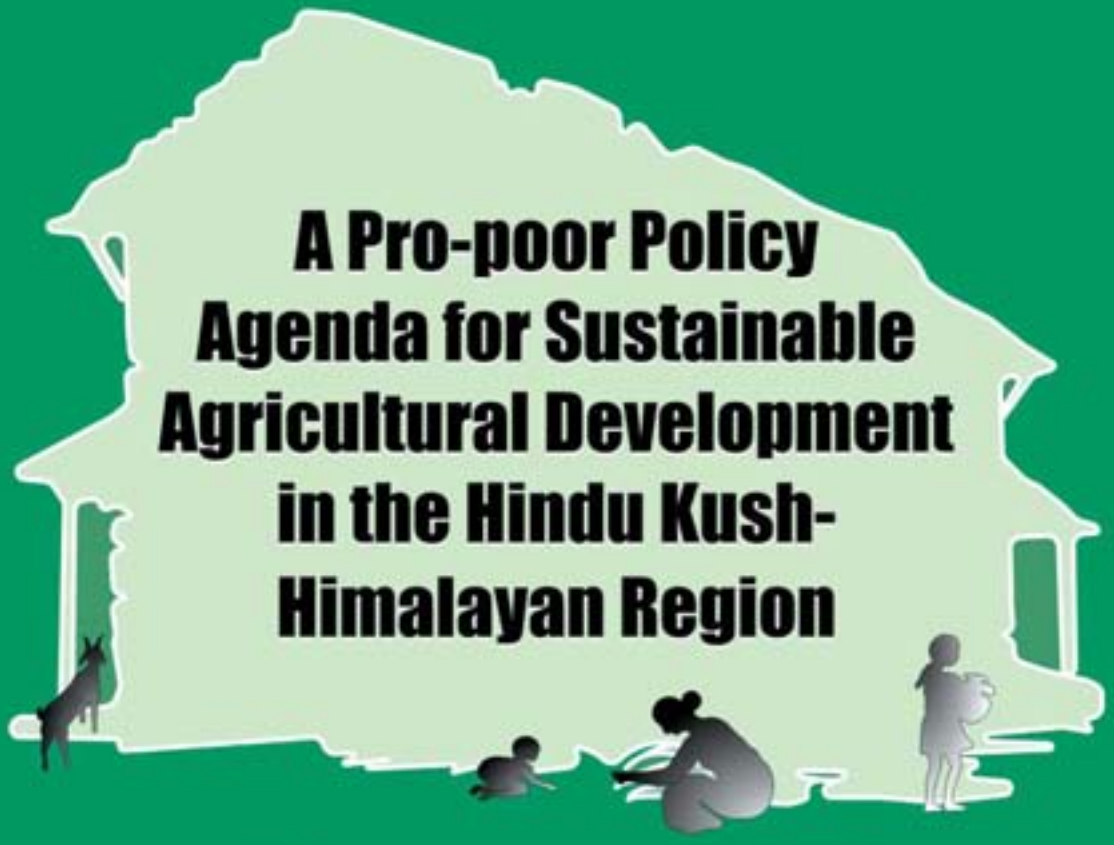
A Pro-poor Policy Agenda for Sustainable Agricultural Development in the Hindu Kush-Himalayan Region



ICIMOD

Talking Points

2/07

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The International Centre for Integrated Mountain Development (ICIMOD) is an independent 'Mountain Learning and Knowledge Centre' serving the eight countries of the Hindu Kush-Himalayas –  Afghanistan,  Bangladesh,  Bhutan,  China,  India,  Myanmar,  Nepal, and  Pakistan – and the global mountain community. Founded in 1983, ICIMOD is based in Kathmandu, Nepal, and brings together a partnership of regional member countries, partner institutions, and donors with a commitment for development action to secure a better future for the people and environment of the extended Himalayan region. ICIMOD's activities are supported by its core programme donors: the governments of Austria, Denmark, Germany, Netherlands, Norway, Switzerland, and its regional member countries, along with over thirty project co-financing donors. 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.

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preface

The agricultural sector has made tremendous progress in the lowlands of Asia including Bangladesh, China, India, Nepal, and Pakistan. The productivity of major crops such as rice, wheat, pulses, and other cereal and non-cereal crops has increased considerably through the use of green revolution technologies such as high-yielding varieties, inorganic fertilisers, pesticides, and irrigation. The mountain regions of these countries have, however, gained little from these technologies and other agricultural advances. In general, mountain farmers have been plagued by problems and constraints of low productivity, erosion of soil nutrients, extreme poverty, and rapid environmental degradation. Compared to the plains, mountain communities face formidable difficulties in improving the conditions of their lives as well as the prime source of their livelihoods which remains to be agriculture.

A key challenge facing policy makers and development practitioners of the region is how to increase agricultural productivity and reduce poverty without degrading the natural resource base on which mountain farmers largely depend. To achieve this multiple goal, it is necessary to understand the characteristics of mountain agriculture: how it differs from agriculture in the plains, where green revolution strategies have worked; and the types of policies, programmes, and institutional arrangements needed to overcome the different nature of the problems characterising mountain farming. There is a dearth of research and knowledge development in this area, a gap which organisations like ICIMOD are making the effort to fill in.

Drawing from the experiences in mountain areas in the eight countries of the HKH region, this study attempts to enhance our understanding by analysing extant policies and programmes targeted towards mountain areas. Most countries of the region are pursuing almost similar agricultural policies and strategies in mountain areas as used in the plains, ignoring mountain specificities such as fragility, marginality, inaccessibility, and underharnessed niche-based resources and environmental services. As a result, agricultural services such as research, extension, credit, marketing – designed to promote green revolution technologies – have largely failed to deliver the kind of information, knowledge, and extension services needed by mountain farmers to overcome their unique constraints.

This book raises important policy and institutional issues and provides some analysis-based explanation for the poor state of agriculture in mountain areas in general. It suggests a multiple-stakeholder, multi-disciplinary approach in designing and implementing policies and setting up institutions to achieve the twin goal of agricultural development in mountain areas, and sustainable management of natural resources. The book is intended for study and use by those responsible for designing and implementing agricultural policies and setting up agriculture and planning-related institutions.

It is our sincere hope that the publication raises awareness and generates new interest in critical policy and institutional issues concerning mountain agriculture. We hope it stimulates discussion to contribute to shaping the views and perspectives that can lead to improved planning and implementation of integrated agriculture, natural resources, and rural development programmes in mountain areas.

Golam Rasul and Madhav Karki

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executive summary

The vast majority of people in the Hindu Kush-Himalayan (HKH) region live in rural areas and depend primarily on agriculture for their survival and wellbeing. Mountain farmers have gained little from agricultural development during the Green Revolution, which has been the programme pursued by most governments in the region during the 1970s and '80s. Since then, and in order to meet the increasing demand for agricultural products for subsistence as well as cash incomes more marginal lands have been being brought under cultivation. This has accelerated deforestation, soil erosion, and environmental degradation, creating a vicious cycle of poverty, degradation, and deprivation. There has not been enough research on land-use practices suitable for mountain areas, and available mountain land use practices have failed to gain wider acceptance. The question is why?

By analysing policies, programmes, and institutional arrangements (such as research, extension, input delivery including credit and marketing), this paper attempts to identify key policy and institutional factors that constrain the wider adoption of sustainable agriculture and sound land-use practices in the HKH region. The analysis shows that agricultural policies and strategies in most countries in the region target agriculture for the plains, particularly for field crops. By ignoring mountain-specific biophysical and socioeconomic factors and diversification potentials and constraints, most countries in the region are pursuing the same agricultural policies and strategies in mountain areas as used in the plains. Public organisations, based on narrow disciplinary mandates that promote green revolution technologies and services oriented toward the needs of the plains, have largely failed to deliver the kind of focus and services required by mountain farmers. Drawing evidence from different parts of the HKH region and other similar regions, this Talking Points paper concludes that agricultural development and resource conservation goals can be achieved simultaneously by removing existing policy biases, and imperfections, and reorienting institutions towards mountain agriculture. Such an approach, however, would require a fundamental change in policies, institutions, strategies, and programmes. This paper develops a framework for such a change or paradigm shift and discusses the concepts.

acronyms and abbreviations

ADB	Asian Development Bank
APP	Agricultural Perspective Plan
ARMP	Agricultural Research Management Projects
BRS	Bangladesh Bureau of Statistics
CHT	Chittagong Hill Tracts
GR	Green Revolution
GRTs	green revolution technologies
GTZ	German Technical Cooperation
HKH	Hindu Kush-Himalayan region
HYV	high yielding varieties
ICIMOD	International Centre for Mountain Development
MAD	medicinal, aromatic and dye plants
NTFP	non-timber forest products
NWFP	North-West Frontier Province of Pakistan
SALT	sloping agriculture land technologies
SRDM	sustainable agriculture and rural development in mountain areas

contents

High altitude and steep slopes, among others, limit the mountain region's suitability for arable agriculture.

1 Introduction

Agriculture is the mainstay of hill and mountain economies in the Hindu Kush-Himalayan (HKH) region. The majority of the region's population live in rural areas and depend primarily on agriculture for their sustenance and wellbeing. Agriculture not only provides livelihoods for the vast majority of people, it also supplies raw materials for industry and is therefore the main vehicle for rural development and poverty alleviation in the region.

Mountains are one of the most fragile natural ecosystems on earth. The ecosystem of the HKH, comprising several parallel mountain ranges stretching from Afghanistan in the north-west to Myanmar in the south-east, is particularly fragile. High altitude, steep slopes, and seasonal variability limit the mountain region's suitability for intensive agriculture, and only 5% of the land is suitable for intensive crop-based agriculture (Banskota 2000). Increasing population and decreasing productivity combined with changing consumption patterns have created an increased demand for agricultural products. This has triggered the intensification of agriculture without appropriate management on fragile lands, which has accelerated deforestation, desertification, soil erosion, and environmental degradation. The negative effects of intensified agriculture on the mountain environment of the HKH has, in turn, affected the lives of 150 million people living in the region and indirectly affected about 450 million more living downstream, and has raised serious concerns about the long-term sustainability of mountain agriculture that degrades the resource base.

Himalayan countries have a long history of agricultural policy and institutional development starting with the transformation of traditional extensive forms of agriculture to modern intensive agricultural systems. Since the late 1960s, the focus of this process was on dissemination of green revolution technologies (GRTs) which mainly included the propagation of seeds of high yielding varieties (HYVs), and the use of irrigation, inorganic fertilisers, pesticides, and mechanisation. Public services including research, extension services, and credit facilities were developed and put into place to disseminate these technologies. Large investments were made in infrastructure for irrigation, roads, marketing, and credit facilities in almost all the HKH countries. Policies and institutional arrangements were also put in place to support the process.

Although such programmes have succeeded in enhancing agricultural productivity in the lowlands, the HKH region has gained little from this development. Most of the technologies did not suit mountain conditions characterised by high poverty and low physical and socioeconomic infrastructure (Rhoades 1997, ICIMOD 1997, Ya 1998). As GRTs did not suit the needs of hill and mountain areas these areas were considered to have a low development potential, and very limited investment was made in mountain areas in terms of agricultural development (Partap 2003, Bakhtani 2003).

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Because of these policies, the HKH region has lagged behind other regions of the world in agricultural development. Poverty and deprivation continue to be widespread in the region. A considerable proportion of South Asia's rural poor, many of them ethnic minorities, live in the HKH region and eke out livelihoods from a poor agricultural resource base. Survival needs have often forced them to use available resources without regard for future sustainability. This has accelerated the degradation of the agricultural resource base. It is estimated that more than 300 million hectares of land in the HKH region are degraded to a certain extent (Bhatta 1990, in Partap and Watson 1994).

A key challenge now facing policy makers is how to improve the quality of life of the region's people while conserving the increasingly fragile resource base. The experiences gained by the International Centre for Mountain Development (ICIMOD) and other organisations during the past decades show that even in mountain areas agriculture can be developed in a sustainable way, given appropriate policy reforms and institutional support (Partap 1994, Nangju 2003). Several technologies and institutional innovations such as multi-purpose agroforestry, modified sloping agricultural land technologies (SALT), alley cropping, the domestication of non-timber forest products (NTFPs), farm forestry, community forestry, and joint forest management are now available and offer ways to improve mountain livelihoods while conserving resources, thereby enhancing and broadening the resource base. The question is: why are these improved agricultural practices not being adopted on a large scale in the HKH region?

In order to design appropriate policies and institutions to promote sustainable agricultural development it is necessary to examine existing policies, rules, and regulations, and the general institutional environment that play significant roles in sustainable agricultural development. Despite great concern for the degradation of the agricultural resource base, little effort has been made to understand how policy and institutional factors interact to influence agricultural development in mountain areas. This *Talking Points* document attempts to fill in this gap by analysing the policy and institutional environment related to agriculture and natural resource management. It suggests a framework to achieve the twin goals of agricultural development and resource conservation – both urgent needs in the region. Given the considerable differences in levels of development, socioeconomic conditions, and policy and institutional arrangements within regional member countries, this publication does not attempt an in-depth, country-specific analysis, but rather focuses on common general issues to all mountain areas of the region.

2. Mountain Agriculture: Different from Agriculture in the Plains

A Conceptual Framework

The types and patterns of agriculture are largely determined by the physical environment (soil, climate, precipitation, slope, altitude, topography); by socioeconomic conditions (roads, transport, markets, knowledge, information, and culture); and by cultural factors of the area (Husain 1986). Mountains differ from the plains both in terms of biophysical and socioeconomic conditions. Biophysical conditions such as high altitude, steep slopes, poor soil, and rough topography make mountains inaccessible, fragile, marginal, and heterogeneous, and impose varying limits on arable agricultural land and the type of crops that can be grown in mountain areas. Inaccessibility, fragility, marginality, and heterogeneity impose heavy limitations on certain types of agriculture. On the other hand, the diversity and suitability of mountain areas for niche agricultural products and services open up unique opportunities (*for details see* Jodha 1992; Jodha et al. 1992).

Farming systems in mountains, even within small areas, exhibit varying degrees of diversity on account of site specificity and variability in microclimatic conditions and these degrees of diversity is matched by varying micro-ecological niches suitable to the cultivation of specific crops and crop combinations. Singh (nd), for example, found 11 different types of farming systems characterised by specific types of vegetation, crops, livestock, off-farm activities, and enterprises in just one area in the Garhwal Himalayas.

Mountain farming systems are complex and diverse and significantly different from farming systems operating under green revolution cover in the plains. In mountain areas, linkages among different farming components such as field crops, livestock, trees, and non-farm activities, are strong compared to lowland agriculture where the linkages among various components are often very low, if not missing. Forests are almost absent in the plains and work animals have been replaced by machines. While in the plains animal power is often replaced by mechanical power, livestock are an important component in mountain agriculture. Mountain agriculture is also largely dependent on intimate knowledge of plants, animals, pests, diseases, and their organic linkages and synergies, while agriculture in the plains is generally dependent on external inputs such as irrigation water, inorganic fertilisers, pesticides, and their supply comes from outside the agricultural sector (Table 1).

Because of these characteristic differences, problems and potentials of mountain agriculture is different from lowland agriculture and, therefore, requires different types and nature of information, knowledge, research, and extension service, as well as mountain-specific policies, strategies, and programmes.

Table 1. **Differences between prime lowland and mountain agriculture**	
Prime lowland agriculture	**Mountain agriculture**
Main characteristics	
Relatively simple, generally one or two lines of activity; limited crops, predominantly mono-cropping with only a few lines of activity	Complex, diverse, and risk-prone; several lines of activity taking place simultaneously integrating crops, livestock, multi-purpose trees and agroforestry, and growing a variety of crops
Objectives	
Generally aims at market sales and maximising profits	A way of life to enhance diversified livelihood options, mostly aimed at limited domestic consumption
Physical environment	
Low altitude plains, good soil, high potential for intensive agriculture, relatively large and homogenous environment easy for mechanisation and specialisation	High altitude steep slopes, poor soil, wide diversity and heterogeneity and fragile environment, limited suitability for crop-based intensive agriculture, little opportunity for mechanisation, and limited access to markets
Types of input	
External inputs such as HYV seeds, irrigation, inorganic fertilisers, pesticides, insecticides, a variety of machinery and equipment	Little external input, locally produced seeds, high dependency on locally available inputs, high nutrient recycling, reuse of resources - mainly human and animal power-based
Kinds of knowledge required	
Technological operation and maintenance of machines, use of inorganic fertilisers, pesticides, and insecticides	Human and often indigenous knowledge based on rich traditions and a culture of growing plants, animals, fish, conserving soil, growing trees with crops, managing pests and diseases, and reducing risks
Extension services required	
Transfer of modern technology	Transfer of knowledge and understanding about symbiotic interlinkages among components of a farming system including plants, animals, soils, water, sun, pests, diseases, and markets, to bring about more synergies
Kinds of infrastructure required	
Big irrigation infrastructure such as canals, roads, rural banking facilities, processing industry, market and credit facilities	Community-based processing and marketing enterprises, rural banks and credit outlets, marketing information systems, small technological facilities

3 The Policy and Institutional Environment

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Based on the conceptual framework developed in the previous chapter, this chapter examines selected policy and institutional issues in relation to agricultural development in mountain areas.

Policy biases against mountain areas

Witnessing the success of green revolution technologies in the plains, most countries in the HKH region have pursued a policy of promoting improved agricultural technologies to increase gross production, often measured in terms of cereal production and productivity. But these technologies are mostly suited to lowland conditions where agriculture is mainly homogeneous and where accessibility factors make them relatively easier to disseminate. Countries like India, China, Pakistan, and Bangladesh, where hills and mountains constitute a

considerable area, have pursued single-pronged green revolution technologies (GRTs). Even predominantly mountainous countries like Nepal have pursued similar policies. Nepal's Twenty Year Agricultural Perspective Plan (1995–2015) is dominated by GRTs such as the expansion of irrigation, application of inorganic fertilisers, improved technology, development of agricultural roads, and electricity, targeted at the Terai and hill valley regions where terrain and soil conditions are more favourable. The specificities of hills and mountains such as diversity, fragility, remoteness, inaccessibility, and niches, have not yet been sufficiently recognised and reflected in planning and implementing of national agricultural research and extension programmes and policies (*for details see* Jodha 1992, Vol.I:43–96; Jodha 1997:314).

Broadly, national policies, agricultural strategies, and institutional support systems in all countries of the HKH region are largely biased towards the promotion of lowland agriculture for the cultivation of field crops dominated by cereals such as paddy wheat and other mono-crops. Although the biophysical and agroecological conditions of mountain areas are significantly different from those found in lowland areas, most HKH countries employ lowland agricultural strategies and policies such as GRTs in the hope that mountain farmers will receive trickle-down benefits (Rhoades 1997). Unfortunately, past policies and strategies to stimulate agricultural development in mountain areas matched its biophysical conditions poorly and failed to address the typical socioeconomic conditions of mountain farmers who depend not only on diverse types of crops, but also on livestock, trees, and other forest products (Sharma 1997, Ya 1998, ICIMOD 1999). As a result, and despite good intentions, past agricultural policies and programmes have failed to bring about the desired impacts on agriculture and rural development in the HKH region.

Poor understanding of mountain livelihood problems

Mountain farmers are faced with a fragile and unstable environment. Their livelihoods therefore depend on the adoption of complex survival strategies involving a variety of enterprises (Yadav 1992, Demaine 1998). Wide variations in micro-climatic conditions and small land parcels that often fall on steep slopes provide limited scope for mechanisation and agricultural specialisation. Extreme poverty and relatively low natural capital have furthermore limited the ability of farmers to absorb risks of crop failure. Mountain farmers use forests and natural resources to gather a host of materials for food, fuel, medicines, construction materials, and other equipment. Livestock provides both draught power, meat, and cash income. In order to meet household cash requirements mountain farmers have to resort to non-farm employment, sometimes in distant cities and countries (Yadav 1992:143–61).

Mountain agriculture is, therefore, much more complex, diverse, and risk-prone than lowland agriculture. Sectoral policies and programmes designed to serve the lowlands, particularly in relation to field crops, have failed to address the diverse needs of mountain farmers that arise from the complex interdependencies between mountain agriculture and mountain livelihood systems (Fig. 1).

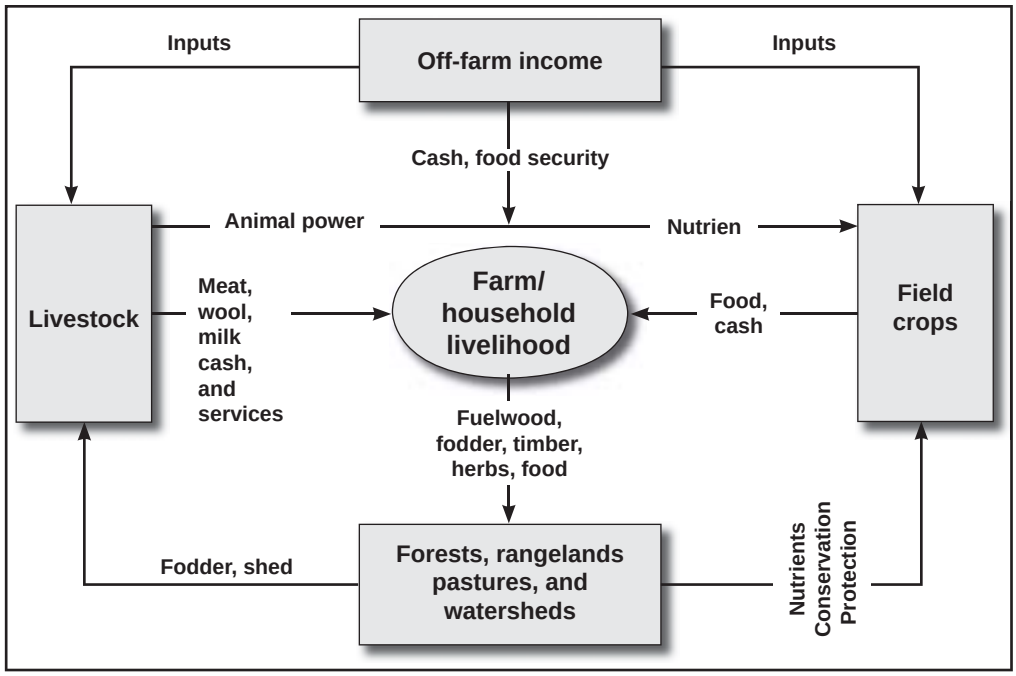

Figure 1. **Interdependencies and inter-linkages of mountain agriculture and livelihood systems**

Ujol Sherchan

Socioeconomic conditions of mountain farmers

The incidence and severity of poverty in mountain areas is relatively high compared to poverty in the adjacent plains. In Nepal, for instance, the severity of mountain poverty is more than double that of the Terai region (Table 2). Incidence of poverty is also higher in most of the mountain states in India (Planning Commission,

Table 2. **Incidence and severity of poverty in Nepal**

Region	Poverty Incidence (%)	Poverty Gap (Depth/Intensity of Poverty) (%)	Severity of Poverty (%)
Mountains	0.56	18.5	8.2
Hills	0.41	13.6	6.1
Terai	0.42	9.9	3.4
Nepal	0.42	12.1	2.8

Source: National Planning Commission 2003

Government of India 2006). The state of undernourishment of the population, one of poverty's finer manifestations, is much higher in several Indian Himalayan states such as Assam, Meghalaya, Sikkim, Arunachal Pradesh, Mizoram, and Tripura than the national average (Table 3). Poverty combined with a poor resource base and small farm sizes constrain investment by mountain farmers in agriculture and favour the continuation of traditional low-input agricultural practices that bind them to a low level of equilibrium and the poverty trap (Khan and Naqvi 2000).

Table 3. **Percentage of undernourished population in the Indian Himalayas compared to the national average**

States	Undernourished population (%)	Percentage of undernourished population compared to the national average (national average = 100)
Jammu and Kashmir	10	29
Himachal Pradesh	24	69
Uttarpradesh Hills	21	60
Sikkim	57	163
Assam	47	134
Arunachal Pradesh	52	149
Meghalaya	51	146
Mizoram	41	117
Nagaland	28	80
Manipur	30	86
Tripura	50	143
India (national average)	35	100

Source: Chand 2000

Mountain people are not only poorer, face much more resource constraints, and are generally undernourished, they are also often poorly educated because of poor access to schools and other public services. The literacy rate in Bandarban Hill district in the Chittagong Hill Tracts, for instance, is just about half that of the nearby plains district of Chittagong (BBS 2003).

Because of persistent poverty and undernourishment the poor are unable to take advantage of agricultural development programmes like growing cash crops, undertaking new ventures, and adopting new technologies (Lipton 2001).

Narrow discipline service organisations

There is a dearth of institutional and policy mechanisms to bring holistic and integrated expertise to mountain agriculture. Most of the service institutions providing research, extension, and marketing services in the Himalayan countries are governed by narrow disciplinary mandates such as forestry, livestock, fisheries, crops, non-crops, cereals, and non-cereals, amongst others, in line with the trend towards agricultural specialisation. Because of this, agencies operating under related mandates usually fall under different ministries or departments, and there is little coordination and cooperation among them. As a result, these service organisations receive different education, training, and orientation and have little communication and interaction with other agencies (Lundgren 1987, Arya 2000). Although organisations specialising in particular disciplines or fields of study fit well within specialised agriculture, they fail to address the needs of mountain farmers who require an integrated approach.

Poor orientation of public organisations to the mountain environment

Many public organisations that provide services for agriculture and forest development in mountain areas have tended to neglect mountain specificities and are poorly oriented to address the unique problems of mountain regions. Reasonably successful in generating technologies for lowland agriculture, these institutions are less successful generating knowledge and technologies that suit farming conditions in mountain areas. Confined by their narrow disciplines or orientation and long affiliation with lowland agriculture, agricultural scientists in the region have paid less attention to generating mountain-specific knowledge and technologies. Most agricultural research efforts are focused primarily on crops suited to lowlands. Mountain farmers need a more holistic and integrated knowledge to grow varieties of crops, trees, and livestock in fragile mountain environments. The primary thrusts of the nine major agricultural research institutes in Bangladesh, for example, are the sectoral aspects which have limited utility for farmers in the Chittagong Hill Tracts (Table 4).

Extension services provided in mountain areas also have little relevance as they are designed for the lowlands. In Bangladesh, for example, extension services are designed centrally according to the needs of lowland agriculture which require the increased adoption of irrigation and agro-chemicals (ADB 2001, Arya 2000, Rasul 2003). Lowland oriented extension services are being provided to all parts of the country, including the CHT where biophysical conditions are not suitable for lowland agriculture. As a result, extension officials, most of whom are Bengali from the plains, have little knowledge about the hilly environment and hill agriculture. A similar situation exists in Pakistan (Dr M Afzal, Director General, National Agriculture Research Centre, Pakistan, personal communication, 10 August 2006).

Table 4. **Research thrusts of the major agricultural research institutes in Bangladesh**

Research institution	Ministerial affiliation	Primary research thrusts
Bangladesh Agricultural Research Institute	Agriculture	Crop research with the exception of rice, tea, sugarcane, and jute crops
Bangladesh Rice Research Institute	Agriculture	Rice research, mainly high yielding varieties
Bangladesh Jute Research Institute	Agriculture	Jute
Bangladesh Sugarcane Research Institute	Agriculture	Sugarcane breeding
Bangladesh Tea Research Institute	Commerce	Tea research
Bangladesh Institute of Nuclear Agriculture	Science and Technology	Application of nuclear science to agriculture
Bangladesh Fisheries Research Institute	Fisheries	Fish culture
Bangladesh Livestock Research Institute	Livestock	Cattle and poultry research
Soil Research Development Institute	Agriculture	Soil and fertility research and monitoring

Unclear property rights

Many ethnic minorities live in the HKH region and use traditional agricultural practices like shifting cultivation in forest frontiers (Kerkhoff and Sharma 2006:6). The British colonial government nationalised most of the forest land in colonial India (which consisted of present-day India, Pakistan, and Bangladesh) and established reserve forests on vast areas in the mid-19th century. Although local people have been using these lands for centuries their access and usufruct rights are not yet recognised. As a result a profound feeling of insecurity and alienation has been developing among shifting cultivators and forest dwellers, which constrains them from adopting improved agricultural practices that require considerable investment in time and labour. Unclear property rights and tenurial insecurity not only constrain agricultural investment, they also deprive farmers of access to formal credit, inputs, and other institutional services required to improve agricultural practices (Soto 2000). Most importantly, they do not provide incentives to shifting cultivators or forest dwellers to be true stewards of the land and its resources and provide disincentives instead. Moreover, when property rights are absent the negative stock effects of agricultural practices such as soil erosion, land degradation, watershed deterioration, among others, are excluded from decision-making in crop choices and land use and management. This undermines long-term security of returns on the land and encourages what economist call, 'higher discount rates' and a short-term perspective.

Market failure to value public goods and services

Since time immemorial, mountain farmers have been the custodians of critical watersheds in nearly all the rivers in South Asia. Mountain watersheds contain vast amounts of forest resources and a unique biodiversity and are the places of origin of a variety of important food, tree crops, and medicinal and aromatic plants. Many

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services provided by mountain farmers in the form of soil conservation, watershed protection, biodiversity conservation, and carbon sequestration through good agricultural practices (such as agroforestry, zero tillage farming and hedgerow and tree farming) do not have any market price or value. Although society at large benefits from these services – and some of the benefits transcend the HKH region – farmers receive even less than the worth of their wage labour as the market fails to recognise the value of the environmental services that they and their environments provide. Because farmers are not compensated for their public goods and services, there is little incentive for them to adopt improved agricultural practices. As a result, farmers do not consider environmental externalities while making decision about land use and which crops to grow on fragile lands like hill slopes (Rasul and Thapa 2007). Some farming systems, such as agroforestry, protect the soil and provide environmental service while others like the cultivation of potatoes, ginger, and maize can lead to soil erosion, with enormous costs to the environment. Market prices do not reflect these environmental benefits and costs and, hence, farmers tend to discount them when choosing crops. Market failures arising from policy failures become more severe in mountain areas as these areas become better connected to markets and more commercialised. This is the condition in many parts of the HKH region where potatoes, ginger, and other cash crops are grown on marginal soil for high market prices regardless of environmental costs.

Poor marketing facilities

The increasing demand for cash income from farming has made marketing facilities fundamental to rural development. Mountain areas have limited markets for their produce owing to their sparse populations, consumption, difficult terrain, and high transportation costs to deliver produce to densely populated distant market centres, often located in the lowlands. These factors put farmers in mountain areas at a considerable disadvantage when competing for the domestic and export markets. As a result farmers in mountain areas are in a considerably disadvangated dicision when competing in the domestic export markets, hence, they receive less benefit from the same opportunities than farmers in more accessible areas. Mountain areas are also more environmentally fragile and susceptible to degradation arising from land use patterns driven by markets that do not take adequate account of environmental costs. For example, because of complicated transit rules, farmers in the Chittagong Hill Tracts in Bangladesh receive less than one-third of the price of timber grown on their farmlands (Rasul 2005). Nepali farmers and collectors receive very low prices for non-timber forest products (NTFPs) because of inefficient marketing systems (Pandit and Thapa 2003). In Myanmar, marketing of major agricultural products is government-controlled, and farmers receive very low prices for surplus products (Okamoto 2004).

Output pricing and input delivery

In many countries in the HKH region, governments interfere with market prices, and formal and informal rules and regulations, taxes, fees, levies, and administrative procedures distort both product and input markets. As a result, the market price deviates from its socially optimal price. Prices for timber, for example, are largely undervalued compared to their true social cost. This is because producers are unlikely to include the environmental benefits of trees for soil conservation or for modulation of local climate when valuating the trees that they cut. Inappropriate prices for inputs and outputs can encourage farmers to degrade resources by making unsustainable practices more profitable. This has happened in many parts of the HKH region where potato, ginger, and other cash crops requiring continuous tillage and extensive soil manipulation are grown (Rasul 2003, Semwal et al. 2004).

Inadequate and inefficient credit systems

Farmers need to make a significant initial investment to be able to practice sustainable agriculture, but returns accrue only after sometime. For this initial investment and to support expenditure during the gestation period farmers need credit on affordable and accessible terms. Although the per-unit investment cost is higher in mountain areas (Chand 2000), in most Himalayan countries formal credit systems are either inaccessible or unaffordable, which forces farmers to depend on informal credit sources available on high interest rates. In Nepal, for example, five of the seven major micro-credit programmes had virtually no coverage in mountain districts, and limited coverage in hill districts (Dhungana and Thapa 1999). Similar conditions exist in the Chittagong Hill Tracts of Bangladesh and other mountain regions. In all hill states in India the flow of institutional credit per hectare of

cultivated area is much lower than the national average (Table 5). Per hectare institutional credit in the Indian Himalayan states varies widely from 3-63% of the national average, with the lowest per hectare credit registered in Manipur, and the highest rate registered in Himachal Pradesh. Other states have around 10% of the national average. Per hectare agricultural credit in Balochistan and the North-West Frontier Province of Pakistan (NWFP) is also much lower than in Punjab and Sind (Chaudhary 1989:196).

Table 5. **Flow of institutional credit to the Indian Himalayas**

State	Per Hectare Credit (IRs)			
	Working Capital	Term Loan	Total Institutional Credit	Percentage of National Average*
Jammu and Kashmir	183	76	190	12
Himachal Pradesh	585	443	1,028	63
Sikkim	85	61	146	9
Assam	12	58	70	4
Arunachal Pradesh	112	33	145	9
Meghalaya	94	49	143	9
Mizoram	134	17	151	9
Nagaland	103	2	105	6
Manipur	4	46	49	3
Tripura	384	81	404	25
India (national average)*	1,243	401	1,644	

Source: Ministry of Agriculture, Government of India, 1999 in Chand 2000:281

Higher borrowing costs not only affect the ability of farmers to invest in agriculture, it also makes the investment financially less attractive. As a result, farmers continue to practice traditional agricultural practices, such as slash and burn, that do not require initial investment. In addition, lack of tenure provides no incentives to make long-term investments in shifting cultivation or forest land.

Inappropriate rules and regulations

Rules and regulations are imposed on mountain farmers without considering their impact on the livelihoods of mountain communities. For example, many Himalayan country governments introduced strict rules and regulations in relation to harvesting (e.g., ban on commercial logging in south-west China, the ban on green felling in Uttaranchal, Sikkim, among others), and on the transport and marketing of forestry and agroforestry products, timber, and NTFPs, ostensibly to control pilferage. These complicated rules have failed to stop pilfering of forest products, but they have penalised mountain farmers who grow trees, practice agroforestry, collect and sell NTFPs, practice horticulture, and other location suitable agricultural activities (Rasul 2005; Melick et al. 2007). A few policy issues that affect the agriculture and livelihoods of mountain people are presented in Table 6.

Table 6. **Examples of key policy issues and their impact on agriculture and livelihoods**

Policy Issue	Impact
Complicated transit rules for transporting timber grown on private land in CHT (Bangladesh)	Encourages rent-seeking behaviour and decreases farmers' profit margins from agroforestry, tree farming, and other location suitable agricultural practices including NTFPs
Government taking over private land left uncultivated for 12 years to grow trees (Bhutan)	Encourages farmers to cut down trees and grow field crops
Privatisation of rangelands (China)	Increases social conflict, decreases scope for livestock mobility, which is an important strategy to cope with seasonal variability, and forage and fodder shortages
In most of the states only degraded forest is handed over to the Forest Protection Committee under Joint Forest Management (India)*	If Joint Forest Management is allowed only on degraded lands, local communities have an incentive to degrade existing forests
State control over the export of agricultural products (Myanmar)	Discourages the export of agricultural products, thus constraining agricultural development in line with market demand
Tax on income from community forestry (Nepal)	Discourages the transformation of community forestry from a subsistence enterprise to a commercial enterprise
Subsidies on ground water irrigation (Pakistan)	Encourages the overexploitation of ground water resulting in the depletion of water tables

*Although the Government waived this restriction in a 2000 circular, the circular is yet to be implemented.

4 A Framework for Facilitating Sustainable Agriculture and Rural Development in Mountain Areas

Cung Chin Thang

The policy bias against upland areas needs to be removed to promote sustainable agricultural practices in mountain areas. One of the major initiatives needed is a fundamental change in perception and approaches. It is important to understand the specificities and livelihood options of mountain farmers within the constraints of inaccessibility, marginality, and fragility. Appropriate policies need to be developed to compensate mountain farmers for the production of national and public goods and environmental services including soil and biodiversity conservation, watershed protection, and carbon sequestration. Sustainable agriculture, rural development, and natural resources management are inextricably linked. Therefore, a holistic and integrated perspective and strategy needs to be developed, one that addresses the complex issues facing mountain farmers.

The policy changes may create facilitating and enabling conditions for promoting mountain agriculture, but they are not enough to alleviate pervasive mountain poverty. In the Himalayan region, the majority of the farmers are poor and do not have easy access to formal credit, technology, extension services, and marketing facilities. Policy reforms alone may not be enough. Mountain farmers need mountain-specific information, knowledge, technologies, skills, capital, and marketing facilities to move to more productive and sustainable agricultural practices. It is necessary to strengthen the provision of effective institutional support including research, extension services, and credit facilities, and to reorient agricultural and extension service institutions to serve the needs of poor mountain communities based on participatory approaches. Close coordination among public institutions needs to be developed and strengthened.

Given the variability of mountain areas in terms of agroecological potential (soil fertility, rainfall, terrain, and fragility) and market access, different types of development strategies need to be adopted based on agroecological potential and market access (Table 7). In areas with better agroecological conditions and access to markets and infrastructure, the strategies should be promoting land use intensification, crop diversification, and growing of cash crops which offer higher incomes. Agro-processing industries may also be developed and promoted. When market access is constrained and infrastructure is poor, less perishable high value (relative to volume), and non-perishable agricultural commodities such as honey, mushrooms, dry fruits and nuts, medicinal, aromatic and dye plants that suffer lower post-harvest losses should be promoted. Under conditions of high population density, strategies for development of non-farm activities (such as processing and trade) should be pursued in more accessible areas, while in remote areas labour can be absorbed in soil conservation and maintenance activities through popular programmes such as food for work programmes.

Table 7. **Development strategy based on agroecological potential and market access**

Agro-ecological Potential	**Market Access**	
	High	**Low**
High	• High-value cash crops • Horticulture, commercial dairy, intensive food crop production, others • Private investments in irrigation, land management, and the agro-processing industry through institutional support	• High-value, low volume crops such as NTFPs and medicinal plants • Subsistence food crops • Infrastructure development to utilise the mountains' high agroecological potential
Low	• Commercial agroforestry, farm forestry livestock, pastoralism, off-farm employment • Crafts and services for markets • Promote technologies that enhance agricultural potentials and utilise local niches	• Agroforestry, tree farming for timber and NTFPs, medicinal plants • Subsistence agriculture with zero-tillage, mixed cropping, livestock production • Tourism and recreation • Promotion of out-migration and conservation activities and development of environmental services

Source: Adapted from Ruben and Pender (2004)

Mountain areas with lower agroecological potentials need a more diversified and sustained strategy to overcome poverty and arrest resource degradation. When market access is guaranteed local niches for small-scale irrigation may be exploited and non-farm activities could flourish. With lower market access, urban or third country migration and reliance on low input agricultural systems for local consumption are the remaining options. In settings where population and land pressure are less severe, land consolidation, extensive livestock (small ruminants) production, and conservation agriculture are possible alternatives.

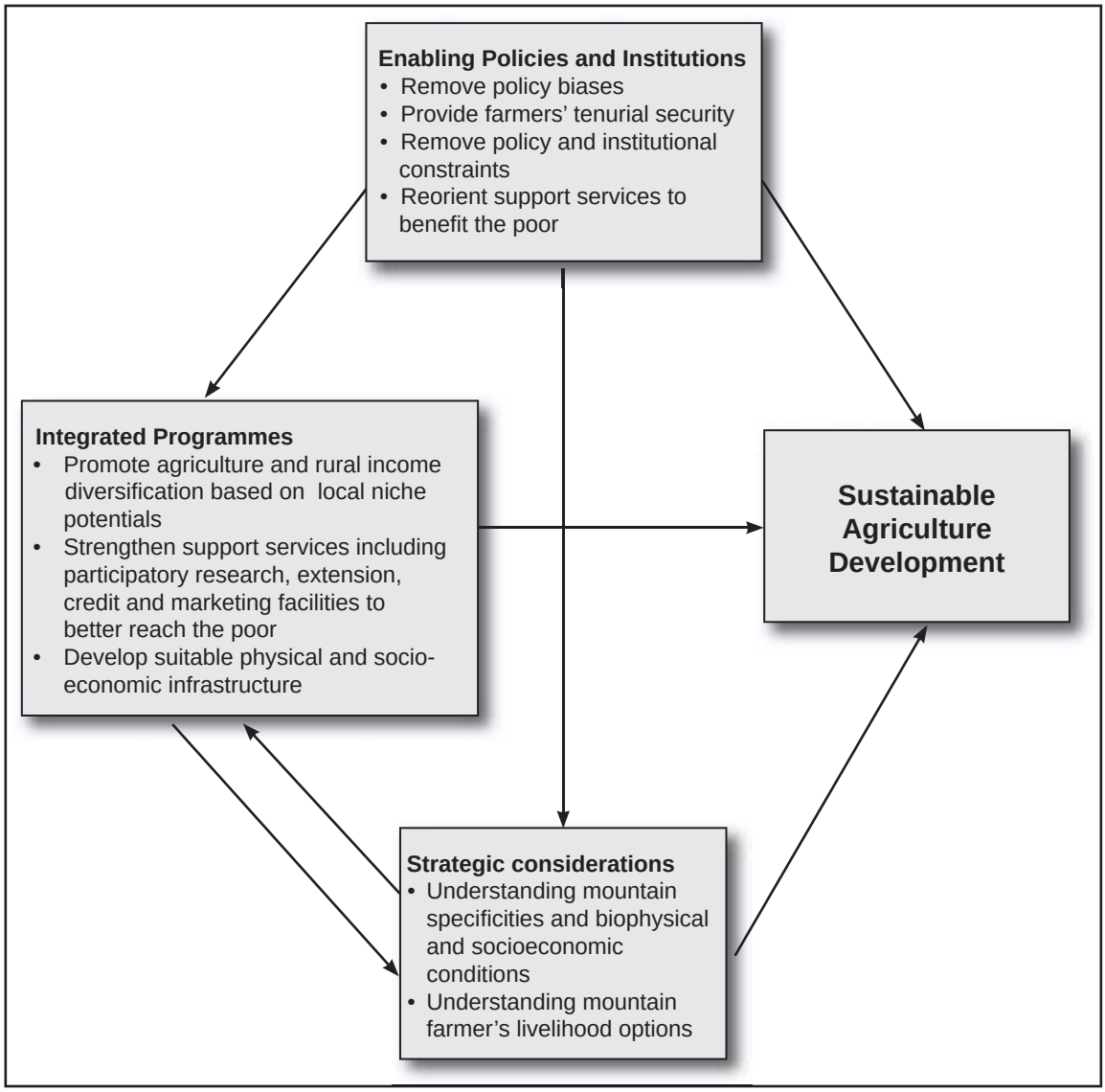
Generally, emphasis, however, should be given to harnessing the mountain's comparative advantages. For example, climatic and ecological variation in hills and mountain areas provide opportunities for ecological niche products such as fruits, vegetables, medicinal plants, herbs, spices, agroforestry, tree farming, seed production, and many other high-value crops.

One of the greatest strengths of mountain agriculture is its largely organic nature. The use of chemical fertilisers is almost negligible. This feature can be leveraged to the advantage of mountain farmers by using organic certification, preferably community- or group-based, thereby adding value to mountain products and improving their market access. Appropriate mechanisms need to be developed to provide adequate compensatory benefits for a variety of environmental services provided by mountain farmers through environmentally and conservation compatible land use practices. In several countries in Europe mountain farmers receive financial benefits from government for generating positive externalities (Hovorka 2001, Flury et al. 2005); mountain farmers in HKH region in comparison receive nothing for their environmental services.

Part of action research and extension services should be reoriented towards mountain areas to take into account mountain specificities, diversities, niches, socioeconomic and cultural factors, and market access. Extension messages should be developed based on local agroecological and socioeconomic conditions. Extension materials and a package of practices should be developed according to area-specific situations including development potentials and problems. In selecting crops and tree species along with biophysical suitability, distance from roads and accessibility factors should be taken into account as they influence the performance of land use systems, which determine farmers' land use preferences. Extension services should be provided in a package form that may include knowledge, tools, and inputs necessary to promote location suitable agricultural practices. Attention should be paid to the promotion of cost-effective technologies suitable to an area's biophysical conditions and farmers' socioeconomic conditions. Special attention should be given to generating off-farm and non-farm employment opportunities to reduce pressure on mountain farmlands.

A broad framework for sustainable agriculture and rural development is outlined in Figure 2. The enabling conditions discussed in this section should be interpreted as generic and are necessary conditions to support poverty reduction and sustainable agriculture development, but not sufficient conditions as there is a large variation in agroecological and socioeconomic conditions in countries of the region, and often in different parts of mountain regions within the same country.

Figure 2. **Framework for Sustainable Agriculture and Rural Development in the Himalayas**



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The conditions in mountain areas are significantly different from those prevailing in the plains. Yet most planners in the public sector in South Asia, planning for the development of hilly and mountain areas and mountain agriculture, either come from the plains, or have been trained to work with plains conditions and have applied green revolution technologies that may have worked well under those conditions, like a one-size-fits-all model. This model has not been quite as successful in mountain areas because it fails to consider and factor in the significant differences of the mountain condition: the steep slopes, high altitudes, less arable land and therefore, the subsistence nature of mountain farming, as well as deep variances in mountain micro-climates and the kind of crops that can be grown, the distance to markets, amongst others.

This *Talking Points* document offers an alternative mountain-specific framework that planners and those working with mountain farmers can use to improve the conditions of mountain farmers, push for the agricultural development of mountain areas with the unique specificities, obstacles, and challenges facing mountain areas in mind, while promoting the conservation of the increasingly fragile mountain resource base. The framework highlights the mountains' comparative advantages, such as the potentials for organic and niche mountain products, and advocates adding value to mountain environmental services. It also urges a review of policies and programmes that carry with them a bias against mountain areas, in order to develop mountain agriculture and improve the conditions of mountain farmers.

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