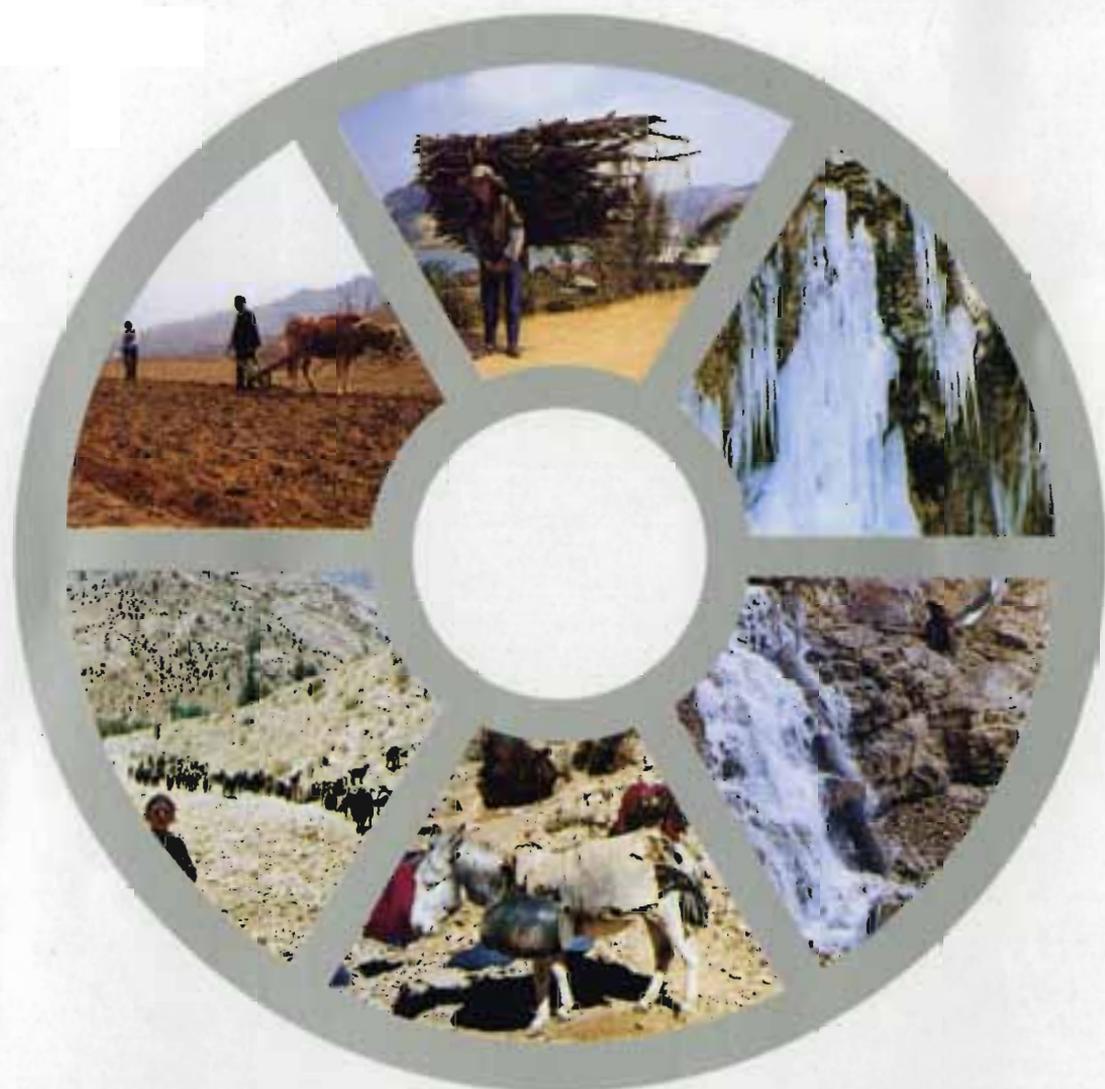


Appropriate Farm Technologies for Cold and Dry Zones of the Hindu Kush-Himalayas



Editor
Shaheena Hafeez

International Centre for Integrated Mountain Development
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Front Cover Photo

1. A woman farmer carrying fuelwood, China
2. Animal grazing the arid highlands, Pakistan
3. Indigenous agriculture, China
4. Rubber water container invented by Afghan refugees, Pakistan
5. Water seepage in the highlands freezes in winter, Ziarut, Pakistan
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2. Gypsy worker making a broom from dry palm leaves (Balochistan)
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4. Afghan woman spinning wool with traditional equipment, Quetta, Pakistan
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Editor

Shaheena Hafeez

This collection of farm technologies is a compilation of field work carried out in China, India, and Pakistan. Three experts, namely, Wang Dasheng from CAS, China, P. K. Khosla from Dr. Y. S. Parmar University, India, and A. W. Jasra from PARC, Pakistan, were commissioned to carry out research and documentation of appropriate and indigenous farm technologies in selected sites within their respective countries. The present monograph is a compilation of the studies submitted and these are listed below.

Documentation of Appropriate Farm Technology for Mountain Areas of China by Wang Dasheng, Chinese Academy of Sciences, Beijing, China

Appropriate Indigenous Farm Technologies in Cold Deserts by Khosla, P. K., Dr. Y.S. Parmar University of Horticulture and Forestry, Solan, H.P., India

Appropriate Farm Technologies in Arid and Semi-Arid Mountainous Areas of Pakistan by Jasra, A.W.; Hussain, A.; and Batool, N., PARC, Islamabad; Khan, C. Z. A.; Kasi, M. M. A.; and Mahmood, T., Department of Agriculture, Balochistan; and Ghaffar, C.A., Department of Agriculture, Punjab, Pakistan

Foreword

Documentation and exchange of information on the Hindu Kush-Himalayas is one of the four activities the International Centre for Integrated Mountain Development (ICIMOD) is mandated to do according to its statutes.

Of the 150 million people inhabiting the Hindu Kush-Himalayas and Qinghai Tibetan Plateau, some 80 per cent are engaged in farming; and whereas the farmers of the Central Himalayas have received much attention from governments, NGOs, and donor organizations, those living in cold and dry mountain areas of this region have often been left on the margins of development support.

While it is impressive how local committees in cold and dry mountain areas have responded to their harsh environment by developing technologies for sustaining traditional farming systems, new aspirations have also induced their quest for change. Technologies successful in other agro-ecosystems are often taken on without proper testing. A technology may be revolutionary in terms of increasing sociocultural structures of an area. Therefore, careless dissemination of a technology may harm the credibility of the technology promoter. In addition to describing in detail many of the technologies, a separate chapter was prepared to include women-specific technologies. These technologies are related both to reducing the drudgery of tasks women are often faced with in their daily lives and those that have scope for income generation.

This monograph has been brought together in collaboration with focal institutions in three HKH countries, namely, China, India, and Pakistan. It contains detailed accounts of diversified technologies. I also acknowledge the valuable input given by Dr. Abdul Wahid Jasra, Director, National Aridland Development and Research Institute (NADRI), Islamabad, Pakistan, in compilation of the draft document.

ICIMOD is grateful to Dr. Shaheena Hafeez for her commitment to producing this manual, which we hope will inspire others to test and disseminate these and other technologies that could contribute to improving the livelihoods of the inhabitants of the cold and dry mountain areas of the HKH.

Egbert Pelinck
Director General

Preface

Mountain communities have managed to survive for generations by using local resources as well as indigenous knowledge. Consistently growing socioeconomic pressures compel the traditional farmer to adopt modern technologies in order to improve farm productivity for economic growth. However, the farmer may not be aware that using technologies at random could cause resource degradation. Because of the highly fragile physiognomic features of the mountains in the HKH region, haphazard selection of technologies could increase the risk of degradation. This is largely because the most widely adopted technologies that have a lasting impact on the process of agricultural transformation in the plains may not be so successful when applied to a mountain environment. In order to address this situation, in 1996 ICIMOD began the documentation of appropriate forms of technologies for cold and dry mountain zones of the HKH region. This manuscript is the outcome of the collaborative efforts of ICIMOD and focal institutions in the three regional countries, i.e., the Chinese Academy of Sciences, Beijing, China; Dr. Y.S. Parmar University of Agriculture and Forestry, Solan, Himachal Pradesh (H.P.), India; the National Aridland Development and Research Institute (NADRI), Islamabad, Pakistan; and the Pakistan Agricultural Research Council (PARC), Islamabad, Pakistan.

Chapters One and Two of the book justify the need for appropriate technology in the HKH region, giving comprehensive information on the biophysical and social environment of the areas in which most of the farm technologies are currently applied. Chapters Three to Seven describe relevant farm technologies in various categories in terms of their application. Three kinds of technology are included: modern, indigenous, and a blend of both. Modern technologies have already been tested in one place or another in the HKH region. In some cases, traditional farmers have been highly innovative in developing a useful technology based on their indigenous experience, and this technology is very effective in increasing farm productivity. Some technologies are an integration of modern ideas and indigenous knowledge, i.e., an indigenous technology improved by merging it with any modern innovation or a modern technology modified to suit the local climatic or socioeconomic conditions. These technologies should prove promising not only in most of the dry and cold parts of the HKH region, but also in similar agro-ecological zones all over the world. Thus, one of our recommendations is that an International Conference on Appropriate Farm Technologies should be organized to initiate a worldwide dissemination process.

I greatly acknowledge the support and guidance of Dr. Egbert Pelinck, Director General, ICIMOD, during the whole process of technology documentation. The contributions of Dr. Mahesh Banskota, Deputy Director General, and Dr. Tej Partap, Head, Mountain Farming Systems' Division (MFS), ICIMOD, have been extremely useful in the completion of this work. I sincerely appreciate the contribution of Dr. Abdul

Wahid Jasra, Director, National Aridland Development and Research Institute (NADRI), Islamabad, Pakistan; his technical assistance and professional input in the preparation of the final report were of immense help. His zeal in assisting me cannot be adequately expressed in words. The assistance of Mr. Iftikhar Uddin Sikder, MENRIS, ICIMOD, in providing maps for this publication, is well acknowledged. Mr. Manish Kokh Shrestha has done an excellent job of typing and compiling the document. The publications' staff of the Documentation and Information Service (DITS), ICIMOD, particularly Anita Pandey, Assistant Editor, Asha Kaji Thaku, Cartographer, and Sushil Joshi, Desktop Publisher, were of great assistance to me in preparing the final draft. Finally, I would like to thank Dr. Zafar Altaf, Chairman of the Pakistan Agricultural Research Council (PARC) and current Chairman of the Board of Governors of ICIMOD, for his guidance, technical inputs, and professional assistance, particularly for the Pakistan study.

To the many people who helped me during field travels in the region, my heartfelt gratitude.

Shaheena Hafeez

Acronyms and Abbreviations Terms

Abstract

The HKH region is the world's highest mountain region, extending over 3,500km. Appropriate farm technologies of the cold and dry HKH mountain areas of China, India, and Pakistan have been documented in this monograph. Technologies for water conservation are being used for the management of water and the irrigation of staple crops and orchards. There is one innovative technology for the artificial recharge of groundwater, i.e., delay action dams (DADs), that has been documented here. There are a total of 17 technologies for land and soil management. Land management technologies are mostly biological tools that improve land productivity levels under natural conditions, whereas soil-related technologies focus on soil fertility, tillage, and so on for crop production. Most of the technologies to increase productivity focus on fruits and vegetables, with a few concentrating on animal production and farm machinery. The agroenterprise-oriented technologies motivate farmers to transform their traditional subsistence-oriented economies into commercial, income-generating farm economies. Indigenous agro-based technologies are women-specific and focus on gender equity in the male-dominated social structures of the HKH region by strengthening the economic empowerment of women. These technologies include farm produce preservation and commercial processing, beekeeping, mushroom production, palm leaf household products, and other cottage products. Some recommendations for study and dissemination of these technology packages at various levels have been listed. The annexes are valuable and list well-known fruit and vegetable varieties found in the different agro-ecological zones of the HKH region.

Emchi	Indigenous medicinal practice
Faphra	<i>Fagopyrum taticum</i>
Far or garu	Male off-spring of yak x dzomo
Fir	Male crossbreed of yak x garmo
Qarmo	Female off-spring of yak x dzomo
Qirmo	Female crossbreed of yak x garmo
Qorich	Winter winds
Qour	A traditional brown sweetener, i.e., a sort of molasses
Kanda	Cultivated fields in the high hills/landholdings far away from settlements
Karez	Underground channelled irrigation system
Karnu	<i>Carissa caranda</i>
Katcha	Temporary
Khadis	Handlooms
Kharif	Summer crop season
Khurud	Non-fat dry cheese
Knol khol	Kohlrabi
Kuhl	Channel irrigation
Kuth	<i>Saussurea costus</i>
Lafe	Boiled apricot as medicine for animals
Landhai	Air-dried mutton from winter lamb
Lassi	Liquid skimmed milk
Lizo	Wild cherries
Lok	Male offspring of yak x girmo
Lokmo	Female offspring of yak x girmo
Malik	Tribal chief
Mash, masur, and moong	Lentils and pulses
Methi	<i>Trigonella foenum-graecum</i>
Mullah	Muslim saint
Naswar	Chewing tobacco
Nullahs	Streams (perennial or ephemeral)
Nangke	<i>Ribes orientale</i>
Pattus, pattis,	Handwoven woollen cloth
Rabi	Winter crop season
Rashtu	<i>Rhus punjabensis</i>
Sailaba	Rainfed flooding
Sarson	Mustard
Shangma	A light bluish stone
Thobi	Rugs made from yak hair
Torgmo	Female crossbreed of yak x lokmo

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