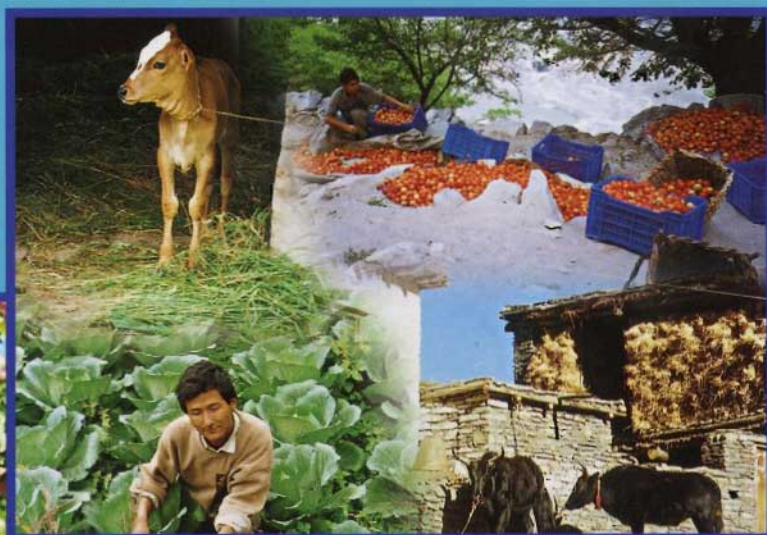










State of Mountain Agriculture in the Hindu Kush-Himalayas

A Regional Comparative Analysis

Pradeep M. Tulachan



about ICIMOD

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.

The views and interpretations in this paper are those of the author(s). They are not attributable to the International Centre for Integrated Mountain Development (ICIMOD) and do not imply the expression of any opinion concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

State of Mountain Agriculture in the Hindu Kush-Himalayas

A Regional Comparative Analysis

The state of agriculture in the Hindu Kush-Himalayas (HKH) region was studied through a comparative analysis of trends in the production of three integral components of mountain agriculture: cereals, horticultural and cash crops, and livestock. The study was conducted in the HKH region, covering the countries of Afghanistan, India, Nepal, Pakistan, and Tibet. The study was conducted in the HKH region, covering the countries of Afghanistan, India, Nepal, Pakistan, and Tibet. The study was conducted in the HKH region, covering the countries of Afghanistan, India, Nepal, Pakistan, and Tibet.

The results show that overall mountain agriculture has been declining since the 1980s. This is due to a number of factors, including the loss of agricultural land, the depletion of natural resources, and the impact of climate change. However, there are some opportunities for increasing mountain agriculture production through increasing crop yields, diversification into horticultural crops, and increasing animal production through increasing crop yields. The study also found that in some cases, mountain agriculture production can occur as a result of increased access to modern inputs such as quality seeds, fertiliser, and irrigation, resulting in higher yields and increased income for farmers. Nonetheless, there is still a need for policy interventions to support mountain agriculture and to ensure that the benefits of modern inputs are shared by all farmers in the region.

Dr. Pradeep M. Tulachan

Farm Economist, Mountain Farming Systems Division

International Centre for Integrated Mountain Development

The views and interpretations in this paper are those of the author(s). They are not attributable to the International Centre for Integrated Mountain Development (ICIMOD) and do not imply the expression of any opinion concerning the legal status of any country, territory, city or area of its authorities, or concerning the delimitation of its frontiers or boundaries.

Copyright © 2001

ISBN 929115 278 1

Published by

International Centre for Integrated Mountain Development
G.P.O. Box 3226,
Kathmandu, Nepal

Editorial Team

Greta Mary Rana (Senior Editor)
Beatrice Shrestha (Editor)
Sushil Man Joshi (Technical Support and Layout)

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 economic profitability 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 small-holder 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.

The most direct outcome of this study is that there is an increasing trend towards high value crops and livestock production in the HKH. This is a positive trend as it indicates that the HKH is becoming more economically viable and that the people living there are becoming more prosperous. The study also shows that there is a need for more research and extension services in the HKH, particularly in the areas of high value crops and livestock production. This is because the HKH is a high pressure area and the people living there are under a lot of stress. The study also shows that there is a need for more community-based organisations in the HKH, particularly in the areas of high value crops and livestock production. This is because the HKH is a high pressure area and the people living there are under a lot of stress. The study also shows that there is a need for more community-based organisations in the HKH, particularly in the areas of high value crops and livestock production. This is because the HKH is a high pressure area and the people living there are under a lot of stress.

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. Qjan 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

Table of Contents

Executive Summary	
Preface	
Acknowledgements	
Acronyms and Abbreviations	
Chapter 1: Introduction	1
The Context	1
The Study	2
Methodology	3
Organisation of the Text	6
Chapter 2: The State of Mountain Agriculture in Bhutan	7
Introduction	7
Farming and Cropping Systems	8
Food Grain Crops and Potatoes	10
Horticultural and Cash Crops	11
Livestock	12
Chapter 3: The State of Mountain Agriculture in China	15
Introduction	15
Cropping Systems	16
Food Grain Crops	18
Horticultural and Cash Crops	19
Livestock	22
Chapter 4: The State of Mountain Agriculture in India	25
Introduction	25
Cropping Systems	26

Food Grain Crops	27
Horticultural and Cash Crops	28
Livestock	30
Chapter 5: The State of Mountain Agriculture in Nepal	33
Introduction	33
Cropping Systems	34
Food Grain Crops	34
Horticultural and Cash Crops	35
Livestock	36
Chapter 6: The State of Mountain Agriculture in Pakistan	39
Introduction	39
Cropping Systems	41
Food Grain Crops	42
Horticultural and Cash Crops	43
Livestock	45
Chapter 7: Trends of Mountain Agriculture in the Hindu Kush-Himalayas	49
General Trends and Patterns	49
Possible Reasons for the Present Trends and Patterns of Mountain Agriculture	54
Chapter 8: Constraints to the Sustainable Development of Mountain Agriculture: Implications of the Present Trends	57
Constraints to Mountain Agriculture	57
Implications of the Present Trends for the Sustainable Development of Mountain Agriculture	62
Bibliography	65