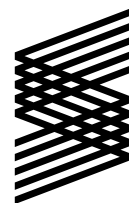# Migration futures in Asia and Africa: economic opportunities and distributional effects – the case of Pakistan

Working paper

PRISE
Pathways to resilience
in semi-arid economies

Research for climate–resilient futures

Migration futures in Asia and Africa: economic opportunities and distributional effects – the case of Pakistan

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Kashif Majeed Salik

Ayesha Qaisrani

Muhammad Awais Umar

Syed Mohsin Ali

Acknowledgements

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Acronyms

D.G. Khan	Dera Ghazi Khan
FGDs	Focus Group Discussions
KP	Khyber Pakhtunkhwa
MoE	Margin of Error
P&D	Planning and Development
PCA	Principal Component Analysis
PKR	Pakistani Rupee
PRISE	Pathways to Resilience in Semi-arid Economies
UC	Union Council
USD	United States Dollar
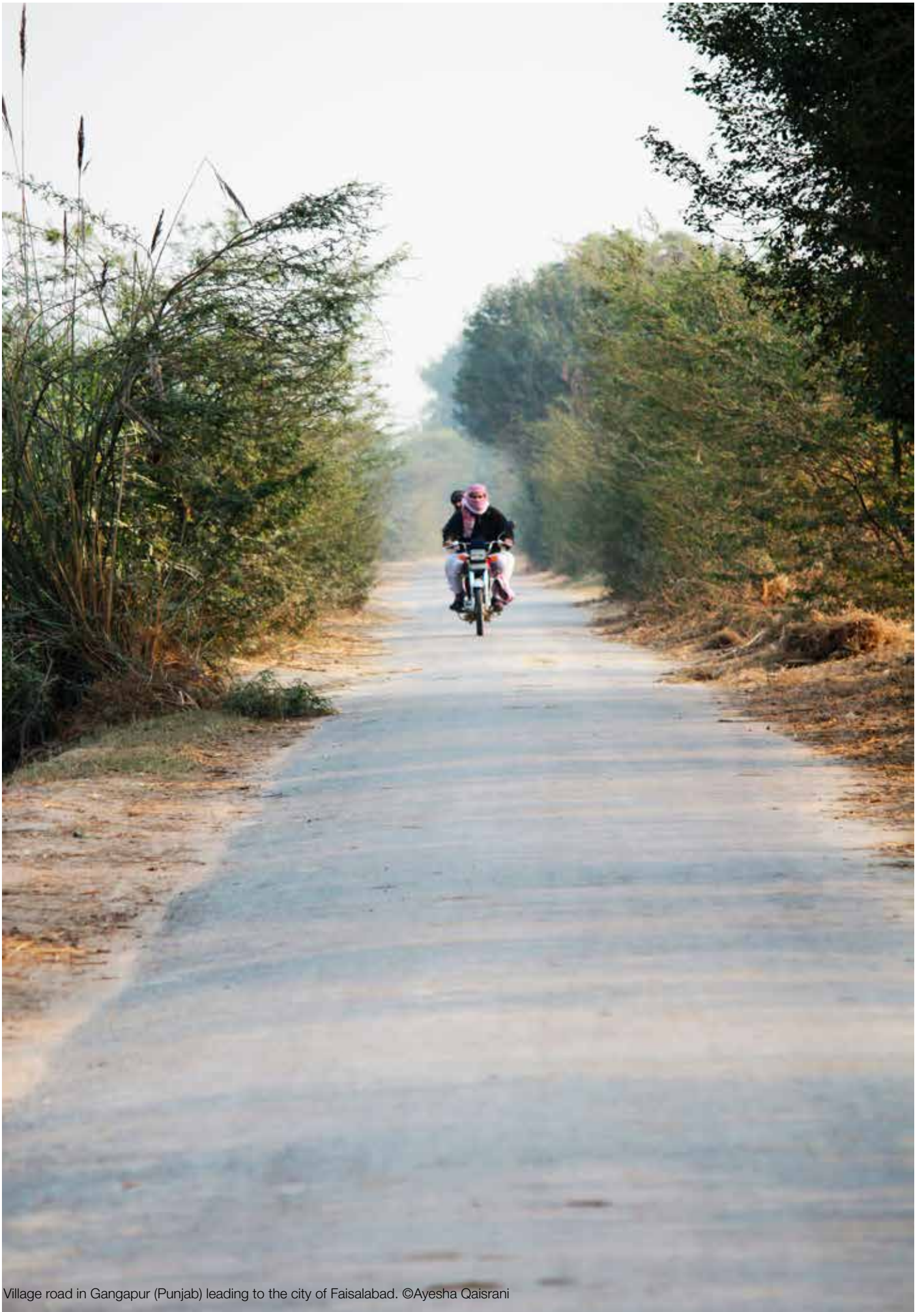
Village road in Gangapur (Punjab) leading to the city of Faisalabad. ©Ayesha Qaisrani

Executive Summary

Climate change will have negative impacts on agricultural productivity, particularly in marginal environments like semi-arid areas. The risk that climate change will contribute to declining farm incomes, narrowing livelihood options, and rising threats of food insecurity implies challenges for rural livelihoods and people.

Such concerns are particularly important for agrarian economies, such as Pakistan. About 60% of Pakistan's 200 million[1] people reside in rural areas, of which 38% fall under the national poverty line, thereby making poverty a striking characteristic of rural areas. Impacts of climate change are particularly concerning for livelihood vulnerability, which is defined as the strength of a given livelihood measured by its productive outcomes and its resilience to shocks, seasonal changes, and trends. Declining agricultural yields and diminishing livelihood prospects because of climate change may motivate many people to move away from villages in search of better opportunities. Therefore, the research arena is now shifting towards understanding the potential of migration as an adaptation strategy and its contribution to building livelihood resilience among households.

Against this backdrop, this study analyses the degree of livelihood resilience of rural migrant[2] and non-migrant households. It does so by studying the role of internal migration in introducing people to new economic opportunities while considering the distributional impacts of out-migration from rural areas on the vulnerable groups such as women. Specifically, we look at the role of migration in livelihood improvement via receipt of remittances, technology transfer, social networks, etc.

This research includes the concept of a migration-resilience nexus. For this study, livelihood resilience is conceptualised in terms of adaptive, absorptive, and anticipatory capacities of the households against any external stressors. It innately involves a consideration of disparities in people's vulnerabilities and capacities to adapt to external threats such as climate change.

This study applies two types of analyses: (i) a livelihood resilience approach by constructing a resilience index for migrant and non-migrant households, and (ii) a case study approach for each of our study sites to get an understanding of the socioeconomic characteristics and push and pull factors that drive out-migration from rural areas, the social impacts of male out-migration on left-behind families, and the profile of current and potential migrants among the households. The overall framework of the study provides an ex ante context of livelihood vulnerabilities, coping strategies, and communities' economic opportunities and wellbeing.

The study is based on a household survey carried out in the rural areas of three semi-arid districts of Pakistan: Dera Ghazi Khan, or D.G. Khan, (Punjab), Faisalabad (Punjab) and Mardan (Khyber Pakhtunkhwa). The total sample size was 600 households (200 households from each district). The sample was stratified into four livelihood categories of households: landless households, small landholders (with less than 12.5 acres of land), large landholders (with more than 12.5 acres of land) and non-farm households. Furthermore, qualitative data was collected through 12 gender-sensitive focus group discussions (FGDs).

Results indicate that the two main drivers of migration from rural areas are better work opportunities and more access to educational facilities in the cities. For those migrants pursuing better work opportunities, low wage rates and diminishing livelihood options in villages stand out as the principle factors encouraging migration.

The resilience index shows that, in general, resilience levels of migrant households surpass those of non-migrant households. This holds true for all sub-components of the index under the categories of adaptive, absorptive, and anticipatory capacities. This indicates that migration can be considered a potentially viable strategy to cope with external shocks and stressors, whether climatic or non-climatic.

Comparatively higher levels of income, lower dependency ratios, more diverse sources of income, and higher employment rates define the adaptive capacities of migrant households. Scores for absorptive capacities indicate that migrant households have better access to financial resources, have more diversified household assets, and enjoy a generally higher standard of living as compared to non-migrant households. These factors better equip migrant households to cope with adverse situations. Furthermore, higher anticipatory capacity scores of migrant households show that they are better at learning new skills, have a stronger social network, and have more access to information.

In addition, we found that in the semi-arid regions of Pakistan the process of migration is highly gendered; migration requires both social and economic capacities, the availability of which is very limited for women.

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1 Estimates from CIA World Factbook, 2016
2 For this study, migrant households are defined as those households from which at least one individual has migrated to another location.

Conversely, male out-migration shifts the work responsibilities at home, where women are often burdened with tasks such as taking care of livestock and fetching water from nearby sources in addition to household chores and taking care of children. However, as in most of the cases, the concept of a female-headed household was restricted – with the out-migration of the male household head, another male relative may take over that role, particularly due to Pakistan's patriarchal society.

From the results, we conclude that migration has the potential to strengthen livelihood opportunities, social and human capital, and the overall level of resilience for households. Through the inflow of remittances and expansion of the social network, migration can improve households' access to resources and the overall standard of living. However, it does not imply that merely facilitating migration would be a viable option for enhancing resilience. The way remittances are used has a significant contribution to the resilience of a household. Resilience is strengthened if remittances are invested in livelihood expansion or other productive purposes. In our study areas, however, the scope of resilience improvement remained somewhat limited as remittances are mostly used for consumption expenditures.

Our findings call for a policy intervention that promotes the positive impacts of rural-urban migration while staying cautious of the adverse impacts. Efforts are needed to attract remittances towards strategic development sectors with potential for improving livelihoods and production, and increasing the role of women, thereby enhancing the resilience of society at large.

1. Introduction

The Intergovernmental Panel on Climate Change's (IPCC) fifth assessment report (AR5) increased the level of certainty about the impacts of climate change on natural and human systems (IPCC, 2014). The rise in temperature and variability in rainfall may cause severe negative impacts on crop yields and a shift from highly productive agricultural land to less fertile land, which can reduce farm incomes and jobs as well as food security in rural areas (IPCC, 2014). However, most concerning is the observed and projected increase in the intensity and frequency of extreme events and their huge negative impacts on rural areas. An increase in intense extreme weather and climate events, such as sudden heavy precipitation, heat waves, floods and droughts, will mean an increase in infrastructure damages and adverse effects on people's lives, property, and livelihoods (Gray and Mueller, 2012; Erickson et al., 2012; IPCC, 2014; Saeed et al., 2016; Mueller et al., 2014). The implications of increasing climate risks are enormous, given the substantial numbers of people already affected; in Asia alone, floods, storms, heat and cold waves during 2010-2011 displaced about 42 million people (ADB, 2012).

Apart from this temporary displacement, there is substantial evidence that people also opt for long-term migration due to climate and weather extremes (Myers, 2005; Parry, 2007; Black et al., 2013; Warner and Afifi, 2011; Saeed et al., 2016). Based on data from 1991-2012, a study on Pakistan by Mueller et al. (2014) concludes that extreme high temperatures during winters caused a gradual decline of one-third of wheat yields and eventually reduced farm incomes and jobs. As a result, the landless agricultural labour opted to migrate to other villages or urban areas. This implies that large numbers of poor and landless rural labour may potentially be induced to migration movements if heat stress continues to reduce yields in Pakistan's major wheat producing areas, as is projected to happen by 2030 (Saeed et al., 2016). Similarly, Haq, (2015) used panel data (Pakistan Rural Household Survey-2004, Pakistan Panel Household Survey -2010) to investigate the incidence and impact of different shocks (including natural/agriculture, economic and social) on rural households of Pakistan. Natural hazards such as floods and droughts coupled with agricultural shocks (55.9% of total shocks) had major impacts on rural households' coping capacity. Poor rural households are more vulnerable due to low asset bases and lack of access to formal and informal financial resources; therefore they are subject to reduced food and non-food consumption, and internal migration in search of new livelihood resources (Haq, 2015).

Migration as an adaptation strategy is one way communities deal with climate change; it provides an opportunity to spread risk and diversify livelihoods through migration (Scheffran et al., 2011; Bardsley and Hugo 2010; Krishnamurthy 2012). Such migration flows are mostly internal or within the country (ADB, 2012); migrants expand their social networks, gain capabilities, and improve social and human capital essential for complete family out-migration or livelihood improvement in sending areas (Scheffran et al., 2011). However, if migration movements are abrupt and large-scale, they can become a challenge for the government and the population in destination areas by leading to conflicts, increased unemployment, political unrest, pressure on natural resources, and shortfalls in urban service delivery, among other impacts (Portes, 1998).

Nevertheless, there is a growing recognition among researchers and policy-makers of the potential benefits of migration as an adaptation strategy (Scheffran et al., 2011; Black et al., 2011; Stern, 2007; Bardsley and Hugo 2010; Warner and Afifi, 2011). For example, migration can provide additional financial support for adaptation through remittances, which improves resilience and may help to diversify the livelihoods of the migrant's origin communities (Scheffran et al., 2011; Adger et al., 2002). Migrants can also serve as a source of technical innovation for efficient and sustainable resource productivity through increased access to technology and skills, and modern knowledge (de Haas, 2006; Sen, 1985).

Migration has also been studied recently in the context of a migration-resilience nexus (Adger, 2002; Deshingkar, 2012; Scheffran et al., 2011). There are a number of definitions and framings of resilience, all of which encompass aspects of coping with and responding to shocks (Bahadur et al., 2013; DFID, 2014). Resilience is a concept that describes the aspects of a socio-ecological system that reduce risk and enables adaptation to different stressors, such as climate change (Pelling, 2011; DFID, 2014). In this study, we use the concept of resilience to understand 'people's capacity to sustain and improve their livelihood opportunities and wellbeing despite the environmental, economic, social and political disturbances' (Tanner et al., 2014). The livelihood resilience approach takes into account the human agency and highlights the need to consider issues of power relationships within a society, differentiated access to resources, and social inequality and poverty. Furthermore, the approach identifies the unevenness of people's vulnerabilities and capacities to adapt in responses to the impacts of climate change (Tanner et al., 2014).

In Pakistan, migration has mainly been studied within an economic context. The existing literature on migration

in Pakistan focuses on an understanding of the economic reasons for migration, identifying individual characteristics of migrants, rates and patterns of internal migrations, and macro-level effects of remittances on people and the economy (Oda, 2007), but migration is a complex phenomenon encompassing social, economic, political, environmental and demographic aspects (Black et al., 2011). These aspects of migration were mainly ignored, such as the role of environment, family and social networks, the micro-level impact of remittances on household resilience and the potential for adaptation to any stressor (such as environment and climate change). A few studies provide some household level understanding of how migration decisions are made and who migrates; gender roles in left-behind migrants' households; and the role of remittance in human capital building, such as education and health (Nabi, 1984; Oda, 2007; Siegmann, 2010; Gioli et al., 2014). However, so far, these studies are limited to only northern mountainous or rain-fed regions of Pakistan (Oda, 2007; Siegmann, 2010; Gioli et al., 2014). A more comprehensive understanding of migration is essential in order to see how it is benefiting (or not benefiting) rural populations in the semi-arid region of Pakistan, particularly the poor and marginalised.

Against this backdrop, the current study focuses on the resilience of migrant and non-migrant rural households by using village-level information and examines the potential of migration to enhance new economic opportunities (taking into account distributional effects, especially for the poor and women) for improving resilience in semi-arid lands of Pakistan. Further, we explain why migration is important in shaping livelihood resilience and diversifying economic opportunities through the role of remittances and return migration. In this regard, this paper is the first in a series of papers that attempts to understand the potential of rural-to-urban migration as an adaptation strategy. This paper sets the baseline by exploring major drivers of rural-to-urban migration and analysing whether migration improves the wellbeing of households. This will be followed by an analysis of livelihood vulnerabilities in rural areas due to climate change and climate extremes, with an approach of understanding the potential of adopting migration as an adaptation strategy. The study will conclude with some policy suggestions to enhance the potential of migration while managing its adverse implications.

This study is structured into four main sections. Section 1 provides an introduction, contextual understanding of socioeconomic issues in rural Pakistan, analytical framework, study sites rationale and methods. Section 2 states the results of the livelihood resilience index and three case studies of semi-arid areas, which include D.G. Khan, Faisalabad, and Mardan districts of Pakistan. Section 3 offers results and discussion, and, finally, Section 4 draws conclusions and points the way forward.

1.1. Migration and rural areas: socioeconomic context

In Pakistan, poverty is largely a rural phenomenon. More than half of Pakistan's population resides in rural areas (60.8% in 2015), out of which about 38.3% (as of 2011) fall below the poverty line (World Development Indicators, 2011). On average, rural incomes in 2013/14 were 38% lower than urban incomes (Pakistan Bureau of Statistics, 2014), while estimates of multi-dimensional poverty show that about 48% people in rural areas are deprived compared to 18% in urban areas (SDPI, 2012).

Agriculture is the key livelihood option for rural populations in Pakistan. A World Bank (2007) study reports that 43% of the rural poor (bottom quintile) are farmers, including both farm owners and tenants. About 52% of the poor are engaged in non-farm activities (ibid.). The contribution of agriculture to the rural economy is rather significant, especially among the poor – 40% of the rural poor derive 30% of their income from agriculture (ibid.). Anwar et al. (2004) found that rural poverty in Pakistan was highest for the landless (54.6%) and non-agricultural households (38.4%), whereas the incidence of poverty declined with an increase in land ownership. One of the main reasons underlying rural poverty is the skewed structure of access to the distribution of land and water, as these factors determine the productivity of agriculture sector (ibid.).

Rural non-farm activities are usually low-end in nature such as daily-wage labouring and taxi driving (Anwar et al., 2004). This is because poor and unskilled people have only their labour to supply in return for a wage (Mduma and Wobst, 2005). According to Hussain (1994), the reason why the rural population started diversifying their livelihoods is associated with population pressure and higher dependency ratios. The analysis of Pakistan's rural household expenditures shows that a significant chunk of income is spent on food, beverage and tobacco (63%); followed by housing, fuel and lighting (16%); then clothing and laundry (8%); and

finally development expenditures, such as health and education, (5% and 1%, respectively) (Nazli et al., 2012). This depicts that much of the rural income is spent on essential living expenses and little or none is saved for human capital growth or any other investment purposes.

Several studies have attempted to understand the dynamics of rural poverty and the wellbeing of the rural population in Pakistan. Ali et al. (2010) report the underlying forces behind rural poverty in Punjab and compared different divisions of the province for their poverty trends. They found that northern and central Punjab have a relatively lower incidence of poverty when compared to southern and western Punjab. Furthermore, at the provincial level, the rate of rural poverty were found to be twice the urban rate. The wide-spread, region-specific poverty incidence implies the need for targeted policy packages to alleviate rural poverty in these areas. The lack of access to safe drinking water and sanitation is also often related to prevalence of poverty in Pakistan (Qazi et al., 1997). For instance areas outside the Indus River Basin, such as the south-western barani lands, rod-kohi areas, Sailaba, deserts and coastal areas, tend to be poorer than regions within the Indus Basin (Naveed and Ali, 2012).

Food security is also a major concern and driver of migration from rural areas of Pakistan (Arif and Khalid, 2007). There are several factors behind the inadequacy of food consumption in the country. Maintaining adequate food production is a real concern in the wake of high population growth rates and changing climatic nature (SDPI, 2015). Nevertheless, inadequate access to food due to economic constraint remains the main factor behind high rates of food insecurity (Ahmad and Farooq, 2010). Besides rising food prices, physical access to food also poses serious challenges in some areas. Access to food in many parts of KP is hindered due to a poor security landscape and conflict situations in the region. Further, the frequent natural disasters and climate extremes, specifically in in mountainous part of the province, causes physical inaccessibility to food.

Although Pakistan's health indicators have improved over the years, the improvement is neither extraordinary nor uniform (Afzal and Yusuf, 2013). Rural areas depict a very pessimistic picture – maternal mortality rates in rural areas are roughly double than those in urban areas (GoP, 2010). Moreover, childbirth in attendance of skilled personnel is alarmingly low and has even declined over the years (Afzal and Yusus, 2013). Estimates show that in rural Punjab, only 41% of childbirth takes place in a health facility, and in rural KP only 36% of childbirth is treated in a health facility (GoP, 2013). Moreover, the survey discloses that about 61% of rural women in Punjab and 89.6% of rural women in KP face problems[3] in accessing health facilities.

According to the latest statistics of Pakistan Social and Living Standards Measurement (PSLM) (GoP, 2015a), more than half of the population in rural areas in Punjab and KP have never attended school. Only 12% of the working-age population of Punjab has acquired some level of professional development skills and training (Pakistan Bureau of Statistics, 2013); the skill development efforts in Punjab are out-dated and lack any market-driven training programmes. Most vocational training institutes are located in urban areas and, therefore, become inaccessible and costly for rural youth and more specifically for those belonging to poor households. The situation becomes severe for women and their professional and skill development mainly due to social mobility constraints and a preference for boys' education and skill development over that of girls (Government of Punjab, 2015). The situation is not different in KP province; despite the fact there is 28% increase in the number of vocational institutes from 2008-2013, the provision of market demand-led skill development lags due to lack of competent teaching staff, deficiency in service training, etc. (Dawn, 2013). The access to such institutions is far less for rural areas in KP due to the disproportionate geographical spread of these institutions across the province (Mustafa, 2012).

Like any other patriarchal society, in Pakistan, access to rights, opportunities and the autonomy of decision-making is mostly enjoyed by men (Farooq and Kayani, 2014). Prevailing social and cultural norms have created an imbalance of responsibilities and duties among men and women (Nosheen et al., 2011). Gender-based disparities are observed to be wider in rural areas than urban areas of the country (SDPI, 2008). In rural Pakistan, men are considered providers and protectors for their households, whereas women are responsible for household chores, rearing children and other indoor activities (Siddiqui, 2006). Females, especially in rural regions of Pakistan, are restricted in access to education, health institutions, formal employment, and general mobility (Khan, 1999; Jejeebhoy and Sathar, 2001; Grünenfelder, 2012; Farooq and Kayani, 2014).

The rural population of Pakistan has decreased from 67.9% in 1996 to 60.8% in 2015; on the other hand, the urban population has increased from 32.1% in 1996 to 39.2% in 2015 (Hussain, 2014). Structural transformation in the economy is driving people towards cities – resources are reallocated from low productive sectors (agriculture) to high productive sectors (industry and service) (ibid.). The productivity of agriculture sector has declined because of high input prices, water shortages, natural events (floods, heavy rain and

3 These problems may include one or more of the following: (i) getting permission to go for treatment, (ii) getting money for advice or treatment, (iii) length of distance to health facility, (iv) not wanting to go alone, (v) management of support

drought), which reduces the earnings of the rural population (State Bank of Pakistan, 2015).

People living in rural areas have low living standards compared to people in urban areas, and they continue to suffer from less availability and low quality of education and health facilities and safe drinking water and sanitation, along with other social services and physical infrastructure (Rahman et al., 2011). The disparities in government spending in development also widen the rural-urban divide. For instance, Figure 1 shows the concentration of the developmental expenditures in Punjab, which are higher in urban areas when compared to rural areas[4] . That clearly indicates the deprivation of social and economic opportunities to the rural population. For instance, in KP, the urban developmental expenditure has increased from PKR 3.4 billion in 2013 to PKR 8.8 billion in 2015[5] . During 2014/15, the government of Punjab allocated PKR 48.31 billion for developmental projects including primary and middle school education, higher education, special education, and youth affairs. This is 107% higher than the previous year's expenditure, which was PKR 23.31 billion[6]. On the other hand, in 2014/15, the government of KP allocated PKR 12.38 billion for libraries and primary, secondary and college education, which is 6.17% higher than the previous year's PKR 11.66.

Figure 1: Development expenditure in Punjab
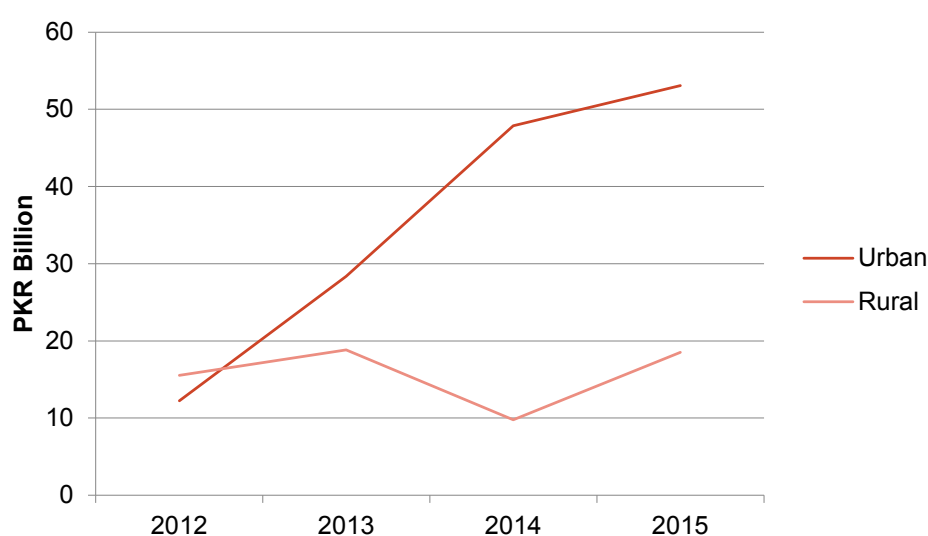
Globally, the role of migration is widely acknowledged as a 'positive force' or 'key intervening apparatus' for development, a way for reducing inequalities and poverty (Raghuram, 2009; Bakewell, 2007), however, some regard it as a reason for increasing poverty in urban and rural areas. The former view relates poverty reduction to the inflow of remittances that supplement rural incomes and contribute to the rural economy by increasing consumption, expenditure in the social sector and household savings (IOM, 2005). Conversely, other studies exploring the links between poverty and migration recognise that the poorest often cannot afford to migrate (Van Hear et al., 2012).

Migration has often been correlated with spatial inequality, in the sense that low levels of local opportunity can generate flows of people seeking better opportunities (Black, 2006). More broadly, a study by Lipton (1980) suggests that the selective nature of migration offers better returns for better-educated people, potentially exacerbating social inequality. Conversely, one can argue that owing to the costs associated with migration, it can only be adopted by those who already possess certain assets (Dorward et al.,2009). However, in principle, if migration was adopted by the poorest segments of the society, and it benefitted them with net gains, then it could be concluded that migration can reduce inequality (Black et al., 2005).

Migration patterns in Pakistan indicate a predominant poverty-migration linkage (Gazdar, 2004), however, the links between migration and poverty are neither linear nor simple (Deshingkar and Grimm, 2005). Rural areas are undergoing rapid socioeconomic transition and internal migration is undeniably an important contributor to this change (Marshall and Rahman, 2013). However, on the research front, internal migration appears to be less visible, possibly because it is less recorded as compared to international migration (IOM, 2005).

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4 Such a rural-urban differentiation of development budget was not available for KP.
5 Government of KP, Annual Development Program 2012/13 and 2014/15.
6 Ministry of Finance, Economic Survey of Pakistan 2014/15.

In Pakistan, internal migration has gradually become a major policy concern and subject of heated public debate. Karim and Nasar (2003) found that between 1951 and 1998 urban population in Pakistan rose by almost six times (from 17.8% in 1951 to 32.5% in 1998), which was twice the rate of the population growth during the same time period. For the past few decades, rural-to-urban migration has received considerable research attention (Lall, 2006) and urbanisation is considered one of the main drivers of migration in Pakistan as well as in other developing countries (Kanwal et al., 2015).

Migration is also an important livelihood strategy adopted by the rural labour force. Hagen-Zanker et al.(2014) attribute migratory decisions from rural areas to urban centres to factors such as land grabbing, the decline in agriculture productivity, less earning opportunities, etc. Social, economic and environmental vulnerabilities in rural areas may also push people to look outward for better opportunities elsewhere. Sabir et al. (2006) also include factors like tenure relations, fragmentations of land holdings due to population growth, and laws of inheritance.

1.2. Analytical framework

The study has two aims: first, to understand the relationship between migration and resilience in rural areas; second, to explain the role of remittances in improving household livelihood strategies and their potential impact on poverty and inequality in the study areas.

To understand the resilience and migration nexus we follow Tanner et al.'s (2014) definition of livelihood resilience as 'the capacity of all people a-cross generations to sustain and improve their livelihood opportunities and wellbeing despite environmental, economic, social and political disturbances'. To estimate livelihood resilience, we use the conceptual framework developed by Bahadur et al. (2015) and explained further by Tanner et al. (2014). This framework allows the examination of three important aspects of livelihood resilience: (1) Adaptive capacity – the ability of social system to adapt to multiple, long-term and future climate change risks, and also to learn and adjust after a disaster (Bahadur et al., 2015); (2) Anticipatory capacity – the ability of social systems to anticipate and reduce the impact of climate variability extremes through preparedness and planning capacities (Bahadur et al., (2015) and; (3) Absorptive capacity – the ability of social systems to absorb and cope with the impacts of climate variability and extremes (Bahadur et al., 2015). This framework allows an ex ante context of livelihood vulnerabilities, coping strategies and communities' economic opportunities and wellbeing (Bahadur et al., 2015).

For the second part of analysis, we used a case study approach to understand how internal migration can improve social and economic wellbeing by enhancing new economic opportunities (taking into account distributional effects, especially for the rural poor and women). We consider migrants as agents of socioeconomic development and assume that migration provides opportunities to shape livelihoods and offer opportunities to acquire new knowledge, income and social networks across regions' (Scheffran et al., 2011, p.1). We analyse three study sites—Faisalabad, D.G. Khan and Mardan—by developing an understanding of the patterns and trends of internal migration; conditions and reasons that induce people to migrate; attractiveness of major destination areas; impact on left-behind migrants' families and the role of remittance on origin areas; role of social networks; and, finally, why non-migrants are not migrating.

1.3. Study sites and methods

1.3.1. Study sites

Our study focuses on two districts of the Punjab province and one district of the Khyber Pakhtunkhwa (KP) province: D.G. Khan, Faisalabad and Mardan respectively. These districts are located in semi-arid regions of the country and constitute largely of agro-based livelihoods.

Figure 2: Aridity map of Pakistan based on Pakistan Met Department station data from 1991-2000
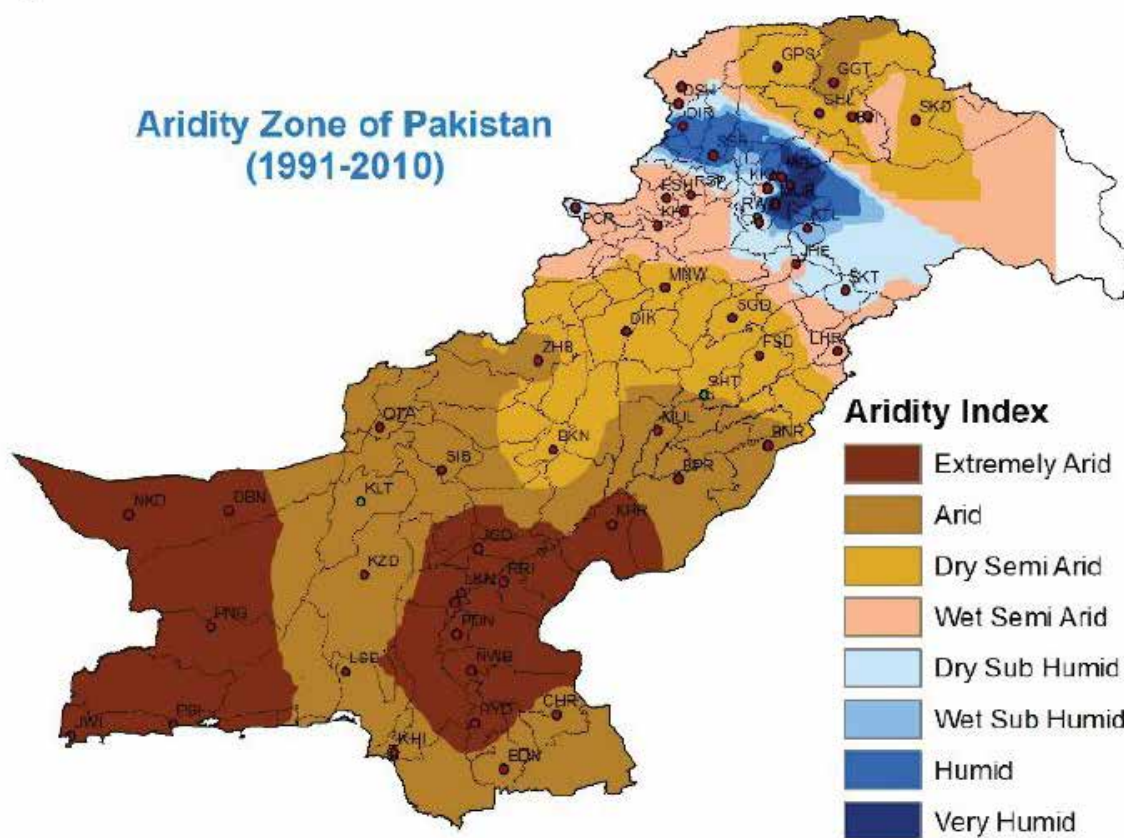
Semi-arid lands are those that face a lack of precipitation and water access. They are characterised by an aridity index with scores between the range of 0.20-0.50 (UN, Environment Management Group, 2011).

Dera Ghazi Khan (D.G. Khan): The D.G. Khan district was selected because it is a mostly rural district, with around 86% of the total 1.6 million population living in rural areas (Pakistan Bureau of Statistics, 2014). The district is also the least developed area within the province, with one of the highest poverty rates (Naveed and Ali, 2012). The livelihood of a majority of the population is directly related to the agriculture sector. The industrial sector is rather limited, mainly comprised of cement, gypsum, textile and tractor manufacturing units (Directorate of Industries, 2009). The labour force is mostly employed on daily wages (including basic farming) while about 36.6% of the labour force is engaged in skilled agriculture and fishery, services, retail trade, and the construction industry (P&D Punjab, n.d.; Government of Punjab, 2009).

Further, the district has a dry, semi-arid climate having very little rainfall (220mm/year) (GOP, 2015b) and is highly vulnerable during the monsoon period from floods and inundation from the Indus River causing caused large-scale soil erosion and crop damages. The remaining part of the year, a drought-like condition persists, particularly in the rain-fed parts of the district. This often generates migration among the poor towards irrigated parts of D.G. Khan. Others with better resources also migrate towards other parts of the country in search of better livelihoods and economic opportunities (Qaisrani, 2015).

Faisalabad: Faisalabad is the third largest populated city of Pakistan and a hub of industrial and agricultural activity (ASER, 2008). The textile sector in Faisalabad started with only five textile mills in 1947 and now has about 7600 industrial large- to small-scale units, 89% of which are textile related (Khan 2013). There are also more than 200,000 small-scale textile power looms and cottage industries in Faisalabad (Khan 2013). As a result, Faisalabad contributes 25% to Pakistan's exports (Batool et al., 2013). It attracts hundreds of potential rural labourers from adjacent rural areas (comprised of around 52% of the overall population of the district) as well as from different parts of the country in search of better jobs and business opportunities (ibid.). It is estimated that around 10 million families are engaged directly or indirectly with textile and associated industrial sectors (ibid.).

The district of Faisalabad has two key limiting factors to its development. First, the brackish ground water that is unsuitable not only for human consumption but also for many industrial processes, such as dyeing and tanning as well as for crops and livestock production. The fresh water is supplied through the lower Chenab

canal. The supply of water is highly vulnerable to unpredictable and declining river flows and increasing water demands from different sectors (Irfan et al., 2014). However, canal water is primarily used for agricultural purposes. Second, the climate of the district is dry semi-arid and characterised by erratic rainfall and increasing heat waves (Saeed et al., 2016), which results in an increase of the agricultural droughts, frequent crop failures, and declines in crop yields (especially wheat) (Mueller et al., 2014). According to Farooq et al. (2005), overall decline in farm income and jobs has caused rural-to-urban migration in the Faisalabad district to increase. Although other factors also contributed to rural-to-urban migration in Faisalabad, such as low paying jobs and lack of economic opportunities in the rural areas, the scarcity of agricultural land, and the social discrimination of the rural poor and landless communities.

Mardan: Our third site is the Mardan district, the second most populous district in KP after Peshawar (the provincial capital city). The district has an estimated population of 2.3 million, 20.2% of which lives in urban areas (USAID, 2009). The selection of this district is based on its vulnerable agriculture sector to climate variability and declining water for irrigation (Saeed et al., 2016). The major crops in the district are wheat, sugarcane and tobacco. The industrial activities in Mardan city have attracted people from adjoining villages and towns in the district and from other remote parts of the province. Moreover, the Mardan district has also experienced some out-migration – a large number of people shifted to Peshawar over time in search of even better economic opportunities (Kosinski and Elahi, 1985). Since Mardan city observes a large inflow of migrants, we have chosen the sub-districts and villages of Mardan for our analysis as they will still contain a number of potential migrants wanting to relocate from their villages to Mardan city in search of better economic opportunities.

1.3.2. Data collection

A survey was conducted using a structured household questionnaire (n=600; and n=200 for each site). The sample size was calculated based on the level of significance, the margin of error (MoE), baseline levels of indicators and design effect (see Appendix 1 and 2). Based on available resources and limited time, the sample size in each district was kept the same. The questionnaire was pre-tested (n=30) for the purpose of its flow and refinement at the local level. A multi-stage stratified random sampling technique was adopted to subdivide each stratum into further strata and to reduce the heterogeneity of the target population (see Appendix 1). For this, 200 sampled households for each site were further divided into sub-samples (n=50) categorised for landless agrarian workers, small landholders (owning less than 12.5 acres of land), large landholders (owning more than 12.5 acres of land) and non-form workers (employed in sectors other than agriculture).

We also carried out 12 focus group discussions (FGDs) (4 from each site; 2 each for separate male and female participants). FGDs were intended to collect information to understand different drivers (both push and pull factors) of migration decisions (at community level) and how it relates to climate change and local governance issues. The discussion revolved around main problems related to agriculture, livestock and other business; mechanisms for making a complaint or raising a grievance; overall perceptions of migration trends among different socioeconomic groups; aspirations of youth regarding local jobs and migration; financial support from formal and informal mechanisms; social networks; environmental- and climate change-related problems (e.g., droughts, erratic rainfall); the role of local and provincial governments and any recent investments/ programmes/interventions to improve livelihood options; and finally the role of women in family income and decisions regarding investment, migration, and access to services and assets.

1.3.3. Construction of resilience index

We follow Cutter et al.'s (2010) method for constructing the resilience index for migrant and non-migrant households. The framework of analysis mentioned in section 1.2 provides the basis of our selection of variables through literature review. We used a comparative approach and utilised proxy variables for the construction of a resilience index. A careful review of literature helped in selecting proxy variables for each of the sub-components of the resilience index (references have been provided in Table 1 of Appendix 4). Since research on resilience indices for migrants and non-migrants is still in infancy, the selection of variables is ad-hoc in most studies, considering the multifaceted nature of resilience. We also validated the results of the resilience index by developing a wealth index using Principal Component Analysis (PCA). See Appendix 4 for more detail.

A construction Worker in D.G. Khan ©Ayesha Qaisrani

2. Results

2.1. Resilience index

The results of the resilience index for migrant and non-migrant households are shown in Table 1. This resilience index consists of three major components: adaptive capacity, anticipatory capacity and absorptive capacity, each component further dividing into sub-components (refer to Appendix 4 for sub-component scores). Our results show that migrant households are comparatively better off than non-migrant households in all three major components. Migration is known as an important approach for adaptation if society faces disparities in economic opportunities, and political and environmental conditions (Waldinger, 2015). According to our results, migrant households are comparatively more resilient; they show more adaptability to shocks because they generally have a higher level of income; have better housing; have diversified income sources; and have a higher employment rate. Even though migrant households have a high rate of agricultural and livestock ownership, rates of livelihood dependency on agriculture are higher in non-migrant households.

The higher percentage of water usage for irrigation   by non-migrants represents their dependence on agriculture for employment or livelihood. Along with this, the lower percentage of income diversification for non-migrants indicates a lack of economic opportunities or their reliance on a single sector (agriculture or livestock) for livelihood. Non-migrant households are less resilient because of this largely single-sector dependency and a higher percentage of non-commercial use of agricultural products. This indicates that they largely rely on subsistence farming.

The scores of the anticipatory capacity component reveal that migrants are better able to deal with problems than non-migrants. Generally, migrants make decisions about their life more freely, have more opportunities to learn new things and show their capabilities. Migrant households are more resilient than non-migrant households because they have better future planning; an understanding of climate change impacts; better strategies to cope with food security situations; and access to the media, which enhances their capacity to anticipate any upcoming extreme events. Migrants are perceived to have opportunities for reducing vulnerabilities and contributing to the enhanced resilience of their communities of origin by creating new diversified livelihood sources, and having information, knowledge, and understanding to mitigate hazards (Warn and Susana, 2014) In most of developing countries, migration is considered an important strategy for risk management to deal with shock or stressors (Waldinger, 2015).

Similar to the aforementioned results, migrants are better able to efficiently absorb external shocks or stressors as compared to non-migrants. Most of the non-migrants in this survey live under the poverty line; they took formal or informal loans to fulfil their basic needs. On the other hand in migrant households, the trend of taking loans is lower and most of the time loans were taken for investment purposes to improve livelihoods. The percentage of families having any real estate/financial property and vehicles is higher among migrants. Migrants' families also have an advantage in substitute water sources for drinking and domestic purposes, however, the difference is not significant. Remittances are a benefit for migrants' families; they help to improve their livelihood and enhance their capacity to absorb shocks. Remittances provide opportunities for recipients to invest in their capital stock and in productive livelihood means, enabling them to deal with food insecurity and improve their education and lifestyle.

It is clear from the above discussion that migrant households are more resilient to shocks and stressors as compared to non-migrant households; their resilience score is comparatively higher than non-migrants. Thus, it indicates that migration can be a viable strategy to cope with any shock or stressor (climatic or non-climatic) (Islam et al., 2014) In practice, accrediting higher resilience to migration may be too straightforward. It could be argued that migrant households are already more resilient than non-migrant households prior to migration, and that this difference in resilience may come from other socioeconomic and behavioural discrepancies. In such a case, migration may not be considered a contributing factor to resilience but rather an outcome of already-possessed higher levels of resilience in some households.

Table 1: Resilience index scores of migrant and non-migrant households in semi-arid regions of Pakistan

Livelihood resilience index	Migrant score	Non-migrant score
Adaptive capacity		
Assets, access, income and food security	0.526	0.462
Strengthening and adapting livelihoods	0.467	0.401
Anticipatory capacity		
Preparedness and planning	0.526	0.452
Capacity, information and mobilization	0.589	0.536
Absorptive capacity		
Saving and safety nets	0.504	0.470
Substitutable and diverse assets and resources	0.211	0.146
Resilience index score (sum of adaptive, anticipatory and absorptive capacities)	2.822	2.467

Source: Authors' own (Based on a structured questionnaire of 600 respondents in D.G. Khan, Faisalabad, and Mardan conducted in February 2016).

To explore the interconnections between wealth, migration and resilience, we constructed a wealth index that divides the population into three homogeneous groups based on the differences in their wealth status. Following that, we calculated the resilience index of migrants and non-migrants for all income groups drawn from the wealth index. The results in Table 2 show that resilience is positively correlated with wealth; the richest groups have the highest resilience scores, and the middle-income groups have higher scores than the poorest groups. Furthermore, within each wealth group, migrants are more resilient than non-migrants.

Table 2: Resilience index score by category

Categories by wealth and migration status		Total resilience score	Adaptive capacity	Anticipatory capacity	Absorptive capacity
Rich	**Migrant**	3.299	1.181	1.252	0.866
	Non-migrant	3.052	1.115	1.17	0.768
Middle	**Migrant**	2.78	0.999	1.077	0.704
	Non-migrant	2.607	0.89	1.035	0.683
Poor	**Migrant**	.301	0.816	0.948	0.537
	Non-migrant	2.003	0.717	0.82	0.466

Source: Authors' own (Based on a structured questionnaire of 600 respondents (51.9% non-migrants, 48.1% migrants) in D.G. Khan, Faisalabad, and Mardan conducted in February 2016).

After assessing the internal validity of the wealth index, (see Table 2), we found three homogenous groups of selected populations – rich, middle class and poor – the wealth characteristics within each group are almost the same. Following that, we calculated the resilience index for the three homogenous groups to understand patterns of resilience between migrant and non-migrant households among the three income groups. The resilience score in the percentage of migrant and non-migrant with respect to the three groups (poor, middle and rich) is shown in Figure 3 (a,b,c,d).

Figure 3 (a, b, c, d): (a) Livelihood resilience (%), (b) Adaptive capacity (%), (c) Absorptive capacity (%), (d) Anticipatory capacity (%), migrant and non-migrant with respect to wealth

(a) Livelihood Resilience
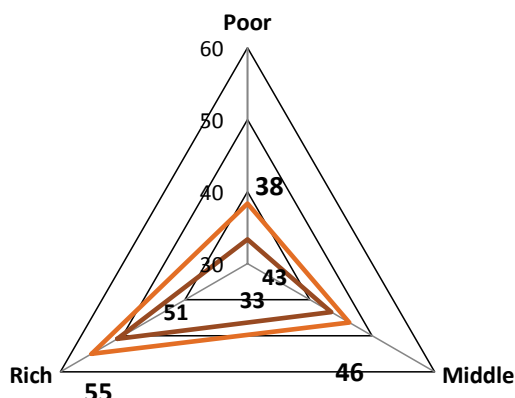
(b) Adaptive capacity
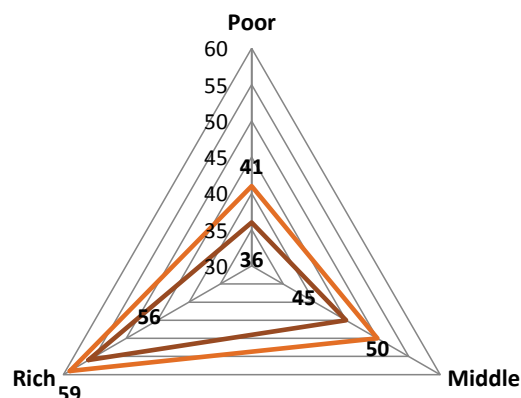
(c) Absorptive capacity
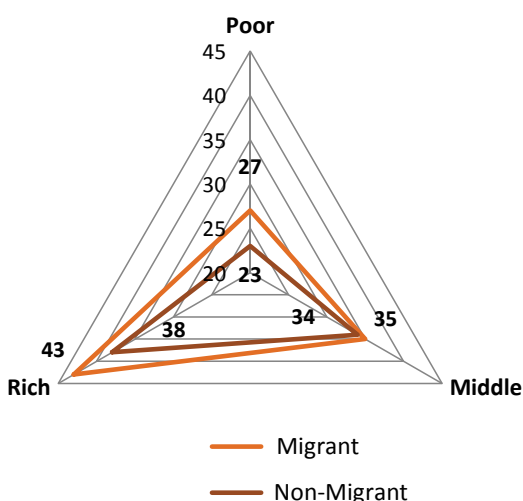
(d) Anticipatory capacity
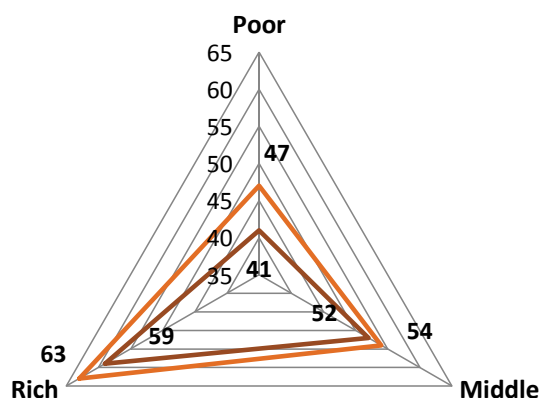
— Migrant
— Non-Migrant

In addition to assessing the resilience of respondents based on the resilience index, we also gathered their perceptions on their own wellbeing and resilience. These scores (see Figure 4) are completely subjective in nature, based on the respondents' discernment regarding their households' own capacities to respond to risks and stressors (Jones and Tanner, 2015). Subjective resilience corresponds with behaviours, attitudes and psychology (ibid.).

We gathered responses on various indicators such as satisfaction with their standard of living, their current life, their aspirations for the future, their sense of worthiness in life, independence in thinking, opportunities to show their capabilities, ability to learn new skills in life, and their ability to deal with major life issues. Results show that although the differences are not too wide, perceptions from migrant households show higher levels of subjective wellbeing and resilience as compared to non-migrant households. These findings strengthen our earlier results from the objective approach of measuring resilience and wellbeing that indicate that migrant households have higher levels of resilience as compared to non-migrant households.

2.2. Case studies: understanding migration in semi-arid lands of Pakistan

In this section, we present three case studies to develop the baseline understanding of 1) patterns and trends of internal migration; 2) what conditions and reasons induce people to migrate; 3) the attractiveness of major destination areas; 4) the impact on migrants' left-behind family members and the role of remittance in origin areas; 5) the role of migrants' networks; and 6) why non-migrants are not migrating. These case studies draw their findings from the household survey and FGDs.Our main focus was on rural-to-urban migration, which

Figure 4: Household perceptions regarding wellbeing (Based on structured questionnaire of 600 respondents (51.9% non-migrants, 48.1% migrants) in D.G. Khan, Faisalabad, and Mardan conducted in February 2016
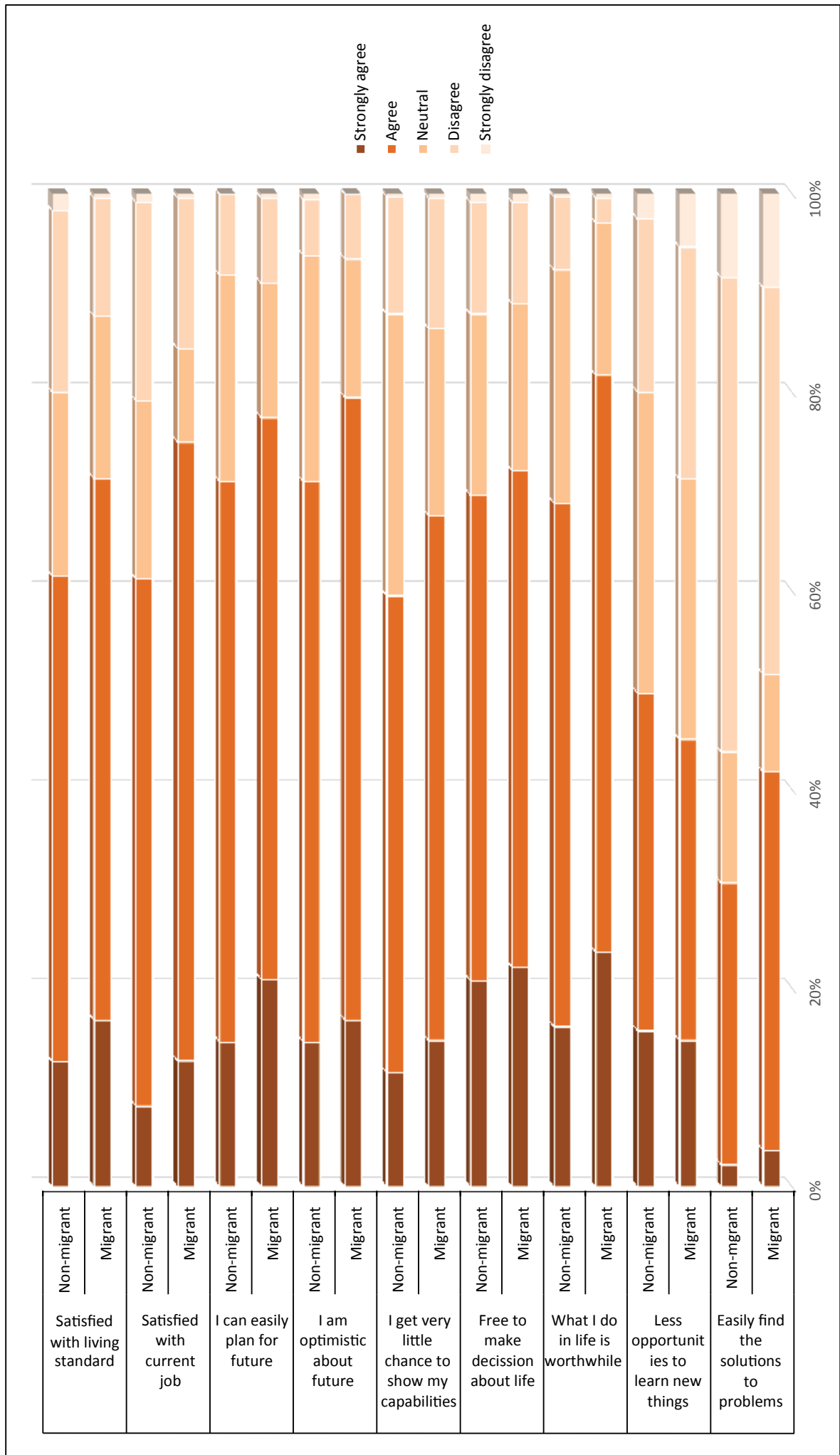
Open Drainage in a village in Faisalabad. ©Ayesha Qaisrani

includes temporary and permanent migration for the purpose of work and study as well as return migration. Other mobility patterns, for example the displacement of people due to security situations or climate extremes such as floods or droughts, are not considered.

2.2.1. Dera Ghazi Khan (D.G. Khan):

Estimates indicate that migration is one of the important income diversification strategies for the people of D.G. Khan. About 50% of the households surveyed had at least one person who migrated away from the village, regardless of their land ownership status and involvement in agriculture. According to our survey, a majority of the rural population in the district is involved in agriculture and livestock activities, yet agriculture has not been too successful in reducing widespread food insecurity and dramatically improving livelihoods.

What induces people to migrate? According to our survey, the majority of people migrate out of the rural areas to find work and to attain higher education (see Figure 8). Migration for education is more common among large and small landowner households in contrast to landless and non-farm households. The main reasons to migrate in the district can be ranked into three categories: an extremely low wage rate prevalent in the village for labour work; better job opportunities in the cities; and a lack of employment opportunities in the village. Other minor factors were also considered: a lack of quality education and health services; adverse environmental or climatic factors; and law and order situations. These findings are quite consistent, as among all focus group discussions (FGDs) held at the district sites, these factors were reported as serious concerns for the villagers. Most importantly, 51.4% of farming households with less than 12.5 acres of land consume all of their agricultural production rather than gain commercial benefits by selling crops such as cotton, wheat and rice. In general, declining crop productivity and agricultural profitability lowers the interest of rural youth in agriculture, due to which many migrate away. The decline in agricultural productivity was highlighted mainly due to the lack of water for irrigation (30% of households); high input prices such as seed and fertilizer (15% of households); frequent heavy and abrupt rainfalls and recurrent floods (15% of households).

Separately analysing migrant and non-migrant households, it was assessed that 82% of migrant households had more than one source of income as compared to 54% of non-migrant households. Among both types of households, small landholders had the highest percentage of households with diversified incomes (100% for migrant households and 76% of the non-migrant households), while non-farm households were the least diversified, both for the migrant (55.6%) and non-migrant (17.4%) categories.

The district is generally a poor, less developed and neglected district with a multi-dimensional poverty index score of 0.19 and a headcount ratio of 36, placing it in the top three extreme poor districts of the Punjab province (Naveed and Ali, 2012). Our findings reveal that about 49% of landless, small landholder, and non-farm households are amongst the poorest in the district that did not consider changing their economic activities or migrating away to offset the reduced incomes. Reasons behind this were a lack of access to financial resources, little to no education, and a lack of entrepreneurial capacities.

Food insecurity is a serious concern in the district. A whopping 91% of respondents reported that there have been times in the past three years that they have had insufficient resources to buy food of their choice. Despite this being a general issue for all types of respondents, large landholders faced this problem much less, reflecting their ease of access to resources. Nevertheless, in times of food insecurity 27.4% of the respondents of the district rely on external help; 21.7% reduce their food consumption by either changing diet or reducing food portions; 12.7% respondents reduce non-food expenditures; and 9.6% of respondents, mostly comprising of large landholders, tend to modify their production methods in order to increase yield. They often rely on strategies like planting different varieties of crops, increasing the use of fertilisers, improving the mode of irrigation, etc. In situations when people fail to cope with food insecurity, many young males, generally in the age group of 14 to 22 year-olds, tend to migrate towards cities. Among those who migrate, 31.9% were previously involved in casual labour; 31.1% were previously unemployed; 12.6% were students; and 10.1% were involved in agricultural and livestock activities. On the other hand, according to our survey, it is highly unlikely for females, people younger than 14 years old, and people older than 40 years old to migrate.

What are the migrants' destinations? The most popular internal migration destinations among the rural population are urban centres of Pakistan. Owing to D.G. Khan's central geographical location, the destinations of migrants are quite diverse. In our study, 16% of the movement from rural D.G. Khan was towards D.G. Khan City, 29% to Quetta (Balochistan), 19% to Karachi (Sindh) and 16% to Lahore (Punjab). Figure 5 shows a map of the major destinations and distances travelled by migrants.

Figure 5: Major destinations of rural migrants in D.G. Khan
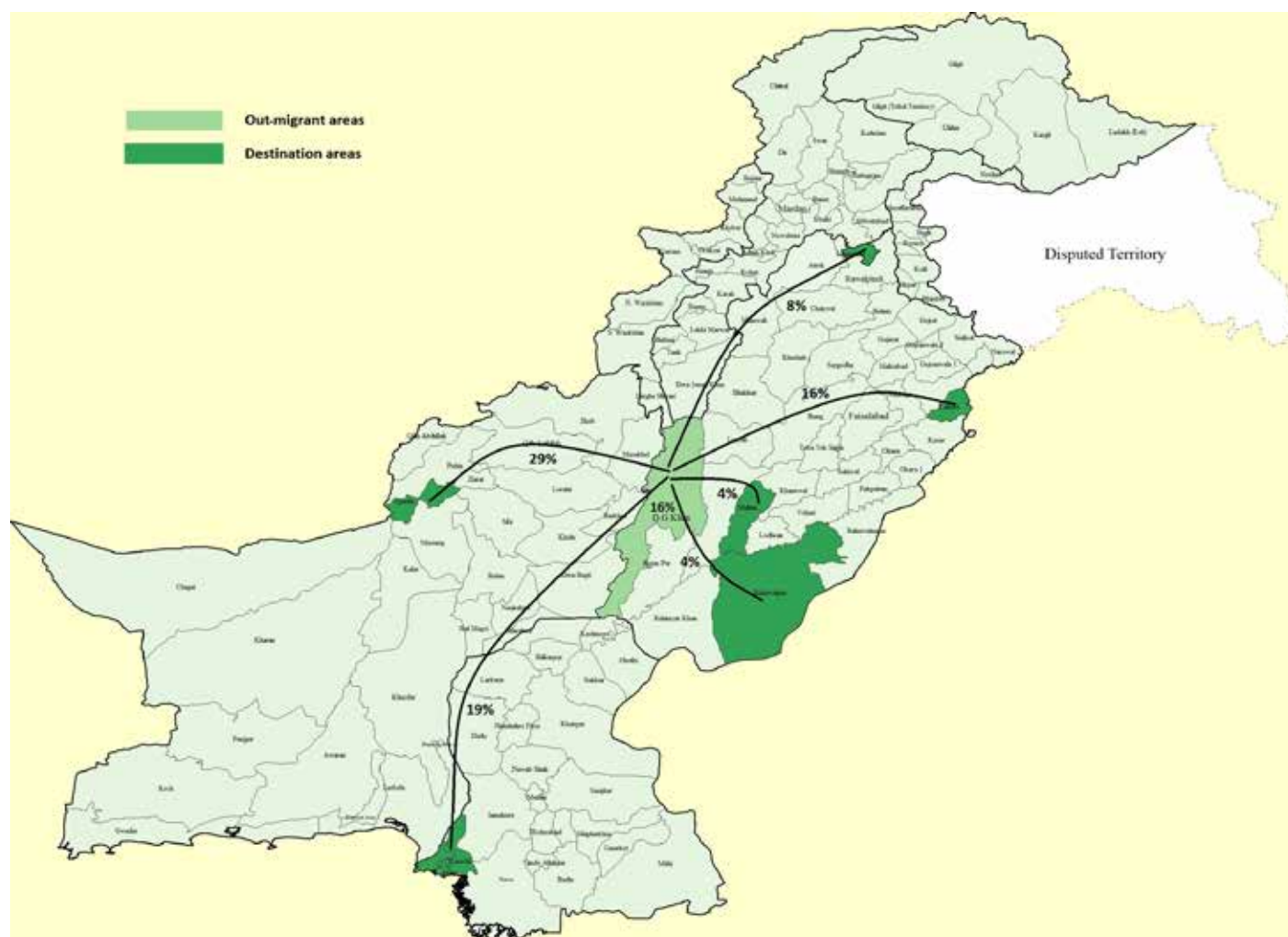
Source: Authors' own.

In cities, among our respondents, 43.7% of total migrants are involved in daily wage activities, while 37.8% are employed in either government or private sector jobs and 10% become skilled labourers (carpenters, drivers, welders, etc.).

The impact of migration on left-behind household members. It was noted that generally men were involved in migration. Women in all income groups face restrictions to migrate for work or for education. The out-migration of males is often coupled with a shift in responsibilities within the household. In the case of D.G. Khan, when only males of the household migrate, women are burdened with additional responsibilities, such as fetching drinking water and taking care of livestock and farms (Siegmann, 2010; Gioli et al., 2014). Interestingly, we did not find a single case of a female-headed household in D.G. Khan. The concept of the joint family system is a common mode of life. More often than not there are multiple male family members who assume the position of the household head. Even in cases of a migrant's family living separately, another male relative may assume the role of the household head.

The role of remittances. The inflow of remittances from migrant members is a regular feature in about 79.5% of households with migrant members. While in most cases remittances make up more than 50% of the monthly income of the households in the villages, large landholders receive remittances less than half of their average monthly income. Similar results were found by Oda (2007) in the case of internal migrants' households, which account for 48.1% of monthly income in rain-fed areas of Punjab. For 17.1% of households, remittances are the sole income source. Upon analysing the use of these remittances, it was observed that a major chunk of them was spent on meeting the food requirements of the household. This held true for all migrant households, irrespective of the economic type. About 33.6% households spend remittances on food expenditures, while

about 22.7% households used them to finance health expenses, and 19.1% used them to purchase consumer goods. With a significant percentage in the case of large landholders, 19% of households reported investing remittances on improving livelihood sources, such as expenditure on purchasing more land or livestock, starting a small agro-business, etc. The substantial contribution of remittances in household income and expenditure patterns shows that migration can help to reduce poverty and improve livelihoods; however, it also implies that ability of rural poor to migrate should also be improved.

The role of social networks. Social networks play an important role in the decision to migrate. 7.9% of non-migrant households mentioned that, after financial costs, the second main hurdle to their decision to migrate was the lack of a social network. In 32.9% of households, social relations like friends and family play an imperative role in shaping the decision to migrate. This is important because, in most of the cases, they help migrants by providing accommodation and financial support, and help them find jobs; 47.7% of migrant households mentioned that relatives provide help at the destination, 18.0% mentioned friends, and 4.5% mentioned neighbours.

Why do non-movers not migrate? Among poorer households with no migrant members, a significant percentage (31.6%) indicated that the unavailability of financial resources is the main hindrance on their decision to migrate and, if provided with resources, they would prefer to migrate. According to rural household estimates, the initial costs of migrating to a nearby city would require between PKR 10,000 to 100,000 (USD 100 to 1000), while international migration would require PKR 500,000 (USD 5000) and above. In contrast, wealthier large landholders reported the main reason they did not migrate was that they were happy in their villages and wanted to stay with their families. Most of the willing migrants are capable of doing work in other cities and countries because they are educated and professional/skilled labourers, but due to a lack of finances and network support they are not able to do so. Finally, female family members of the household are the least likely to migrate as it is against the culture or local norms.

Is there any return migration? The rate of return migration is generally low. Only 18.5% of the total migrants returned to their villages, either temporarily or permanently. However, 69.5% of the households with migrant members said that they intend to return to their villages, out of which 22.7% have plans to return permanently to set up their own businesses or to live with family. The remaining 77.3% have intentions to temporarily return for holidays.

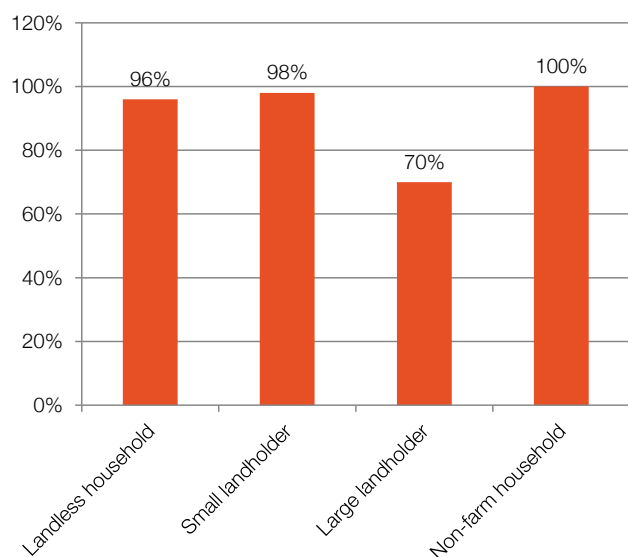**Figure 6: Percentage of the population facing food insecurity in D.G. Khan**

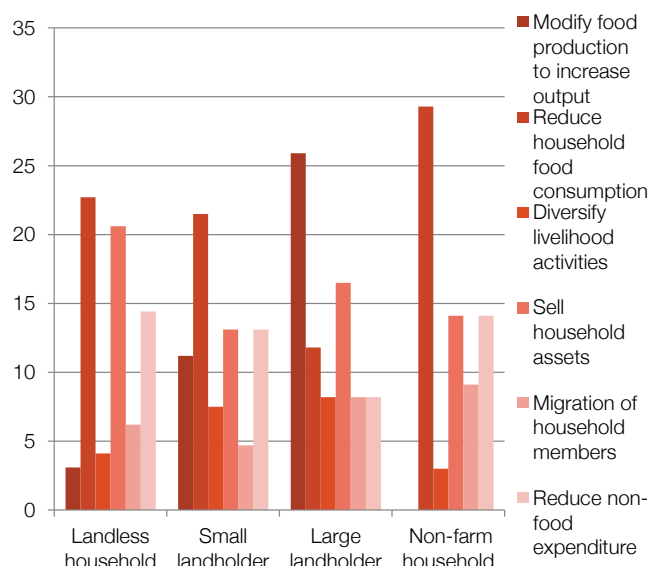

Figure 7: Coping strategies for food insecurity in D.G. Khan
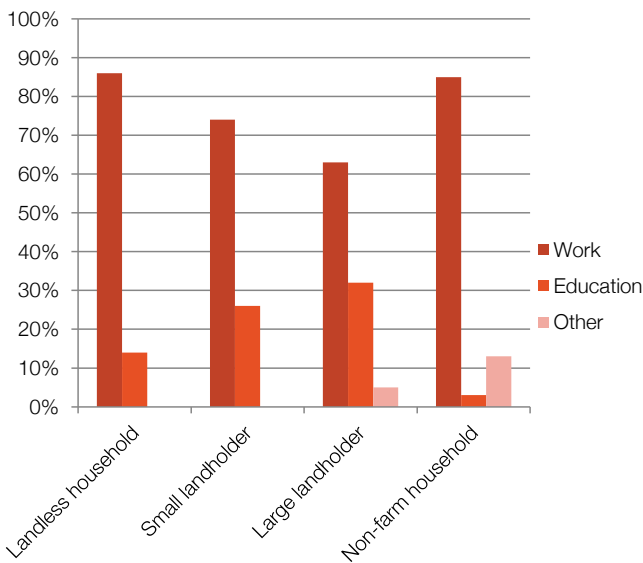
Figure 8: Reason for migration

Figure 9: Use of remittances
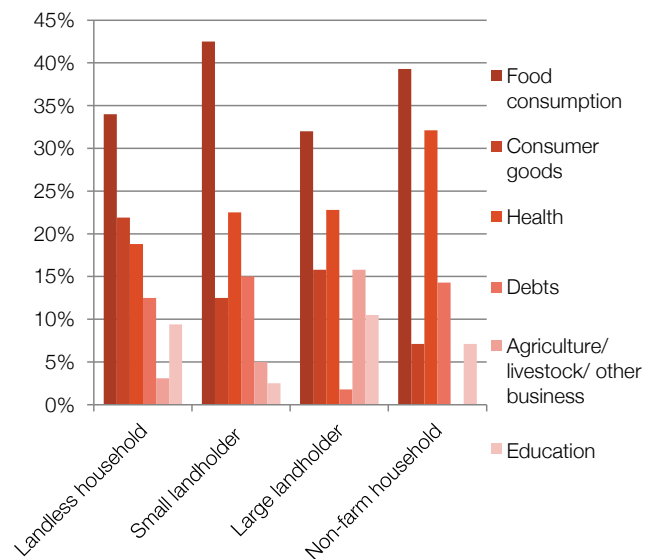
Source: Authors' own.

2.2.2. Faisalabad

The Faisalabad district has a thriving rural economy. Rural areas here are primarily agricultural in nature, however non-farm activities (such as wage labour construction) and involvement in small business (such as running a shop or driving a taxi/rickshaw) are also quite popular. About 46% of the rural population surveyed is in the middle-income class (quintiles 2 and 3), while 60% of the richest class is comprised of large landholders. About 33% of the population surveyed has achieved secondary education and above, most of them coming from wealthy families (generally large landholders). On average, the landless population is among the poorest, living in worse conditions than the rest of the community.

About half of the population surveyed had multiple sources of income. As a secondary livelihood, non-farm households are often engaged in the agricultural sector by providing casual labour whereas farm households often engage in small business or doing skilled labour. Large landholders can sell their surplus agricultural product at the market, whereas smaller landholders use approximately half of their produce for household consumption and sell the remaining amount to cover production costs. About 30% of our respondents had at least one migrant member. Therefore, migration is common in rural Faisalabad to diversify household income and attain higher education.

What induces people to migrate? The decision to migrate may be based on multiple factors in the origin and destination regions. In order of importance,, 75% of respondents mentioned that the availability of better jobs in cities is the main reason for migration, followed by insufficient employment opportunities in villages (70%), better living qualities in cities (57.5%), dissatisfaction with current livelihoods (43.3%), aspirations of building an independent life (41.9%), and the unavailability of land for farming and grazing due to inheritance law (24.6%). Other secondary reasons behind migratory decisions include water shortage for agriculture, salinization, and decline in crop yield due to environmental factors.

While the villages of Faisalabad have better infrastructural conditions as compared to D.G. Khan, respondents still cited the major issues faced by the villages as a lack of government-supported agricultural extension programmes, electricity load-shedding, lack of drinking water, and insufficient health and education facilities. There are no hospitals in either of the villages but rather a basic healthcare centre, where both a male and female doctor occasionally visit. In the recent years, the district's agriculture faced a serious setback because of multiple pest attacks as well as untimely heavy rainfalls. This resulted in the decline of incomes for most households or, in some cases, a loss of livelihood.

About, 88.4% of respondents had faced a situation in past three years where lack of financial resources hindered the purchase of nutritional food. This reflects the degree of food insecurity in the district. At times when food expenses are extremely difficult to meet, people often rely on various strategies to cope with the

problem. The most commonly employed strategy is to sell household assets. 'Assets' to be sold may vary for different households based on their economic capabilities. Some may sell their land (partially or completely), others may sell agricultural products and livestock (or related products), some may sell their car or motorbike, and others may resort to selling jewellery. In such times, aside from selling assets, people may often rely on modifying production methods to increase crop yield and reducing household food consumption.

What are the migrants' destinations? The most popular migration destinations among rural Faisalabad are Faisalabad City (64.1%) and Lahore (23.1%). These destination choices are common for landless and small and large landholder households. It was also observed that non-farm households opted for Sialkot, Karachi and Islamabad. Post-migration, the most popular economic activities are employment in the government/private sector (31.8%), casual labour (23.5%), and serving in the transport sector (21.2%). Some migrants also work as skilled labour or even start their own business, but the percentage of such migrants is smaller (10.6% and 8.2% respectively). Before migration, most of these migrants were involved in agriculture back in the village (32.6%) or were casual labourers (22.2%). Conversely, about 25.8% were students prior to migrating and therefore were not involved in economic activities. Figure 10 shows the major destinations for rural migrants of Faisalabad.

Figure 10: Major destinations for rural migrants of Faisalabad
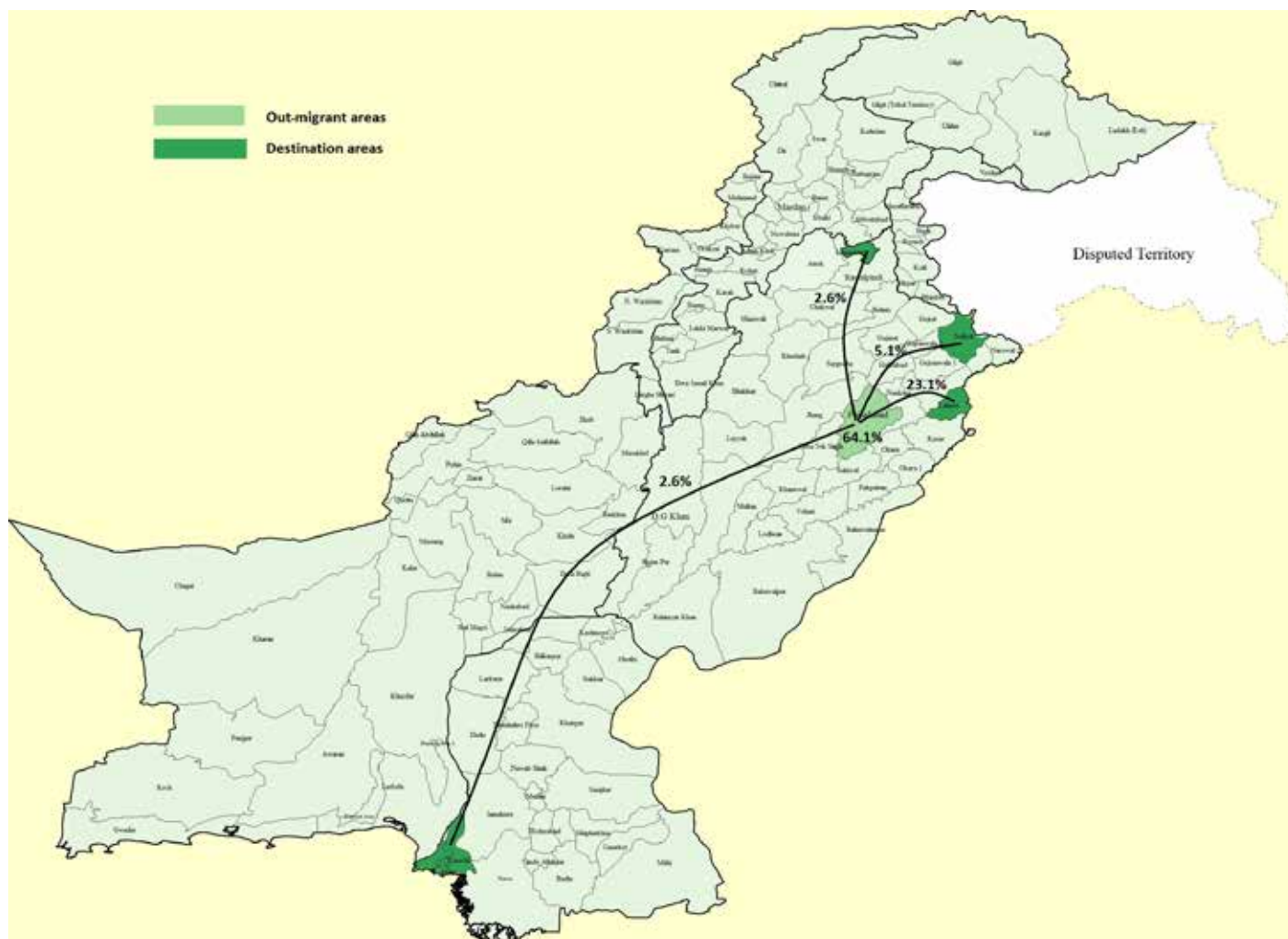
Source: Authors' own

The impact of migration on left-behind household members. In gender-segregated FGDs, it was highlighted that men and women have somewhat equal opportunities to get education until secondary school, after which education for women is no longer a priority. Women are involved in labour work, but the wage differentials between men and women are stark. Women do not have much freedom to make decisions on matters outside the home. Their suggestion may be taken, but the final decision is in the hands of men. They are not allowed to go far from the village for work, and the migration of women—except by marriage—is not common. Women may make financial decisions on household expenditures, but even these decisions are made by men in most households. In the case of migrant households, remittances sent home are also controlled by the men who remain there, which in most cases are either the father or the brothers of the migrant.

Cotton-picker in Faisalabad ©Rajeshree Sisodia

The role of remittances. More than 60% of households with migrant members receive remittances on a regular basis that amount to 50% of their average monthly incomes. Small landholders heavily rely on remittances as they make up more than 50% of their average monthly income; 31.6% households spend these remittances on food, 21.4% spend them on other consumer goods, and 22.4% spend them on health expenditures. On average, only 15% of households that receive remittance use it to invest in livelihood improvement.

The role of social networks. Migrants' access and use of social networks at the destination area are very important. For 11.6% of non-migrant households, lack of any connections in the city is the main factor for not migrating. Advice and recommendations of friends and family are taken into account in the decision-making process. About 52.6% of households said they give due importance to their friends' and relatives' advice while making the decision to migrate. At 72.9% most people rely on family and kin to support them when migrating, while about 17.9% receive help from extended community networks (friends, neighbours, etc.).

Why do non-movers not migrate? Among non-migrants, the landless, small landholders and non-farm households reported that the major factor for not moving away from the village (for any reason) was a lack of financial resources. For the large landholders, the main reason for staying was that they did not want to be separated from their families, and sometimes also because of their influential role in local politics. According to respondents' estimate, around PKR 10000 to 100000 ($100 to $1000) would be required to migrate to a nearby city or migration within the country, and for international migration PKR 500000 ($5000) and above would be required. People are willing to migrate due to economic reasons; in most of cases, the head of the households are willing to migrate for better earnings because they are experienced and old enough to cope with problems. People who are most likely to migrate from this district are in the 14-31 age bracket. People who are least likely to migrate are often alone or are the only male in the household and therefore must take care of their family.

Is there any return migration? The rate of return migration is not high. Most people who have settled outside the villages only visit their village of origin during holidays (78.8%), while a significantly smaller amount want to return permanently to settle and start their own business or want to live with their families in the village (21.2%).

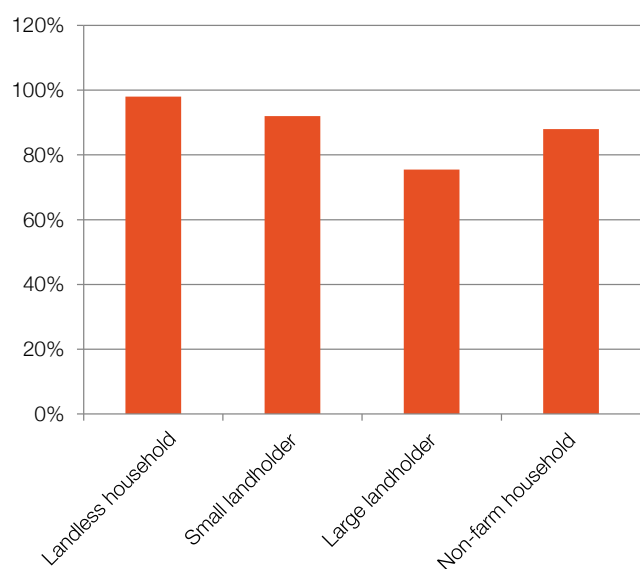## Figure 11: Percentage of population facing food insecurity in Faisalabad

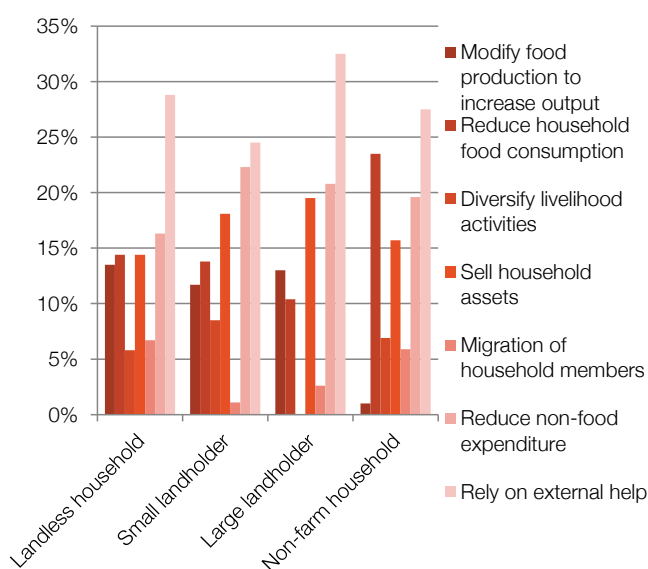## Figure 12: Coping strategies for food insecurity in Faisalabad

Figure 13: Reason for migration
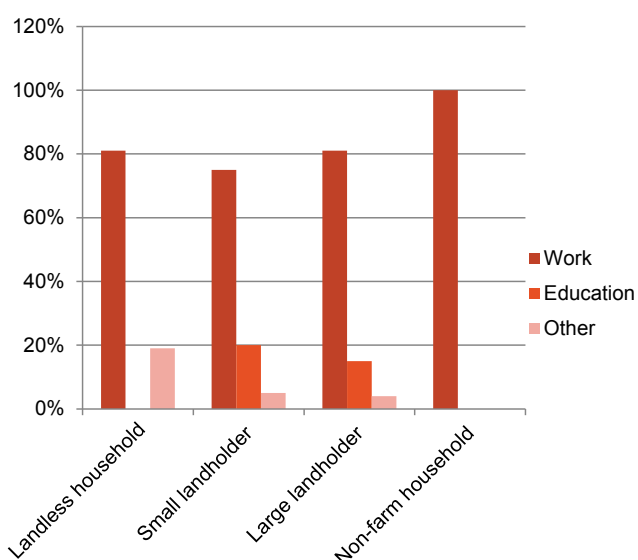
Figure 14: Use of remittances

Source: Authors' own
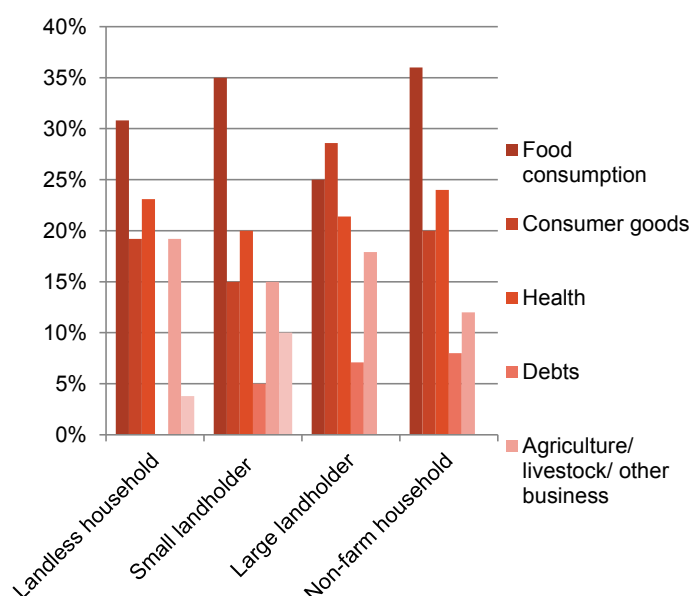
2.2.3. Mardan

Like the other two study sites, agriculture is the primary occupation for most people in rural areas of the Mardan district. Commonly harvested crops in the region include tobacco, sugarcane and wheat. People in Mardan often opt for migration as an income diversification strategy. About 38.5% of total households surveyed in the district have at least one migrant member in the household. The concept of migration is most common in large landholder households where 56% have one more migrant members. On the other hand, 40% of small landholder households, 32% of landless households, and 26% of non-farm households have one or more migrant members.

What induces people to migrate? The majority of farm and non-farm households have diversified sources of incomes. Even as a secondary source of income, agriculture remains the most popular choice in addition to small businesses (such as shops, construction, etc.). Landless and small landholder households are engaged in subsistence farming, while large landholders are engaged in farming for commercial purposes (i.e. the sale of agricultural produce). About 62% of large landholders sell as much as 75% of their agricultural production at the market.

People in Mardan generally undergo migration for the sake of work, however, only 12% of small landholders and 19% of large landholders also migrated to get an education (see Figure 16). Rankings for reasons to migrate showed that unlike D.G. Khan and Faisalabad, more than 50% of respondents in Mardan ranked educational and health issues in the village as important factors in making the decision to migrate. Moreover, for livelihood purposes, the availability of more opportunities in urban areas and the lack of employment options in villages were considered very important. All other factors comprising of environmental and social issues (such as water quality, salinization of land, less availability of land, conflict with friends and family) were ranked as not important. Major issues prevalent at the village level include unemployment, security concerns, and insufficient health facilities. The surveyed villages are quite underdeveloped: they lack facilities for higher education, therefore, among the respondents only 30% had completed secondary education; there is no health care facility in any of the villages surveyed and, on average, about 60% of households complained of health issues among household members that affected their livelihood activities. Plus, in the last five years farmers have faced two crop failures due to heavy rains and pest attacks.

Among non-farm households, major livelihood-related issues include difficulty finding work, delayed payments, and underpaid jobs. There is a wide gap between the economic classes, with large landholders amongst the richest in the village while most non-farm households are amongst the poorest (and belong to the lowest income quintile).

About 70% of respondents in Mardan faced situations in which they had inadequate access to food. In such situations most landless and non-farm households must reduce their household's food consumption either by reducing portions or changing their diets, while large landholders modify food production methods to increase output. Small landholders often resort to selling household assets (20%) and rely on external help (20%). During such times, 12.6% of respondents diversify their livelihood activities. This is common for both large

landholders (15.1%) and landless households (14%).

Most people who migrate are between the ages of 14 and 31. Those below the age of 14 and above the age of 40 are the least likely to migrate in all types of households. Among the landless, small landholders and non-farm households, a lack of financial resources was the main barrier to migration. If resources were available or made available to them (through microcredit, loans, etc.), more than 65% of households would prefer to send a family member to a city or town.

What are the migrants' destinations? The most common migration destinations for the rural respondents of the district are Peshawar (30.3%), Mardan City (15.2%) and Swabi (9.1%). Additionally, out-of-province migration is largely to Karachi (Sindh) (10.6%), Islamabad (Federal Capital) (9.1%) and Quetta (Baluchistan) (10.6%). Still, Peshawar is the most popular destination for all types of respondents in this district.

Prior to migration, 26.2% of migrants (a majority) were involved in agriculture-related activities, 26.1% were students (roughly the same percentage), 18.9% were casual labour, 18% unemployed, 5.6% were government or private job holders, and only 3.6% had their own business. Post-migration, 36.7% of migrants work as casual labourers, 35.8% are employed by the government or private sector, 7.3% are skilled labourers, 7.3% have their own business, and 8.3% are involved in transportation services (such as taxi or rickshaw drivers). Figure 15 shows the destinations for migrants from rural Mardan.

Figure 15: Major destinations of rural migrants of Mardan
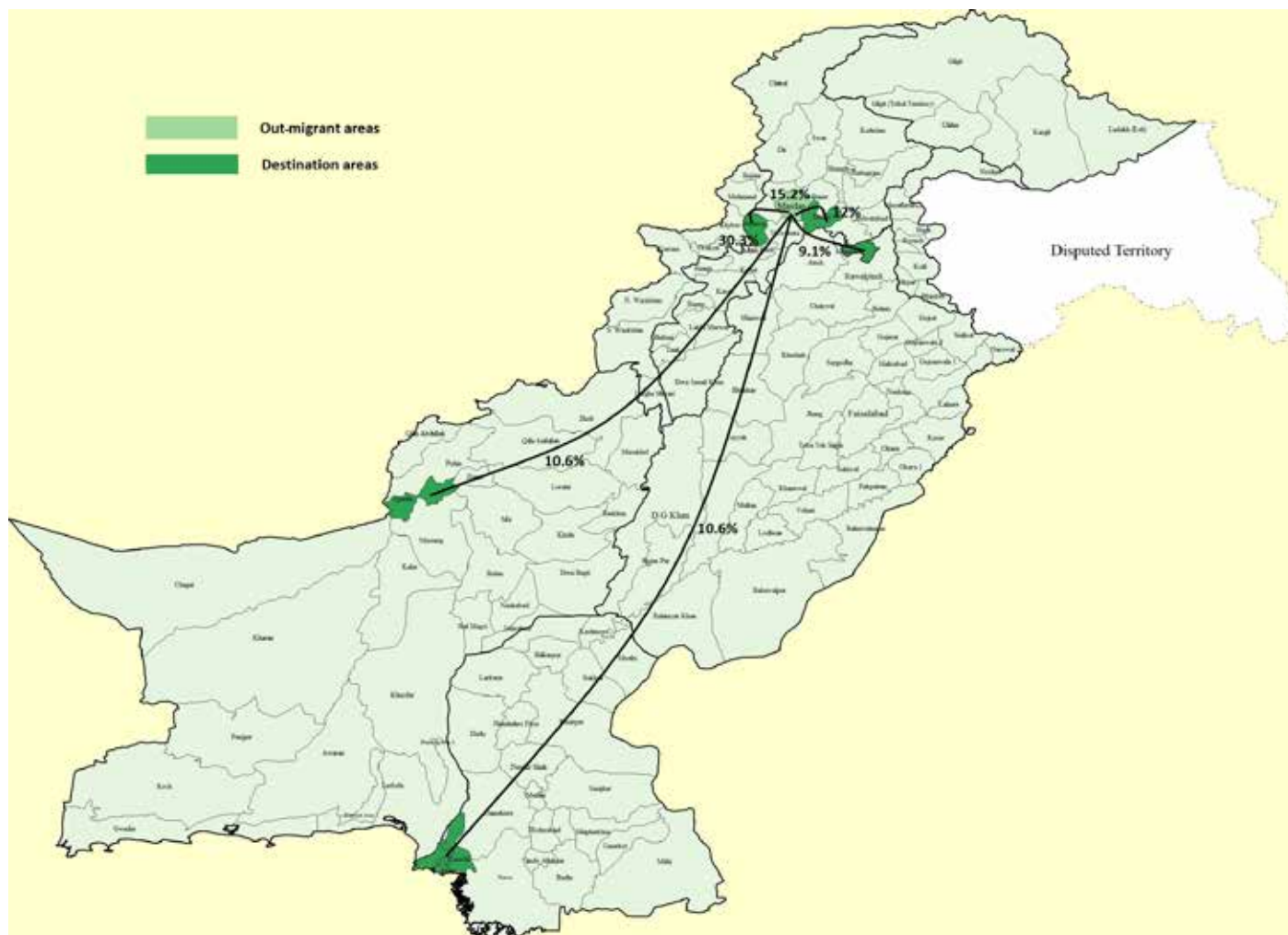
The impact of migration on left-behind household members. Like the other study sites, in Mardan men are the dominant decision-makers, though suggestions by women are taken into account. Women have more say and decision-making power on matters of children and the home. While they are allowed to be educated, if money shortages occur girls are the first to be denied education. The only suitable jobs considered for women are either teaching or serving in the health department. It is not socially acceptable for women to migrate for the sake of work.

The role of remittances. More than 80% of migrant households receive money from migrant family members. Among them, more than 60% receive money regularly, while the rest receive it occasionally. In most cases, remittances make up half—or more than half—of the total monthly income. An exception is large landholders; for them remittances make up less than half of their monthly income. Most respondents usually spend remittances on food purchases (36.5%), followed by health expenditures (23.7%), and consumer goods (17.4%). Investing remittances in productive use, such as livelihood improvement, is not common; only 15% of large landholders and less than 5% of small landholders and landless households invest their remittances in productive livelihood means, while none of the non-farm households invest in productive livelihood means.

The role of social networks. In Mardan, the social network trends of non-migrants were similar to those of D.G. Khan and Faisalabad; 8.1% of non-migrant households mentioned that the lack of access/presence of friends and family in other locations is the main reason they have not migrated. People give much importance to the advice and suggestions of their social contacts; 35.7% of households believed that they decided to migrate based on advice from friends and family. The importance of having a social network in the destination area can be judged by the fact that 38.4% of migrant households mentioned that relatives provide help at the destination, 23.3% mentioned friends, and 5.5% mentioned neighbours.

Why do non-movers not migrate? Among the non-migrant landless, small landholders and non-farm households, a lack of financial resources was the main barrier to migration. If resources were made available to them (through microcredit, loans, etc.), more than 65% of households would prefer to send a family member to a city or town. Among the non-migrant large landholders, the decision to stay in their villages was a choice they made because they were happy there and preferred to stay with their families. The initial cost for internal migration or migration to a nearby city is same as the other districts PKR 10,000 to 100,000 ($100 to $1000). But for international migration, they mentioned the required amount would be PKR 300,000 to 500,000 ($3000 to $5000). Young people aspire to migrate due to lack of economic opportunities in the village. People who are the least likely to migrate—such as heads of households responsible for looking after their business and family—mentioned that, due to family issues, they are unable to migrate.

Is there any return migration? As compared to the other two study sites, the rate of return migration is lower in Mardan. Only 4.8% of migrants surveyed returned to their villages. Estimating the intent of current migrants to return shows that only 4.5% migrants plan to return on a permanent basis to start their business or live with their family, while the rest come back to just visit their family and relatives. It should be noted that this percentage of return migration is only based on intent – none of the migrants had returned to the village yet.

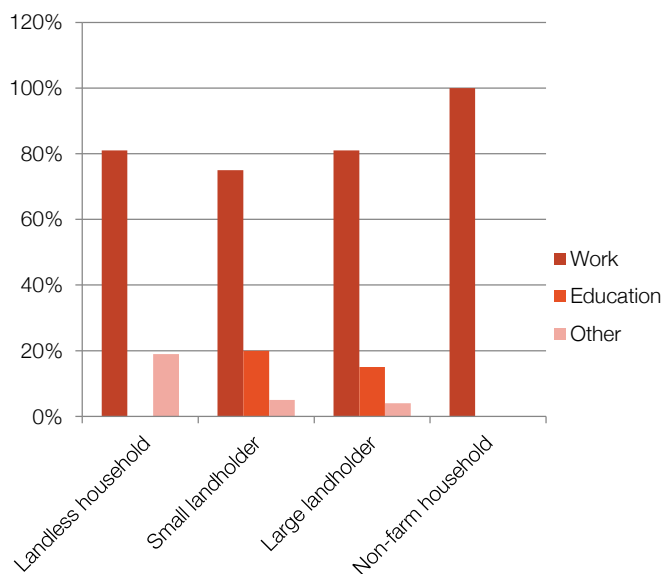## Figure 16: Percentage of population facing food insecurity in Mardan

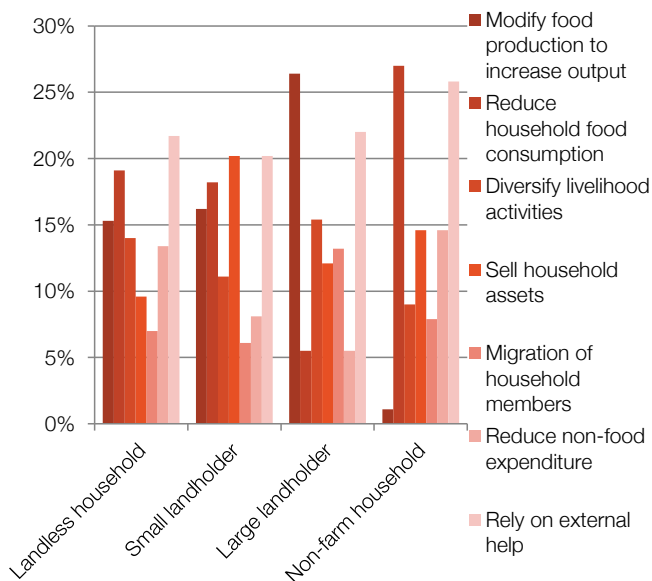## Figure 17: Coping strategies for food insecurity in Mardan
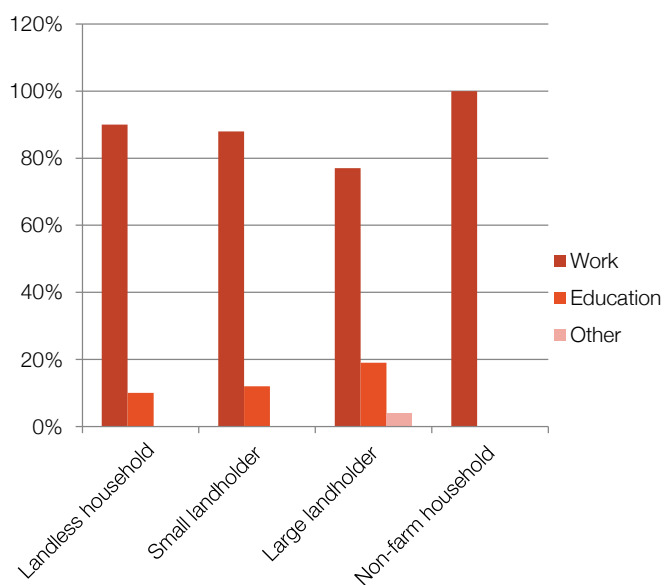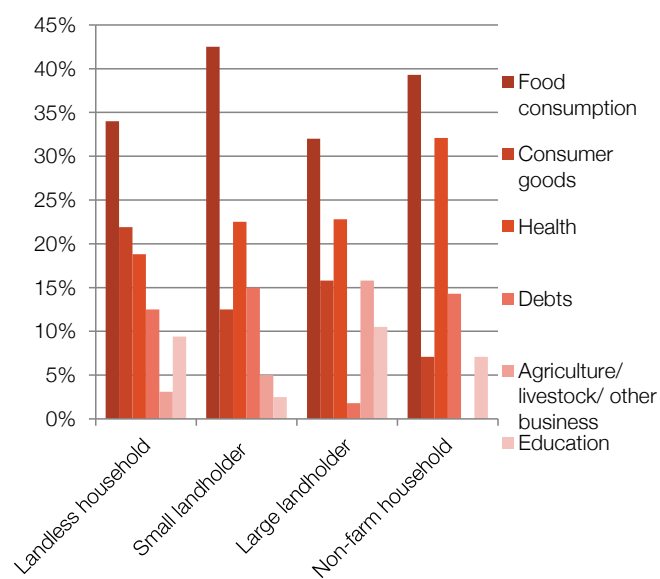

Figure 18: Reason for migration

Figure 19: Use of remittances

Source: Authors' own

3. Discussion

3.1. Migration, resilience and adaptation potential

Using a livelihood resilience framework, we tested the hypothesis if migration improves livelihood resilience and provides a source of adaptation (to climate change) as well as boost economic opportunities in rural Pakistan. We also explored if it acts as a maladaptive strategy that results in socioeconomic inequalities for the left-behind family members (including women, children, the elderly and the poor)? We found that migration movements tend to strengthen livelihood opportunities, social and human capital, and overall resilience among rural households. Migration improves the resilience of migrants' left-behind families through better living standards, better access to resources, and greater potential to utilise remittances for productive purposes.

Adaptive capacities are essential to sustain and improve livelihood strategies against any social, economic, political and environmental stressors (Tanner et al., 2014) as well as enhance learning to cope with disasters and ability to change behaviour after a disaster (Scheffran et al., 2011; Jones et al., 2010). We found a positive association between migration and increasing the adaptive capacities of households in our sample rural areas (see Table 2 and Figure 3). The study argues that migrant families are more capable of gathering livelihood assets, improving incomes, and ensuring food security than non-migrant families. Our results show that migrants' families are more income diverse, are more involved in progressive farming, have lower dependency ratio, and are more educated. They also have more access to employment opportunities and better housing and household amenities (see Appendix 4). The female participation in household income is high, as compared to non-migrants. They are socially more secure and satisfied with their living standards, which enable them to be less affected during natural disasters.

Similarly, better resilience can also be achieved through anticipatory capacities. It refers to the ability to pro-actively prepare and plan for an upcoming stressor (Boyd et al., 2009). It requires predictive capacities, knowledge, skills and experience (Folke, 2006; Tschakert and Dietrick, 2010). Our analysis suggests that anticipatory capacities of migrant households are better compared to those of non-migrant households. They are more capable to anticipate by learning new skills, having better access to social networks to deal with issues, having access to information and an understanding how to mitigate risks and hazards (see Table 2 and Figure 3). Migrants' families have a greater capacity to manoeuvre decisions about education, investment and business, and a greater capacity to show their capabilities (see Appendix 4).

Resilience also requires enhancing the absorptive capacity, which refers to the ability to absorb and cope (during and after) the impacts of disturbances (OECD, 2014). Béné et al. (2012) explain absorptive capacity in terms of 'persistence and stability' influenced by supportive economic resources such as asset holdings and savings, as well as links to informal safety nets and social capital (Starr and Tabaj, 2015). The score of our absorptive capacity index indicates that migrant households have better access to financial resources and have more alternative options than non-migrant households (see Table 2 and Figure 3). Migration diversifies the household assets and human capital that result in better housing and living standards and better access to health facilities and transport, etc., all of which are essential for appropriate response to any shock or stress (see Appendix 4).

However, the study finds it challenging to develop an understanding of resilience in societies with varying social, economic and cultural values. In this regard, Tanner et al. (2014), raised an important concern: 'resilience of what type, for whom?' Resilience is a concept about the system's capacity to 'bounce back' to its original conditions, but what if the previous conditions are 'undesirable'. In this way, people may be locked in poverty, injustice, inequality and discriminations (Schipper and Langston, 2015; Tanner et al., 2014). In other words, resilience (especially for the poor and marginalised) needs to be redefined, and there is a need to develop consensus on 'desired states' (Tanner et al., 2014). For example, migration occurs in the state of inequalities as it is beneficial for those who were previously well-off and would only help them to build resilience, leaving the poor and marginalised behind and worse off (Lipton, 1980). This study was carried out under these limitations and only presents the ex ante perspective of resilience with respect to internal migration. Moving forward, a focus is needed on incorporating transformational aspects of resilience, with some thinking on 'desired states' of adaptation that are essential to responding to climate change impacts.

Still, this study has been successful in pointing out that migration tends to benefit all income groups in rural Pakistan. Migration seems to improve not only the already well-off families, but also helps boost socioeconomic conditions for poor rural households—although poor households are only able to improve livelihoods through small-scale labour migration to adjacent areas. Even then they are not able to unlock the absolute poverty traps and struggle to find prosperous and sustainable livelihoods. However, migration provides the rural poor with hope and opportunity, which should be facilitated through vocational training, easy access to finance,

and improvement in human capital through investment in health and education. In this regard, women in poor rural households can be the best target for improving livelihoods and rural development. We observed in our women-only FGDs a strong motivation in rural women to contribute to family income, to learn new skills, and to travel to cities if provided with a safe working environment. Despite many socio-cultural and workplace-related limitations, the role of women is crucial in building livelihood resilience. This is because migrating women around the world prove to be better at contributing to family wellbeing, schooling, and remitting larger amounts of money (compared to men), plus they have experienced expanded roles in family decisions and a reduction in domestic violence (Nyberg-Sørensen et al., 2002; Gioli et al., 2014).

3.2. Migration and economic opportunities in semi-arid regions of Pakistan

Migration is a normal social aspect of human life that has emerged from historical and current patterns of inequality among regions in levels of development, poverty and unemployment. It is also driven by human insecurity, disparities in living standards, and discrimination embodied within and across societies of origin and destination (Castles, 2010, 2013; Van Hear, 2010; Adepoju, 1998; King and Skeldon, 2010). The drivers of rural-to-urban migration in Pakistan follow similar patterns. Our results show that most of the migrants moved from rural areas to urban areas due to extremely low wage rates and lack of work opportunities in the villages; with their current experience and skills, they are able to find better job opportunities in the cities. According to recent government estimates, 61% of the total working-age population in Pakistan is living in rural areas and about 5% of rural labour force is unemployed (GoP, 2015b). Other important factors that drive migration include lack of quality education and health services in rural areas, and adverse environmental or climatic factors.

The above reasons for migration indicate that rural areas of Pakistan, in general, do not have enough livelihood opportunities. This, in turn, pushes the rural population to look for opportunities elsewhere. For instance, as the Pakistan's economy shifts towards the industrial and services sector, the share of the agriculture sector on the Gross Domestic Product has declined from 49% in 1951 to 21% in 2014 (Salik et al., 2015a; Zaheer, 2013). Growth within the agriculture sector has remained low over the past decade due to the low uptake of progressing techniques, lack of government investment in the sector, slow rate of technological innovation, and poor credit facilities for agriculture production (GoP, 2015b). Furthermore, there are many farm-level problems, which include declines in water availability for irrigation, high farm-input prices, and frequent environmental hazards (such as heavy and abrupt rainfalls, recurrent floods, soil salinization and erosion).

A farmer in district Faisalabad sowing new crop. ©Ayesha Qaisrani

Most migrant families indicate that staying in the agricultural profession would not provide enough benefits for their families. It is evident from the fact that, in our study areas, most of the small- to medium-sized farmers practice subsistence agriculture and have little or nothing to sell at the market. Most rural households have faced high food insecurity situations lasting many months a year. Migration becomes an inevitable response to this. Rural youth finds no incentive to stay in rural areas, and they ultimately decide to migrate towards urban areas, helping them to spread their family's food security risks and attain stable livelihoods. Our study results show a strong relationship with food insecurity, poverty, and inequality in access to financial resources with migration movements. During the FGDs, we found that rural youth initially search for industrial and other private sector jobs in nearby towns and cities. Once successful, they save money and develop linkages with migration networks through friends and colleagues and search for opportunities for international migration. This trend is more common among aspiring first-time young migrants and less so with poor rural youth who have no family history of international migration as they usually the lack family networks and resources needed to support international migration. In most cases, as our FDG participants tell us, efforts to move abroad were unsuccessful and subject to despair, asset loss and debt.

However, internal migration shows more positive outcomes for the poor and left-behind families who remained in the villages, as it improves incomes, supports household consumption, and generates saving. Although success greatly depends on the migrant's human and social capital (i.e. education, capacity, age, the length of migration, and networks). Remittances have a significant contribution to make livelihoods more secure, to reduce income uncertainty and provide a source of new investment in land and property (Deshingkar, 2006; Rogaly, 2002; Oda, 2007). In our study areas, evidence suggests that remittances are mostly used for household consumption (food, health, dowry or weddings, repaying debts, etc.) and less on investment for expanding livelihoods or other productive purposes. For example, from all income groups, up to 80% of migrant families are receiving remittances that constitute 50%—or even more—of their monthly household income. This also highlights the contribution of remittances in the reduction of rural poverty and food insecurity in the study areas. Remittances have also been used to invest in advanced agricultural practices and agro-based businesses by return migrants in our study areas.

The debate on migration and its effects on inequality are varied and inconclusive (Black et al., 2005). When considering the context and selectivity of migration, the literature indicates that inequality of any kind (such as in income, social order, access to opportunities, gender, or lifestyle) can generate a specific type of migration (internal or international; short distance or long distance; rural-rural, rural-urban; etc.). Migration is also defined by access to migrants' social networks, jobs and benefits at the destination (Skeldon, 1997; Lipton, 1980; De Haan, 1999). Because migration involves risks and costs, the poorest of the poor are less likely to migrate (Black et al., 2005). Our survey results showed similar inequalities, as most non-migrants are willing to migrate (at least one member of the household) within the country to improve livelihoods, but only if they can afford to do so.

Currently, many scholars argue that migration and inequality outcomes need to be looked at through the wider spectrum of political, economic and social-cultural institution perspectives rather than only in terms of income or wealth outcomes (Black, et al., 2005; Black, et al., 2006; De Haas, 2010). The role of formal and informal networks in sharing the cost and risk of migration—especially for poor household income groups—are critical in reducing initial levels of inequality and poverty in both migration-sending and -receiving regions (Black et al., 2005; Black et al., 2006; De Haas, 2010). Our study also suggests that social networks and advice from relatives and friends played an important role in the decision to migrate or not; non-migrant households mentioned that the inability to access social networks and associated costs involved are the main reasons not to migrate.

In conclusion, we found (internal) migration to have a positive role in improving the socioeconomic conditions of rural households through the reduction in the overall poverty, improving livelihoods, and enhancing economic opportunities. Thus, migration would help in resilience building and the potential for adaptation to any stressor (e.g. climate change, income shocks).

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4. Conclusion

This study provides an ex ante assessment of the state of the resilience of migrant and non-migrant rural households in semi-arid regions of Pakistan. We used a livelihood resilience framework and a case study approach to answer some key questions about the role of migration in improving resilience these regions. Furthermore, we tried to explain how migration can potentially be shaped as an adaptation strategy, and its potential to introduce new economic opportunities through the role of remittances and return migration. Our analysis also takes into account the distributional effects of migration, especially for women and the poor. The study provides following conclusions:

- Migration movements critically strengthen the livelihood resilience of migrant families. Migrants are able to diversify livelihood opportunities, reducing risks of income failure, and are able to expand social and human capital. Migrants' left-behind families experience the positive outcome of migration – especially poor migrant families – by getting better living standards, better access to resources, and a greater potential to utilise remittances for productive purposes.

- We found a strong association between migration and increase in adaptive capacities of rural areas. Migrant's families are more capable of gathering livelihood assets, improving incomes and ensuring food security than non-migrants' families. We establish that migration in semi-arid regions shows potential for transformational adaptation to reduce risks and impacts of any stressors, such as climate change.

- Migration improves anticipatory capacities of migrant households. They are more capable of anticipating future conditions by learning new skills, having better social networks to deal with issues, gaining access to information, and understanding ways to mitigate risks and hazards.

- Migrant households show enhanced absorptive capacities through better access and more alternative options to financial resources. Migration diversifies the household assets and human capital that result in better housing and living standards, access to health facilities, transport and credit, etc., which are all considered essential for appropriate responses to any shocks or stressors.

- The major causes of internal migration in semi-arid regions are extremely low wage rates and a lack of work opportunities in the villages; a lack of quality education and health services in rural areas; high food insecurity situations; and adverse environmental or climatic factors.

- Remittances are important to make livelihoods more secure, to make housing better, and to improve the standard of living. They also help to reduce income uncertainty and provide a source of new investment in land and property purposes. Remittances can also help to reduce rural poverty in the study areas. Return migrants can invest in advanced agricultural practices and agro-based business.

- We also find inequality in opportunities of migration in rural areas. The majority of non-migrants are willing to migrate internally to improve livelihoods (at least one member of the household) – only if they're able to manage the minimum financial resources essential for migrating internally. Non-migrants also lack access to social networks and consider it a main hurdle of their decision to migrate.

- Migration, which is being used as an adaptation strategy, is gendered since it requires both social and economic capacities that are not equally available to women. We find strong motivation among rural women to learn new skills and a desire to contribute to family incomes. In this regard, they show interest in moving to cities for education and work, if suitable and safe conditions are available from the family and the government.

Results of this study call to revisit the government approach of viewing rural-to-urban migration in a pessimistic context. Pakistan does not have an internal migration policy, however, the general concern of internal migration discourse has always called for measures to 'control' urban in-flows. The government should recognise the resilience-enhancing potential of migration rather than view it as a rapid urban agglomeration issue. Policy focus needs to promote the positive impacts of migration while being cognizant of the negative impacts. The welfare of all citizens of Pakistan, including urban and rural dwellers, should be taken into account while planning for population flows and development expenditure. Investment of remittances should be channelled towards livelihood-enhancing sectors, such as small enterprises for agriculture value addition, packaging and storages, etc. Furthermore, migration is a socially-embedded phenomenon, which is challenging to curb. Rather, an effort should be made to improve education, capacities and skills among rural youth, so as to provide an effective contribution to urban as well as national economic growth. This, subsequently,will improve their personal and family livelihoods.

4.1. Way forward

The next phase of this study will focus on a more detailed inquiry of semi-arid regions in Pakistan on the following key questions:

- To what extent will climate extremes increase people's livelihood vulnerabilities in semi-arid rural areas over time?

- What policy shifts/changes and institutional capacities are needed in semi-arid regions to support migration as an adaptive strategy while reducing the social costs of migration for women, children and the elderly?

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Migration futures in Asia and Africa: economic opportunities and distributional effects – the case of Pakistan

Appendices

Appendix 1: Data sampling

```
                    Pakistan
                   /        \
              Punjab          KP
             /      \           \
     D.G. Khan   Faisalabad    Mardan
        |            |            |
     UC Kala      UC 116      UC Rustam
        |            |            |
     UC Sokar     UC 39       UC Jalala
```
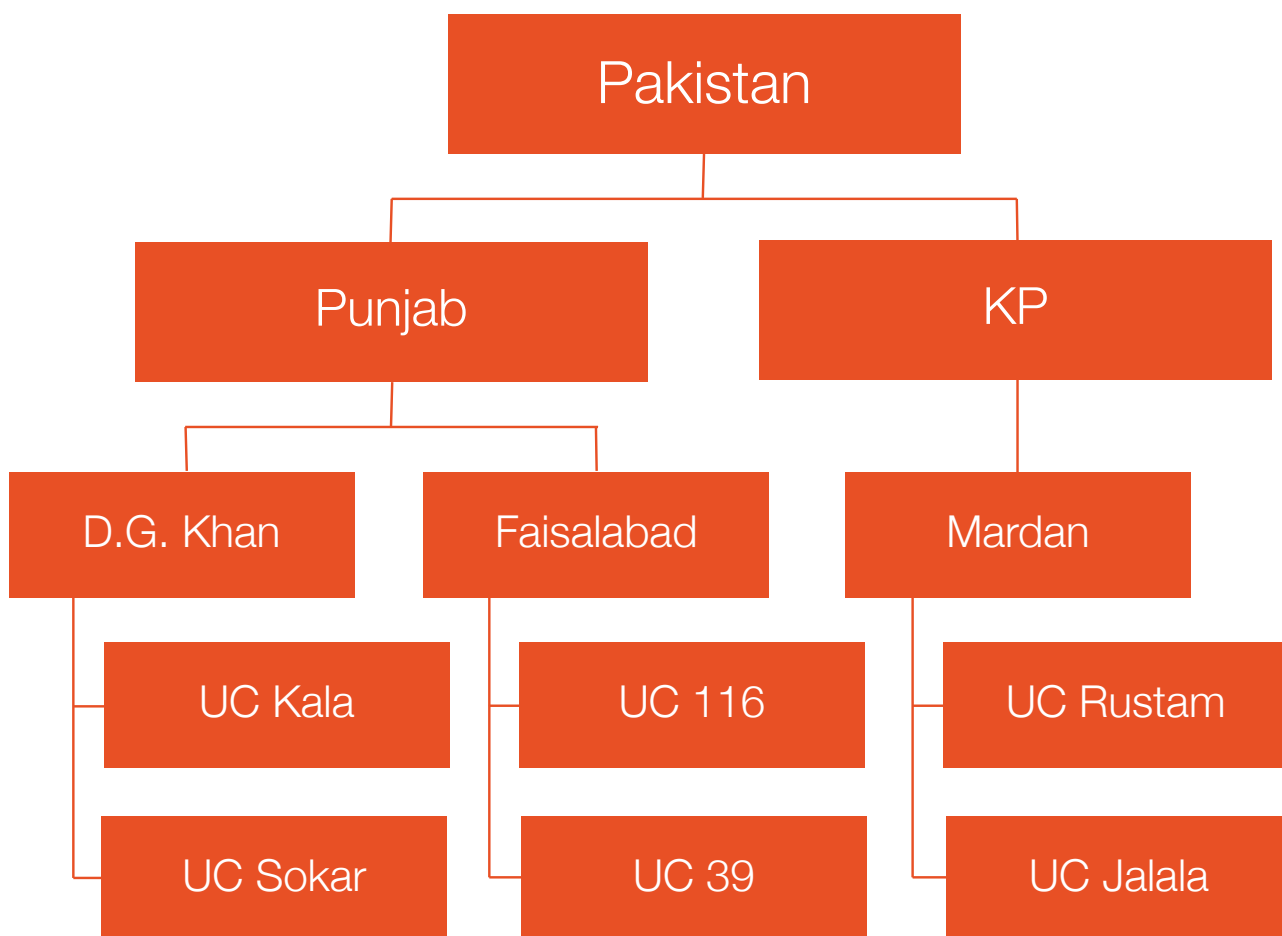
Appendix 2: Formula for the sample size calculation

$$n = \frac{inv\chi^2_{(1-\alpha,1)}(N)(\alpha(1-\alpha))}{(\alpha^2)(N-1)+(inv\chi^2_{(1-\alpha,1)})(1-inv\chi^2_{(1-\alpha,1)})}$$

Where , n = required sample size. In this case, it came out to be 100

χ = the tabulated value of inverse of chi-square for degree of freedom (=1) at the desired confidence interval (5%)

N = population size of village (on average, about 200 households in one village)

α = degree of accuracy (expressed as a proportion) = 95%

	Name of district	Name of Union Council (UC)	Sample per UC	Landless (agrarian workers)	Small landholder (less than 12.5 acres)	Large landholder (greater than 12.5 acres)	Non-form HH (non-agrarian workers)
Punjab	**D.G. Khan**	Kala	100	25	25	25	25
		Sukar	100	25	25	25	25
	Faisalabad	116	100	25	25	25	25
		39	100	25	25	25	25
KP	**Mardan**	Rustam	100	25	25	25	25
		Jalala	100	25	25	25	25

Source: Authors' own.

Appendix 3: Note on sampling error

Using a large sample size and an appropriate sampling technique can help in reducing the sampling error, which is otherwise unavoidable. An appropriate sample size of 600 was calculated (200 from each district). There were six defining criteria for our sample size: 1) level of significance, which reflects the level of uncertainty in the sample mean as an estimation of the population mean, generally accepted at 95%; 2) margin of error (MoE), which refers to the expected half-width of the confidence interval (for smaller MoE, larger samples are needed – we took 0.05 MoE, which is 5% of the total population); 3) baseline levels of indicators, which demonstrate the estimated prevalent of risk factors within the target population (values reaching 50 are considered conservative, and in our study it is 0.5); 4) design effect, which describes the loss of sampling efficiency owing to complex sample design; 5) variation in target population; and 6) available resources for this study and time frame.

Appendix 4: Construction of resilience index

We follow the procedure followed by Cutter et al. (2010) for constructing the resilience index for migrant and non-migrant households. The framework of analysis mentioned in Section 1.2 provides the basis of our selection of variables through literature review.

Results of resilience index for migrant and non-migrant households

Livelihood resilience/ determinants	Explanatory variables	Effect on resilience	Migrant	Non-migrant	Significant difference (P-value)
Adaptive capacity					
Assets, access, income and food security					
Household income	Percent of households living above poverty line	Positive	0.717	0.548	0.000*
Dependency	Ratio of individuals in non-working age group to working age group	Negative	0.394	0.323	0.382z
Nature of dwellings	Percent of households with houses made of permanent material	Positive	0.766	0.652	0.003**
Food insufficiency	Percent of households with food insecurity	Negative	0.193	0.138	0.090***
Livestock ownership	Percent of households with livestock	Positive	0.693	0.657	0.366
Land ownership	Percent of households with agriculture land	Positive	0.544	0.489	0.176
Employment rate	Percent of work force employed	Positive	0.445	0.406	0.023**
Education	Percent of people educated at secondary level and above	Positive	0.309	0.253	0.000*
Access to drinking water	Percent of households with access to improved drinking water facilities	Positive	0.816	0.764	0.132

Livelihood resilience/ determinants	Explanatory variables	Effect on resilience	Migrant	Non-migrant	Significant difference (P-value)
Unequal access to resources	Gini-coefficient (0=equality; 1=inequality)	Negative	0.380	0.390	
	Average		0.526	0.462	
Strengthening and adapting livelihoods					
Youth population	Percent of non-elderly population (ages 14 to 29)	Positive	0.353	0.325	0.036**
Income diversification	Percent of households with more than one source of income	Positive	0.819	0.388	0.000*
Main purpose of agriculture and livestock produce	Percent of households selling crops and livestock produce in the market	Positive	0.445	0.392	0.247
Source of water for irrigation	Percent of farming households with access to surface/tube well water	Positive	0.561	0.610	0.240
Destabilization of the livelihood system	Percent of households facing problems in livelihood activities	Negative	0.350	0.366	0.702
Natural disasters	Percent of households affected by natural disaster in the last five years	Negative	0.389	0.435	0.262
Female involvement in workforce	Percent female labour force participation in livelihood activities	Positive	0.067	0.083	0.236
Professional wellbeing	Percent of households satisfied with current profession	Positive	0.750	0.612	0.000*
	Average		0.467	0.401	
Anticipatory capacity					
Preparedness and planning					
Risk management perception	Percent of households dealing with problems with ease	Positive	0.418	0.306	0.005**
Learning new skills	Percent of households learning new things in life	Positive	0.287	0.199`	0.013**
Degree of self-determination	Percent of households deciding freely about life	Positive	0.721	0.697	0.515
Planning for future	Percent of households planning for the future	Positive	0.775	0.711	0.081***
Coping (food) strategies	Percentage of households depending on more than three coping strategies	Positive	0.427	0.348	0.076***
	Average		0.526	0.452	
Capacity, information and mobilization					
Lack of representation/ social inequality	Percent of households that think that they have little chance to show their capabilities	Negative	0.324	0.404	0.045**
Degree of wellbeing and self-satisfaction	Percent of households that think that they are satisfied and have had valuable contributions to society	Positive	0.820	0.691	0.000*
Understanding climate change impacts	Percent of households that perceive climate change has had an impact on livelihood activities	Positive	0.547	0.478	0.103***
Access to TV/ newspapers	Percent of households with access to TV/newspapers	Positive	0.664	0.570	0.021**
	Average		0.589	0.536	
Absorptive capacity					
Saving and safety nets					
Credit accessibility	Percent of households that have loans	Positive	0.693	0.809	0.001*
Reasons of taking loan	Percent of households that take loans for livelihood improvement	Positive	0.462	0.347	0.015**
Real estate/financial property	Percent of households that have real estate/financial property	Positive	0.103	0.062	0.071***
Transport	Percent of households with a vehicle of any type	Positive	0.758	0.662	0.011**
	Average		0.504	0.470	

Livelihood resilience/ determinants	Explanatory variables	Effect on resilience	Migrant	Non-migrant	Significant difference (P-value)
Substitutable and diverse assets and resources					
Substitute of domestic-use water supply	Percent of households that have a substitute source of domestic-use water supply	Positive	0.045	0.034	0.447
Substitute of drinking water supply	Percent of households that have a substitute source of drinking water supply	Positive	0.066	0.059	0.742
Water storage	Percent of households able to store water	Positive	0.471	0.489	0.675
Use of remittances for investment	Percent of households that use remittances for livelihood investment purposes	Positive	0.263	0	
		Average	0.211	0.146	
		Sum of averages	2.822	2.467	

*(Note: *,** and *** imply significance at 1%, 5% and 10% respectively)*

Source: Authors' own

We used a comparative approach and utilised proxy variables for the construction of the resilience index. The steps included in constructing the resilience index were: 1) the data on selected variables were normalized all values by using a Min-Max scaling scheme to create a set of variables on the same scale (0 to 1); 2) we figured out the correlation matrix of all transformed variables and excluded those variables who were highly correlated with each other (R>0.70); 3) we figured out the internal consistency of the remaining variables – for this purpose we calculated Cronbach's Alpha value that was 0.698, which means that selected variables are internally consistent; 4) we also checked whether both migrant and non-migrant respondents are technically and significantly different from each other or not – for this purpose, we applied an independent t-test (p value 0.000< 0.05), which shows that migrant and non-migrant are statistically independent from each other; 5) the variables were adjusted regarding their impact on resilience (positive or negative); 6) each variable was equally weighed and aggregated to find out the final resilience score. Using equal weights for constructing composite indices is the most popular method (Beccari, 2016). Different weights for each proxy variable leaves room for subjective value judgment as experts and researchers may give different value to variables (Hudrlikova, 2013). Since this study is focused on three research sites, it cannot be ascertained whether each variable will have the same importance at each site. Therefore, to avoid any error based on subjective errors, we used equally weighted proxy variables.

List of variables used for the construction of the resilience index

Livelihood resilience/ determinants	Explanatory variables	Effect on resilience	References
Adaptive capacity			
Assets, access, income and food security			
Household income	Percent of households living above poverty line	Positive	Tanner et al., (2015); Brown (2011)
Dependency	Ratio of individuals in non-working age group to working age group	Negative	Barr et al., (2010)
Nature of dwellings	Percent of households with houses made of permanent material	Positive	Brooks and Adger (2005)
Food insufficiency	Percent of households that have experienced food insecurity	Negative	Wright et al., (2011)
Livestock ownership	Percent of households with livestock	Positive	Nelson et al., (2007); Ostrom (2009)
Land ownership	Percent of households with agriculture land	Positive	Nelson et al., (2007); Ostrom (2009)
Employment rate	Percent of work force employed	Positive	Adger et al., (2002)

Livelihood resilience/ determinants	Explanatory variables	Effect on resilience	References
Access to drinking water	Percent of households with access to improved drinking water facilities	Positive	Salik et al., (2015b)
Education	Percent of people educated at secondary level and above	Positive	Himes-Cornell and Hoelting. (2015);
Unequal access to resources	Gini-coefficient (0=equality; 1=inequality)	Negative	Twigg (2007)
Strengthening and adapting livelihoods			
Youth population	Percent of non-elderly population (ages 14-29)	Positive	Adger et al., (2002)
Income diversification	Percentage of households with more than one source of income	Positive	Twine (2013)
Main purpose of agriculture and livestock produce	Percent of households selling crops and livestock produce in the market	Positive	Adger et al., (2002)
Source of water for irrigation	Percent of farming households with access to surface/tube well water	Positive	Ellis (2014)
Destabilization of the livelihood system	Percent of households facing problems in livelihood activities	Negative	Adger et al., (2002)
Natural disasters	Percent of households affected by natural disaster in the last five years	Negative	Ellis (2014)
Female involvement in workforce	Percent female labour force participation in livelihood activities	Positive	Muthoni and Wangui, (2012)
Professional wellbeing	Percent of households satisfied with current profession	Positive	Tschakert and Dietrich (2010)
Anticipatory capacity			
Preparedness and planning			
Risk management perception	Percent of households dealing with problems with ease	Positive	Jones and Tanner (2015); Tschakert and Dietrich (2010)
Learning new skills	Percent of households learning new things in life Degree of self-determination	Positive	Tanner et al., (2015); Tschakert and Dietrich (2010)
Degree of self-determination	Percent of households deciding freely about life	Positive	Tanner et al., (2015); Tschakert and Dietrich (2010)
Planning for the future	Percent of households planning for the future	Positive	Tanner et al., (2015)
Coping (food) strategies	Percentage of households depending on more than three coping strategies	Positive	Tanner et al., (2015)
Capacity, information and mobilization			
Lack of representation/social inequality	Percent of households that think that they have little chance to show their capabilities	Negative	Tanner et al., (2015); Tschakert and Dietrich (2010)
Degree of wellbeing and self-satisfaction	Percent of households that think that they are satisfied and have had valuable contributions to society	Positive	Tanner et al., (2015); Tschakert and Dietrich (2010)
Understanding climate change impacts	Percent of households that perceive climate change has had an impact on livelihood activities	Positive	Tschakert and Dietrich (2010); Berkes (2007)
Access to TV/newspapers	Percent of households with access to TV/newspapers	Positive	Swanson et al., (2007); Colten et al., (2008)

Livelihood resilience/ determinants	Explanatory variables	Effect on resilience	References
Absorptive capacity			
Saving and safety nets			
Credit accessibility	Percent of households that have loans	Positive	Himes-Cornell and Hoelting (2015)
Reasons for taking loans	Percent of households that take loans for livelihood improvement	Positive	Himes-Cornell and Hoelting (2015)
Real estate/financial property	Percent of households that have real estate/financial property	Positive	Cutter et al., (2008)
Transport	Percent of households with a vehicle of any type	Positive	Cutter et al., (2010)
Substitutable and diverse assets and resources			
Substitute of domestic-use water supply	Percent of households that have a substitute source of domestic-use water supply	Positive	Frankenberger et al., (2012)
Substitute of drinking water supply	Percent of households that have a substitute source of drinking water supply	Positive	Frankenberger et al., (2013)
Water storage	Percent of households able to store water	Positive	Scheffran et al., (2011)
Use of remittances for investment	Percent of households that use remittances for livelihood investment purposes	Positive	Scheffran et al., (2011)

Source: Authors' own.

Use of Principal Component Analysis (PCA) for wealth index: comparing the resilience index of both migrants and non-migrants is not a straightforward method. It is important to test that resilience scores of migrant households and non-migrant households are, in fact, comparable. In case of two sample groups (migrant and non-migrant households), which may be fundamentally different from each other, indicating that resilience is a linear function of migration cannot be justified. Therefore, it is important to understand the underlying factors that may differentiate between the two groups in order to comprehend the differences in resilience. For this purpose, firstly, we developed a wealth index by using PCA. A wealth index is an economic indicator that is constructed using household asset items such as households' ownership of different durable consumer products (e.g. car, television, washing machine, tractor etc.) and assets (e.g. type of house, access to water, access to electricity, etc.) (a list of variables included is provided in the table below). In other words, a wealth index determines the living standard of people and divides them into wealth quintiles. The index provided us with five categories of both migrant and non-migrants (from Very Poor to Very Rich), and these categories are merged to form three categories out of those five (from Poor to Rich). This technique has provided us three homogenous groups of a selected population. Finally, we have compared the resilience of migrant and non-migrant by considering the homogeneity of the selected population.

PCA is one of the prominent techniques in social research for measuring non-arbitrary, replicable and systematic weights for asset variables. According to Filmer and Pritchertt (2011) PCA is the only technique that provides plausible and defensible weights for an index of assets which can serve as a proxy indicator for wealth. They have also recommended the use of PCA for calculating wealth effects.

The following are the three main assumptions that must be fulfilled before using PCA: 1) All variables should be on the same scale. For the validity of this assumption, we first converted household assets into the same scale by using Min-Max transformation; 2) Correlation between the variables must be less than 0.90. For our dataset we calculated the correlation matrix of all asset variables and excluded one of those variables whose correlation was more than 0.90; 3) KMO and Barlett's test must have significant results. In this test, our null hypothesis is that the correlation matrix is an identity matrix. An identity matrix is a matrix in which all the diagonal elements are 1 and all the off-diagonal elements are 0. In our dataset, KMO and Barlett's test has (<0.05) significant results, which means that the correlation matrix of all considered variables is an identity matrix.

Estimation of wealth index using PCA: The estimation of wealth index is based on the first principal component. By definition, the first principal component variables across households or individuals has mean zero and variance γ. It corresponds to the largest eigenvalue of the correlation matrix of x, which explains maximum variation as compared to all other components. Formally, the wealth index for household j is the

linear combination, which is given as:

$$y_j = \varphi_1\left(\frac{x_1 - \bar{x}_1}{s_1}\right) + \varphi_2\left(\frac{x_2 - \bar{x}_2}{s_2}\right) + \cdots + \varphi_m\left(\frac{x_m - \bar{x}_m}{s_m}\right)$$

Where, $\bar{x}_m$ and $\bar{s}_m$ are the mean and standard deviation of asset x_m, and φ is the weight for each variable.

Internal validity of wealth index using first principal component

Quintiles of wealth	Poor	Middle	Rich
	percent	percent	percent
Tube well ownership	11.7	23.1	56.5
Cow	50.8	57.0	69.9
Goats/sheep	29.2	28.1	33.5
Chicken	17.1	13.2	20.5
Home,permanent material	29.6	86.0	99.6
Home,temporary material	69.6	10.7	.4
Home,temporary and permanent material	.8	3.3	0.0
Insurance	1.3	2.5	16.7
Land/property owned	15.0	23.1	66.1
Access to electricity	95.4	99.2	99.6
Water supply (piped water)	35.4	18.2	10.5
Water from a nearby source	9.2	17.4	27.6
Hand/motor pump	52.1	66.1	66.1
Car/pickup	0.0	2.5	33.9
Motorcycle	18.8	62.8	86.2
Bicycle	24.6	34.7	40.6
Tractor	0.8	1.7	29.3
Donkey/horse	12.1	9.1	8.4
Washing machine	31.7	69.4	97.5
Generator/ups	1.3	6.6	60.3
TV	30.8	66.1	88.3
Refrigerator/freezer	15.4	59.5	97.1
Plastic water tank for water storage	19.6	52.9	74.5
Average wealth (mean score of first PCA)	-1.0121	-0.0096	1.02126

Source: Authors' own.

Results from PCA

Variable description	Migrant			Non-migrant		
	Mean (%)	Std. deviation	Factor score	Mean (%)	Std. deviation	Factor score
Land ownership	55	.499	.606	49	.501	.560
Tube/well ownership	32	.467	.503	32	.466	.475
Cow	61	.489	.270	59	.493	.266
Goats/sheep	34	.473	.067	29	.453	.081
Chicken	23	.421	.045	14	.348	.096
Home, permanent material	75	.434	.686	65	.479	.698

Variable description	Migrant			Non-migrant		
	Mean (%)	Std. deviation	Factor score	Mean (%)	Std. deviation	Factor score
Home, temporary material	23	.424	-.699	35	.477	-.685
Home, temporary and permanent material	2	.127	-.010	1	.075	-.104
Insurance	10	.298	.408	6	.241	.286
Land property owned	41	.494	.579	34	.474	.477
Access to electricity	98	.142	.202	98	.148	.220
Water supply	27	.443	-.285	19	.391	-.419
Water from a nearby source	15	.359	.065	20	.402	.335
Hand/motor pump	60	.491	.288	61	.489	.146
Car/pickup	18	.389	.584	11	.313	.505
Motorcycle	62	.486	.605	49	.501	.651
Bicycle	32	.469	.140	33	.472	.255
Tractor	14	.343	.478	12	.320	.546
Donkey/horse	10	.304	.018	10	.298	-.073
Washing machine	74	.441	.619	60	.491	.609
Generator/UPS	31	.462	.682	22	.418	.622
TV	66	.473	.517	57	.496	.613
Refrigerator/freezer	64	.480	.718	52	.500	.711
Plastic water tank for water storage	47	.500	.446	49	.501	.556

Source: Authors' own.

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