrigation systems have existed for centuries. In the absence of a Government agency responsible for creating irrigation facilities, three types of initiatives developed in Nepal viz: a) religious trusts, b) individual or groups of farmers, and c) community as a whole. It is noteworthy that even in the wake of irrigation developments by Government agencies over the last 35 years, more than 60% of the irrigated area of the country is being served by these farmer-managed systems. Therefore, these systems play an important role in the irrigation subsector for agricultural intensification.

It has been stated that in Terai about 526,000 ha of area is under the command of surface irrigation schemes managed by 1,925 farmers' groups or communities. In the hills, about 166,000 ha are under gravity irrigation. Each such scheme serves areas between 5 and 15,000 ha. Most

schemes fall in the range of 5 to 5,000 ha and divert water from rivers by making diversions of brush wood, boulders, and soil. During the monsoon, they have to be reconstructed several times after each flood. The canal system is generally earthen with a few simple rudimentary structures. In the hills, with the help of district budgets, some retaining walls and pucca linings have been constructed. Some FMIS have permanent weirs financed by District Panchayats (elected Councils) or other Government institutions.

About 41% of the FMIS in Terai draw water from perennial sources and the rest from seasonal rivers. The perennial rivers have decreasing water up to March and so cannot irrigate for year round cropping. The seasonal rivers provide only one supplementary irrigation. Therefore, augmentation from other sources or from groundwater is essential to improve their function and performance.

The farmers' investment in time in rebuilding the diversion bunds is considerable and most farmers' committees would prefer permanent diversions as an improvement to their systems. They would need head regulators to control floods entering into the canals. Farmers usually contribute land and also kind to the maintenance of their systems. The contribution is usually based on the area of land a household irrigates from the system. In an emergency, all the available labour force is required to go to repair. The considerable labour used in maintenance is estimated to be between 30 to 75 farmer-days per hectare, depending upon the number of times the diversion bund has to be rebuilt, and on the terrain and length of the canals, etc. Assuming the value of labour is Rs 18/- per day, the average cost of O & M comes to Rs 900/- per annum per hectare. In difficult hill canals, this cost is still higher. The lack of technical skills in the original construction of these canal systems has the effect of increasing the maintenance cost. (In 1988 US \$ 1 = Rs 23.29.)

Where the main canal is shared by more than one village, then the water is bifurcated into two or more village canals by means of a Saacho (a rectangular notched log where the width of notches are proportional to the areas of the villages). Although many FMIS have strong beneficiary organisations which can ensure proper management and the required

resource mobilisation, in the country there are still several in a poor state of affairs due to ineffective organisation. Some of them are totally inoperative due to serious technical problems or a financial inability to keep them operative. With the increase of command area due to new land being brought under cultivation, and a decrease in dry season discharge due to environmental degradation, many of the schemes fail to supply sufficient water for optimum cropping intensities for the total area. In such schemes, augmentation of water has to be done from other sources or conjunctive use of groundwater will be required.

It is evident from the above situation that there is a great potential for improvement in the FMIS where rehabilitation and upgrading can greatly help in agriculture intensification and thereby contribute to the national goal of self sufficiency in food by 2000 AD.

1.2 Rehabilitation with the participatory approach

1.2.1 General

From the beginning of the 1980s, emphasis has been given in developing countries to the necessity of involving beneficiaries of irrigation development in decision making from inception to the completion of schemes. In 1978 in Nepal, a high level seminar-cum-workshop was organised on People's Participation in Rural Development. It was concluded that there was a greater need for people's participation in development works, but the question as to how people could be activated was not resolved. With the enactment of the Decentralisation Act 2039 (in 1982), the policy has been to motivate the beneficiaries to initiate their own development works. Village and district level projects have been implemented with the beneficiary groups sharing certain portions of the cost involved. Since that time, users' involvement has gained momentum.

A seminar was held in Nepal in 1983 on 'Water Management Issues' which, among other issues, revealed that farmer irrigation organisations had a tendency to turn more to the Government for resources for the improvement of their systems. As a matter of fact, they have been getting some finance for such improvements. A serious result of Government help in

the remodelling and upgrading of the FMIS was the erosion of the self-help attitude among the farmers. They wanted the Government not only to rehabilitate their existing systems but also to take up the maintenance. This tendency had developed during the last decade when Government had taken up such schemes of upgrading and remodelling as new projects, and after completion had taken O & M responsibility as well. In this approach, the people's initiative that existed before had ceased and it was assumed by the people that the Government is there to provide the services.

1.2.2 Farmer irrigation projects implementation

In Nepal, the Government has to transport food grain to the food-short hilly and mountainous areas (even by plane) when the transport cost is borne by the exchequer as a subsidy. On the other hand, a lot of small streams in those areas could be utilised for irrigating the farm lands, and the existing or abandoned farmers' schemes could also be improved to give a better performance.

Hence, in 1981 the Government decided on a policy to take up small irrigation schemes under a participatory approach in which the Government would provide 75% of the cost as a subsidy and the balance was to be borne by the beneficiaries as their equity. The schemes were implemented by the Farm Irrigation and Water Utilisation Division (FIWUD) of the Department of Agriculture (DoA). In the beginning, this programme was to be applied in a few food-short hill districts and if the result was found to be encouraging, then the programme could be spread to other districts. The anticipated benefits from this programme were as follows:

- The schemes were implemented with beneficiaries participation where only 75% of the capital cost was borne by the Government.
- Large and medium projects would take a long time and huge investments, whereas new minor schemes and rehabilitation schemes could be completed in a short time with less cost.
- The construction by beneficiary participation would mostly use local material, labour and skills.

- As the beneficiaries would expect benefits to flow as soon as possible, the works generally could be done fast in a participatory approach.
- Such projects after completion would be operated and maintained by the beneficiaries themselves, thereby there would be no O & M burden to the Government.
- Overhead cost and the administrative burden was minimised.

To implement these schemes, simple procedures, and rules and requisitions were adopted as narrated below:

- 1 The Government provided, as a subsidy, 75% of the cost estimate prepared by FIWUD technicians.
- 2 Before the actual implementation of the scheme, the beneficiaries had to deposit, in cash, 5% of the cost estimate in a bank account in the project's name.
- 3 The Agricultural Development Bank of Nepal (ADBPN) had to provide a loan to the beneficiary group up to 20% of the cost of the scheme; alternatively, the beneficiaries had to provide labour works amounting to 20% of the cost.
- 4 The total fund consisting of 75% of Government subsidy, 20% of the ADBPN loan, and 5% cash contribution by the beneficiaries was deposited in a nearby bank. The expenses for work were paid from the account, which was jointly operated by the project technician and the representative of the beneficiaries' committee.
- 5 The technical supervision and control of the work was the responsibility of the FIWUD technical personnel.
- 6 Before the start of the scheme, the beneficiaries had to make a written commitment to carry out by their share of financial and labour resources.

1.2.3 Evaluation of farm irrigation projects

Before the take up of a rehabilitation scheme, the base line data, like total area cultivated, different crops grown and yields, farm inputs and net incomes are assessed. After completion, during the O & M phase, the above data are again collected on a sample survey basis.

Some 14 rehabilitation and upgrading of farmers' irrigation schemes were implemented in the initial years starting 1981 in the districts of Ramechhap and Sindhuli. In these schemes, the Government provided Rs 2,011,000/- as subsidy, and the beneficiaries spent Rs 670,000/- as their equity. Before completion of these schemes totalling 783 ha, maize was grown in 430 ha, wheat in 62 ha, millet in 193 ha, paddy in 271 ha, and potato in 16 ha, thereby having a cropping intensity of 125%.

After receiving irrigation facilities in a proper and organised manner, most of the cropping pattern was changed. Now farmers cultivated paddy in 563 ha, wheat in 500 ha, maize in 200 ha, millet in 100 ha, and potato in 183 ha, thereby attaining a cropping intensity of 200%. The yield also increased a little bit. The main benefit was due to an increase of cropping intensity and pattern. The net income increased from Rs 2,312,000/- to Rs 6,346,000/-.

2. NEW STRATEGY FOR EXTENSIVE REHABILITATION

2.1 Background

His Majesty the King has given directives to fulfil the minimum basic need of the country by 2000 AD. Accordingly, a programme is formulated to increase the present food grain production from 4,312,000 tons to 8,651,000 tons by the end of the century. Irrigation, being the prime contributing factor, has been given priority and long term targets have been fixed.

To meet the objectives of the Basic Needs Programme, a total of 1,250,000 ha must be provided with irrigation facilities by the end of 2000 AD. By

the end of 1986/87, some 434,000 ha of land was to be provided with irrigation infrastructure by the combined efforts of Government agencies and the ADBN. Hence, during the next 13 years, an additional 816,000 ha area has to be brought under irrigation. This target needs greater efforts to achieve.

2.2 Previous policy for irrigation development

Although great importance has been given to irrigation, the achievements from new irrigation projects and rehabilitation of old schemes has not been encouraging. Out of the 434,000 ha areas developed for irrigation by Government agencies, the actual irrigation has been about 40% of the commanded land during the kharif season, and only about 20% get year round irrigation.

The Department of Irrigation (DOI), being the main Government agency responsible for irrigation development, has concentrated on the execution of permanent types of large, medium and minor irrigation schemes with a consideration to long term benefits. Other agencies like DOA, MPLD, and ADBN, have given importance to shorter term objectives and have implemented simple, less expensive projects in which farmers' participation was possible to be arranged. Also traditional farmer-managed irrigation schemes which were sick or inoperative due to technical or financial problems, were rehabilitated. Both of these policies had positive and negative aspects.

In Nepal, the different agencies involved in irrigation works here so far each followed their own policy and there was an inconsistency in cost sharing and Government subsidy. The DOI projects were taken up with the full cost and responsibility of the development, so much so that O & M has been the full responsibility of the Department. The other agencies followed a system where the beneficiaries have to share a part of the cost as well as the full responsibility of O & M. In the ADBN schemes has been fully borne by the beneficiaries as the loan has to be returned in due course of time.

2.3 New working policy

Under the new policy, all the different Government agencies involved in irrigation development have been merged into one Irrigation Department and all irrigation work will be carried out with a unified approach and the same policy. The main principles for the new policy are as follows:

- Beneficiary initiation and participation is made compulsory for project identification, selection, layout and construction. Also, a commitment for participation in the O & M phase is required.
- Irrespective of which agency is executing a project, the contribution of equity by the Government for the different types of project is fixed and ADBN will provide loans to the beneficiary groups based on a fixed proportion of beneficiaries shares of the total cost. The working procedures of this policy are narrated in the following paragraph.

2.3.1 Classification of projects scale

- i Surface Irrigation Schemes are categorised as small, medium and large depending on the size of command area the project serves. This also depends on whether they are in the hills or plains.

Table 1: Classification of Irrigation Schemes in Nepal

Class of irrigation systems	Command Area (ha)	
	Hills	Terai (plain)
Small	less than 50	less than 500
Medium	50 - 500	500 - 5,000
Large	greater than 500	greater than 5,000

lift irrigation project from rivers and sprinklet systems will also be classified as above.

- ii All type of small and large diameter shallow and deep tubewells and open dug wells are categorised as groundwater irrigation projects.
- iii It is realised that sprinklet or drip irrigation could be of great benefit for the hilly areas where water is scarce. In areas where such potentiality exists, farmers will be encouraged to use such a system and an appropriate grant will be made available.
- iv Renewal, repairs and rehabilitation works of non-Governmental or communal schemes are also categorised as in (i) above.

2.3.2 Selection of rehabilitation projects

- i Project feasibility studies will be initiated only after a genuine demand from the beneficiaries is made to the irrigation authorities. Studies will be made on the basis of design manuals being prepared for nation-wide use. Those projects having greater IRR, less expensive and with a chance of completing in a short time, as well as those projects which have a chance of receiving foreign aid, will be given higher priority.
- ii Any project which gives an IRR of more than 10% will be considered feasible. The project will be started only after the total fund for completion is ascertained beforehand.
- iii Rehabilitation, upgrading or remodelling of traditional or non-governmental projects will be identified and proceeded for execution with the joint efforts of the concerned member of District Panchayat, Member of Peasants' Organisation, beneficiaries groups, DOI and ADBN. Surveying, designs and cost estimates will be made with the close cooperation of the beneficiaries groups. Priority for approval will be given to projects which are less expensive and have a chance of greater users' participation.
- iv The farmers' group is ready to enter into a written agreement regarding the terms and conditions of assistance to be given by the Government, and the farmers' responsibility for establishment and/or maintenance of a Water Users' Group which would participate in

planning and construction, contribution to the capital costs and resumption of full responsibility to O & M of the scheme after completion. This agreement will be a pre-requisite for proceeding the project for Government involvement.

- v On the technical feasibility of the scheme, the suitability of soil for irrigation and problem of soil erosion and land slides will be given due consideration.
- vi The cost per hectare of rehabilitation should not be more than Rs 30,000 (\$1,300) in hills and Rs 20,000 (\$800) for the Terai schemes.¹

2.3.3 Criteria for prioritisation

At present, in the sectoral lending programme, the following priority in selection is going to be adopted.

- i The scheme should have a high economic rate of return.
- ii The per hectare cost should be low but within the limit given above.
- iii A beneficiary's organisation already exists in the project area or, if not operational at present, there is a good chance for its revival without delay.

2.3.4 Basis of cost sharing

In determining the farmers' share of the capital cost of the scheme, due consideration has to be given such that:

- i The sense of ownership among farmers is enhanced. Also the government contribution should not be high enough to undermine the

¹ Note by Mary Tiffen. Fixing an upper limit for rehabilitation costs in this manner is a very important principle. It will help to focus the attention of both designers and farmers on what are the essential priorities for rehabilitation, and to differentiate those from desirable extras.

- farmers' participation for the development or upgrading of the scheme.
- ii The proportion of the farmers' share will remain flexible in order to permit revision after a trial period. The estimate of repayment capability of farmers is subject to actual experience in the field.
 - iii Farmers' contribution should mainly be in the form of labour, but a small proportion of it must be in cash in order to prove the farmers' commitment. In the rehabilitation of the scheme, certain farmers may make their contribution entirely by cash or from loan.
 - iv The beneficiaries' group have to provide land free of cost for tertiary and field channels to improve the water distribution.
 - v Farmers' share of the cost of the schemes should be based on their capability to pay and the per hectare cost.

On the basis of location of the schemes, the unit cost of rehabilitation and the past experience of FIWUD and MPLD where beneficiaries were required to contribute 15 to 25 per cent of the total cost of the scheme, the following formula is to be applied for the Government's and farmers' contribution to capital costs.

Table 2: Proportion of Government and Farmers' Shares towards the Capital Cost of Rehabilitation

Rehabilitation Cost (Rs/ha)	Government contribution (% of total cost)	Farmers' Contribution (% of total cost)	
		Cash/loan	Labcur
1 Less than 10,000	75	5	20
2 10,000 - 20,000	85	2.5	12.5
3 20,000 - 40,000	91	1.75	7.25

2.3.5 Organisational arrangement for irrigation development

- i In order to formulate a national policy and programme for irrigation development in a coordinated way, a high level committee has been set up under the Chairmanship of the Water Minister, where heads of other allied ministries will be members. This committee will fix priorities, fix the targets, decide the working procedure, and provide coordination between working units.
- ii The Department of Irrigation and the ADBN will be the main working units for irrigation development. To have closer coordination at each stage between these two units and the Department of Agriculture and to assist in each others' technical efforts, and to have a complete record of irrigation facilities in the country, a central coordination committee will be established.
- iii The organisation of the DOI and the ADBN, from the centre to the districts, will work as per newly created organisational setups. The work would be implemented in a coordinated manner at all levels, including field units.

3. CONCLUSION

In Nepal, farmer-managed irrigation systems are claimed to give a better performance than the Government sector irrigation schemes. In Government schemes, farmer initiative and involvement during construction and O & M has not been considered, resulting in difficulty in water management and finally resulting in poor performance. In Nepal even now, about two thirds of the irrigated area is under traditional, communal, irrigation systems. All of them are not functioning well, and many need upgrading and rehabilitation whereby their utility can be greatly enhanced. In irrigation sector strategy, the rehabilitation of farmers' systems is given priority due to the fact that intensification of irrigation is possible in a shorter period and in a cost effective manner. All such work will be done on a demand basis and under a participatory approach, with the full involvement of actual beneficiaries.