Chapter 13
Training Needs Priorities and Methodology

13.1: The Importance and Implications of Training

For any new endeavour, especially concerning the introduction of a new technology to an underdeveloped and remote rural area, training is perhaps the most important intervention. Even for simple devices, such as improved cooking stoves, some level of user training has been found to be quite beneficial for achieving optimal results. In the case of MHP plants, training of various related groups; especially managers/operators, has been cited as an important input for their success. Many past studies and reports in Nepal and Pakistan have also pointed out the need for adequate training programmes for different groups.

Some activities have been undertaken, in this instance for participants from the HKH Region, during the past few years. ITDG, in collaboration with other international/ regional agencies, has organised about half a dozen such training programmes for manufacturers, implementers, engineers, and planners lasting for a month or more in different countries such as Switzerland, Sri Lanka, Nepal, and, more recently, The Philippines. Similar training is also organised by the Hangzhou Regional Centre (Asia and Pacific) for Small Hydropower (HRC-SHP) every year, lasting for two months, in Hangzhou, China. The scope of this programme, however, is mostly for small plants (ranging up to 10MW in capacity).

Training programmes have also been organised for operators and owners in Nepal by the manufacturers, particularly the BYS in Kathmandu and the DCS/BEW in Butwal; these are usually funded by other donor agencies. These training programmes, however, are not held on a regular basis and have certainly not covered the needs of all the plants and their employees. Some training is also provided to operators during the commissioning phase of MHP installation. This is reported to be happening in both Nepal and Pakistan. This training is imparted by the installing agencies (PCAT/AKRSP in Pakistan and manufacturers in Nepal). However, the usual perception is that such training is not adequate. Evaluation has not been attempted so far. Training for managers, installers, surveyors, and so on is not usually available.

There can be no doubt that training for different groups is necessary and must be undertaken regularly through a suitable institutional system. However, the requisite regular funding and institutional arrangements have not materialised as yet. The costs versus benefits' issues have also not been fully examined or appreciated. Let us assume that about 100 MHP plants are to be installed per year in Nepal, costing about Rs 100 million. HMG/Nepal spends around Rs 20 million on subsidies and another 60 million on loans per year (at the prevalent rates). The cost of training for about five surveyors/assessors, five installers, and about 200 managers/operators would be around Rs five million (6.25% of government expenditure). This additional money, coming either from the government system or donors, would be well spent, since it would contribute towards decreasing breakdowns and failure rates and towards increasing economic returns. This, in turn, would not only improve the success and impact of the plants, it would also alleviate the loan non-repayment

situation for the lending agency. Thus, this additional expenditure would almost certainly bring greater returns/rewards. Some training programmes might be more cost effective if organised on a regional basis.

13.2: Training Needs

A number of different groups, needing significant levels of training, has been identified through many studies completed in Nepal and Pakistan, including studies sponsored by ICIMOD. These various groups, principally associated with private, informally-managed MHP plants, and their training needs are described below.

a) Decision-makers from government departments or donor organisations, including planners, financiers, energy administrators, etc, need to be made aware and convinced of the usefulness and viability of MMHP for remote, isolated, inaccessible, and scattered populations in mountain areas. They should also be made aware of various options in technology, funding systems, and methodology of implementation, as well as the advantages/limitations thereof.

b) Communities and their leaders should be informed about the benefits and limitations of MMHP installations, plus their responsibilities and actions desired in this respect. Additionally, some basic information should also be provided to consumers regarding other end uses such as cottage industries, irrigation, cooking and heating, and so on.

c) Surveyors and assessors of the potential and available power from a given site should be trained in the techniques of flow and head measurement and location and layout of various civil works and equipment; e.g., intake, power channel, forebay, penstock, powerhouse, turbine, tailrace, and so on. In this respect, surveyors/designers have also to cater for geological constraints, floods, landslides, and other such eventualities.

d) Technical personnel with a strong civil engineering background should be trained in the design, construction, and supervision of civil works.

e) Mechanical engineers from relevant agencies should be trained in design/selection of electrical/mechanical equipment such as penstocks, valves, turbines, governing/ control systems, coupling/transmission, generators, instrumentation, supply panels/switches, etc.

f) Manufacturing personnel need to be trained in appropriate methods for manufacturing various components, as well as quality control and dimensional accuracy.

g) Engineers/technicians should be trained in installation procedures for testing equipment and performance during the commissioning phase. The concerned engineers should also be trained in design and construction of transmission and distribution systems, including transformers if required.

h) Owners/managers should be trained in various aspects of plant operation, including load management; following operational procedures, including speed/frequency maintenance; watching out for signs of malfunction (noise, power loss, vibrations, overheating); book-keeping; organisation and scheduling of maintenance and repairs; public relations; and so on.

i) Operators should be trained in operation and maintenance procedures.

j) Mechanics/technicians (e.g., from nearby workshops) should be trained in various aspects of plant machinery, its functioning, assembly, and so on, so that they can undertake repairs easily. They should also be trained in the appropriate repair procedures.

k) In addition, personnel from appropriate institutions should be trained in assessment of plant performance, economic as well as technical; especially technical performance, including power output, operational problems, etc.

Some training needs are already being met through courses being organised by ITDG and HRC-SHP; i.e., those described in 'c', 'd', and 'e' above. However, most other needs are not being catered to at present. The situation is more serious in Pakistan than in Nepal; but it is far from satisfactory even in Nepal.

13.3: Priority Areas for Training

Some training needs are obviously more crucial than others, and the extent/depth would have to be decided accordingly. Since resources are also usually limited, training needs have to be prioritised in some way. Considering a number of factors, such as the relative necessity and current availability of some training programmes in the HKH Region, indicated in various studies/reports, the following priorities are suggested. The letters in parentheses refer to the groups described in section 13.2 above.

Plant managers (h)

Plant operators (i)

Installers (g)

Surveyors/layout designers (c)

Prospective repair personnel from nearby areas (j)

13.4: Training Methodology and Materials

The first prerequisite for training programmes is the existence of appropriate institutions to undertake organisation of such training programmes on a regular basis and with a desired level of competence and devotion. Such an agency would also have to mobilise assistance, including funding and other inputs. It is not necessary for all the requisite ingredients to be present under one roof (e.g., equipment, instruments, and faculty). Whereas it would be necessary to have most of the hardware available, the faculty could come from the outside, e.g., manufacturers, NGOs, etc.

Some basic equipment and instruments would be needed to train managers, operators, and repair personnel. The plant rig could be a real-life or simulated one to demonstrate how the system works. In addition, sub-assemblies of other components, such as runner and casing, bearing housing, load controller, etc, would be needed. Similarly, some instruments would be needed, e.g., for power measurement, flow measurement, and vibration measurement. The training materials, especially the technical manuals, could be prepared for and provided to the trainees in a simple written form with adequate illustrations and explanations. To some extent, the trainers have also to be trained, at least initially.

The training (of the managers/operators, say) should have two or three components; in a central institution dealing with theory and basics, through visits to some well-run plants and, finally, at a site where a new plant is being installed and commissioned. The last training aspect would be the most crucial. More detailed training programmes have to be prepared by experts in the field.