



WATER, ENVIRONMENT AND MANAGEMENT

Community irrigation opportunities and challenges

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INTRODUCTION

Andhi Khola Project includes the construction of a 5.1 megawatt hydroelectric power plant in central Nepal. This run-of-the-river system will also make 0.8 cumecs of water available for irrigation of farmland near the plant. The project is a collaborative activity of His Majesty's Government of Nepal, the United Mission to Nepal (UMN), an international NGO, and Butwal Power Company (Private) Limited (BPC), a company involved in small hydropower development. These organizations have as an objective to be of service to the poorest and most marginalized people of Nepal.

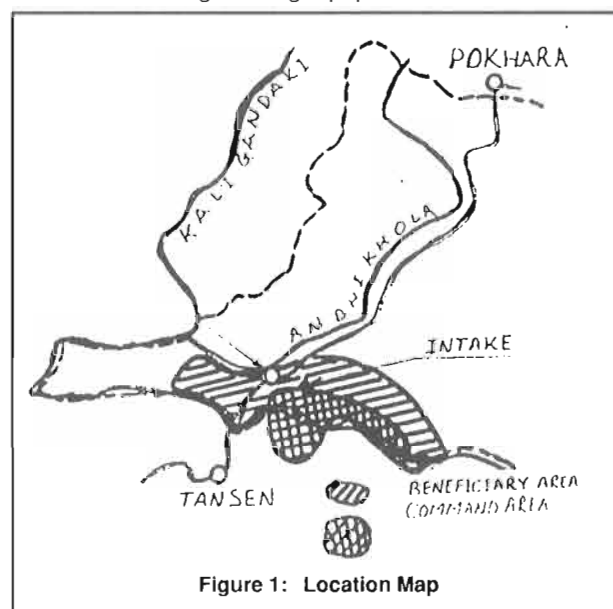
To achieve this objective through an irrigation scheme, which normally would benefit only landowners, the Project has created an innovative system by which local residents manage a shareholding and land redistribution plan that allows non-landowners to benefit from the application of irrigation. Any community member may join the farmer-managed Andhi Khola Water Users' Association (AKWUA) and contribute labour to canal construction. Five days' labour entitles one to a share in the total amount of the irrigation water. Those who own land below the canal use their water share on their own land, but if they do not have enough water of their own, they must buy or rent water from non-landowning shareholders. In this way, the increased wealth generated through irrigation is distributed widely throughout the community.

The Project also includes a small land-redistribution measure. Local farmers have determined that in this area, about one-quarter of a hectare is needed to feed a family of seven. Families who have more land than they need by this guideline must sell 10% of their excess land to the Association to be eligible to join. This land is then sold at no profit to poor or landless AKWUA members, allowing them a chance to own a small plot of irrigated land.

SELECTED PROJECT OBJECTIVES

- Increase agricultural production on a sustainable basis.
- Share the benefits from the irrigation system investment among the target population.
- Provide marginal farmers with land for subsistence farming so that no farm owner has less than 0.04 ha per family member.

This paper will discuss primarily the strategies for achieving objective 2: "Share the benefits from the irrigation system investment among the target population."



Construction Technical Features:

Section:	East	West	Aserdi
length (km):	5.1	1.5	2.2
capacity (cumecs):	0.6	0.1	0.1
area (ha):	180	17	85
oftakes:	8	2	1
inverted siphon crossings:	6	1	1

Figure 2

Technical

Work on the 5.1 MW Andhi Khola Power Station utilizing water from the Andhi River began in 1982. The project takes water from the river at a 5 m high dam on the Andhi. It then flows along the 1.3 km headrace tunnel out into the Kali Gandaki Valley south of Galyang. The minimum

economic size of the tunnel will accommodate flow in excess of that required for peak power generation so it was planned to use the excess water for irrigation by gravity in areas below this level. Water for the AHREP Headrace Gravity Irrigation Scheme (HGIS) is taken from the surge tank at the outlet of the headrace tunnel at an elevation of 628 m, from which 8.8 km of canal and pipeline will irrigate 282 ha of land down to an elevation of 380 m above sea level (Spare & Francis 1987 p 2). Estimated total cost of the system is US\$ 782,000 of which about 15% will be contributed in labour and cash by the beneficiaries.

AGRICULTURE

The command area includes land with slopes up to 30 degrees. The soil is a silty loam with significant portions of gravel in the steeper areas. The present cropping pattern is rice-wheat-maize on levelled irrigated fields and maize-millet-wheat on unlevelled irrigated fields. Alternative crops include mustard (oilseed), potato, and other vegetables and legumes. Expected increases in returns due to irrigation for various crops ranges from 21% to 48% (Spare & Francis 1987 p 5-15).

SHAREHOLDING SYSTEMS

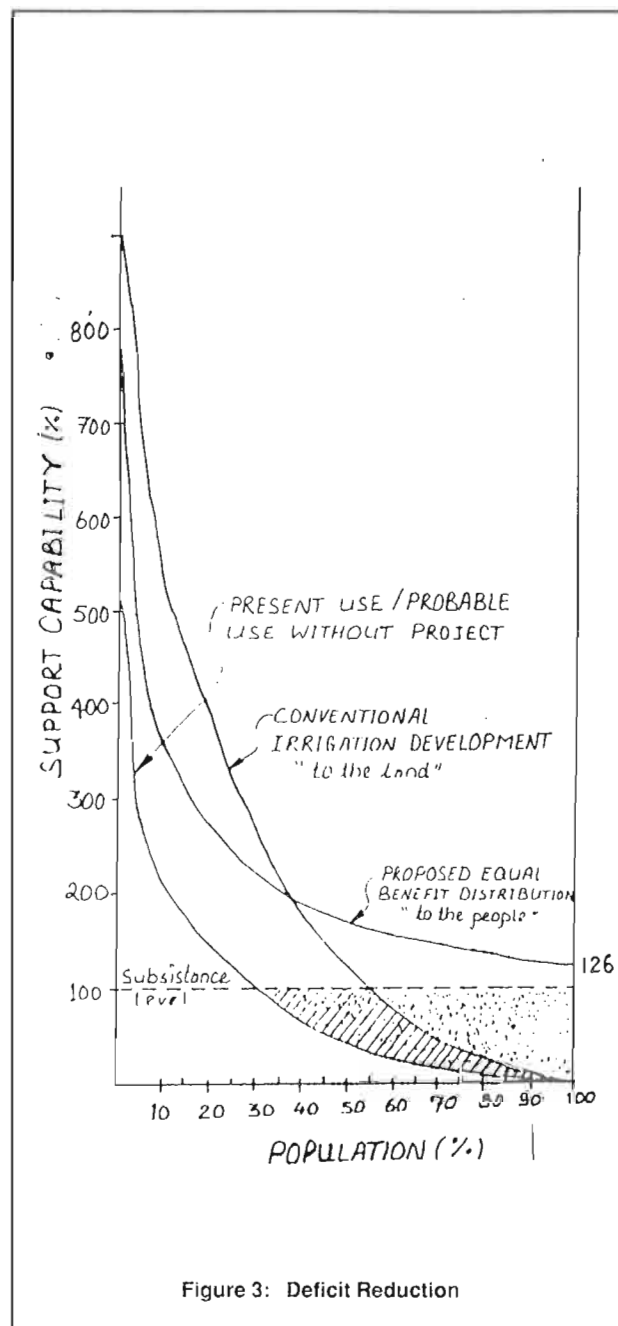
In its early phases, the project was influenced by information gained about other farmer-managed irrigation systems in Nepal, especially those researched by Yoder (1986) and Martin (1986). These included a system built by farmers in the village of Chherlung where water shares were allocated to members on the basis of initial investment in the system, or later purchase, but not, as in the other cases, on the basis of land ownership (Yoder 1986 p 215). In the case of Andhi Khola Project, however, the system has been initiated, not by farmers, but by outside development workers and the Project itself has set the additional goal of reducing the food deficit in an equitable way so that even the poorest may benefit. This concern is explained in the following section and diagram from the preliminary feasibility study (Thiessen 1983 pp 14-15):

FOOD DEFICIT REDUCTION

The support requirement for a certain population is the amount needed to maintain subsistence (the area under the subsistence level on Figure 3). The deficit of the population living below the subsistence level is the amount required for them to reach subsistence (the area under the subsistence level and above the support capability curve). The amount that this deficit is reduced as a percentage of the support requirement is the deficit reduction.

The support capability curve represents the ability of the people to support themselves with their own landholdings. The graph shows that presently some have more than five times as much as they require, while the majority (above 30%) have less than they require.

Figure 3 illustrates the difference between two methods of water allocation. Inspection of this figure shows that, with allocation "to the land", the deficit reduction would be only 19%, allowing the population above the subsistence level to rise from 30% to 55% while, with allocation "to the people" the total population could achieve more than required to subsist, in other words, an entire reduction of the existing 45% deficit. If benefits are equally distributed, the very poorest would rise to 126% subsistence.



It should be noted that no precedent is known which has achieved the level of benefit distribution being proposed here and, in that light, the projections stated may be optimistic. Nevertheless they are considered worth pursuing.

ACHIEVEMENTS TO DATE

Construction of the irrigation system is 25% complete at this time with 26 ha under irrigation. Up to 12 April 1992, 113,895.5 mandays of labour have been contributed by local residents to earn water shares. 21,551.79 shares have been earned by labour and 1,227.31 have been purchased in cash. 141 individuals without land in the command area have earned a total of 1,246.1 shares. Water has been distributed on the present 26 hectares for just over one year (four seasons) but it is felt that this is not sufficient, either in time or in area for a rigorous evaluation of the shareholding system. One result that is already visible is that farmers seem to have a much clearer idea of the value of water than they had before because water can only be distributed in limited amounts as shares are earned.

CONCLUSION

It is considered normal in development projects for the rich to get richer and the poor to get poorer. Andhi Khola Project has set itself the task of trying to change this trend so that at least everyone can benefit equally. Whether this is possible or over-optimistic remains to be seen. Certainly it is more difficult, complicated and expensive to develop irrigation resources in this way. If the project proves to be successful, we believe that the possibility of genuinely aiding the poor is worth the added trouble and expense. Will anyone else follow our lead along this rocky path?

REFERENCES

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SPARE, Daniel and FRANCIS, Michael 1987 "AHREP Headrace Gravity Irrigation Scheme Feasibility Study". BPC Hydroconsult, Kathmandu.

THIESSEN, Ernest "Preliminary Feasibility Report AHREP Headrace Irrigation" 1983. UMN Andhi Khola Project.

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QUESTIONS FOR DISCUSSION

1. S Command area landowners feel that as the "benefits" of irrigation are to come off of their land, those benefits should not be "equitably" distributed. Is it fair to require landowners to help their poorer neighbours?
2. How can we determine what is an appropriate expenditure for a system of this nature? Surely US\$ 650,000 cash is too much to irrigate only 282 ha.?
3. Is this project replicable?