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Sustainable Mountain Agriculture in the Hindu Kush-Himalayas: Strengthening Education and Research Capacities

Mountain Farming Dilemma

Given the limited area and low fertility of their land and the increasing population, mountain farmers are finding it increasingly difficult to sustain their livelihoods on the basis of cultivating their own land and are looking for other options.

It may be true that without the present level of mountain agricultural research and new agricultural technologies, the poverty of mountain farmers would have been worse, but it is also true that this "greening" has benefitted only a few, and in selected areas. The concern then, over who in the mountains has gained from agricultural research, becomes even more important as the composition of the poor changes. Among the rural poor today, we find smallholders, marginal farmers, and, of course, countless landless agricultural labourers.

Wage labour is replacing subsistence agriculture; but, in a sense, both are subsistence because they provide no more than a hand-to-mouth existence at most

Agricultural researchers have so far not taken into account the impact of their recommendations on the diverse ethnic environments and demographic circumstances of mountains as they do for specific agroclimatic regimes.

Rapidly increasing demands caused by the fast growth in human and livestock population in mountain areas are likely to threaten all efforts towards sustainability of mountain agriculture both ecologically and economically.

Today, although mountain agricultural research institutions have fully recognised the importance of employing different methods for different agroclimatic zones, they have failed to understand that different strategies are also required to match the needs of big farmers, smallholders, marginal farmers, and the landless. It is a different task, and probably a harder one, t steer the benefits of agricultural research towards smallholder and labourers. Today, although mountain agricultural research institutions have fully recognised the importance of employing different methods for different agroclimatic zones, they have failed to understand that different strategies are also required to match the needs of big farmers, smallholders, marginal farmers, and the landless. It is a different task, and probably a harder one, to steer the benefits of agricultural research towards smallholders and labourers.

One also finds the contradiction that managing food security and overcoming poverty is more important to the mountain communities than the concern for environmental conservation, while public interventions give higher priority to the latter. This may be the `heart of the mystery' of the unclear flow of benefit of farm research to mountain farmers.

The sustainability of mountain agriculture has two dimensions; one ecological and the other economic. Case studies, commissioned by ICIMOD, have revealed that successes are largely associated with the consideration for and failures with disregard for mountain- specific conditions, both physical and socioeconomic. This means that both the nature of opportunities available and the types of constraint that are operative have to be understood. Opportunities in mountain

environments are manifested by diversity, comparative advantages, and adaptation mechanisms, while the main constraints are inaccessibility, fragility, and marginality.

The educational institutions located in the Hindu Kush-Himalayan (HKH) Region were reviewed extensively by ICIMOD during the period 199295. These institutions appear to have the following common organisational and operational problems.

- Educational institutions were organised on the pattern of relatively successful and older institutions in the plains. Their organisational structure and curricula emphasise crop production under irrigation. Efforts to reorient towards the specific needs of mountain agroecosystems have been limited, ad hoc, and poorly supported.
- Agriculture in mountain areas is based on integrated croplivestock-agroforestry farming systems in which supportlandfarmland energy flow is an integral process. But the curricula are based more on the monoculture of individual commodities - some food but mostly cash crops. Horticulture and pastoral management, which are very important in mountain areas, are generally neglected in the curricula.
- Because of the fragility of the mountain environment, sustainable use of the resource base is vital for the growth of agriculture in these areas. Adequate emphasis is not given to integrated management and sustainable harvesting of natural resources.
- Linkages among research institutes, extension organisations, and the public sector development agencies are often weak. These institutions have confined themselves to oncampus teaching and thesisoriented academic research. As a result, they have little contact with the agricultural community and are, therefore, not necessarily involved in finding appropriate solutions to serious problems.
- In most cases, there is very little interaction with the farmers, resulting in serious adverse consequences on the quality, relevance, and usefulness of the knowledge imparted.
- Funds are insufficient to carry out effective research and outreach programmes.

It is difficult to argue that universities based in mountain regions should focus on mountain relevant subjects only, as the opportunities and outlets to absorb their product with such specific skills may be very limited. However, concerned agencies can begin to provide "mountain agricultural development modules" in the general agricultural curriculum, especially in those organisations located near or in mountain areas. In the context of conventional mountain agriculture, mountain-specific conditions have not been given sufficient weight by agricultural R & D, which explains our poor understanding of them.

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In more successful initiatives, such as those taken at the Lumle and Pakhribas agricultural centres in Nepal and in Himachal Pradesh in India, mountain specificities have played a key role in determining choices of technology. These experiences highlight the need to identify problems carefully, get feedback from the farmers themselves, and give appropriate institutional back-up to address these issues.

The important question is how do we ensure food security and cater to the other needs of a growing number of people sustainably; without destroying the environment and limiting the options for future generations? While there may be many other obstacles to making this transition, a more serious problem appears to be in the lack of knowledge and skills required to bring about the needed changes. While different agencies have crucial roles to play, the main challenge lies for research and education systems, to determine the type of technological options as they are responsible for the development of human resources capable of bringing about the changes needed for sustainable mountain agriculture.

Among other factors, mountain agriculture has suffered from neglect and this has led to the current crisis. To overcome the damage caused by past neglect, systematic and focussed effort is necessary. And education and research are probably the best area to start such efforts. Without sound investment in people, research, and in the application of the lessons learned, the problems faced by mountain farmers will not be solved.

Although considerable diversity is seen in the organisational patterns of farm research institutions in the HKH Region, they do have some common characteristics. These are summarised below.

- Most research institutions devote most of their efforts to field crops, especially cereals, wheat, maize, and rice, and, in some cases, potatoes.
- Research is limited mainly to higher yielding varieties responsive to external management inputs and not on further developing traditional systems and practices.
- Research on livestock management, fodder production, pasture management, horticultural crops, and agroforestry, especially as components of an integrated farming system, is often not included in the research agenda of these institutions.
- Most research is limited to biological and agronomic aspects, and there is very little research on sustainable use of the resource base, soil conservation, and socioeconomic aspects.
- Most research institutions in the region almost entirely neglect post-harvest operations - processing, storage, and marketing aspects - which result in sizeable losses of perishable produce and great differences in commodity prices.
- Very little attention has been given to addressing gender-specific problems. Strong biases against women are seen in faculty, research and extension.
- Research strategies do not pay attention to optimising the farm incomes from smallholdings through the sustainable use of natural resources.
- Periodic review of mandates, organisational and management structures, perspective plans, research programmes, and interinstitutional linkages is rarely carried out.
- Specially designed training facilities for developing human resources for mountain agriculture are lacking.
- Most R & D institutions are underfunded. Adequate and appropriate resource allocation is necessary for effective research in and development of relevant technologies.

If we talk about biotechnology and genetic engineering, we are also discussing ownership of policies and projects by stakeholders, the need for better understanding of social cohesion, and accountability and empowerment of the marginalised, such as women and small farmers. All of these have become as relevant for sustainable mountain agriculture as in other areas of development. Biotechnology and genetic engineering alone will not solve the problems of mountain agriculture. Stakeholders must be able to participate in the design and implementation of the policies and programmes to be carried out in their areas and on their land. Also essential is the empowerment of marginalised groups such as women and other poor farmers.

Research and education need to be integrated because educational skills relevant to specific mountain situations depend upon the ability of experts to examine problems and potential of mountain areas. Farmers themselves should be involved in both the teaching and research functions and their perceptions may be reflected both in the curricula as well as the research agenda.

Institutions need sufficient funds to acquire proper laboratory, library, and farm facilities to undertake research programmes. Because of the relative isolation of mountain areas, mandatory adequate support to professionals working in these institutions is essential in order to retain them and keep morale high.

ICIMOD has actively been trying to identify strengths and weaknesses in the national agricultural education and research institutions in the HKH. In this context, it organised a Regional Consultation on Education and Research for Sustainable Mountain Agriculture in January, 1996, in Kathmandu. The consultation provided a platform for sharing experiences, discussing common concerns, and identifying areas for action at national and regional levels.

The gathering also identified gaps in mountain agri-education and research. Priority areas for human resource development, training, and research were identified in the context of building institutional capacities. It was thought that institutional marginality within the national context, could be overcome by creating a mechanism for regional cooperation/alliances. The priority areas identified for regional cooperation included human resource development for reorientation of farm education and research to suit local farming conditions and facilitate exchange of knowledge and experiences among countries. The recommendations listed below were made for follow-up by institutions, national governments, and ICIMOD.

- Developing and refining sustainable mountain agricultural concepts vis a vis agricultural research and education
- Strengthening of institutions to improve human resources in order to carry out necessary changes in education and research. This can be achieved by establishing internship/sabbatical leave for in-service training and specially designed short training summer schools in sustainable mountain agriculture.

If teaching practices and research methods do not understand or involve the farmer who is the ultimate beneficiary of these activities, then the value of such teaching and research becomes questionable.

- Regional initiatives to develop specialised academic courses on mountain agriculture for the undergraduate and post-graduate levels and support to improve lead /focal point education and research institutions in each country
- A regional alliance to facilitate exchange of scientists and research fellowships in the field of mountain agriculture

Institutional strengthening initiatives focussing on human resource development in agricultural planning, education, research, and extension within various provincial institutions have begun in Tibet. Efforts have been made to strengthen capacities of the Tibet College of Agriculture and to establish a Mountain Agriculture Faculty to run specialised courses in pastoral management. Under the Tibet Fellowship Programme, sponsored by ICIMOD, young Tibetan in-service scientists are being given an opportunity to work towards M. Sc and Ph D degrees in the highland agricultural issues of Tibet.

In pursuance of the above-stated recommendations and also to address the issue at the regional level, ICIMOD will continue dialogue with national agricultural and education institutions of the HKH countries and formulate a regional programme for reorientation of education and research for mountain agriculture. In addition, it will aspire to bring together mountain agricultural research and education policy makers of the HKH region to share their perspectives and find common sulutions and also disseminate mountain agricultural development information as widely as possible.

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Contact:

Dr. T. Partap
Mountaim Farming Systems

e-mail: partap@icimod.org.np

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