

Recommendations and Conclusions

Three working groups met during the Workshop to deliberate on the following major areas of concern :

- **Policy and Project Priorities**
- **Research Priorities**
- **Training and Systematic Information Exchange**

While most of the concerns expressed in discussions during the plenary sessions and group meetings have been reported in the Workshop Discussions, specific suggestions made by the working groups are presented below :

Policy and Project Priorities

1. Watershed management requires a coherent policy framework which includes not only those policies directly concerning watershed development, but also those which have indirect effects. Because of this need for a comprehensive view of watershed management, the first priority at the national level is to develop long - term plans to examine watershed problems within the national development context, and pay particular attention to supporting policy measures, such as encouraging decreased population growth, increasing off - farm income, promoting development and use of alternative energy sources, and the mitigation of the negative environmental effects of other development activities such as road building, urbanisation, and commercial agriculture.
2. Some participants voiced the opinion that in order to effectively plan, coordinate, and implement watershed policies, a separate Watershed Authority needs to be created, under which specific watershed organisations will be required, with legal authority, to work across sectoral and administrative boundaries to deal with whole watersheds.
3. Intensive watershed activities, involving such curative measures as engineering structures and relocation of agricultural activities, should be confined to critical watersheds with severe erosion where high-value investments must be safeguarded. In these areas, watershed authorities may be required to take on comprehensive implementation of activities spanning a number of sectors.

4. Of more importance in the long run is the idea that a small number of key preventive approaches should be selected for a massive programme to be implemented by relevant sectoral agencies, non - governmental organisations and other concerned groups throughout the upland areas. The role of the Watershed Management Department, in this case, may be that of a facilitator providing training, technical inputs, and expert services, and disseminating information to other agencies.
5. Finances for watershed management activities may be generated from the beneficiaries, but should be commensurate with the benefits received by different sectors of the population. To the extent that downstream residents and the nation as a whole receive direct benefits in the form of prolongation of the life of hydropower installations, less flooding, or less road maintenance cost, those beneficiaries should pay the cost. This can be in the form of a surcharge on the use of the protected resource.
6. The watershed management programme should explicitly consider the welfare of upland residents. Such programmes should diversify and increase the income and employment of rural people without causing resource degradation. Programmes should provide economic incentives to motivate for action.
7. All legislation concerning ownership and use rights of land, trees and other forest resources, grazing and water resources, and local organisational authority for managing common lands should be assessed and modified to remove current ambiguities, contradictions, and disincentives for sound land management.
8. Institutional innovations should be encouraged at the governmental, non - governmental, and local levels to enable greater responsiveness to local conditions and people. This includes the need to identify and develop innovations through action research, intermediary organisations, and more effective local organisations, as well as to restructure government organisations to allow them to play a more facilitating role based on local circumstances.
9. Other development sectors should play a supporting role by placing greater priority on providing social and economic services to the often neglected upland residents.
10. Where watersheds are shared by more than one nation, it would be desirable to develop common policies and coordinate watershed development actions. In the short run, international cooperation can be strengthened through information exchange, joint training activities, and the exchange of scientists and practitioners.

Research Priorities

1. **Bio-physical** : Research on various important elements of geomorphic, hydrological, and biotic processes was felt to be necessary, particularly: alternative fuel and fodder resources and their use on marginal lands for pasture and forestry development, productivity losses in natural resources and land capability assessment methodology, and factors inducing landslides, sedimentation, and erosion. The study of mass wasting and glacial dam/lake outbursts and identification of hot spots should be carried out through field survey techniques, as well as remote sensing. Appraisal of glacio - hydrologic data for both short- and long - term forecasting of major hazardous events is needed for the design of early warning systems.
2. **Human and Institutional** : With the exception of aggregate demographic data, the existing database related to ethnic perceptions and culture and information on indigenous resource institutions is presently inadequate, demanding further field surveys and research. Similarly, demographic data needs to be contextualised in relation to the resource base. Further research is necessary on : different types of migration and implications for resource use, forms of common property rights, forms of national parks and forest reserves and their impacts on local communities, and finally, on various methods of technology transfer to the farmers.
3. **Rural Production Systems** : Further research was also considered important on resource productivities, different forms of land use, and the linkages and interrelations among various sectors, namely, forestry, agriculture, and livestock. It was felt to be particularly important to conduct research on the implications of development efforts on various resource-use and resource productivities.
4. **Policy Research** : The important areas of policy research identified were: an assessment of the impacts of government policies on various resource-use and resource productivities, and comparison of the cost-effectiveness of different types of watershed conservation measures, particularly the efficacy of technical engineering vis-a-vis the biological measures of land/resource conservation. Further, it was stressed that there was a need to examine distributional effects of watershed programmes at local, regional, and national levels.

Training and Systematic Information Exchange

1. Watershed Management requires a multidisciplinary approach, with training in forestry, agriculture, horticulture, animal husbandry, soil science, hydrology engineering, sociology, economics, mass communication, and extension methods.

2. Perspective planning for manpower requirements for the Hindu Kush - Himalaya Region in different disciplines needs to be done by each country to determine training requirements.
3. Courses should be developed for training at different levels and in various disciplines.
4. Short orientation courses are needed for policy makers and planners.
5. Short training courses and visits to demonstration sites, particularly in locations of successful watershed management projects, should be arranged for the beneficiaries in the watersheds.
6. Refresher courses of the latest techniques in various fields should also be arranged for all levels of personnel.
7. Courses of forestry and soil and water conservation training institutes need to be examined to ensure a balance between watershed management techniques, implementation issues, and a sensitised understanding of local resource use.
8. An information directory of the institutes and universities engaged in work relating to watershed management in the Region is required listing scientists and professionals working in related disciplines. The directory is also to include information of professional societies in the countries of the Region. The directory needs to be updated each year and distributed to all regional institutes and universities.
9. A nodal agency should be identified in each country, to collect, process, and disseminate information concerning watershed management. The nodal agency in each country should be suitably equipped to conduct the exchange of information assigned.
10. Relevant literature and information regarding mountain resource management should be collected from other parts of the world for the nodal agency information network proposed.
11. An abstracting service may be developed to summarise and publish relevant information from journals, periodicals, reports, and scientific papers relating to watershed management in the Region.

Conclusions

A number of key issues may be identified for more effective watershed management throughout the Hindu Kush - Himalaya. These are :

- the need for a fuller understanding of the consequences of continuing population growth -- both human and livestock -- in the mountains on watershed management and for urgent policy and programme action. Related to this is the issue of diversification of farming systems and provision of off-land employment, to relieve the increasing pressure on vulnerable mountain habitats.
- the need for thorough examination and understanding of practical measures for mountain resource management and farming systems to ensure food and energy security. It was recognised that while there is an overall knowledge gap in these areas, mountain pasture management, with regard to grazing, improved fodder production, and better animal husbandry, is a particularly neglected field.
- the need for large - scale training facilities, planning, implementation, and monitoring and evaluation in watershed management, as well as the need for awareness of integrated development and use of mountain resources of land, soil, water, and vegetation on a sustainable basis.
- the need for more effective institutions, with emphasis on positive incentives rather than negative controls, more concern with consultation and participatory roles, and in particular, better ways of achieving constructive common property resource management.
- the need to include appropriate technology alternatives (particularly in energy, transport, processing and packaging of agricultural produce, etc.) as essential ingredients of integrated watershed management.
- the need for sharing of experiences within the Region and the need for integrating biophysical and socioeconomic approaches.