

1. INTRODUCTION

Background

The overall level of development in the Hindu Kush-Himalayan range, home to about 120 million people, is very low. Agricultural productivity, infrastructure, and many other aspects are quite inadequate. The same is the case with energy. Not only is the per capita usage of energy very low, there is an almost complete dependence on fuelwood and other biomass, and tree cover is becoming scarcer, leading to degraded lands and destabilised mountain slopes. Some of the mountain areas are already barren and the people, especially women, are facing considerable difficulties in obtaining adequate biomass even for basic needs such as cooking. Industrial activities, both modern as well as traditional, are minimal; and non-availability of adequate and affordable energy supplies is at least partly to blame for these difficulties.

Most of the mountain areas in the HKH Region are endowed with a renewable and environmentally-friendly resource; i.e., hydropower, especially in the mini- and micro-range (say up to a 1,000 kW capacity per plant), which has many advantages over other fuel systems, including large hydropower (HP) plants. Some of the main advantages are listed below.

- A sizeable potential exists in almost all the areas of the HKH Region.
- The plants are comparatively more viable for remote and inaccessible areas than other commercial fuel systems.
- They are easier to design and manufacture locally.
- Sophisticated and expensive instrumentation and control systems can be avoided for the most part.
- The plants are cheaper to manufacture and install by a factor varying between two to five compared to imported plants, and they can be repaired easily using local facilities.
- The problem of transporting other fuels to such difficult areas can be offset.
- The organisation and management (O&M) costs of privately-owned/-operated plants are also much lower.
- Indigenous design and manufacture of such plants contributes towards development of the local industrial base as well as technical expertise, which is useful for other development work.
- Adverse environmental effects are minimal.
- Mini- micro-hydropower (MMHP) is more suited to decentralised development, and this includes the design, manufacture, installation, and operation/management.
- MMHP can also be integrated with other rural water utilisation schemes to increase benefits and reduce costs.

Unfortunately, MMHP also has some shortcomings; for example, the capital costs are high; the overall performance of endogenously manufactured equipment is usually low; and the resulting breakdowns may be frequent and difficult/expensive to redress. In addition, the locations of the plants may be out of the way and shifting or selling them may be a difficult

prospect. However, the overall benefits, including those associated with the environment and indigenous technology development far outweigh the drawbacks. Other problems mainly associated with the implementation and operation / management (low plant factors, untrained staff, inadequate management) can be overcome through amicable inputs such as training programmes, financial incentives, research and development (R&D), and so on. The main advantage is that MMHP is an indigenous, renewable, and environmentally friendly resource; therefore it should be promoted and used to meet local energy needs. MMHP is a comparatively viable option for many remote areas even now, and with the right inputs and support it can become a financially viable and self sustainable system.

The MMHP project is mainly focussed on private, endogenously-developed and implemented power plants, because it has been observed that the principal government electricity agencies, such as Nepal Electricity Authority Nepal (NEA) or Water And Power Development Authority Pakistan (WAPDA), do not consider the MMHP range to be economically viable or easy to manage. In fact, many such agencies are in the process of handing over MMHP installations to the private sector. Additionally, there have been new moves in inviting the private sector to generate power. Also, the more remote and inaccessible mountain areas are usually given least priority by government agencies in the context of providing electricity or other forms of energy. Recent experiences in Nepal and Pakistan have shown that MMHP can be developed and operated in remote and undeveloped mountain areas by personnel having minimum qualifications or training. Admittedly, the problems are also sizeable, but a process has been established and it can become self-sustainable and reliable, contributing towards further development of mountain areas. Significant progress has been made in evolving different management systems for private MMHP plants. These range from family-owned and operated informal plants to more sophisticated systems managed and operated by trained employees and supplying electricity to a variety of consumers, from households using one bulb to industrial units or commercial establishments such as hotels. Electricity is also used for cooking, heating, hot showers, and even irrigation.

Many international agencies, such as the Intermediate Technology Development Group (U.K) and the Swiss Centre for Development Cooperation in Technology and Management (SKAT), have been promoting the use of MMHP in many parts of the world, including the HKH Region, and especially in Nepal. More recently, the International Centre for Integrated Mountain Development (ICIMOD) introduced a project in this field mainly to assess the current status, policy support by governments, problems, and prospects. Under this project, financially sponsored by the Norwegian Agency for Technical Cooperation (NORAD), country reports were commissioned in five countries of the region; i.e., Bhutan, China, India, Nepal, and Pakistan. These country reports also included specific case studies and accompanying video documentaries to highlight certain aspects of development. Subsequently, a Consultative Meeting of Experts, both from the HKH Region and from outside, was organised to assess the available information and formulate a future course of action. This Report is about the Consultative Meeting held in June 1994 in Kathmandu.

In addition to the Consultative Meeting, the following activities are also planned under the same project.

- a) Organisation of national seminars, in each of the participating countries, to disseminate the information acquired through the Country Reports and the Consultative Meeting to a wider audience and to stimulate discussions.

- b) A Familiarisation Seminar for decision-makers from participating countries to apprise them of the achievements and prospects. For this purpose, a training manual is also to be developed for use during the Seminar and for possible future use.
- c) It is also planned to establish a Regional Information Exchange Network for MMHP to link various agencies in the Region, so that access to information is easier and collaboration facilitated.

Objectives and Expected Outputs of the Meeting

The following were the main objectives of the International Experts' Consultative Meeting.

- **General:** to pursue ways and means to proliferate MMHP and meet the energy needs of remote and inaccessible mountain areas by rendering MMHP technically and economically viable.
- To discuss issues, share ideas, and draw upon replicable experiences.
- To identify training needs and priorities on all aspects of MMHP.

In addition there were two specific outputs expected from the Consultative Meeting.

- Outlines of a training programme for the decision-makers of the HKH Region.
- Conclusions/recommendations for a future course of action leading to sustainable and enhanced growth of MMHP in the region.

A training/familiarisation programme for decision-makers is the main activity under the current MMHP project, and this is expected to take place in January 1995. The training programme is aimed at top-level decision-makers involved in planning, allocation of funds, and overall implementation.

Participants and the Programme

Thirty experts participated in the Consultative Meeting. Eight of them were from outside the HKH Region. There were three experts each from India and Pakistan and two from China, and twelve participants were invited from Nepal, the host country. Most of the participants belonged to implementing agencies in the region, or supporting international organisations. Some professionals also came from the donor agencies working in Nepal. The finalised programme of the consultative meeting, covering five days from 13th to 17th June, 1994, is given in Annex 1.

The Inaugural Session was addressed by prominent people associated with MMHP in Nepal. This session was followed by Planning Session Two, during which the objectives, anticipated outputs, and other aspects of the Meeting were presented and discussed. The proposed programme was also presented, reviewed, and finalised. Country statements were presented during the Third Session by principal participants from the countries of the HKH Region. During the Fourth Session, the Synthesis Report was presented before the plenary body. This was based on country reports from five countries of the Region, giving data and information about installations and programmes. The Synthesis Report was the base document for the

Consultative Meeting. The experts invited from outside the region presented their views on some specific and important aspects of MMHP programmes during the Fifth Session.

The third day was mainly devoted to Group discussions. Five groups (Annex 4) were formed to discuss given aspects of MMHP and formulate initial conclusions. These highlights/conclusions were then presented before the Sixth Plenary Session and comments and suggestions were incorporated. The Groups then continued with discussions and presented their conclusions/recommendations on the fourth day. During the Seventh Session extensive discussions took place. Following this, two small committees were formed to prepare the two main outputs of the Meeting, i.e., Outlines of the Training Seminar and Conclusions/Recommendations for the Future. These outputs were presented before the Concluding Session of the Meeting on the fifth day (morning), followed by discussions in which many suggestions were made. Important suggestions were later incorporated in the finalised outputs of the Concluding Session. After the Concluding Session the participants visited Mohantar village in Dhading District. Unfortunately, the arranged site could not be visited due to a landslide the night before. However, about three other running MMHP plants were visited and discussions were held with the owners.