

INNOVATIVE PROGRAMMES INTRODUCED BY ADB/N IN THE HILLS

Lack of a proportionate share for the hills of the total institutional credit raises the question of social justice. However, it goes even beyond this and also implies that the hills, in general, lack sufficient opportunities for initiating additional income generating activities. This, in turn, raises the question of whether the hills, under the circumstances, are a sustainable proposition. More specifically we can ask, "will the resource base of the hills sustain the burden of the current population and its inevitable growth in the coming years?" And even if it can sustain this, can we expect a substantial improvement in the quality of life in the foreseeable future?

These are difficult questions to answer and involve a lot of 'if' and 'buts'. One such 'ifs' pertains to the possibility of introducing changes in technology in a number of areas. These technological changes encompass a large number of fields including agricultural, engineering, and organization and management science. In this section, we shall first try to explore the areas where ADB/N is seeking such changes.

Irrigation Development

The foregoing analysis showed that the hills produced less food compared to its share of population. As a result, 37 districts in the hills in the FY 1986/87 were found to be deficit in food¹¹. This deficit is partly met by the provision of subsidised food through Nepal Food Corporation, but most of it is not met at all. This situation will worsen if impressive gains are not achieved on the production front. The Government's capability to provide subsidised food in the hills is severely limited due to the prohibitively high transportation costs. Secondly, without improvements in food production the purchasing capacity of the hills' population will deteriorate further and their effective demands will be unfavourably affected.

Lack of proper irrigation facilities has been a principal limiting factor in the adoption of improved farming practices in the hills. This factor again can be traced to a number of other factors. Although Nepal boasts of large and perennial river systems, they can be harnessed only in narrow river valleys, and the hill slopes are mostly dry in the non-monsoon seasons. Secondly, most of the irrigation schemes are bound to be on a small-scale and thus, are not suitable for applying the lengthy and manpower-intensive procedures of public sector irrigation development programmes.

ADB/N has been testing and multiplying a number of schemes designed to overcome these shortcomings. In hardware technology, it has been pilot-testing lift-irrigation systems that are suitable for areas in river valleys that cannot be irrigated through the gravity-flow system. Known as *tars* in Nepal, they are located 10 to 50 meters above the river basins and so require a substantial lift. The current approach is to generate power locally through water turbines and use it for lifting the water. The initial results are encouraging and this technology will eventually be applied in suitable areas.

As stated, water availability is limited on the hill ridges and slopes. To tackle this problem the Bank pilot-tested a 'sprinkler' irrigation technology during the FY 1987/88, and found it to be effective. As a result, large-scale application of this technology has been initiated.

11. HMG, DFAMS, *Nepal Adhirajya Ko Upbhogya Khadyanna Bibaran* (Edible Food Supply in Nepal, 1986/87), Kathmandu, 1987.

The most innovative of the changes that the ADB/N has tested successfully is in the field of organizational technology. ADB/N, under the Small Farmers' Development Programme, organised the would-be beneficiaries into groups which in turn formed, among themselves, a construction committee. This committee takes charge of the construction activities of the project together with the advisory engineering service made available by ADB/N. Once the construction activity is completed, the committee is converted into a water user's group which is responsible for repairs and maintenance. At this stage, ADB/N, on a selective basis, provides technical services for launching agro-forestry and crop development programmes.

Under this methodology, over 31,000 ha of land has been brought under irrigation in the last five years. Out of a total of 31 schemes, 16 were in the hills and 15 in the *Terai*. However, because the hills have much lower coverage per scheme, over 80 per cent of the irrigated area is in the *Terai*. Even more projects are under construction now - eight of which are in the hills (Table 18). A gradual increase in the share of the hills, in total area irrigated, is the future policy goal of the ADB/N.

Development of Alternative Energy Sources

Environmental degradation has been a continuing feature in Nepal over the last two decades. It is more acute in the hills, although a systematic adverse effect in the *Terai* is inevitable in the long run. The immediate cause of environmental degradation is the need for bringing more land under cultivation to feed the growing population. But, perhaps more importantly, it can be traced to the need for energy for household consumption. In Nepal, about 76 per cent of the total energy consumed is in the form of fuelwood¹², and this puts tremendous pressure on forest resources. In areas where forest resources have depleted substantially, dung, an important source of organic manure in Nepal, is dried and used as fuel. This in turn has affected food production and the sustainability of the agricultural system.

The basic strategy of the ADB/N is to propagate the use of biogas plants and water turbines in suitable areas. Technically, biogas is found to be popular in the *Terai*, low-lying hill valleys, and the lower slopes or river basins in the hills. By the end of 1987/88 over 3,000 biogas plants had been installed throughout the Kingdom. Over three-fourths of the plants had been installed in the hills and a little over 20 per cent of them in the hills outside the Kathmandu Valley. The Eastern *Terai* had the largest share (25%) followed by the Central *Terai* (24%).

The use of water turbines has been propagated more as a device for generating mechanical power to run food processing equipment such as hullers, mills, or expellers. Most of them are in the range of 10 to 25 kw and a significant proportion of them generate electricity for local consumption. By the FY 1987/88 521, a number of water turbines had been installed; four per cent of these are in the hills. The Western Hills top the list with a 38 per cent share and the Central Hills follow with a 22 per cent share (Table 19). These turbines are the only source of energy of a commercial quality which does not depend upon imported carbon fuels.

12. HMG, Water and Energy Commission Secretariat, Energy Sector Synopsis Report, 1985-86, Kathmandu.

Table 18 : Community Irrigation Schemes Launched by ADB/N (Until FY 1987/88)

Area	Completed Projects			Ongoing Projects		
	No.	Ha	% of Total	No.	Ha	% of Total
A. Development Regions						
Eastern	4	629	20	2	383	38
Hills	0	0	0	0	0	0
Terai	4	629	20	2	383	38
Central	19	1434	46	6	491	48
Hills	14	529	17	5	91	9
Kath. Val.	0	0	0	0	0	0
Outside Val.	14	529	17	5	91	9
Terai	5	905	29	1	400	39
Western	2	225	7	2	43	4
Hills	1	13	0	2	43	4
Terai	1	212	7	0	0	0
Mid Western	6	846	27	1	100	10
Hills	1	25	1	100	10	
Terai	5	821	26	0	0	0
Far Western	0	0	0	0	0	0
Hills	0	0	0	0	0	0
Terai	0	0	0	0	0	0
B. Aggregate						
Hills	16	567	18	8	234	23
Terai	15	2567	82	3	783	77
Grand Total	31	3134	100	11	1017	100

Source : Office files of ADB/N.

Table 19 : Alternate Energy Schemes Developed by ADB/N (Until FY 1987/88)

Area	Biogas Plants		Water Turbine Schemes	
	Absolute	Relative	Absolute	Relative
A. Development Regions				
Eastern	802	26	65	12
Hills	51	2	63	12
Terai	751	25	2	0
Central	847	28	120	23
Hills	116	4	113	22
Kath. Val.	42	1	12	2
Outside Val.	74	2	101	19
Terai	731	24	7	1
Western	1056	35	208	40
Hills	487	16	199	38
Terai	569	19	9	2
Mid Western	264	9	96	18
Hills	13	0	83	16
Terai	251	8	13	2
Far Western	60	2	32	6
Hills	10	0	31	6
Terai	50	2	1	0
B. Aggregate				
Hills	677	22	489	94
Terai	2352	78	32	6
Grand Total	3029	100	521	100

Source : Office files of ADB/N.