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# **Migration and Global Environmental Change**

## **DR9: Drivers of migration in mountainous regions of the developing world: a review**

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# Abstract

This paper reviews the major environmental and non-environmental drivers of migration in the mountainous regions of the developing world. Mountains are highly diverse in terms of their physical, socioeconomic and political environments. Mountain environments are highly fragile and their inhabitants are exposed to both environmental and non-environmental stressors, which are interlinked and have serious implications for mountain livelihoods. The combination of multiple agricultural and non-agricultural income sources is a characteristic of mountain people's livelihood systems. Migration is not a recent phenomenon, but has been a traditional source of non-farm income to varying degrees. This review finds that migration behaviour is influenced by a combination of environmental (floods, flash floods, landslides, droughts and land degradation) and non-environmental (economic, demographic, social and political) drivers. As the decision to migrate or not is ultimately an individual one, it is methodologically challenging to single out any single driver as significant – a fact well reflected in the available literature. The inter-relationship between the dynamics of the factors triggering migration and migration dynamics has been rarely explored. In particular, studies concentrating on migration in the mountainous regions of the developing world are few.

## Introduction

Mountains cover around a quarter of the world's land surface and are home to about 12% of the world's population (UNEP-WCMC, 2002; Huddleston *et al.*, 2003). Chapter 13 of Agenda 21, which was adopted at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992, explicitly recognises mountains and uplands as a major component of the global environment (UNEP, 1992). What are referred to as 'mountain specificities' (namely, inaccessibility, fragility, marginality, diversity, niche opportunities and human adaptation mechanisms) distinguish mountains from the lowlands (Jodha, 2001). This paper adopts the widely used definition of Kapos *et al.* (2000), which is based on altitude, slope, or a combination of both factors, and delineates roughly all areas above 1,000 m in altitude in the subtropics and tropics and above 300 m in altitude in the remaining parts of the world as 'mountainous areas' (Table 1).

**Table 1: Definition of mountainous areas**

Class 1	<b>Elevation 300–1,000 m and local elevation range (5 km radius) &gt; 300 m outside 23°N–19°S</b>
<b>Class 2</b>	Elevation 1,000–1,500 m and slope $\geq 5^\circ$ or local elevation range (5 km radius) > 300 m
<b>Class 3</b>	Elevation 1,500–2,500 m and slope $\geq 2^\circ$

Class 1	<b>Elevation 300–1,000 m and local elevation range (5 km radius) &gt; 300 m outside 23°N–19°S</b>
<b>Class 4</b>	Elevation 2,500–3,500 m
<b>Class 5</b>	Elevation 3,500–4,500 m
<b>Class 6</b>	Elevation > 4,500 m

Source: Adapted from Kapos *et al.* 2000

Mountain livelihoods are highly dependent on natural resources as 73% of all mountain people live in rural settings (Huddleston *et al.*, 2003). Ecosystem services related to water play an overriding role as the basis for local livelihoods (e.g. drinking water, irrigation and biomass growth). Mountain environments are highly fragile and their inhabitants are exposed to environmental and non-environmental stressors, which are interlinked and have serious implications for mountain livelihoods. Environment stressors, namely rapid-onset hazards (floods, flash floods, landslides), slow-onset hazards (droughts, land degradation), or a combination of both, are contextual influences on migration behaviour. Rapid-onset hazards have a short response period, whereas the effects of slow-onset hazards are staggered over time and could take months or even years to become a disaster (Curson, 1989; ODI, 2006). The difference in response time for rapid- and slow-onset hazards results in a varying influence on the migration behaviour of the affected population. In this context, climate change acts as an additional stressor, which can multiply existing development deficits and reverse progress in mountain areas, and may limit mountain people's inherent capacity to cope and adapt (UNDP, 2010). As unfavourable conditions result in food and income insecurity, livelihood diversification is an important strategy to reduce vulnerability to environmental and non-environmental risks. Migration is one of the livelihood strategies used by mountain people to respond to changes and is regularly combined with other livelihood strategies.

The knowledge base on the socioeconomic implications of the impacts of environmental stressors in mountainous regions, along with other drivers of global change, is still inadequate, particularly for the subtropical and tropical mountains in developing countries. Presently, environmental and development indicators are mainly available and analysed at a national level, but administrative boundaries do not necessarily correlate with the boundaries of ecoregions such as mountains.

This paper examines the drivers of migration in the mountainous regions of the developing world with a focus on the Himalayas, based on the available literature. Mountain-specific studies on migration outcomes in the developing world are limited. Evidence for some countries is more easily available than for others. This paper uses both quantitative and qualitative evidence from mountain countries or countries with significant mountainous regions in the developing world to illustrate various aspects of the migration process. The regions/countries covered are Asia (Afghanistan, Bhutan, China, India, Myanmar, Nepal, Pakistan and Vietnam); Africa (Ethiopia, Lesotho and Morocco) and South America (Argentina, Bolivia, Chile, Colombia and Ecuador).

# Drivers of migration

Migration is a multi-causal phenomenon and, over time, several, often conflicting, theories and approaches have been formulated to explain the causes and outcomes of human migration (see Harris and Todaro, 1970; Wallerstein, 1974; Stark and Bloom, 1985). The relevance of migration for development (McDowell and de Haan, 1997; de Haas, 2008; Black and Sward, 2009) in the context of climate change (McLeman and Smit, 2006; Kniveton *et al.*, 2008; Tacoli, 2009) has been widely discussed in the past few years. This paper follows a framework developed by a Foresight research team, which classifies various factors of migration into five drivers: economic, environmental, demographic, social and political.

## Environmental drivers

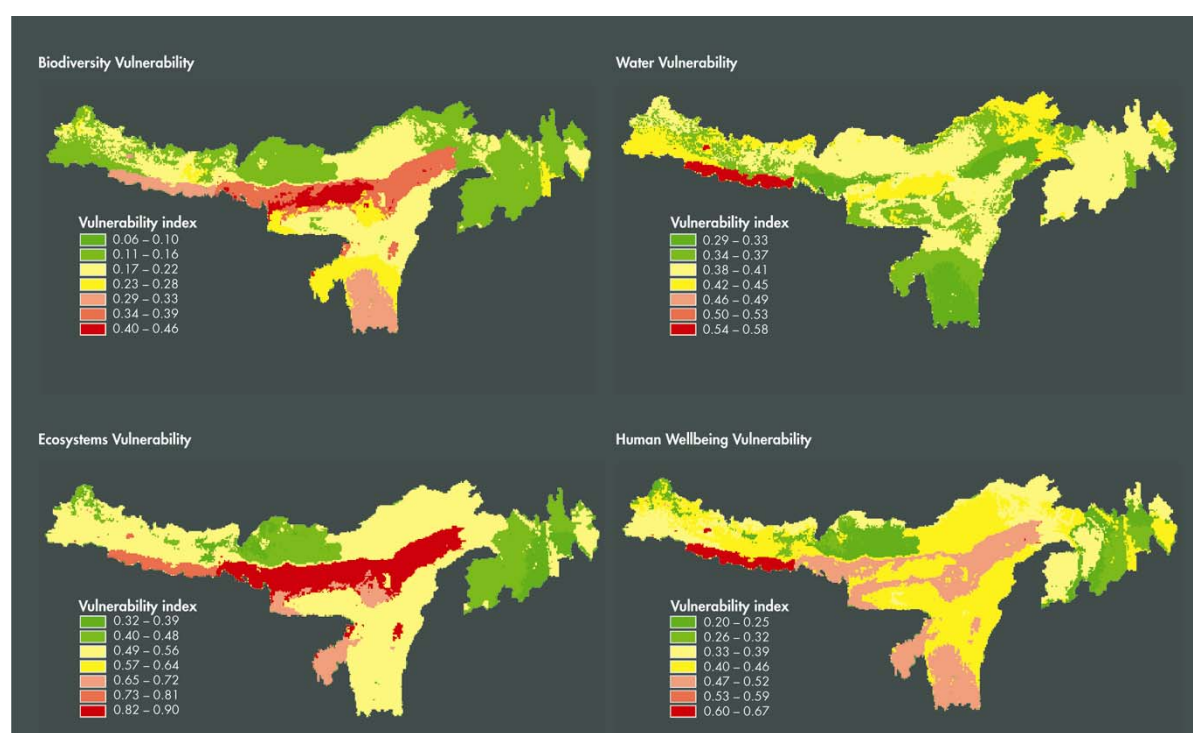
Environmental drivers play a prominent role in migration in mountainous areas. Mountain livelihoods are dependent on the services provided by ecosystems. In addition, environmental factors change considerably with the changing climate. Mountains, with their steep relief, high precipitation, and quickly changing climatic patterns, are particularly sensitive to environmental change, with significant influence on human well-being (Körner and Ohsawa, 2005).

One way of approaching the environment–migration relationship is to begin with the concept of ecosystem vulnerability (Figure 1). Although the direct impacts of climate change are most marked at high elevations, they have the most impact at lower elevations for two reasons. First, the ‘cascading’ of effects from high- to low-altitude areas, for example increased run-off at high altitude leading to floods and increased sand deposition on agricultural land at lower altitudes (Tsering *et al.*, 2010). Second, small changes in climate variables could have a high impact in lower-elevation areas where agricultural activities and biodiversity are unable to adjust to these changes. Population pressure and the devastation of natural biodiversity are the main factors that make these places highly sensitive to climate change; other factors include low levels of socioeconomic services and productive livelihood assets, poor health and chronic disease outbreaks, land degradation and deforestation. The impact of these factors is further aggravated by weather extremes and climatic variability including recurrent floods (Tsering *et al.*, 2010).

Probably the most important environmental service provided by mountains is fresh water. Mountains are often referred to as ‘water towers’ for the world’s lowlands (Viviroli *et al.*, 2007; UNEP-WCMC, 2002). Mountains store a vast amount of water in the form of glaciers, snow, ice and groundwater, as well as in lakes and streams. Almost all of the world’s major rivers, and many minor ones, originate in mountains (Messerli and Ives, 1997). According to Viviroli *et al.* (2007), over 50% of the Earth’s mountain areas are vital for supplying water to the adjacent lowlands for household consumption, agricultural activities, electricity generation and industrial use. Besides water, mountains house a high level of biological and agricultural diversity including food, fibres and medicinal plants. Many important crops (e.g. maize, potatoes, barley, sorghum, tomatoes and apples) and domestic mammals (e.g. sheep, goats, domestic yak, llamas and alpacas) are found in mountain areas (UNEP-WCMC, 2002). High-value mountain products such as medicinal plants and nutraceuticals, precious fibres such as cashmere and alpaca wool, and mountain-specific crops are in great demand in downstream and global markets. Mountain forests provide timber, fuel, forage and non-timber forest products for mountain and downstream economies. The genetic diversity of mountains is an important resource in today’s rapidly changing world.

Mountain forests (28% of the world's forests are situated in mountains) protect against natural hazards, ensuring slope stability and preventing or reducing soil erosion, landslides and avalanches. Mountain forests, especially in the tropics, contain a high level of genetic diversity and serve as wildlife habitats. Together with highland wetlands, mountain forests play a significant role in biospheric carbon storage (IPCC, 2007a,b).

**Figure 1: Relative magnitude and spatial characteristic of vulnerability to climate change impacts in the Eastern Himalayas**



Source: Tsering *et al.*, 2010: 55

## Changes in temperature

Mountain regions have experienced above average warming in the twentieth century (IPCC, 2007a,b; Nogues-Bravo *et al.*, 2007). In the Himalayas, for example, progressive warming at higher altitudes is three times greater than the global average (Eriksson *et al.*, 2009; Xu *et al.*, 2009). A recent regional climate model study for the tropical Andes shows a similar trend: increased warming at higher elevations and increased inter-annual temperature variability for scenarios with greater global warming (Urrutia and Vuille, 2009). Projections for the twenty-first century indicate that temperatures will continue to increase disproportionately in mountain areas. The highest temperature rise in the four IPCC Special Reports on Emissions Scenarios is expected in the high-latitude mountains of Asia, North America and Europe and the mid-latitude mountains of Asia. The high-latitude mountains of Asia are expected to experience the highest change in temperature; the tropical and mid-latitude mountains in Africa and South America are expected to warm less (Nogues-Bravo *et al.*, 2007). The average warming projected in mountain areas across the globe by 2055 ranges from 2.1°C to 3.2°C, depending on the emissions scenario (Nogues-Bravo *et al.*, 2007). This is two to three times greater than recorded during the twentieth century (Pepin and Seidl, 2005). An increasing rate of warming with elevation has also been observed. The results of a study encompassing the whole physiographic region of Nepal using climatological data from 1977 to 2000 suggest that the



seasonal temperature variability is increasing and the altitudinal lapse rate of temperature is decreasing (see Table 2).

**Table 2: Increase in regional mean temperature in Nepal from 1977 to 2000 (°C/year)**

	Seasonal				Annual
Regions	Winter	Pre-monsoon	Monsoon	Post-monsoon	
	Dec–Feb	Mar–May	Jun–Sep	Oct–Nov	
<b>Trans-Himalayas</b>	0.12	0.01	0.11	0.10	0.09
<b>Himalayas</b>	0.09	0.05	0.06	0.08	0.06
<b>Middle Mountains</b>	0.06	0.05	0.06	0.09	0.08
<b>Siwalik Hills</b>	0.02	0.01	0.02	0.08	0.04
<b>Terai</b>	0.01	0.00	0.01	0.07	0.04

Source: Tsering *et al.*, 2010: 15, updated from Shrestha *et al.* (1999) and Xu *et al.* (2007).

## Cryosphere

The most noticeable impact of climate change in mountains is the recession of glaciers. According to UNEP-WGMS (2008), glacier shrinkage on the century timescale is of a non-periodic nature and may lead to the deglaciation of large parts of many mountainous ranges during the coming decades. In the Himalayas, glaciers are receding more quickly than the global average (Dyurgerov and Meier, 2005). The rate of retreat for the Gangotri Glacier over the last three decades is more than three times the rate during the preceding 200 years (Srivastava, 2003). Most glaciers studied in Nepal have also undergone rapid deglaciation (Seko *et al.*, 1998; Kadota *et al.*, 2000; Fujita *et al.*, 2001). In the last half-century, 82.2% of the glaciers in western China have retreated (Ding *et al.*, 2006; Kang *et al.*, 2010). One exception is the Karakoram, where some high-altitude glaciers are advancing (Hewitt, 2005). In South America, the Northern Patagonian Ice Field lost about 3.4%, or 140 km<sup>2</sup>, of its area between 1942 and 2001. In Africa, 85% of the total ice volume of the plateau glaciers of Mount Kilimanjaro disappeared between 1912 and 2000 (Thompson *et al.*, 2009). Other consistent trends are the acceleration of the degradation of permafrost, with the active layer becoming thicker as the result of surface warming, and the shrinking of most of the snow and ice caps across the world at increased rates. These alterations in the cryosphere are already leading to changes in land surface characteristics and drainage systems, and are likely to have significant implications for water availability in mountain and downstream communities (Stern, 2006).



## Hydrology

With global warming, it is likely that the hydrological cycle in mountain areas will intensify, changing the frequency and intensity of floods and droughts (Beniston, 2005). During the last few decades, the Greater Himalayan Region has experienced changes in precipitation patterns (Xu *et al.*, 2009; Immerzeel *et al.*, 2010). Monsoon patterns have shifted, but the picture remains ambiguous. Shrestha *et al.* (1999) report that, unlike temperature, precipitation does not show any consistent spatial trends in Nepal. Annual precipitation changes are quite variable, showing a decrease in one site and an increase in a site nearby. Dash *et al.* (2007) observe that during the last century there have been small increases in rainfall in north-east India during winter and in the pre- and post-monsoon seasons.

Moreover, with the continuing melting of glaciers and snow and ice cover, the supply of water to the vast land masses and billions of people may no longer be guaranteed, leading to severe water stress and potential conflict. In Asia, for example, changes in perennial snow and glacial cover induced by climate change could affect half a billion people in the Himalayan region and a quarter of a billion people in China, who depend to some extent on meltwater from the mountains for their water supply (Stern, 2006). Nevertheless, it should be recognised that, as a result of the interlinkages between the climatic and non-climatic drivers influencing the world's freshwater resources, as well as the high level of uncertainty regarding changes in precipitation patterns and other parameters influencing the hydrological cycle in mountains, it is extremely difficult to predict what changes will occur.

## Biodiversity

Mountain systems support about half of the world's biological diversity and nearly half of the world's biodiversity hotspots (Myers *et al.*, 2000; Hassan *et al.*, 2005). Of the world's total acreage of land-based protected areas, some 27.6% is situated in mountains (Kollmair *et al.*, 2005). With rising temperatures, upward shifts of vegetation belts to higher elevations and northward advances in the geographical ranges of species in the northern hemisphere are expected (Nogues-Bravo *et al.*, 2007). Some mountain species are likely to be losers, including large territorial animals, late successional plant species, species with small and restricted populations, and species confined to summits (Körner, 2009). These processes should not be regarded as entirely negative – they may also present new opportunities. Because temperatures decrease with altitude, mountain species are in the privileged position of being able to migrate upwards to cooler areas, whereas lowland species usually have no other option than to adapt to higher temperatures, which is much more difficult (Körner, 2009). Hence, mountains could serve as refuges for species that can no longer survive in the lowlands (Singh *et al.*, 2010).

## Extreme events and natural hazards

Mountains are typically exposed to multiple hazards (Kohler and Maselli, 2009). With climate change, it had been predicted that the frequency and magnitude of extreme events, including floods, windstorms and droughts, will increase (IPCC, 2007a,b). This is expected to have significant implications for fragile mountain ecosystems, as well as for mountain livelihoods and infrastructure. More intensive precipitation events could trigger flash floods and landslides in mountainous terrain. The influence of rapid-onset hazards (floods, flash floods, landslides) on migration behaviour differs from that of slow-onset hazards (drought, land degradation). For example, in a study conducted in the Himalayan region, Banerjee *et al.* (2011) found that households in communities exposed to rapid-onset water hazards (floods, flash floods) have a 32% higher probability of sending a household member to work somewhere else than households in communities exposed to slow-onset water hazards (drought, water shortages). Among the communities affected by slow-onset water hazards, levels of migration for work are

likely to be higher in communities affected by very severe hazards than in those affected by less severe ones.

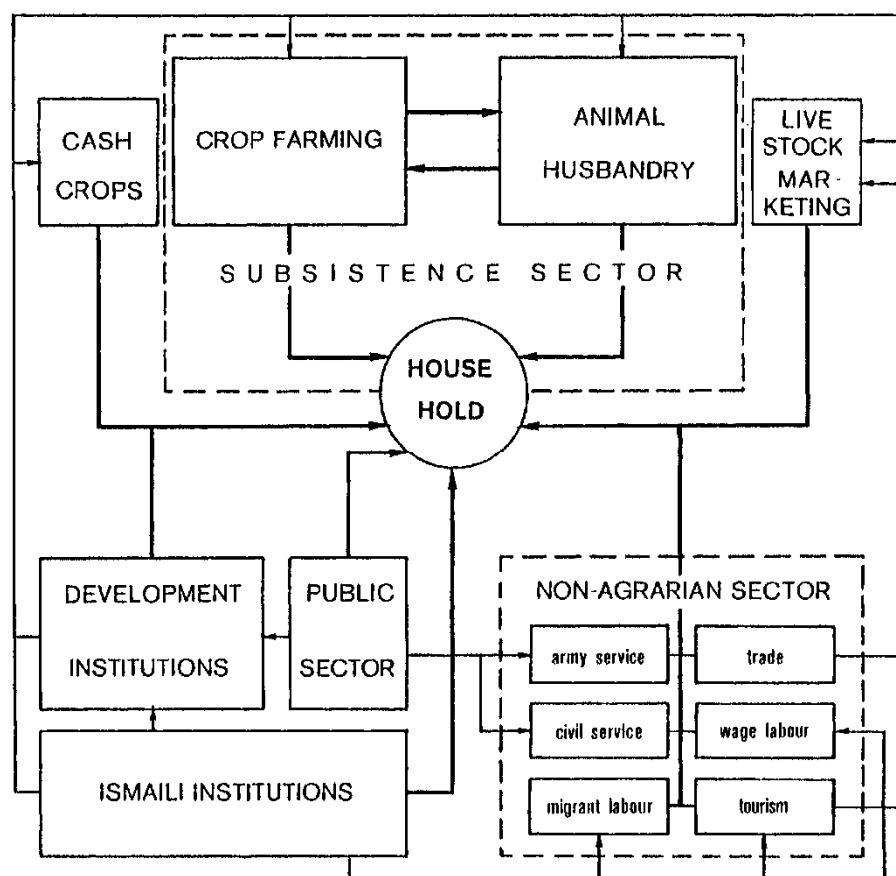
It is also predicted that the risk of drought in most subtropical and mid-latitude regions will be greater in the future. Moreover, continuing glacier recession is increasing the danger of glacial lake outburst floods. About 204 glacial lakes have been listed as having the potential to breach in the Himalayan region (Ives *et al.*, 2010).

## Economic drivers

### Livelihood activities in the mountains

Although, mountain livelihoods are largely dependent on the use of natural resources, mountain households employ a 'multi-income' livelihood system, combining agricultural and non-agricultural systems (Figure 2). They pursue mixed mountain agriculture based on farming (cereal grains, horticulture crops) and animal husbandry. Non-farm incomes from wage employment, trade, or remittances contribute to household income to varying degrees (Kreutzmann, 1993; Ediger and Huafang, 2006; Cavassa, 2009; Mariscal *et al.*, 2011; Schutte and Kreutzmann, 2011). Commonly managed non-farm natural resources such as forests and pastures play a crucial role in maintaining the livelihood system in most mountain areas. They provide multiple products like firewood, construction material, medicinal plants, grazing area (Hamilton, 2004; Heinen and Acharya, 2011).

**Figure 2: Typical 'multi-income' mountain livelihood system combining agricultural and non-agricultural systems in Hunza, Pakistan**



Source: Kreutzmann (1993: 29)

Mountain agriculture is often subsistence orientated, but increasingly includes a variety of high-value cash crops. In the Himalayan region, lack of sufficient agricultural land, changes in agricultural productivity, the impacts of climatic stresses (erratic precipitation and extreme temperature fluctuations), biophysical conditions (low soil nutrient, soil erosion and shallow soil), small and fragmented landholdings, lack of irrigation, lack of mechanisation, barriers to market participation and falling commodity prices are major challenges to food supply and income in agricultural households. Other changes, such as volatility in global crop prices, variability in food production elsewhere and conservation processes, also affect livelihoods in mountain communities (Tulachan, 2001; Goodall, 2004; Ediger and Huafang, 2006; Hoermann *et al.*, 2010). The supply of adequate food has been a perpetual challenge in northern areas of Pakistan, which remains a food-insecure area (Khan and Gill, 2009; Suleri and Haq, 2009). In the Yangliu sub-watershed in Yunnan province, China, the reduction of arable land caused by farmland conversion policies, under which grain and cash subsidies are provided to farmers who plant trees in designated cropland areas on steep slopes, has contributed to the greater economic integration of the rural household economy with the market economy. This shift has increased the significance of cash income for farming households in meeting basic needs and influenced the reallocation of farm labour to off-farm employment pursuits (Ediger and Huafang, 2006).

Findings in the Andean region are consistent with those in the Himalayas. In the Northern Potosi region on the high plateau of Bolivia, Mariscal *et al.* (2011) found that constant reduction in the amount of land available for farming because of the combined effect of new land tenure and production systems, the creation of mining enclaves, desertification and climate variability has led to the impoverishment of the indigenous population, triggering contemporary migration in the region. Gray (2009) reported that the effects of land quality are jointly significant for local mobility and internal migration in the southern Ecuadorian Andes, but only marginally significant for international migration. Both the rise in household ownership of flat land and the mean slope of community land have led to an increase in local mobility. Both internal and international migration decreased with precipitation, which suggests that it is likely to be influenced by agricultural productivity. Fluctuations in agricultural harvests significantly increased local mobility and internal migration, but international migration was not affected. Tanner (2003) reported a similar impact of agricultural production and food supply on migration decisions in Valle Grande of north-west Argentina.

The highlands of Morocco in northern Africa are a major source of food grains, fibre and meat in the country. Environmental degradation as the result of highland deforestation, overgrazing, declining soil fertility, soil erosion and periodic drought has affected agricultural activities in the region (Barrow and Hicham, 2000).

Livestock are an important source of food, serve as pack and draught animals and provide animal fibre. Animal husbandry is dependent on ecological potential, access to summer pastures, the availability of winter fodder and socioeconomic factors (Nuesser and Clemens, 1996; Nautiyal *et al.*, 2003). Mountain communities combine farming and herding at different altitudes (Chakravarty-Kaul, 1998; Hilgert and Gil, 2005; Shaoliang *et al.*, 2007). At present, the movement of pastoralists has been altered by changes in the political situation, ecological changes caused by alterations in land use, a rise in the population of both humans and animals, and erosion of the customary institutions that regulate pastoralism and agricultural practices in the mountains. Similar changes in traditional transhumance practices have been reported in mountain communities in China (Shaoliang *et al.*, 2007), Argentina (Tanner, 2003: 110), Lesotho (Turner *et al.*, 2001) and Morocco (Bencherifa and Johnson, 1991).

The shortfall in household income and food supply because of the deficit in local agricultural production is compensated by additional income from non-farm sources such as trade, services and labour migration.

### **Lack of alternative livelihood opportunities in mountain areas**

In general, livelihood opportunities in mountainous regions of developing countries are limited in nature. Livelihood options are generally restricted to primary-sector occupations such as agriculture, livestock farming and the collection of forest products. Factors such as environmental shocks and stress variability, land degradation and lack of basic infrastructure for intensive land use undermine agricultural growth and its labour absorption potential. Changes in the agricultural system, such as the introduction of modern technology and mechanisation, have meant that a large number of labourers are no longer necessary for farming. In combination with the natural increase in the rural population, these factors have created a surplus of labour in rural areas. The reallocation of this surplus rural labour force from agricultural to non-agricultural occupations is an inevitable consequence of environmental and non-environmental changes. The diversification of rural livelihoods is realised by increasing employment in non-primary sector activities such as government services, trade and wage employment (see Ezra, 2001b; Liang and Ma, 2004; Huo *et al.*, 2006; Shaoliang *et al.*, 2007; de Haas, 2007).

Mountain specificities, such as inaccessibility, fragility, marginality, diversity, niche opportunities and human adaptation mechanisms, have significant implications for local economies (Jodha, 2001). The slow economic development in the mountainous regions of developing countries contrasts sharply with the economic vibrancy of the lowlands, foothills and urban areas (Turner *et al.*, 2001; Tanner, 2003; Barrera-Mosquera *et al.*, 2010). According to Du *et al.* (2004), the low population density and high transportation costs of rural mountainous regions of China are a major challenge to the growth of industries in the interior rural areas, which implies that migration may be an important component of the structural change occurring there. In Bolivia, the main migration flows are dictated by strong regional variations in growth and development. Of the poor rural population, 31% live on the altiplano (the high plateau), 47% live in the high Andean valleys of the altiplano, and the remainder in the lowlands of eastern Bolivia and Chaco (O'Hare and Rivas, 2007: 313). The flows consist of large movements of people from the stagnating semi-subsistence farming economy of the rugged and often inaccessible high plateau (altiplano) to the modern export-oriented agribusiness and oil- and gas-exporting lowland regions of Santa Cruz and Tarija. Migration is oriented towards the main urban centres in the country, particularly El Alto, Santa Cruz, Cochabamba and La Paz (O'Hare and Rivas, 2007). In many communities in the Rif Mountains, the Sous valley and southern oases, Morocco's main migration belts, between one-fifth to over half of all households have at least one international migrant (de Haas, 2005, 2007). Under such circumstances, labour migration has become a significant livelihood diversification strategy in the mountain communities across the developing world (see Kreutzmann, 1993; Turner *et al.*, 2001; Ediger and Huafang, 2006; de Haas, 2007; Cavassa, 2009; Hoermann *et al.*, 2010; Mariscal *et al.*, 2011).

It must be noted that migration for work is one of many livelihood options available to a household. Often mountain households adopt labour migration in combination with other livelihood strategies (Sharma, 2008; Cavassa, 2009; Banerjee *et al.*, 2011). For example, the lighter agricultural workload in certain seasons allows some farmers to look for seasonal non-farm work in urban centres. During the off-farm season in Nepal (November to January), many Nepali farmers migrate to India to seek employment. Their remittances are the main or supplementary source of income in these households. Seasonal migration is also prevalent in Peru; from June to August, when agricultural labour is at its minimum, and January to March,

during the school holidays, both adults and young men and women migrate in search of harvesting jobs, as mine labourers, or domestic help (Bravo, 2002).

### Employment opportunities outside mountainous regions

Employment opportunities beyond mountain areas are an attraction to potential migrants in the mountain communities of the global south. There is a growing awareness of prospects beyond the region through education, communication and social networks (Hoermann *et al.*, 2010). In China, the rise in rural to urban migration over the last three decades is a response to the increasing demand for cheap labour and rapid economic growth in urban areas such as the coastal region (Li, 1996; Zhang and Song, 2003; Liang and Ma, 2004; Huo *et al.*, 2006). In the Andes, the exposure of mountain cultures to external influences and the lack of economic opportunities in the mountains have induced migration to urban centres (Sarmiento, 2000).

The development of a market economy in urban areas has increased the demand for low-wage labour in service sectors. Migrants account for a considerable proportion of workers in the private sector. In addition, the civil and defence services are traditional employers in many parts of the Himalayas. Employment in these occupations often involves migration to the place of work (Adhikari *et al.*, 2008; Hoermann *et al.*, 2010). Male migrants from Cañar in southern Ecuador migrate mostly to the 'zafra' (sugar cane harvest) or other labour-intensive tasks in the coastal plains. With globalisation, this trend within Ecuador has expanded to include migration abroad (Sarmiento, 2000).

### Economic opportunities in mountain areas

Nodes of development, in the form of towns and cities, exist in the mountain regions across the developing world: Shimla, Dehradun and Nainital in the Indian Himalayas; Kathmandu and Pokhara in the Nepal Himalayas; and Caracas, Bogota and La Paz in the Andes. Urban centres located in the mountains attract migrants from the mountains and from the neighbouring lowlands. Inequality in regional development, the influence of social networks on choice of destination and growing accessibility of means of transport and information are bringing migrants to these mountain urban centres in search of livelihoods. Nepal (2007) reported that the rise of the tourism sector in the Annapurna region induced reverse migration from the lowlands to the highlands as people found lucrative business and employment opportunities in the mountains. The mountain tourism hubs of Ghandruk, Jomsom and Manang in the Annapurna region have benefited from the influx of government and non-governmental organisations in generating employment opportunities. Since the late 1990s, Yunnan has become one of the most popular tourist destinations in China, stimulating the growth of the service sector in the province. This attracts 'floating migrants' (without *hukou* or household registration status) from within the province and elsewhere. Between 1990 and 2000, Yunnan experienced a 230% increase in the size of the inter-county floating migrant population (Liang and Ma, 2004). The city of La Paz–El Alto in the Bolivian highlands mainly attracts migrants from the rural highlands. Cochabamba, in the valley region, is another important urban centre. Unlike in the Himalayas, the Andean cities are the centre of administrative, economic and political leadership in the region (Andersen, 2002).

Not all migration within mountain regions is induced by urban centric employment opportunities. The need for workers in the primary sector directs the flow of migrant workers in some mountainous regions. In China, Xinjiang is the only non-coastal province with a high proportion of floating migrants – 10.4% of the total population. Almost half a million people migrate from Sichuan to Xinjiang to seek employment during the cotton harvest season (Liang and Ma, 2004: 473). Similar instances have also been reported from the mountain communities of India (see Brusle, 2008) and Pakistan (Kreutzmann, 1993; Teinberg, 2001).



## Market conditions in destination

The flow of migrant workers is not solely dependent on conditions at the place of origin, it is also influenced by market conditions (wage levels, employment opportunities, demand for quantity or quality labour) at the destination. These market conditions can accelerate, slow down, or reorient migration flows. Since the 1990s, in response to new work opportunities in south Europe, a spatial diffusion of international migration has occurred beyond the historical migration belts of Morocco, which were earlier predominantly orientated to internal destinations (de Haas, 2005, 2007). In Argentina, the restructuring of the agricultural economy since the late 1970s, including the introduction of mechanised harvesting and new technologies in processing activities, and declines in employment in sectors such as mining, construction, and steel and metal works have altered traditional patterns of seasonal, temporary and permanent migratory flows from the highland regions (Tanner, 2003).

However, an economic downturn does not always dissuade new migrant workers from arriving in well-established labour markets, nor does it always induce laid-off migrant workers to return to their origin communities. This is particularly true if returning to the destination is perceived to be difficult because of the cost of returning or travel restrictions, or if there is a lack of employment opportunities in the origin community (Ratha and Mohapatra, 2009).

## Intervening obstacles: cost of migration

The financial cost of migration includes logistical expenses, household expenses at origin, living expenses at destination and agents' fees. For example, the financial cost of migration for Nepalese workers ranges from 70,000 Nepalese rupees (US\$986) per migrant for the Gulf countries to 204,000 Nepalese rupees (US\$2,873) for South Korea (Adhikari *et al.*, 2008). Some households may not be able to meet these costs. Yet migration for work may be a necessary livelihood choice for them. If the expected income at the place of destination is higher than the actual income at the place of origin, some households take loans from friends, relatives, moneylenders or self-help groups to finance the migration of a household member (Zhao, 2003; Nadeem *et al.*, 2009; Jain, 2010; Banerjee *et al.*, 2011).

Migration may not be an option for some households for economic or non-economic reasons. In the highlands of north Ethiopia, Morrissey (2008) found that household and individual responses to environmental change are determined by the degree to which migration constitutes a possible strategy for the household or individual. Structural forces other than environmental stresses influenced the choice of response. In Himalayan communities exposed to floods and droughts, factors such as lack of resources, acceptance of losses as a cost of locational benefits, perceived lack of skills, family obligations and lack of additional personnel prevented households from sending a member to migrate for work (Banerjee *et al.*, 2011).

## Demographic drivers

Although, there is a lack of disaggregated demographic data for mountainous regions, present projections state that the world's population will grow by a third over the next four decades and most of this increase will be in developing countries (UNDP, 2009). This implies a considerable increase in the population in mountainous regions. Taking mountain areas as a whole, population densities are quite low; but, if one looks at the habitable areas (mainly in the valleys), densities can be very high. The influence of population pressure on the migration decision is mediated through its influence on other drivers of migration: economic, environmental, political and social.

The global working age population is expected to increase by 1.1 billion by 2050. New entrants to the labour force in developing countries will exceed the total number of working-age people currently living in developed countries during the next 15 years (UNDP, 2009), although there will be intra-country variations in the size of the working-age population. The increase in workforce size in mountain areas will have a significant impact on agricultural self-sufficiency, the availability of resources and employment, and wage levels. Migration reduces population pressure at the place of origin and complements the limited resource base of the origin community by providing access to resources from elsewhere in the form of remittances (Teinberg, 2001; Krishna, 2002; Hoermann *et al.*, 2010). Household composition significantly influences the migration decision to work, as the role of the migrant member has to be fulfilled by other household members. Shrestha and Bhandari (2007) report that the availability of men positively contributes to within-country migration in Nepal, whereas the presence of both men and women is important for international migration. In the case of women, the effect of an additional woman is positive, but diminishing. Another study conducted in the Himalayan region found that an increase in the number of adult males in the working age group in a household increases the probability of the household sending a member to work somewhere else by 19% per additional male (Banerjee *et al.*, 2011).

Urban centres are attractive to potential migrants because of access to employment opportunities, access to urban amenities and services such as education, health, electricity and water, and opportunities for market participation. In China, medium-sized cities are the most favoured migration destinations. The employment threshold in metropolises and other large cities is relatively high and hard for rural migrants to meet. Small cities are less appealing to the migrants because of their undeveloped economy (Huo *et al.*, 2006). According to the Ministry of Agriculture in Bhutan (2006), rural–urban migration is a significant contributor to the urbanisation process in Bhutan as 72% of all urban dwellers could be classified as migrants from rural areas. Between 1976 and 2003, the number of poor people in Bolivia increased from 3.9 to 5.9 million. The high rate of rural–urban migration ensured that most of the additional 2 million poor were accommodated in the nation's urban centres. The size of the poor population in the cities would have been even higher had it not been for the ability of urban areas to provide basic services to their growing population (O'Hare and Rivas, 2007).

Natural population increases along with immigration to urban areas exerts pressure on urban infrastructure, housing, sanitation, water supply, transportation network, health care and social welfare. The city of El Alto in Bolivia is struggling to support its rapidly rising population. Due to the growing influx of migrants between 1992 and 2001, the city failed to provide basic services to many (O'Hare and Rivas, 2007). Migrants compete with members of the host community from similar socioeconomic backgrounds for jobs. This can increase the urban unemployment rate (Zhang and Song, 2003). Such competition can lead to conflict between the host community and the migrants. In India, there have been several outbreaks of violence between migrant workers and 'sons of soils'. The latter perceive the migrants to be not only an economic threat, but also a sociocultural one (Mahajan *et al.*, 2008).

## Social drivers

### Social networks

Social networks have a strong influence on the migration decision and the choice of destination. Social networks can be based on familial links or affiliation to particular religious, ethnic, linguistic, or social groups. Social networks offset the disadvantages of migration by extending loans at low interest rates, assisting in logistics, arranging a job in the place of destination, assisting recent migrants to adjust to the new environment and providing support



to the family left behind in the origin community (Zhao, 2003; Nadeem *et al.*, 2009; Banerjee *et al.*, 2011). Social networks contribute to social security, social life and community development. Social networks have a similar influence in Nepal (Thieme, 2003, 2006; Sharma, 2008; Poertner *et al.*, 2011), China (Rozelle *et al.*, 1999; Zhao, 2003; Liang and Ma, 2004), Pakistan (Kreutzmann, 1991, 1993; Nadeem *et al.*, 2009) and Morocco (de Haas, 2005, 2007).

## Education

Education has emerged as an important determinant of migration. In the district of Ladakh in India, Goodall (2004) observed that economic motives alone did not explain migration from Kharnak to Leh because the wage differential between the two places is negligible and in many instances negative. However, in Leh, migrants from Kharnak invested in a long-term goal, the education of their children, who could then secure well-paid jobs. Goodall (2004) found that among the migrant population from Kharnak in Leh over 80% of children were attending, or had completed, basic school education. In the far west of Nepal, Poertner *et al.* (2011) found that one of the factors that influenced the migration decision among government employees was the wish to educate their children in better schools in lowland urban areas. According to the Ministry of Agriculture in Bhutan (2006), lack of education facilities was the most commonly cited reason for leaving rural homes in Bhutan. Andersen (2002) reported that a quarter of all rural–urban migration in Bolivia could be explained by the need for educational services. Gray (2009) reported that human capital had a significant positive impact on international migration from the southern Ecuadorian Andes. Education, particularly at higher levels, also induces young people to outmigrate from their villages in Lesotho (Turner *et al.*, 2001).

## Transport infrastructure

Transport infrastructure (highways, bridges and tunnels) is not a common feature of infrastructure development in the Himalayas and the Andes. Nevertheless, with progress in communication, electrification and transportation networks, marginal mountain communities are being connected to the main market economies of the region (Kreutzmann, 1993; Sarmiento, 2000; Blyth *et al.*, 2002; Massey *et al.*, 2007). Ediger and Huafang (2006) noted that, along with the relaxation of government controls on population movement in China, improvements in infrastructure and economic connectivity had increased the convenience of seasonal migration. Conversely, Rozelle *et al.* (1999) found that the ease of transportation is an insignificant determinant of migration in China. A well-developed transport network increases the opportunity cost of migration as it facilitates local development and lowers the cost of commuting – the other alternatives to migration. In Peru, improvements in the road network through the Rural Roads Programme have facilitated transport services and, as a result, seasonal migration during the off-farm season and school holidays (Bravo, 2002). In the southern Ecuadorian Andes, Gray (2009) reported that residents of the most isolated communities selected more distant destinations, probably because opportunities to visit their origin community are limited, even from nearby destinations. The creation of supportive infrastructure, particularly roads and communication facilities, could facilitate outmigration as well as in-migration (see Bhandari, 2004; Massey *et al.*, 2007).

## Political drivers

### Policies

Some policies explicitly or implicitly seek to control migration. In China, controls on internal migration have been gradually relaxed since the late 1970s, but many implicit restrictions on rural–urban migration still exist (Wang and Zuo, 1999; Du *et al.*, 2004; Guang and Zheng, 2005). The *hukou* or household registration status seeks to limit internal migration flows. Access to certain jobs, the pension and medical care are reserved for ‘recognised’ local

residents. Even the children of migrants without *hukou* are not allowed to enrol in local public schools. However, the reform of the *hukou* system has made it much easier to obtain a local *hukou* in small towns or cities, although in large cities the reform process has been slower (Liang and Ma, 2004). In India, the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) of the Government of India guarantees 100 days of wage employment in a financial year to every rural household whose adult members are willing to do unskilled manual work (Ministry of Rural Development, 2008). One objective of the Act is to limit the outmigration of unskilled labour from rural to urban areas by providing income opportunities in origin communities. The programme has had a mixed outcome in the context of migration. In some areas, it has helped to slow down migration from rural to urban areas (see [http://www.undp.org/poverty/projects\\_india.shtml](http://www.undp.org/poverty/projects_india.shtml)). Jain (2010) found that the programme has reduced the need for seasonal migration and, in Uttarakhand, to some extent mainly among unskilled or less educated members of the community.

Other policies seek to facilitate migration. The Indo-Nepal Treaty of Friendship of 1950 created an open border between the two countries, allowing visa-free and passport-free entry and access to employment without a work permit. Any citizen of either country can migrate to the other country and stay for as long as desired (Subedi, 1991; Adhikari *et al.*, 2008). For areas such as the far west of Nepal, the cities of the northern Indian plains are geographically closer than Kathmandu and the cities of central Nepal (Skeldon, 2011). For the poor, even the acquisition of official migration documents such as a passport, is often an insurmountable hurdle (Hoermann and Kollmair, 2008). The open border between Nepal and India permits the use of any national identification document (electoral identity card or driving licence) for entry. The Temporary and Circular Labour Migration (TCLM) programme between Colombia and Spain is another innovative migration model. The programme was originated to respond to the gap in labour supply in the agricultural sector in the region of Catalonia in Spain. The Unión de Pagesos (UP), the main agricultural trade union in Catalonia, selected beneficiaries in Colombia and took care of the logistics for seasonal migrant workers. The programme targeted various vulnerable groups in Colombia, including those affected by environmental disasters (see Engelman, 2009; Magri, 2009; de Moor, 2010; IRIN, 2010).

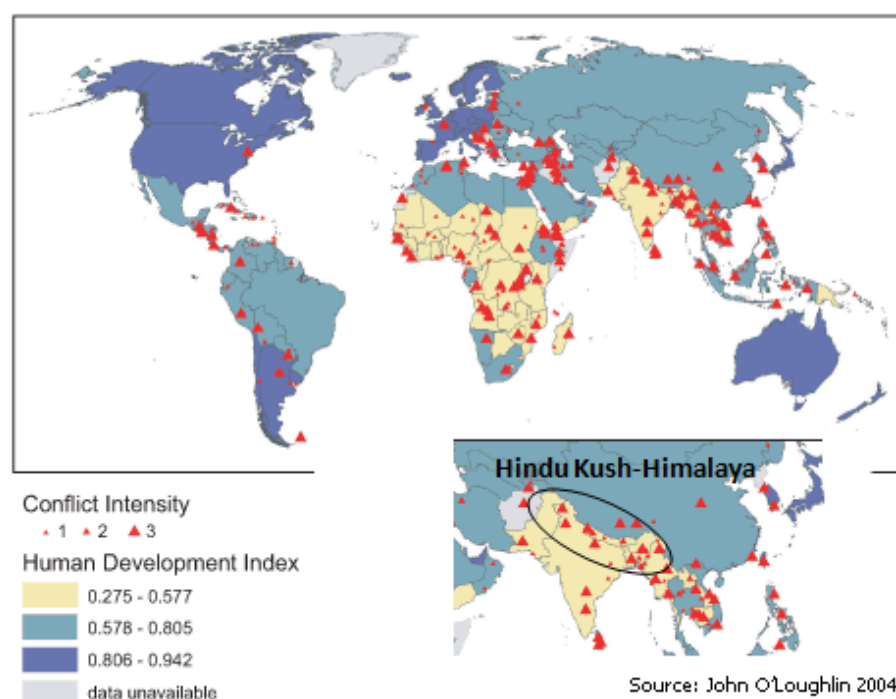
Some policies that are not migration specific can still influence migration behaviour. The reorganisation of Ethiopia into autonomous regional states along ethnic lines in the 1990s restricted the traditional rural–rural flow of labour migrants within the country from the north to south. People are less inclined to migrate to regions administered by ethnic groups other than their own. At the same time, this administrative reorganisation has boosted the development of regional capitals and surrounding towns. These urban centres provide the surrounding populations with some employment opportunities and have become the main destinations for migrant workers. The pattern of migration since the change of government in 1991 has shifted from inter-regional to intra-regional. Rural–urban migration also increased rapidly during this period (Ezra, 2001a,b; Morrissey, 2008).

### Political instability and conflict

Mountainous regions frequently witness conflict in various forms (Figure 3), including conflict between countries, insurgencies, political instability and violence against people belonging to certain social groups (Fearon and Laitin, 2003; Starr, 2006). Past and ongoing conflicts continue to uproot people across the world, including in mountainous regions. Conflicts also hinder the return of refugees and internally displaced persons (IDPs) (see Blyth *et al.*, 2002; Rouvinski and Vasquez-Sanchez, 2005; Mahajan *et al.*, 2008; UNHCR, 2010). Examples include Tibetan refugees in India and Nepal (see Subedi, 1991; Baral, 2003); the migration of ethnic Nepalese from Bhutan to Nepal via India (see Baral, 2003; Mazumdar, 2005); Afghan refugees in Iran and Pakistan (see Kronenfeld, 2008; UNHCR, 2010); the Chin refugees from

Myanmar fleeing to India (Mahajan *et al.*, 2008); and IDP populations in Pakistan (see IDMC, 2010), Peru (see Stepputat and Sorensen, 2001) and Colombia (see Rouvinski and Vasquez-Sanchez, 2005; Calado and Medrano, 2006; Silva, 2006; IDMC, 2010).

**Figure 3: Areas of conflict intensity and Human Development Index**



## Personal characteristics of migrants

### Age

Migrants from the mountainous regions are mostly young adults. Bose (2000) reported that most of the outmigrants from the communities studied in Uttarakhand State in India are young men aged 18–35 years. Mariscal *et al.* (2011) found that migrants in the Northern Potosi region of Bolivia are mainly young men and women. Similar observations about the age of migrants have been made in Bhutan (Ministry of Agriculture, 2006), China (Li, 1996; Rozelle *et al.*, 1999) and Ethiopia (Ezra, 2001b). Massey *et al.* (2007) reported that migration within the Chitwan valley in Nepal is highly selective with respect to age, but that long-distance mobility is less selective with respect to age. Gray (2009) found that the effects of age are significant for local mobility and international migration in the southern Ecuadorian Andes, but not for internal migration.

### Gender

Labour migrants from mountainous regions are predominantly male. Conservative social norms, the traditional division of labour between genders, and lack of education and exposure of women, especially in the Himalayan regions of India, Nepal and Pakistan, explain the low volume of female labour migration in this area (Hoermann *et al.*, 2010). Although, men still dominate the migration flows in China, the gap between male and female participation in the

migrant labour force is narrowing. The proportion of women in long-distance migration has increased sharply in many provinces including the mountain provinces of Sichuan and Yunnan (Rozelle *et al.*, 1999). Gray (2009) found that in the southern Ecuadorian Andes, compared with men, women are more likely to be local movers, equally likely to be internal migrants, but less likely to be international migrants. His findings are consistent with previous studies in Ecuador (Laurian and Bilsborrow, 2000; Jokisch and Pribilsky, 2002). In Peru, there is growing recognition of the fact that economic activity by young women brings social status, although to a lesser extent than for their male counterparts (Bravo, 2002). In Ethiopia, Ezra (2001b) observed that mostly men migrate for economic reasons, but non-economic migration, mainly marital migration, is predominantly female. Marital migration in many parts of the Himalayas is the most common form of female migration (Mahajan *et al.*, 2008).

## Education

Most of the migrants from mountainous regions have some form of education. A study in the Himalayan region reported that around 90% of the surveyed migrants had some form of school education, and most of these educated migrants had completed either primary (36%) or secondary (37%) levels of education (Banerjee *et al.*, 2011). In China, migrants are relatively well educated. By 1995, 64% of migrants nationwide had at least a middle school education. The education levels of male and female migrants are roughly equivalent, but male migrants are a little more likely than women to have either a high school or elementary school education (Li, 1996; Rozelle *et al.*, 1999). In Nepal, Massey *et al.* (2007) found that each additional year of schooling raised the odds of long-distance migration by a highly significant 5%.

## Socioeconomic status

Migration has a cost and requires certain resources (financial and social) to meet or mitigate these costs. Therefore, migration may not be feasible for all households. Some households may not choose migration if other comparatively more feasible options are available to them. In China, Du *et al.* (2004) found that the likelihood of migration increased with low endowment levels. In the Chitral region of Pakistan, households that have financial resources but do not have strong ties with the origin community are more likely to migrate. Those who have limited resources are more willing to migrate, but are constrained by lack of financial resources (Nadeem *et al.*, 2009). Jain (2010) found that people from socially dominant castes in Uttarakhand State in India are more likely to migrate than those from weaker sections of the society. The socially dominant castes have better access to education, financial means and social networks. In Nepal, Bhandari (2004) reported that, even at the lower level of relative deprivation, individuals with relatively better socioeconomic conditions are more likely to move. In the southern Ecuadorian Andes, land-poor households are most likely to migrate, whereas international migration is most likely from land-rich households (Gray, 2009). Based on household survey data from a sample of the highland cantons of Ethiopia, Ezra (2001b) found that the likelihood of migration for economic reasons is lower among households considered wealthy than among poorer households; in contrast, the likelihood of migration for non-economic reasons is higher among wealthier households. For instance, daughters in wealthy households are traditionally married earlier than their counterparts in poor households.

## Marital status

The marital status of migrants varies depending on the gender and the motive of migration. For example, three-quarters of migrant workers in China are unmarried (Li, 1996). However, in some parts of the Hindu Kush–Himalayas, because of social customs, marital migration is most

common among women. Marriage is the main reason for female migration in China (see Davin, 2005), India (see Mahajan *et al.*, 2008), Nepal (see Subedi, 1991; Datta, 2002), Ethiopia (see Ezra, 2001b) and Lesotho (see Turner *et al.*, 2001). In the southern Ecuadorian Andes, Gray (2009) found that the likelihood of international migration is higher among married individuals, often because of family reunification.

## Migration outcomes in the mountainous regions

Migration outcomes are mediated by the perceived influence of environmental and non-environmental drivers of migration, the household asset base (e.g. natural, social, physical, financial and human), and intervening factors (e.g. transport, communications, institutional policies and social discourse). These can induce various types of migration such as internal migration, transhumance, international migration, displacement and refugee flows. Although, mountain-specific disaggregated data on migration outcomes are scarce, global and national patterns could provide a fair idea of the situation. This section discusses evidence from mountain countries or countries with significant mountainous regions from across the developing world – Asia (Afghanistan, Bhutan, China, India, Myanmar, Nepal and Pakistan), Africa (Ethiopia and Morocco) and South America (Bolivia, Chile, Colombia and Ecuador) – to illustrate migration outcomes.

### MI: Mobility that poses technical or managerial challenges

The overwhelming majority of migrants remain within their country of origin. Using a conservative definition, UNDP (2009) estimates that there are approximately 740 million internal migrants; this is almost four times the number of international migrants.

The form of mobility that poses technical and managerial challenges is the flow of internal migrant workers from less developed remote mountain communities to comparatively more developed urban areas within mountainous regions and plains. Surplus rural labour is likely to migrate to towns and cities temporarily in search of employment. These migrant workers can be broadly divided into two groups: low-skilled and highly skilled migrant workers. Each will follow a separate migration trajectory.

Low-skilled migrants are mainly employed in the informal sector of the destination economy. In China, the proportion of interprovincial floating migrants increased from 28% in 1990 to 54% in 2000 (Liang and Ma, 2004). The low income and higher living costs in destination communities do not allow many of these migrants to relocate their immediate families to the destination. As a result, this type of migration is predominantly seasonal or temporary in nature. In cases of family reunification, low-skilled migrants and their families often live in substandard housing, mainly in slums, with poor access to basic services such as clean water, sanitation, health care, education and public distribution systems. This has been documented in previous studies in India (see Mukherji, 2001; Mahadevia, 2002; Deshingkar and Anderson, 2004) and China (see Liang and Ma, 2004).

On the other hand, highly skilled migrants, although fewer in number, belong to socioeconomically better-off sections of society than their low-skilled counterparts. These highly skilled migrants are employed in the formal economic sector in destination communities. Highly skilled migrants have better access to basic amenities (e.g. water, sanitation, health

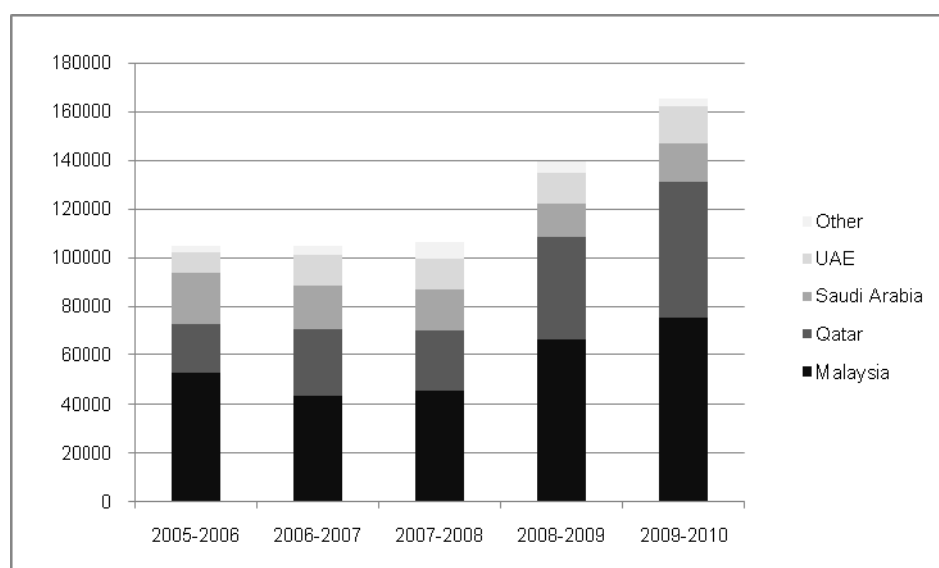


care, education) and can afford good-quality housing and a finer lifestyle. They often become part of the growing middle class in urban centres. Their better income level also allows them to relocate their immediate family (i.e. wife and children) to the destination. This progressively weakens their familial linkages with the place of origin and most likely results in permanent outmigration from the origin community.

Internal migration creates certain challenges for the host community, including greater pressure on urban infrastructure, housing, sanitation, water supply, the transportation network, health care and social welfare. For example, the city of El Alto in Bolivia is struggling to support its rapidly increasing population. As a result of the growing influx of migrants between 1992 and 2001, the city failed to provide basic services to an extra 132,000 people (O'Hare and Rivas, 2007). Migrant workers may compete with members of the host community from similar socioeconomic backgrounds for jobs, most likely low-income jobs in secondary and tertiary sectors. This may increase the urban unemployment rate (see Zhang and Song, 2003) and lead to conflict between the host community and the migrants. Migrants of different ethnicity or linguistic background than the host community may become victims of wider conflict. In the State of Assam in India, Hindi-speaking migrants from the states of Bihar and Uttar Pradesh in India are perceived as representatives of mainstream 'Indian' society, and are repeatedly targeted by insurgents (Mahajan *et al.*, 2008).

## **M2: Mobility that poses political challenges**

Over the past 50 years, the share of international migrants of the world's population has remained stable at around 3%, or around 200 million people. Among the international migrants, just over a third moved from a developing to a developed country. Most of the international migrants moved either from one developing country to another or between developed countries (UNDP, 2009). One significant form of international migration is international labour migration of low skilled workers as well as of highly skilled professionals. There are several examples of well-established international low skilled labour migration streams in the mountainous regions: contractual labour migration to the Middle East (e.g. Qatar and Saudi Arabia), Southeast Asia (e.g. Malaysia and Singapore) and East Asia (e.g. South Korea). From 2009 to 2010, over 160,000 Nepalese migrant workers received work permits for Malaysia, Qatar, Saudi Arabia and the United Arab Emirates from the Department of Foreign Employment of the Government of Nepal (Figure 4). The migration corridor between Nepal and India is significant because of the open border. Adhikari *et al.* (2006) estimated that approximately 1.5 million Nepalese are working in India. Over the last six decades, Morocco has experienced large-scale migration of mostly unskilled migrants to France, the Netherlands, Belgium, Germany, Spain and Italy. Over 3 million people of Moroccan descent lived abroad in 2004 (de Haas, 2007). In Latin America, Colombia–USA, Colombia–Republica Bolivariana de Venezuela and Ecuador–Spain feature among the top 10 migration corridors identified by the World Bank (2011).

**Figure 4: Flow of Nepalese migrants holding work permits to major destinations**

Source: Department of Foreign Employment, Government of Nepal ([www.dofegov.np](http://www.dofegov.np))

Highly skilled migration is mainly oriented to traditional Organisation for Economic Co-operation and Development (OECD) member countries such as Australia, Canada, the UK and the USA (see Ratha and Xu, 2008). The legal opportunities for migrant labour in these countries focuses on skills that are in short supply in the destination country.

In destination countries, irrespective of whether in the developed or developing regions, immigrant workers are perceived as competition for economic opportunities and social welfare. The influx of immigrants is believed to exert increased pressure on infrastructure, housing, transportation, health care and social welfare. In addition, immigrants have often been, justifiably or unjustifiably, linked to criminal and terrorist activities. The immigration issue is significant in the political discourse of many destination countries. If immigrants and members of the host community belong to different ethnic, linguistic, or religious backgrounds, immigrants may be perceived to be a threat to the local socioeconomic fabric. This can result in a violent backlash against immigrants.

## **DI: Displacement that poses technical challenges**

The displacement of people within their country of origin can occur for several reasons: a natural disaster, conflict, or land acquisition. Between 1997 and 2009, the number of people internally displaced by conflict, generalised violence, or human rights violence steadily increased from around 17 million to over 27 million (IDMC, 2010). Displacement is a 'reactive' response wherein households are mainly driven by external shocks or stresses to seek shelter, either within their own community or elsewhere. The displacement may be either temporary or permanent.

Between 2008 and 2009, the global IDP population increased by over a million. Most of this increase is accounted for by South and Southeast Asia and the Americas and is mainly the result of the rise in the IDP populations in Pakistan and Colombia. During the last decade, internal armed conflict was the main cause of internal displacement. In Pakistan, some 3 million people were displaced during the offensive against the Taliban and other armed groups by the Pakistan Army in the Northwest Frontier Province (NWFP) and the Federally



Administered Tribal Areas (FATA). In many countries, long-term conflicts have continued to displace people. In Afghanistan, the conflict between the government and the Taliban continues to displace civilians. In Myanmar, the armed force's policy to separate the insurgents from their support bases has continued to displace civilians. The ongoing government offensive against the Revolutionary Armed Forces of Colombia (FARC) and the emergence of new armed groups after the demobilisation of paramilitary groups have escalated the level of violence in Colombia, which has continued to displace people (IDMC, 2010).

**Table 3: Country-wise figures for internally displaced persons and refugees from some mountain countries**

Mountain region	Country	IDPs (at end of 2009)	Source (year)	Refugees originating from the country (2009)	Source (year)
Hindu Kush–Himalayas	Afghanistan	297,129	UNHCR (2010)	1,905,804	UNHCR (2010)
	Bhutan	–	–	86,773	
	Myanmar	At least 470,000	IDMC (2010)	206,650	
	Nepal	50,000–70,000	IDMC (2010)	5,108	
	Pakistan	1,230,000	IDMC (2010)	35,132	
Andes	Bolivia	–	–	573	
	Colombia	3,300,000–4,900,000	IDMC (2010)	104,338	
	Ecuador	–	–	1,027	
	Peru	150,000	IDMC (2010)	6,271	
	Venezuela	–	–	6,221	
Atlas	Algeria	Undetermined	IDMC (2010)	8,184	
	Morocco	–	–	2,285	
	Tunisia	–	–	2,259	

Mountain region	Country	IDPs (at end of 2009)	Source (year)	Refugees originating from the country (2009)	Source (year)
Highlands	Ethiopia	300,000–350,000	IDMC (2010)	62,873	

*Note: (a) Disaggregated data on IDPs and refugees are not available for mountainous regions; (–) means data not available; (b) IDMC data do include people internally displaced by natural or human-made disasters, or by development projects; (c) UNHCR data do not include the Palestinian refugees under the UNRWA mandate*

Most of the people displaced in 2009 were able to return after a few weeks or months of displacement. For instance, over two-thirds of the people displaced in Pakistan in 2009 were able to return to their place of origin; however, 1.2 million people are still displaced. Most of the IDPs at the end of 2009 were already displaced in 2008. For example, Colombia had one of the largest internally displaced populations in the world at the end of 2009. In many countries, IDPs are involved in situations of protracted displacement. The lingering impacts of conflict or violence prevent IDPs from returning to their places of origin or rebuilding their lives, even after the fighting has stopped.

There is no global database on migratory movement as a result of natural disasters. There are some estimates that have been derived from displacement data relating to particular crises (IOM, 2009). According to one global estimate, 20 million people were displaced by sudden-onset extreme hazards events during 2008, compared with 4.6 million internally displaced by conflict and violence (UNOCHA; IDMC, 2009). As this study includes only displacement as a result of sudden-onset disasters, the results can be considered a minimum estimate of displacement as a result of climate related events and processes. According to the same study, China (1st), India (2nd), Myanmar (6th), Nepal (11th), Pakistan (16th), Chile (18th) and Ethiopia (19th) featured among the 20 countries with the highest levels of disaster-related displacement in 2008 (UNOCHA; IDMC, 2009). A rapid assessment by IOM in 11 districts of the Khyber–Pakhtunkhwa province of Pakistan affected by the 2010 floods found that over 257,000 households had lost their homes or been temporarily displaced (IOM, 2010b). Banerjee *et al.* (2011) reported permanent and temporary displacement from flood-affected or flash-flood-affected communities in the Koshi basin of east Nepal, the eastern Brahmaputra basin in the State of Assam in India and the Chitral district in Pakistan. There is an urgent need to consider displacement by sudden-onset hazards in the context of other possible environmental stressors such as slow onset extreme hazard events. Gradual changes in the environment are likely to have a comparatively greater impact on migration in the future (Leighton, 2010).

The situation of most IDPs, and particularly that of long-term IDPs, is precarious. They are confronted with risk to their security, have difficulty in accessing humanitarian assistance and basic services, suffer disruption of their livelihood and social network, live in dismal housing conditions and face challenges in returning and rehabilitation. The process of finding a durable solution for the IDPs living in protracted displacement has been stalled. In many countries, returns are not voluntary and IDPs are encouraged or forced to return before it is safe or

sustainable to do so. Internally displaced women, children, elderly and minorities are the most vulnerable because displacement increases their exposure to violence, discrimination and exploitation. Displaced children have poor access to education. Some national governments barely recognise the situation of displacees and are less willing to let other national or international actors engage with IDPs (IDMC, 2010)

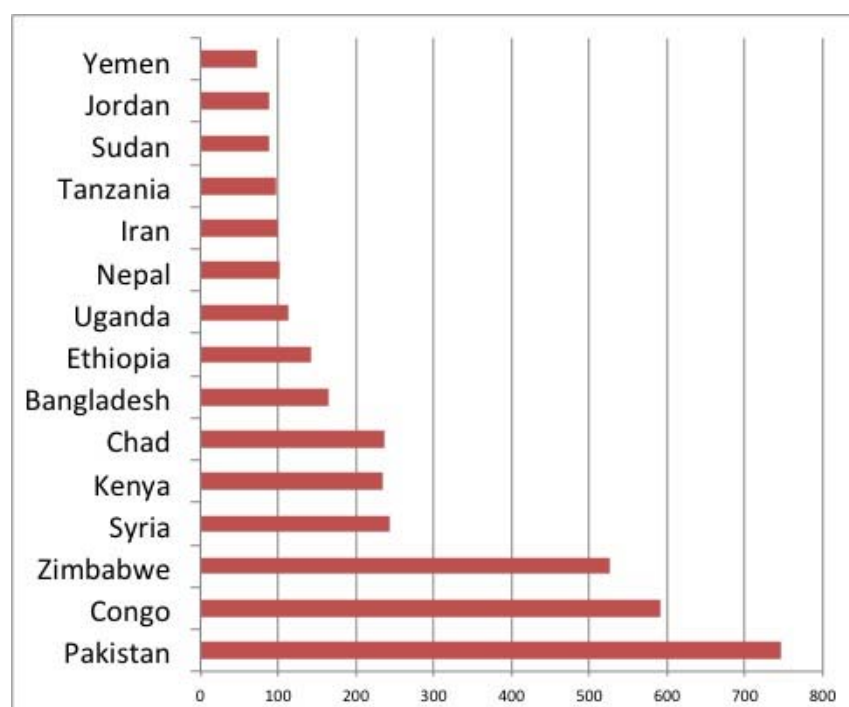
## **D2: Displacement that poses political challenges**

By the end of 2009, UNHCR was responsible for 10.4 million refugees (not including Palestine refugees under the UNRWA mandate), including some 1.6 million people in refugee-like situations. Most refugees flee to neighbouring countries. UNHCR (2010) estimates that around 8.7 million refugees remain within their region of origin. Developing countries host 80% of the global refugee population (UNHCR, 2010). In Asia and the Pacific regions, the number of refugees under UNHCR's mandate has increased. There was a marginal increase in the refugee population in the Americas, mainly because 26,200 Colombians were granted refugee status by Ecuador, and numbers decreased in the Middle East and North Africa. Globally, the number of refugees has remained stable with a marginal decrease of less than 1% compared with 2008. Voluntary repatriation and local integration are the major reason for this decline.

For the past three decades, Afghanistan has been the leading country of origin for refugees. At the end of 2009, almost 2.9 million Afghans were still refugees. Almost 96% of Afghan refugees are based in Pakistan and the Islamic Republic of Iran. Other countries in mountainous regions that are major countries of origin for refugees are Myanmar (206,650) and Colombia (104,338) (UNHCR, 2010). Even though the refugee population in Pakistan decreased by 40,000 people from the previous year because of voluntary repatriation, registration and resettlement, Pakistan was the country with the largest number of refugees, around 1.7 million. Most of the refugees in Pakistan originate from neighbouring Afghanistan (UNHCR, 2010).

The likelihood of absorbing and supporting refugee populations is higher in countries with strong economies. UNHCR (2010) estimated that at the end of 2009 Pakistan hosted 745 refugees per 1 USD per capita – the highest number of refugees compared with its national economy. Nepal and Ethiopia also supported a high refugee population compared with their national economies (see Figure 5).

**Figure 5: The burden of refugees for receiving countries: The 15 countries with the highest number of refugees per 1 USD GDP (PPP) per capita in 2009**



Source: UNHCR 2010: 23

Most refugees end up in a neighbouring country where they are confronted with several challenges. The primary among these is to become recognised as a refugee by the host country or the UNHCR. Recognition is the first step towards being eligible for protection, accessing humanitarian assistance and, in return, local integration or repatriation. Other challenges faced by refugees include risk to personal security, difficulty in accessing humanitarian assistance and basic services, suffering disruption of livelihood and social network, dismal housing conditions and challenges in return and rehabilitation. Refugee women, children, the elderly and minorities are the most vulnerable, being exposed to violence, discrimination and exploitation. Unaccompanied and separated minors have special protection needs (see UNHCR, 2010). The country of first arrival may be unwilling to host the refugees because of political, social, economic or security concerns. The refugees, particularly if they belong to a different ethnic, linguistic or religious background, may be perceived by the host community as a threat to local resources or the way of life. Animosity between the local community and the refugees may be fuelled if humanitarian assistance programmes for the refugees do not include the local community, many members of which may be in a similar socioeconomic situation to the refugees.

## Inter-relationship between environmental and non-environmental drivers

### Outmigration

Environmental and socioeconomic changes are an integral part of mountain life. The impacts of environmental stressors are superimposed on socioeconomic conditions, and the outcomes

are almost always caused by a combination of environmental and non-environmental factors. Environmental stressors exacerbate existing household vulnerabilities. Mountain livelihoods have traditionally depended on a multitude of strategies, using available ecosystem services, which typically encompass non-*situ* activities such as trade and migration. Many of these strategies are undergoing rapid change in the context of changing environmental and socioeconomic conditions. Migration is a typical response strategy of people affected by environmental stressors. Migration can have several forms: displacement, labour migration, household migration or community resettlement. Migration behaviour is influenced by the scale of damage, the adaptive capacity of affected households and communities, the issue of safety and security, availability of material assistance and the disruption to livelihood (see Hugo, 1996; ODI; UNDP, 2005). Recent research indicates that migration will be one of the outcomes of the intensification of environmental stressors linked to climate change (see McLeman and Smit, 2006; Brown, 2007; Kniveton *et al.*, 2008; IOM, 2010a).

Migration outcomes are not linear in nature. Factors such as the type of environmental stressor and the actual or anticipated direct impacts of the environmental stressor (such as loss of life, damage to dwellings and infrastructure, and loss of livestock) can induce displacement in combination with non-environmental factors (such as the generic development condition, demographic scenario, disaster preparedness and response mechanisms), leading to the temporary or permanent displacement of affected households. The impact of the 2005 earthquake in Pakistan, including displacement of the population, was a combined outcome of the severity of the earthquake and a set of non-environmental factors such as the generic development conditions in the region, lack of earthquake resistant buildings, inappropriateness of soil conditions for housing, population density and incompetent disaster response by various national and international actors, which was exacerbated by the difficult terrain conditions in the area (see OCHA, 2005; Özerdem, 2006).

The majority of households in mountainous regions are primarily dependent on agriculture or livestock for their livelihood. The dependency of these activities on ecosystem services makes them hazard prone. However, a disruption of the primary means of livelihood may not be a sufficient motivation to migrate to work. The influence of non-environmental factors such as lack of alternative livelihood opportunities, a growing working-age population, awareness of economic opportunities in the urban centres in and outside mountainous regions, accessibility and affordability of transportation, the influence of social networks and the competency of institutions in disaster response, together with the impacts of environmental stressors, influence the migration decision (Gray, 2009; Banerjee *et al.*, 2011).

In Nepal, Massey *et al.* (2007) found that environmental stressors are just one factor in a set of factors that influence long-distance migration. The impact of the environment on the migration decision is seen in the context of more important social and economic drivers of migration. Shrestha and Bhandari (2007) assessed the effect of environmental insecurity, measured in terms of access to forest resources, on household migration decisions for work in rural Nepal. The results showed that increases in environmental insecurity increased the likelihood of labour migration, regardless of destination. Morrissey (2008) found that in the highlands of Ethiopia lack of sufficiently productive land is the most common determinant of rural–urban migration. Droughts, the biggest environmental concern in Ethiopia, triggered migration in some cases. Permanent migration is a strategy for managing drought. But ascribing sole agency to environmental factors ignores the significance of social factors in mediating the migration behaviour of individuals. Some household members migrated to urban areas in the hope of finding work that would allow them to support an independent household at the destination and earn enough money to procure equipment such as irrigation pumps to mitigate the impact of increasingly variable rainfall patterns at their place of origin. Ezra (2001b)

reported that the pattern, direction and volume of rural outmigration from drought-prone areas in the northern regions of Ethiopia is largely the result of political instability, steady agricultural decline and government policies designed in response to drought and famine. In the southern Ecuadorian Andes, environmental factors are the most important in local and internal migration, but negative environmental conditions do not necessarily increase migration (Gray, 2009). In the Northern Potosi region on the high plateau of Bolivia, the new land tenure and production systems and the creation of mining enclaves in an ecologically fragile area already affected by the desertification process have led to the degradation of forests, water pollution and an acceleration of erosion processes. The impact of these processes progressively reduced the amount of land available for farming, causing impoverishment among the indigenous population, providing the catalyst for contemporary migration. The El Niño event in 1983 caused a drought without precedence in climate history that lasted until 1985. This exacerbated the process of impoverishment, which increased the outmigration rate. Since then, subsequent events such as the mining crisis, neoliberal policies and the impacts of climate change (e.g. increased temperature, frost and hailstorms, and changes in rainfall pattern) have consolidated migratory flows from the region (Mariscal *et al.*, 2011).

## Inmigration

Favourable environmental conditions along with the development of transport and communication infrastructure in some parts of mountainous regions have created employment opportunities (e.g. in tourism, transport and construction) not just for the local populations, but also attracting migrant workers from within mountain regions and from the neighbouring lowlands. Nepal (2007) reported that traditional communities in the Annapurna region of Nepal are progressively adapting to a cash-based market economy. The Annapurna region has seen reverse migration from the lowlands to the highlands as people found lucrative business and employment opportunities in tourism. In the Northern Potosi region of Bolivia, Mariscal *et al.* (2011) found that, because of the increase in temperature, maize was being grown at an altitude of 3,900 m and potatoes above 4,000 m. However, there is still a certain amount of uncertainty in agricultural activities because of changes in rainfall and frost patterns. Some climate models have predicted that some parts of the Ethiopian highlands may benefit in aggregate from future climate change, particularly from a lengthened growing season (Black *et al.*, 2008). Such changes would have implications for migration to and from the highlands, but this is so far unexplored. Favourable weather conditions could also induce amenity migration to mountainous regions. Nam and Sato (2010) reported that development of tourism and amenity migration in Sapa town of Lao Cai province in Vietnam has induced the growth of new economic, institutional and physical infrastructure capacity in the host region, lowered outmigration rates and increased property values and job opportunities.

## Conclusions

The drivers of migration in mountainous areas of the world are manifold and closely interlinked and, therefore, not easy to isolate. Mountain environments are characterised by an extraordinary diversity of environments and economic, demographic, social and political situations. Mountain livelihoods still depend to a great extent on the use of natural resources and ecosystem services provide an important basis for local livelihood options. Any changes in these services directly affect mountain livelihoods. Slow- and rapid-onset environmental changes and socioeconomic transformation are an integral part of mountain life. The impacts of environmental stressors are superimposed on the local socioeconomic setting and generally exacerbate existing household vulnerabilities. Under such circumstances, household



responses are a combined outcome of several environmental factors (e.g. the severity and frequency of environmental stressor) and non-environmental factors (e.g. generic development conditions, the demographic situation, household- and community-level adaptive capacity and the role played by institutions).

Migration is a typical diversification strategy for mountain livelihoods to reduce vulnerability to environmental and non-environmental risks. Notably, migration is only one of the livelihood strategies used to respond to such risks and is regularly combined with other strategies. Each migration decision is influenced by drivers of migration (environmental, economic, demographic, social and political), intervening obstacles and the migrants themselves, to varying extents. In particular, the influence of environmental stressors on migration behaviour are often mediated through other drivers of migration. Such migration can take several forms such as displacement, labour migration, household migration or community resettlement.

In addition to challenges, recent environmental changes induced by climate change have also had positive effects on mountain communities providing certain opportunities. Upwards-moving vegetation and cropping belts allow the cultivation of additional species and multiple cropping. The attractiveness of mountains as 'cooler' places with favourable climates for recreation and work is gaining importance. The resulting economic activities are creating income opportunities for mountain people and may even attract migrant workers from the neighbouring lowlands. A larger-scale reverse migration compared with today is imaginable.

Not all of the effects of migration are negative; there could be positive effects for both sending and receiving societies. There is growing evidence that suggests that mobility, in conjunction with income diversification, is an important strategy for reducing vulnerability to environmental and non-environmental risks – including economic shocks and social marginalisation (see McLeman and Smit, 2006; Morrissey, 2008; Tacoli, 2009; Banerjee *et al.*, 2011). In many cases, mobility not only increases resilience but also enables individuals and households to accumulate assets (Morrissey, 2008; Tacoli, 2009; Banerjee *et al.*, 2011). However, certain resources are necessary for migration, which may decline as the result of the impacts of various stressors. In many cases, the poor and vulnerable will be unable to move (Tacoli, 2009; Banerjee *et al.*, 2011).

Unfortunately, there is a dearth of reliable data on various aspects of existing migration flows and their drivers in the mountains of the developing world. Moreover, the available data are mainly based on national administrative boundaries, which do not necessarily correlate with the boundaries of ecosystems such as mountains. It is methodologically challenging to single out the importance of any one driver of migration, as they are inextricably linked. This makes it difficult to predict future trends, particularly in the context of environmental stressors. Studies on the influence of environmental drivers on migration behaviour that focus on the mountainous regions in the developing world are few. The interrelationship between environmental and non-environmental drivers of migration has rarely been explored quantitatively.

The complexity of the relationship between climate change, environmental stressors and migration; the intricacies involved in any consequent migration; and the future changes in demographic, economic, social and political scenarios, makes the prediction of the impacts of climate change on migration, especially in the long term, extremely difficult. Yet, the influence of past and current climatic variability on migration behaviour is a useful way of understanding the future impacts of climate-change-intensified water hazards on the same. It is likely that the current trend of high mobility, linked to income diversification, will continue and intensify. Short distance and temporary movement will probably increase. Any adaptation initiative has to emphasise the growing need for the diversification of income sources, and the spatially



unequal distribution of economic opportunities (Tacoli, 2009; Banerjee *et al.*, 2011). But one thing is clear, in all likelihood, migration resulting from environmental change will continue to increase in the future (Zetter, 2009; IOM, 2010a).

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