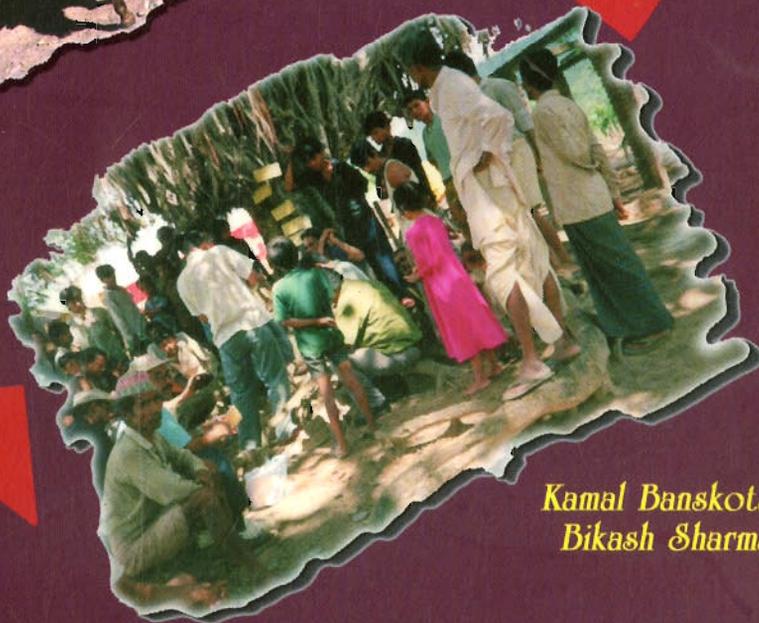
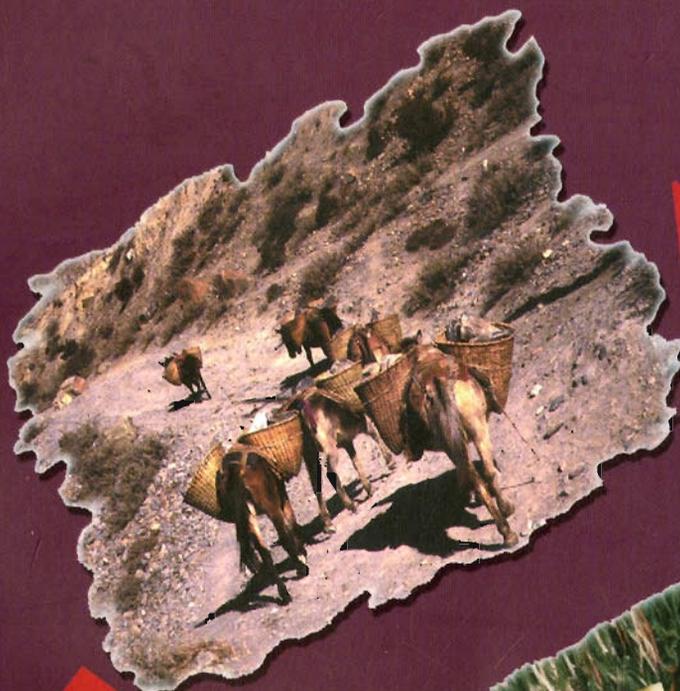


Traded Resource Flows from Highland to Lowland

Understanding Economic Linkages



*Kamal Banskota
Bikash Sharma*

Traded Resource Flows from Highland to Lowland Understanding Economic Linkages

**Kamal Banskota
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Preface

The relative underdevelopment of mountain areas is caused, to a significant extent, by a lack of adequate investment and the absence of infrastructure to harness potentials and ensure reinvestment back into the mountains of resources generated by selective extraction of mountain niches (e.g., timber, hydropower, tourism, etc) used by downstream economies. The uncompensated or very partially compensated resource and product flows from the highlands to the lowlands are another key feature of economic links between the two. The consequent mismatch in the flow of funds to the highlands, resulting in insufficient investment in mountain areas, is another related issue. Policy-makers and planners rarely give attention to these problems. Instead mountain areas and communities are often treated as liabilities by the mainstream, and they become beneficiaries of welfare measures and subsidies rather than actors in their own development.

The trends alluded to above are likely to be accentuated during the rapid process of globalisation and liberalisation. Accordingly, market-driven processes (with little sensitivity to environmental and social concerns) may accentuate the uncompensated over-extraction of mountain resources. The same process, by marginalising the public sector and thereby reducing welfare activities, might also reduce resource flows to the highlands.

In the light of these emerging scenarios, it is necessary to look at the problems of highland - lowland economic links and promote equitable terms of trade between the highlands and lowlands. If mountain resources and products traded to the lowlands were to be priced realistically, the subsequent resources available for mountain areas might far exceed the funds currently provided to these areas on a 'charity or welfare' basis.

However, in order to convince policy-makers about the above issues, the first requirement is to undertake quantitative documentation of the issues involved. To facilitate this, ICIMOD's policy-programme project initiated work on this theme. The present study is focussed on Nepal. Addressing the above issues is part of the work undertaken by ICIMOD. As the study shows, lack of relevant data is a serious problem. Despite data limitations, the study is able to provide methodological leads and evidence about the nature of highland - lowland economic links in the case of Nepal. Hopefully, this will facilitate more intensive work in this field.

N.S. Jodha
Policy Analyst

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Introduction

INTRODUCTION

The economic linkage between highlands and lowlands arises from the difference in natural resource endowment and the resulting economic opportunities of production and exchange, and these are facilitated by man-made infrastructure and technology and the bio-physical conditions that characterise highland areas. The characteristic economic linkage between highland-lowland has been a hinterland-metropolis type, with the highlands serving as a source of raw materials to the economies in the lowlands and urban areas. Obviously, such a relationship is characterised by structural and operational inequities, resulting in selective over-extraction of some raw materials (Mahat 1985). Highlanders seldom receive fair prices for their products, and this is because of the constraints imposed by restricted mobility, perishability, and poor bargaining power. The result of

these factors is the under-pricing of highland resources, products, and services. On the other hand, flows of resources from the lowland to the highland have been guided for the most part by infrastructural needs to extract mountain-resources for lowland areas and for security concerns. Even otherwise, flows generally have consisted of limited supplies of consumer goods and food grains to the highlands. This virtually one-way flow of resources from the highlands to the lowlands permits rapid development of the lowlands and urban areas and often condemns the supplying area to increasing stagnation and underdevelopment. "The assault does not primarily come, as often suggested, by the unbridled population increase of 'backward and ignorant' mountain dwellers who are wasting away their soils, forests, and wildlife and thereby inflicting damage on the downstream areas and society in general. Rather it comes from

development pressures arising exogenously and fuelled by planned or unplanned actions by "flatlanders in government agencies, in corporate boardrooms or offices, and in international funding or assistance institutions, all usually located close to sea level" (Hamilton 1993). The poor state of development in highland areas has been both a cause and effect of its marginalisation and is accentuated by inaccessibility, fragility, and even diversity of highland areas (Jodha 1992).

This state of affairs is the result of several factors that relate to poor awareness of the importance of highland areas. Many resources found in the highlands are unique, and their potential value to humanity in general is believed to be enormous (Thorsell and Harrison 1993). Following the Earth Summit in 1992, a great deal of awareness of highland areas as major sources of fresh water, biodiversity, and regulation of downstream stability and mountains have become the centre of global attention. Realistic costing of resources and environmental services has helped understand resource degradation, poverty, and the poor terms of trade faced by the highlands. Economic and political changes, social insecurity, technology, markets and marketing power, as well as market and policy failures and globalisation are likely to alter the complex highland-lowland linkages and further exacerbate the marginalisation of the highlands. Flows of resources, products, and services between the highlands and lowlands determine the nature, strength, and magnitudes of economic linkages, and understanding the nature of the linkages

provides a basis for making the flows more equitable and sustainable by strengthening complementarities based on the comparative advantages of the two regions.

Many highland areas (in Nepal) are still subsistence economies where production is primarily for one's own consumption. The means of production are primitive (low per capita use of capital) and coupled with the poor state of human resource development, productivity of labour is relatively low. Despite the low level of development of most highland areas, these areas serve the needs of urban and lowland areas in a variety of ways. In the first place, many different natural resources are provided by the highlands to urban and lowland areas. Most of these resources are renewable, natural resources in which highland areas are believed to have a comparative advantage. However, there is scattered evidence that this comparative advantage of the highlands may not be sustainable because of the poor management practices currently in place. One difficulty with the natural resources is that they are found mostly on government lands where monitoring and enforcement of extraction and harnessing are not possible and made more difficult by the remoteness of such areas.

Over the last few decades, the natural beauty of highland areas has attracted tourists from all over the world. Mountain tourism has generated employment and income in remote and inaccessible areas, but the benefits of this activity have been confined to small pockets. Additionally, poor management of the natural resources that attract tourists has gen-

erated great concern for the deteriorating natural environment in areas where mountain tourism takes place. The poor state of development in highland areas has also resulted in substantial leakages of tourism income. In other words, large amounts of goods are imported by highland areas from urban centres to meet the needs of their clients. Many of the imports could be substituted locally if goods were produced in the highlands. Therefore, the benefits from tourism in such areas have been minimal.

Migration from the highlands to the lowlands, for whatever reason, can be termed a human resource flow, and it is a manifestation of the third type of economic linkage between the highlands and lowlands. The linkage resulting from migration has two aspects, and these are related to the outflow of manpower and the inflow of remittances. Migration has resulted in labour shortages in some highland areas. Many parents support the education of their children studying in the lowlands and urban areas. Likewise, many employed people send back income earned from the lowlands and urban areas to families in the highlands. Over the years these remittances have become a major component of the highland economy. Little is known about the implications of the outflow of human and financial resources on the highland economy.

Most highland areas produce their own food and little is purchased. However, almost all non-food items have to be purchased, as they are not produced locally and have to be imported from urban centres or the lowlands. This form of consumption expenditure takes away large



The Phewa Lake in Pokhara is an important tourism attraction and lake tourism provides income and employment to many local people

amounts of household budgets, and these are leakages from the highlands.

Yet, another flow is social transfers and public investments (cash and kind supplies, welfare relief funds, development funds etc). Very often, this flow to the highlands serves the needs of lowland dwellers, as in the case of large hydropower projects. The impacts of such transfers on the highland economy in terms of income and employment multiplier effects are minimal, as substantial leakages result from purchases of raw materials and employment of manpower from the lowlands.

The various types of flow described give rise to economic links. Economic links are mostly concerned with the value of the flows. In the absence of well-functioning markets, prices do not reflect the true value of the resources transacted. Additionally, the markets are far from competitive, and this implies that there are many distortions arising from policy weaknesses, poor infrastructure, lack of information, and so on. Many highland resources are valued below their actual economic value. Generally, it is argued that the terms of trade between highland and lowland areas are unfavourable to the highland areas.

The terms of trade, i.e., the prices at which the highland resources are traded, need to be fully understood. In the presence of imperfections and distortions, attempting to derive economic values in order to understand the linkages is an extremely difficult task.

Little is, however, known about the dimension of these links. It is believed that the economic flow is disproportionately in favour of the lowlands. The extraction of products and activities with substantial comparative advantages in the highlands (e.g., irrigation, hydropower, timber, herbs, and tourism) are often guided by the needs of mainstream economies and governed by market signals. In this process, the resources and surpluses of mountain areas are generally siphoned off from local communities on unequal terms of exchange and compensation. The magnitude of such flows is not known. The magnitude can be easily obtained by adding up all the flows, but there is no information about what compounds the problems in varied ways. In the first place, what all the different flows are needs to be known. There is no systematic documentation of all resources, products, factors of production, services, and other flows between the highlands and lowlands. Thus identifying what the major flows are, their dominant features, and their magnitudes becomes a priority.

OBJECTIVES AND SCOPE

The present study attempts to understand economic linkages between the highlands and lowlands. Given the various limitations, the present study has attempted to document some

important flows that originate from the highlands on the basis of secondary information. In the absence of adequate information, it has not been possible to use existing models or approaches to study the economic linkages between highlands and lowlands. As a matter of fact, the situation, in the context of what flows from the highlands to the lowlands? from where do the flows originate? what are the magnitudes of these flows? who are the different actors involved in the flows? how do benefits accrue to different actors? and who are the end users for highland products or resources? is at present very vague. Without first developing an information base on these issues, it is almost impossible to use any of the approaches to address highland-lowland economic linkages comprehensively. At this stage, therefore, an important first step is to try to document the different flows to the greatest extent possible, quantify their magnitudes, and address relevant issues on the subject as an awareness-generating process.

The specific objectives of the study are as follow:

- ✦ given that the linkages between the highlands and lowlands are poorly understood, the study identifies a framework to understand the linkages;
- ✦ flows are be measured and quantified and the implications for the highlands identified and analysed to the greatest extent possible; and
- ✦ based on the understanding generated through the above, recommendations are given.

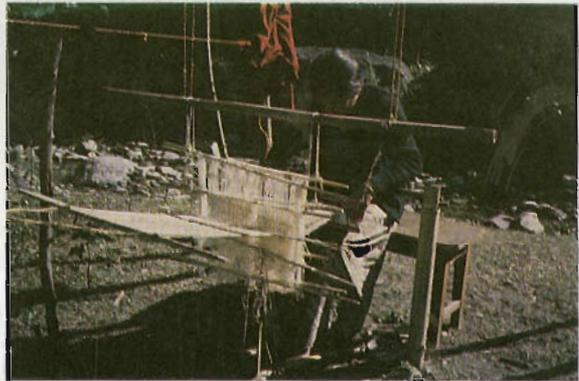
habitats (herds). Others may have a uniform flow throughout the year (milk). Additionally, the flow of many highland products may not be uniform throughout the year and exist seasonally, with flows peaking immediately after the harvest season and thereafter completely disappearing from the market. For example, many horticultural products, seasonal vegetables, cotton, and mountain tourism all such seasonally.



Framework and Literature Review

INTRODUCTION

There are many products, in the form of raw materials, semi-finished, finished, and agricultural products; manpower; and others that originate and provide the basis of economic flows from the highlands. The value of some of these flows can theoretically be assessed in monetary units. However, other flows originating from the highlands are not easily measurable and assigning values is not easy. For example, the flow of water from the highlands to generate power consumed in the lowlands and urban areas is not easily quantifiable, or at least the portion of the revenue generated that must accrue to the highlands is not easy to determine. Additionally, the markets for many highland products are far away from where the products are cultivated or harvested, and local prices are often many times lower than market prices. Using local prices does not reflect the true economic value of the resource.



Quantifying the total volume of the different highland flows and valuing them are both problematic in the absence of reliable information. As a start, therefore, it is useful to classify the different factors and products in the form of raw materials, semi-finished, finished, and agricultural products; manpower; and others into meaningful groups in order to measure the economic flow. While some may be cultivated (horticultural products, vegetables) others are directly harvested from their natural

Weavers are able to sell their products to tourists occasionally, but "local prices are often many times lower than market prices."

habitats (herbs). Others may have a uniform flow throughout the year (milk). Additionally, the flow of many highland products may not be uniform throughout the year and exhibit seasonality, with flows peaking immediately after the harvest season and thereafter completely disappearing from the market. For example, many horticultural products, seasonal vegetables, migration, and mountain tourism exhibit such seasonality.

This Chapter is divided into seven sections. Since many resources flow from the highlands to the lowlands, it is important to classify the resources into different groups and subgroups based on certain criteria. The classification can be carried out in different ways, but here a simple approach is followed which is elaborated upon in Section 2. Different characteristics of the resources, as manifested in terms of their spatial distribution, yield and harvests, trade, and so on, are discussed in Section 3. Different methods used to study economic links are briefly discussed in Section 4. However, in the case of Nepal, severe information gaps are the main limitations to application of any method. Consequently, a simpler framework that relies on marketing is discussed in Section 5. In Section 6, a short review of some pertinent literature on products traded from the highlands is provided. A critical evaluation of the different information sources used in this study is given in the last section.

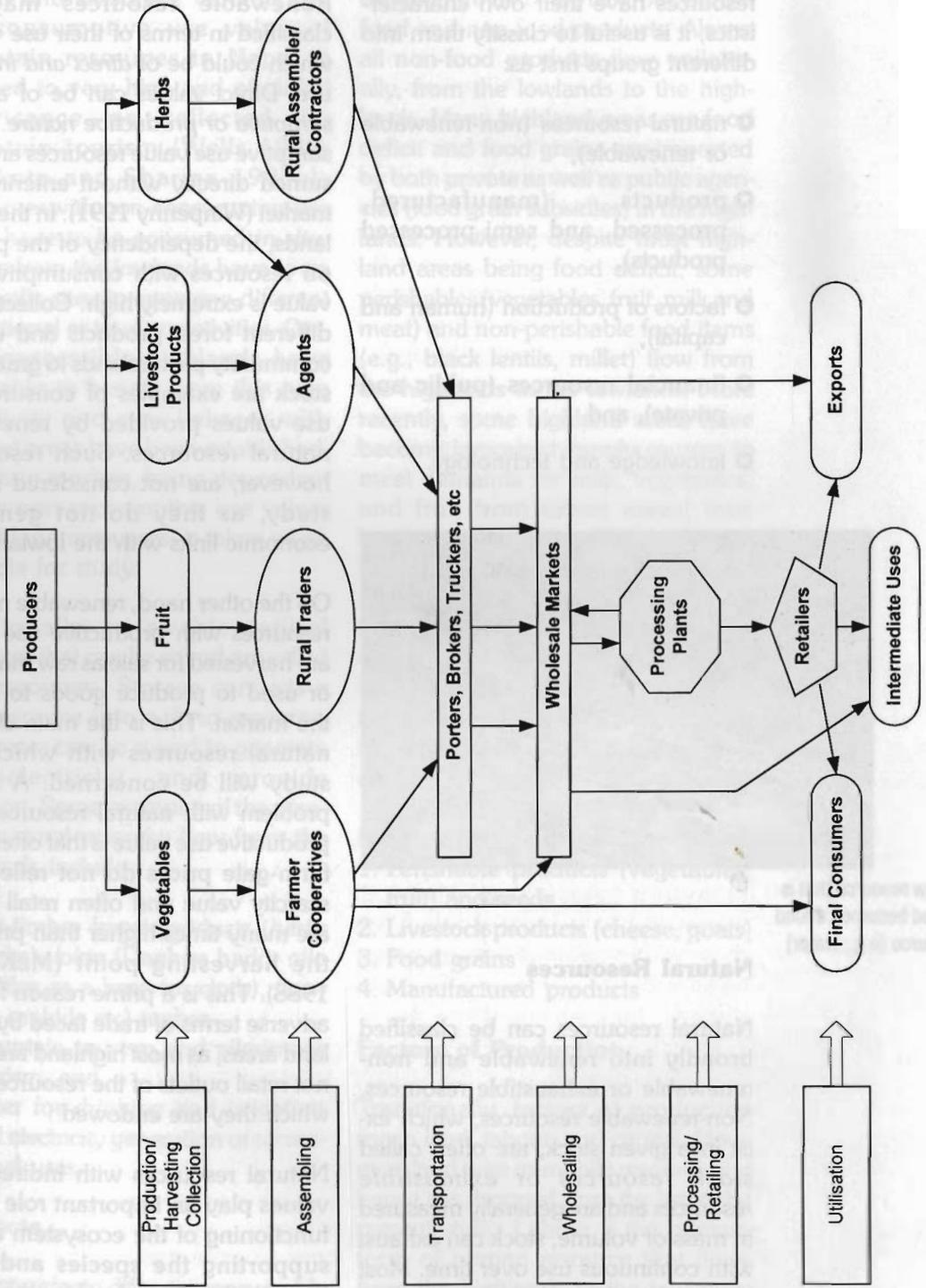
CLASSIFICATION OF HIGHLAND RESOURCES

All resources that flow from the highlands are not of interest to the present study. Only those resources that are

traded and for which information on volumes and values of flow exists will be examined. Additionally, only traded resources flowing unilaterally from the highlands to the lowlands are taken into account. All resources found in the highlands are not necessarily in demand in the lowland areas. Thus, it is first necessary to list all the important highland resources that are in demand in the lowlands. The demand for highland resources may be for local production activities to produce goods and services that may be locally consumed and exported. If the entire production activities are such that they fulfill a highland demand and create no demand in the lowlands, such resources are not considered as contributing to highland-lowland economic linkages. However, if the resources are used for production of goods and services that are in demand in the lowlands, or if the resources have a derived demand in the lowlands, a basis for economic linkage is then provided (Figure 2.1).

In the first place, resources need to be defined. The resources that flow between highlands and lowlands can be of many types, from raw materials to finished products and development funds, and they can flow from the private as well as the public sector. Natural resources can be renewable or non-renewable. Renewable resources can be of two types, flow and fund resources. A flow resource that is stored becomes a fund resource (e.g., water). Factors of production (labour and capital) also flow from areas where returns are low to areas where returns are high. Services are important resources that need to be considered. Also, the flow of knowledge and technology derived from research can also have implications

Figure 2.1: Marketing Channel for Major Highland Products



on highland resource use patterns and flows. Because different types of resources have their own characteristics, it is useful to classify them into different groups first as:

- ✦ natural resources (non-renewable or renewable),
- ✦ products (manufactured, processed, and semi-processed products),
- ✦ factors of production (human and capital),
- ✦ financial resources (public and private), and
- ✦ knowledge and technology.



A flow resource that is stored becomes a fund resource (e.g., water)

Natural Resources

Natural resources can be classified broadly into renewable and non-renewable or exhaustible resources. Non-renewable resources, which exist in a given stock, are often called *stock resources* or *exhaustible resources* and are generally measured in mass or volume; stock can exhaust with continuous use over time. Most highlands in Nepal are not known to be endowed with large deposits of exhaustible resources.

Renewable natural resources can be exploited on a sustainable basis. Renewable resources may be classified in terms of their use value, which could be of *direct and indirect use*. Direct values can be of a *consumptive or productive nature*. Consumptive use value resources are consumed directly without entering the market (Winpenny 1991). In the highlands, the dependency of the people on resources with consumptive use value is extremely high. Collection of different forest products and use of community pasturelands to graze livestock are examples of consumptive use values provided by renewable natural resources. Such resources however, are not considered in the study, as they do not generate economic links with the lowlands.

On the other hand, renewable natural resources with productive use value are harvested for sale as raw materials or used to produce goods to sell in the market. This is the main class of natural resources with which this study will be concerned. A major problem with natural resources and productive use value is that often their farm-gate prices do not reflect the scarcity value and often retail prices are many times higher than prices at the harvesting point (McKneely 1988). This is a prime reason for the adverse terms of trade faced by highland areas, as most highland areas are not retail outlets of the resources with which they are endowed.

Natural resources with indirect use values play an important role in the functioning of the ecosystem and in supporting the species and their habitats that are valued for their productive and consumptive purposes. Indirect use value resources can be

divided further into those providing non-consumptive uses and having option and existence values. The non-consumptive use value of mountain resources in Nepal is believed to very high and of global significance—as reflected by mountain tourism (Wells 1992; Banskota and Sharma 1995b). Resources with non-consumptive use value have to be consumed *in situ*. People from the lowlands have to go to specific sites to consume different recreational or tourism activities. Certain inaccessible highlands have been able to benefit from this type of activity and new linkages with lowland areas have been established. Mountain tourism, being dependent on the non-consumptive use values of highland resources, is taken as an example for study.

Additionally, renewable natural resources that can be stored are called fund resources. Storage converts a flow resource into a *fund resource*, e.g., water can be stored to generate hydroelectricity and provide irrigation. Some examples of the managed natural resource flow from the highlands include:

1. non-timber forest products (*herbs* (herbs), *lokta* (Daphne bark), *allo* (nettles as a base for cloth), flowers, orchids etc) timber,
2. mountain tourism and pilgrimage tourism, and
3. water for drinking and irrigation and electricity generation or recreational uses.

Products

Products refer to different consumable items that households and other sectors purchase for final consumption.

This group of resources may be the most significant in terms of household expenditure and may be grouped into food and non-food products. Almost all non-food products flow unilaterally, from the lowlands to the highlands. Many highland areas are food deficit and food grains are imported by both private as well as public agencies (food grain subsidies) in the highlands. However, despite most highland areas being food deficit, some perishables (vegetables, fruit, milk and meat) and non-perishable food items (e.g., black lentils, millet) flow from the highlands to the lowlands. More recently, some highland areas have become important supply sources to meet demands for milk, vegetables, and fruit from urban areas, thus breaking the traditional flow of natural resource-based raw materials. Large numbers of live animals are exported from the highland areas to meet the demand for meat in urban centres. In addition, livestock products, such as milk and cheese, are being increasingly exported from highland areas.

Examples

1. Perishable products (vegetables, fruit) and seeds
2. Livestock products (cheese, goats)
3. Food grains
4. Manufactured products

Factors of Production

Traditionally, factors of production mean land, labour, and capital. However, land is an immobile resource and hence it is dropped from the list in the present study. Labour is the primary form of human resource that flows from the highlands to the lowlands. Labour could be skilled, semi-skilled, or unskilled. The quality and quantity

of educational attainment and acquired skills determine the quality of labour. Most educated individuals migrate from the highlands to lowland areas in search of employment. Faced with chronic food deficit and lack of alternative employment outside of agriculture, people are forced to migrate elsewhere in the lowland market for the sake of jobs. The seasonal or temporary migration of adult males from the highlands to the plains is a well-known form of human resource flow. Literature cites both pull and push factors as being the driving forces of such migratory trends. While such migration may have created labour scarcities and an increasing burden on mountain women, it has also helped generate a more regular flow of income for mountain families in the form of remittances (financial resource) (Jodha 1998).

Generally, migration has been unilateral with flows from the highlands to the lowlands. Migration can be seasonal, temporary (longer duration), and permanent. Permanent migration may be seen as a form of labour flow that permanently reduces the supply of labour in the place from where migration takes place. Although migration has in general benefitted those who migrate, its impact on the wider mountain economy has been mixed. Income remittances to household members residing in the highlands have been the main economic link, but this income perhaps leaks out considerably to the lowlands in the form of consumption expenditure. Little is, however, known about the cost and benefit associated with such human resource flows.

Capital resources are all man-made resources or what could also be called

the means of production. Here the concern will be only with capital that can flow, as for example in the case of machinery and equipment. The availability of capital can have implications on the flow of other resources found in the highlands with consequences on the size of linkages, generation of benefits, and their distribution.

Inputs, such as seeds and chemical fertilizers, also qualify under this group. The flow of fertilizer and seeds to the highlands is substantial and increasing. Fertilizers were subsidised substantially but, in recent years, this subsidy (in the form of transport) has increasingly been curtailed.

Examples

1. Labour
2. Seeds
3. Fertilizers and other agricultural chemicals

Financial Resources (or Capital Service Flow)

Although highland areas receive grants and other development funds, there are considerable leakages of financial resources from the highland areas in the form of consumption expenditure (manufactured goods) and outflow of savings and remittance income to acquire property in lowland areas, to pay for children's education, and so on. Social transfer and public investment flows between the highlands and lowlands are also significant. This flow is generally unilateral, with flows taking place from the lowlands to the highlands, and can consist of cash and kind subsidies and other forms of grants for development purposes. Very often this flow to the highlands has been guided to meet

the needs of lowland dwellers, as in the case of large hydropower projects, through use of 'fund resources', namely, water. The flow of funds and the nature of secondary linkages arising through the purchase of materials and services outside upland areas are a poorly understood phenomenon in mountain development (Jodha 1998). Additionally, public funds in the form of subsidies and welfare (transfer payment) also flow from lowlands to highlands.

A number of financial institutions (commercial banks) and development organizations (NGOs) working in the highlands provide financial resources for different productive activities. These resource flows are vital for augmenting the production and economic links. Although the propensity to save is low in the highlands, little is known about the flow of savings and its use. Many households from highland areas are known to have invested in property in urban centres and lowland areas.

Examples

1. Remittances sent and received
2. Different forms of subsidy and grants
3. Private savings
4. Consumption expenditure leakage on imports to highlands
5. Secondary leakage (investments and importation of raw materials)

Knowledge and Technology

The knowledge generated through research has enabled substantial growth, primarily in the agricultural sector of many countries and in some highland areas such as Himachal Pradesh (Teotia 1993; Vaidya *et al.*

1987). Knowledge and technology may also be considered as resources that are generated through research. If research is focussed on mountain-specific problems, it has potentials to generate new knowledge and technology that can help the highlands develop. So, important issues here may be the allocation of research funds to mountain problems and the size and flow of the benefits of mountain-specific research vis a vis lowland areas. Highland areas are storehouses for many endemic and threatened species of which the potential value to mankind in the form of new medicines, recreational activities, and aesthetic values could be substantial. Research can identify sustainable ways to harness the highland resources (McKneely 1988).

DOMINANT FEATURES CHARACTERISING HIGHLAND RESOURCE PRODUCTS

The different resource products (RP) (meaning all groups identified above) exhibit different characteristics and have implications on the flow process. A proper understanding of mountain specificities and their imperatives is perhaps the first step towards assessing the dominant features of mountain-resource products. Among the important conditions characteris-

Improved accessibility increases mobility overcoming the inaccessibility aspect to some extent.



ing highland habitats, which separate them from the lowlands, are inaccessibility, fragility diversity, and niches. All these mountain characteristics (which are interrelated due to their common bio-physical foundations) and their implication on the highlands have been well discussed in the literature (Jodha 1992). Below are listed some characteristics that may influence the flow of resource products from highland areas.

Traded Resource Products and Their Spatial Distribution

Identification of the spatial distribution of highland resources becomes essential to the understanding of specific characteristics of resource products, their origin, and nature and pattern of flow in order to narrow down the scope of the study. Understanding the spatial dimension or the place of origin of resource products is an important prerequisite to understanding the management of resource supplies. The extraction of resource products that originate from a specific geographical niche can be taken as more risky in terms of long-term sustainability. This may not be the case, however, for those resource products¹ that originate from spatially diversified areas. It is important to identify major geographical niches and/or spatially diversified areas in order to understand the nature and magnitude of resource flow.

Ownership Rights

Many resources that flow from the highlands to the lowlands are natural resources (herbs, medicinal plants,

and other forest products). These natural resources are either publicly owned or owned by the community and often qualify as being of open access regimes. Supply management becomes a difficult task when property rights are not clearly defined. In situations such as these, there is a tendency to over harvest resources, as incentives for conservation are poor. When ownership is defined and can be enforced, as in the case of privately-owned resources, such problems are minimised. It thus becomes important to understand the issue of ownership of natural resources to assess the nature of resource flows and their sustainability (McKneely 1988).

Seasonality

Many highlands are not easily accessible and this problem is exacerbated during the peak monsoon seasons. Additionally, since most natural resources that flow out from the highland areas are renewable resources, harvesting can occur generally once a year. The implications of this seasonality phenomenon on supply management and resource pricing need to be understood as it has implications on the generation of income and employment also. Transport is also hampered during monsoon with adverse impacts on marketing and economic returns. Seasonality, however, must not be seen as an obstacle only, as many food crops in the highlands ripen weeks in advance of lowland areas (Teaotia 1993). This seasonality can be of importance in marketing vegetables and horticultural products from the mountains in lowland areas.

¹ As opposed to an aesthetic resource, e.g., environment.

Yield and Harvest

Renewable natural resources as well as supplies of agricultural products are determined by the annual yield or harvest rates. If annual harvest rates exceed sustainable yield rates, resource degradation and extinction are likely. Additionally, when resources are owned by the community or the public, there is a tendency to over extract or harvest the resource since it is not in the interests of the community to conserve such resources if appropriate incentive mechanisms are not in place. For management of supplies, understanding the stock and flow are important.

Volume and Magnitude of Resource Flows

The magnitude of the flows needs to be assessed for several important reasons. In the first place, the size of the flow is directly dependent on the stock of the resources. Whether the existing stock can sustain the current flows is an important question that needs to be addressed in the case of highland areas that specialise in the export of flow resources that are not privately owned. Quantifying the flows is a necessary step to understanding the volume of benefits generated.

Institutional Factors

The nature and extent of different types of institutional support required for commercialisation and specialisation of mountain resource products based on their natural comparative advantages also determine, to a great extent, the magnitude of flows and hence the economic link between the highlands and lowlands. Resource products that are largely supported by

government and non-governmental institutions (agencies providing financial and extension services) naturally have better marketing and economic linkages than those that receive no support. While institutional support has been traditionally focussed on horticulture, dairy farming, and tea cultivation, many resource products (herbs, medicinal plants, and non-renewable resources) in the highlands receive no such institutional support. Furthermore, institutional service delivery linkages as a precondition to economic links are believed to be most available in those areas where there are NGOs supporting production activities through the community-based organizations sponsored by them. At the same time, at the local level, it is being increasingly realised that helping local people organize themselves helps them create an effective demand for service deliveries and other production inputs. Such grass roots' organizations are becoming an effective medium for carrying out small development projects, marketing their farm produce, and conducting savings and credit schemes as well. Thus, organizing local communities is an important dimension of institutional development, with implications for resource management and marketing (Oakley 1991).

Social Factors

Another important characteristic of mountain resource products is the sociocultural setting and social linkages that cause the production, harvesting, and trading behaviour of farm households (producer/ collectors) to differ greatly from place to place. Important questions are whether harvesting, extraction, transport, and so on. are solely confined

to specific ethnic groups. How do their social linkages/relations affect trading behaviour? Are the resource extractions and marketing functions of native communities gradually replaced by outsiders from the lowlands?

AGGREGATE STUDY METHODS

Different methods are available for studying economic linkages (Bendavid-Val 1991). These methods demand comprehensive information about a broad range of issues related to production, transportation, consumption, and trade which, in the case of highland areas of Nepal, are completely missing. The general purpose of the different approaches used to address economic links has been to investigate and compare the economic characteristics of an area and its relationship with other areas by addressing a number of issues related to:

- ❖ levels, sources, and distribution of income and employment;
- ❖ sectoral and subsectoral composition of economic production activities;
- ❖ interdependencies among sectors and subsectors;
- ❖ characters, intensities, and consequences of economic flows to and from purchasers and suppliers from outside the area;
- ❖ patterns of change in the measures; and
- ❖ how the area compares with other areas and the country as a whole in the measures selected for comparison.

The input-output model has been used widely to study inter-industry linkages. Each industry that is engaged in production has to purchase inputs such as raw materials, semi-finished goods, and capital equipment from other industries or sectors. Labour must be hired and labour can provide a variety of skills. The industry must also pay taxes. Intermediate goods may have to be imported. The final output produced is sold to final users or to other industries or sectors that use the goods as inputs. Thus, across industries, there is continuous buying and selling of final goods from one industry by others—by final users or as intermediate products.

Input-output analysis examines the area inter-industry demand stimulated by the final demand of its goods and services. It tracks the production linkages of the industries and how these linkages generate income through final sales and employment. Income and employment multipliers are generated, and these describe the additional income and employment generated in the production process through the sales of final goods to other sectors and industries. An input-output model attempts to deal with basic questions such as:

- ❖ what are the nature and economic effects of inter-industry production linkages in the area in question? and
- ❖ how do these linkages translate into multiplier effects associated with outside, consumer, and government demand for an area's products?

Studying production linkages helps to identify the principal channels through which an area generates

income from outside by exporting its products and also helps to identify the principal channels through which the area loses income multiplication potential because of imports. There are two kinds of inter-area production linkage, forward and backward. Forward linkages applies goods and services sent outside the area for further processing towards final sale. Backward linkages applies to what the area receives from the outside for further processing towards final sale. Often transport and distribution linkages are relevant also for understanding production linkages in more detail. These linkages must be considered in the forward and backward linkages as they add to the costs of the import or export. In this approach the main questions posed are:

- ⊛ what are the nature and features of the main forward and backward production linkages between the area and other areas of the country? and
- ⊛ how are these linkages expressed in terms of area of exports and imports?

A third approach is flow study. Flow studies are conducted generally over the period of an entire year to document the flow of major goods across the borders of an area. The goods selected are the ones that figure significantly in the area's economy. Other goods that have potentials for

harnessing/exploitation may also be documented. Flows are documented in terms of quantities at different points, the mode of transport used, and the place of origin of the goods and their destination outside the area. Such flow studies base annual flow estimates on sample surveys, but they are supplemented by surveys at origin and destination points. Wholesalers are also a good source of information in such studies. The principal questions asked in a flow study are:

- ⊛ what volumes and values of selected goods flow across the borders of the area? and
- ⊛ what means, at which points, in what directions, and between which origins and destination do the flows take place?

Yet another approach used is known as the income accrual analysis. Agricultural growth can lead to substantial non-agricultural sector growth as agricultural incomes rise. This is partly made possible because agricultural growth demands more inputs, more processing activities, marketing, and transport. Increase in household expenditure also means increasing expenditure on non-food items. Thus, agricultural growth stimulates a strong growth link with the non-agricultural sector. The main issue in this study is concerned with growth in a leading sector and secondary growth in other sectors of the economy.

On Site Effects		Off Site Effects
Erosion		Sedimentation
Loss of organic matter	Decrease in root zone	Decline in reservoir capacity
Decreased land productivity		Loss in irrigation, hydroelectricity and flood control services

A tendency in the past has been to ignore the depletion of natural resources and environmental degradation in the national income accounts. Renewable natural resources are capital stocks and their depletion, although it increases income in the short-run, diminishes the future scope of income streams. A physical and financial flow of resource accounting will need to be developed to understand the economic and environmental linkages between the highlands and lowlands. This approach is known as the resource accounting approach and, more recently, this approach is being used to adjust national income (GNP or GDP) to reflect depletion of natural resource stocks.

One growing concern has been the estimation of on site and off site impacts. In many instances, certain actions taking place at one site have off site impacts. Soil erosion is a case in point. Soil erosion is the process through which soil particles become detached from a place of origin and are transported and deposited elsewhere by means of wind or water. Soil erosion is an upstream phenomenon and deposition of soil or sedimentation is a downstream phenomenon. Impacts from soil erosion (on site) and sedimentation (off site) can thus be classified as on site and off site impacts (see chart below). These impacts can be translated into economic links of different types.

Quantifying and estimating the impacts (on site and off site) have been challenging from both the methodological and quantification points of view. Two approaches have been used to estimate the loss in productivity of land resulting from soil ero-

sion. The first is to directly estimate the relationship between crop yield and soil depth using the soil loss damage function. The damage in terms of yield loss can then be valued by using the price of the crop under consideration. The more variables that can be treated in the model, the better the results obtained, although this can also add to complexity and cost (Carson 1989). However, when data constraints limit such application, the alternative approach is to use replacement cost method. The basic premise of this method is that cost incurred in replacing a productive asset (land) can be interpreted as an estimate of the benefit presumed to flow from measures taken to prevent that damage from occurring (Dixon *et al.* 1996). The quantity of nutrient carried away by eroded soil is estimated and valued using appropriate prices to derive the on-site value of damage from soil loss.

In addition to the above approaches, several other methods have also been used to study linkages. In the general interaction studies, the main analysis is on trade, the dominant characteristics, operating efficiency and linkages, and suggestions about potential expansion of the inter-area trade. In the extended commodity trade systems' analysis the focus is on marketing and marketing channels, particularly on exports from the area, linkages from the point of production to the point of export, and how income is earned and multiplied in the area. The resource sector report addresses how different sectors of the area economy interact with major natural resources, and how certain major problems and opportunities are associated with the interactions.

MARKETING APPROACH

A proper understanding of market structure and the marketing channel and its functions is essential for an understanding of the factors governing the resource product flow between the highlands and lowlands. The marketing sector transforms the resources into purchases, and these are used for other production activities or for final consumption. In other words, markets determine prices and allocation of resources, although, in the case of certain resources, this is not true. Many factors relating to the market structure; the presence of externalities and other distortions resulting from government interventions in the form of fiscal, monetary, and regulatory policies; infrastructures; organizations/institutions; and knowledge among highland producers about market conditions—all play an important part in determining the efficiency of markets. The flow of goods from the place of origin to the place of destination involves a number of activities of transfer and intermediaries; and these are known collectively as the marketing process. The marketing process and its efficiency are determined by the structural characteristics of the market (Scott 1995).

Understanding the Structural Characteristics of the Market

Marketing efficiency of resources traded from the highlands is determined by the costs of performing the various marketing functions. The extent to which marketing functions are performed efficiently is mostly determined by the market structure and market conduct. Market structure is generally defined as the characteristics of the organization of a market

which influence the nature of competition and pricing behaviour within the market. Structural characteristics measure the extent of deviation from the perfectly competitive norms and influence the pricing behaviour.

Marketing Function

Marketing is the process through which goods and services are exchanged. The flow of goods from the place of origin to the place of destination involves a number of activities of transfer—known as the marketing function. The marketing function can be exchange; and this can be physical or facilitating.

The exchange function brings about changes in the ownership of products through buying and selling. There can be three types of buyers, namely, manufacturers and businessmen, middlemen, or consumers. The exchange function involves assembling which minimises the cost of transportation and helps standardisation and grading.

Physical supply functions are related to creation of utilities of place and time. The physical transfer of goods from the producer/manufacturers to consumers takes place by means of a) transportation and b) storage. Transport plays an important role in harnessing resources and supplying them to the markets. Market integration is also facilitated by a good transport network and helps reduce monopoly and improve competition. With good transport, processing units become relatively more feasible in terms of location in highland areas, thus enabling the generation of employment and value-added to highland products.

Facilitating functions are all supporting activities that contribute to carrying out other functions relating to financing, risk bearing, standardisation, market information, and promotion.

Marketing Channels

Marketing channels provide systematic knowledge of the flow of goods and services from their origin (producer) to their final destination (consumers). Marketing channels are distribution networks and may be either non-integrated (conventional) or integrated (Scott 1995).

In the non-integrated channel, manufacturer, wholesaler, and retailer bargain with each other and negotiate over the terms of sale. The channel of distribution can be both direct and indirect. In contrast to a direct distribution channel where the products are sold directly to consumers, the indirect channel follows the lengthier process of transferring the goods to final consumer/users through involving a number of intermediaries.



Haat bazaar (weekly market), the direct distribution channel

Integrated channels may be either vertical or horizontal and are networks in which channel components participate in a coordinated manner. There can be three types of vertical

distribution channel: administered, contractual, and cooperative channels. Horizontal channels involve an alignment of two or more companies to jointly exploit marketing opportunities either by themselves or by creating third entities. The process that links production to consumption can be either centralized or decentralized. In a decentralized system, producers and rural assemblers take on added responsibilities. Producers' organization replaces the wholesaler as production moves from its origin to the retailers.

Intermediaries in Marketing Channel

Markets are seldom complete without intermediaries, and this could apply to several types of group.

Producer: Rural assemblers, transporters or traders or producers, are the primary sources of supply to second agents and this relationship forms the first link in the marketing channel. Marketing decisions concern questions of what, when, and how much to grow or harvest/collect.

Middlemen or Business Intermediaries connect the producers and consumers. Middlemen could be either agent or merchant middlemen. Agent middlemen are engaged in wholesale dealing and get a certain percentage of commission on the volume of purchase or sale negotiated by them. Brokers, commission agents, and manufacturing agents, selling agents, resident buyers, and warehouses function as middlemen. Merchant middlemen buy and sell goods on their own account/risk and resell the products at profit (e.g., wholesalers and retailers).

Wholesalers assemble goods coming from various sources for retailers to buy. At this stage in the channel, wholesale prices are established depending on the producer price and trader margin. Wholesalers provide information to suppliers (growers, assemblers) and assume the risk associated with buying and selling.

Retailers are the connecting link between wholesaler/manufacturer and final consumers

Producers and consumers' associations include professional associations and farmer cooperatives that regulate and influence the production and marketing processes. They could also be consumer associations that substitute for middlemen and have an impact on marketing margins.

Government institutions or companies include all government organizations that guarantee minimum prices to the producers and regular price-controlled supplies to consumers.

Marketing Margin

The proper understanding of marketing channel and marketing function provides the basis for examining the marketing cost or margin at various stages of the market. Marketing efficiency is examined by analysing marketing margins to find out whether these margins are fair or not.

Exchange activities generate income for sellers. Not all of this income is pure profit and a big marketing margin may in fact result in little or no profit or even loss for the seller involved. Marketing margin measures

the share of the final selling price that is captured by a particular agent in the marketing chain. Marketing cost, as well as buying and selling price, determine the margin. Furthermore, middlemen do not always earn a marketing margin. Many observers confuse a marketing margin with a trader margin. Margins and profits are largely influenced by the degree of market competition.

In a perfectly competitive market, the marketing margin should, on the average and in the long run, be equal to the cost of marketing—including cost of capital with a competitive return to labour, management, and risk. Of concern is the size of marketing margin, change in marketing margin, and the incidence of change in margin. Changes in factor price, market efficiency, and market service embodied in the product change marketing margins. Marketing margin may fluctuate due to perishability of the products, number of marketing channels, marketing services provided, and risks and uncertainty borne by each of the market participants (Scott 1995).

The perishable nature of highland products, such as fruit, vegetable, and livestock products; the seasonality of supply; and distances separating producers from ultimate consumers are some of the principal factors instrumental in the size of the various costs or margins. Furthermore, marketing margins provide only one point of reference in the evaluation of performance and should be compared with amounts of profit earned by marketing firms to determine whether or not margins are excessive.

Marketing and Pricing Efficiency

Traditionally, the efficiency of the market system has been looked at from two perspectives: a) technical or physical efficiency and b) pricing or allocative efficiency. The former relates to the cost of performing the physical function. Physical efficiency is generally considered to have increased when cost per unit of output is reduced through improving the technology involved in marketing functions such as transport, storage handling, and processing (i.e., reducing physical loss). The latter form of efficiency is achieved through pricing products at different marketing stages. More specifically, pricing efficiency is achieved when the following conditions are present (Acharya and Agrawal 1994).

- ❖ Price differences between spatially separated markets do not exceed the transportation costs.
- ❖ The intra-year price rise is not more than the cost of storage (the greater the correlation between the intra-year price rise and storage cost the higher the pricing efficiency and vice versa).
- ❖ The price difference between processed and unprocessed products does not exceed processing costs.

Hence, the pricing efficiency of the market is concerned with the extent to which prices at subsequent stages of marketing deviate from what the costs of performing the function of transportation, storage processing, and retailing warrants. In addition, it is also concerned with the ability of the market to transfer the price signal arising in one hierarchy of the mar-

ket to another (i.e., if the price in the terminal market increases, to what extent is it transferred to producer / farmers?).

Pricing Efficiency under Restrictive Trade Practices

Analysis of the pricing efficiency of the marketing system through the above approach is however blurred by government interventions in the forms of fiscal, monetary, and regulatory policies (Acharya and Agrawal 1994). An important question that immediately comes to mind is how the price would behave if there were less government interventions. The answer to this question calls for comparison of prices in the domestic market (e.g., highlands) and those in the global market using the concept of a nominal protection rate. Such a comparison could provide measures for protecting or doing away with the protection given to various commodities produced in the country.

LITERATURE REVIEW

This section briefly reviews the literature on some highland products. The literature is limited. A few analytical studies exist on marketing fruit, vegetables, and herbs, and these are limited in scope as they are case studies focussing on small pockets and a particular resource product. Moreover, these studies do not focus on highland lowland linkages in particular. Most of the issues discussed in the different studies are similar. Because of the similarities of the studies, identifying various marketing issues in the case of highland exports, namely, vegetables, fruit, and milk products, is also not possible. Additionally, non-renewable natural

resources, for which mining licenses are issued and are primarily exported, have not been studied. The partial nature of the information available therefore does not permit any comprehensive review of the highland-lowland economic links. There are a few studies on some herbs.

Based on the literature, it is pointed out that the development of horticultural and vegetable production has been *ad hoc*, with the emphasis being primarily on production. In the case of perishable products, such as vegetables and horticultural products, little attention has been given to post-harvest technology and product marketing. The studies identify that marketing is mostly in the hands of middlemen or commission agents who manipulate the operation and take a major share of the consumer rupee. Often the benefits accruing to highland producers are among the lowest in the entire marketing chain. There is no regulated market for fruit and vegetables, and the bulk of the transactions are carried out in wholesale markets managed or operated by associations, merchants, or commission agents. Producers on the other hand are generally unorganized, lack access to organized transport and storage facilities, and have poor packing materials—resulting in high losses. These factors have resulted in poor farm-gate prices for vegetable and fruit farmers. It is estimated that farmers receive only 20-25 per cent of the consumer rupee at the most. Neither the producers nor the consumers derive appropriate benefits under the prevailing marketing system. These results hold for most of the Hindu Kush highlands (Teaotia 1993; Swarup and Sikka 1987; HMG/FAO 1987; CEAPRED 1996).

Vegetables and horticultural produce are generally traded through different channels depending on the types of products and their origin. Generally, the flow of these goods in the market can be traced through three stages before reaching retail or export outlets.

Primary level sales exist at the village level where no physical structures exist to facilitate marketing operations. The sellers are usually village farmers who have little marketable surplus. Farmers usually sell their products to collection agents and sometimes they sell products directly to consumers. The collection agents sell the produce to larger merchants and get fixed commissions from them. Some agents are also known to operate with their own funds. These agents sometimes negotiate prices before harvesting against advance payment to the farmers. Because of cash needs and storage problems, small farmers are generally forced to sell their produce immediately after harvest when the agents come to their doors.

In secondary and tertiary markets, wholesalers are involved in purchasing goods from agents involved in the primary markets. At this stage, sellers are generally agents and farmers. The intermediary at this stage has more working capital and storage facilities, and hence stores produce anticipating a rise in price in future.

At the final market level, processed products (e.g., grain) are distributed through wholesalers and retailers to final consumers. Farmers are also found to sell their products directly in the final market depending on the accessibility and price difference be-

tween the final market and those offered by agents in the secondary markets.

More specifically, marketing channels differ by type of commodities/products and their origin. The products might

come from rural hinterland areas, other areas within the countries, or they might be imported. The general pattern of resource flows in the highlands and the marketing channels for different local products are shown in Figure 2.2.

Figure 2.2: Marketing Channels in the Highlands for Various Traded Resource Products

Food Grains								
Producers	to	Haat Bazaar	to	Final Consumers				
Producer	to	Local Buyer/Retailer	to	Final Consumers				
Producer	to	Buying Agents	to	Wholesaler	to	Retailer	to	Final Consumers
Live Animals								
Farmers	to	Buying Agents / Middlemen	to	Market Centre/ Butcher	to	Consumers		
Livestock Products (Ghee and Chhurpi)								
Producers	to	Buying Agents	to	Traders	to	Final Consumer		
Producers	to	Market centre/Hat Bazaar	to	Traders	to	Final Consumers		
Producers	to	Buying Agents	to	Wholesaler	to	Retailer	to	Final Consumers
Fruit and Vegetables								
Producers	to	Local Teashop /Consumer	to	Traders				
Producers	to	Wholesaler	to	Retailer	to	Final Consumers		
Producers	to	Assembler	to	Wholesaler	to	Retailer	to	Final Consumers
Producers	to	Assembler	to	Retailer	to	Final Consumers		
Cardamom/Forest Products								
Farmers/ Collectors	to	Buying Agents /Middle Men	to	Local Contractors	to	Traders/Wholesalers	to	Export to India
Collector	to	Village level Assembler	to	Buying Agents/Middle men	to	Wholesaler	to	Processing Plants (Nepal)
Collectors	to	Village Level Assemblers	to	Buying Agents	to	Wholesaler	to	Export

Source: SAPPROS 1998

Implication of Shorter Versus Lengthier Channels

The lengthier marketing chain observed for highland exports (e.g., forest products/herbs) indicates that payment farmers receive is negatively influenced by inefficiency. It also implies that there are more opportunities along the channel for adding value locally and which create additional jobs and income in the area. If the market is competitive, the transport costs and normal profit will always fully account for price differences. A relatively shorter marketing chain on the other hand implies that farmers receive a relatively higher proportion of the final market price and there is less opportunity for adding value between the farm gate and final buyers.

In short, the main points in horticultural and vegetable marketing may be summarised as given below.

- ⊛ Marketing of perishables is an expensive business because post-harvest operations (storage and transport) are beyond the capacity of individual farmers unless there are organized efforts to establish cooperative marketing centres and government-run wholesale marketing organizations in the highlands.
- ⊛ Storage is very important for efficient marketing but such facilities are expensive and require financing from cooperatives or government.
- ⊛ In the absence of established standards, packing with whatever materials are available is not only detrimental to the products but also harmful to the environment (e.g., timber extraction).

- ⊛ The lack of local processing industries in the highlands remains a serious obstacle to ensuring fair prices for farmers.

The situation is not much different in the case of herbs (Edwards 1993; Malla, 1994; Karnali Institute 1994; Rai and Sharma 1994; Bhattarai 1994; Sharma 1995; Amatya *et al.* 1995; Olsen and Helles 1997). Marketing of herbs in Nepal has remained a secretive trade and is one of the key factors responsible for low benefits accruing to highland collectors (Aryal 1993). The secretive nature of the trade limits the flow of information to collectors. Additionally, because these highland collectors are generally unorganized and sell small quantities to the road-head trader, their bargaining power is also limited. The road-head trader too does not appear to benefit much as he is dependent on *Terai* wholesalers who are equipped with capital as well as information. Although the study carried out by Olsen and Helles (1997) is strictly confined to the central region of Nepal (Gorkha), the case may be similar in the eastern (Edwards 1993) and western regions (Karnali Institute 1994) of Nepal. Annually, large quantities of herbs are exported and Indian traders in Delhi control the total herb trade.

Studies have not covered the production or supply response of these many highland products. With respect to herbs, the main points are (Amatya *et al.*, 1995; Edwards 1993; Olsen and Helles 1997) :

- ⊛ thousands of collectors sell to four to six *Terai* wholesalers (storage and transport) who in turn sell to Indian wholesalers who resell to

processors and retailers in India and also export to third countries;

- ⊛ collectors' margins range from 37 to 62 per cent; and
- ⊛ Nepali traders are entirely price takers from the larger traders of India, most of the products are exported.

Among the traders, the road-head trader makes the least margin due to various reasons. Conditions are, however, quite different for the *Terai* wholesaler whose margins are relatively higher since:

- ⊛ they have better information on Delhi wholesale prices, and
- ⊛ they are able to reduce storage costs as they purchase from the road-head dealer only at the opportune time.

INFORMATION BASE

Using any one of the above frameworks to quantify the economic linkages between the highlands and lowlands requires a vast amount of information. The information available is either insufficient or is not organized to address economic linkages. In the following Chapter, an attempt is made to use the available information to quantify economic linkages between the highlands and lowlands of Nepal. At this stage, this quantification is partial due to information gaps and, secondly, only one-way flow, i.e., flow from the highlands to the lowlands, is considered. Before quantifying the economic linkages, this section briefly discusses the sources of information used in the study (next chapter).

In the natural resource category, the resource products studied are herbs (Spikenard), mountain tourism, semi precious stones, non-timber forest products (*lokta* and *allo*). The Department of Forests (DOF) produces an annual report that provides information on the licenses issued for harvesting herbs (quantity in kg) by type of herb, district, and the royalty raised from the issue of licenses. Trade Promotion Centre (TPC) as well as the Federation of Nepal Chamber of Commerce and Industry (FNCCI) annually publish trade statistics that provide information on the magnitude of different exports items from Nepal to India and overseas (details by country are also provided). The primary sources of information for both TPC and FNCCI are the Balance of Payments' Department at Rastra Bank and the Department of Customs. Time series' data are available from these two latter sources. For some non-renewable resources (stone, sand, gravel, marble, etc) the Statistical Yearbook of Nepal has been used, and it only provides aggregate (national) information. In such cases, judgement has been used to determine whether the resource or product originates from the highlands or lowlands.

In other cases, individual sources had to be visited several times to obtain information. Information on the flow of vegetables and fruit by district and types of vegetable was gathered from the Kalimati Wholesale Marketing Office. The Dairy Development Corporation provided information on milk and milk products. These two sources have information that can be used for more in-depth studies. With

other resources and products, individual studies have been used and are noted in the appropriate places.

Another source of information used is based on the National Living Standard Survey (NLSS) conducted nationwide by HMG and the World Bank. Use of this database has helped to indicate the contribution of highland areas towards the supply of different food items consumed in urban areas. With growing populations in urban centres in different parts of the country, the increasing demand for different food items is being met by rural areas, some of which are in the highlands. The NLSS data presented here should be seen as indicative at this stage as the data are not fully

processed. The raw data were purchased from the Central Bureau of Statistics.

It needs to be emphasised that the existing information on the flow of highland products is extremely poor. The fragmented nature of the data, questions on reliability, incompleteness, difficulty in acquiring information from different sources (primarily HMG), and lack of record or reluctance on the part of different offices to release the information do not permit development of a macro, highland resource flow picture at present. However, selected information is presented and issues are discussed (Chapter 3) that bring out the need to focus on this subject.

INTRODUCTION

This chapter provides an overview of the major highland resource products. It deals mainly with their dominant features, magnitude of flow, and factors governing the flow process in Nepal. However, detailed information

The NLSS household survey is used to identify the flow of human resources from the highlands to the lowlands. Lastly, the flow of financial resources is also highlighted dealing with remittances sent by highland households to lowland areas and remittances received by highland



Flow of Highland Resource Products

INTRODUCTION

This chapter provides an overview of the major highland resource products. It deals mainly with their dominant features, magnitude of flow, and factors governing the flow process in Nepal. However, detailed information on the different resource products is not available. The discussions are conducted through four major headings; namely, natural resources, products, human resources, and financial resources. Under natural resources, non-timber products consisting of herbs² (herbs and medicinal plants) and *allo* (nettle fibre) and *lokta* (daphne bark) are discussed. Information on non-renewable resources is very limited, except for information on royalties collected from mining and quarrying licenses issued. These are highlighted. Products are mostly perishable farm products (vegetables, fruit, and milk).

The NLSS household survey is used to identify the flow of human resources from the highlands to the lowlands. Lastly, the flow of financial resources is also highlighted dealing with remittances sent by highland households to lowland areas and remittances received by highland households from the lowlands. Under the flow of financial resources, an estimate on the flow of remittances to the highlands and expenditure on food by urban households for highland products are also examined in an aggregate context. The principal findings and issues are discussed in each section.

NATURAL RESOURCES

Non-Timber Forest Products (NTFP)

All forest products, other than timber, fuelwood, and animal fodder are con-

² Herbs in this chapter is a translation of the term *Jaributi* in Nepali which is used to describe a wide range of herbs and medicinal plants.

sidered to be NTFPs in Nepal (Edwards 1993). The Himalayan region has been regarded as a repository of medicinal and aromatic plants. About 690 species of medicinal and aromatic plants (about 8% of the Nepalese vegetation) have been recorded in Nepal (Malla and Shakya 1984/1985). These plants have a myriad products and uses in addition to medicinal use, e.g., fibre, gums, dyes, oil, etc (Malla 1994).

Herbs and Medicinal Plants

Among the NTFP, herbs and medicinal plants are a major item exported from the highland areas of Nepal. About 100 different medicinal, aromatic, and spice plants are considered to be herbs and medicinal plants (Olsen 1996). Herbs and medicinal plants have different kinds of value for local people, ranging from food and nutritional supplements, housing materials, and so on. Some herbs and medicinal plants are also used as raw materials by small-scale industries found in highland areas, but larger quantities are exported to lowland areas and overseas. For the present study, only the herbs and medicinal plants exported in raw or processed form from highland areas are considered.

There does not appear to be any systematic reporting of the total area under different herbs and medicinal plants (naturally growing), total growing stock, annual sustainable yield, annual harvest, or the magnitude of total trade in herbs and medicinal plants. From the information available, the importance of some herbs and medicinal plants as highland export items is nevertheless apparent.

There is no single source from which the flow of herbs and medicinal plants from highland areas can be derived. The different sources available are the Annual Bulletin of the Department of Forests (DOF) (in Nepali), which provides the volume harvested based on licenses issued by the DOF; export volumes and values are provided in the Nepal Overseas' Trade Statistics; and the Herbs' Production and Processing Co. Ltd provides information on the export of some processed products. In addition, the Department of Botany (HMG) has published short monographs (3 to date) on some herbs and medicinal plants that discuss the distribution, cultivation, uses, and harvesting patterns. Finally, there are some studies conducted by different individuals and institutions on selected herbs and medicinal plants and trade in them.

Spatial Distribution

The herbs and medicinal plants that feature importantly in the exports from highland areas are mostly found in the high Himal areas (northern areas), almost across the entire 830km length of the country. Most of these districts have temperate, sub-alpine, and alpine climates and such climates appear to be conducive to their growth. Despite the favourable climatic condition of these areas, the environment in the various niches is fragile with extremely short growing periods and poor soils. These factors thus can quickly erode the comparative advantage of these areas if one does not adhere to strict supply management practices.

The Central Development Region, which includes the districts of Rasuwa, Kabhre, Sindupalchok, Dhading,

Nuwakot, Kathmandu, Lalitpur, Bhaktapur, Ramechhap, and Dolakha, contains the largest distribution of different herbs and medicinal plants. Licenses for harvesting were provided for 55 different types. Likewise, in the Eastern Development Region, the districts of Taplejung, Panchthar, Ilam, Dhankuta, Bhojpur, Sankhuwasabha, Udaypur, Khotang, Okhaldhunga, and Solukhumbu are the prime areas for herbs and medicinal plants. Licenses for harvesting are issued for 29 different types of herbs and medicinal plants. In the Western Development Region licenses are issued for 43 different herbs and medicinal plants, and they are collected in Palpa, Argakhachi, Baglung, Gulmi, Myagdi, Mustang, Syangja, Tanahu, Lamjung, Gorkha, and Manang. The main districts for collection are Jumla, Kalikot, Humla, Mugu, Dolpa, Surkhet, Jajarkot, Dailekh, Pyuthan, Rolpa, Salyan, and Rukum in the Mid-Western Development Region. Generally, licenses are issued for the collection of 55 types. Finally, in the Far Western Development Region, the number of licenses issued for collection was for 38 different types and the districts for collection are Achham, Bajura, Bajhang, Dadeldhura, Baitadi, and Darchula. Herbs and medicinal plants

are also found in the lowland districts in all the development regions but are not considered in the present study.

Harvest

For the most part, herbs and medicinal plants are not harvested in a scientific way; meaning that generally no care is taken to manage the growing stock. Harvesting generally implies cutting or uprooting (Sharma 1995; Edwards 1993; Malla 1994). This practice is believed to be serious as annual harvests in a given area are declining and people have found it more difficult to collect the products (personal communication with the Herbs' Production and Processing Centre). Additionally, the growing period in highland areas (where the herbs and medicinal plants are found) is short, generally between June to August, after which, due to a rapid decline in the temperature, the plants go into hibernation. This is the time when herbs and medicinal plants are collected and the time when livestock are grazed in large numbers on highland pastures. Livestock trampling, due to unmanaged grazing practices, harvesting the resource too early, and often over-harvesting are the main threats to sustained supply. In simple terms, there is no supply management, and harvesting is not carried out in a scientific way; these are both major threats to the continued existence of herbs and medicinal plants. Little is known about the environmental implications of such faulty practices (Amatya



Herbs on sale in a local haat bazaar in the Arun Valley

et al. 1995; Bhattarai 1996; Malla 1994; Sharma 1995).

Ownership

Most of the herbs and medicinal plants harvested or collected are from government-owned pastures, shrublands, and forests, and thus access, for those who care to collect them, is not restricted. Due to dwindling supplies, conflicts between communities may occur during harvests (Sharma 1995). Since most herbs and medicinal plants grow on government land, they are subject to royalty. Such lands are generally in remote and inaccessible areas where government monitoring (and enforcement) of annual harvests is not carried out. Several reasons that suggest poor enforcement and hence over-extraction of the resources may be as follow (Edwards 1996; Olson and Helles 1997; Amatya et al. 1995).

1. The stipulated royalty rates do not have any bearing on the abundance of the products.
2. The stipulated rates do not reflect the market value of the product.
3. The rates are the same over the entire country for the same products, irrespective of their supply, access to market, and demand.
4. The royalty rates can vary for the same products because of the difference in the names used in different areas.
5. Royalty rates are not enforced on individual collectors at the collection point, but at the wholesale point in the districts. As a result there is little prospect of relating the volumes collected to sustainable harvesting rates.

6. Products collected from government-managed and other forests cannot be distinguished. In practice, all herbs and medicinal plants traded can be taxed regardless of ownership. The taxing of private property is a common source of conflict between collectors and forestry officials. Currently, the royalty system provides no preferential incentive for cultivation on private land, or for common property management.

7. The growing success in community forestry has yet to be applied to management of herbs and medicinal plants.

Volume and Magnitude of Flows

Table 3.1 below provides the volume of different herbs and medicinal plants originating from different development regions (considering only highland areas) and the royalties collected by the government through issuing licenses. The licensed amount of all herbs and medicinal plants combined is in excess of 3,120 MT and the total royalty is about Rs 30 million (or about half million US\$). The actual amounts harvested/collected may be in excess of the figures reported in the table, but by how much is difficult to ascertain (Karnali Institute 1994; Olsen and Helles 1997; Edwards 1993; Sharma 1995). For example, based on the licenses issued for Chirayta (*Swertia chirata* — an Indian plant of the gentian family), the total amount harvested is 137,349kg. The Trade Promotion Centre (TPC) data show export of 27,000kg. The remaining amount cannot be accounted for accurately. Large quantities of Chirayta are exported to India where

Table 3.1: Quantity of Different Herb and Medicinal Plants Harvested Based on Licenses Issued by the DOF and Royalties Generated by Development Regions, 1996/97

Types	Eastern	Central	Western	Mid Western	Far Western	Total	%
1 Amalbed	-	-	1475	-	-	1475	0.05
2 Bajradanti	-	-	-	2000	-	2000	0.06
3 Bhojho	255	-	250	14768	18890	34163	1.09
4 Bhojwada	-	-	-	-	4200	4200	0.13
5 Bikh	3357	8381	2015	-	-	13753	0.44
6 Chabo	4505	-	241	-	-	4746	0.15
7 Chatiwan	650	-	11800	-	-	12450	0.40
8 Chiraito	99066	31722	3730	806	2025	137349	4.40
9 Dalchini	8815	-	71899	41246	9075	131035	4.20
10 Falkira	-	-	-	17141	-	17141	0.55
11 Jatamansi	1915	-	1219	99981	-	103115	3.30
12 Jiwanti	1000	-	-	-	-	1000	0.03
13 Kakarsingi	-	-	-	5382	-	5382	0.17
14 Kukur Tarul	-	14420	460	-	-	14880	0.48
15 Kurelo	2360	52100	11929	47798	6077	120264	3.85
16 Kutki	10531	6090	4018	72855	27320	120814	3.87
17 Lauhan	5050	-	-	-	-	5050	0.16
18 Lauthsal	7000	-	110498	-	-	117498	3.77
19 Lohasalla	-	109378	-	-	-	109378	3.51
20 Majitho	66142	24892	4366	5391	-	100791	3.23
21 Mushroom	300	-	-	-	-	300	0.01
22 Nagbeli	14363	12636	10051	-	-	37050	1.19
23 Padamchal	-	-	6814	101502	200	108516	3.48
24 Pakhanbed	12858	-	-	340225	17120	370203	11.86
25 Pangree	1230	-	-	-	-	1230	0.04
26 Pipla	165	-	3151	1000	-	4316	0.14
27 Rasulla	-	-	-	21600	-	21600	0.69
28 Rittha	156235	-	2040	298219	287918	744412	23.85
29 Rudrakhchya	475	-	-	-	-	475	0.02
30 Saldhup	27	-	-	-	-	27	0.00
31 Satawari	5836	-	12316	2071	150	20373	0.65
32 Setakchini	-	-	6835	52	15634	22521	0.72
33 Shugandhawal	-	-	1577	19463	-	21040	0.67
34 Sikakai	550	-	15600	1985	15500	33635	1.08
35 Silajit	-	-	-	38074	-	38074	1.22
36 Sitalfal	2000	-	-	-	-	2000	0.06
37 Sunpate	-	4035	-	-	-	4035	0.13
38 Tayari	-	-	45000	-	-	45000	1.44
39 Tejpat	28205	-	305	3680	18243	50433	1.62
40 Thinguresal	2500	-	-	-	-	2500	0.08
41 Thungeful	-	-	-	-	-	0	0.00
42 Timur	871	-	5601	478996	958	486426	15.59
43 Wild garlic	3465	-	-	-	-	3465	0.11
47 Others	1153	17990	-	1883	25473	46499	1.49
Total Quantity (kg)	440879	281644	333190	1616118	448783	3120614	100.00
Total Royalty (Rs)	1950008	4488407	5475731	16224109	2282077	30420332	
% Royalty	6.41	14.75	18.00	53.33	7.50	100.00	

Note: Other products for which licenses were issued and for which amounts collected were small are not reported.

Source: Department of Forests, Annual Bulletin, 2053/54, HMG (in Nepali)

the demand for this product in the beverage industry is believed to be high. Chirayta is not exported in any processed form from Nepal. In addition, the total quantity of Spikenard air-lifted from Jumla (1994) exceeded the licensed amount (Karnali Institute 1994; also see Box 3.1). In short, the volume of herbs and medicinal plants exported annually is far in excess of the official records. Quantities harvested and royalties are increasing annually (Table 3.2). Nepal has been the leading

was 63.4 tonnes. The high volume of exports, which are mostly in crude form, fetches a low price. Export of processed or semi-processed products from herbs and medicinal plants only accounts for a small share of the market.

The total value of herbs and medicinal plants exported to India and other countries has increased from Rs 27.5 million in 1992/93 to Rs 64.5³ million in 1996/97 with an average growth rate of about 24 per cent per annum.

While India has been the major trading partner in terms of total export value, the export of herbs and medicinal plants to other countries is increasing at a much faster rate than to India (Table 3.3).

Not all herbs and medicinal plants harvested enter the overseas' market or trade with India. The quantities that

Table 3.2: Commercial Harvesting of Herbs and Medicinal Plants in Nepal with Royalties Collected

Year	Quantity (tonnes)	Rs ('000)	US\$ ('00)
1989/90	3348	3490	69.80
1990/91	6217	7400	148.00
1991/92	3372	5650	113.00
1992/93	5679	11330	226.60
1993/94	11694	15812	316.24

Source: Department of Forests, Annual Bulletin, 2053/54, HMG (in Nepali)

Table 3.3: Trends in Herbs and Medicinal Plants Exported to India and Overseas' Countries (Rs in 000)

	1992-93	1993-94	1994-95	1995-96	1996-97	Growth rate
India	24000	28100	41700	40500	47400	18.55
Overseas	3500	3500	7200	8100	17100	48.67
Total	27500	31600	48900	48600	64500	23.75

Source: Federation of Nepalese Chambers of Commerce and Industry, Nepal and the World: A Statistical Profile, 1998

supplier of herbs and medicinal plants to India and overseas' countries, e.g., Singapore, Hong Kong, Korea, Japan, Britain, France, and Germany, for the last two decades. (Export items also include spices such as ginger, cardamom, and turmeric and rosin.) The total volume of exports in 1989

are traded within Nepal (highland, lowland, and urban areas) cannot be derived from the available information. The people of Jumla, who go on seasonal trading trips to India, are known to take along with them different herbs, medicinal plants, and other natural products such as *silajeet*⁴ to

³ The exchange rate was about 67 rupees to one US dollar at that time.

⁴ Silajeet is a kind of oil found in the rock crevices. It is valued as a tonic.

Box 3.1: Benefit from Spikenard Collection and Trading in a Small Village of Jumla District

Chaudabisa Valley in Jumla district has a population of about 15,000 people, spread across 4 VDCs and 17 villages. The average household size is about 8 persons per household. Despite the fact that only about 10 per cent of the land is arable, the main occupation of most households is agriculture. The main crops grown are maize, buckwheat, wheat, and potatoes. With low crop yields and cropping intensity, only about 60 per cent of the households have sufficient food, and therefore migration is a common practice. About 80 per cent of the households in Chaudabisa involve themselves in the collection of Spikenard. Harvesting conflicts are known to occur. Official permits are required from the Department of Forests for collection of the resource for which the royalty that has to be paid is in proportion to the amount that is collected. The Spikenard collected is generally airlifted from the STOL airfield at the district headquarters.

On an average, the amount of Spikenard collected per household was about 100kg, given that in Chaudabisa a total of 69,500kg was collected. The employment generated by this trade (collection and pottering) was 20,600 days per year. In 1992/93, the average earning was about US\$ 20 per household. Since raw Spikenard cannot be exported, a processing plant is located on the Nepal-India border at Krishnanagar. The price of Spikenard in Nepal (US\$ 1.70/kg) is lower than the price across the border in India (US\$ 2.24/kg), which gives rise to illegal trade. The oil that is extracted from Spikenard sells for US\$ 180/kg. In short, the Chaudabisa households gain the least from the product they harvest.

Source: Karnali Institute 1994

trade. The quantities traded are not known.

Factors Governing the Flow from and Benefits to the Highlands

While huge quantities of herbs and medicinal plants are exported from the highlands, the highland peoples who collect these resources get only a small part of the benefit. Despite the large volumes of high-value herbs and medicinal plants being exported every year from the highlands, the highland people are not benefitting sufficiently due to a number of reasons, mostly related to marketing. The

lack of processing plants at the collection points and existence of a large number of intermediaries in the marketing channel appear to reduce the benefits to highland collectors. Another factor in the poor benefits accruing to the highland people is the low prices they receive for their goods. Both of these factors reflect the worsening terms of trade against the highland.

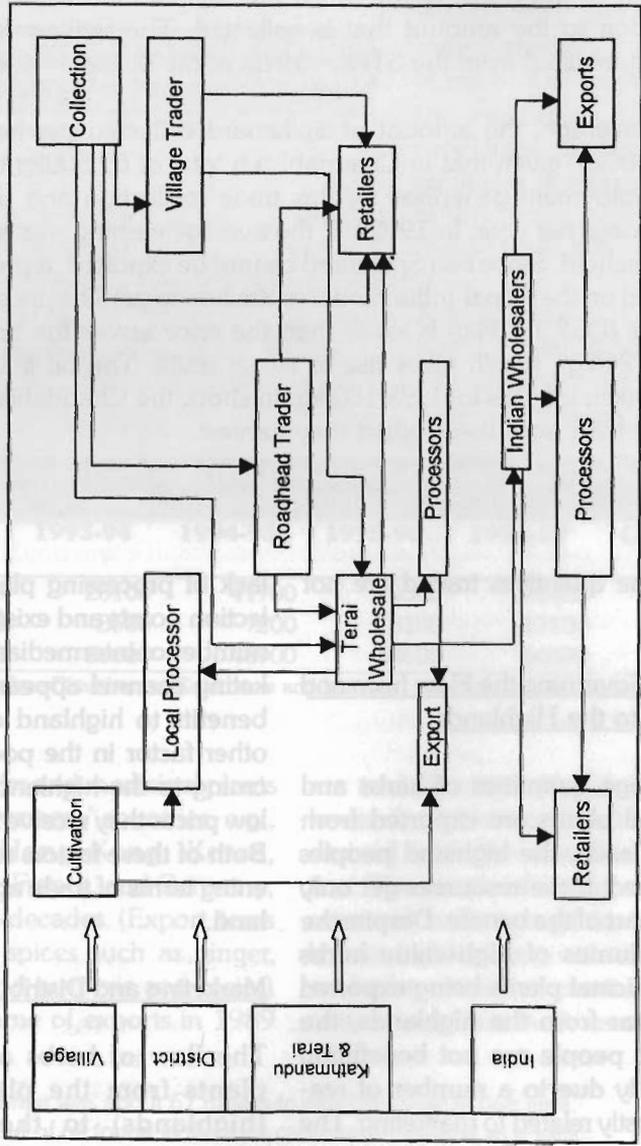
Marketing and Distribution Channels

The flow of herbs and medicinal plants from the place of origin (highlands) to the destination

(lowlands, mainly Indian Plains in the south) involves a number of intermediaries in the marketing chain (Figure 3.1). Throughout the Himalayan region, herbs and medicinal plants are collected, transported, and traded. The collection method at the source involves cutting, removing the bark, or uprooting. The herbs and medicinal plants gathered are carried to collection points, which may be at the district headquarters or at a road-head.

Three main groups are distinguishable in herb marketing; namely, the collector, the trader (middlemen), and, to a lesser extent, the officials. Collectors could be either hired collectors or those holding permits. After the hired collectors hand over the harvest to the trader they are paid, usually at the road-head, and these hired collectors completely disappear from the marketing system. Permit holders are local collectors who have permits and are better informed about

Figure 3.1: Marketing Chain for Herbs and Medicinal Plants in Gorkha District



Source: Adapted from Olsen and Helles 1997.

plants and details about their location. Because of the information at their disposal, their bargaining power is relatively better than the hired collectors, and hence they benefit more in relation to that. The local collectors go to nearby forests to graze their cattle and collect whatever herbs and medicinal plants they can find.

Terai-based wholesalers are few and small but are comprised of a powerful group of middlemen, who have close links with traders in Delhi (Figure 3.1). Given their close contact with Indian merchants, they have the latest market information and are thus able to control marketing and the prices paid to road-head traders and thus to collectors (Edwards 1996). Despite the high marketing margin enjoyed by *Terai* wholesalers, entry into the trade is difficult for new participants due to a number of market imperfections. Not only is the cost of establishing a network of buyers in India high for new participants but the capital investment required to buy stocks is also enormous, amounting to several million Nepalese rupees. Competition in the market is restricted not only by the control of price information exercised by the *Terai* wholesalers but also by the limited number of road-head traders at each collection centre. If the collectors find prices to be unacceptable, they may have to spend up to several days to reach another wholesaler in some other location, and this adds to their costs and weakens their bargaining position—on the other hand, the cost of establishing sales in India combined with a lack of knowledge of Indian market prices are constraints to road-head traders establishing direct sales to India. Maintaining secrecy about the

details of trade and concealing the financial gains would be necessary to maintain oligopsony (Olsen and Helles 1997).

A direct contact made by the collectors with the end-use buyers would completely change the marketing chain as highlanders would most likely benefit more and the trader margins would decline. This is one reason why the trade remains highly secretive (Aryal 1993). The long marketing chain obviously implies lower payments to collectors. Scope also exists to add more value internally through processing.

Spikenard (*Nardostachys grandiflora*)

Spikenard or *jatamansi* as it is known in Nepal is found between 3,000 to 4,500masl. It has been used since ancient times to make costly perfumed ointments. It is available in the northern districts of Nepal, namely, Taplejung, Therathum, Sankhuwasabha, Solukhumbu, Gorkha, Lamjung, Kaski, Parbat, Baglung, Gulmi, Mustang, Myagdi, Rolpa, Dailekh, Jumla, and Jajarkot. The literature indicates that there is a concentration of Spikenard in the Karnali Zone of western Nepal because of its favourable climate and topography. The total collection permitted by the district office in 1997 was about 103 metric tonnes, of which about 100 tonnes were collected in the Mid-Western Development Region (MWDR) alone and the rest in the Eastern Development Region (EDR) and the Western Development Region (WDR) (Table 3.1). The volume of Spikenard collected by development regions is summarised in Table 3.4.

Table 3.4: Trend in Spikenard Collection by Development Regions

Year	Quantity collected (MTs)	Development region	Number of districts
1987/88	64.35	E,C,W,MW	9
1988/89	111	E,C,W,MW,FW	14
1989/90	118.1	E,C,W,MW	9
1990/91	70.4	E,C,W,MW,FW	10
1992/92	203.3	E,C,W,MW	14
1992/93	113.3	E,C,W,MW,FW	19
1993/94	260	C,W,MW	14

Source: Federation of Nepalese Chambers of Commerce and Industry, Nepal and the World: A Statistical Profile, 1998

The applications of Spikenard are varied and almost the entire plant has applications. The plant is valued for its rhizomes/ roots which are used medicinally in China and the Indian subcontinent for various medicinal purposes. The main parts of the plant are used for the distillation of oil (called Spikenard [*jatamansi*] oil, the price of which in 1993 was Rs 5,800/kg in India), and it is one of the most expensive oils used in perfumes.

Among the herbs and medicinal plants, Spikenard is one of the top exports from the highlands. Whenever the export of unprocessed Spikenard was allowed, it used to be exported officially in amounts of over 100 tonnes per annum. With the ban on its export in unprocessed form in 1989, the official export figure for this item is not available in customs' statistics. However, in spite of the ban on its export in unprocessed form, it is finding its way to the Indian market and subsequently to processors in India, Germany, and other countries (Malla 1994). A study carried out by Bista *et al.* shows that 150 tonnes were shipped from Jumla airport, whereas the revenue paid to the district forest office was for 75 tonnes

only. This indicates that there is a wide discrepancy between the quantity permitted and the quantity actually air-lifted from Jumla.

The collectors' margin estimated by Olson and Helles (1997) for Gorkha ranges from 37 to 62 per cent, and this compares well with Edwards' estimate (39-89%). Estimates of both gross and net marketing margins for collectors, road-head traders, and Terai wholesalers involved in marketing Spikenard are summarised in Table 3.5. The road-head traders are not able to make a profit but are forced to buy all products offered because, if they do not do so, the collector may sell elsewhere. These traders generally speculate and take the advantage of the price in the Terai during the year (scenario III). The Terai wholesalers receive relatively higher net margins than the road-head traders. Road-head traders who are assumed to transport the product to the Terai are, on the other hand, able to make high net margins even when selling at the average price (Scenarios I and II). Moreover, they may also increase their income substantially by speculating on the Indian wholesale market (Scenario III) (See Box 3.1).

Table 3.5: Average Marketing Margin for Spikenard from Gorkha District

	Scenario I	Scenario II	Scenario III	% of Delhi
	Price during	Prices during	Average of two	wholesale
	one year	the main	maximum sale	price
	period (Sept	trading	prices offered	
	94-Aug 95)	season	during the year	
Collectors				
Delhi wholesale price	92.40	93.87	104.00	100.00
Collector price	46.03	46.95	46.95	52.2
Road head trader				
Roadhead wholesale price	56.51	46.95	65.31	59.1
	10.48	8.49	18.36	9.0
Gross margin (3-2)	16.68			
Marketing cost	-6.28	-8.18	0.60	-8.7
Net margin (4-5)				
Terai wholesaler	35.89	38.43	48.56	40.9
Gross margin (1-3)				
Marketing cost	21.51	23.98	33.50	25.6
Net margin(7-8)				

Source: Olsen and Helles 1997

Chirayta (*Swertia chirata*)

Another major export from the high Himal area is Chirayta or *Swertia chirata*. It is generally found at altitudes of between 1,200-3,000m, mostly on open ground. The habitats most favourable for its growth are forest areas that have been slashed and burned, and these can be found in all development regions (Table 3.6). The main production pockets are in Eastern Nepal, mainly in the catchment areas of Hile road-head (Therathum, Panchthar, Sankhuwasabha, and Bhojpur districts). It is also

collected in lesser quantities in Central Nepal (Edwards 1993). The EDR is the major belt for collection in Nepal and accounts for over 70 per cent of the total export. Chirayta is harvested from government land, after acquiring a permit and paying a nominal royalty fee. The total volume of export, based on the royalty collected, was about 137.3 metric tonnes in 1997.

Edwards' study shows that collection of *Swertia chirata* is an important activity for many poor households in the Kosi hill area, and he estimated that

Table 3.6: Trend in *Swertia chirata* Collected by Development Regions

	Quantity collected (MTs)	Development Regions	Number of districts
1987/88	159.5	EDR, CDR, WDR, MWDR	15
1988/89	131.8	EDR, CDR, WDR, MWDR	18
1989/90	165.1	EDR, CDR, WDR, MWDR	18
1990/91	85.6	EDR, CDR, WDR, MWDR, FWDR	19
1992/92	159.3	EDR, CDR, WDR, MWDR, FWDR	27
1992/93	200.8	EDR, CDR, WDR, MWDR, FWDR	36
1993/94	304.6	EDR, CDR, WDR, MWDR, FWDR	35

Source: Department of Forests, Annual Bulletin, 2053/54, HMG (in Nepali)

it brings in an estimated US\$ 280,000 per year in the area. Edwards also provides the distribution of benefits from this trade in the Kosi Hills (Tables 3.7 and 3.8) and Olsen and Helles (1997) for Gorkha.

lowland areas but also for export. In terms of the revenue raised by the government from the licenses issued for collection of NTFPs, the revenue raised from NTFPs was about Rs 25,741,337 in 1995/96 (DOF 1998).

Table 3.7: Estimated Distribution of Benefits from *Swertia chirata* Trade in the Kosi Hills

	Month	Income (Rs/kg)	% of Retail Price	Quantity (kg)	Total (Rs)
Harvesters	Sept.	60	50	20	1200
Village traders	Oct.	28	23	500	14000
Porters	Oct.	12	10	500	6000
Roadhead traders	Nov.	10	8.3	4000	40000
Terai traders	Dec.	4	3.3	20000	80000
Retailer	Dec.	6	5	10000	60000

Source: Edwards 1993

Table 3.8: Average Marketing Margin for *Swertia chirata* from Gorkha 1994-95

	Scenario I Price during one year period (Sept 94-Aug 95)	Scenario II Prices during the main trading season (Oct 94- March 95)	Scenario III Average of two maximum sale price offered during the years	% of Delhi Wholesale price
Collectors				
Delhi wholesale price	92.75	95.73	120.00	100.00
Collector price	48.23	49.98	49.98	52.2
Roadhead trader				
Roadhead wholesale price	64.33	65.73	78.44	68.7
Gross margin (3-4)	16.10	15.75	28.46	16.5
Marketing cost				
Net margin (5-7)	2.63	2.08	13.39	2.2
Terai wholesaler				
Gross margin (1-3)	92.75	95.73	120.00	100.00
Marketing cost	82.10	83.69	85.15	87.4
Net margin(8-9)	10.65	12.04	34.85	12.6

Source: Olson and Helles 1997

Other Non Timber Forest Products (NTFP)

Other NTFPs for which there is a demand in the lowlands and overseas are briefly discussed in this section. The importance of other non-timber forest products has been increasing over the years. Currently, most of the NTFPs are used by local communities, but some NTFP products made from them are in demand not only in

There is not much information on most NTFPs, despite their extraction and export. Two NTFPs on which some studies have been conducted are *Daphne (lokta)* and *allo (nettles)*, and these are briefly discussed below.

Lokta (*Daphne bholuia*)

Lokta is used to refer to three plants belonging to the family of Thymelasceae, namely, *Daphne*



A Cinnamon bush—a forest product that can be a valuable cash crop

bholua, *Daphne papyracea* and *Edgeworthia gardneri*. The bark of *Daphne bholua* is the principal ingredient used for making Nepali paper and other paper products that are sold in the domestic market and exported to many countries.

across the entire belt of the Himalayan foothills of Nepal, except in the FWDR where its occurrence is relatively sparse. *Lokta* is found relatively more abundantly in the WDR according to the figures derived from the number of harvesting licenses issued by the DOF (Table 3.9). As for herbs and medicinal plants, the

amount of *lokta* collected may be more than stipulated in the licenses (Dhungana and Chhetri 1995).

The harvesting methods used are primitive. The bark is generally stripped directly from the plants, left to stand, or uprooted. These are all

Table 3.9: Daphne(Lokta) Harvest Based on Licenses Issued by the Department of Forests, 1995/96

District	Amount Collected kg	District	Amount Collected kg
Illam	1000	Ramechhap	20000
Taplejung	27000	Dolakha	11983
Bhojpur	1000	Sindhupalchok	43000
Therathum	4000	Dhading	8461
Sankhuwasabha	3700	Central Dev. Region	47447
Khotang	1750		
Okhaldhunga	8000		
Solukhumbu	10600		
Total Eastern Dev Region	57050		
Lamjung	28000	Rukum	3450
Gorkha	17000	Mugu	2119
Myagdi	332500	Jajarkot	6993
Western Dev region	377500	Mid Western Dev Region	12562

Source: Department of Forests, Annual Bulletin, 2053/54, HMG (in Nepali).

Spatial Distribution and Harvest

Lokta is found as an understory shrub standing one to three metres high in oak/laurel and oak/rhododendron forests, generally between 2,100-2,700masl. It is distributed almost

unscientific methods and not conducive to plant regeneration. Although detailed studies on annual yield and regeneration and stock are lacking, it has been indicated that present harvesting methods are unsustainable as regeneration is being negatively af-



Lokta bark being dried to make Nepali paper.

fects (Nepali *et al.* 1990). Some trials have been conducted for the cultivation of lokta in the Makalu Barun National Park and Conservation Area.

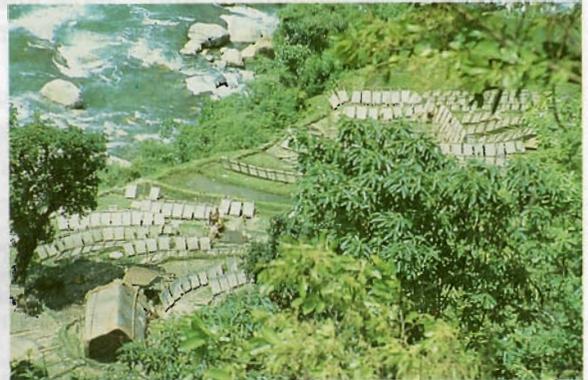
Paper Making

The collected bark is dried and sold to traders or registered industries. Some collectors use the bark to make ropes for domestic purposes. To manufacture paper, the dried bark is boiled for several hours. This boiling process uses up a lot of firewood, and, thus, encouragement of Nepali paper-making must also include provision of alternative energy sources. About three kilogrammes of firewood are required to produce one kilogramme of lokta pulp (Nepali *et al.* 1990). After the boiling is completed, the pulp prepared is spread on screens with wooden frames to dry. Once dried, it is ready for use.

Exports

There is no information on the total volume of paper prepared from lokta

annually. In addition, the total quantity consumed within the nation is not known. What is available is the value of Nepali paper exports. The countries of Western Europe and Japan are the main countries buying Nepali paper and paper products. In 1995/96 the value of total exports was Rs 59,085,168, which is close to a million US\$. Currently, the product is exported to 46 different countries (21 in Asia, 17 in Europe, and some countries in Africa, and America).



Nepali paper being dried for shipment to the lowlands.

Allo (*Girardinia diversifolia*)

Many communities in Nepal, living in highland areas, make use of this plant for its rich fibre content. It is also called the Himalayan nettle, and it is found growing in wooded or deciduous forests of oak, maple, and cherry in subtropical and temperate climates between altitudes of 1,000-4,000m. Three main species of allo (*Girardinia*) are found, namely, *Girardinia palmata*, *Girardinia zeylanica* and *Girardinia heterophylla* or *Girardinia diversifolia* (most commonly found in Nepal). The plant is an evergreen shrub and usually grows from about one to 2.5m tall.

Uses

Traditionally, the fibre is used for making bags, fishing nets, ropes, sacks, and clothes. Trials in blending this fibre with cotton, wool, and polyester have been successful. The polyester mixed fibres are suitable for shirts and suits and as such the fibre is used to make cloth which is exported out of the highland areas. Also the plant is used to make vegetable



Fibres produced from this nettle plant (*allo*) are used to weave materials that have export value.

dyes and many local people use the leaves as vegetables. The fibres are also used for weaving carpets, but this practice is not common (Shrestha 1994).

Harvest and Yield

The plant is generally found in areas unsuitable for agriculture, in shady damp places as undergrowth in the forest. Growth is best on north facing slopes. The number of shoots increases every year if plants are appropriately harvested and not uprooted. Regeneration from seeds is very slow. The plant matures in about three years. Poor harvesting methods are known to cause low yields the following year (Shrestha 1994). Esti-

mated yield (dry bark) varies from about 43kg per ha to 254kg/ha.

The plant is harvested best before the flowering season, when the quality of fibre is at its best. Collection is generally carried out in groups by both men and women. Often the walking distance is more than one day away. Villagers generally agree on the time of collection. Sickles are used to chop the stems, leaving a stump. The plants contain stinging hairs and hence hands are wrapped with thick cloth for holding the plant. Gloves may also be used. Teeth are used to separate the bark from the inner part of the stem. The inner stem is discarded and the peeled portion (dried ribbon) is gathered and sun dried. The entire process involves a lot of wastage.

Processing

After drying completely, the ribbon is soaked in water for one or two days. It is then boiled three to four hours in wood ash-water solution and left to simmer over night. The material is then washed in running water by frequent beating of a mallet. The fibres are then mixed with white clay, used to soften the fibre, and then dried in the sun and, after complete drying, the clay is removed by beating the fibre with a stick. Large quantities of firewood are required for boiling (1kg of fibre to 12kg of firewood). Information on the total production of fibre from *allo* is not available, although the fibre is available in the market from several outlets.

Other Renewable Resource Products

There are many other products originating in the highlands that are exported to India and other countries (Amatya 1995). Unfortunately, information on the production, spatial distribution, and marketing is not available. The Federation of Nepalese Chambers of Commerce and Industry and Trade Promotion Centre report export values of some renewable resource products (Tables 3.10 & 3.11). The exports are either in raw form, processed to some extent, or finished products. It is known that *rudrakchya* (*Elaeocarpu sphaericus*) and orchids are also exported from

Nepal, but information on these items could not be obtained.

Issues and Options

Traditional harvesting methods need to be improved, as currently the methods are not conducive to plant growth, its sustainable supply, as well as the environment it grows in. The management regime suggested is to harvest the plant on a six-year cycle. Total stocks and harvest zones need to be identified and harvesting needs to be regulated, monitored, and enforced. Herbs, medicinal plants, spices, and other NTFP cultivation must be encouraged on private lands since herbs and medicinal plants can

Table 3.10: Renewable Resources to India and Overseas

PRODUCT	1992/93	1993/94	1994/95	1995/96	1996/97
India					
Ginger	73900	73800	90900	137300	121600
Dried Ginger	30700	23100	76900	47200	40600
Marble Slabs	13330	5300	19800	41800	36500
Stones & Sand	23900	24900	24500	19700	27100
Cinnamon	5900	8900	3700	5800	10100
Turpentine	2300	NA	5100	20600	9100
Turmeric	200	NA	200	1100	1600
Overseas					
Nigerseeds	198000	134300	84300	409300	259200
Tea	2700	5200	13000	11600	19800
Herbs	3500	3500	7200	8100	17100
Cardamom	100	NA	200	NA	NA
Perfume Oils	3700	NA	3600	4600	800

Source: Federation of Nepalese Chambers of Commerce and Industry, Nepal and the World: A Statistical Profile, 1998

Table 3.11: Other Exports Overseas Originating from Highland Products (1996/97)

Product	Volume (kg)	Value (Rs)
Lycopodium	15600	6386238
Other Medicinal Herbs	27111	2203708
Spices		279416
Coffee	4245	602259
Honey	887	132372
Apple	3403	155993
Dry Fruits		13907
Essential Oils	4544	5460882
Flowers and flower seeds		584351
Fruit Jam		72198

Source: Trade Promotion Centre, Kathmandu Nepal, Nepal Overseas' Trade Statistics, 1996/97

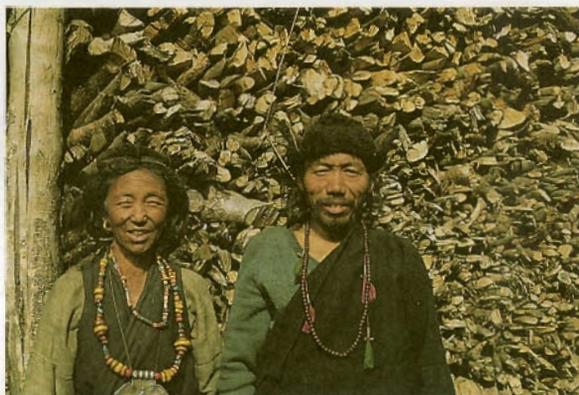
earn more income from the same piece of land than from traditional crops such as maize and millet. Setting the royalty rates is an important first step to encouraging cultivation of herbs and medicinal plants on private land.

Export of unprocessed produce results in high economic loss. The value of processed exports is many times higher than the unprocessed products. The export of unprocessed herbs and medicinal plants in an inefficient marketing system limits the benefits that can be reaped by the highland people. More focus and incentives need to be provided to encourage processing within the country. Supply management to ensure sustainable supplies need to be promoted. Farmers need to be encouraged to cultivate plants so that natural habitats can be conserved as a seed reservoir. Without assurance of sustainable supplies, processing within the country will not be possible.

A necessary step in promotion production, processing, and marketing to benefit the highland people may lie in getting them organized first. The haphazard collection and marketing practices of local people prohibits them from deriving higher benefits. Additionally, small-scale NTFP enterprise development would be possible if the local people could be organized into groups. Many different activities could perhaps be developed at the local level to generate employment and value added.

Problems caused by intensive use of firewood to process some herbs and NTFPs must be addressed, or with increased production of NTFPs, demand for firewood can increase and

have negative impacts on forest resources.



Fuelwood stored for the coming winter

One area that needs to be addressed is marketing. The benefits local people can derive from marketing depend on how long they can effectively stay in the marketing chain. Currently, most local people are out of the marketing chain once the product is sold to the roadhead dealers. Secondly, the marketing chain is fairly long, and this is also believed to reduce the prospects for highlanders to benefit from NTFP trade. Their disappearance from the marketing scene, once NTFPs are sold to the roadhead dealers, and the absence of processing and production of products from NTFPs in the highlands, therefore, severely limit highlanders in deriving sufficient benefit from the very resources with which they are endowed.

MOUNTAIN TOURISM

Dominant Features of Mountain Tourism Products

Tourism as a specialised service product has some specific characteristics that set the products apart from the more general goods sold in the market place. An understanding of the

dimensions of the service product concepts is an essential prerequisite for successful marketing. While most products combine the attributes of pure goods and services, tourism is generally believed to have more service contents than others, given the dominant features of intangibility, perishability, and inseparability of products. Tourism is a composite product comprised of attraction, services, transportation, information, and promotion (Banskota and Sharma 1995b).

Tourist destinations provide a convenient focus for the examination of tourist flow and its impact and significance. Destination is where most significant elements of tourism occur and where attraction and all other support facilities needed by tourists are found. Understanding the diversity of tourist destinations in mountain areas first requires identification of their common features.

Mountain tourism products are unique highland resources consisting of Himalayan scenery, the flora and fauna, the village people and their customs, and so on that have limited substitutes and which tourists come to enjoy. In contrast to other tangible products, mountain tourism products are intangible. In tourism, certain facilities and services are made available for a specified time and for specified use. Intangibility implies that tourism products cannot be easily evaluated or demonstrated in advance of its purchase. Unlike other goods, tourism products cannot be stored and this adds to the risk in the industry as it involves devising complex pricing and promotion policies. Tourism service products are often consumed and produced

simultaneously, i.e., the visitors have to be physically present at the destination to experience tourism. Unlike many products, tourism products are an amalgamation of many components that together make a complete product. The products tourists consume cover the complete experiences of their visit to a particular place and are contingent on marketing efforts, coordination among different agencies, services, and so on (Banskota and Sharma 1995a).

Tourism is a seasonal business in the highlands. Besides seasonality, other political unrest in different parts of the world and economic instability influence tourism. Seasonality becomes an issue because the products cannot be stored and this results in them not being used to capacity in lean seasons. In Nepal, highland tourist arrivals peak during the winter season (October-January), followed by the dry season (February-May), and slacken considerably during the rainy season (June-September). The seasonal nature of tourism has certain disadvantages in the context of mountain tourism. First, seasonality leads to crowding or congestion in an area. Second, the income and employment generated are seasonal. Seasonality may also be a blessing to the mountain environment, as it gives a chance for vegetation to regenerate and for local people to participate in agriculture during the monsoon season when tourism is also at a low ebb (Banskota and Sharma, 1995a).

Highland Tourists and Distribution

Highland or mountain tourists in Nepal are of three types, namely, moun-

taineers, free independent trekkers (FITs), and group tourists (GTs). The distribution of these types of trekkers varies by region as well as over time (Table 3.12). Mountaineering tourists

cent of the tourists visited Nepal for pleasure, 23 per cent for trekking, and the rest for business (6.4%), official (5.1%), and others (13%). The percentage share of trekker and moun-

Table 3.12 Trends in Tourist Arrivals by Purpose of Visit

Year	Holiday/ Pleasure	Trekking & mountai neering	Business	Pilgri- mage	Official	Confe- rence	other	Total
1970	41881	556	918		1528		1087	45970
1985	128217	28707	10416		9230		4419	180989
1986	163958	33609	10863		8825		6076	223331
1987	184979	36164	11781		8882		6274	248080
1988	200775	36937	12008		9781		6442	265943
1989	180973	40093	2630		12275		3974	239945
1990	161839	39999	11728	6713	26578	2838	5190	254885
1991	1773770	42308	14601	9103	37274	5441	6898	1889395
1992	237711	35166	31765	7219	20967	815	710	334353
1993	170279	69619	19495	10429	15812	5367	2566	293567
1994	168155	76865	23522	5475	20431	5361	26722	326531
1995	183207	84787	21829	5257	20090	5272	42953	363395
1996	209377	88945	25079	4802	20191	6054	39165	393613
Share	53.19	22.60	6.37	1.22	5.13	1.54	9.95	100.00

Source: Banskota and Sharma 1996

can also be classified into two categories, namely, those who climb peaks above 6,000m and those who climb peaks below 6,000m. Each of these groups has different impacts on the areas they visit (Banskota and Sharma 1995a). In 1996 about 53 per

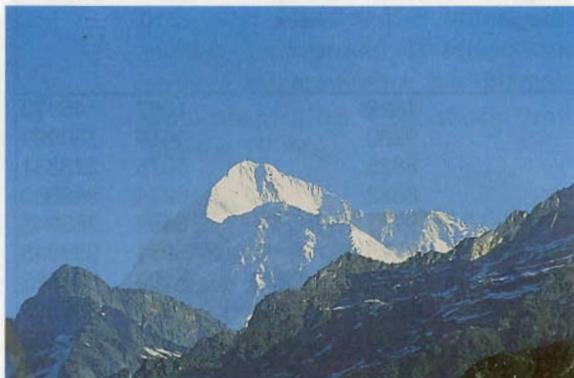
cent of the tourists visited Nepal for pleasure, 23 per cent for trekking, and the rest for business (6.4%), official (5.1%), and others (13%). The percentage share of trekker and moun-

Table 3.13: Protected Areas in Highland Nepal

Name	Area (sq.km.)	Location	Gazetted
Rara National Park	106	High mountains	1976
Shey Phoksundo National Park	3555	High Himal	1984
Annapurna Conservation Area ¹	7000	High mountain to high Himal	
Langtang National Park	1710	High mountain to high Himal	
Sagarmatha National Park	1148	High Himal	1976
Makalu-Barun National Park & Conservation Area ²	2330	High mountain to high Himal	1992
Shivapuri Watershed Protected Area ³	144	Mid mountains	
Dhorpatan Hunting Reserve	1325	High mountain	1987
Kaptad National Park	225	High mountain	

Source: Master Plan for the Forestry Sector Project 1988, Main Report

peaks opened for mountaineering throughout the country. The most popular areas in the mountain regions visited by trekkers are the Annapurna, Langtang, and Sagarmatha regions. The areas in the highlands visited by tourists are mostly protected areas (Table 3.13).



Mt. Makalu (5th highest in the world), located in the Makalu Barun National Park and Conservation Area is a prime tourism attraction.

Volume and Magnitude of Benefits

Significant income and employment benefits have been realised from mountain tourism. These benefits are attributed to the direct expenditure of tourists. The benefits that accrue to

mountain people are currently confined to small pockets and small groups. Currently, income benefits to mountain people are through expenditure by tourists on food and accommodation. Employment benefits are primarily in the form of porter services for trekkers and mountaineers. There are variations in the amount of benefits generated by group and independent trekkers, with the former contributing more to employment generation and the latter to income generation (Banskota and Sharma 1995a). Potentials to generate greater than current benefits through appropriate valuation of the mountain tourism assets exist (Wells 1992).

Estimates of income generation from mountain tourism are provided in Table 3.14. The total revenue generated from mountain tourism in 1992 was about Rs 641 million compared to about 74 million in 1980. Wages paid to porters and other support staff constituted about 23 per cent, food and accommodation expenditure for nearly 50 per cent, mountaineering

Table 3.14 : Income Generated by Mountain Tourism in Nepalese Rupees (Rs in 000)

Year	Wages	Food	Mountaineering		Trek & Park	Peak Fee	Total Mountain Revenue	Expenditure Per Trekker per day
			Exp	Royalty				
1980	16328	35558	15827	843	3295	2121	73972	192
1981	18595	39073	18217	5281	3525	1760	86452	210
1982	22811	47206	17504	1036	3880	2108	94545	209
1983	24836	52414	18575	1150	3876	2521	103372	229
1984	36343	74121	20169	2752	4945	3104	141434	245
1985	31483	64272	17870	3298	3928	3646	124497	272
1986	52485	117298	28854	4063	5949	5602	214251	309
1987	55596	115481	34020	4330	5673	7770	222870	337
1988	81310	159630	42582	5079	7353	8523	304477	355
1989	89938	184416	63976	7222	7303	1389	354244	416
1990	103952	197112	68368	7266	7451	1605	385754	444
1991	120225	309618	156363	8929	7892	13053	616081	669
1992	146663	332838	101355	30351	8573	20883	640662	641

Source: Banskota and Sharma 1996

expenditure for 15 per cent, and mountaineering royalties accounted for less than two per cent on average. The share from the various permit fees has been decreasing steadily over the years and is less than the share contributed by trekking peak fees. The estimates made are lower than they should be due to gaps in the information. Despite this underestimate, it is nevertheless clear that mountain tourism assets generate a substantial amount of income, and that there is scope to increase this income

The ratio of the import content of the tourism sector in Nepal is about 62 per cent at the macro-level, indicating high leakages. There is a possibility of decreasing leakages through development in the domestic sectors that have a strong linkage with tourism. The leakages are fairly high, even in mountain areas (Table 3.15) and promotion of agricultural activities can help reduce them.

the flow of tourists and generation and higher retention of benefits generated. Currently, one of the main factors limiting generation of increased benefits is the lack of supply side management of mountain tourism in highland areas.

Evidence also indicates that there is limited scope for sharing benefits from mountain tourism. This is primarily due to the poor linkages of this sector with local production and other activities that have remained underdeveloped. Substantial benefits can be accrued from tourism provided there is interrelated development of all supply side components of tourism through sound action planning. Opportunities exist to use entry fees for development of infrastructural facilities. Above all, in order to realise these potentials fully and sustain the impacts, capacity building of local participatory institutions is vital (Banskota and Sharma 1998).

Table 3. 15 Estimate of Leakage of Tourist Generated Income (% imports) in Lodges in Ghandruk and Ghorepani

Item	Ghorepani	Ghandruk
Rice	100	96.82
Flour	95.88	51.59
Bread	85.29	57.58
Vegetables	414.75	20.91
Meat	25.00	18.06
Eggs	100	98.86
Milk	100	78.86
Fruits	99.12	100
Jam/Butter	100	100
Furniture	9.71	14.55
Cloth/drinks/Mattress	94.44	100
Overall	76.41	68.09

Source: Banskota and Sharma 1995

Issues and Options

Supply side planning and marketing play important roles in determining

Continuing to promote trekking tourism alone is unlikely to increase benefits to the nation or to local communities. There is a great deal of



Tourists camping in Chandanbari on the way to Gosainkunda in Langtang National Park.

scope for developing new mountain tourism products, and favourable government policies for investment in mountain areas needs to be encouraged.

Use of firewood by tourists has been restricted (kerosene is mandatory in some mountain areas), but its use by tourist support staff and local tourism outlets continues. Policy failure arises from the fact that this derived demand for firewood by tourists is not considered an integral part of the mountain-tourism energy policy.

Nepal's mountaineering tourism is now suffering from self-glorifying and *ad hoc* policy changes (Banskota and Sharma 1995a). Besides the ACAP, institutional and participatory approaches to mountain and tourism development are lacking. Tourism-led development has been an individual response to meet tourist needs, and community development has been externally driven. The need to organize mountain communities for both community and tourism development has not been addressed.

A clear long-term policy on what is desired from tourism in the context of mountain development has yet to emerge in Nepal. Tourism development cannot be viewed in isolation from conservation and natural resource management and mountain development, as it is the mountain resources that form the very basis of mountain tourism as well as the basis of survival for local mountain communities. This lack of



Local people constructing a cottage along a tourism trekking route.

realisation has resulted in a demand-induced tourism growth pattern, with local people responding to tourist needs; and thus it has not contributed to mountain development in a meaningful way.

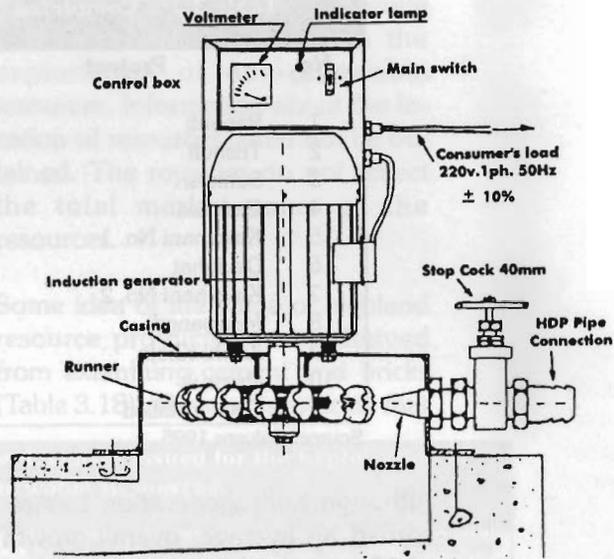
HYDROPOWER GENERATION AND CONSUMPTION

In Nepal, the Ministry of Water Resources is the guardian of water bodies. Hydropower is essentially an *in situ* water resource (a flow resource converted to a fund resource). Nepal Electricity Authority (NEA) was created in 1985 to undertake all planning, construction, operation, and maintenance of electrical services in the country. NEA is the largest government undertaking in terms of

human resources, capital investment, and assets. Over the years, NEA has been providing electricity services to households, industrial enterprises, government and other offices, and other commercial outlets. NEA is actively involved in rural electrification. Currently, about 15 per cent of the households in the country have access to electricity. About 254 MW of electricity are produced from the Marsyangdi, Kulekhani, Trishuli, and other smaller and diesel plants.

Highland areas by virtue of their water resource endowments are prime locations for hydropower generation. Hydropower generation may be categorised as small- or large-scale. Small-scale refers to the units established by individual households (peltric turbines) to generate power for domestic and other uses. Power consumption for such small projects is generally not connected to the national grid and hence consumed locally. Only larger-scale projects that enter the national grid have direct relevance in the context of highland-lowland linkages, as power is used to meet lowland or urban area energy needs.

Projects with a potential capacity of 82,000 MW have been identified, but less than one per cent (254 MW) of this energy has so far been tapped. Advanced studies (pre-feasibility) have been conducted to tap 14,742 MW. Nepal electricity supply systems primarily consist of two sub-systems: the interconnected Nepal power system, better known as the national grid, and isolated systems. Out of the installed capacity of 254 MW, 248 MW is connected to the national grid. The remaining five MW are in isolated systems serving remote areas of the



Peltric turbine

country, and they consist of over two dozen small/mini plants (Shrestha 1996). Forty-five per cent of the electricity generated by the national grid is used by Kathmandu alone. The national grid accounts for almost 98 per cent of the capacity and 99 per cent of the associated electric energy supplied, and as such the national grid represents the overall hydroelectric industry of Nepal. In Nepal, 356 plants of varying sizes in both the public and private sector, with a total capacity of 254 MW, including the isolated systems, exist. The numerous, small privately-owned plants account for only 0.66 per cent (1.68MW) of the total installed capacity. Losses and internal consumption (producing units) account for about 25 per cent.

All hydropower plants are obviously located in highland areas. The major projects with installed capacities, and the year they became functional, are provided in Table 3.16. Marsyangdi is the largest (69 MW) project in Nepal.

Table 3.16: Completed Major Hydropower Projects

No	Project	Capacity (KW)	Year
1	Panauti	2400	1965
2	Trishuli	21000	1962
3	Sunkosi	10050	1973
4	Gandaki	15000	1979
5	Kulekhani No. 1	60000	1982
6	Devighat	14100	1983
7	Kulekhani No. 2	32000	1986
8	Marsyangdi	69000	1989
9	Andhi Khola	5100	1991
10	Jhimruk	12500	1994
	Total Installed	241150	1994

Source: Salvans 1995

Although hydrogeneration has recorded an average, overall growth of 13 per cent in terms of installed capacity, Nepal's electricity supply has always lagged behind demand. About 12 per cent of the total population have access to electricity, and this increased from nine per cent in 1992. Of those having access to electricity, about 90 per cent are urban dwellers (Shrestha 1996). Per capita consumption is highest in the CDR and lowest in the FWDR. Supply constraints are already a serious problem, as load shedding on a regular basis continues.

Benefits to the Highland People

The benefits to the highland people can be seen from the rural electrification that is being carried out by NEA. Rural electrification is a costly investment and, given the large-scale poverty in rural areas, rural electrification implies large subsidies. Although there is no transfer of resources directly to the highlands after using highland water, rural electrification is a direct benefit received by rural highland households. The magnitude of subsidies provided could, however, not be obtained.

NON-RENEWABLE NATURAL RESOURCES

There are certain non-renewable natural resources occurring in highland areas that are directly in or in intermediate demand in various urban and lowland industries. Although detailed information on the different non-renewable natural resources used by lowland areas is not available, different sources provide some idea. Non-renewable natural resources that flow out of the highland areas can be placed in the following groups.

- ✪ Metallic (copper, ores)
- ✪ Non-Metals (agriculture-lime, clay, garnet, limestone, magnesite, mica, ochre, quartz crystal, salt, tourmaline, coal, boulders and gravel, cement clinker, flag stone, stone boulders, sand, lime stone-cement grade, marble, chips, raw stone, slab).

Urban construction in highland areas consumes a great deal of sand. Some construction work uses rocks and boulders. All construction work requires bricks which are manufactured from clay. In addition, there are currently three big cement

factories in Nepal that consume considerable amounts of limestone; and this is available only in highland areas. Almost all construction work needs cement. The three cement industries in Nepal cannot meet the total demand, and Nepal has to import cement from abroad. Almost all lowland road construction uses rocks and other rock materials from highland areas. Some materials, such as quartz, garnet, tourmaline, and so on, are even exported. Table 3.17

gives the volume and the revenue generated from royalties on the exploitation of non-renewable resources. Information about the location of resources could not be obtained. The royalties do not reflect the total market value of the resources.

Some idea of the value of highland resource products can be derived from examining cement and bricks (Table 3.18). The results indicate that

Table 3.17: Royalties Raised from the Licenses Issued for the Exploitation of Various Non-renewable Resources

		Unit	1986/87	1990/91	1994/95	1995/96
Metalics	Copper	Mt	1.66	3.5	Na	Na
	Copper ore	Mt	14	21	Na	Na
Non-metalics	Agriculture-lime	Mt	12200	Na	Na	Na
	Clay	Mt	44750	8850	8225	10000
	Lime stone (1)	Mt	Na	19700	14004	13000
	Magnesite	Mt	3838800	Na	Na	Na
	Quartz crystal	Kg	Na	1062	1864	1500
	Salt	Mt	Na	7.3	6.5	8.5
	Tourmaline	Kg	Na	4.5	2.05	2.95
	Talc	Mt	3359	3170	2363	5323
	Coal	Mt	4653	127040	7485	7253
	Construction Materials (2)	Mt	Na	128823	97656	Na
	Lime stone (3)	Mt.	334270	221920	411942	488883
	Marble aggregates	cu.m	Na	31948	34779	40040
	Marble chips	Mt	1664	1037	0.308	548
	Marble craggy	sq.m	6263	6464	1414	2690
Marble raw stone	cu.m	Na	25230	Na	22500	
Marble slab	sq.m	Na	24749	33245	688841	
Total revenue from royalty (NRs '000000')			4.1	1.3	5	0.8

Notes: 1. Chemical grade. 2. Figures are for 1991/92 and 1993/94. 3 Cement grades

Source: Statistical Yearbook of Nepal, 1997, Central Bureau of Statistics (Tables 16.1 and 11.4)

Table 3.18 Production of Bricks and Tiles and Cement 1986/87-1995/96

Products	Units	1986/87	1990/91	1994/95	1995/96
Bricks and Tiles	000' pieces	33876	32625	23449	25911
Value of Bricks	Rs	50,814,000	49,937,500	35,173,350	38,866,500
Tiles					
Cement	Mt	151631	135897	326839	343181
Value of Cement	Rs	758,155,000	679,485,000	1,634,195,000	1,715,905,000

Note: Bricks and tiles are valued at Rs 1.5 per piece and cement at Rs 250 per 50 kg.

Source: Statistical Yearbook of Nepal, 1997, Central Bureau of Statistics (Tables 16.1 and 11.4)

the volume of production originating from highland resources is substantial. There is little doubt that the value of non-renewable resources flowing out of highland areas is also substantial.

FARM PRODUCTS

Mountain areas in recent times have begun to export cardamoms, different vegetables, and horticultural products to lowland areas, thus breaking the traditional flow of natural resource-based raw materials. Large numbers of live animals and livestock products, such as milk and cheeses, are being exported from highland areas in increasing amounts. Attempts have been made in this section to examine the nature and magnitude of the flow of vegetables, fruit, and livestock products (mainly milk and dairy products). Marketing processes and constraints are identified and options for improving the income of highland farmers are suggested.

Cardamom (*Amomum subulatum Roxburghi*)

This fruit is also called *alaichi* or false cardamom. The fruit of the cardamom is a deep red globose capsule, each cell of which contains small seeds held together by a viscid sugary pulp and possesses the properties of the true cardamom (small yellowish). The seed is valued as a spice in food preparations and for its oil in the perfume industry. For many farmers in the highland areas of Eastern Nepal (Ilam, Panchthar, Taplejung, Therathum, Dhankuta, Sankhuwasabha, and Bhojpur), cardamom is becoming a high-value crop. Although there is no record on

the area under cardamoms, increasingly farmers in these districts are cultivating this crop. This crop is generally cultivated in damp areas under the canopy of *Utis* (*Ulnus nepalensis*). In other words, cardamom grows in damp wasteland areas that are unsuitable for other crops. At least, in Sankhuwasabha district, there was no competition reported between cardamom and other crops. Owing to the very high returns from cardamom, farmers were found to have converted their *khet* (irrigated rice land) to cardamom production in Sankhuwasabha district (Banskota *et al.* 1991). India is currently the largest importer of cardamoms from Nepal. Table 3.19 shows that the value of exports to India increased from Rs 124.4 million in 1992/93 to Rs 171 million (over US\$ 2 million) in 1996/97.

Table 3.19: Value of Cardamom Export to Other Countries and India (Rs '000)

Year	Other Countries	India
1992/93	100	124400
1993/94	Na	147200
1994/95	3600	137700
1995/96	4600	195400
1996/97	800	187600

Source: Federation of Nepalese Chambers of Commerce and Industry, Nepal and the World: A Statistical Profile, 1998

Vegetables

Spatial Distribution of Vegetable Production

Nepal's diverse topographic features and climatic conditions permit production of about 250 vegetable crops, of which about 50 are common. While vegetables are grown almost everywhere, the more concentrated areas are located along the major highways and near urban centres.

Vegetables in the highland areas are primarily grown during summer as off-season vegetables and are in great demand in the lowland and urban centres, the main consuming markets. Winter vegetables from the Terai (tomatoes and aubergines) are grown as summer vegetables in the mid-hills. Temperate vegetables (cauliflowers, cabbages, radishes, and carrots, etc) are grown in the high hills during summer as off-season crops. With the improvement of the north-south transportation system, these main season and off-season vegetables are supplied to urban areas all year round. The highlands are also ideally suited for vegetable seed production.

The statistics available provide the regional distribution of the aggregate area under vegetable production. The total area has increased steadily from 82,000 ha in 1975 to about 144,368 ha in 1996, with growth rates of about 76 and 225 per cent respectively. The highlands currently account for about 41 per cent of the country's total area under vegetables (Table 3.20).

due to the lack of proper harvest management. This situation leads to a glut in the market and prices fall. During the off season when vegetable supplies are in short supply, prices peak. Steps to stabilise prices through harvest and supply management become necessary in order to protect both farmers and consumers. In the highland areas the lack of adequate transportation and storage facilities, together with the lack of producer organization, severely limit the prospects for vegetable production on a commercial scale as well as export to urban and lowland markets.

Volume and Magnitude of Flow

Precise estimates of the vegetable flow from highland to lowland areas are not available. Kathmandu is the main market centre consuming the bulk of the vegetables imported from both the hill and Terai districts, including India. Information was obtained from the Kalimati vegetable wholesale market to assess the annual volume of vegetables going to Kathmandu, the largest urban centre in Nepal.

Table 3.20: Area and Production of Vegetables in the Mountains and Hills by Development Region (1995/96)

	Area (ha)	%	Prod (Mt.)	%	Yield (kg/ha)
E. Region	10795	18.23	88924	16.09	8238
C. Region	27273	46.07	280244	50.70	10276
W. Region	9274	15.67	84452	15.28	9106
MW. Region	8962	15.14	74782	13.53	8344
FW. Region	2898	4.90	24391	4.41	8416
Highlands	59202	100.00	552793	100.00	9337
Nepal	144368		1327298		9194
% Highland	41.01		41.65		

Source: Agricultural Statistics Division, Ministry of Agriculture (1996/97)

Perishability and Seasonality Characteristics

During the harvest season there is always an excess supply of vegetables

According to the experts on vegetables, Nepal is almost self sufficient in vegetable production, except for some vegetables, such as pointed gourd, of which the

cultivation in Nepal has not yet begun on a commercial scale. Demand for other seasonal vegetables is almost entirely met through domestic production, some of which is carried out in the highland areas neighbouring Kathmandu.

Table 3.21 shows the monthly volume of different types of vegetables coming in from the highland and Terai districts. About 107 thousand metric tonnes of vegetables were marketed through the Kalimati wholesale market in 1996/97. Of this, about 45 per cent (47,972 MT, Table 3.22) came from the highland areas of Kathmandu Valley (Kathmandu, Lalitpur, Bhaktapur) and neighbouring districts of Dhading, Kabhre, Nuwakot, Makawanpur, Gorkha, and Tanahu. The remaining 55 per cent came from lowland districts (Chitwan, Bara, Parsa, Rautahat, Siraha, Sunsari, Jhapa, and partly from India). In terms of value the highland share is also almost 50 per cent (Rs 526,169,093).

The accessibility (physical link) largely conditions the flow of vegetables from the highland to the lowland markets. The vegetable flow from the highlands is high in those areas that are connected by roads. However, the exact volume of vegetables flowing from the highlands to the lowlands among the major north-south road corridors is not available. While areas, which have motorable roads and access to markets, have received priority for vegetable programmes, little attention has been paid to support the facilities needed for efficient marketing of vegetables.

Farmer- wholesaler – retailer- consumer.

Farmer- cold storage – wholesaler - retailer- consumer.

Farmer- assembler - wholesaler – cold storage - retailer- consumer.

Vegetable Marketing and Distribution Channel

A proper understanding of the market structure, marketing channels, and its functions is essential to understand the factors governing the vegetable flow from highlands to lowlands and urban market centres. There are two types of vegetable market. The first is the producer supply market or collection centre. These are usually located near production pockets. Producers or middlemen bring vegetables to such markets for sale to wholesalers. The second type of market is the consumer market, and these are usually located near major urban centres. Wholesalers and commission agents supply vegetables from collection centres to consumption centres.

In the case of the Kathmandu vegetable market, the most common marketing channel for vegetables produced in adjoining districts is from producer to wholesaler to retailer to final consumers. In the case of potatoes, the marketing channel is different. The following types of marketing channel are common for potatoes grown in the highlands.

When potatoes are exported to India, the marketing channel mostly used by growers involves farmers, local wholesalers/assemblers, and Indian assemblers for export to India. The vegetables imported from India are supplied through commission agents who sell them to wholesalers in the Kathmandu market.

Table 3.21 Monthly Volume of Vegetables and Fruit in Kalimati Wholesale Market (Kathmandu) by Sources of Supply (2053)

		Unit in MT														
Kathmandu		Lalit-Bhaktapur	Dhading	Makwanpur	Kavre	Nuwakot	Gorkha/Tanahun	Total Hill District	Chitwan	Bara Parsa	Rautahat	Sarlahi	Sunsari	Jhapa	Other	Total
Shrawan	55.0	62.5	489.0	352.0	1097.0	417.0	201.0	2673.5	860.1	1185.0	397.0	362.0	643.0	178.0	1447.0	7745.6
Bhadra	55.4	47.2	380.3	3014.0	1044.0	530.0	194.0	5264.9	578.0	978.0	280.0	259.0	602.0	514.0	1569.0	10044.9
Ashwin	128.9	46.1	563.3	731.0	915.0	614.0	253.0	3251.3	536.0	1019.0	307.0	255.0	567.0	497.0	1453.0	7885.3
Kartik	113.8	55.6	904.0	662.0	1163.0	1054.2	350.0	4302.6	450.0	1022.0	217.0	168.0	421.0	522.0	1280.0	8382.6
Mangsir	148.5	69.7	972.2	1384.0	1484.0	1074.0	448.0	5580.4	340.0	1265.0	196.0	183.0	376.0	400.0	1602.0	9942.4
Poush	98.8	106.4	902.0	907.0	1697.0	1368.0	614.0	5693.2	764.0	764.0	1886.0	369.0	523.0	373.0	275.0	10647.2
Magh	108.6	119.6	765.0	660.0	1730.0	916.0	121.0	4420.2	779.1	1957.0	467.0	572.0	408.0	249.0	1949.0	10801.3
Falgun	108.8	117.1	839.0	696.0	1699.0	725.0	261.0	4445.9	1086.0	2052.0	528.0	161.0	366.0	289.0	2146.0	11073.9
Chaitra	107.1	113.7	926.1	529.0	1551.0	418.0	289.0	3933.9	773.0	1691.0	273.0	405.0	349.0	286.0	2146.0	9856.9
Baisakh	na	na	na	na	na	na	Na	na	na	na	na	na	na	na	na	na
Jestha	230.4	479.2	1052.1	695.1	1584.0	785.9	112.3	4938.8	1621.3	2295.2	530.5	1125.7	258.1	299.9	2738.3	13807.8
Ashad	na	Na	na	na	na	na	Na	na	na	na	na	na	na	na	na	na
Total	1153.3	1217.1	7793.0	9630.1	13964.0	7902.1	2843.3	44504.8	7787.5	14228.2	5081.5	3859.7	4513.1	3607.9	16605.3	100188.0
%	1.15	1.21	7.78	9.61	13.94	7.89	2.84	44.42	7.77	14.20	5.07	3.85	4.50	3.60	16.57	100.00

Source: Kalimati Wholesale Project 1998

Table 3.22: Total Inflow of Vegetables to the Kalimati (Kathmandu) Wholesale Market

Commodities	Volume (kg)	Price	Value (Rs)	Hills Share in supply percent			
				Volume	Value	Volume	Value
1 Tomato (small)	5984500	14.89	89119179	2693025	40103631	6	8
2 Tomato (Large)	4437000	17.50	77647500	1996650	34941375	4	7
3 Potato (red)	13590000	9.08	123442500	6115500	55549125	13	11
4 Potato (White)	13360000	7.58	101313333	6012000	45591000	13	9
5 Onion Dry	9570000	8.83	84535000	4306500	38040750	9	7
6 Carrot	383400	25.60	9815040	172530	4416768	0	1
7 Cabbage	6307700	5.17	32589783	2838465	14665403	6	3
8 Cauliflower local	5666800	17.78	100743111	2550060	45334400	5	9
9 Cauliflower Terai	329600	12.86	4237714	148320	1906971	0	0
10 Radish white	3785000	8.33	31541667	1703250	14193750	4	3
11 Radish red	144300	7.20	1038960	64935	467532	0	0
12 Brinjal long	5157323	7.78	40123973	2320795	18055788	5	3
13 Brinjal gland	877000	8.89	7795556	394650	3508000	1	1
14 Cow pea	1954000	12.25	23936500	879300	10771425	2	2
15 Green peas	1818000	13.60	24724800	818100	11126160	2	2
16 French Bean	15559400	13.88	215886675	7001730	97149004	15	18
17 Sword bean	1561000	10.71	16725000	702450	7526250	1	1
19 Bitter Gourd	2011100	15.20	30568720	904995	13755924	2	3
20 Bottle gourd	1656000	7.60	12585600	745200	5663520	2	1
21 Pointed gourd	3711000	18.13	67261875	1669950	30267844	3	6
23 Smooth gourd	1656000	11.50	19044000	745200	8569800	2	2
24 Sponge Gourd	547000	15.70	8587900	246150	3864555	1	1
25 Pumpkin	698000	6.09	4251455	314100	1913155	1	0
26 Squash	896000	5.56	4977778	403200	2240000	1	0
27 Turnip	188000			84600	0	0	0
28 Okra	1320000	11.88	15675000	594000	7053750	1	1
29 Sweet potato	56000	10.25	574000	25200	258300	0	0
30 Barela	240200	10.50	2522100	108090	1134945	0	0
31 Arum	1273000	9.20	11711600	572850	5270220	1	1
32 Christophine	583200			262440	0	1	0
33 Broad leaf Mustard	243550			109598	0	0	0
34 Spinach leaf	202000			90900	0	0	0
35 Cress Leaf	178000			80100	0	0	0
36 Mustard Leaf	124100			55845	0	0	0
37 Fenugreek leaf	3800			1710	0	0	0
38 Onion Green	185500			83475	0	0	0
39 Bakalu	4300			1935	0	0	0
40 Yam	343000	18.33	6288333	154350	2829750	0	1
Total	106604773		1169264652	47972148	526169093	100	100

Source: Kalimati Wholesale Project 1998

Several studies have computed the share of different actors in the marketing channel for vegetables mostly transported from the *Terai* to the Kathmandu market. These studies show that the retailer's share of the consumer's rupee is higher than that of the wholesalers due mainly to the high physical loss at the retail level,

together with the high local transport costs borne by retailers. Packaging, transportation, handling, and management costs do not vary much by crops, which ranged from 12 to 14 per cent of the total marketing cost. Estimates indicate that farmers get only 20 to 25 per cent of the consumer rupee and the balance of 75-

Box: 3.2: Vegetable Production in the Highlands: Lessons from the CEAPRED Vegetable Programme in Dhankuta District

In recent years, many NGOs have been actively involved in disseminating vegetable production technology to different parts of rural Nepal and to some highland areas. The Centre for Environmental, Agricultural, Policy Research, Extension and Development (CEAPRED) is one active NGO whose work in vegetable production in the Kosi Hills has brought significant change to the living standards of several farmers living in the Hele-Basantapur area. The project began in 1990. This story is about the success of vegetable farming through development of producer cooperatives for vegetable production and marketing.

First, farmer groups were organized and a cooperative formed. This helped to reduce transaction costs for input delivery, technology dissemination, and output marketing. The groups formed also raised nominal savings from members on a monthly basis. The accumulated savings were used for lending within groups to provide credit security to the members.

A main feature of this project is the marketing arrangements. A marketing committee was formed and is comprised of seven members from seven cooperatives. This committee purchased a truck to transport vegetables with a bank loan. Having their own transportation means the farmers do not have to depend on middlemen to transport their vegetables from the collection centres to Dharan, Biratnagar, and even Jogbeni—a border town in India.

Farmers transport the vegetables from their farms to collection centres along the road where sorting and repackaging take place. Vegetables are then transported in trucks to the marketing centre. Losses reported due to poor grading, packing, and other factors initially ranged from 10 to 20 per cent but were reduced through improved packing in wooden boxes. The farmers are charged five paisa per kg of vegetables marketed through the collection centre, and the amount collected is deposited as group savings.

The cooperative marketing has helped prevent farmers from being at the mercy of monopsonists. The farm-gate price is usually fixed on the basis of the prices prevailing in Dharan after deducting the costs associated with transportation and losses incurred through transporting and handling, it is usually more than half of the retail *Terai* price. Depending on the vegetables grown, farmers are making 3 to 5 thousand rupees per ropani (72ft by 72ft or 0.075ha) and about Rs 15,000 per household from vegetable sales. Farmers are switching from maize cultivation to vegetable cultivation, as the returns from vegetables are at least six times higher than from food crops. The profitability of vegetable farming has induced farmers to allocate about one fifth of their cultivated land to vegetable cultivation. The land has been systematically withdrawn from maize cultivation.

CEAPRED is currently engaged in similar work in other highland areas; namely, Surkhet, Baitadi, Kabhre, Kaski, and Lalitpur districts. Table 3.23 gives a summary of the vegetable cultivation programme implemented by CEAPRED.

Source: CEAPRED Progress Report 1996

Table 3.23: Data on Vegetable Production Programme Implemented by CEAPRED

Project district	VDCs covered	Area under vegetables (ha)	Producer group formed	Marketable production (MT)	Market value of production (Rs)	Major market centres	Major crops grown
Dhankuta	3	20	51	For consumption			Radish, Carrot, Cabbage, Knolkhol, Spinach, Broccoli, Turnip, Cauliflower, Mustard Spinach
IGPWF	8 Cooperatives	500 as of 1994	85 (more than 1300 members)	900 (5-6 Mt per day for six month)	35 million per year	Dharan, Joghani, Damak	Beans, Aubergines, Cauliflower Cabbage, Capsicum, Chilli Radishes, Cucumber, Tomatoes, Squash, Bitter Gourd, Lady Fingers, Cow Pea s, Peas, Swiss Chard
Surkhet	8	43	38	73	615533	Nepalgunj, Surkhet	
Baitadi	8	30	47	122	1170970	Jhulalghat, Pithoragarh	DO
Kaski	8	179	42	580	7915644	Pokhara, Nareyan ghat	DO
Kabhre	8	670	132	3967	5528000	Kathamandu, Tatopani	DO
Lalitpur	45	35	41	122	990608	Lagankhel	DO
Total	2	1043	401	5764	49805000		

Source: Information provided by CEAPRED.

80 per cent is shared by the middlemen. The share of highland farmers may be even less than that of lowland farmers due to poor packaging and higher transport costs.

Information available from highland growers in the eastern belt of Nepal (Dhankuta) indicates that farmers get not more than 50 per cent of the retail price even when producer groups are organized into cooperatives to market their products. This implies that correcting the existing marketing inefficiency through reducing the costs and risks associated with marketing can play an important role in vegetable marketing (See Box 3.2).

Marketing

Vegetable production in the highlands has taken place in an *ad hoc* manner without considering the post-harvest operations and product marketing. Despite the wide scope for promoting commercial vegetable farming in the highlands, a number of production and marketing constraints needs to be addressed to improve the incomes of producers. These problems include shortage of good quality seed, poor irrigation facilities, lack of credit, and shortage of production inputs such as chemical fertilizers. Likewise, infrastructural facilities and support systems, such as integrated market centres, wholesale markets, collection centres, warehouse processing, packaging, and storage facilities are also lacking.

Additionally, as with other highland resource products, marketing information related to prices prevailing in different markets is not made available for producers. Nor have the link-

ages and coordination among farmer transporters, middlemen or agents, wholesalers, and retailers been institutionalised. Farmers have to bear significant economic losses due to the lack of a support system on post-harvest technologies. A study carried out in selected markets in Nepal in 1991 showed that the physical losses from producers to retail outlets were 23 per cent for tomatoes, 16 per cent for cabbages, and 12 per cent for cauliflowers. The retailers pass on this loss to the producers as well as the consumers. Scope exists to minimise the marketing inefficiency through improving farmer knowledge about post-harvest technologies. The lack of vegetables and fruit processing industries in the area remains the major obstacle to ensuring a fair price for farmers and for economic use of such products in inaccessible areas from where the transport of fresh fruit is difficult (SAPPROS 1998).

Fruit

Spatial Distribution

Like vegetables, there is a variety of fruit cultivated in Nepal, owing to the wide variations in altitude and climate. Fruit grown in Nepal can be broadly grouped into citrus, winter (deciduous), and summer (tropical) fruit. Ecologically, the mountain and hill regions are relatively more suitable for citrus and deciduous fruit farming. Mandarin orange, sweet orange, lime, and lemon constitute the major citrus varieties grown in highland areas, whereas apples, pears, walnuts, peaches, apricots, persimmons, and pomegranates are the main winter fruit varieties (deciduous) grown in the highlands.



Oranges fetch good income for highland farmers

Likewise, mangos, bananas, guavas, papayas, jackfruit, pineapple, and litchis are the main summer (tropical) varieties grown in the lowlands. Oranges, or citrus in general, and apples are important on a commercial scale in the highlands. Keeping in mind the favourable climatic conditions for horticultural⁵ development, HMG has launched a horticultural development programme in different parts of the country.

Table 3.24 summarises the trends in the area and production of citrus and

tion of fruit by 22 per cent between 1993/94 and 1996/97. During this period, the area and production of citrus grew by about 18 and 22 per cent respectively, whereas the area and production of non-citrus increased by less than 12 per cent. Currently, citrus accounts for about 22 per cent of the total fruit cultivation area in the country (42,285 ha in 1996/97) and the remaining 78 per cent is used for winter/deciduous fruit (22%) and summer /tropical fruit (56%). Highlands contributed about 58 per cent of the country's total fruit production and areas and almost 60 per cent of the total fruit areas. Excluding summer fruit, which is mostly (70% of the total area) grown in the Terai, highlands by far produce most of the citrus and deciduous winter fruit in the country (Table 3.26).

Table 3.27 summarises the percentage distribution of area and production of different fruit grown in the highlands by development regions. Within the highland area, the CDR

Table 3.24: Changes in the Area and Production of Varieties of Fruit in Nepal

	Citrus		Winter (deciduous)		Summer (tropical)		Overall	
	Area (ha)	Production (MT)	Area (ha)	Production (MT)	Area (ha)	Production (MT)	Area (ha)	Production (MT)
1993/94	7899	76471	8632	72876	21377	228564	37946	352290
1996/97	9330	92994	9402	81640	23553	253591	42285	428225
Annual growth	5.71	6.74	2.89	3.86	3.28	3.52	3.67	6.72
% change	18.12	21.61	8.92	12.03	10.18	10.95	11.43	21.55

Source: Agricultural Statistics Division, Ministry of Agriculture (1996/97)

non-citrus fruit in the country (1993/94 -1996/97) and other details are given in Table 3.25. The Table (3.24) shows that the total area under fruit (both citrus and non-citrus) increased by 11 per cent and the total produc-

ranks first in terms of both area and production of fruit followed by the WDR and EDR, respectively. These three development regions together contributed more than 75 per cent of the highland's total fruit production,

⁵ Horticulture in this usage refers to the cultivation of fruit (and also vegetables) for market sales (market gardening).

Table 3.25: Trends in Area, Production and Yield of Fruit Varieties in Nepal

	Total Area (ha)	Productive Area (ha)	Production (MT)	Yield (MT/ha)
Citrus				
1993/94	13544.44	7899	76471	9.68
1994/95	14628.69	8488	83375	9.82
1995/96	15243.59	8977	88635	9.87
1996/97	15923.59	9330	92994	9.97
Winter Deciduous)				
1993/94	12055.16	8632	72876	8.44
1994/95	12361.55	8670	75231	8.68
1995/96	12869.97	9137	78267	8.57
1996/97	13261.1	9402	81640	8.68
Summer (Tropical)				
1993/94	30591.51	21377	228564	10.69
1994/95	31999.08	22287	239682	10.75
1995/96	32846.44	22894	200588	8.76
1996/97	33734.28	23553	253591	10.77
Overall				
1993/94	56191.11	37946	352290	9.28
1994/95	58989.32	39445	398288	10.10
1995/96	60960	41008	367490	8.96
1996/97	62918.97	42285	428225	10.13

Note: Productive area includes area of fruit bearing trees only.

Source: Agricultural Statistics' Division, Ministry of Agriculture (1996/97)

Table 3.26: Percentage Distribution of Area (ha) and Production (MT) of Different Types of Fruit Grown in the Highlands (1996/97)

Development Region	Citrus		Winter Fruits		Summer Fruits		Overall	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Eastern	27.61	25.46	20.00	20.34	21.60	22.03	23.11	22.75
Central	30.07	29.26	24.37	25.22	26.26	26.29	26.89	27.05
Western	28.64	28.23	19.33	19.28	31.22	32.12	25.88	26.46
Mid Western	11.53	10.00	22.36	21.64	15.06	13.95	16.55	15.00
Far Western	2.15	7.06	13.94	13.52	5.86	5.61	7.57	8.74
Overall	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total	8796	92622	9377	81513	6966	74332	25139	248467
Fruit Type Share (%)	34.99	37.28	37.30	32.81	27.71	29.92	100	100

Source: Agricultural Statistics' Division, Ministry of Agriculture (1996/97)

the rest being contributed by the Mid Western (15%) and Far Western regions (9%). Also note that citrus alone contributed about 37 per cent of the highland's total fruit production in 1996/97; winter fruit contributed 33 per cent and summer fruit 30 per cent.

Several fruit development programmes and projects have been launched. They are listed below.

- ✪ The national priority programme for the commercial development of citrus fruit in several districts.
- ✪ A horticultural development project to promote fruit production techniques for sweet oranges, grapes, and chestnuts (since 1986) through the horticultural research and training station in Kirtipur.
- ✪ A hill-fruit development project has been implemented since 1988 in

Table 3.27: Regional Distribution of Productive Area and Production of Citrus in Nepal (1996/97)
Unit: Area in Ha & Production in MT

Regions	Oranges		Sweet Oranges		Lime		Lemon		Others		Total		Regional Share	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Eastern	1423	15526	240	2542	630	4572	122	813	14	126	2429	23579	26.0	25.4
Mountains	236	2171	30	293	83	552	39	193	1	9	389	3218	4.2	3.5
Hills	1187	13355	210	2249	547	4020	83	620	13	117	2040	20361	21.8	21.9
Terai														
Central	1044	10814	1212	13285	341	2632	58	422	16	141	2671	27294	28.6	29.4
Mountains	154	1325	25	225	51	430	15	101	2	18	247	2099	2.6	2.3
Hills	877	9385	1187	13060	284	2159	38	291	12	109	2398	25004	25.7	26.9
Terai	13	104			6	43	5	30	2	14	26	191	0.3	0.2
Western	1870	20696	137	1314	370	2627	121	1354	34	285	2532	26276	27.1	28.3
Mountains											0	0	0.0	0.0
Hills	1859	20580	137	1314	369	2620	120	1347	34	285	2519	26146	27.0	28.1
Terai	11	116			1	7	1	7			13	130	0.1	0.1
Mid western	735	7068	73	671	140	980	49	397	20	163	1017	9279	10.9	10.0
Mountains	14	147									14	147	0.1	0.2
Hills	721	6921	73	671	137	959	49	397	20	163	1000	9111	10.7	9.8
Terai					3	21					3	21	0.0	0.0
Far Western	346	3246	166	1728	107	825	59	613	13	124	691	6536	7.4	7.0
Mountains	47	376	10	90	8	49					65	515	0.7	0.6
Hills	299	2870	156	1638	99	776	59	613	13	124	124	6021	1.3	6.5
Terai														
NEPAL	5418	57350	1828	19540	1588	11636	409	3599	97	839	9840	92964	100.0	100.0
Highlands	5394	57130	1828	19540	1578	11565	403	3562	95	825	8796	92622		
% Highland	99.56	99.62	100.0	100.0	99.37	99.39	98.53	98.97	97.94	98.33	94.18	99.63		

Source: Agricultural Statistics' Division, Ministry of Agriculture (1996/97)

various hills districts of the eastern development region for citrus fruit development.

Despite these efforts, the expansion of fruit farming on a commercial scale in Nepal and in the hills in particular has been severely limited by lack of roads and storage and marketing facilities. Consequently, commercial fruit growing has been developed in accessible areas, particularly along the roads and near urban areas.

Perishability and Seasonality

Fruit crops are not only bulky and highly perishable but their production is also seasonal (production characteristics) and poses a variety of marketing problems. To avoid loss in weight and rotting, fruit has to be disposed of as early as possible through proper packing, transport, cold storage and handling. The lack of adequate facilities (transportation, storage, and others) creates difficulties in marketing fruit, which forces farmers to sell their produce mostly to mid-

dlemen at very low prices. While farmers are good producers, they are poor sellers because they are not organized to carry out marketing (Banskota 1993). There are no regulated and organized wholesale markets for fresh fruit, and this may be the reason why fruit production from highland areas is below potential. Large quantities of fruit rot annually in many inaccessible highland areas.

Volume and Magnitude of Flow

Kathmandu is the main market centre, consuming the bulk of the fruit imported from both the hill and Terai districts and from India. Because it can be an ideal place to assess the nature and volume of flow of fruit, information was obtained from the Kalimati wholesale market. Table 3.28 shows the monthly volume of different types of fruit coming from the highland and Terai districts. In 1996/97, about 6,760 metric tonnes of fruit were marketed in the Kalimati wholesale market. Of this, it is estimated that

Table 3.28: Sources of Fruit for the Kalimati (Kathmandu) Wholesale Market (2053)

Month	Hill districts (kg)	Terai Districts (kg)	Total (kg)	Highlands Share (%)
Shrawan (Jul/Aug)	54000	0	54000	100.0
Bhadra (Aug/Sept)	104000	4000	108000	96.3
Ashwin (Sept/Oct)	265200	0	265200	100.0
Kartik (Oct/Nov)	776000	0	776000	100.0
Mangsir (Nov/Dec)	1103000	175000	1278000	86.3
Poush (Dec/Jan)	956000	1292000	2248000	42.5
Magh (Jan/Feb)	164000	52000	216000	75.9
Falgun (Feb/Mar)	194000	202000	396000	49.0
Chaitra (Mar/Apr)	184000	356000	540000	34.1
Baisakh (Apr/May)	Na	Na	Na	
Jestha (May/Jun)	503100	375700	878800	57.2
Ashad (Jun/Jul)	Na	Na	Na	
Total	4303300	2456700	6760000	63.7
%	63.66	36.34	100.00	

about 64 per cent came from the hill districts (Kathmandu, Lalitpur, Bhaktapur, Dhading, Kabhre, Nuwakot, Makawanpur, Gorkha, and Tanahu) and the rest from the *Terai* (mainly, Chitwan, Bara, Parsa, Rautahat, Siraha, Sunsari, and Jhapa) and from India. The seasonal nature of the flow of fruit from the highlands to the urban markets can be assessed from the monthly volume of fruit supplies from the hill districts to the Kathmandu wholesale market (Table 3.28). The flow is high during the winter months, the prime season for most highland fruit.

Among other things, physical linkages (transport accessibility) largely condition the flow of fruit from the highland to the lowland markets. Naturally, flow of fruit from the highlands is high in those areas connected by road. However, the exact volume of fruit flowing from different parts of the highlands to the lowlands is not available. Even in organized wholesale markets in Kathmandu, the recorded volume is perhaps underestimated. The estimated volume of fruit coming from the highlands to the Kathmandu wholesale market in 1997 was 4,303 MT or about 10 per cent of the total fruit production in the mountain and hill regions of the CDR.

Marketing and Distribution Channels

The marketing channel for fruit varies according to the type of grower, kind of fruit, and origin. Fruit with a relatively short life, such as mango and banana, is harvested as soon as it matures and is sold mostly to middlemen or commission agents. The fruit grown in the highlands is marketed through a number of channels in which different functionaries are

involved. Pre-harvest contractors undertake all the difficulties involved in the marketing of fruit and bear the risk of price fluctuation. Before making a contract, contractors visit the fruit producing areas in the flowering season to assess the crop. Contracts are generally finalised long before fruit reaches maturity and conditions regarding the mode of payment are all settled at this time. Village merchants, apart from acting as pre-harvest contractors, also buy fruit at the production sites and transport it to markets at their own risk and cost. Small growers generally prefer this type of business arrangement. Forwarding agents are involved in arranging the transportation and dispatch to specified traders in different markets. Commission agents sell the produce and charge a certain percentage on the total sale of the value of the commodity. Sometimes commission agents act as wholesalers also. Cooperative societies are also emerging as an important body in fruit marketing. They arrange for packaging, transportation, storage, and sale of products to benefit their members.

The marketing channel adopted for the fruit grower may differ from product to product depending on the fruit, areas of production, and point of consumption (Figure 3.2). The share of the consumer rupee received by the producer is determined by the channels used. In Nepal, no systematic studies have so far been made to estimate the marketing margin of different actors along this marketing chain. However, available information reveals the widespread inefficiency resulting from market imperfections; and these include lack of knowledge about post-harvest technologies and operations (SAPPROS 1998).

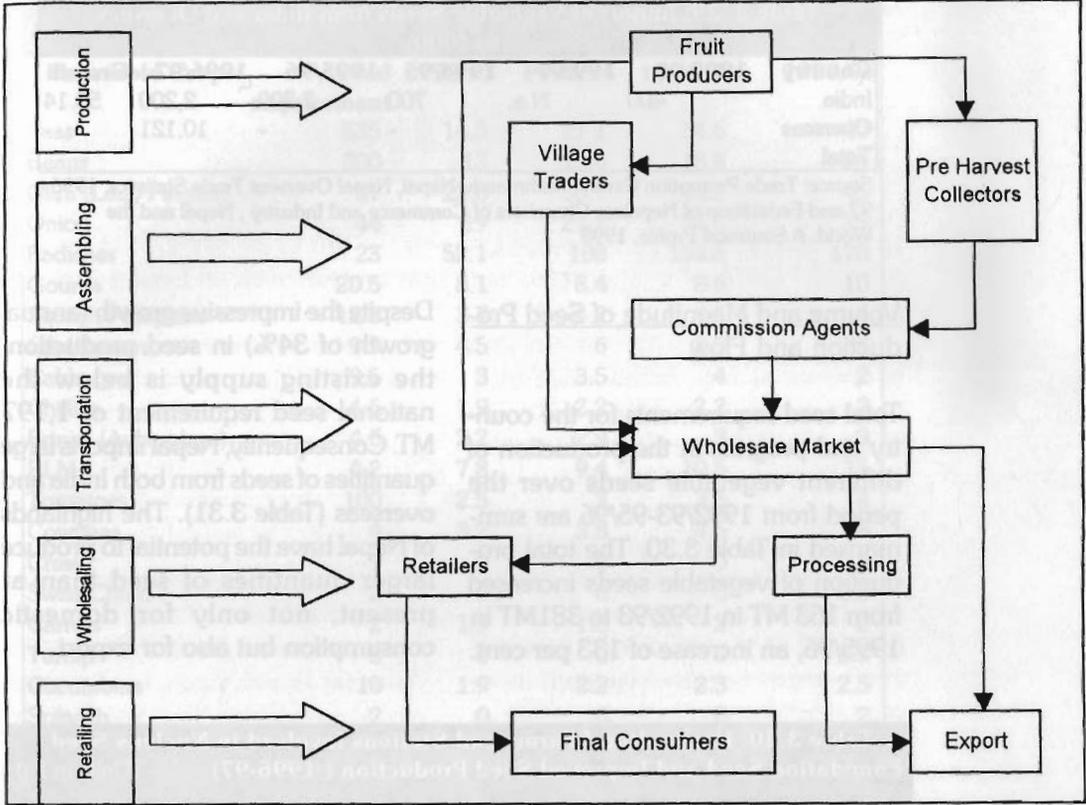


Figure 3.2: The Marketing Channels for Highland Fruit

Vegetable Seeds

Production Pockets

The growing demand for vegetables in the country has resulted in an increasing demand for vegetable seeds. To cater to this demand, vegetable seed production programmes have been launched in different agro-ecological zones. Ecologically, the highlands are ideal for seed production. Since 1981, a HMG/FAO vegetable seed production project has been operating in the country. This project has been able to identify different varieties of vegetables suitable for Nepal and has been providing support to develop the necessary technical manpower. Various seed production pockets in the highlands have

been identified and seed development programmes in various farms and stations disseminate to production pockets.

Seeds produced on the horticultural farms are of two types: foundation seeds for further multiplication and improved seeds for sale in commercial production pockets. Improved seeds are handed over to the Agricultural Inputs' Corporation for distribution. Table 3.29 lists various horticultural farms and stations involved in the production of foundation seeds, improved seeds, and nucleus seeds in the country. Horticultural farms and stations produced a total of 296kg of nucleus seeds, 9,994kg of foundation seeds, and 1,722kg of improved seeds in 1996/97.

**Table 3. 29: Import of Vegetable Seeds from India and Overseas
(Rs '000)**

Country	1992/93	1993/94	1994/95	1995/96	1996/97	Growth
India	400	N.a.	700	2,300	2,200	53.14
Overseas	-	-	-	-	10,121	-
Total						

Source: Trade Promotion Centre, Kathmandu Nepal, Nepal Overseas Trade Statistics, 1996-97 and Federation of Nepalese Chambers of Commerce and Industry, Nepal and the World: A Statistical Profile, 1998

Volume and Magnitude of Seed Production and Flow

Total seed requirements for the country and progress in the production of different vegetable seeds over the period from 1992/93-95/96 are summarised in Table 3.30. The total production of vegetable seeds increased from 163 MT in 1992/93 to 381MT in 1995/96, an increase of 133 per cent.

Despite the impressive growth (annual growth of 34%) in seed production, the existing supply is below the national seed requirement of 1,197 MT. Consequently, Nepal imports large quantities of seeds from both India and overseas (Table 3.31). The highlands of Nepal have the potential to produce larger quantities of seed than at present, not only for domestic consumption but also for export.

Table 3.30: Horticultural Farms and Stations Involved in Nucleus Seed, Foundation Seed and Improved Seed Production (1996-97) (Units in kg)

	Horticultural farms	Nucleus seed	Fountain seed	Improved seed
1	VSCP, Khumaltar	5	1323	223
2	VSPC, Rukum	15	1167	0
3	VSCP, Dadeldhura	4	79	533
4	HC, Sarlahi	0	3848	0
5	HC, Trisuli	0	365	102
6	HC, Palpa	0	418	0
7	HC, Dolakha	0	0.25	0
8	HC, Sindhuli	0	17.3	183.3
9	HC, Solukhumbu	0	53	0
10	HC, Panchkhal	0	110	0
11	HC, Daman	0	315	0
12	HC, Marpha	2	142.5	147.4
13	HC, Dolpa	0	47	81
14	HC, Pokhara	0	325.5	0
15	LAR	0	784.3	0
16	ARC, Dasarathpur	0	0	257.5
17	ARC, Nepalgunj	0	595	0
18	ATRC	270	110	0
19	ARC, Dhanakuta	0	294	195
	Total	296	9993.85	1722.2

Note:

VSPC=Vegetable Seed Production Centre

LAC= Lumle Agricultural Centre

ATRC= Agricultural Tarharae Research Centre

Source: Nepal Seed Company 1998

HC= Horticultural Centre

ARC= Agricultural Research centre

Table 3.31 : Crop-wise Vegetables Seed Production in Nepal

Vegetable Crops	(Units in MTs)				
	Seed requirement	1992/93	1993/94	1994/95	1995/96
Peas	535	14.5	21.1	34.6	40
Beans	300	13	15.6	18.8	24
Okra (Lady Fingers)	87	22.8	35.7	44.2	45
Onion	44	19	27.1	34.6	25
Radishes	23	52.1	108	159.6	170
Gourds	20.5	8.1	8.4	8.6	10
Squash/Pumpkins	12.3	3.7	4.2	4.2	4
Cauliflowers	9.9	4.5	6	8.3	8
Cabbages	9.5	3	3.5	4	2
Chillies	4.6	1.9	2.2	2.2	2
Brinjal (Aubergines)	4.5	2.2	2.9	3	3
BLM	4.2	7.8	9.4	10.5	15
Tomatoes	100	2.5	3	3.5	4
Cowpeas	4	3.2	3.8	4.5	18
Cress	1	0	0	0	0.5
Swiss Chard	2	0	0	0	0.5
Carrots	2	1.9	1.8	2	2
Turnip	5	0	0	0	0.5
Cucumbers	10	1.9	2.2	2.3	2.5
Spinach	2	0	0	0	2
Broccoli	2	0	0	0	0.5
Coriander	2	0	0	0	0.5
Capsicum	2	0.5	0.7	1	1
Methi (Fenugreek)	10				0.5
Water Melon	1				0.5
Total	1197.5	162.6	255.6	345.9	381

Source: Kalimati Wholesale Project 1998

Issues and Options: Vegetables and Fruit

In the context of vegetables and fruit, the multiple problems related to preservation, processing, distribution, marketing, and retailing need to be improved concomitantly. Lack of cheap and easy transport has led to limited use of products from different highland areas. Lack of markets limits the prospects for farmers and poor facilities limit the benefits they can accrue. Given the poor facilities, farmers lose substantially by having to bear the loss incurred during transport to urban markets. Additionally, urban

consumers also lose, as they have to pay higher prices for products than would otherwise be the case. In the case of vegetables and fruit, the marketing facilities appear to be poor and may be a major factor in the relatively higher prices consumers have to pay and the poor prices farmers receive for their products.

A second issue relates to poor harvest management. During the season, the market is saturated and prices fall and, although this is good for the consumer, it is not good for the producer. Harvest management is essential to stabilise prices and benefits to the farmers.

Besides products that are directly harvested (vegetable and fruit), there are a few activities to process and preserve the products. Processing can help highland areas to generate employment and income. Processing helps convert high-volume products to high-value low-volume products. In remote areas, such as Marpha and Jumla, where apples are cultivated on a large scale, fruit unfit for the table is processed as jam, jellies, dried fruit, brandy, and wine. Processing also helps to manage supplies and stabilise prices.

Most farmers cultivating fruit and vegetables in the highlands are not organized. As the existing marketing system is long and does not benefit the farmers, their involvement in an organized manner by forming farmer cooperatives would help overcome some of the problems. Organization will help strengthen their bargaining positions.

Other issues can be summarised as follow.

- ✱ Lack of support systems such as an integrated market centre, wholesale market, collection centre, warehouse, and processing units
- ✱ Lack of dissemination of post-harvest technologies to farmers
- ✱ Marketing is mostly in the hands of middlemen or commission agents who manipulate the operation and take a major share of the consumer rupee.
- ✱ There is no marketing information system to provide farmers with information about the prices prevailing at different stages of marketing and in different markets for different products.
- ✱ Linkage and coordination among farmers, carriers, middlemen or agents, wholesalers, and retailers need to be institutionalised.
- ✱ Farmers have to bear significant economic losses due to lack of access by farmers to post-harvest technologies as currently large losses are incurred.
- ✱ There is no organized effort to establish a cooperative marketing centre in the highlands.
- ✱ While areas that have motorable roads and access to markets in the vicinity have received priority for special programmes in vegetable production, there are few facilities for efficient marketing.
- ✱ The existing marketing structure limits the prospects for farmers to increase benefits.
- ✱ Control of grazing livestock is poor.
- ✱ Knowledge of crops and seed yields of various crops and cultivars is limited.
- ✱ National programmes do not give this sufficient priority.
- ✱ Inadequate training of human resources.
- ✱ Lack of knowledge of appropriate production technology
- ✱ High risk in investment
- ✱ Lack of marketing knowhow vis a vis liberal government import policies
- ✱ Lack of proper processing, packaging, and storage facilities

MILK AND DAIRY PRODUCTS⁶

Milk

Animal husbandry is an indispensable component of the highland farming system. The highland economy played and continues to play an important role in meeting the growing demand for milk and milk products in the urban areas of the country. The Dairy Development Corporation (DDC), a public sector enterprise, has played an important role in establishing milk-collection centres and chilling centres in Biratnagar, Hetauda, Kath-mandu, Pokhara, and Lumbini and thereby increasing milk production in the country due to an assured, limited market.

Milk Supply Sources

Milk catchment areas are located in different parts of the country and cover a total of 36 hill and Terai districts. The supply of milk at the Kathmandu collection centre originates from eight highland districts. In Biratnagar the supply comes from seven districts, three of which are highland districts; in Hetauda from six districts, one of which is a highland district; in Pokhara from eight hill districts; and in Lumbini from seven districts (one hill). Table 3.32 shows the trends in the collection and production of milk over the last five years. Between the fiscal



Collecting milk from farms.

years 2049/2050 and 2053/54 (1993 and 1997), milk collection from all these centres increased by 67 per cent with an average annual growth rate of 14 per cent.

Volume and Magnitude of Milk Flow from the Highlands

The flow milk from the highlands to urban areas and the lowlands is given in Table 3.33. All the milk collected and processed in Kathmandu and Pokhara and, to a great extent (85%), in Biratnagar originates in the highlands, whereas in Hetauda and Lumbini most of the milk is collected from the lowlands. In the fiscal year 2053/4, a total of 58.45 million litres

Table 3.32: Milk Collection in the Fiscal Year 2054/55 (1997/98) by Supply Source

Dairy Centre	Volume of Milk collection (litres)			% Hills
	Hill	Terai	Total	
Biratnagar	7409337	1295888	8705225	85.11
Hetauda	268071	12519679	12787750	2.10
Pokhara	2847279	0	2847279	100.00
Kathmandu	23118939	0	23118939	100.00
Lumbini	777214	4646270	5423484	14.33
DPPDC*	1846168	0	1846168	100.00
Total	36267008	18461837	54728845	66.27

* Dairy Products Production and Distribution Centre

Source: Dairy Development Corporation 1998.

⁶ We are very grateful to Mr. Arun Shrestha, Chief Technical Officer of the Dairy Development Board, for providing us with all the information used in this section.

Table 3.33 : Trends in Collection, Production and Distribution of Milk by Dairy Centre (100,000 litres)

Projects	2050	2051	2052	2053	2054	% Change	Av. Growth
Kathmandu							
Collection	114.16	152.57	156.8	196.06	234.53	105.44	19.72
Production	341.88	396.59	417.37	453.64	475.5	39.08	8.60
Biratnagar							
Collection	62.05	63.68	75.64	80.31	86.12	38.79	8.54
Production	55.61	57.79	70.76	98.06	109.52	96.94	18.46
Hetauda							
Collection	101.77	103.08	113.23	147.56	152.13	49.48	10.57
Production	89.08	81.11	87.23	89.66	89.6	0.58	0.15
Pokhara							
Collection	25.71	32.14	33.47	34.34	33.82	31.54	7.09
Production	34.2	40.24	45.24	47.15	49.71	45.35	9.80
Lumbini*							
Collection	31.74	34.95	46.39	65.71	58.36	83.87	16.45
DPPD Project							
Collection	13.82	13.67	7.15	15.5	19.61	41.90	9.14
Total							
Collection	349.25	400.09	432.68	539.48	584.57	67.38	13.74
Production	520.77	575.73	620.6	688.51	724.33	39.09	8.60

* Collected milk supplied to Kathmandu due to the lack of dairy facilities

Source: Dairy Development Corporation 1998

of milk was collected and about two thirds (387.3700,000 litres) were estimated to have come from the highlands and the rest from the lowlands (Terai) (Table 3.34).

Table 3.34: Estimated Volume of Milk Collected from the Highlands (2053/54)

(Unit in 100,000 litres)

Dairy Centre	Total	Highland
Kathmandu	234.53	199.6171
Biratnagar	86.12	1.805343
Hetauda	152.13	152.13
Pokhara	33.82	33.82
Lumbini	58.36	8.363297
Milk products	19.61	19.61
Total	584.57	387.3753

Benefit to Milk Producers

It cost the DDC about Rs 923.04 million to collect milk in the fiscal year 2053/54. Of this amount, 94 per cent

(Rs 864.5 million) was actually paid to the farmers (Rs 760.7 million for milk purchase) and their cooperative associations (Rs 103.7 million as a lump sum commission for the milk collection, transportation, and institutional overheads). With 89,000 farmers currently involved in supplying milk, it is estimated that each farmer receives, on an average, Rs 10,000 annually from milk. This also implies a daily income of Rs 2,369,000 accruing to milk-producing households. Considering that about two thirds of these dairy farmers reside in the highlands, the income generated from milk is substantial. The magnitude can also be judged from the distribution of milk in urban areas. As can be seen from Table 3.35, a total of 569.700,000 litres of milk was consumed in urban areas in 2053/54,

Table 3.35: Trend in the Distribution of Milk (litres)

Projects	2050	2051	2052	2053	2054	Price (litres)	2054 Value in Rs	%
Kathmandu	31955585	36422938	38860983	42902220	44921617	18	808589106	79.452
Biratnagar	2576771	1918494	2486671	2583675	3661911	17	62252487	6.117
Hetauda	316534	3286641	382628	3895815	4225362	17	71831154	7.058
Pokhara	2404853	2776561	3419097	3816201	4163256	18	74938608	7.363
Lumbini	32622	14075	17718	20050	5847	17	99399	0.010
Total	37288415	44420760	45169149	53220014	56980047		1017710754	100.000

Source: Dairy Development Corporation 1998

which is equivalent to Rs 1017.6 million based on the prevailing price of milk in the different regions. Note that private dairies have also emerged, but information on their collection and distribution is not available.

Milk Marketing and Distribution

Currently five dairy centres are operating in Kathmandu, Biratnagar, Hetauda, Pokhara, and Lumbini. Each of these centres has their own chilling plant. Milk is collected through a network of Milk Producer Cooperative Associations/ Cooperative Societies (MPCAs/CSs). MPCAs/CSs receive a fixed commission from the chilling centres based on the fat content in the milk supplied to them. The commission covers marketing costs involved in collecting milk from the farmers and

transporting it to the centres and overheads for operation of the cooperatives. The number of chilling plants and their cooperative networks varies from centre to centre depending on the size of their catchment areas. So far, there are 43 chilling centres and 907 MPCAs/CSs operating throughout the country. The growth in number of chilling centres and producers' association/cooperatives under each dairy centre over the last five-year period (2049/2050-2053/2054) is summarised in Tables 3.36 and 3.37. Figure 3.3 The Milk Marketing Channel in Nepal.

Dairy Products

Apart from milk, other dairy products are marketed by the five production centres. These products include cheese, butter, ghee, yogurt, and ice-

Table 3.36: Number of Chilling Centres by Dairy Project Region

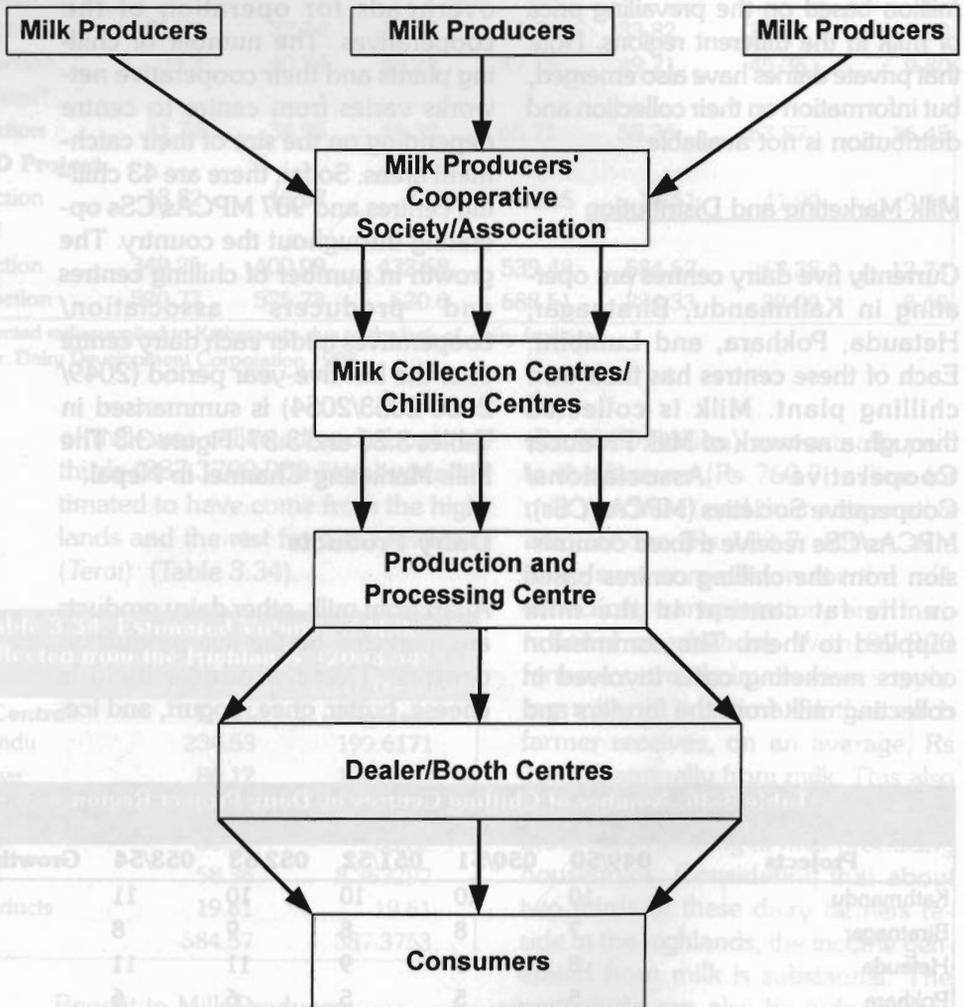
Projects	049/50	050/51	051/52	052/53	053/54	Growth rate
Kathmandu	10	10	10	10	11	2.41
Biratnagar	7	8	8	9	8	3.39
Hetauda	8	9	9	11	11	8.29
Pokhara	5	5	5	6	6	4.66
Lumbini	6	6	6	7	7	3.93
Milk Products & Distri	1	1	1			
Total	37	39	39	43	43	3.83

Source: Dairy Development Corporation 1998

Table 3.37: Number of Cooperatives by Dairy Project Region

Projects	049/50	050/51	051/52	052/53	053/54	Growth rate
Kathmandu	237	268	264	345	345	9.84
Biratnagar	101	105	105	119	116	3.52
Hetauda	184	201	205	229	231	5.85
Pokhara	93	96	104	95	100	1.83
Lumbini	73	77	84	89	90	5.37
Milk Products & Distri	8	8	10	28	25	32.96
Total	696	755	772	560	907	6.84

Source: Dairy Development Corporation 1998

**Figure 3.3: Marketing and Distribution Channel for Milk**

cream. There are currently 12 cheese production centres (of which six are located in the high mountains) operating in different parts of the country. These cheese production centres col-

lect milk from the network of 25 milk producer cooperative associations (Table 3.38). Table 3.39 summarises the trend in production of dairy products over the last five years.

Table 3.38: Number of Cheese Production Centres

	Cheese Factory	Sub-centre	Cooperative
Kavre	1	0	7
Rasuwa	2	8	0
Solukhumbu	1	4	0
Ramechhap	1	4	0
Dolakha	2	5	0
Illam	2	0	8
Panchthar	3	0	10
Total	12	21	25

Source: Dairy Development Corporation 1998

Table 3.39: Trends in Production of Dairy Products

Butter Production (kg)					
	2050	2051	2052	2053	2054
Dairy Distribution Projects	2050	2051	2052	2053	2054
Kathmandu	632746	743756	572889	667947	684125
Biratnagar	80292	57357	186149	329860	271494
Hetauda	134584	99042	129910	188804	204205
Pokhara	65295	83265	131527	123880	98759
Cheese centre	40704	32638	20796	22446	26436
Total	953621	1016058	1041271	1332937	1285019
Cheese Production (Kg)					
Biratnagar	69960	66740	67099		
Pokhara	10534	2153	2766	2166	2675
Milk product project	105285	96644	64144	134395	172088
Total	185779	165537	134009	136561	174763
Ghee Production (Kg)					
Biratnagar		76385	75637	128458	201062
Hetauda	58177	71772	81568	271077	223451
Pokhara	105586	94326	102384	153294	193998
Milk product project	44092	99317	37748	66849	111247
Total	162937	155662	110718	42559	96648
Ice-cream Production (litre)					
Biratnagar	2000	2302	3302	1799	1125
Hetauda	1031	1078	2170	5399	6812
Pokhara	4253	7732	12733	5618	4628
Lainchaur	20837	18281	20981	17575	12912
Total	162937	155662	110718	42559	96648

Source : Dairy Development Corporation 1998

HUMAN RESOURCES: MIGRATION

Both seasonal and permanent migration taking place from the highlands to lowland and urban areas are believed to be substantial in Nepal. The NLSS data can be examined to provide a preliminary estimate of the scale of migration. The NLSS survey asked household heads if they had ever migrated for work or to settle land and if so where had they migrated from and age at migration.

In total 447,609 or about 12 per cent of all household heads indicated they had ever migrated. Of these 62 per cent reported they had migrated from the hills and 24 per cent reported they

had migrated from the *Terai*. When the highlands are considered (hills and mountains), the percentage reporting migration is 71 per cent (Table 3.40). Additionally, about five per cent of all household heads reported they had migrated from India.

The inter-ecological belt migration flow is also provided in Table 3.40. It can be observed that about one per cent of household heads reported migration within the mountain region. There were no household heads reporting migration from the hills and *Terai* to the mountain region, although a small per cent of household heads in the mountains reported they had migrated from India/Others.

Table 3.40: Household Heads Reporting Place of Migration, Present Residence and Region

		Household Heads Migrated from				
		Mountains	Hills	Terai	India/ Others	Nepal
	Mountains	5567	0	0	1820	7387
	Hills	4190	88446	6362	0	98999
	Terai	31483	187698	99816	22227	341224
	Nepal	41240	276145	106178	24047	447609
	Percentage of Total					
	Mountains	1.24	0.00	0.00	0.41	1.65
	Hills	0.94	19.76	1.42	0.00	22.12
	Terai	7.03	41.93	22.30	4.97	76.23
	Nepal	9.21	61.69	23.72	5.37	100
	Percentage of Column Total					
	Mountains	13.50	0.00	0.00	7.57	1.65
	Hills	10.16	32.03	5.99	0.00	22.12
	Terai	76.34	67.97	94.01	92.43	76.23
	Nepal	100.00	100.00	100.00	100.00	100.00
	Percentage of Row Total					
	Mountains	13.50	0.00	0.00	24.63	100
	Hills	4.23	89.34	6.43	0.00	100
	Terai	9.23	55.01	29.25	6.51	100
	Nepal	9.21	61.69	23.72	5.37	100
Household Heads Migrated To	Total Reporting	Migration Yes (%)		Migration No (%)		Total Cases
		12.28		87.72		3646018

Source: Computed from NLSS data

Migration from the mountains to the hills is also not very high (0.94%), while migration within the hills was reported by almost 20 per cent of household heads. Also migration does not appear to be significant from the *Terai* to the hills where only a small percentage reported such (1.42%).

Migration from the mountains and hills to the *Terai* is highest. From the mountains seven per cent of household heads reported having migrated to the *Terai*, while from the hills this was about 42 per cent. Households were also found migrating within the

ported (10%) migration from urban areas (Table 3.41). From the hills about 11 per cent reported migration to urban areas, and the remaining 89 per cent reported migration to rural areas. The distribution of migrating household heads within the ecological belt is largely dominated by hill household heads (61-67%), followed by those from the *Terai* (22-24%).

Among the migrating household heads, about 37 per cent were between 20-30 years of age, followed by those who were below 20 years of age. Then progressively the percent-

Table 3.41: Household Head Reporting Place of Migration by Present Residence and Urban- Rural

	Household Heads Migrated from				
	Mountains	Hills	<i>Terai</i>	India/ Others	Nepal
Urban	4190	33024	10867	895	48976
Rural	37050	243121	95311	23152	398634
Nepal	41240	276145	106178	24047	447610
	Percentage of Total				
Urban	0.94	7.38	2.43	0.20	10.94
Rural	8.28	54.32	21.29	5.17	89.06
Nepal	9.21	61.69	23.72	5.37	100
	Percentage of Column Total				
Urban	10.16	11.96	10.23	3.72	10.94
Rural	89.84	88.04	89.77	96.28	89.06
Nepal	100.00	100.00	100.00	100.00	100.00
	Percentage of Row Total				
Urban	8.56	67.43	22.19	1.83	100.00
Rural	9.29	60.99	23.91	5.81	100.00
Nepal	9.21	61.69	23.72	5.37	100.00

Source: Estimated from NLSS data

Terai as reported by 22 per cent of the household heads from the *Terai*. Households also reported some migration (5%) from India to the *Terai*. Other details may be observed in Table 3.40.

The migration reported by household heads is largely from the rural areas (89%) and a small percentage also re-

ported (10%) migration from urban areas (Table 3.41). From the hills about 11 per cent reported migration to urban areas, and the remaining 89 per cent reported migration to rural areas. The distribution of migrating household heads within the ecological belt is largely dominated by hill household heads (61-67%), followed by those from the *Terai* (22-24%).

FINANCIAL RESOURCES

Remittances

A substantial amount of income in the form of remittances flows in and out

Table 3.42: Distribution of Household Heads Reporting Migration by Age Group

		Age Group					Total
		Below 20 yrs	20-30 yrs	30-40 yrs	40-50 yrs	Above 50 yrs	
Mountains	Count	6443	15143	7339	8472	3843	41240
	% of Total	1.44	3.38	1.64	1.89	0.86	9.21
Hills	Count	74490	85580	65611	29707	20756	276144
	% of Total	16.64	19.12	14.66	6.64	4.64	61.69
Terai	Count	27301	56640	11251	6223	4763	106178
	% of Total	6.10	12.65	2.51	1.39	1.06	23.72
India/Others	Count	9589	6653	4858	2360	587	24047
	% of Total	2.14	1.49	1.09	0.53	0.13	5.37
Total	Count	117823	164016	89059	46762	29949	447609
	% of Total	26.32	36.64	19.90	10.45	6.69	100.00

Source: Estimated from NLSS data.

of the different regions of the country. The NLSS data were examined to estimate the flow of this income. The NLSS asked a specific question whether in the last 12 months anyone from the households had sent money or in kind supplies to someone who was away from home for more than six months. About 10 per cent or 458,264 households reported sending remittances, whereas over a million household heads reported receiving remittances (Tables 3.43 & 3.44).

Of those sending remittances, 33 per cent were in the hills, 61 per cent in the Terai, and six per cent in the mountains. In all of the highlands (hills and mountains) 39 per cent sent remittances. Likewise, among those receiving remittances, about 44 per cent were in the hills and 50 per cent in the Terai. In the mountains, the proportion of household heads reporting sending and receiving remittances was six per cent in both cases.

Table 3.43: Mean Remittance Sent (Rs), Number and Total Amount Sent by Recipient

Donor Lives in		Recipient Lives in				
		Mountains	Hills	Terai	India/Other	Total
Mountains	Mean (Rs)	2005	4599	4349	4000	3075
Hills	Mean (Rs)	2738	6408	9258	13545	7042
Terai	Mean (Rs)	0	10618	3672	2081	4201
Total	Mean (Rs)	2035	7159	4218	3228	5077
Mountains	Number	14555	6636	3797	671	25658
Hills	Number	614	123926	21985	5005	151530
Terai	Number	0	31821	203773	45482	281076
Total	Number	15168	162383	229555	51158	458264
Mountains	Sum (Rs)	29181554	30514534	16512270	2683960	78892318
Hills	Sum (Rs)	1680600	794092200	203532871	67797248	1067102919
Terai	Sum (Rs)	0	337863157	748177067	94669784	1180710008
Total	Sum (Rs)	30862154	1162469891	968222208	165150992	2326705245

Source: Estimated from NLSS data

Table 3.44: Mean Remittance Received (Rs), Number and Total Amount Received by Recipient

Recipient Lives in		Donor Lives in				
		Mountains	Hills	Terai	India/Other	Total
Mountains	Mean (Rs)	2877	7871	4674	10584	6519
Hills	Mean (Rs)	12770	13653	9050	21305	16963
Terai	Mean (Rs)	16515	7168	7142	11101	8710
Total	Mean (Rs)	5208	11240	7336	16227	12192
Mountains	Number	23788	19491	6277	17687	67243
Hills	Number	2369	206638	34588	222843	466438
Terai	Number	3321	106341	218716	201320	529698
Total	Number	29478	332470	259581	441850	1063379
Mountains	Sum (Rs)	68434135	153409581	29340320	187197210	438381245
Hills	Sum (Rs)	30250204	2821133336	313005413	4747787414	7912176367
Terai	Sum (Rs)	54850180	762267004	1561973819	2234818467	4613909470
Total	Sum (Rs)	153534519	3736809921	1904319551	7169803091	12964467082

Source: Estimated from NLSS data

The mean values of the remittances sent and received were Rs 5,077 and Rs 12,192 respectively. In other words, the mean value of remittances received was more than double the mean value of remittances sent by households.

The mean remittances sent and received were highest in the hills followed by the *Terai*. In both the mountains and *Terai*, the mean value of remittances received is more than double the mean value of remittances sent. In the hills, the mean value received (Rs 13,653) is about 2.13 times higher than the mean remittance sent (Rs 6,402).

It is also interesting to observe that 50 per cent of the remittances sent are to the *Terai*, followed by the hills (35%) and India/others (11%). In terms of remittances received, almost 42 per cent originate in India/Others, 31 per cent originate in the hills, 24 per cent in the *Terai*, and about three per cent in the mountains.

The total value of remittance transfer is also provided in the Table. In aggregate, the total value of remittances received is nearly six times more than the value of remittances sent, and, in all three regions, the remittances received are greater than the remittances sent.

Of the total households reporting sending remittances, 45,880 (10%) were in urban areas and 412,384 were in rural areas. The mean remittance sent by urban households was Rs 8,387 and that sent by rural households was Rs 4,709. The remittances sent from rural areas accounted for about 83 per cent of the total remittances sent.

Altogether 177,188 (39%) households from the highlands reported sending remittances. In the highlands the average remittance sent was Rs 6,468 and the total sent was Rs 1,145,995,237 or 49 per cent of the total remittance sent by all households. Urban highland households

accounted for 51 per cent of the total highland households sending remittances and the total remittances sent by urban highland households were 51 per cent of the remittances sent by all households. In other words, the remittances sent from highland areas are substantial, accounting for 39 per cent of households sending remittances and 49 per cent of the total remittances sent.

FOOD EXPENDITURE

The recently completed National Living Standard Survey (NLSS) data provide information that can be used to address the value of different food items that flow from the highlands to urban areas and lowlands. Although it is not possible to say precisely what the exact value of the flow of food items from the highlands to urban and other areas from the highlands is, some idea can nevertheless be provided. At this stage, the data are being cleaned following acquisition from the Central Bureau of Statistics and hence the results are preliminary.

The NLSS provides information for 3,777 households collected from 74 districts. The district and the urban and rural status of the households can also be identified, and hence all households from the highlands can be separated from urban and lowland areas. The food section covers 13 food groups and within each group different food items are identified. Only food for which household reported expenditure is accounted for, food produced and consumed at home is not. In addition, the food expenditure does not account for expenditure on alcohol, tobacco, and tobacco products and items in the miscellaneous food group.

Not all types of food flow from one ecological belt. Some food originates entirely in the highlands, e.g., millet, apples, citrus. Large quantities of milk to most urban centres in east and central Nepal come from the hills. In other regions, the supply of milk from highland areas may be about 20 per cent of the total supply, with lowland areas supplying the bulk. Likewise, part of the supply of mutton to urban areas comes from goats exported from highland areas.

The food groups selected to assess value of food flow from the highlands are classified into three major groups as follow.

1. Food originating almost entirely in the highlands (mountain and hill districts). In this category the foods included are those that have a comparative advantage in the highlands and cannot be grown in the lowlands. The foods include millet, black pulse, citrus fruit, apples, and dried fruit (mostly apples).

2. Food originating partially in the highlands. Some foods in this group originate in the highlands as well as in the lowlands. In the past most of these food items were being supplied from the lowlands and India, but, in recent times, increasing amounts of the items in this category are also coming from the highlands. The foods included in this group include milk, ginger/garlic, green vegetables, cauliflower/cabbage, mutton, and cumin/pepper.

3. Food originating mostly in the lowlands (Terai). In this category the supply of food from the highlands is small or negligible, as generally highland areas are not conducive to the produc-

tion of such food groups (opposite of the first group) or, although production takes place currently, the supply from the highlands is small. The items included in this group are eggs, potatoes, tomatoes, other vegetables, buffalo meat, chicken, and chillies.

Table 3.45 provides the number of households reporting the different types of food identified above as percentages of the total. About nine per cent of the households reported consuming food items that originate pri-

cent of the expenditure occurs in the mountain areas and 51 per cent (urban 12 and rural 39) in the hill regions, giving a combined total share for the highlands of 58 per cent. Rural areas account for 81 per cent of the total expenditure for the selected food items, out of which the rural mountains, hills, and Terai account for 7, 39, and 35 per cent respectively.

Tables 3.47 to 3.49 provide expenditure on the selected food items and

Table 3.45: Percentage of Households Reporting Food Consumption by Origin of Food

Food Originating Mostly in the Highlands			Food Originating Partially in the Highlands			Food Originating Mostly in Lowlands		
Food Type	Frequency Reporting	% Reporting	Food Type	Frequency Reporting	% Reporting	Food Type	Frequency Reporting	% Reporting
Millet	1406693	1	Milk	2514145	2.4	Potatoes	3488387	3.4
Black Pulses	1569032	1.5	Ginger/garlic	3289886	3.2	Tomatoes	2513057	2.4
Citrus	1960018	1.9	Cauliflower	2320279	2.2	Chillies	3511809	3.4
Apples	907575	0.9	Cumin/pepper	3430551	3.3	Other Spices	891430	0.9
Dried Fruits	261219	0.3	Green Veg	3300414	3.2	Total	10404683	10
Turmeric	3529895	3.4	Other Veg	2619201	2.5			
Total	9634432	9	Mutton	2679406	2.6			
			Total	20153882	19.4			

Note: Food does not include alcoholic beverages, tobacco and tobacco products and miscellaneous food (meals eaten outside home and other food).

Source: Estimated from NLLS data

marily in the highlands. About 19 per cent reported consuming food groups that originate partially in the highlands and 10 per cent reported consuming food groups that originated mostly in the lowlands. Note that, of the nearly 132 different food items, only seven were selected as originating primarily from the highlands.

Different shares have also been calculated for selected food items and are presented in Table 3.46 by ecological regions and the urban or rural status of the households. Of the selected food items about seven per

shares of expenditure relative to total food expenditure. In terms of the expenditure shares, the first food group, namely, those originating primarily in the highlands account for three per cent of the total food expenditure by households. Although the shares do not account for large percentages of total food expenditure, in terms of the absolute value this expenditure is about 1.3 billion rupees. Likewise, six per cent of the food expenditure is accounted for by food that partially originates in the highland areas and 5.5 per cent by food that originates mostly in the lowlands.

Table 3.46: Share of Total Food Expenditure across Ecological Belt, Urban Rural Status and Highland-Lowland-Nepal 1996

Ecological Belt	Status	Expenditure Total (Rs)	Share of Expenditure across Ecological Belt and Urban-Rural Status					
			Within Belt	within status	% of Total	Rural	Urban	High-Low land
Mountain	Rural	2383269415	100.00	8.49	6.86	56.20	65.01	57.89
Mountain	Total	2383269415			6.86			
Hills	Urban	4336840538	24.47	65.01	12.49			
Hills	Rural	13384914045	75.53	47.71	38.54			
Hills	Total	17721754583			51.03			
Terai	Urban	2334551181	15.96	34.99	6.72	43.80	34.99	42.11
Terai	Rural	12289107931	84.04	43.80	35.39			
Terai	Total	14623659112			42.11			
Nepal	Urban	6671391719	19.21	100.00	19.21	100.00	100.00	100.00
Nepal	Rural	28057291391	80.79	100.00	80.79			
Nepal	Total	34728683110			100.00			

Note: Food does not include alcoholic beverages, tobacco and tobacco products and miscellaneous food (meals eaten outside home and other foods).

Source: Estimated from NLSS data

Table 3.47: Aggregate Household Expenditure on Food Originating Primarily in the Highlands

Ecological Belt	Urba/Rural Status	Millet	Citrus	Apples	Dried Fruits	Turmeric	Black Pulse	Total
Mountain	Rural	114036336	4829176	3584171	237795	24137	23765840	146477455
Hills	Urban	4660992	21673062	33168275	10167681	93460	80086064	149849533
Hills	Rural	470404902	50686240	23172494	2787409	92471	213356358	760499875
Hills	Total	475065894	72359302	56340769	12955091	185931	293442422	910349408
Terai	Urban	43124382	24294464	13011404	7237793	20883	31291608	118980533
Terai	Rural	43124382	34256288	34349422	3442793	102915	64047459	179323259
Terai	Total	0	58550752	47360826	10680585	123798	95339067	212055028
Nepal	Urban	4660992	45967526	46179679	17405474	114343	111377671	225705684
Nepal	Rural	627565621	89771705	61106087	6467997	219523	301169657	108630058
Nepal	Total	632226612	135739231	107285766	23873471	333866	412547328	131200627
Shares		Shares Are Based on Total Food Expenditure						
Highland	Urban	0.01	0.06	0.10	0.03	0.00	0.23	0.43
Highland	Rural	1.35	0.15	0.07	0.01	0.00	0.61	2.19
Highland	Total	1.37	0.21	0.16	0.04	0.00	0.84	2.62

Note: Total aggregate household expenditure for all foods except alcohol, tobacco, and miscellaneous was Rs 34,728,683,110.

Source: Estimated from NLSS data

Table 3.48: Aggregate Household Expenditure on Food Originating Partially in the Highlands

Ecological Belt	Urban/ Rural Status	Milk	Ginger/ Garlic	Green Vegetables	Cauliflower Cabbage	Mutton	Cumin/ Black Pepper	Total
Mountain	Rural	4021046	27782	2410313	2540051	162917200	86660	172003053
Hills	Urban	405609492	231684	100441386	37123343	252498583	322487	796226976
Hills	Rural	283423269	148179	41281667	46800791	963244258	344281	1335242445
Hills	Total	689032761	379863	141723053	83924134	1215742841	666768	2131469421
Terai	Urban	89876844	31380	22170457	31005186	101939231	61364	245084463
Terai	Rural	375430326	99185	68018929	95984429	636846087	227656	1176606612
Terai	Total	465307170	130565	90189386	126989615	738785318	289020	1421691075
Nepal	Urban	495486336	263064	122611844	68128529	354437814	383851	1041311438
Nepal	Rural	662874641	275146	111710909	145325271	1763007546	658597	2683852110
Nepal	Total	1158360977	538210	234322752	213453801	2117445360	1042448	3725163548
Shares		Shares Are Based on Total Food Expenditure						
Highland	Urban	1.17	0.00	0.29	0.11	0.73	0.00	2.29
Highland	Rural	0.82	0.00	0.12	0.13	2.77	0.00	3.84
Highland	Total	1.98	0.00	0.41	0.24	3.50	0.00	6.14

Source: Estimated from NLSS data

Table 3.49: Aggregate Household Expenditure on Food Originating Primarily in the Lowlands

Ecological Belt	Urban/ Rural Status	Eggs	Potatoes	Tomatoes	Other Vegetables	Buff	Chicken	Chilies	Total
Mountain	Rural	14157866	33631287	5834489	3035974	56039781	34180836	37220	146917453
Hills	Urban	102915519	140408353	50248322	80684477	154666130	127840139	125780	656888720
Hills	Rural	85040703	269621421	51459383	46820087	522985427	265327691	136729	1241391442
Hills	Total	187956222	410029774	101707705	127504565	677651557	393167830	262509	1898280162
Terai	Urban	16910864	100756781	17971900	59108119	8765986	15582703	32689	219129042
Terai	Rural	51997887	451855122	40862986	94800788	110768564	97542146	258201	848085694
Terai	Total	68908752	552611903	58834885	153908906	119534551	113124849	290890	1067214736
Nepal	Urban	119826383	241165134	68220221	139792596	163432116	143422842	158469	876017761
Nepal	Rural	151196457	755107830	98156858	144656849	689793773	397050674	432150	2236394590
Nepal	Total	271022840	996272964	166377079	284449445	853225889	540473516	590619	3112412351
Shares		Shares are based on total food expenditure.							
Highland	Urban	0.30	0.40	0.14	0.23	0.45	0.37	0.00	1.89
Highland	Rural	0.24	0.78	0.15	0.13	1.51	0.76	0.00	3.57
Highland	Total	0.54	1.18	0.29	0.37	1.95	1.13	0.00	5.47

Note: Total aggregate household expenditure for all foods except alcohol, tobacco and miscellaneous was Rs 34,728,683,110.

Source: Source: Estimated from NLSS data

The rough estimates above are sufficient to highlight the importance of economic links between the highlands and lowlands in terms of food consumption. With growing transport infrastructure and urbanisation, the demand for highland food is likely to increase. Moreover, many food items are not reported in the NLSS survey, and thus the estimates provided should be seen as indicative only.

From these results, it is possible to get an idea of the value of total flow of food from the highlands. Consumption in the highland areas is not taken into account. The values of the food flowing from the highlands for the three food groups are calculated as follow.

1. The expenditure on food throughout Nepal, originating primarily from the highlands minus highland consumption, is roughly the value of food that flows from the highland areas. Only 25 per cent of the value is assumed to be contributed by the highlands.
2. The expenditure on food throughout Nepal, originating primarily

from the highlands minus highland consumption is roughly the value of food that flows from the highland areas. Only five per cent of the value is assumed to be the highland's contribution. The assumption on 25 per cent and five per cent of the highland contribution could be further refined by examining actual flows (if available) of food types and calculating the percentages.

The results are provided in Table 3.50. Food that originates partially in the highlands accounts for the largest share (53%) of total flow (Rs 1,046 million or about 3% of the total food expenditure by the households of Nepal), while food that originates primarily in the highlands accounts for 39 per cent. However, when viewed in terms of total food expenditure (all Nepal), the shares are small (1.6% partially originating from the highlands and 1.2% primarily originating from the highlands). It should be noted that not all food originates in Nepal and large amounts are imported as well; this cannot be derived from these data.

Table 3.50: Estimated Values and Shares of Food Contributed by the Highlands

	Food originating primarily in the highlands = Total Nepal-(rural mountain + rural hill)	Food originating partially in the highlands = Total Nepal-(rural mountain + rural hill)*.25	Food originating primarily in the lowland = Total Nepal-(rural mountain + rural hill)*.05
Flow from highlands (in Rs)	405,028,944	554,479,513	86,205,173
Percentage of total food expenditure	1.17	1.60	0.25
Total flow from the highlands (in Rs)	1,045,713,629.06		
Flow from highlands as % of total food expenditure	3.01		

Source: Estimated from NLSS data

4

Summary, Issues, and Recommendations

INTRODUCTION

This chapter summarises the main findings and issues emerging from the study. At the outset it is imperative to point out that the information required for the study is either non-existent or not adequate to understand the economic linkages between highlands and lowlands at the macro-level. As such, the study has been limited to exploring the dominant features characterising the flow of some important traded commodities from the highlands to the lowlands. Herbs and other non-timber forest products, mountain tourism, and horticultural and other farm products are the main highland products considered in the case study. Commodity flows from the lowland to the highlands are mostly manufactured products, financial resources, biochemical inputs, and food. The flow of these traded goods and services from the lowlands to the highlands has not

been possible to examine at this stage in the study because of lack of information. It is conceivable that examination of a one-way economic linkage (flow of resource products from the highlands to the lowlands) does not provide a complete picture of inter-regional economic linkages. However, to date there has been no effort made to understand this flow from the highlands, and such an understanding is essential for the assessment of the highland area's contribution to overall economic development. In addition, the study brings out important areas that need further investigation in lieu of the large-scale resource extraction that is taking place in highland areas.

SUMMARY

The highland areas are already making a substantial contribution to the overall economic linkages with the lowlands and urban centres. Based

on the study, Table 4.1 provides an idea of the highland's contribution in terms of the monetary flows. Strictly, it is not possible to aggregate the monetary values of the flows because not all information is for the same year, and, in some cases, there is the possibility of double accounting. Furthermore, some of the monetary values shown reflect only royalties earned from licenses collected and not the market value of the resource traded. However, even if aggregated, the monetary values may be an underestimate since the full traded volumes are not available. Despite these deficiencies, it is nevertheless tempting to add the monetary flows from the highlands.

Based on the study, some of the main findings are briefly summarised. According to Table 4.1, the total monetary value of the flow is about Rs five billion, and this is not a small amount. This value may be only the tip of the iceberg and not the total value, as it has not been possible to identify and account for the full volume of resource products that flow out from the highlands for reasons pointed out above. Also, note that many of the values are not those of the market value of the resource products.

The highland-lowland economic linkages are dominated by the flow of renewable natural resources and perishables products. Most of the natural resource-based flows are in the form of raw materials, which are collected *in situ* and governed by government licenses. Additionally, the extraction methods are unscientific (e.g., harvesting too early or uprooting the plants) and endanger the habitats of these resources and their growing stocks. Uncontrolled livestock

grazing is also a prime cause of habitat destruction. There is little incentive to conserve the resource as most of these renewable resources are found on government-owned lands.

Highland's contribution. The A fundamental problem exists with the current practice of issuing licenses. The evidence, based on different studies, indicates that the quantities collected are in excess of the authorised amounts and in the case of certain resources, namely, NTFPs, the current extraction rates may exceed the sustainable yield rates. This may also be true for non-renewable resources, and information on permitted quantities and mines was simply not available. This is a serious threat to the highland areas as it is akin to killing the goose that lays the golden egg. Royalties are collected far away from the point of extraction, and the royalties do not reflect the market values of the resources.

In the case of perishables, namely, vegetables, fruit, and milk, the contribution of highland areas is on the increase. Already about 44 per cent of the vegetables supplied to Kathmandu's wholesale market are from highland areas. The supply is higher in the case of fruit (63%). In the case of milk for which the information available is relatively better, the supply from highland areas is overwhelming. The supply of milk to the urban centres of the Eastern, Central, Mid-Western, and Far Western Development Regions is primarily from the highland areas. In the Western Development Region, the contribution from highland areas is about 30 per cent. Important factors that have contributed to an increasing supply of perishables from highland areas to urban centres are the increase

Table 4.1: Summary of Resource Product Flows from the Highlands and Value of the Flows

	No	Resource Products	Qty	Value (Rs)
Renewable Natural Resources that Originate Primarily in the Highlands	1	Jaributi (Herbs and Medicinal Plants)	3120614 (kg)	30,420,332
	2	Jaributi Export		64,500,000
	3	Commercailly harvested NTFPs	11690 (MT)	15,812,000
	4	Export of NTFPs	13581 (MT)	306,685,000
	5	Chiraita	27000 (kg)	3,461,488
	6	Chiraita	305 (kg)	
	7	Lokta	494559 (kg)	
	8	Cardamom		188,400
	9	Lycopodium	15600 (kg)	6,386,238
	10	Other medicinal herbs	27111 (kg)	2,203,708
	11	Spices		279,416
	12	Essential Oils	4544 (kg)	5,460,882
	13	Grass pulp	72,392 (kg)	8,210,968
	14	Cinnamon		10,100,000
	15	Tumeric		1,600,000
	16	Turpentine		9,100,000
	17	Niger seeds		259,200,000
	18	Perfume Oils		800,000
	19	Other herbs		17,100,000
	20	Ginger		121,600,000
	21	Dried ginger		40,600,000
	22	Coffee	4245 (kg)	602,259
	23	Mountain Tourism	334353 (tourists)	640,662,000
	24	Hydropower	241150 (kw)	
		Subtotal		1,544,972,691
All may not accrue to the highlands	1	Flowers and flower seeds		584,351,000
	2	Honey	887	132,372
	3	Tea		19,800,000
	4	Fruit, dry fruit & jam	3403	242,098
			Subtotal	
Non-renewable resources	1	Marble slabs		36,500,000
	2	Stones & sand		27,100,000
	3	Royalties: non-renewable resources		800,000
	4	Bricks and tiles	25911000 (pieces)	38,866,500
	5	Cement	343181 (MT)	1,372,724,000
		Subtotal		1,475,990,500
Other flows from the Highlands	1	Vegetables * fruits	47972148 (MT)	526,169,093
	2	Migration	317385 (persons)	
	3	Remittance Sent from the Highlands	177188 (persons)	1,145,995,237
	4	Remittance Received	203236 heads	8,341,000,000
	5	Expenditure on foods originating from the highlands		1,045,713,629
			Subtotal	
		Total		5,297,652,991

Note: It is not possible to say what portion of the revenues generated is retained in the highlands. Much of the highland people's income leaks out in the form of consumption expenditure to purchase food and non-food items as well as for the education of their children and for health care. The flow of remittances to the highlands is substantial and exceeds the value of total flows identified in the Table.

in urban population, better transportation, and formation of cooperatives or small groups of farmers, who are in a better position to manage production, that have helped strengthen their bargaining position. The benefits that accrue to these farmers, especially producers of perishables, can be increased if improved packaging arrangements can be made. Currently, large amounts of the produce supplied to the wholesale markets are destroyed along the marketing chain, for which the producers have to bear the loss.

Mountain tourism is currently confined to a few areas that are fairly remote and too inaccessible for efficient transportation. In these remote and inaccessible areas; mountain tourism has generated substantial income and employment, and this would not have not been possible if mountain tourism did not exist. The leakages of income earned from tourism are, however, high and could be minimised if the production of many perishable items was encouraged in the mountain areas. Such a strategy not only helps reduce leakages but also promotes productive employment in highland areas. The overall supply side planning for mountain tourism is essentially non-existent and mountain tourism has been entirely demanded. This situation has resulted in haphazard growth of rudimentary infrastructure and promotion of mountain tourism requires, among other things, a concerted effort to improve the overall supply side management.

The marketing of most highland products is lamentable. In the first place, the marketing chain is too long.

Secondly, non-highlanders control all aspects of the marketing functions. The poor human capital and poor marketing information, along with the fact that most highland sellers have to sell on an individual basis greatly reduce the bargaining strength. Where highland producers or sellers have been able to organize themselves, their capacity to bargain and to improve the accrual of benefits has been strengthened.

There is considerable migration from the highlands to the lowlands, and the reason for this migration is mainly the lack of opportunities in the highlands. Many highland households remit income to members living in different parts of the country, but the amount of remittances received by highland households is substantially larger than the outgoing amount.

ISSUES AND RECOMMENDATIONS

Lack of Appreciation of Highland Resources and Long-term Plan for Highland

For a long time to come, highland areas will continue to rely on the supply of natural resources to the lowlands and urban centres. Although this is already happening and the monetary values of the flow are substantially high, there is little awareness of this contribution made by highland areas. In part, this lack of awareness is perhaps because of not being able to appreciate that mountain areas are indeed endowed with resources that have potentially high economic value. Without appreciation of the potential economic value of highland resources, a vision of harnessing these resources to transform the highland economy is not possible. Many

resources found in highland areas have little close substitutes in the world. The diverse ecology of the highlands gives them a natural comparative advantage in a wide range of natural products that have few close substitutes. However, the natural comparative advantage of the niches have not been well explored, and, even if these opportunities are recognised, the coordinated support programmes that are needed from different government and private agencies have been unforthcoming.

Generate Awareness at the Policy Level about the Importance of Highland Resources and Their Contribution to National Development

There is no concerted effort to perceive the highland areas as potentially rich in a variety of unique natural resources that can be harnessed to transform their current economic state. This lack of realisation and vision has been the source of a number of policy and institutional problems. Long-term integrated plans and programmes are not in place to guide development in the highlands. Policy weakness, inconsistencies, and market failures are, to a great extent, responsible for poor terms of trade, poverty, unemployment, and environmental degradation in the highlands. *Ad hoc* pricing and regulatory mechanisms for mountain tourism products and many other high-value non-timber products (herbs), without prior assessment of their potential value through scientific research, are examples of policy failures. It is important to recognise the highland specificities in terms of fragility, inaccessibility, remoteness, compara-

tive niches, and adaptation mechanisms of highland people in the plans and programmes.

Develop Long-term Plans and Programmes That Provide Opportunities for Sustainable Uses of Highland Resources

The stipulated royalty rates for harvesting NTFPs are insufficient on several grounds: First, the royalty rates do not reflect the market value of the product. Second, they are not enforced on the individual collectors at the point of collection but on the wholesale traders in the districts. The rates can vary for the same product because of the difference in the names used in different areas. Third, existing royalty rates provide no preferential incentive for cultivation on private land or for common property management.

Encourage Cultivation of High-value Resource Products in Highland Areas through an Appropriate Incentive Mechanism Based on Scientifically Established Principles and Experiences

Ways and means have to be explored to make highland farmers more responsive to the opportunities created by the growing demand in lowland and urban centres for agricultural products in order to bring about an impact on income and employment. For example, helping farmers receive more for their produce requires an improvement in the marketing arrangements to help improve the terms of trade in the highlands. Care should also be taken that an increase in prices does not lead to overexploitation of

the resource base. As witnessed, helping farmers/producers organize themselves and helping them improve their skills through training have helped improve resource management, their bargaining position, and their incomes and productive employment.

Encourage Farmers/Producers to Organize Themselves and Help Improve Their Skills

Existing development policies and programmes are not based on objective considerations of the characteristics of various types of enterprises, the advantages they offer, and the support they need from government and private agencies to realise their potential. The pattern of existing urban development programmes and policies that are largely confined to the political boundaries of municipalities have, in fact, mostly ignored the opportunities offered by highland-lowland synergy. Many development programmes sponsored by the government in the rural hinterland areas are sectoral in nature, with little or no coordination between agencies. A substantial shift in policies and priorities is needed to establish a strong cross-sectoral production and consumption linkage with the rural hinterlands through collaborative efforts among different stakeholders.

Make Collective Efforts to Develop Innovative Enterprises Based on Highland Resources to Strengthen the Highland Economic Base

Poor Information

Poor information is a serious impediment not only in the context of as-

sessing the economic linkages between highlands and lowlands, but also in the context of identifying the potentials of the highlands. While the minimum database, consisting of spatial distribution of mountain-specific products, their production base, and the nature and magnitude of flows, is imperative, the lack of adequate information also seriously affects the entire planning process. Currently there is no practice of systematically recording and monitoring the stock or resources or their distribution and flows. Poor information also implies difficulties in monitoring and evaluating highland resources and flows.

Initiate a Process of Collecting, Organizing and Disseminating Information Pertaining to Important Issues in the Highlands

Institutional Vacuum

Currently, there is no single institution responsible for addressing the issues of the highlands. Many government agencies at both the national and district levels lack coordination in planning and implementation of development projects designed to address the problem of highland economies. The lack of a coordinating institutional body at the national level, in this context, implies that no institution is responsible for developing an information system to monitor the economic flow of traded goods from and to highland areas. An authoritative institutional body is badly needed at the local level, and this can be established by forging a partnership among different key stockholders. A central-level agency at the apex to coordinate and monitor the plans

and programmes of highland areas is also needed.

Create a Unit at a High Level (e.g., in the National Planning Commission) to Coordinate Highland Programmes and as a Repository of Highland Information

Developing an Integrated Hierarchical Structure of Dispersed Markets

The development of a well articulated and integrated hierarchical structure of dispersed market centres in the highlands is crucial if the market zone in the highlands is to benefit from the most powerful local hubs of market development. Under such a system, the bigger markets in the chain would serve the smaller centres, which in turn would serve their nearest hinterlands. It is essential to identify the market tiers (primary urban centres, secondary urban centres, small / tertiary market centres and villages) within the highland region. The primary market centre would provide more goods and services, have a larger population, and more functional establishments or, in other words, a larger service area than the secondary and tertiary market centres.

Market centres can be used as sites for locating and relocating service facilities or agencies to provide efficient services to rural areas (i.e., to maximise service efficiency). Establishing service delivery linkages is necessary to stimulate production linkages. However, both these linkages in the highlands are constrained by poor physical (transport accessibility) linkages. Although the scope for improv-

ing physical linkages by means of a well-established transport network is limited in many remote areas because of difficult terrain, improving the existing marketing system through a well-articulated and integrated hierarchical order of markets is one possible approach to overcoming the constraints imposed by poor physical linkages. Currently, many market centres located in the highlands have not performed the economic role they are expected to in stimulating production linkages with their rural hinterlands. Instead, they are functioning as commercial transaction centres for the flow of externally produced goods and services. Opportunities exist to establish many storage and processing units in these market centres, so that they can play a role in facilitating value addition locally through the export of processed products to the lowlands and elsewhere in the international market. Regional perspectives are essential for developing individual market towns in the highlands. Currently broad-based investment programmes and policy reform strategies related to such market towns are few. There is no institutional mechanism for financing these centres that are so vital, not only for strengthening rural urban linkages but also highland-lowland linkages.

Mules carrying supplies to places in the mountains.



Encourage the Development of an Integrated Hierarchical Structure of Dispersed Markets that Are Able to Stimulate Local Production Activities

Improving Marketing Efficiency

Despite the vast potential for commercial production of vegetables and fruit and other cash crops in the highlands, there is still tremendous scope for the highland areas. Many of the present problems relate to numerous production and marketing constraints. The manifestations of production and marketing linkages in many market zones, especially those in the hills, are mostly constrained by their poor physical linkages. While the scope for improving physical accessibility in these areas is limited there is an urgent need for improving the marketing system to compensate for the poor physical linkages. A marketing information system simply does not exist to provide farmers with information on the prices prevailing at different marketing levels for different types of commodities; and this has resulted in a kind of monopoly in the case of highland products such as herbs, fruit, and vegetables. This is the main reason why a few Terai wholesalers have full control over herbs (herb trade) and a few Kathmandu wholesalers have control over the vegetable and fruit trade.

Linkages and coordination among farmers, transporters, middlemen or agents, wholesalers, and retailers need to be institutionalised through marketing arrangements. Currently, farmers have to bear significant economic losses due to the lack of a support system for post-harvest technologies. The lack of storage and processing plants for promising highland products remains another obstacle to ensuring the generation of appreciable benefits (income and employment) in highland areas.

Several approaches and actions can be taken to improve the existing marketing system. Coordination between local farmer/producers' institutions and other relevant institutions needs to be strengthened. Organizing farmers for group marketing (cooperative) is a necessary means of addressing a number of marketing problems, but this has to be backed by complementary programmes. A strict code of conduct for collection procedures, their monitoring and enforcement mechanisms, herb processing, and use and production-oriented programmes is needed to address the above issues.

Improve Marketing Efficiency by Making Better Information Accessible to Organized Highland Farmers/Producers to Compensate for the Difficulties Arising Out of Poor Physical Infrastructure



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Himalayan Region**



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