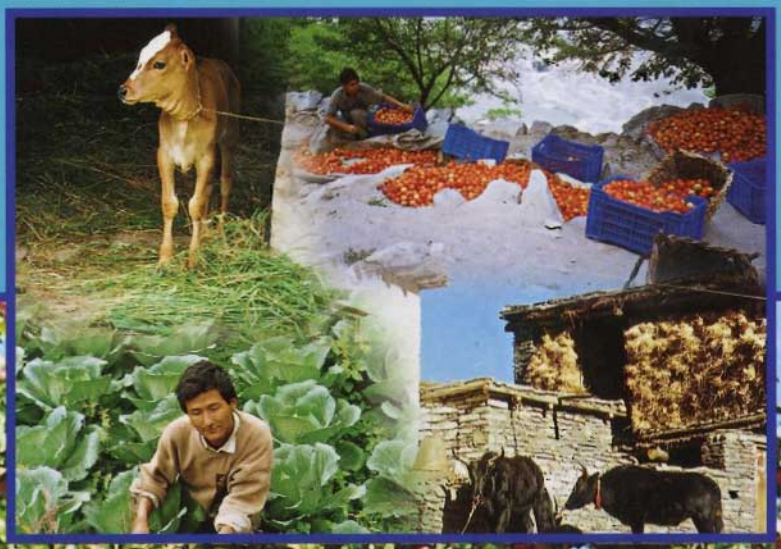
# State of Mountain Agriculture in the Hindu Kush-Himalayas

## A Regional Comparative Analysis

Pradeep M. Tulachan



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The International Centre for Integrated Mountain Development (ICIMOD)is an international organisation devoted to development of the Hindu Kush-Himalayan region covering all or parts of eight sovereign states, Afghanistan  , Bangladesh  , Bhutan  , China  , India  , Myanmar  , Nepal  , and Pakistan  . The Centre is located in Kathmandu, Nepal. The primary objective of the Centre is to promote the development of an economically and environmentally sound mountain ecosystem and to improve the living standards of mountain populations. The Mountain Farming Systems' Division at ICIMOD was established to promote improvement of farm productivity on small mountain farms without degrading the resource base.

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**Plates (clockwise)**
Cross-bred calf, Thimphu, Bhutan - Pradeep Tulachan
Tomatoes and cabbages, Ladakh, India - Pradeep Tulachan
Jhopa with barley straw, Mustang, Nepal - Pradeep Tulachan
Apple trees, Himachal Pradesh, India (background) - Pradeep Tulachan

# Executive Summary

The state of agriculture in the Hindu Kush-Himalayan (HKH) region was studied by analysing trends in the production of three integral components of mountain farming systems—food grain crops (cereals), horticultural and cash crops, and livestock—using time series data published by national governments.

The results show that overall the area under food grain crops (cereals) in the HKH region has remained steady over the last 10 to 15 years, that yields have declined less than often suggested, and that in some cases crop yields have increased. The results suggest that mountain farmers are maintaining relatively stable production of food grain crops to ensure food security, despite an increasing trend towards diversification into horticultural crops. Thus, there seems to be an opportunity for increasing cereal production through increasing crop yield. The increases in production can occur as a result of increased access to modern inputs such as quality seeds, fertiliser, and irrigation, resulting from favourable government policies. Nonetheless, there seems little prospect for expansion of area under cereal production and the per capita food availability may decline due to increases in population.

The most distinct finding of this study is that there is an increasing trend towards crop diversification with rapid expansion of production and marketing of horticultural crops. Horticultural crops are growing in importance for mountain farming systems and household economies in the region. The present trend of rapid expansion of horticultural crop production will have positive implications for the future development of mountain agriculture in terms of harnessing mountain niches ; this will have positive ecological and economic effects. This could also lead to cultivating more fertile lands with irrigation (lands that are presently under cereal production) with high-value cash (HVC) crops, such as fruit, vegetables, and medicinal plants, which are more dependant on econnomic profitibility and market demand.

However, one problem is the decline in productivity of HVC crops in the mountains, and this raises concerns about the long-term sustainability of these crops. Furthermore, there has been a reported increase in the use of pesticides on horticultural crops. Because farms have small parcels of land, there has been an intensification of land use for multiple crops and excessive use of

chemical fertilisers and pesticides. This has led to concern about environmental pollution, e.g., groundwater pollution and health hazards.

Trends in livestock holdings indicate that there is a potential for increased development of smallholder dairies with improved breeds of buffaloes raised in a stall-fed system in those high pressure areas of the HKH sub-tropics where mixed crop-livestock farming systems are found at present. The number of stall-fed buffaloes and goats is rising, and there is increased use of external inputs such as commercial feed. A growth in dairy farming will relieve the pressure on common property resources, such as forests and community lands, and have a positive impact on the environment. Rearing of buffaloes and goats can also contribute to food security and nutrition in mountain households.

To conclude, there is a great prospect for increasing cash incomes in the HKH. High-value crops, such as fruit and vegetables, and livestock raised for smallholder dairies or meat (fowl, goats, and so on) have the potential to contribute to cash income and hence improve the standards of living of farm communities. Likewise, increasing involvement of women in research and extension programmes and in programmes to improve food security for marginalised mountain households would prove beneficial.

# Preface

This study provides a broad, regional picture of the state of mountain agriculture across the Hindu-Kush Himalayas, based on the analysis of the empirical data obtained from national government publications. The mountain farming systems has basically three integrated components; they are production of staple food crops, horticultural and cash crops, and livestock raising. Dr. Pradeep M. Tulachan has systematically collected, collated, organised, and analysed the data related to these key components of agricultural production systems in order to provide broad trends and patterns of mountain agriculture and their implications on long-term sustainability. The data used are from selected mountainous provinces, states, and regions of five Hindu-Kush Himalayan (HKH) countries: Bhutan, China, India, Nepal, and Pakistan.

Thus, this work has focused on empirical analysis to provide broad patterns and trends of mountain agriculture across the HKH region. It is a valuable pulling together of factual information from across the region with a useful comparative analysis. Hopefully many readers will find this not only a valuable introduction to mountain agriculture across the region but also an important source of background statistics for their own analyses. It is interesting to see what the situation is in other parts of the region while pursuing the implementation of any project and programme on the ground.

# Acknowledgements

I would like to thank Professor John Mellor, Professor Robert Rhoades, Dr. Mahesh Banskota, Dr. Trilok S. Papola, and Dr. Tej Partap for their comments on the original version of this paper, which was part of a regular biannual report. Sincere thanks are due to Ms. Qian Jie, Dr. Nima Tashi, and Dr. Tang Ya, for translating Chinese Agricultural Statistics into English, and Mr. Arun Neupane and Ms. Vishakha Maskey for data entry and analysis.

Note

The data used for the analysis are from national government sources. The author is responsible for all comments arising from analysis and interpretation of the data and for the views expressed.

# Acronyms and Abbreviations

| | |
|---|---|
| AZRI | Arid-Zone Research Insitute |
| GDP | Gross Domestic Product |
| HH | household |
| HKH | Hindu-Kush Himalayas |
| HP | Himachal Pradesh |
| Masl | metres above sea level |
| NA | not available |
| NWFP | North West Frontier Province |
| RNR | renewable natural resource |
| UNDP | United Nations Development Programme |
| UP | Uttar Pradesh |

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