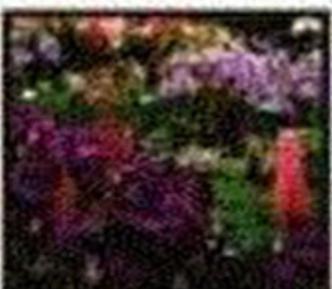
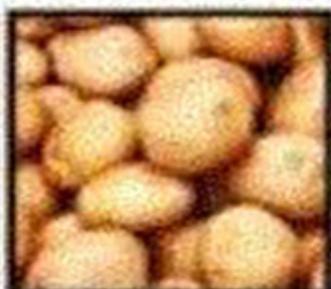




Sustainable Hill Agriculture

AN OVERVIEW

Anil Kumar, B. C. Sharma & Vikas Sharma



SUSTAINABLE HILL
AGRICULTURE -
AN OVERVIEW

SUSTAINABLE HILL AGRICULTURE - AN OVERVIEW

EDITORS

**Anil Kumar
B. C. Sharma
Vikas Sharma**



AGROBIOS (INDIA)

Editors:

Anil Kumar, Ph.D.

Division of Agronomy, Faculty of Agriculture
Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu
Chatha, Jammu-180009

B. C. Sharma, Ph.D.

Division of Agronomy, Faculty of Agriculture
Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu
Chatha, Jammu-180009

Vikas Sharma, Ph.D.

Division of Soil Science and Agricultural Chemistry, Faculty of Agriculture
Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu
Chatha, Jammu-180009

Published by:

AGROBIOS (INDIA)

Agro House, Behind Nasrani Cinema
Chopasani Road, Jodhpur 342 002
Phone: 91-0291-2642319, Fax: 2643993
E. mail: agrobios@sify.com



AGROBIOS (INDIA)

© All Rights Reserved (2011)

All rights reserved. No part of the book or part thereof, including the title of book, be reprinted in any form or language without the written permission of the author and the publishers. The copyists shall be prosecuted.

ISBN No. (13): 978-81-7754-453-4

Published by: Dr. Updesh Purohit for Agrobios (India), Jodhpur

Laser Typeset at: Yashee Computers and Printers, Jodhpur

Cover Design by: Reena

Printed at: Bharat Printers (Press), Jodhpur

PREFACE

Agriculture is the predominant livelihood activity in hills. Hill and mountain region in India is spread over an area of 53.8 million ha, which is inhabited by 33.7 million people of whom more than 90% live in rural setup. Agriculture is much more important for hills' economy as scope for industrialization is limited due to topographical constraints and environmental concerns. There are vast forests, pastures, grazing lands, miscellaneous groves and trees, much higher rainfall, moderate temperature and intensive natural vegetation which add lot of organic matter every year to soils. Naturally the fertility of soils in hills is comparatively high as compared to plain areas. Hills also have a **comparatively advantage or "niche" over plains for production of the off-season vegetables; hi-value vegetable seeds sub- temperate and temperate fruits like apple, almond, kiwi etc., medicinal plants and other high value cash crops.** However sustaining productivity in the hills is a major challenge. Sustainability is the ability of a system and its sub systems to maintain a certain well defined level of performance or output over time. Sustainable agriculture development thus implies the management of resources including land, labour, capital, technology and water. The hills have limited cultivated land across the Indian Himalayas. Their economy is largely dependent upon agricultural crops, horticulture and livestock rearing. Farming in hills assumes greater significance in comparison to lowlands for reasons of fragility of environment. Agriculture is an important of all farming systems in the hills.

Hills and mountains are distributed all over the country covering 23 states. However, the largest area is located in the Himalayas, which is the most prominent hill eco-system. It consists of two distinct geo-political sub regions, viz., North Eastern (NE) Hills and North-Western (NW) Hills. In total there are eight states in NE hills and three states in NW hills. Climatically both the regions are different in nature. Annual rainfall in NE hills is very high (2800-12000 mm per year) as compared to NW hills (350-3000 mm per year). The pattern of agriculture is also different in the two regions. Shifting cultivation is predominant in NE hills, whereas settled cultivation is traditionally common in NW hills. Rice is the major crop of NE hills. Pig, mithun, yak, cow and poultry are major livestock in this region. In contrast, wheat, rice and maize are major crops and cow, sheep, goat, buffalo and yak are the important livestock of NW hills. Both the regions have tremendous bio-diversity. The conservation of biological diversity and genetic resources in hills is an

important issue in ensuring food security. Apart from that the adoption of new strategies would increase their potential based on plant genetic variability for favourable characteristics in primitive cultivars. Also relatives of various crops can be exploited in breeding programmes for developing varieties adopted to hill environments. The role of biodiversity, land races, multipurpose trees and multipurpose crops for sustainable agriculture is all well known and must be harnessed in future in 21st century.

Land degradation including soil erosion is one of the major problems faced by the farmers of hilly areas of the world. Many-a-times soils are of poor structure and contain low organic matter resulting in enhanced rates of soil erosion under unprotected conditions. Agro-forestry is an age old land use system which has been practiced by farmers in hilly areas of our country. Shifting cultivation, a sequential agro-forestry system, was the initial attempt in hilly areas to grow food. The system which was identified as stable and efficient, have become heavy environmental and socio-economic liability. The agro-forestry systems are superior to other cropping systems due to their potential for soil management. Integration of tree component on agricultural and pasture land helps to control erosion. Horticulture has been identified to be the most remunerative diversification of land use in hilly areas. It not only prevents soil erosion but also helps to maintain the natural fertility of the soils. It has provided greater opportunities for employment during pre and post-harvest management. The increase in productivity over the years is relatively lower in comparison to Western countries. The scenario, therefore, requires restructuring of production planning to develop strategies for faster development of horticulture in Himalayas. There is a tremendous scope for diversification in horticultural crops due to varying extent of agro-climatic conditions, land-use and economic returns. This approach is not only required in the selection of crops but also in the selection of varieties. Diversification should aim at selection of low volume and high value cash crops in fruits, vegetables and flowers and particularly the crops which have export potential. It should also help to meet out domestic requirements besides raising economic status of the people through ancillary crops such as mushroom, cut flowers and spices. Sustainability of hill agriculture needs elaborate research to quantify the indicators, which are most sensitive to change. It will demand systems approach to study soil process, land use dynamics, organic matter status and post status both on short and long term basis. Indigenous knowledge and ecological role played by traditional farming must be integrated with efforts to improve hill farming. The hill agriculture should not only address to food and environment but economic and livelihood security as well. The prosperity and employment generation has to come from diversified land use, higher productivity, value additions, marketing and related activities. It is necessary to consider spatial variation management to increase the productivity. The hill watersheds management should address to a set of common goals and at the same time be specific to local needs and potential. Still it is a challenge to synthesize the technology and practices so as to sustain the ecosystem and use the resources meeting ecological, economical and social functions. The environmental security, higher productivity and

prosperity of hills are thus interdependent, and need sufficient efforts. A prosperous and environmentally secured mountain region is a pre-condition for a developed nation-India.

The hill farmers are caught in the vicious cycle of poverty. Innovative technologies are the need of the hour for mitigating the miseries of these resource poor farmers. These technologies by and large include an integration of all enterprises be it crop husbandry, alternate land use systems, and other income generating units at the farm level. Yield potential of irrigated plains have been more or less realized, however, a vast scope lies in enhancing production from the hills and mountains. For achieving these targets we will have to be innovative in integrating the different agricultural sciences from water conservation to biotechnological interventions. The present book is an effort to integrate the traditional and modern technologies for maximizing the profitability, productivity and sustainability of hill farming areas.

In this endeavour, we sincerely acknowledge the contributors for their valuable inputs covering wide aspects of sustainable hill agriculture. We are grateful to our family members for their cooperation and understanding during the long hours spent in the preparation of the manuscript.

A deep sense of gratitude goes to our hon'ble Vice Chancellor, Dr. B. Mishra for creating conducive environment to take up devotional assignment of this kind. Appreciation is must for International Book Distributing Corporation, Lucknow in general and Mr. Suneel Gomber in particular for taking personal interest and putting great efforts in giving practical shape to our thoughts and ideas.

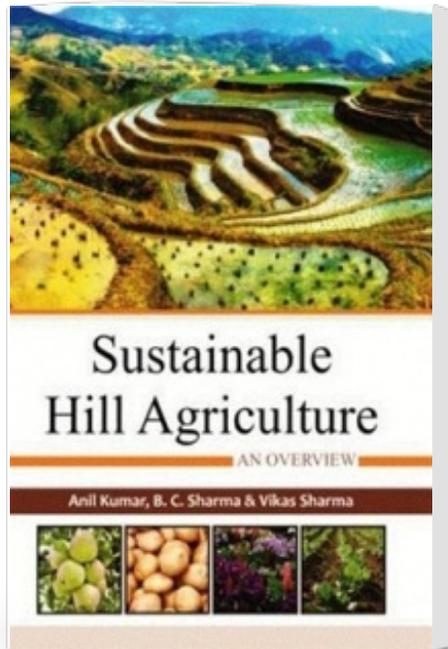
June, 2011

Editors
Anil Kumar
B. C. Sharma
Vikas Sharma

COUNTRIBUTORS

1. **AKASH, SHARMA**
Division of Agronomy, FOA,
SKUAST-J, Main Campus
Chatha. Jammu-180009
2. **AMANULLAH, M. MOHAMED**
Department of Agronomy,
Tamil Nadu Agricultural University,
Coimbatore – 641 003, India
3. **ANIL, KUMAR**
Ph.D. Student, Department of Soil
Science, College of Agriculture
CSK HPKV Palampur 176 062 (H.P.)
E. Mail: anilkumarhpkv@gmail.com
4. **ARORA, SANJAY**
Central Soil Salinity Research Institute,
ICAR, Bharuch, Gujrat
5. **BAKSHI, PARSHANT**
Division of Fruit Science
Sher-e-Kashmir University of
Agricultural Sciences and Technology-
Jammu, Main Campus
Chatha, J&K-180 009
6. **BALI, A. S.**
Division of Agronomy, FoA, Chatha,
Sher-e-Kashmir University of
Agricultural Sciences and Technology
of Jammu, Jammu-180 009 (J&K)
7. **BASSI, K.**
Department of Agronomy,
CSKHPKV, Palampur – 176 062
(H.P.)
8. **BAWA, S S**
Zonal Research Station for Kandi Area
(PAU), Nawanshahar, Punjab
9. **BHAGAT, R. M.**
DRI cum Dean PGS
Sher-e-Kashmir University of
Agricultural Sciences and technology
of Jammu, Chatha, Jammu-180009
10. **BHAT, DEEP JI**
Division of Vegetable Science and
Floriculture, SKUAST-Jammu, FoA
Main Campus Chatha-180009
11. **CHOHAN, ABHA**
Directorate of Extension Education,
SKUAST-K, Shalimar, Srinagar
12. **DWIVEDI, SUDHAKAR**
Div. of Agricultural Economics and
Statistics, FoA, SKUAST-Jammu
13. **GUPTA, B. B.**
Division of Plant Breeding and
Genetics, Sher-e-Kashmir University
of Agricultural Sciences and
Technology, Main Campus, Chatha,
Jammu-180 009 (J&K), India
14. **GUPTA, R. D.**
Ex-Associate Dean, Faculty of
Agriculture, Sher-e-Kashmir University
of Agricultural Sciences and
Technology of Jammu
15. **GUPTA, R. K.**
Division of Entomology
SKUAST- Jammu
16. **GUPTA, S. K.**
Division of Agroforestry, Faculty of
Agriculture, SKUAST, Jammu
Chatha, Jammu 180 009
17. **GUPTA, VISHAL**
Faculty of Agriculture
Sher-e-Kashmir University of
Agricultural Sciences and Technology
of Jammu, Main Campus
Chatha-180009 (J&K)
18. **KALHA, C. S.**
Faculty of Agriculture
Sher-e-Kashmir University of
Agricultural Sciences and Technology
of Jammu, Main Campus
Chatha-180009 (J&K)

Sustainable Hill Agriculture: An Overview



Publisher : Agrobios
Publications

ISBN : 9788177544534

Author : Kumar A, Sharma
B, Sharma V

Type the URL : <http://www.kopykitab.com/product/7098>



Get this eBook