

CONCLUSIONS

The implementation aspects of rural energy planning described in this paper are based on observations from one of the least developed countries in the world. Some of the conclusions that can be drawn from the Nepalese experience would be applicable to other developing countries. Others are specific to the country and are of varying importance to other countries. A case in point is the emphasis on decentralised renewable energy technologies. This is necessitated partly by the opportunities and constraints presented by the mountain terrain and partly by the predominance of the subsistence agricultural economy. We have already noted that fuelwood, agricultural residue, and animal dung cake constitute 96 per cent of the total energy consumed. Substitution by imported petroleum products in the context of poverty is unfeasible. The mountain terrain, however, provides ample opportunities for hydropower development, although the current capacity is very low indeed. Many of the communities are scattered and not easily accessible. These peculiarities require special considerations in programme implementation. We do not expect all the points to be directly applicable to other countries. In some countries, we foresee that commercial energy planning could play a more important role than that described in this paper. The important lesson, however, is that each country needs to understand its own peculiar characteristics to which the criteria of implementation have to respond. Although some of the basic principles might be similar, the emphasis will invariably differ. The following conclusions will therefore have to be seen in that light.

- o A widespread recognition exists that energy programmes have a great deal to contribute to the development of rural areas. What is lacking is the concerted effort to put the recognition into actual practice. The investment of resources and manpower is very low and that too is dispersed in many sectors among different line agencies. Consequently, the impact of rural energy programmes is not of much significance. This characteristic would be common to most developing countries. In order to overcome this particular problem, we have advocated the establishment of a "Ministry of Energy" for the planning and implementation of energy-specific activities, traditional as well as commercial, in coordination with other line agencies. Attempts along this line have recently been initiated in some countries, e.g., India, Indonesia, Thailand, and others. The effort deserves very serious attention if rural energy activities are to be coordinated and consolidated and thereby make the desired contribution.
- o There are many examples of success in the implementation of rural energy programmes. Success is evident when the energy programme is compatible with the development objectives aspired to by the users in the specific context of their socioeconomic conditions. Furthermore, decision-making and control have to rest ultimately on the users if the success is to be sustainable. We have shown that external sponsorship has really not been effective. Participatory village development approaches and private sector initiatives have, on the other hand, performed admirably. External resources are indeed brought in and used. The difference is that the users become active participants in the dialogue with technologists, bankers, and other external resource people when decisions are made. This has to be accepted as a fundamental principle in the implementation of rural energy programmes, not only in Nepal but also in other developing countries.

- o Rural energy programmes have different components of varying scale. Cooking-stoves have to be distributed to households; micro-hydro turbines for milling may be operated by individual entrepreneurs or a group of partners; lift irrigation schemes using small hydropower plants involve the whole community of affected farmers; petroleum products can be distributed only through selected depots in market centres. Technological dissemination, therefore, needs to take into account the varying organisational and managerial requirements. The implication is that the implementing agency has to adopt a flexible and negotiative stance. This has general validity in all the countries.
- o Rural energy programmes that are oriented specifically to supplying cooking or lighting requirements are only of secondary relevance. This is true in spite of the supposed fuel crisis in Nepal caused by deforestation. This is equally true in the case of mini-hydropower schemes that are installed with the primary purpose of lighting district headquarters in the country. A greater relevance is apparent, as in the case of Karma Singh Phant, where the water pump provides lighting but, more importantly, the milling services and water for irrigation for agricultural production. Given the subsistence nature of the economy in rural areas, opportunities for income enhancement or greater productivity through energy use are of greater importance.
- o Following from the above point, it is important to note that energy programmes have to be seen only as one input in the development effort and, therefore, has to be integrated with other inputs. Examples include: the requirement of effective credit and extension schemes; compatibility with development priorities in the eyes of local people as well as concerned agencies; the enhancement of local people's ability to adopt and pay for new ventures; reliability in the supply of materials and technologies; and the capability of manufacturers to deliver appropriate technologies and required services. Unless there is a convergence of efforts by all related actors (local people as well as those from outside the rural area), the success of the programme cannot be sustained.
- o Because of the cross-cutting nature of energy with respect to sectoral activities, a different managerial style is required. One model that has been described is that of the Small Farmers' Development Programme of the Agricultural Development Bank of Nepal. The principal idea here is that the Group Organiser acts as the catalyst in initiating rural energy activities and organising people in the process of adoption. External resources are channelled in through the credit scheme. Encouragements to involve the private sector (such as turbine manufacturers or the Biogas Company) are prominent in the scheme. Attempts are made to train local people in the operation and maintenance of technologies. Where possible, the capability of local artisans is upgraded to provide repair and maintenance services. When major problems are encountered, local people are aware of where to go and whom to contact. This model with appropriate variations holds a great deal of promise and deserves further strengthening, especially for implementation at the village level. Coordination is, however, needed at the policy level so that the private sector gets adequate incentives. A national agency such as a Ministry of Energy can then focus more on quality control and the monitoring of activities by the private sector. At the same time, the Ministry might direct research institutions to develop relevant technologies, design training programmes, and work closely with manufacturers and the ultimate end users.