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Authors: Gioli, Giovanna, Khan, Talimand, Bisht, Suman, and Scheffran, Jürgen

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# Migration as an Adaptation Strategy and its Gendered Implications

## A Case Study From the Upper Indus Basin

Giovanna Gioli<sup>1\*</sup>, Talimand Khan<sup>2</sup>, Suman Bisht<sup>3</sup>, and Jürgen Scheffran<sup>1</sup>

\* Corresponding author: giovanna.gioli@zmaw.de

<sup>1</sup> Research Group Climate Change and Security (CLISEC), Institute of Geography, KlimaCampus, University of Hamburg, Grindberg 5, 20144 Hamburg, Germany

<sup>2</sup> Sustainable Development Policy Institute (SDPI), 38 Embassy Road, G-6/3 Islamabad, Pakistan

<sup>3</sup> International Centre for Integrated Mountain Development (ICIMOD), GPO Box 3226, Kathmandu, Nepal

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Natural resource-dependent isolated mountain communities are highly vulnerable to climatic and environmental stresses, and migration is often the most important livelihood diversification strategy for insuring a

household against shocks. In this paper, we present some key results from a study conducted in the West Karakoram region of Pakistan to assess the influence of environmental shocks on migration and the effect of remittances on the adaptive capacity of recipient households and on gender relations. Primary data were collected at community and household level through in-depth interviews, focus group discussions, and quantitative questionnaires covering 210 households in 6 villages of the West Karakoram. Our

findings suggest that migration is adopted as a core response to environmental pressure, both as an ex ante form of household risk mitigation against decreased and uncertain agricultural production, and as an ex post coping mechanism in the wake of environmental shocks. Gender structures migration; only men participate in circular labor migration to urban areas, while women are left behind to take care of the agricultural work and the household. Despite women's increased role in farming activities, no significant changes were noted in the decision-making power of women as a result of male outmigration. Gender positive transformative processes are more likely to be intergenerational and driven by increased access to education for girls.

**Keywords:** Gender; migration; adaptation; Indus; Karakoram; Pakistan.

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## Introduction

Mobility in the context of climatic and environmental change can be the outcome of the immediate stress resulting from a natural disaster (distress migration/displacement), but it can also be labor migration as an income-diversification strategy undertaken in anticipation of or in response to environmental shocks, as well as to cope with a long-term decline in livelihood (Boano et al 2007; Kniveton et al 2008; Beardsley and Hugo 2010; Banerjee et al 2012; Warner, van der Geest, et al 2012). From this perspective, labor migration can be seen as an integral part of communities' adaptive capacity, "an active set of strategies and actions taken in reaction to or in anticipation of climate change [including climate variability and extremes] by people in order to enhance or maintain their well-being" (Goulden et al 2013: 907). This proves true especially in communities whose livelihoods are closely tied to agriculture and to natural resources and hence highly exposed to climate-change impacts and more prone to poverty-related shocks (Warner, Afifi, et al 2012).

There is a general lack of knowledge on migration in mountain communities (Banerjee et al 2013), and for the upper Indus basin, there is especially little information on the interplay between gender and migration and on the environmental dimension of mobility. This article aims to contribute to filling this gap by investigating (1) the environmental dimension of labor migration and its role as a strategy for coping with and adapting to environmental shocks and (2) the gendered impacts of migration and their consequences for communities' adaptive capacity.

## Migration, remittances, and adaptation as gendered processes

Labor migration in the context of climatic and environmental change benefits communities mostly via social and financial remittances. The emerging agenda of tapping "remittances for adaptation" to climatic and environmental change (Foresight 2011; ADB 2012; Banerjee et al 2012; Warner, Afifi, et al 2012) shares

several similarities with the decade-old “migration and development” policy agenda (Ratha 2003) aimed at harnessing remittances for development. Borrowing from Kunz (2008), we define this tendency as the global remittances trend. Within it, references to gender issues are scarce and most studies are gender blind, except for some recent attempts (King et al 2006; Rahman 2013). When it comes to methods and theoretical framework, global remittances trend studies largely understand “gender” as a synonym for “sex.” Accordingly, they mostly limit their goal to asserting whether migrant women and men differ in their remittance behaviors and whether women and men as recipients of remittances differ in how they use them.

The present study understands gender as the socioculturally and politico-economically constructed roles and responsibilities ascribed to men and women, which change over time, are context and history specific, and are inseparable from power relations. It also refers to a domain of characteristics that shape the value, status, and access to resources of women and men within different societies (ICIMOD 2013). Gender is hence understood as both a structure and a process (Pessar and Mahler 2003). As a structure, it is a “lattice-work of institutionalized social relationships that ... organize and signify power at levels above the individual” (Pessar and Mahler 2003: 813). This is reflected in activities, tasks, spaces, time, and dress, as well as in the organization of migration (Nyberg Sørensen 2005; King et al 2006). Contextually, gender is also a process—that is, the way cultures assign meaning to biological differences is not immutable or “natural,” and hence gender identities, relations, and ideologies are fluid, not fixed, and are constantly renegotiated within the social field.

Adaptive capacity and decision-making are hampered by entrenched inequalities. The role of gender in shaping the differentiated and interdependent adaptive options available to men and women has been increasingly acknowledged (Adger et al 2009; Nightingale 2009; Onta and Resurrecion 2011; Verma et al 2011). For instance, in South Asia the ideal of *purdah* (gender segregation), which assigns a “symbolic capital of honor” (Thieme and Siegmann 2010) and respectability to the control over women’s realms of action, has hampered women’s mobility and independence. Only in recent years have India and Nepal witnessed a feminization of international migration, linked to a global demand for domestic workers, reproducing the traditional gendered division of labor (Agarwal 2003). Despite the fact that the surveyed homogenous and cohesive mountain communities of the West Karakoram have a far less strict understanding of *purdah* than most other areas of Pakistan, the scant recognition of women’s work at both individual and policy levels and women’s structural dependence on their

male relatives (for example, because of patriarchal land rights) still hampers women’s access to and control over assets and resources (Fazlur-Rahman 2007; Khattak and Brohi 2008), with significant consequences for both adaptation and development.

## Study area and methods

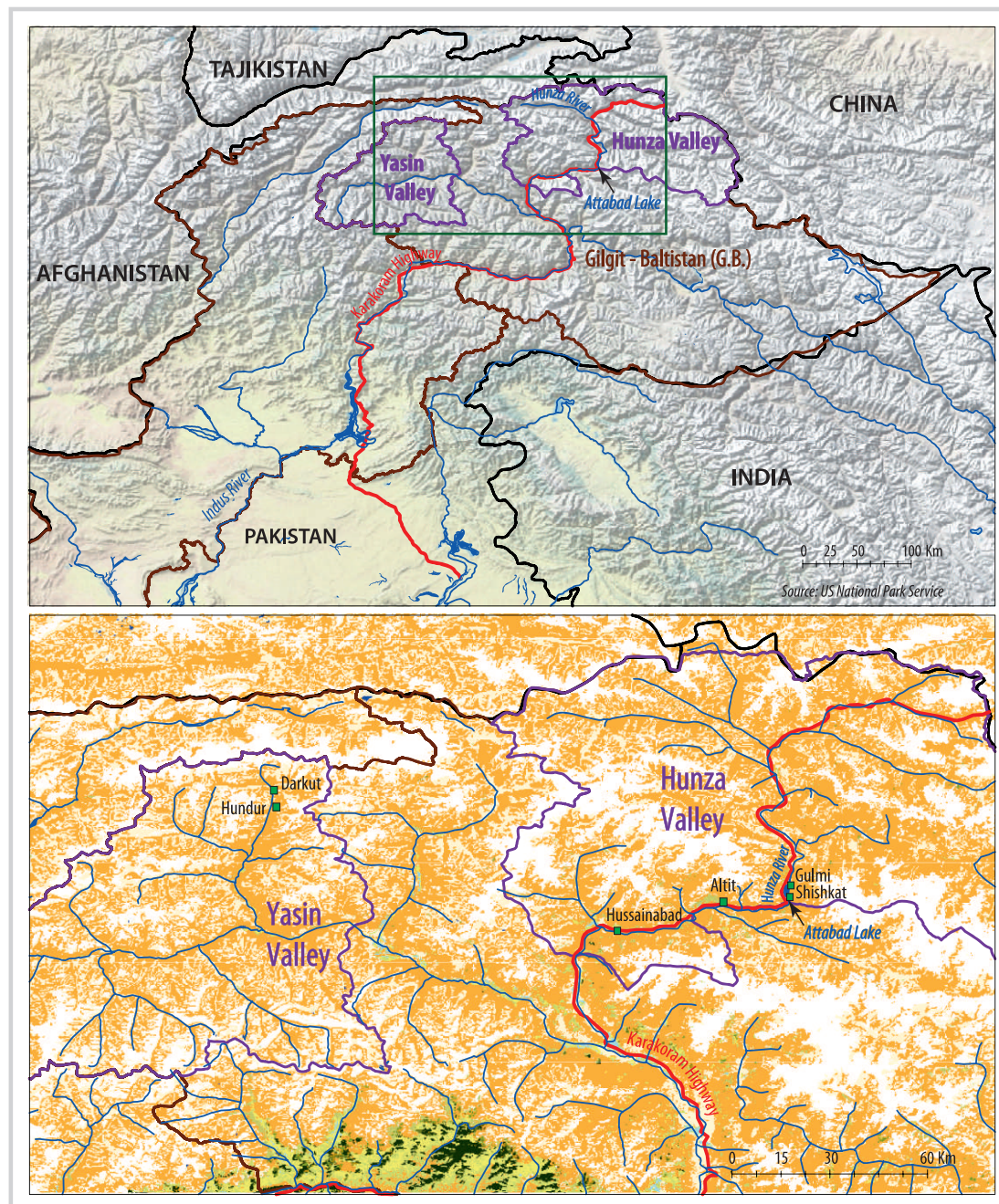
This paper is based on primary data collected in May and June 2012 in the Yasin and Hunza Valleys of Pakistan’s province of Gilgit-Baltistan (Figure 1). Six villages were selected (Table 1) through meetings with key informants; the main criteria for purposive identification were the recent occurrence of environmental shocks and a high incidence of labor migration. Both valleys present a high rate of labor migration, combined with partial reliance on subsistence agriculture. Yasin faced severe floods in 2010, whereas Hunza, less affected by flooding, suffers from recurrent landslides. In particular, in 2010, a massive landslide blocked the Hunza River and created Attabad Lake. The lake submerged houses, agricultural land, and infrastructure, including part of the vital Karakoram Highway (Cook and Butz 2013). We do not claim that these 2 events were a direct result of climate change, but we assume that the impact of climate change will be similar to that of environmental stressors; therefore, these events are a proxy for future impacts of climate change.

The altitude of the selected villages ranges between 1800 and 2760 m. Hunza and Yasin Valleys are characterized by an extreme environment and an arid climate, where agricultural production is made possible by a complex indigenous irrigation system channeling meltwater from glaciers (Kreutzmann 2000, 2011; Stöber 2000). Government-subsidized wheat is the main crop, and since the 1980s, various nongovernmental organizations and in particular the Aga Khan Rural Support Program have introduced cash crops (potatoes and orchards), which have become a major source of income for the local people.

The vast majority of households own small pieces of land transmitted from generation to generation along patriarchal lines, whereas most of the grazing areas are communal and assigned to different villages according to customary laws. Growing population and environmental shocks have led to a significant reduction of the available land per capita. Local communities are increasingly shifting from an agropastoral economy to a “combined subsistence-labor system” (Herbers 1998; Kreutzmann 2006) aimed at integrating highly risk-prone mountain agriculture with external income-generating opportunities, such as labor migration, trade, and tourism. (Tourism is, however, jeopardized by the rise of sectarian violence in the region.) Increased education rates have also increased the share of people employed in government jobs and in the nonprofit sector (Kreutzmann 1993, 2006; Malik and Piracha 2006).



**FIGURE 1** Study area and villages surveyed. (Maps by ICIMOD and Leonard Borchert)



Women are severely underrepresented in nonfarm jobs: in Hunza, only 7.5% of the total female workforce engages in nonfarm employment, compared to 66% for men (Malik and Piracha 2006).

Yasin lags behind Hunza in terms of economic development, yet the 2 regions have faced similar challenges and used similar strategies, following the same model of development (implemented by the Aga Khan Rural Support Program). These similarities are reflected in our sample; thus, the data are disaggregated

only when the divergence between the valleys is significant.

#### Data collection

Both quantitative and qualitative methods for data collection were employed (Table 1). The quantitative sample comprised 210 households. A 30-page structured questionnaire was administered in face-to-face interviews to gather information about (1) local perceptions of changes in climate patterns and natural shocks, (2) the

**TABLE 1** Surveyed villages and methods.

	Latitude	Longitude	No. of questionnaires	No. of focus group discussions	No. of interviews
<b>Yasin Valley (Ghizer District)</b>					
<b>Hundur</b>	36°36'45"N	73°27'18"E	40	2	8 (6 male, 2 female)
<b>Darkut</b>	36°38'39"N	73°26'28"E	29		2 (male)
<b>Lower-central Hunza Valley</b>					
<b>Hussainabad</b>	36°14'55"N	74°23'39"E	46	2	7 (6 female, 1 male)
<b>Altit</b>	36°19'5"N	74°40'57"E	24		2 (2 female, 5 male)
<b>Upper Hunza Valley</b>					
<b>Gulmit</b>	36°23'17"N	74°51'56"E	35		7 (3 female, 4 male)
<b>Shishkat</b>	36°21'15"N	74°51'59"E	36	2	5 (1 female, 4 male)

impacts of climate change and variability on households' productivity and livelihood security and on their main adaptation strategies, and (3) the role of migration in the context of environmental change and its gendered impacts. This paper focuses mainly on point 3. We reported elsewhere findings related to points 1 and 2 (Gioli et al 2013).

The sample was stratified by gender in order to reach a gender-balanced representation. From 24 to 46 households were randomly selected in each village by random walks, representing about 12% of the estimated number of households per village. The sampled households were smallholders with an average farm size of 5500 and 6500 m<sup>2</sup> in Yasin and Hunza respectively, a household size (extended-family system) of about 9 people, and a dependency ratio of 0.4 (Table 2).

As for the qualitative methods, we conducted 31 interviews with key informants and stakeholders from the communities, and 6 gender-disaggregated focus group discussions with 8 to 10 people each in 3 different villages, to countercheck and complement the information collected in the quantitative questionnaires. As key informants included more men than women, we slightly overrepresented women in the quantitative sample (57%).

### Data analysis

Data obtained from the questionnaires were analyzed using descriptive statistics, and content analysis was applied to the results of the focus group discussions. The results of the data analysis are discussed in the framework of the Sustainable Livelihood Approach, which defines livelihood diversification as "the process by which (rural) households construct an increasingly diverse portfolio of activities and assets in order to survive and to improve their standard of living" (Ellis 2000: 14) and holds that livelihood diversification can have a positive impact on households' ability to cope with climatic and

environmental change (Kollmair and Gamper 2002; Tacoli 2009).

## Gendering migration and remittances in the context of environmental shocks

### Migration characteristics

Spatial diversification, involving the temporary migration of household members, is a prominent livelihood strategy adopted by 76% of the surveyed households. The migrants are men (99%) in their 20s (in Yasin) or 30s (Hunza), with a considerably higher educational status in Hunza (Table 3).

The study found a positive correlation between level of income and the probability of having a migrant in the household. The households were classified into 4 quartiles (economic status rising progressively from the first to the fourth quartile) and 80% of the nonmigrants belong to the first 2 economic quartiles. This correlation is even stronger in the Yasin Valley, where the average income per capita found by our survey was less than that in Hunza. As indicated by many studies (World Bank 2006; Tacoli 2009; Banerjee et al 2013), it is not the poorest or the most deprived who migrate, but those who have enough financial and social capital to do so. Migration occurs predominantly at provincial (50%) and national scales (97%), from rural to urban areas. Migration is predominantly seasonal and circular, towards trade hubs in the region (such as Sost, Gilgit, and Chitral) or to major cities within the country (especially to Karachi). These findings are consistent with recent literature on mobility in the context of climatic and environmental change, contending that migration occurs often at national and regional scales (Massey et al 2007; Tacoli 2009; Adamo and Izazola 2010; Banerjee et al 2011, 2013; Gemenne 2011; McLeman 2012), is predominantly short in distance



**TABLE 2** Characteristics of the study area (Yasin and Hunza Valleys). Study area profile. When not specified, data refer to both Yasin and Hunza Valleys.

Study area	Yasin Valley	Hunza Valley
<b>Survey overview</b>		
Total population (inhabitants)	45,000 Yasin <sup>a)</sup>	65,000 Hunza <sup>a)</sup>
Altitude (m)	1800–2700	
Households in survey	69	141
Average household size	9	9
Dependency ratio	0.4	0.4
Religion	Islam (Ismaili sect of Shia Islam)	
Major natural shock	Flood (2010)	Landslide (2010)
Households that own land (%)	85	95
Irrigated land (%)	100	98
Average household income per capita (US\$)	160	340
Average property size	5500 m <sup>2</sup>	6500 m <sup>2</sup>
<b>Gender-age-literacy</b>		
Average age (respondent)	47	50
Female respondents (%)	56	58
Female illiteracy (respondent) (%)	80	43
Male illiteracy (respondent) (%)	55	31
<b>Migration</b>		
Migrant sending households (%)	75	77
Sex of the migrant	99% male	
Age of the migrant (first migration)	20 (SD: 5)	27 (SD: 7)
Age of the migrant (present)	25 in Yasin (SD: 8)	33 in Hunza (SD: 10)
Migrant destination	97% intranational; 50% intraprovincial; 2.6% international	

<sup>a)</sup>Population Census Organisation 2000 (The last census in Pakistan was conducted in 1998).

(Massey et al 2007; Tacoli 2009; Gill 2010), and is often temporary or circular in nature (Gill 2010; Banerjee et al 2012).

### Remittances and livelihoods

Remittances are predominantly financial (86%) and are usually sent monthly (51%) or quarterly (26%). Nonfinancial remittances in the form of skills acquired have also positively impacted sending communities: 69% of the migrants in Hunza and 46% in Yasin said they had the opportunity to use their new skills and knowledge once they returned. Both Hunza and Yasin rely almost entirely (94%) on fuelwood to meet their energy needs for heating and cooking, and widespread deforestation (Schickhoff 2006) over the last 2 decades has forced

people to buy fuelwood on the market. In both valleys, fuelwood tops the list of remittance uses, followed by food and health-related expenditures. Villagers in Yasin said that 3 months of energy expenditures are equivalent to 9 months of the combined other expenditures for the household. Women are responsible for cooking, and the highly inefficient cookstoves used in the area have dire consequences for the health of women and children, who are more exposed to indoor pollution.

In the surveyed areas, there is significant awareness of the crucial role of education for economic growth and development (thanks to the work of the Aga Khan Rural Support Program in the region). During both men's and women's focus group discussions, education was recognized as the main factor enhancing women's

**TABLE 3** Educational status of migrant workers from Yasin and Hunza.

	Yasin Valley	Hunza Valley
<b>Illiterate (%)</b>	8	10
<b>Primary school (%)</b>	21	7
<b>Middle school (%)</b>	12	14
<b>Matriculated secondary school (%)</b>	37	23
<b>Intermediate (%)</b>	12	10
<b>Graduation (%)</b>	6	29
<b>Master (%)</b>	4	17

decision-making power within the household and, to a more limited extent, in the community. Local people said that migration has helped improve education rates for both genders. Our quantitative data show that remittances in the last 10 years have also led to a 5% increase in school enrollment for both genders in Yasin (from 65 to 70% for girls and 76 to 81% for boys) and a 12% increase in Hunza (78 to 90% for girls and 81 to 93% for boys). This trend matches recent data on female school enrollment reported for the whole of Pakistan and for the province of Gilgit-Baltistan (Table 4). Gilgit-Baltistan fares slightly better than the national average at almost every level of education. In particular, at the level of higher secondary education, the gender gap is reversed. The surveyed communities, especially Hunza, fare particularly well within the province, and the increase in highly educated women in the region presents a challenge to the patriarchal structure, as well as the main in situ opportunity for gender positive transformation.

The concurrent spatial and temporal diversification of livelihoods reproduces the gendered division of labor characteristic of the agropastoral economy. Women continue to be involved in the care economy (household chores and care for children and the sick and elderly) and in subsistence agriculture (agriculture and animal husbandry, production and processing for the extended

household). The nonfarm economy is largely male dominated and expanding. Male outmigration and land fragmentation have also caused a drastic reduction in pastoral activities. Local women said that the production of wool items (such as coats and hats) has continuously decreased over the last 10 years, because of the decline of pastoral activities and to the ready availability of modern alternatives in the market.

Consolidating what is argued in other studies on the Hindu Kush-Himalaya region (Kaspar 2005; Thieme and Müller-Böcker 2010; Adhikari and Hobley 2011), both our qualitative and quantitative data show no significant long-term changes in the intrahousehold decision-making power of women as a result of male outmigration. Women and men gave comparable and coherent narratives, saying that women have their say over a well-defined and limited set of issues (household expenditures related mainly to food and basic child and elder care) that mirror the prevailing gendered division of labor and duties. Women have some say in the marketing of agricultural products that are traditionally processed and marketed by them (such as apricot oil). They are responsible for the basic management of the homestead's livestock, whereas men are in charge of high-pasture pastoral activities. Decision-making power at the community level is still rarely

**TABLE 4** Percentage of female enrollment and corresponding Gender Parity Index. (Data source: USAID 2011.)

	Preprimary	Primary	Middle	High	Higher secondary
<b>Percentage of female enrollment</b>					
<b>Pakistan</b>	45	44	43	42	39
<b>Gilgit-Baltistan</b>	45	45	42	43	55
<b>Gender parity index</b>					
<b>Pakistan</b>	0.82	0.79	0.75	0.72	0.64
<b>Gilgit-Baltistan</b>	0.82	0.82	0.72	0.75	1.22

enjoyed by women in either valley, and migration has not altered this.

In neither Hunza nor Yasin do women have direct control over the economic capital sent via remittances. If the migrant is the head of the household, in his absence the next oldest male household member is entitled to act as head and is responsible for managing the money. In both areas there is a general understanding, reported also in Nepal (Thieme and Müller-Böker 2010), that the most educated person in the household (still usually a man) should handle the money, as he is the most competent person to do so. In case of nuclear families (hardly represented in our sample), the wives of the migrants managed the money, but the husbands made important decisions on investments, either when they returned from seasonal and circular migration or by phone (women's focus group discussion, Hundur).

Both women and men reported that the traditional division of labor changed after male outmigration, and women have to perform several tasks that were previously assigned to men, including land preparation, seedbed preparation, woodcutting, and threshing. Men are involved in irrigation, ploughing, and harvesting. Women are expected to perform the rest of the agricultural labor—one woman focus group participant in Hussainabad said that “men now do not take part in these activities even when they are not migrating”—and have reported an increased workload. Although no external help is hired, the percentage of children involved in household chores has increased by 15% for boys (48 to 63%) and by 10% for girls (46 to 56%). This is in stark contrast with Nepal, where increased work for mountain women leads them to mobilize only their daughters for both agricultural and reproductive work (Adikhari and Hobley 2011; Onta and Resurrecion 2011). Despite their increased role in farming activities, there is scant acknowledgment of women's work, which was reported as the duty of a housewife by both women and men during the focus group discussions.

Another impact of male outmigration on women is their curtailed mobility and significant reduction in access to health facilities outside the village (as reported by women in all the surveyed communities). Because of *purdah* and other limitations (like inability to drive a car or unfamiliarity with the urban environment), women cannot travel long distances to access healthcare services if not accompanied by a male relative. Traditional societal and intrahousehold hierarchies also tend to assign more power and respect to older women, and young wives of migrant workers seem to enjoy the fewest benefits, as they are more vulnerable and dependent on the in-laws.

In both valleys, about 70% of the female respondents and over 85% of the male respondents said they were happy with the decision to migrate, because of the household's enhanced food security, better access to basic amenities, and ability to save for their children's

education. The lower degree of satisfaction recorded from women may correlate with the increased workload and lack of mobility due to the absence of the male workforce.

## Labor migration and environmental shocks

Adaptive measures can be categorized as *ex post* or *ex ante*, according to the degree of planning involved: measures can be taken after experiencing change or can proactively anticipate future problems (Smit et al 1999). In our sample, labor migration has been undertaken exclusively in the last 3 decades (no reports of migration before 1985). Migration peaked in 2010, and 34% of all the migrants first migrated during the period 2010–2012 (Figure 2).

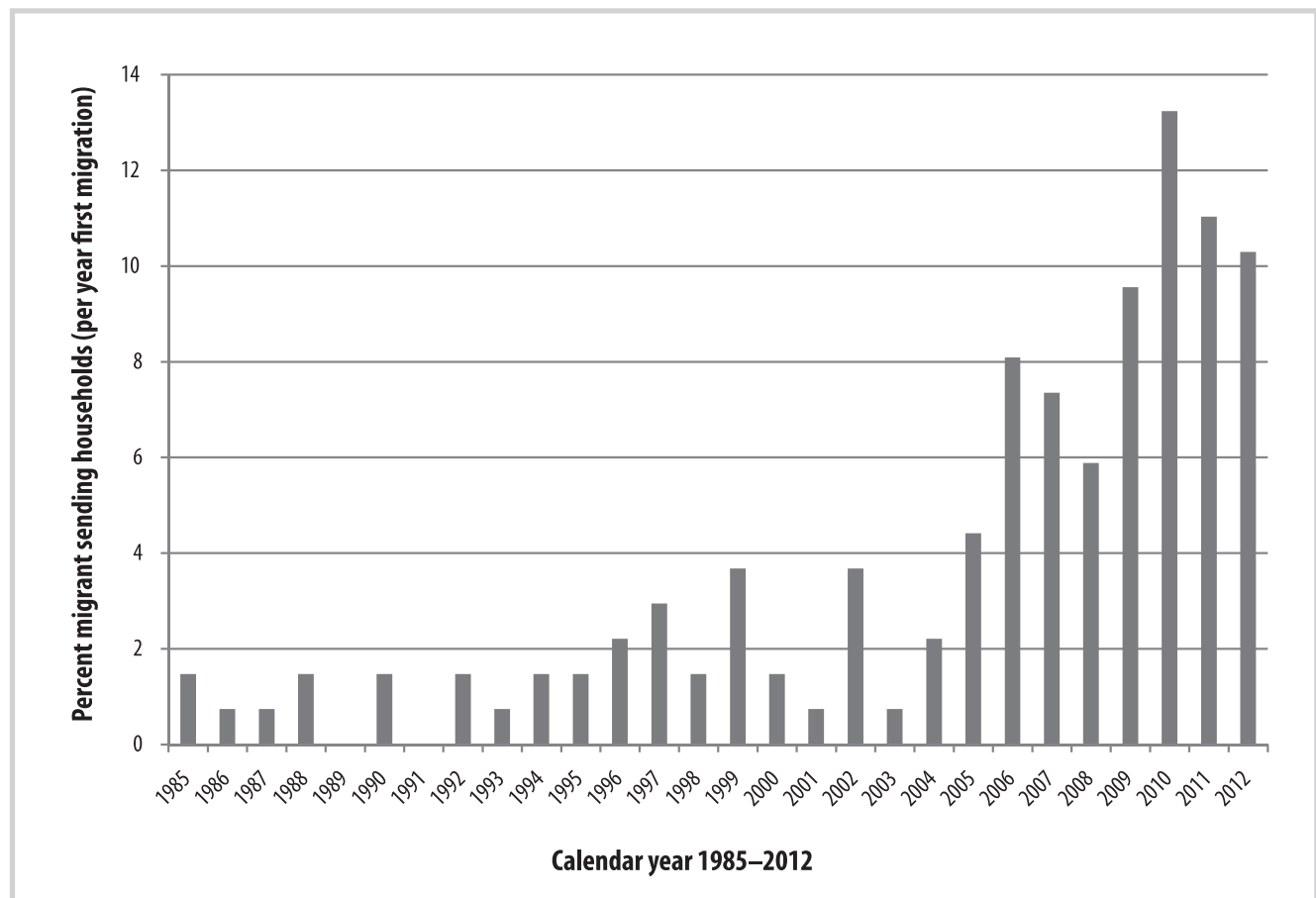
About 65% of those who migrated before the 2010 flood and Attabad disaster belong to the third or fourth economic quartile of the present income distribution, so that they are better off than average; they earn about 50% more than those who migrated after 2010. (Incomes were much more homogenously distributed among these 2 groups 10 years ago.) Nonmigrant households (24% of the sample) earn on average 60% less than migrant households, and a large majority of them belong to the first 2 quartiles of the income distribution.

In order to test the role of migration as a strategy for coping with and adapting to environmental shocks, we considered a subsample (about 17% of the surveyed households) made up of those who lost all or most of their land (<15% of the land and less than 1500 m<sup>2</sup> remaining) as a result of the 2010 floods and landslide. The average income of the subsample is about half of the mean value for the whole sample. Within this group, only 64% are migrant households (compared to 76% of the total sample). Among these, 39% migrated after 2010 to cope with the losses and the disruption of their livelihoods (compared to 34% of the total sample). Also, 10 years ago the average income of the subsample was lower than that of the rest of the sample. These are poor and extremely vulnerable households.

The analysis of the survey data pertaining to this subsample generated 3 distinct household profiles in relation to the use of migration in response to the 2010 environmental shocks (Figure 3).

- The first group, consisting of nonmigrant households, makes up 36% of the subsample. Immobility is due mostly to the lack of financial resources, employable skills, and human capital and to family obligations and illnesses. The income of households that lost their land and were not able to migrate was found to be about 60% less than that of those who lost land but were able to resort to labor migration (the second and third groups below). Interestingly, 10 years ago the incomes were homogenously distributed in the subsample. This

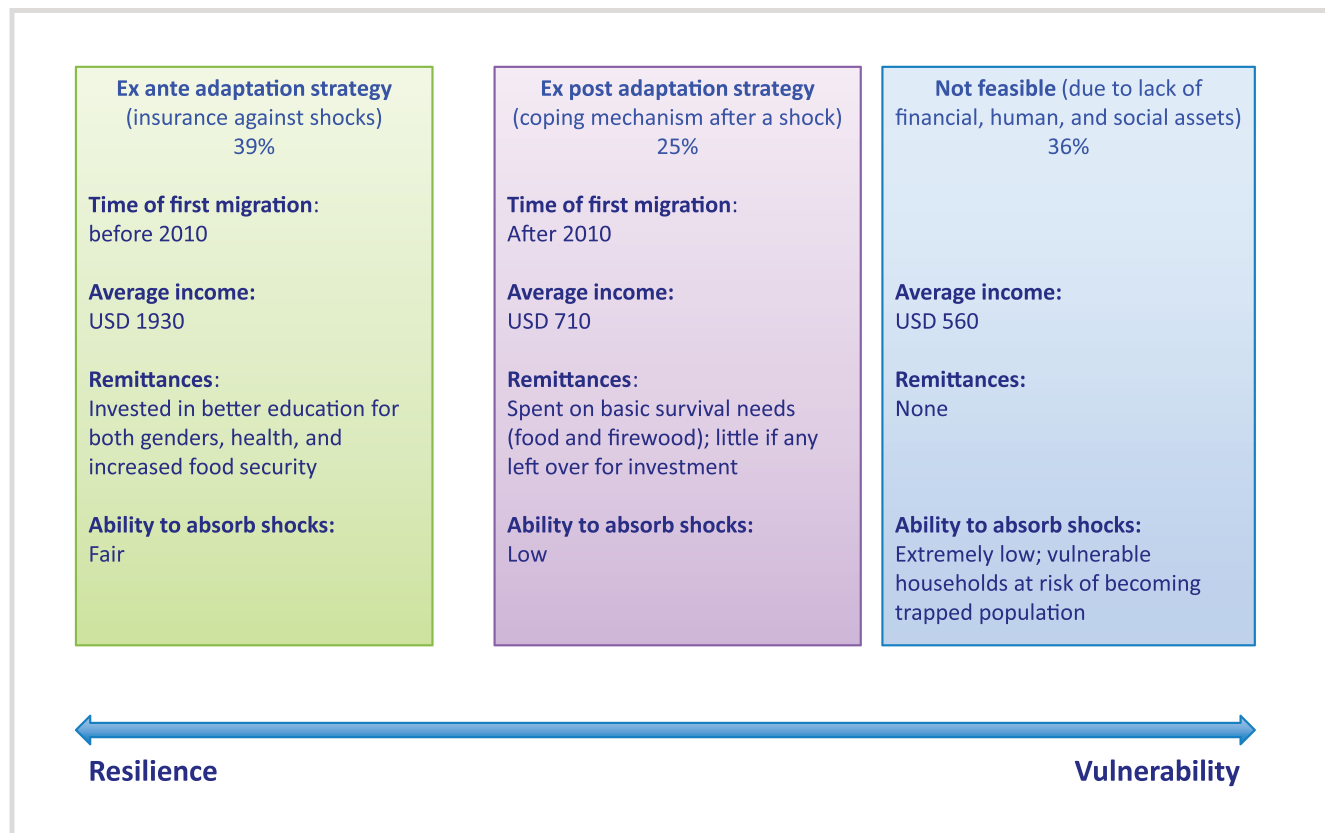


**FIGURE 2** Percentage of migrant-sending households stratified according to the year of first migration.

suggests that the inability to migrate and differentiate the livelihoods portfolio initiates a vicious circle of poverty that puts this group at increased risk of being unable to respond to shocks and being trapped during and after extreme events (Black et al 2013). One of the reasons for not resorting to migration among this group is the lack of men of working age in the family, suggesting that gender plays a role in determining the vulnerability of these households.

- The second group (25% of the subsample) consists of households that undertook migration during or after 2010. This group earned 30% more than those who did not migrate. Our data suggest that these households resorted mostly to low-wage labor in nearby towns, sold assets (mainly livestock), and cut down on food, health, and education expenditures to cope with the losses and the disruption of their livelihoods and to meet the initial costs of migration. This has gendered consequences, as families forced to cut back on education withdraw girls from school—“there is now only enough money to educate only one gender” (men’s focus group discussion, Shiskat). In this scenario, migration may help
- alleviating alleviate the immediate pressure and help the household to cope; yet this might result into in an “erosive coping” (Warner, van der Geest, et al 2012) detrimental in the longer run, as people are depleting their asset base, which threatens their future livelihood sustainability and ability to absorb future shocks and risks. In this scenario, women who previously engaged in agriculture are now deprived of their work, and aid dependency was mentioned in the focus group discussions in Hunza, along with the politicization of aid and resources, which often leads to deteriorating community cohesion.
- The third group (39% of the subsample) consists of households whose first migration took place before 2010 (mostly in the 2000s); this group makes up 61% of all migrants. This group has a much higher average income, almost 3 and 4 times as large as that of the second and first groups, respectively. Although 10 years ago the households in this group (just as the entire subsample) were much poorer than the average of the whole sample, now their income is more similar to the average of the whole sample: their economic status has improved despite the heavy toll of the 2010 events.

**FIGURE 3** Migration in households deprived of all or most arable land after the 2010 environmental shocks. (Following Warner, Afifi, et al 2012)



This matches the qualitative data, suggesting that in these households remittances have been invested in better health and education for children of both genders and in other household assets, with positive implications for medium- and long-term resilience (eg improved seeds and fertilizers). In contrast, the households of the 2 other groups are among the poorest in the whole sample, and so face persistent and increased vulnerability.

## Conclusions

In the last decades, Yasin and Hunza have experienced rapid socioeconomic and environmental change, and they are increasingly diversifying their livelihoods and resorting to rural-to-urban migration, occurring mostly at the provincial and national scales. Migration has been successful in enhancing households' ability to absorb shocks only when it has been undertaken proactively (ex ante) as one of a wider spectrum of choices that are usually available to households with a more solid asset base. Migration as an ex post strategy is mostly undertaken by poorer households to cope with losses and damages in the wake of environmental shocks. This might prove

detrimental in the medium or longer term, as it erodes important assets and decreases the household's overall resilience. Our study confirmed that nonmigrant households are more likely to be caught in the poverty trap.

Migration interacts with gender in at least 3 important ways. First, it is not yet a viable option for women. Gender structures the migratory process, and migration indirectly helps reinforce a gendered division of labor, confining women's work to the household and the farm (considered an extension of the household), and devaluing it. Women's contributions as farmers and caregivers need to be recognized, regulated, and protected as part of the formal economy. Women are key managers of natural resources, and enhancing their agricultural techniques and technologies means not only alleviating their drudgery but also improving the adaptive capacity of the entire household. Climate-change-related projects, as well as disaster-preparedness trainings, should specifically target women as crucial agents of climate adaptation and community resilience.

Second, migration has triggered gender-transformative processes. Thanks also to remittances, female school enrollment is rising in both valleys, and this will soon translate into the presence of more skilled women in the labor market. Occupational opportunities (not limited to the agricultural sector) within the local economy and

facilitation of safe mobility might soon become a priority for avoiding the waste of precious human capital.

Third, women are usually not entitled to handle remittances. As education becomes a crucial factor in entitling household members to engage in financial

management, it is paramount to bridge the gender gap and invest in women's financial literacy, to enhance their bargaining and decision-making power. Transformative processes in this area are more likely to be intergenerational rather than immediately migration driven.

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## REFERENCES

- Adamo SB, Izazola H.** 2010. Human migration and the environment. *Population and Environment* 32:105–108.
- ADB [Asian Development Bank].** 2012. *Addressing Climate Change and Migration in Asia and the Pacific*. Mandaluyong City, Philippines: Asian Development Bank.
- Adger WN, Dessai S, Gulden M, Hulme M, Lorenzoni I, Nelson DR, Naess LO, Wolf J, Wreford A.** 2009. Are there social limits to adaptation to climate change? *Climate Change* 93:335–354.
- Adhikari J, Hobley M.** 2011. *Everyone Is Leaving—Who Will Sow Our Fields? The Effects of Migration from Khotang District to the Gulf and Malaysia*. Kathmandu, Nepal: Swiss Agency for Development and Cooperation (SDC).
- Agarwal B.** 2003. Gender and land rights revisited: Exploring new perspective via the state, family, and market. In: Razavi S, editor. *Agrarian Change, Gender and Land Rights*. London, United Kingdom: Blackwell, pp 184–224.
- Banerjee S, Black R, Kniveton D.** 2012. *Migration as an Effective Mode of Adaptation to Climate Change*. Report submitted to the European Commission. Brussels, Belgium: European Commission.
- Banerjee S, Gerlitz YS, Hoermann B.** 2011. *Labour Migration as a Response to Water Hazards in the Hindu-Kush-Himalayas*. Kathmandu, Nepal: International Centre for Integrated Mountain Development.
- Banerjee S, Gerlitz YS, Kniveton D.** 2013. A methodology for assessing patterns of labour migration in mountain communities exposed to water hazards In: Faist T, Schade J, editors. *Disentangling Migration and Climate Change*. Dordrecht, Netherlands: Springer, pp 81–100.
- Beardsley DK, Hugo GJ.** 2010. Migration and climate change: Examining thresholds of change to guide effective adaptation decision-making. *Population and Environment* 32(2–3):238–262.
- Black R, Arnell N, Adger W, Thomas D, Geddes A.** 2013. Migration, immobility and displacement outcomes of extreme events in nature and society. *Environmental Science and Policy* 27(1):532–543.
- Boano C, Zetter R, Morris T.** 2007. *Environmentally Displaced People: Understanding the Linkages Between Environmental Change, Livelihood and Forced Migration*. Oxford, United Kingdom: Refugee Studies Centre.
- Cook N, Butz D.** 2013. The Atta Abad landslide and everyday mobility in Gojal, Northern Pakistan. *Mountain Research and Development* 33(4):372–380.
- Ellis F.** 2000. *Rural Livelihoods and Diversity in Developing Countries*. Oxford, United Kingdom: Oxford University Press.
- Fazlur-Rahman.** 2007. The role of Aga Khan Rural Support Programme in rural development in the Karakorum, Hindu Kush & Himalayan region: Examples from the northern mountainous belt of Pakistan. *Journal of Mountain Science* 4(4): 331–343.
- Foresight.** 2011. *Migration and Global Environmental Change: Final Project Report*. London, United Kingdom: Government Office for Science.
- Gemenne F.** 2011. Why the numbers don't add up: A review of estimates and predictions of people displaced by environmental changes. *Global Environmental Change* 21(1):41–49.
- Gill N.** 2010. Environmental refugees: Key debates and the contribution of geographers. *Geography Compass* 4(7):861–871.
- Gioli G, Khan T, Scheffran J.** 2013. Climatic and environmental change in the Karakoram: Making sense of community perceptions and adaptation strategies. *Regional Environmental Change*. <http://dx.doi.org/10.1007/s10113-013-0550-3>.
- Goulden MC, Adger WN, Allison EH, Conway D.** 2013. Limits to resilience from livelihood diversification and social capital in lake social–ecological systems. *Annals of the Association of American Geographers* 103(4): 906–924.
- Herbers H.** 1998. Work and nutrition in High Asia. Theoretic framework, methods and main results of a comprehensive study on the production-reproduction-system in Northern Pakistan. *European Bulletin of Himalayan Research* 14:18–30.
- ICIMOD [International Centre for Integrated Mountain Development].** 2013. *Gender Transformative Change in the Hindu Kush Himalayas*. Kathmandu, Nepal: ICIMOD.
- Kaspar H.** 2005. "I Am the Household Head Now!" *Gender Aspects of Out-Migration for Labour in Nepal*. Kathmandu, Nepal: Nepal Institute of Development Studies.
- Khattak SG, Brohi N.** 2008. *Women's Land Rights: Consolidated Research Findings*. Islamabad, Pakistan: Sustainable Development Policy Institute. [www.sdpi.org/research\\_programme/Files/wlr\\_consolidated%20research%20findings\\_final.pdf](http://www.sdpi.org/research_programme/Files/wlr_consolidated%20research%20findings_final.pdf); accessed on 31 August 2012.
- King R, Dalipaj M, Mai N.** 2006. Gendering migration and remittances: Evidence from London and northern Albania. *Population Space and Place* 12(6): 409–434.
- Kniveton D, Schmidt-Verkerk K, Smith C, Black R.** 2008. *Climate Change and Migration: Improving Methodologies to Estimate Flows*. IOM Migration Research Series No. 33. Geneva, Switzerland: International Organization for Migration.
- Kollmair M, Gamper S.** 2002. *The Sustainable Livelihood Approach: Training Input*. Zurich, Switzerland: Development Study Group Zurich.
- Kreutzmann H.** 1993. Socioeconomic transformation in Hunza Northern Areas, Pakistan. *Mountain Research and Development* 13(1):19–93.
- Kreutzmann H, editor.** 2000. *Sharing Water. Irrigation and Water Management in the Hindukush–Karakoram–Himalaya*. Karachi, Pakistan: Oxford University Press.
- Kreutzmann H.** 2006. High mountain agriculture and its transformation in a changing socio-economic environment. In: Kreutzmann H, editor. *Karakoram in Transition. Culture, Development and Ecology in the Hunza Valley*. Oxford, United Kingdom, New York, NY, and Karachi, Pakistan: Oxford University Press, pp 329–358.
- Kreutzmann H.** 2011. Scarcity within opulence: Water management in the Karakorum Mountain revisited. *Journal of Mountain Science* 8: 525–534.
- Kunz R.** 2008. Remittances are beautiful? Gender implications of the new global remittances trend. *Third World Quarterly* 29:1389–1409.
- Malik A, Piracha M.** 2006. Economic transition in Hunza and Nager Valleys. In: Kreutzmann H, editor. *Karakoram in Transition. Culture, Development and Ecology in the Hunza Valley*. Oxford, United Kingdom, New York, NY, and Karachi, Pakistan: Oxford University Press, pp 359–369.
- Massey D, Axinn W, Ghimire D.** 2007. *Environmental Change and Out-Migration: Evidence from Nepal*. Ann Arbor, MI: Population Studies Center, University of Michigan.
- McLeman R.** 2012. Developments in modelling of climate change–related migration. *Climatic Change* 117(3):599–611.
- Nightingale AJ.** 2009. Warming up the climate change debate: A challenge to policy based on adaptation. *Journal of Forest and Livelihood* 8(1): 84–89.

- Nyberg Sørensen N.** 2005. *Migrant Remittances, Development and Gender*. Copenhagen, Denmark: Dansk Institut for Internationale Studier.
- Onta N, Resurreccion BP.** 2011. The role of gender and caste in climate adaptation strategies in Nepal. *Mountain Research and Development* 31(4): 351–356.
- Pessar PR, Mahler SJ.** 2003. Transnational migration: Bringing gender in. *International Migration Review* 37(3):812–846.
- Population Census Organisation.** 2000. District Census Report Islamabad: Statistics Division, Government of Pakistan.
- Rahman MM.** 2013. Gendering migrant remittances: Evidence from the UAE and Bangladesh. *International Migration* 51:156–178.
- Ratha D.** 2003. Workers' remittances: An important and stable source of development finance. In: Bank TW, editor. *Global Development Finance*. Washington, DC: World Bank, pp 157–175.
- Schickhoff U.** 2006. The forests of Hunza Valley: Scarce resources under threat. In: Kreutzmann H, editor. *Karakoram in Transition. Culture, Development and Ecology in the Hunza Valley*. Oxford, United Kingdom, New York, NY, and Karachi, Pakistan: Oxford University Press, pp 123–144.
- Smit B, Burton I, Klein RJT, Street R.** 1999. The science of adaptation: A framework for assessment. *Mitigation & Adaptation Strategy for Global Change* 4:199–213.
- Stöber G.** 2000. Irrigation practice in Yasin, northern areas of Pakistan. In: Kreutzmann H, editor. *Sharing Water, Irrigation and Water Management in the Hindukush–Karakoram–Himalaya*. Oxford, United Kingdom: Oxford University Press, pp 73–89.
- Tacoli C.** 2009. Crisis or adaptation? Migration and climate change in context of high mobility. *Environment and Urbanization* 21(2):1–13.
- Thieme S, Müller-Böker U.** 2010. Social networks and migration: Women's livelihoods between far west Nepal and Delhi. *European Bulletin of Himalayan Research* 35/36:7–122.
- Thieme S, Siegmann KA.** 2010. Coping on women's backs: Social capital–vulnerability links through a gender lens. *Current Sociology* 58(5):715–737.
- USAID [United States Agency for International Development].** 2011. *Pakistan Education Statistics*. Islamabad, Pakistan: Academy of Educational Planning and Management. [www.aepam.edu.pk/Files/EducationStatistics/PakistanEducationStatistics2010-11.pdf](http://www.aepam.edu.pk/Files/EducationStatistics/PakistanEducationStatistics2010-11.pdf); accessed on February 2014.
- Verma R, Nellemann C, Hislop L.** 2011. *Women at the Frontline of Climate Change: Gender Risks and Hopes*. Arendal, Norway: United Nations Environment Programme, GRID-Arendal.
- Warner K, Affi T, Henry K, Rawe T, Smith C, de Sherbinin A.** 2012. *Where the Rain Falls: Climate Change, Food and Livelihood Security, and Migration*. City, Country: CARE/United Nations University Institute for Environment and Human Security. Bonn, Germany: United Nations University and CARE.
- Warner K, van der Geest K, Kreft S, Huq S, Harmeling S, Koen K, de Sherbinin A.** 2012. *Evidence from the Frontlines of Climate Change: Loss and Damage to Communities Despite Coping and Adaptation*. Loss and Damage in Vulnerable Countries Initiative Policy Report No. 9. Bonn, Germany: United Nations University Institute for Environment and Human Security.
- World Bank.** 2006. *Migration and Inequality*. World Development Report 2006 background paper. Washington DC: World Bank.