PREFACE

The Mountain Farming Systems' (MFS) Division of ICIMOD has been engaged in work on Strategies for Sustainable Mountain Agriculture in the Hindu Kush-Himalayan (HKH) Region with the support of various donor agencies, including the Ford Foundation, since 1988. The main objective of this long-term programme is to develop a fuller understanding of the constraints and potentials prevailing in the mountains and to promote the sustainable development of agriculture in the region.

The past work of MFS under Phase-I (1988-1990) examined the available evidence of the unsustainability of mountain agriculture. The emerging trends of negative changes in mountain agriculture were found to be strongly related to the biophysical and socioeconomic setting of the mountain habitat and its people throughout the mountain areas of the region.
Realising the need for closer and in-depth study on these changes, MFS started systematic investigation of unsustainability processes, trying to understand their possible causes and factors, including also identification and documentation of potential options that could contribute to making mountain agriculture more sustainable. This was undertaken in the Phase-II (1991-1992) Programme supported by the Ford Foundation.

This present discussion paper entitled, "Options for Sustainable Mountain Agriculture", is an outcome of the above programme. This paper has documented approximately 35 options related to farming, based on the work of Pakhrribas Agricultural Research Centre (PAC) of Nepal. Many of the traditional options will be suitable even in the future under changing circumstances (e.g., demographic pressure, technological innovations, and market integration). Others are modern and modified (a combination of modern and traditional). Most of the options have been well tested in the eastern hills and mountain regions of Nepal at altitudes ranging from 500-2,000masl. It is believed that several of these options may be replicated elsewhere where the biophysical and socioeconomic conditions of the hills and mountain areas are similar.

The documented options have also been examined with the help of the mountain perspective framework developed by ICIMOD. The status of convergence between the attributes of options and the operational implications of mountain conditions, such as remoteness, fragility, diversity, and marginality, strongly indicate that the options are likely to be successful in contributing to sustainable mountain agriculture in the HKH Region.

The main aim of this paper is to demonstrate to policy-makers, planners, and those who are involved in agricultural R & D that there are many options for sustainable mountain agriculture and that these need to be systematically assessed and integrated by the present agricultural development systems in the ICIMOD member countries.

S.P. Chand, agronomist from Pakhrribas, and Sugandha Shrestha, of the Mountain Farming Systems' Division of ICIMOD, merit special mention for their work on this paper. I would also like to thank Pakhrribas Agricultural Centre and the many members of its staff who contributed to collating these options.

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Various studies have indicated that the environmental conditions of mountain areas in many parts of the Hindu Kush-Himalayan (HKH) Region are deteriorating (Jodha et al. 1992). Agriculture, which supports the bulk of the mountain population is most affected as it is subjected to emerging negative trends in terms of biophysical and socioeconomic dimensions. Thus, mountain agriculture is becoming unsustainable (Jodha 1990a and 1991b).
These negative trends, which are referred to here as indicators of unsustainability, are increased landslides, soil erosion, gully formation, declining crop yields and livestock productivity, increased hunger gap period, outmigration, and so on (Shrestha 1992). Consequently, mountain communities are witnessing: (a) a reduction in quality and range of options; (b) increased shortage of farm and community level resources; and (c) a reduction in flexibility of rural economic activities (Jodha 1991b and Shrestha 1992). Factors leading to the unsustainability of mountain agriculture, as well as options for reversal, have been identified (Jodha 1991b and Shrestha 1992).

In this context, efforts were made to prepare an inventory of possible options that could contribute to sustainable mountain agriculture. Lumle and Pachribas Agricultural Centres (LAC/PAC), located in the western and eastern parts of Nepal, were found to be relatively more effective in technology generation and diffusion (Jodha et al. 1992). A large number of reports (e.g., technical reports, annual progress reports, and other relevant reports), published mainly by PAC, were reviewed. Several options, both traditional and modern, or modified versions (blending modern and traditional), were found to be promising - not only on the basis of preliminary results at farm level, but also on the basis of the probability of convergence between their attributes and the imperatives of mountain conditions (e.g., remoteness, vulnerability to land hazards, diverse microclimates, etc).

Altogether more than 35 options for sustainable mountain agriculture have been documented. They are grouped into six major categories: (a) Crop Production; (b) Cropping Systems; (c) Horticultural Crop Production; (d) Livestock Production; (e) Forestry; and (f) Utilisation of Local Resources and Farmers' Traditional Knowledge.

These options and farming techniques were found to be successful mainly in the middle mountains of Nepal, where altitudes range from 1,000 to 2,000 masl. However, some of them were also successful in the high mountains, i.e., above 2,000 metres. In addition, some of them, mainly increased total biomass (e.g., higher production levels of both grain and crop residues and green fodder) production-centred options, were successfully applied in the U.P. Hills of India. Therefore, the options documented in this paper have a potential for wider replication, not only in the middle mountains of Nepal but also in various countries of the HKH Region where similar biophysical and socioeconomic conditions exist.