CLIMATE-INDUCED DISPLACEMENT AND MIGRATION IN PAKISTAN
Insights from Muzaffargarh and Tharparkar districts

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LIST OF ACRONYMS

BISP: Benazir Income Support Programme
CCC: Climate Change Council
CCD: Climate Change Division
CDM: Clean Development Mechanism
DMA: Disaster Management Authority
DRR: Disaster Risk Reduction
EIA: Environmental Impact Assessment
EPAs: Environmental Protection Agencies
FGDs: Focus Group Discussions
GDP: Gross Domestic Product
GLOF: Glacial Lake Outburst Floods
HR: Human Resource
IBIS: Indus Basin Irrigation System
IDMC: Internal Displacement Monitoring Centre
IOM: International Organization for Migration
LHV: Lady Health Visitor
MCCICC: Multi-Stakeholder Climate Change Initiative Coordination Committee
MECC: Migration, environment and climate change
MoCC: Ministry of Climate Change
NAP: National Adaptation Plan
NAPA: National Adaptation Program of Action
NCCP: National Climate Change Policy
NCS: National Conservation Strategy
NDMA: National Disaster Management Authority
NDRRMA: National Disaster Risk Reduction and Management Authority
PDMA: Provincial Disaster Management Authority
PEPA: Pakistan Environmental Protection Act
PEPC: Pakistan Environmental Protection Council
PEPO: Pakistan Environmental Protection Ordinance
PPAF: Pakistan Poverty Alleviation Fund
PPRD: Progressive Pseudo Rheumatoid Dysplasia
REDD: Reducing Emissions from Deforestation and Forest Degradation
SDGs: Sustainable Development Goals
SDPI: Sustainable Development Policy Institute
SOPs: Standard Operating Procedures
UNCHR: United Nations High Commissioner for Refugees
UNFCCC: United Nation Framework Convention on Climate Change
WEC: Women Empowerment Centers

GLOSSARY OF KEY TERMS

Migration: The movement of a person or a group of persons, either across an international border, or within a State. It is a population movement, encompassing any kind of movement of people, whatever its length, composition and causes; it includes migration of refugees, displaced persons, economic migrants, and persons moving for other purposes, including family reunification'.[1]

Displacement: The movement of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters.[2]

Climate-induced migration: The movement of a person or groups of persons who, predominantly for reasons of sudden or progressive change in the environment due to climate change, are obliged to leave their habitual place of residence, or choose to do so, either temporarily or permanently, within a State or across an international border.[3]

International migration: The movement of persons away from their place of usual residence and across an international border to a country of which they are not nationals.[4]

Internal migration: The movement of people within a State involving the establishment of a new temporary or permanent residence.[5]

Seasonalor circular migration: A characteristically short term, repetitive or cyclical in nature migration movements that adjusted to the annual agricultural cycle.[6] A migrant worker whose work, or migration for employment is by its character dependent on seasonal conditions and is performed only during part of the year. [7]

Return Migration: In the context of internal migration, the movement of persons returning to their place of habitual residence after having moved away from it.[8]

Trapped population: Populations who do not migrate, yet are situated in areas under threat, [...] at risk of becoming 'trapped' or having to stay behind, where they will be more vulnerable to environmental shocks and impoverishment.[9]

Remittances: Personal monetary transfers, cross border or within the same country, made by migrants to individuals or communities with whom the migrant has links.[10]

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1 IOM, 2019
2 IOM, 2019
3 IOM, 2019
4 IOM, 2019
5 IOM, 2019
6 Nelson, 1976; Deshingkar and Start, 2003; Haberfeld et al. 1999; Shonchoy, 2010
7 IOM, 2019
8 IOM, 2019
9 IOM, 2019
10 IOM, 2019

Social remittances: The transfer of ideas, behaviors, identities and social capital from migrants to their communities of origin.[11]

Hazard: The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources.[12]

Climate Change: Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use.[13]

Impacts: The consequences of realized risks on natural and human systems, where risks result from the interactions of climate-related hazards (including extreme weather and climate events), exposure, and vulnerability. Impacts generally refer to effects on lives; livelihoods; health and well-being; ecosystems and species; economic, social and cultural assets; services (including ecosystem services); and infrastructure. Impacts may be referred to as consequences or outcomes and can be adverse or beneficial.[14]

Drought: A period of abnormally dry weather long enough to cause a serious hydrological imbalance. A period with an abnormal precipitation deficit is defined as a meteorological drought.[15]

Flood: The overflowing of the normal confines of a stream or other body of water, or the accumulation of water over areas that are not normally submerged. Floods include river (fluvial) floods, flash floods, urban floods, pluvial floods, sewer floods, coastal floods, and glacial lake outburst floods.[16]

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11 IOM, 2019
12 IPCC, 2018
13 IPCC, 2018
14 IPCC, 2018
15 IPCC, 2018
16 IPCC, 2018

EXECUTIVE SUMMARY

The effects of climate change are now well evident in Pakistan. Long spells of droughts and frequent floods have led to a decline in farm productivity, increased livestock mortality, and large-scale unemployment. While floods are regularly displacing people from their homes, drought and water scarcity are increasing people's vulnerabilities, compelling them to migrate.

In a broader context, climate-induced displacement and migration influence society's socio-economic dynamics, causing greater inequalities. Extreme climatic events are especially harmful for the poor landless rural population. The study finds that displaced rural communities were least prepared to cope with floods and droughts. They lack training and knowledge of risks and have no information regarding the expected loss of life and livelihood assets.

Climate-induced migration exacerbates typical migration typologies such as rural-to-rural, rural -to-urban, urban-to-urban, international, and seasonal migration. In urban areas, migrant families mostly reside at vulnerable locations (to floods) due to a lack of affordability and knowledge of the place.

According to the study's findings, people have limited adaptive and response capabilities to face multiple challenges posed by climate change to their lives, livelihoods, and property. The current level of social and institutional preparedness and capabilities are inadequate to counter the challenges posed by extreme climate events and their immediate and long-term impacts.

Therefore, this study identifies some key policy measures that can contribute to national and in-ternational development goals, particularly in achieving Sustainable Development Goals (SDGs), which aim to 'leave no one behind' and have been adopted as part of Pakistan's national development agenda.

The recommendations include building community awareness on disaster prevention and preparedness by providing training, information, and resources at all levels. Meanwhile, the government must provide better access to health, education, and essential services, including safe drinking water, while promoting climate-resilient farming and integrated water resource management to ensure strategic water reserves for human and livestock consumption to counter adverse climate change impacts.

It is critical to develop provincial and local government officials' capacity to better respond to the local level (slow and fast-onset) climatic changes by effectively monitoring and assessing vulnerable populations and identifying potential adaptation measures. The focus should also extend to the integration of migrants in local job markets for inclusive growth and development.

The government must devise a national and subnational level internal migration policy based on social, economic, environmental, cultural, and demographic information. Additionally, the government should focus on climate-induced migration planning and management, considering the potential social and economic challenges and opportunities for the migrants and their families in areas of origin and destination. Finally, there is an urgent need for collaborative global and regional research given the scale of uncertainties regarding climate change impact and anticipating migration patterns and trends.

1 INTRODUCTION

The impact of climate change on human society is widely experienced particularly in rural areas where livelihoods are mainly climate sensitive.[17] The well-being of individuals, households and communities is deeply linked to the sustainability of livelihood resources and strategies.[18] Livelihood resources that include natural (land and water), human (health, skills, education), social (relationships, networks, institutional support), physical (household assets and housing), and financial (income and savings) are altering significantly due to the impacts of climate change.[19]

Meanwhile, livelihood strategies that account for the ability to respond or adjust to (climate) stresses are mainly limited in rural settings.[20] For instance, the ability to cope with or adapt to depends on social, economic and human capitals and technical capacities that enable rural communities to diversify (agricultural) incomes, increasing knowledge and awareness, and access to government support programmes. According to various studies, climate change continues to be one of the important factors behind declining livelihood resources and strategies; several others see its likely effect on migration flows globally.[21] In this regard, migration may potentially provide an alternate source of livelihood or survival strategy for the vulnerable population.[22] Alternatively, some studies also highlight that the well-being and security of vulnerable migrants declines due to the complex inter-relationship between migration and many social, economic, political, cultural, and demographic factors.[23]

Pakistan is listed among the most vulnerable countries that is experiencing both slow and fast-onset climate change events.[24] The slow-onset climate events (such as an average rise in temperatures and sea levels)are causing gradual decline in agricultural productivity, degradation of ecosystem services, shifting of cropping zones, increase in crop water requirement, decline in soil fertility, thus reducing farm income and labour requirements.[25]

On the other hand, the fast-onset climate events (such as floods, extreme rainfall and heatwaves) are more frequent, which are causing sudden loss of livelihood sources, crop failure, and damage to life and property.[26] As a result, the human and ecosystems vulnerability to climate change has becomes manifold leading to an increase in migration flows and displacement in all ecological zones of Pakistan.[27] In the past, for instance, people of northern mountains used to migrate to the areas close to their trade routes, however, due to extreme climatic conditions their migration pattern have been changed. Now, they are willingly or forcibly migrating to urban areas such as Karachi, Lahore and Islamabad in search of their livelihood.[28] The plains of Pakistan show similar trends of migration flows, where a majority of national population reside.[29]

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17 Adger, 1999
18 Adger and Kelly, 1999; Adger, 2010; Maharjan et al., 2020
19 Adger, 2010; Hallegatte et al., 2011
20 Adger, 1999
21 Brown, 2008; Obokata, et al. 2014; Thiede, et al. 2016; Gray and Wise, 2016
22 Jokisch, et al. 2019; Adger, et al. 2019; Mueller, et al. 2020; Qazlbash, et al., 2020
23 Lein, 2009; Wood, et al. 2010; Adger, et al. 2014
24 Eckstein et al. 2019
25 Ahmed and Schmitz, 2011; Salik et al., 2015; Ahmed et al., 2016a
26 Dixon and Schaffer, 2010; Ahmad, 2016
27 Dixon and Schaffer, 2010; Mueller et al, 2014; Salik et al., 2015
28 Hasan, 2010
29 Mueller et al, 2014

Furthermore, the country possesses a diverse landscape consisting of mountain in the north, deserts and coastal belt in the south, and alluvial plains in the east along the Indus River. This diverse geography is increasingly threatened by extreme climate events such as floods, drought, Glacial Lake Outburst floods (GLOFs), heat and cold waves and rising sea levels due to climate change. This also pose an additional threat to the coastal areas where about 10 percent of Pakistan's population resides.[30] Furthermore, recent global report on internal displacement places Pakistan among 50 countries that shows new increasing trends of displacement due to floods, heavy monsoon rainfall along with other non-climatic factors such as conflicts and earthquakes.[31]

Very limited literature is available for in-depth understanding of climate change impacts on migration patterns in Pakistan. Most of the migration inquiry is either viewed as economic phenomenon (mainly based on push-and-pull theory) or focuses on international migration and effects on remittances flows. Therefore, this research is an effort to understand the role of climate change as an additional driver to the multi-causal migration phenomenon. The report is also an effort to understand the ways people are impacted by extreme climate events events and the consequent patterns of displacement and migration and finally, the role of migration in diversifying incomes of the most poor and vulnerable. Moreover, this research aims to identify gaps in institutional arrangements and policy measures related to migration and climate change. The study adopts a participatory methods approach to generate evidence using in-depth semi-structured interviews, focus group discussions, Case studies and key-informant interviews.

The report consists of six sections including the introduction. The first section represents a short literature review of the country profile, climate change and migration in Pakistan. The second and third section presents drivers and impact of displacement and migration in Muzaffargarh and Tharparkar districts , and the fourth section provides a discussion on institutional arrangements in relation to climate change and migration . The fifth section provides discussion and main findings. The last section furnishes conclusions and recommendations. The details of the research methodology used in the study can be found in Annex.

1.1 Country profile

Pakistan is a country of about 208 million population, which stretches over an area of 796,000 square kilometer with a great diversity in temperature and precipitation. Pakistan has a varied topography and climate. The topography of Pakistan is a blend of landscapes and its climate ranges from tropical to temperate. The climate ranges from semi-arid to humid in the high mountain ranges, and vast arid to semi-arid areas in the fertile Indus plains, the hyper-arid Balochistan Plateau and Cholistan and Thar Deserts, and the sub-tropical coastal Indus delta along the Arabian Sea.[32]

The arid to semi-arid Indus plains of Pakistan is mainly serve as a food basket and source of livelihood for around 75 percent of the population of Pakistan.[33] Politically, the region constitutes of Punjab, Sindh and parts of Khyber-Pakhtunkhwa provinces of Pakistan.[34] The region covers 80% of area under cultivation and responsible to supply food and fiber to 90% of

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30 Rabbani et al. 2008
31 IDMC, 2020
32 Janjua, 2009
33 Qureshi, 2011
34 Yu, 2013

country's population.[35] It contributes significantly to the country's economy. For instance, it employs 38.5 percent of the national labour force, and it accounted for 18.5 percent of the GDP in 2019.[36] Agriculture is considered as backbone of the economy and particularly for rural population agriculture is the main economic activity in the Indus plains and supported by irrigation.[37] The region receives between 300-500 mm of rainfall annually.[38] The Indus Basin Irrigation System (IBIS) comprises of five rivers, barrages and a web of main canals and farm watercourses covering 18 million hectares of the Indus Plain.[39] In the arid to semi-arid climate, agriculture without irrigation is not possible.

1.2 Climate change in Pakistan

Pakistan's vulnerability to climate change impacts is well documented and acknowledged. A historical analysis of mean annual temperature has shown an increase of 0.57°C in Pakistan, since 1900.[40] The warming trend more pronounced during winters in the northern, southern and south-western (Indus plains) part of the country.[41] In Sindh, the aver-age number of hot days and nights has increased between 1980 and 2015.[42]

The historical trend in precipitation shows an increase in Northern Pakistan (15 to 25 percent) mainly during monsoon seasons, whereas a slightly decreasing trend found for the South.[43] An increase in the frequency and intensity of extreme weather events have observed.[44] For instance, the frequency of heat waves has increased at a rate of 11 days per decade since 1980.[45]

The projected trends in climatic parameters are likely to become more pronounced in the future. The mean annual temperature in Pakistan is projected to increase by 1.2°C by the 2020s, 2.5°C by 2050s and could increase by 4.5°C by the 2080s under extreme climate change scenario.[46] This increase will not occur uniformly across the country, with northern glaciated regions projected to rise in mean annual temperature by 3°C to 4°C, while a smaller increase expected for southern Pakistan of 2°C to 3°C.[47] Consistent with current trends, warming will be greater in the winter than in the summer.[48] In south Punjab and Sindh (location of study sites) warm days and nights is projected to increase by 75 and 60 days respectively.[49] For precipitation patterns, the confidence level of projections is low.[50] However, a projected increase in overall annual summer precipitation is reported over the whole of Pakistan.[51] Some studies suggest that there could be an increase in mean precipitation due to increased inter-annual variability including southern parts of Pakistan.[52] A high probability of increased occurrence of extreme rainfall events predicted mostly in northern Pakistan.[53] For Sindh and South Punjab, the consecutive dry days is projected to increase that may intensify droughts.[54] For the summer monsoon patterns, it expected to increase in both mean and extreme precipitation level, with more spatial and temporal variability.[55]

35 Qureshi, 2011
36 GoP, 2019
37 Qureshi, 2011
38 FAO, 2011
39 Yu, 2013
40 GoP, 2010; Haensler, 2013
   Sheikh et al., 2009; Abbas et al., 2018;
41 Khan et al., 2019; Wester et al., 2019
42 Abbas et al., 2018
43 Sheikh et al., 2009; Haensler, 2013; Abbas et al., 2018
44 Abbas et al., 2018; Krakauer, et al., 2019; Abbas et al., 2014

45 Chaudhary et al., 2009; Zahid and Rausl, 2011; Saeed et al., 2017; Khan et al., 2019
46 Ali, et al., 2019; IPCC, 2013; Abbas et al., 2018
47 Iqbal and Zahid, 2014
48 Ikram et al., 2016
49 Ali, et al., 2019; IPCC, 2013
50 Christensen et al., 2013; Almazroui et al., 2020
51 Ikram et al., (2016); Ali, et al., 2019
52 Ali, et al., 2019; Almazroui et al., 2020
53 Ikram et al., 2016
54 Ali, et al., 2019; Abbas et al., 2018
55 Christensen et al., 2013; Ikram et al., 2016

The processes of climate change constantly pose additional risks to the already fragile economy of Pakistan. The key source of climate risk is the significant rise in annual intensity and frequency of rainfall fluctuations, along with an increase in extreme weather events. According to Eckstein et al. (2019) around 145 climate extreme events occurred between 1998 and 2017 in Pakistan, with an average of five events per year. [56] The events comprise of droughts, floods – including the mega-flood of 2010 – heavy snowfall in the northern mountains, heat waves, cyclones, heavy rains, and landslides. [57] These events exemplify why Pakistan is listed among the ten most climate risk affected countries in the world. [58] Floods during monsoon season are common phenomenon in Pakistan. However, its intensity and frequency become manifold. The flood events occurred almost every year since 2003 with varying intensity, however, mega-flood of 2010 was unprecedented. Around, 20 million people were displaced and caused direct and indirect economic losses of approximately USD 10.5 billion, excluding the restoration costs. [59] In particular, rural areas were the most effected in terms of life, property, and livelihoods. About, 80 percent of current 54 million Pakistan's poor reside in rural areas. [60]

In Pakistan, agriculture is the most vulnerable sector due to climate change. Agriculture is the main economic activity of Pakistan's rural population, the latter constituting about 65% of the total population in Pakistan. [61] Agriculture is threatened by declining water storage capacity and a very old irrigation infrastructure, as well as an increasing demand for water from non-agricultural sectors, such as domestic use and the industrial sector. Any variability in the irrigation supply may affect the agricultural production of 80 percent of the irrigated arable land of Pakistan, which supplies 90 percent of the total national agricultural produce. Several projections show crop yields may reduce in future due to climate change, the most critical of which are wheat, rice, cotton, sugarcane and maize. [62] The situation in livestock production is also expected to be negatively affected by high temperatures, implying lower productivity (such as milk and meat), animal health and nutrition. [63]

Currently, crop cultivation in Pakistan, mainly occurs on small to medium-size farms having less than five hectares in size, accounting for 96 percent of all farms. [64] Such small-scale farming has limitations to uptake progressive farming techniques and results in less farm diversification and more likely vulnerability to productivity shocks. [65] There is also a wide gap in actual and potential crop yields in Pakistan in comparison to similar agro-climatic and irrigation conditions elsewhere in the world. [66] Recent studies also show some farm-level adaptation responses by farmers to climate change in Pakistan. [67] Farmers are aware of climate change impacts but the lack of access to weather and market information, illiteracy and poverty limit their ability to adapt. [68]

56   Eckstein et al. 2019
57   Rahman and Shaw, 2015; Ecksteun et al., 2019
58   Eckstein et al., 2019
59   GoP, ADB and WB, 2010
60   World Bank, 2018; Iqbal, 2020
61   Qureshi, 2011
62   Hussain and Mudasser, 2007; Sultana et al., 2009; Iqbal et al., 2009 a, b; Tariq et al., 2014; Siddiqui et al., 2010; Ahmed and Schmitz, 2011; Ahmed et al., 2016; Hussain et al., 2020

63   Ahmed et al., 2016; Abid et al., 2016
64   GoP, 2010
65   Bhutto and Bazmi, 2007
66   Prikhodko and Zrilyi, 2013
67   Ahmed et al., 2016; Abid et al., 2015; Abid et al., 2016
68   Abid et al., 2015; Abid et al., 2016

1.3 Migration Profile of Pakistan

The understanding of interaction between climate change and migration, as well as the contribution of migration as a response strategy, form a large gap in the literature on migration in Pakistan, particularly internal migratory movements. Addressing this gap is important because internal migration in Pakistan, so far, is mainly studied as an economic phenomenon, where the focus has been on economic reasons of migration, individual characteristics of migrants, and effects of remittances on people and the economy.[69] Such studies have used human capital models and employed macro-level data to understand individual-level human capital (such as education or health), the role of remittances in asset accumulation, savings and consumption behaviour, and impacts on poverty dynamics and income inequalities of the rural sending regions.

Research studies in Pakistan has shown that the environmental and climate changes contributed to a decline in agricultural production and a rise in food insecurity and inequality affecting the rural population, particularly the poor and marginal households.[70] However, a handful of studies have examined the links between migration and climate change. For instance, Mueller et al. (2014) provide household-level analysis on the impact of climate variables on-farm production and incomes with rural out-migration rates in Pakistan.[71] Nevertheless, the study does not provide any information on how male out-migration could affect the well-being of migrants' families left-behind.

Against this background, this study will focus on the understanding of potential associations between climate change and migration in two different study sites in Pakistan i.e. Muzaffargarh, Punjab and Tharparkar, Sindh. This study takes place in rural areas that are characterised by high population growth, high poverty rates, single sector dependency (agriculture), high sensitivity to climate change impacts such as erratic rainfall patterns, unpredictable droughts and rising temperatures. This study further pursues into the situation of migration at the destination either urban or peri-urban areas in Pakistan. The study will additionally look at the village and the migrants' families left behind when people out-migrate. Moreover, understanding migration outcomes in terms of increasing economic and social opportunities in this area are also necessary.

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69 Gazdar, 2003
70 Dixon and Schaffer, 2010; Mueller et al., 2014; Salik et al., 2017
71 Mueller et al. (2014)

FIGURE 1: Map of Pakistan showing study sites:Muzaffargarh and Tharparkar districts.
Source: http://www.surveyofpakistan.gov.pk/

2 DRIVERS AND IMPACTS OF DISPLACEMENT AND MIGRATION IN MUZAFFARGARH DISTRICT.

2.1 Muzaffargarh District

Muzaffargarh is a mainly rural (84 percent) district, spread across an area of 8249 sq. kms, with a population of 4.3 million. The district is located in the South of Punjab province, at the confluence of the Indus and Chenab rivers.[72] Its location between the two main rivers situates the district in a high flood risk zone.[73] The absence of forecasting or early warning systems results in major damage to property and infrastructure, as well as lives, when frequent flooding occurs, often causing the displacement or migration of people.[74] Access to already inadequate public services is severely reduced due to damage to roads and electricity supply. In addition, there is significant damage to hospitals, schools, crops, livestock, irrigation canals and embankments.[75] Frequent flooding has also resulted in the erosion of social security nets and trust on the local government that greatly impacted on the recovery of the poorest and most vulnerable communities, who rely on strong social support networks, as well as government assistance, during pre- and post-flood periods.[76]

The district is characterized by high poverty, low literacy, social deprivation and poor public service provision and delivery related to health, education, electricity and drinking water.[77] For instance, only 51 percent of households in the district have electricity, 6 percent have piped water and over 25 percent have no bathroom or latrine facility in the house.[78] Poor housing quality means they cannot withstand floods, as was seen in the 2010 floods, where 75 percent of homes, which were made of mud, were wash-ed away. The 2014 floods destroyed even brick and cement houses, built to replace mud houses, in the hope that they would withstand flooding.[79] Fifty-six percent of the population is poor, setting Muzaffargarh among the poorest districts of Punjab. There is a great divide in social inequality between the landless and landowners. The latter enjoy social status and power that enables them to get more political and institutional support during disasters and aid distribution.[80]

Most people are employed in farming and small-scale agribusiness, with little opportunity to diversify their livelihoods.[81] In order to recover from farming losses due to floods and gain an income, smallholder and landless farmers in the district migrate temporarily or permanently. Only those with adequate social, human and financial capital can afford to migrate permanently to rural areas, for instance.[82] This coping mechanism allows them to reconstruct their homes, recover from economic loss and enhance their family income through remittances.[83]

Moreover, agriculture that is a mainstay of rural Muzaffargarh not only affected by floods but also with other climatic factors such as heavy rainfall, hailstorm and droughts. Such climatic threats imply serious risks to agricultural productivity such as crop damage, delayed sowing and cultivation, as well as increased vulnerability to already poverty-ridden rural population.[84] Ahmad (2018) finds a low level of preparedness and perceptions of such risks among farmers of the district mainly due to inadequate weather and market information

72 Jamshed et al., 2020, GoP, 2017;
73 Jamshed et al., 2020
74 Ishfaq, 2019; Quddus, 2011
75 Jamshed et al., 2020; Ishfaq, 2019; Akbar 2017
76 Arai, 2012; Akbar, 2017
77 GoP 2012; GoP 2017; Naveed, 2017
78 Bengali et al. 2003

79 Jamshed et al., 2020
80 Mohmand and Gazdar, 2007; Jamshed et al., 2020; Arai, 2012
81 Jamshed et al., 2020
82 Jamal and Ashraf, 2011
83 Imran et al. 2018; Jamshed, 2015; Jamal and Ashraf, 2011
84 Ahmed et al. 2019; Aslam et al. 2018

and lowering of farm incomes that limit them to adapt innovative farming practices.

Gender relationships in a largely patriarchal society face multiple challenges in the district. Women's access to health and education is mostly limited compared to men, which is evident from a large gap in male and female literacy rate or schooling years.[85] Although women can inherit land and property, most are still denied any physical and financial control or benefit.[86] Like other districts in South Punjab, women are the key agriculture workforce in Muzaffargarh. Women of the landless, lower social class work in agriculture, picking cotton or raising livestock.[87]

2.1.1 Rural Muzaffargarh

Impact of floods on communities:
Speaking to communities in rural Muzaffargarh, the research team found that the impacts of flooding on people's lives were high due to the lack of an early warning system, community preparedness and safe evacuation support by the government. This was compounded by the lack of preparedness and early warning by government institutions. When floods occurred people could not access roads; houses, fields and schools were destroyed; people lost their livestock; drinking water got polluted; and it was difficult to move the disabled and elderly to safety.

One female study participant from the Ajab Arian area of Muzaffargarh district said:
"*My kids were very young during the 2010 floods, and one of my sons is blind. Someone had to go out repeatedly to check on the level of rising floodwater in the area to decide whether we had to move out with my blind son or not. I managed*

to get a trolley to help transport him, but struggled as it filled with floodwater and moving out from the house to safety became very difficult. Eventually, I managed to do it moving through dirty water and being bitten by mosquitoes."

A male study participant from Ajab Arian area of the district said:
"*I struggled to move out my disabled grandmother during the flood. There was no transport available by the government and we had to arrange a rickshaw at our own expense to get to safety. The rickshaw driver over-charged us, but we had no other option but to pay him to reach a safe place.*"

Another female participant from the Ajab Arian area mentioned the cycle of debt they were trapped in due to a bank loan:
"*To construct our home, my husband took a loan from the bank. Now, many years later we are still trying to pay loans back, by growing and selling vegetables.*"

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85   Jamshed et al., 2020, GoP, 2017;
86   Jamshed et al., 2020
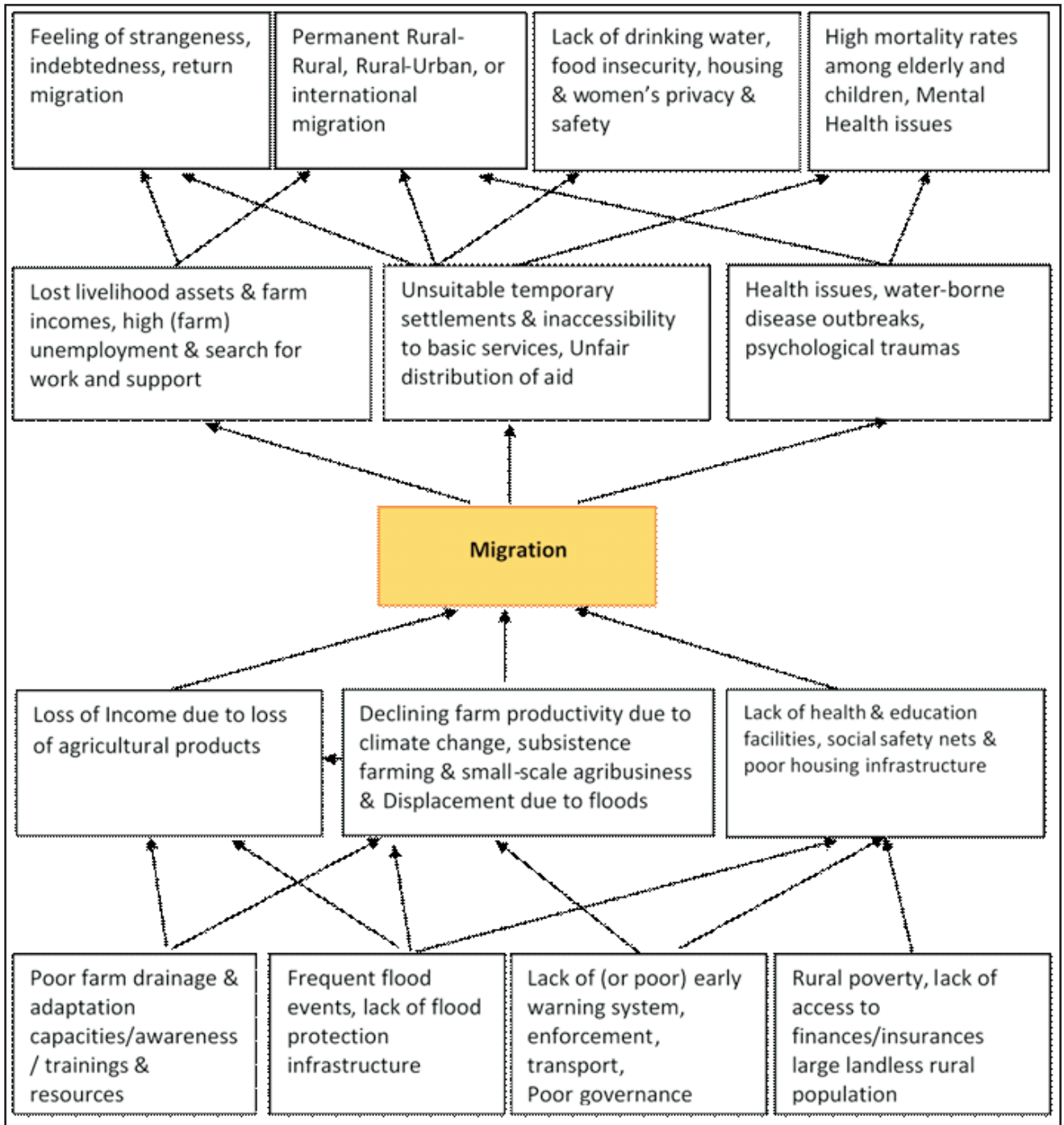87   Ishfaq, 2019; Quddus, 2011

FIGURE 2: Problem Tree Analysis: Muzaffargarh Rural Area
Source: Authors' own illustration

Migration Profile of Muzaffargarh and Impacts of migration on communities:

People spoke about the severe economic losses they suffered when floods hit the area. Shops, kiosks, poultry sheds, livestock and other economic assets were swept away by floodwater. Those who managed to save their buffaloes, goats or other livestock were forced to sell them at much lower prices due to the unavailability of fodder. The poor also lacked access to aid during and after floods, due to its late arrival and mismanagement. For instance, many suffered from weakness after starving for days while waiting for food delivery to arrive by airplane to the area (see figure 2 for linkages). Families were displaced by floods to areas that lacked proper shelter and sanitation facilities. Under these challenging circumstances, at least one male member of each family migrated in search of work (to either a rural or urban area), so that they could send money home and support the rest of their family.

Besides migrating due to devastation of their agricultural livelihoods, people also migrated from rural to urban areas, due to the lack of proper health or education facilities for themselves and their children, food insecurity and lack of infrastructure locally. Only landowners who did not want to leave their ancestral lands behind, returned to the original area, post-flood.

The research study found that most of the migration in the area was internal and permanent, even though the migration typology (whether temporary, permanent, seasonal or international) depended on the social, human and financial capital that migrants managed to build up. Landless farm and non-farm households encouraged a male member of the family to migrate and as he built up resources and finances, the entire family fol-lowed him to the destination site, never to return.

In cases where family members were left behind, the migrant sent them financial remittances that were vital in supporting household living expenses and provided a safety net during times of hardship for the family.

Some migrant members took loans to manage the cost of migration, and used remittances to help pay back loans, thus shrinking the amount of remittances available for left-behind family members to use. Migrants envisaged eventually returning home if they lost their job, retired in old age or when they had earned enough money for the future well-being of the family.

The study also found that those who were displaced, migrated several times as they continued to be displaced by frequent floods wherever they lived. These families eventually moved to large cities, which they felt were more secure.

Thirty-five year old Hasnain from Tibi Hussaina bad in Muzaffargarh said:
"*In 1992 we migrated to Rawaywala due to floods and moved again after the 2010 mega flood, migrating to Rasoolabad (a town near Muzaffargarh city). We then migrated to Sheikhupura (a large city near Lahore) after the 2014 flood*"
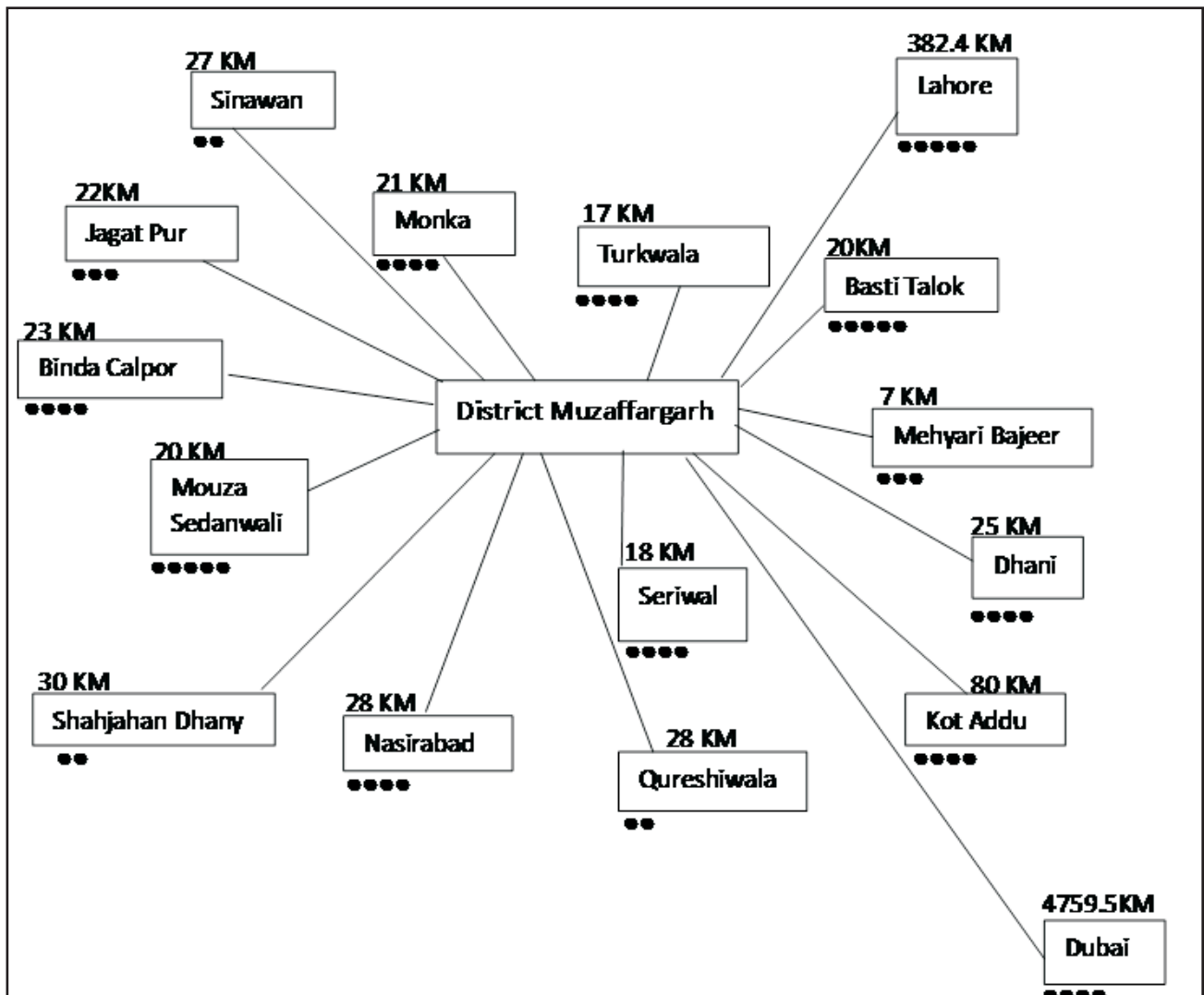
FIGURE 3: Mobility mapping exercise for Muzaffargarh
Source: Authors' own illustration

Figure 3 shows the mobility mapping exercise carried out with the study participants to know how far they travelled when they migrated, and outlines the kind of hardships they faced. The community members did not know how many people from their area had migrated out. Each community member talked about their own hardships faced at the migration destination. Migrants of Lahore and Mouza Sedanwali faced a lot of difficulties in terms of getting employment opportunities. Migrants found it comparatively easier to get work in nearer areas, that were within a 30-kilometre distance.

Impact of flooding on Women:
Pregnant women did not receive much care during as well as in the post flood situations and lost their babies while giving birth. Newborns could not survive due to non-availability of baby-formula milk and malnutrition of mothers to feed their babies. Temporary shelters in many cases were not safe. Most of the families either moved to high ground or took shelter in schools and small shrines. Participants shared that girls were drugged and raped by the locals. Clean water was not available for drinking. Help came to only those

who had good connections with the local administration. The rest were helpless and managed on their own. They had muddy water to drink and mothers had to feed their babies muddy floodwater mixed with sugar to keep them alive.

People talked about missing their native, ancestral areas and not being there when a family member who had been left behind got sick. In general, they felt the lack of subjective well-being as issues like this impacted the mental health not only of migrants, but of those left behind, as they dealt with their family member's absence.

FIGURE 4: Focus Group Discussion in Rural Muzaffargarh

Table 1 shows a matrix scoring exercise rating the migrant's experience of access to public services and privacy, at the destination site. The table highlights that the migrants at destination areas are mostly face poor sanitation facilities and live in vulnerable and populated peri-urban settlements. They have access to a very low level of education facilities for their children. However, they are better-off in terms of health, shelter (securing any sort of space for housing) and food security, making migration a more appealing choice than remaining behind, not only for themselves, but also for left-behind family members at areas of origin. Issues of privacy did not pose any difficulty for migrant families at destination areas.

Migration Destinations	Health	Food & water	Sanitation	Education	Shelter	Privacy
MolaTibiHussainabad	••••	••••	•••••	••	••••	
Faisalabad	•••	••••	••••	••••	•••••	•••••
Karachi	•••••	••	••	•••	•••••	•••••
Lahore	••••	••••	••	••••	••••	••••
Sahiwal	••	••••	•	••	••••	
Mullah BhukariWala	•••••	•••••	•••	••	•	•••••
TibiKarimabad	•••••	•••••	•••••	•	••	

TABLE 1: Matrix scoring by migrant's left-behind family members in rural Muzaffargarh

Case study: A non-migrant in Rural Muzaffargarh

Thirty-two year old Muhammad Khan is a non-migrant residing in the village of Saraj-ul-din Tar located in Muzaffargarh. He is a primary school teacher, with a Bachelor's degree in Education from AllamaIqbalopen university. He belongs to the Chohan-paw, farming class social group. He lives in a joint-family system with his wife and five children (between the ages of 2 and 12) along with their parents. His wife mostly takes care of household chores. Two of his children, Abdul Rahim and Tehreem, go to school. His father is still doing subsistence farming but the entire family mainly depend on Khan's earnings, of about PKR 33,000 (USD 297) per month. Most of the income (about PKR 23000 (USD 207)) is spent on household expenditure, health and the children's education, leaving only a meagre amount as monthly savings. During the 2010 floods, Khan's house was submerged in floodwater and damaged, but he decided to stay in the village rather than subject himself and his family to the misery and stress of living in a rescue camp or temporary shelter. He found that facilities there, like basic washrooms or latrine facilities, were not easily available and he suffered from lack of privacy when people were required to openly defecate. He also complained about bad health facilities that women endured, facing many issues during pregnancy and delivery due to lack of appropriate healthcare.

2.1.2 Urban Muzaffargarh–impacts of flooding and migration

Urban flooding and migration:
The communities spoken to in Muzaffargarh city were mainly associated with peri-urban agriculture, livestock rearing, small businesses like tea shops and kiosks, and daily wage labour. These communities were migrated during the 2010 flood from rural areas and mostly settled in the peri-urban flood prone areas of Muzaffargarh. They described what had happened during the major flood events of 2012 and 2014:

- Almost all infrastructure and key buildings, including homes, schools, roads and railway tracks, were damaged
- Homes and businesses were washed away
- People lost their valuables
- Livestock were electrocuted or drowned

- Crops were destroyed
- Floodwater eroded soil and washed away farmland demarcations

People were trapped in vulnerable places without any transport. Many had to travel with their families for long distances by foot, in search of food and shelter. The first few days after floods hit were more challenging as people struggled without food, shelter and safe drinking water. Later, flood relief and rescue support from the government and local welfare organisations helped them survive, although the scale of these efforts was limited in comparison to the scale of havoc wreaked by the floods, and people's needs. People were displaced to temporary shelters such as mosques, schools, railway tracks, or other such open elevated places, and lived there for 2 to 3 months. People expressed that the relief work favored the most politically influential people, overlooking the needs of the poorest and most vulnerable people.

Those who had migrated to the city to escape the flooding situation in their rural areas found themselves struggling overnight due to the impact of floods in the city.
For instance, thirty-five year old Mr. Ali Shah, who had permanently migrated to Muzaffargarh city, said:
"*In the 2010 floods, my tea hotel was completely destroyed and I had no other way to support my family. I moved to Muzaffargarh city to earn an income, but I am now facing a lot of challenges finding suitable accommodation, setting up a business and earning some money to sustain my business and household expenditure.*"

Another major impact of flooding in the city, was that most people lost important documents such as property deeds, computerized national identity cards (CNIC), and result reports of their children. Due to this, they were

unable to claim their own property and farmlands, and couldn't vote during the general election in Pakistan. Children's education was affected, as they struggled to pay school fees or buy uniforms and textbooks.

Impact on women during displacement:
During their stay at relief camps, women fed their toddlers floodwater mixed with sugar due to unavailability of milk or cereals. They tried to filter floodwater using their dupattas. Consequently, waterborne disease outbreaks were common such skin rash, itching, fever and diarrhea. Pregnant women did not have any food or medication. There were no medical camps nearby. Midwives carried out deliveries of pregnant women within the relief camps. One community member miscarried after seven months, due to the inaccessibility of any health facility during floods.

The community members spoke about cases of women being raped and children abducted during floods. For instance, one of the female community members said that some of the locals mixed sleeping drugs in the food and later raped women while they were unconscious. Such events occurred due to lack of security and easy access to relief camps without any guarded boundaries. Children were abducted from camps. Abduction and rape was reported as more common among those families who did not have adult male members with them during the flood even as they had migrated to other areas in search of work.

During floods and displacement, lack of proper sanitation facilities affected women's privacy causing mental stress and depression. In this regard, community members reported sheer negligence, and incompetence at all levels of the government department dealing with flood relief and rescue work.

A few community members said that though they had migrated to the city for better employment opportunities and education facilities, they were disappointment by the lack of availability. Recurrent floods in the destination sites further worsened their socio-economic challenges, triggering urban-to-urban migration. For example, one of the urban community members spoken to mentioned that, 30 years ago, they had migrated from their village to Muzaffargarh city, but during the 2010 mega flood, their elder brothers migrated to Rasoolabad city and, in 2014, moved to Sheikhupura (a city near Lahore). In each city, they had relatives to provide them with accommodation and support them in finding work. This shows how migrants who have some support in place to do so, keep moving from city to city in search of better opportunities. Figure 5 shows a cause and effect relationship regarding urban flooding and its impacts on communities.
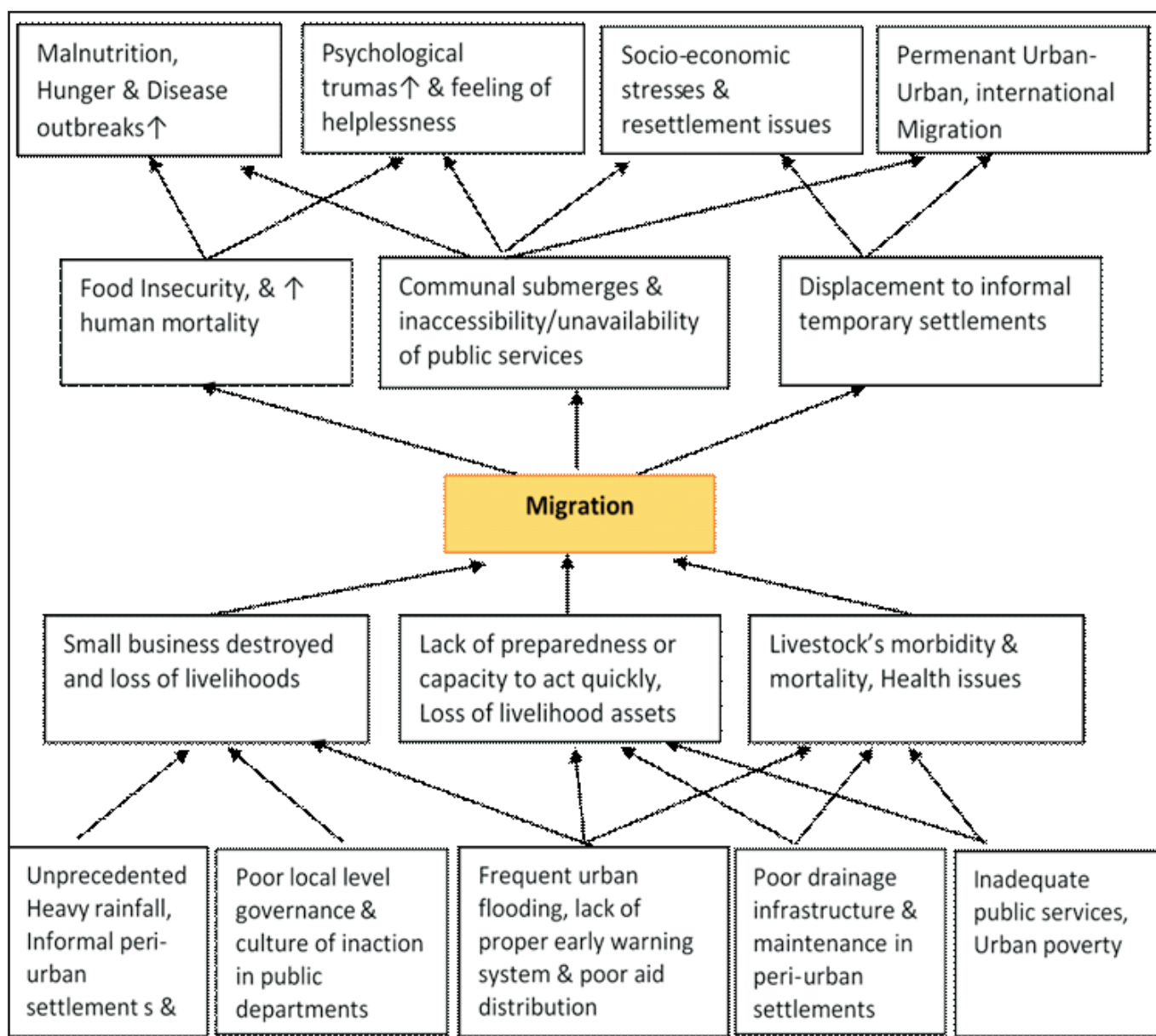

FIGURE 5: Problem Tree Analysis - Muzaffargarh, Urban Area.
Source: Authors' own illustration

Migration impacts at destination areas:

Overall, migration improved the income of migrant families in Muzaffargarh, although people also mentioned a lack of improvement in their lives due to recurrent floods, increasing household expenditure with inflation and unemployment. In general, migrants felt their income was better in the urban area compared to the origin area they had migrated from.

Migrant success stories after moving to the city included people establishing a small business, improving business connections for generating funds, and finding better jobs in multi-national companies. Others gained access to micro-finance and other government support programmes such as the Benazir Income Support Programme. For instance, a migrant, working in the construction sector, migrated to the city and started learning music and singing. Although he earns monthly wages of PKR 15,000 (USD135) he has managed to supplement his income with PKR100,000 (USD900) per year from the cultural department, by working as a singer. Thus, migration to the city gave people the opportunity to diversify their income sources in ways that enabled them to educate their children and build secure houses for themselves.

However, most of the migrant families showed a low level of satisfaction in terms of access to basic services and facilities such as healthcare, a regular and safe drinking water supply, shelter, privacy, sanitation and food supply. Migrants talked about the lack of good healthcare facilities and drinking water being equally bad in both the origin and the destination sites. People used bottled water, which was costly and difficult to acquire. Housing conditions in destination sites were an issue as migrants unhappily paid rent to relatives in exchange for accommodation, or stayed in flood relief camps, which were monitored and managed by the police and armed forces.

Case studies : Urban Muzaffargarh

Case study 1 :
a) Rural-Urban migration and floods:

Twenty-four year old Sumbal Seema is a young university graduate who is working as a researcher in a multinational company. A decade ago, her family permanently migrated from rural Multan to Muzaffargarh suburb (Mohalla BukhariWala, Tehsil Muzaffargarh). She lives with her mother and three sisters (18, 17 and 14 years). The sisters are studying in different levels. Her fifty year old mother has an intermediate education, and is employed as a health worker for women.

During the 2010 mega flood, this suburb of Muzaffargarh city was inundated and Sumbal's family was moved to a relief camp. Initially, her family faced psychological and adjustment issues there due to lack of drinking water, food, improper shelter, and safety. But later the army took control of the relief camp and ensured the security and the provision of basic necessities (food, water and sanitation) to flood victims. However, they did not receive any other support from the government except a monthly stipend of PKR500 (USD4.5). During the flood, Sumbal's father had a cardiac arrest. Though they were unable to reach any hospital or find any medication, he recovered, but had another cardiac arrest 6 months later, which left him paralyzed. When they migrated from rural Multan to urban Muzaffargarh, initially her father worked as a daily wage labourer with no time-off, not even for Eid. However, her father managed to establish an electricals shop, which was later destroyed in the 2010 flood.

As a rural to urban migrant, Sumbal's family struggled to pay their monthly bills of about PKR15000 (USD135). After her father's paralysis, Sumbal's family established a sewing shop through financial help from the Benazir

Income Support Programme. Women from a political influential family helped Sumbal's family gain access to funds with their registration in the programme.

b) Case study 2 :
Urban flooding and migrant business:
Twenty-nine year old Ali Abbas lost his small tea kiosk in MolaTibi, a suburb of Muzaffargarh, during the 2010 floods. About 9 years ago, he migrated from his village to Muzaffargarh leaving his family in the village as they feared losing their ancestral affiliation with the area if they migrated out. Initially, he went through a number of personal difficulties due to extreme loneliness and lack of finances. However, his sister-in-law who lived in the city helped him re-establish his tea kiosk in the city. He now earns almost PKR2000 (USD18) per day compared to the PKR300 (USD2.7) that he earned in the village before he migrated. He also supports his family back in the village.

c) Case study 3 :
Flooding and international migration:
Kausar was pregnant and delivered her baby during the 2010 mega flood. Unfortunately, her baby could not survive the stress and malnutrition that followed the flood event. During the flood, her family lost their national identity cards. Without these, they could not access and receive any government programme support. Her family were landless, therefore had no other possible earnings. However, a close relative from her village helped her husband migrate to Dubai as a labourer. Other relatives also financially contributed and arranged his travel to Dubai. However, her husband has not sent any money to support the family yet, as he has struggled to get steady work on a permanent basis. Currently, he only gets occasional work, which is not enough even to sustain his living in Dubai. When he does not get any work, he stays in the local mosque.

88 Bengali et al. 2003
89 Akhtar and Jariko, 2018
90 GoP, 2017

3 DRIVERS AND IMPACTS OF DISPLACEMENT AND MIGRATION IN THARPARKAR DISTRICTS

3.1 Tharparkar district

Situated in the south of Sindh province, Tharparkar district is spread across 19,638 sq. kms and located in the 'Thar' desert. Tharparkar district has a total population of 1.6 million, is mostly rural and has been ranked the most socially deprived among all the districts of Sindh province. The district shows a high development lag in terms of economic opportunities, education, housing quality and access to basic services. For instance, only 4 percent of households in the district have electricity, while 2 percent have piped water. Only 32 percent have latrines and 41 percent have one-room houses. Only 18 percent of the population is literate.[88] Ninety-one percent of the population of Tharparkar district are growing crops or rearing livestock. The rest are engaged as daily-wage labourers, businessmen, or work in government or private jobs. The majority of the Hindu population of Pakistan lives in this district.[89]

Mithi tehsil (sub-district) forms Tharparkar district's headquarters and is inhabited by 200,000 people.[90] The town is situated between the well-irrigated Indus plains and desert settlements. It has better road connectivity to all other parts of the district and, therefore, attracts people from rural areas to settle here. It also has better economic opportunities with respect to desert tourism, selling handicrafts, marketing agro-products and selling cross-border smuggled goods. The district possesses high reserves of coal and granite that attract mega investments, from both local and international sources, in mining and non-renewable energy projects. These projects not only attract labour from within and outside of the district, but also contributes to economic and population growth of Mithi town.[91] Another issue is the forced displacement of the local population from such project sites to Mithi town. Altough people are unwilling to migrate, particularly poor and Hindus, mainly due to ancestral affiliation with the area, religious sanctity, and livelihood and social networks.[92]

Tharparkar has mostly arid to semi-arid climate with annual mean rainfall less than 206 mm.[93] During Kharif (summer) the districts receive more the 80 percent of annual rainfall, whereas it declines to 20 percent during the Rabi (winter) season.[94] In the case of annual and seasonal rainfall, the trends are decreasing for the region. The annual aridity is rising in the region which becomes more pronounced during winter i.e. 9 percent increase in aridity that fall into hyper-aridity class. Whereas 20 percent decline in aridity (or increase semi-arid areas) during summer. It implies that over the past century, winter season (when wheat is sown) has become drier and summer become wetter.[95] Wheat, beans and chillies are the main crops of the district, which are mainly dependent on timely rainfall. Therefore, such changes in rainfall and aridity pattern effect farm outputs and incomes and thus forcing people to migrate and seek alternative sources of livelihood, which are less or no climate-dependent.[96]

Women in Tharparkar is the key workforce of rural areas. Women are mostly working on the farm for cropping and livestock management but social and economically deprived in the district.[97] Women are mostly working without any financial benefit and mostly taken the burden of men's work. Along with this, women also to perform domestic work and fetch water from a well, which is mainly far from the home or village. Any decline in crop production or supply of food the major effect in terms of hunger and nutritional status faced to women

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88 Bengali et al. 2003
89 Akhtar and Jariko, 2018
90 GoP, 2017
91 Rajar et al. 2007
92 Channa, 2015
93 Usman and Nichol, 2020
94 Ahmed et al., 2019; Usman and Nichol, 2020
95 Ahmed et al., 2019
96 Herani et al. 2009; Saeed, 2017
97 Solomon, 2019

rather than men.[98] Women right to inheritance land and property is generally accepted but in practice, many social, legal and bureauc-ratic hurdles limit to own and cultivate the land own by the women in the district.[99]

3.1.1 Rural Mithi, Tharparkar

Impacts of Drought on Communities:
The livelihoods of most of the people in rural Mithiare focused on livestock rearing and crop harvesting. Slow-onset climate impacts, such as droughts and heatwaves, are leading to a reduction in agricultural productivity and profitability. In turn, this leads to farm labour losing work.

Communities in Mithi, who were part of the research study, mentioned that the frequency of droughts and heatwaves had increased. According to them, droughts used to occur every 8 to 10 years, but were much more frequent now. The communities in Mithi had faced severe drought every year since 2016 due to a reduction in rainfall. The consequent water scarcity resulted in less grass grown, which was needed as fodder for livestock. The lack of water and fodder resulted in communities moving to other places (like Kunri and Dhero) along with their livestock.

Most of the people in Mithi engaged in sharecropping wheat, sugarcane, cowpea, and millet. The produce is shared with absentee landlords. The impact of low rainfall, or lack of access to water resources such as canal water or reservoirs, on crop production has had a more severe impact on sharecroppers than their landlords. For instance, the annual production of pearl millet, cowpea, and green gram used to be about 50 Maunds [100] per acre. However, during drought, this was reduced to about 20 Maunds per acre. This reduction in agricultural output affected not only people's livelihoods but also worsened food insecurity, poverty and indebtedness to landlords, money lenders or banks. One thirty-five year old male community member from DareloParo village in Islamkot, Mithi said:

"*We do not apply fertilizers on barren or water-deprived land because there is no certainty that after fertilizing this land the seed will grow. Most farmers have debts of about PKR100,000 (USD 900) with the landowners whose land they work on. During stressful conditions, the only option is to abandon the land. However, our landowner said that if we do not work on his land then we have to return his money. So, we went to another landowner to undertake a debt of PKR 150,000 (USD1350) in order to pay back the first landowner, and buy household items (such as food, fuel, other daily consumables, expenditure on health and education, etc.) from the remaining amount for our living.*"

Frequent droughts and water scarcity compel people to sell livelihood assets such as seeds and livestock to spend on food and health. A forty-five year old female community member from Umerkot, Mithi said:
"*We had to sell seeds at a reduced rate of PKR1000 (USD 9) instead of PKR4000 (USD 36.2), due to illness and shortage of money. Later, we had to pay a higher price for the same seed.*"

In 2011 and 2013, an unprecedented amount of rainfall in Mithi not only damaged houses but also led to an unexpected drop in average temperatures. Such abrupt weather changes severely impacted the elderly and children, who were more susceptible to catching pneumonia, fever, cough, and diarrhea. In most cases, these vulnerable people died due to these cold waves.

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98 Solomon, 2019
99 Solomon, 2019
100 1 Maund = 40 kg

Migration Profile of Mithi and Impacts of migration on communities:

Conversations with the communities revealed that lack of delivery of public services like proper healthcare, transport and education, coupled with a decline in social relationships and support, forced people to migrate. For example, rural areas have salty, brackish water and women spent at least two hours, while leaving their kids alone at home, to fetch drinkable water from wells that were farther away.Furthermore, when droughts occurred, well-water dried up and males migrated out, followed by the rest of the family.

In many cases, climatic and non-climatic factors (social, economic, institutional etc.) combined together, drove people to migrate. For instance, migration due to the climate change impact on crop and livestock production was strongly linked to issues of food and human security, social oppression or inequality of the area. A fifty-year old male community member from DareloParo in Islamkot, Mithi said:

"*During the famine I lost my job and my animals were starving. Livestock fodder was scarce, and it was expensive to bring some from the barrage area (irrigated areas where canal water is available for cultivation). This situation affected my children's education also. Any support that was received from the government, went to the feudal landlord. We received nothing. The landlords do not allow us to live freely in the village. There were security issues for females and kids. We had to face all these issues along with famine due to which we migrated.*"

Who migrates?

The research study found that in rural Mithi, Tharparkar, migration is mostly common among landless sharecroppers. People said that during droughts, (subsistence) farming become less profitable due to decline in productivity, lack of inputs and financial resources. They also have fear of hunger (for themselves and their livestock), less work and support, thus migrate to other villages, towns and cities for livelihoods.

In some cases, the male member of the household out-migrate and remaining family members stayed back at origin rural areas and doing farm labour. However, in severe drought conditions, the study found that the entire village comprise of 40 households migrated either to other rural areas or to urban areas of the district.

The research study also found that landlords residing in the rural areas also migrated during severe drought conditions to nearby towns as well as to other urban areas of the Sindh like Karachi, Hyderabad. However, they continue to move back and forth to retain firm control over the social and economic activities of the area and to sustain political influence. For this, they have enough financial and human resources for taking care of their land, property and livestock. The rural Tharparkar, also have number of absentee landlords, who have already migrated to urban areas and their land and property is managed through relatives and servants. There farms are mostly cultivated by landless sharecropper.

Trapped in Debt:

The communities in Mithi suffered from lack of social and economic support from friends and family, who had limited means to share. Most people who migrated due to drought had to spend their own money on food, health and shelter. On reaching their destination site, they borrowed heavily from shops or landlords, often submitting to exploitative payback terms, as they had no other options in order to survive. Migrants found themselves trapped in cycles of debt as they struggled to meet the payback terms, and debt, in turn, limited their mobility and travel in search of work elsewhere.

In rural areas, people impacted by declining agricultural productivity due to climate-change related factors, would borrow money from landlords in order to survive. If people wanted to migrate in order to earn an income, landlords demanded that they paid back their loans first. Thus, a person's migration journey became managed through a bonded contract between the migrant (or a migrant family) and the landlord, either in the origin or destination area. In order to hire much needed migrant labour, the landlord in a destination area paid back the debt amount of the migrant to the landlord in the origin area. In addition, landlords in destination areas also facilitated the transport of the migrant worker or family by providing either a vehicle or finances for their travel. In some cases in Mithi, people still used traditional sources of travel, such as camels.

The migrants at destination areas remain well connected to their rural areas of origin. In this way they can support potential family members to migrate also, help them with sowing of crops, to build businesses or retain social ties to their village. Left-behind family members receive financial remittances that crucially support daily living expenses, repayment debts and provide a safety-net during times of hardship or when climate hazards like drought occur.

Migrants intend to return home when enough financial resources are saved up by the family for their future well-being or situations when the migrant is not able to earn any longer due to old-age or loss of a

Impact on women:
People migrated to other rural areas and work on farms as a labourer to grow crops like cotton, pepper, wheat and sugarcane. Often, farm labour is hard and exploitative, particularly for women who also worked along with their males:

"*I worked in the field to harvest cowpea, and millet, which led to the loss of her 6 months' pregnancy. The landowner gave me only Rs.1000 for treatment in public hospital*" (A female respondent of FGDs, Mithi, Tharparkar)

Women played an active part to contribute to a family earning. Besides helping men in the field and doing domestic work, women are also sewing and knitting traditional cloths. This income enables women to financially better-off and less dependent on male and his income for daily spending. Women also share the consequence of unsuccessful migration movements and standby their family:
"*We migrated along with our cattle. Among 25 cows few became ill. My husband also got ill. So we sold our few cattle for his treatment and we return with one goat to the village*" (A female respondent of FGDs, Mithi, Tharparkar)

People do not have access to basic health facilities and sanitation services during drought. Most of the migrants in rural Sindh engage in seasonal or circular migration. Children and women were more vulnerable to the droughts. For instance, one of the women in the study shared her migration experiences that she was pregnant during drought condition and she had to travel on camel to the city to deliver her baby. Due to long travel and malnutrition, her baby died after three days after birth. She also shared that her mother-in-law got sick during migration and she was under treatment for four years but she could not recover and died. In some cases, communities have permanently migrated.
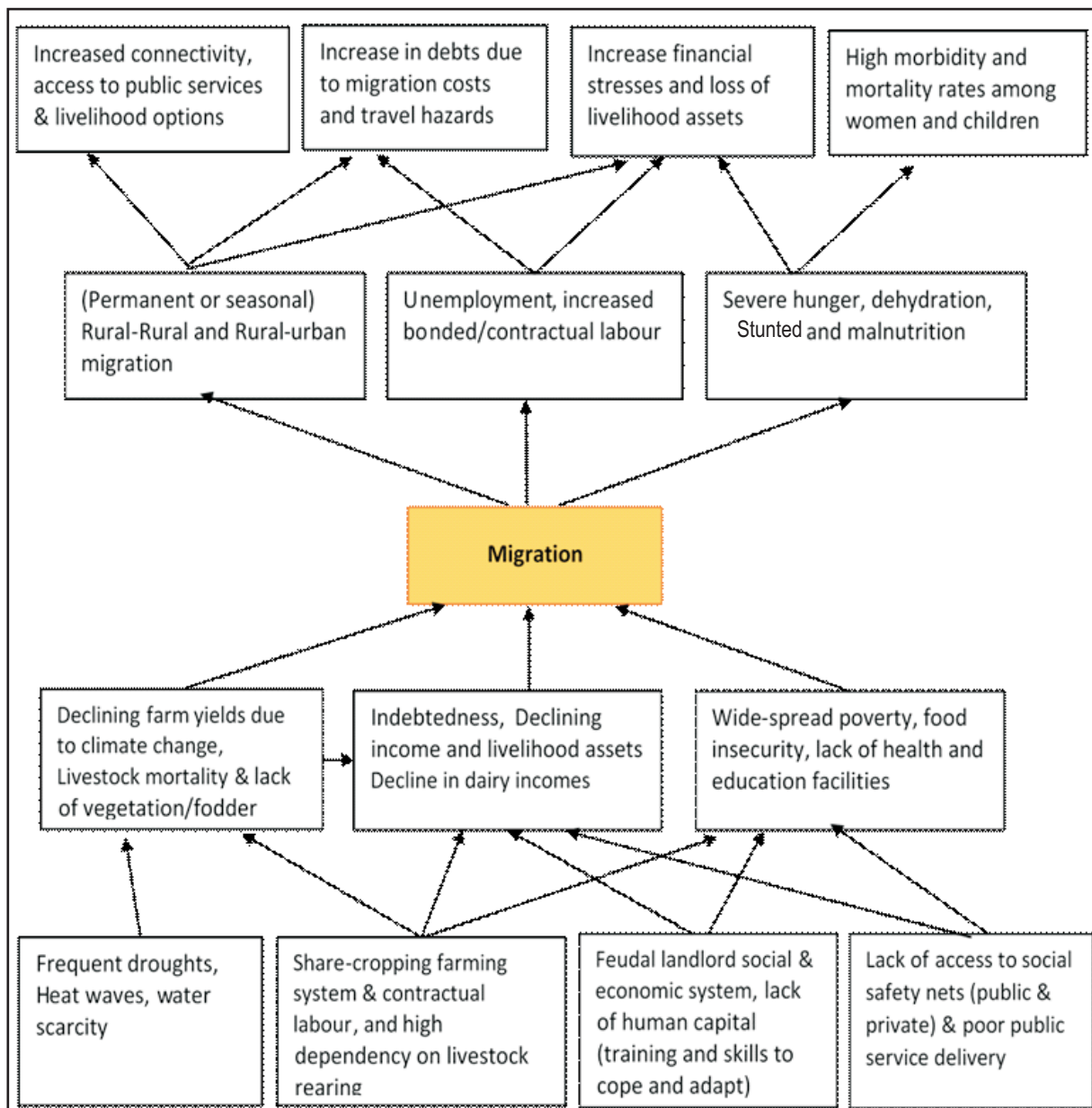
FIGURE 6: Problem Tree Analysis: Mithi (Tharparkar) Rural Area
Source: Authors' own illustration

Migration typologies:

Tharparkar district mostly exhibits rural to rural migration within or across the district. People migrate from drought-affected rural areas to other secure rural areas mainly based on their social networks and the support available to them, which is largely based on kinship and closes tribal relationships. However, permanent migration from rural areas across Tharparkar to Mithi town and other urban centers such as Karachi is also increasing.

Figure 6 shows the mobility pattern of migrants from Mithi. Some community members migrated as far away as Karachi. People migrated to Sanghar as it had more options for employment but struggled with the lack of access to health facilities and water availability once they arrived. The common issue for every migrant at destination sites was lack of money to afford food and accommodation.
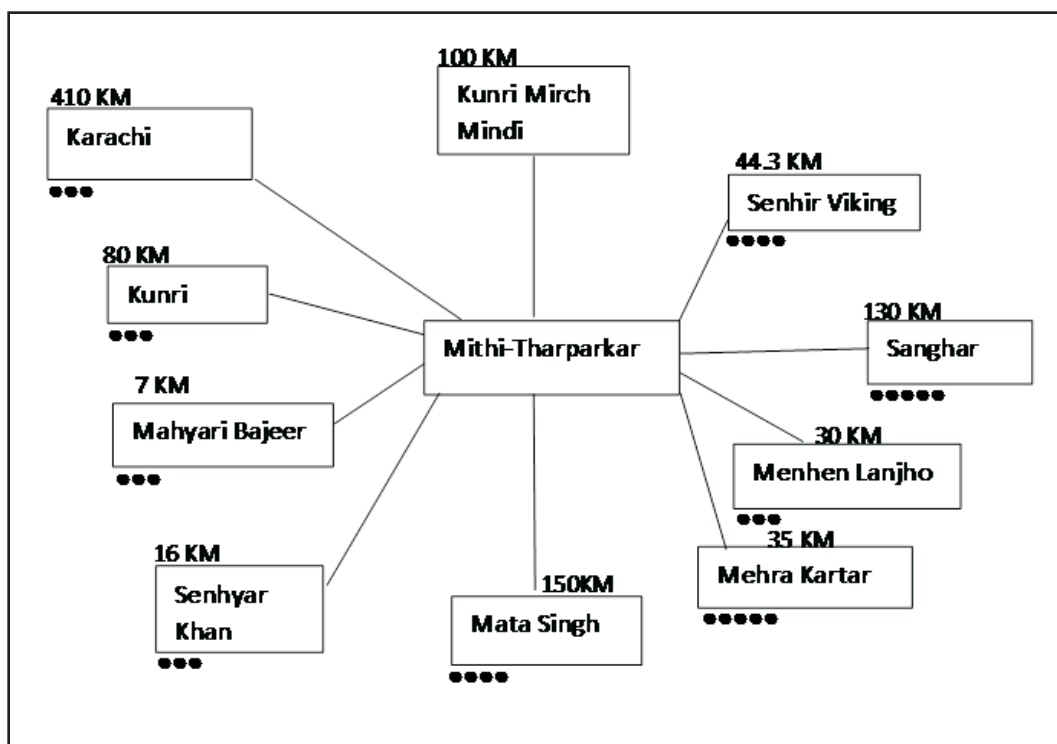
FIGURE 7: Mobility Mapping Exercise for Mithi Tharparkar
Source: Authors' own illustration

Rural-to-rural migration due to drought in Mithi is not very rewarding for people. Frequent drought has not only reduced their meagre livelihood assets, such as livestock and seeds, but had also increased their indebtedness to landlords and others. Farmers lack critical skills and financial resources to cope and adapt to the vagaries of a changing climate. In order to protect their families from starvation, their only recourse is to descend further into debt with landlords or migrate to other areas.

The research study shows that the migration of landless farmers to other rural areas is challenging in terms of financing their migration journey, which is often done with their entire family and livestock. The mobility of migrant families is often restricted by landlords with whom they have contracts to work on their farms. Although, such restrictions are loosened by the mutual arrangement between landlords of origin and destination areas, by paying off

migrant families' debts in exchange for farm labour in destination sites. Although these agreements are exploitative and have little reward for migrants, such circular migration does help migrant families to secure food, clothing and better healthcare. However, education of children and living conditions is still largely compromised, as shown in Table 2.

In the case of rural-to-urban migration, there is a greater improvement in migrants' lives as they attain better livelihood options, increased connectivity and better social networks destination sites. In migrant families, women are able to learn embroidery and making handicrafts. Other family members get training as electricians, motor mechanics, or even as artistic performers, which can help them earn a decent living. Single male member migrants provide essential financial remittances and potential job opportunities to other left-behind family members.

Table 2: Matrix scoring exercise of Mithi						
Migration Destinations	**Health**	**Food & Water**	**Sanitation**	**Education**	**Shelter**	**Privacy**
Islam Kot	•••	•••••	•••••	••	••••	
MalookMehar	•••	•••••	•••	•	••	••
Sanghar	••••	•	•••••	•••••	•••	
MeyariBajeer	•••••	•••••	••	•••••	••	

TABLE 2: Matrix scoring by migrant's left-behind family members in rural Mithi
Source: Authors' own illustration

Case Studies: Rural Mithi, Tharparkar

Demee is a forty-five year old, rural, migrant woman who lives in MalookMehar in Tharparkar. She belongs to the lower Hindu social group of Meghwar. She never went to school but financially supported her family through tailoring, making handicrafts and livestock rearing. She lives in a joint family system along with her sixty year old husband, Kawel and nine other people of varying age, education and employment. Kewal works as a daily labourer at the local brick kiln. When drought came, it affected their lives and their livelihood. The family took a loan of PKR50,000 (USD 320) from the local money lender to survive.

To pay back the debt they migrated to Umer-Kot in search of work. But her husband became ill and as they had no other source of earning, she started working at a brick kiln there, and earned PKR 40 (USD 0.36) for every 1000 bricks.

Her family also took a loan of PKR 15,000 to 20,000 (USD135 to 180) for her husband's treatment and to pay back the debt they stayed and worked in Umer-Kot for four years. Then, they returned to MalookMehar and the family repaid the debt to the moneylender after 10 years. While sharing her migration experience Demee said:

"*Our fields were destroyed due to drought. We had no other option except to lock up our homes and migrate. When we came back, we found that our houses were destroyed, so we built them again.*"

Migrants from Mithi preferred to move to places that had more food and water availability because they were suffering from lack of these, especially drinking water, due to drought. Hence, their preferred destination sites were Islam Kot, MalookMehar and Sanghar.

FIGURE 8: An old woman from Mithi sharing her painful experience of migration.

3.1.2 Urban Mithi, Tharparkar

Impacts of droughts on migrant communities at destination areas:

People from rural areas mainly migrated to urban areas of Tharparkar to avoid hunger, water scarcity and unemployment caused due to prolonged and frequent drought conditions where they lived. During drought, farming and livestock rearing became unprofitable and exhausted their already meagre financial resources, particularly for landless farmers engaged in sharecropping. This situation caused an increase in borrowing money from landlords and local moneylenders. Increasing indebtedness and contractual obligations with feudal landlords, to work on their farms, put pressure on landless farmers and other lower social classes such as artisans, farm labourers, and non-farm rural households, further intensi-

fying their social oppression and distress. Under these stressful conditions, people were forced migrate to urban areas, not only to seek better livelihood opportunities and food security during times of drought, but also to alleviate their social suffering. People also migrated for access to better education and health facilities.

During the FGDs the migrant families in Mithi town, mentioned that on arrival they have meagre financial assets that deepen food insecurity situation causing malnutrition and other health issues, particularly among women, the elderly, and children. Furthermore, the research team found that these migrant families lack essential skill-sets and experience to obtain urban jobs as well as social network to support them on arrival for managing housing, access to public department for financial supp-

ort and other services, and establish businesses (see figure 9 for linkages).

The situation of these migrant families was compounded by the droughts that affected the urban areas in multiple ways. The foremost impact of the drought was the decline in urban water resources and supply. Speaking to communities in Mithi town, the research team found that water scarcity utilises much of people's time, financial and human resources to fetch water for drinking and sanitation purposes from public water filtration plants. This was particularly troublesome for the women that mostly carry water for the whole family. Furthermore, mostly migrant families are involved in urban livestock businesses, water scarcity not only effects low animal water intake but also exhaust vegetation of the area that reduce productivity and profitability. People said that during severe drought situation they were forced to sell their livestock at lower prices, to avoid further loss resulting from the death of animals due to unavailability of water.

The study found wide-spreadpoverty among migrant families due to lack of job opportunities and instable incomes. Most of migrant families are working as daily-wage labour in (grain) markets, construction and service sectors. People experienced the loss of work when prolonged droughts affect these markets. For example, droughts impacted the trading of urban grain markets by reducing the farm produces (for wheat, millet, chillies, etc.) from rural areas, and thus significantly reduced wages as well as work opportunities for migrant's families.

The research study found that droughts also linked to increasing the burden on the already inadequate public services such as health, education and sanitation facilities. The migrant

families in urban areas of district Tharparkar reported the lack of access to all such services. The situation becomes more critical due to the influx of new drought-affected migrants from rural areas.

Impact of droughts on migrant women and children:
Health and education of their children are the prime concerns of migrant women of the study area. Although, during FGDs, women have shown their opinions regarding the lack of proper health and education facilities in Mithi town. However, when comparing these facilities to rural areas, they mentioned better access and level of their satisfaction to these facilities in their current location. Furthermore, women showed their satisfaction regarding the availability of parks and playground for their children and different fair and festivals in the city.

Among causes of indebtedness of migrant families is the borrowing money for marriages. The study noted that migrant families took loans from a local moneylender or micro-finance banks, for carrying out expenses for dowry, jewellery and other marriage-related costs. Extravagant marriages are a social taboo in the area, like in other parts of Pakistan, which result in to increase in indebtedness. Later, repayment of loans takes away the family's hard-earned income and livelihood resources. However, family's debt also caused women to work in the farms, livestock rearing or sewing traditional clothing either at home or in the factories.
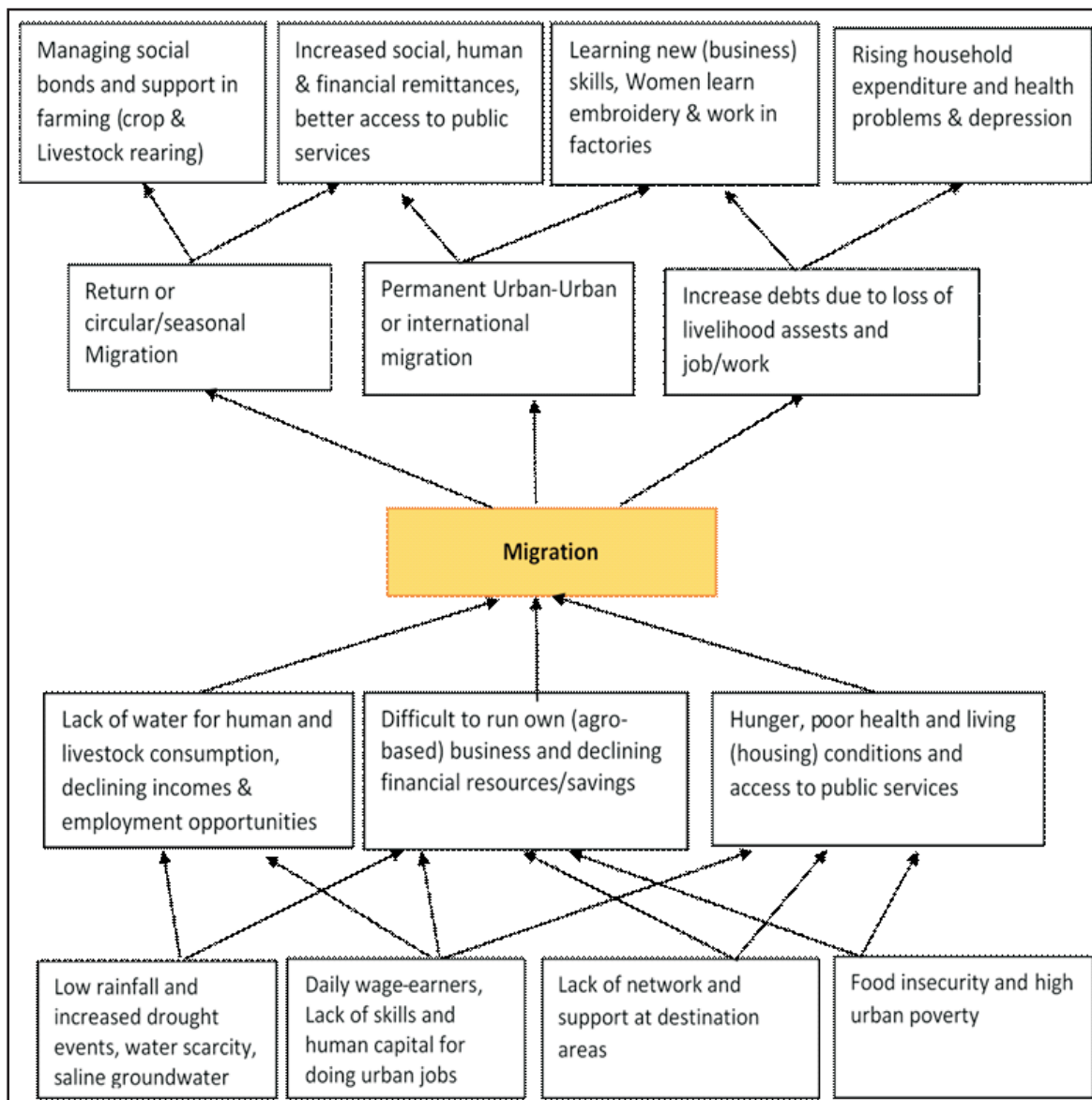
FIGURE 9: Problem Tree Analysis: Mithi(Tharparkar) Urban Area
Source: Authors' own illustration

Migration typologies:

Increasing stress on livelihood resources and family incomes due to droughts compels migrant families to look for opportunities elsewhere. In this regard, three distinct migration typologies observed among migrant families in the area. The first and most prominent type is seasonal or circular migration. The families involved in seasonal-migration are always on the move and traditionally doing livestock businesses, farm labourers or as construction workers. The duration of their stay depends on the availability of food, water, fodder and shelter. They always seek for better livelihoods and move from one village or city to another. The study finds that droughts have intensified their migration movements as well as reduced their livelihood assets (such as livestock) and opportunities in the urban area. However, these migrant groups sustained their migration movements due to their strong social network and support mechanism for basic needs, sharing travelling costs, and livestock rearing during stressful times.

The second migrant groups belong to migration returnees. The study finds intentions of return to rural areas of origin among those male migrants who migrated individually or with their immediate family members (i.e. wife and children). These migrant families have lost their livelihoods or jobs due to droughts in the areas of destinations. Thus, have intentions to support their extended family members in terms of personal saving, participate in social activities (such as weeding, care of the elderly) and work at farms. Some migrant women, who have gained experience in sewing traditional handicrafts, showed interest in providing training to rural women of their village and earned money in return.

The third migrant group in the area showed aspiration to move to other urban areas, particularly to Karachi. Such migrant families have kinship-based business networks and possesses financial resources to carry out migration journeys. They mostly work as middlemen (manages supplies of traditional clothing from rural to urban areas), involved in trading of livestock and engaged in dairy and poultry businesses. Frequent drought conditions in the area have reduced their livelihood options, profitability, and increased desire to migrate. The study finds that such migrant families have experience of trading (such as traditional clothing and handicrafts like rugs and carpets, bedsheets, etc.) due to their connections with local manufacturers that enable them to migrate to other urban areas of Sindh province as well as internationally to Gulf countries.

Case studies : Urban Mithi, Tharparkar

Case study – Seasonal or circular migration and droughts:

Rajo is a 37-year-old Hindu housewife who never went to school. She lives in Sanghar (130 km away from Mithi) and belongs to the Hindu-peel social group. She also works in the fields and fetches drinking water for her family of six. Her forty-year old husband Talooko has studied up to the fifth standard. He works in the fields and chilli market. Her two young children aged eight and ten, Ramesh and Lachmi, are in school. Besides going to school, Ramesh tends to their livestock. Rajo has 2 more children who are too young for school.

Her family migrates seasonally to alleviate regular unemployment, drought and starvation. In the last three years, her family have migrated to three locations namely Shahadpur (310 kms away), Sanghar (200 kms away) and KunriMirchMandi (km away). The family stayed in each location for 8 months. Rajo was satisfied with the basic facilities (i.e. sanitation, food, privacy, shelter, health care and water supply) available in these places, but she showed her concern for using tap water, which was unsafe.

Her family did not get any support from the government or any other organization. Rajo has saved only PKR 4000 (USD 23.70) during her last three migrations. While sharing her migration experiences she said:
"*I was seven months pregnant when we migrated to earn money. I worked as a labourer and lifted weight due to which I had a miscarriage. We had to borrow PKR 10,000 from the landowner to pay for my medical bills. We faced so many problems: our children got ill when we migrated and then we had to spend our earnings on their health and fares.*"

3.2 People's Solutions

Following solutions were proposed by the communities of Muzaffargarh and Mithi.
- Land that is lost due to flooding in Muzaffargarh should re-allocated to small land farmers

- There is need for mosques where people can take shelter temporarily in case when area hit by the flood again.

- Embankments should be built at the river so that areas inundated receives less water during floods and crops can be prevented from the floods.

- During disasters, government need account for providing shelter and camps. They should bolster support systems in terms of education, healthcare, privacy, dignity particularly in the case of women and children. In relief camps, affected communities should be safe and cope with the detrimental effects during and after the flood.

- Government should build infrastructure for flood-affected areas that caters floodwater management including dams and barrages, and proper embankments on riverbanks to safe villages and farms.

- There is a dire need of the timely warning so that people can manage displacement at their own. Early warning systems in rural areas need upgrading system.

- There should be a mechanism to check implementation of the relevant schemes such as funds allocation for aiding communities and construction of embankments.

- It is imperative to do survey of the flood victims about their current situation and requirements and government should provide opportunities and skills accordingly.

- There must be some organizations who can support and teach school going children during floods.

- In order to avoid water scarcity issues in Mithi

it is crucial to build water pipelines and hand pumps.

- There must be a hospital with basic facilities in the area. For instance, Pregnant women have to travel very far for delivery. There should be health units in nearby facility.

- Educational institutes do not have teachers, their attendance should be made mandatory so that education is not affected.

- Skills must be provided to women particularly widows so that they can earn better for their families.

- It is important to provide employment opportunities according to skills.

3.3 Paired-Comparison Matrix Approach

Paired comparison matrix analysis for Muzaffargarh:
Based on fieldwork communities in rural as well as urban Muzaffargarh (see figure 10) voted the most for government aid during floods for health, transportation, safety, construction of embankment and shelter. In any disaster, whether it is a sudden onset or develops gradually, communities and individuals will be vigorously coping and restoring from its aftereffects according to their own preferences. For instance, communities are in the view that government should be the first one to respond for help proactively when an area struck with flood. They also need help from the government for re-settlement. The impacts of climate change are several. There should be employment opportunities post flooding as people lose their agricultural lands in most of the cases and family member have to move to city or gulf countries in search of job opportunities to support their families. Small shop holders who lost their sole source of in-

come, when migrated to cities they had to take loans from banks or relatives to establish their small businesses which was major challenge for them. Skill development could have helped them and made their life much easier. The second top priority area for communities are education and dams. They firmly believe that construction of dam can divert water and make their origin of migration less vulnerable. they are fully cognizant that education develops in us a perspective of looking at life. They know that education is the only tool which expands vision and outlook for future problems. However, free education is the one opportunity they are looking for. Floods have destroyed their schools and they do not have enough money to bear expenses of private schools, which are far and require transport charges as well. Communities provide relief assistance in the form of temporary arrangements minimum weighted, such as water filtration plants, hospitals and temporary shelters.
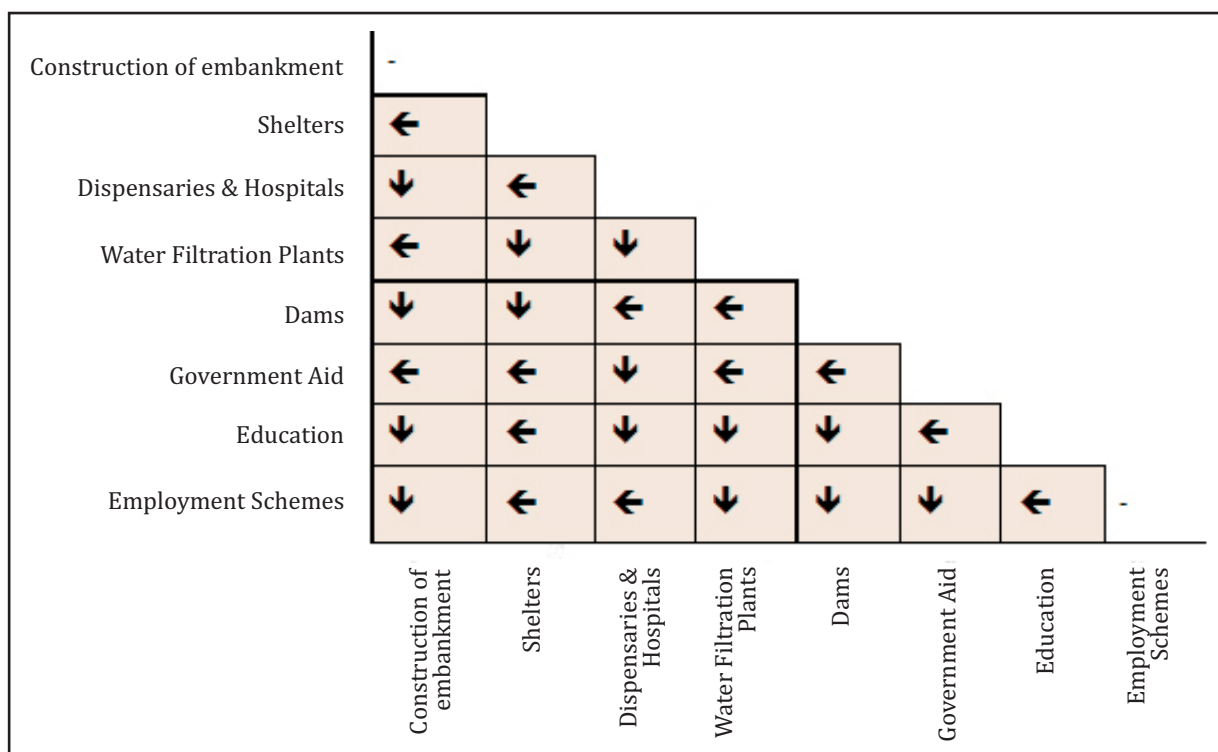

FIGURE 10: Paired-Comparison Matrix for Muzaffargarh
Source: Authors' own illustration

Paired comparison matrix analysis for Mithi, Tharparkar:

Communities most pressing issue in district of Tharparkar is freshwater availability (see figure 11). Women have to travel long distances to fetch water for drinking and households use. Even that water is also salty and muddy, but they have no other option but to use it. Therefore, communities of Mithi are in the desperate need of water. Communities depen-dent on agriculture also demand water in their areas.

They are aware that droughts are repetitively hitting their areas and killing their animals and peacocks therefore agriculture and animals are not sufficient for their livelihood therefore vocational training centers which can teach them and connect them with markets to sell their handicrafts will improve their life. They also require community centers, access to hospitals and free medicines. They are ready to learn technical courses on digital technology and farming given them the chances.
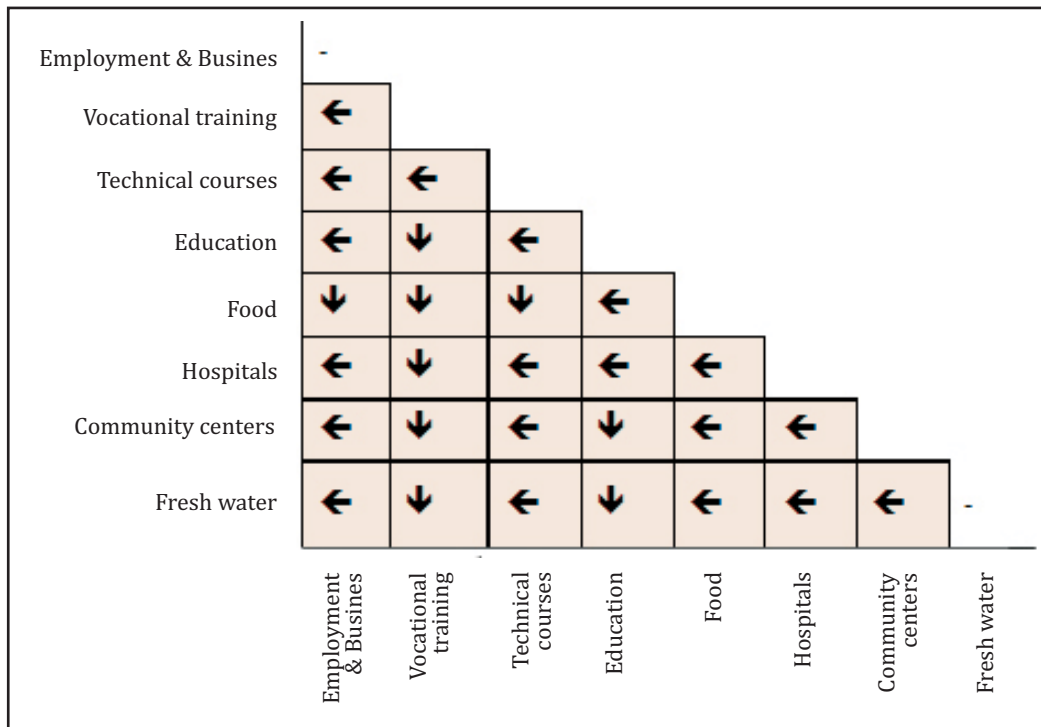
FIGURE 11: Paired-Comparison Matrix of Mithi, Tharparkar
Source: Authors' own illustration

4. INSTITUTIONAL ARRANGEMENTS IN RELATION TO CLIMATE CHANGE AND MIGRATION

Ministry of Climate Change (MoCC) is the main governing body to deal with climate change related issues in Pakistan. The primary responsibility of MoCC is to prepare climate change strategies, policies, and action plans as well as to contribute to the global climate change negotiations.

Pakistan is a signatory of various global environmental agreements such as the Kyoto Protocol and the Paris Agreement under the aegis of United Nations Framework Convention for Climate Change (UNFCCC), MoCC also deals with Clean Development Mechanism (CDM) and Reducing Emissions from Deforestation and Forest Degradation (REDD+) initiatives in the country.

The other national initiatives of MoCC include, land use change, forestry (including biodiversity protection, soil conservation, watershed maintenance and sustainable forest and rangeland management), agricultural and livestock practices, waste management (landfills, solid waste management, recycling, animal and livestock wastes), transportation (e.g., alternative fuel vehicles, mass transit systems, cleaner engines, compressed natural gas) and industrial processes. Furthermore, MoCC is also strengthening sub-national institutional capacities related to planning and implementation of climate change and resilience projects, enhancing communities' adaptive capacities, climate smart agro-technologies, and developing research and development to integrate climate change adaptation at different levels.[101]

In Pakistan, extreme weather events (such as floods, heat waves and droughts) have become more common and are affecting lives, livelihoods and infrastructures adversely. The National Disaster Management Authority (NDMA) - under MoCC, is one of the key institu-tions dealing with disaster risk reduction (DRR). The National Disaster Management Council - the national policy-making body for disaster management is headed by the prime minister of Pakistan. Other members of the council include leaders of opposition parties, provincial chief ministers and governors, federal ministers for defense, health, foreign affairs, social welfare, special education, finance, communication, and interior as well as representatives from civil society. The National Disaster Management Authority (NDMA) implements policy decisions at national level in collaboration with Provincial Disaster Management Authority (PDMA) and Distract Disaster Management Authority (DDMA).

Several policy level efforts have been made in Pakistan related to the environment and climate change. This includes: National Climate Change Policy (NCCP), 2012; Framework for Implementation of Climate Change Policy (2014); Pakistan Vision 2025; National Development Strategy, 2012; National Energy Conservation Policy, 2007; National Operational Strategy for Clean Development Mechanism, 2006; Renewable Energy Policy for Development of Power Generation, 2006; National Environmental Policy, 2005; and Pakistan National Conservation Strategy (NCS), 1992.[102] Moreover, the National Assembly of Pakistan passed the Climate Change Act of 2017 and formed three entities:
1) Pakistan Climate Change Council (for advisory role);
2) Pakistan Climate Change Authority (for implementation, preparing legislation and action plans (like National Adaptation Plan)), and contribute to global climate change efforts;
3) Pakistan Climate Change Fund (to channelise global climate funds for Pakistan). However, this Act is yet to operationalised by the current government.

Although, these above-mentioned policies address some of the key vulnerabilities to the development of Pakistan from environmental degradation and climate change, due to lack of sound research and gaps in understanding of climate change issues in the country, these policy documents only outline mitigation and adaptation measures that are less likely to reflect the national (to local level) social, economic and environment challenges, and thus become shelved documents.[103] Some other obstacles to implement such policies include: lack of public financial support and participation of private sector in climate mitigation and adaptation efforts, lack of institutional/inter-departmental coordination and capacities.[104]

4.1 Institutions in Tharparkar (Mithi) and Muzaffargarh

The health department in Mithi established medical camps to aid people during droughts in collaboration with other concerned departments. The health department has no specific budget to deal with emergencies (such as droughts related health issues or pandemic situations). In this regard, the health department has submitted a proposal to the authorities to establish 55 new health care centers to improve its services in remote desert areas of the Tharparkar district.

The Education Department of Mithi has developed a drought awareness programme, including delivering lectures at schools and colleges. However, 1500 schools out of 4000 in the region are not operational due to a lack of teaching staff.

Low government budget allocations for education are a significant concern affecting the quality and access to education in the region.

Agriculture Department in Mithi has mainly provided support to farmers related to crop production in rainfed conditions. Most farmers grow a single crop in a year due to the non-availability of canal water. Besides, ground-water is brackish, which is unsuitable for irrigation purposes. Therefore, the department is trying to promote bio-saline agriculture in the area but gained modest success due to a lack of finances and human resources. To reduce water scarcity in Mithi, the government launched 40 drip irrigation pilot projects in 2007, mainly for kitchen gardening purposes.

The Livestock Department has only 168 veterinary dispensaries for 7 million livestock in the Tharparkar district. Still, the majority of dispensaries are not yet functional due to a lack of staff. The most common diseases in Tharparkar among animals are Progressive Pseudo Rheumatoid Dysplasia (PPRD) diseases, foot and mouth diseases, endoparasites, and malnutrition. The veterinarians occasionally visit affected areas and animals for treatment. However, the department's functional capability has mainly remained limited due to the low budget provided by the Sindh government.

The Health department of Muzaffargarh, in collaboration with other concerned departments, established 42 relief camps in the district during the megaflood in 2010. During the 2010 flood, the department also provided bottled water to the affected communities for 3 to 4 months, for both drinking and washing purposes. The department with limited resources assigned few doctors, dispensers, and lady health visitors and required medicine to these camps. However, due to a large influx of floodwater, the department staff could not access these camps and thus temporarily shifted to Multan district. Furthermore, only 10

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104 Salik et al., 2015

percent of the department budget is allocated for medicines that limit its capacity to cater to a large number of patients during floods.

The Environmental protection agency (EPA) is trying to address the smog problem in the region. The department has instructed 45 brick kiln owners in Muzaffargarh to upgrade their brick kilns to zig-zag technology or face closure. However, brick kiln owners cannot implement these technologies due to high technical and maintenance costs and lack of expertise.

4.2 Policy responses on climate change and migration linkages

As mentioned earlier, climate change is adversely impacting lives and livelihood resources. According to National Disaster Management Authority (NDMA) estimates, the average annual economic loss to the country adds upto about USD 4 million between 1994 and 2013 due to extreme climatic events. During 2010 to 2015, consecutive floods have caused an economic loss of about USD 18 billion, displaced 38 million people and damaged crops of about 10 million acres of land. As this study suggests, such catastrophes force people to migrate elsewhere for alternate livelihoods.

Although, Pakistan has a draft National Emigration policy, it mainly caters to international migration issues and does not cover any social, economic, environmental, cultural, and demographic aspects of internal migration. Here, the policy gap is somewhat filled by the National Climate Change Policy (NCCP) that acknowledges the mounting risks on rural livelihoods and increasing migration of rural population toward urban areas of the country.[105] Consequently, the Framework for Implementation of National Climate Change Policy (2014), which

provides actionable policy targets for implementing NCCP, recommends that rural to urban migration be curbed through rural development. The goal is to improve climate resilience among vulnerable rural population and thus limit (rural to urban) migration by providing better livelihood opportunities and infrastructure for health, education, and transport. However, the framework does not recognise the potential of (rural to urban) migration as an adaptation strategy to climate change.[106] Nonetheless, many countries have integrated the internal migration into their development goals and adaptation planning.[107]

Likewise, Pakistan's National Disaster Risk Reduction Policy published in 2013 emphasised the mulit-hazard early warning, disaster preparedness and response strategies and a range of policy measures to reduce vulnerabilities. Although, the policy does mention climate change hazards and their link to migration and displacement (in its preamble), it lacks information in terms of ensuring safe relocation of vulnerable rural population during early period of disasters (such as floods).

The National Food Security Policy (2018) only considers internal migration as a contextual factor for rural transformation (in terms of land use change), urbanisation and food insecurity, but offers no specific policy suggestions regarding migrants or displaced population. However, the policy does provide guidelines regarding emergency preparedness plan for food security and agriculture during disaster situations.

In addition, other recent government documents propose rural development schemes in the context of increasing rural to urban migration trends. A report published by Ministry of

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105 Chaudhry, 2017; GoP, 2012
106 Ishfaq, 2019

107 Martin et al. 2013; Wilkinson et al., 2016; Qaisarani and Salik., 2018

Climate Change in 2017, laid out as key priority, agriculture sector development projects which include high efficiency (drip and sprinkler) irrigation systems, surface rainwater harvesting and groundwater recharge, development of drought tolerant crop varieties, and climate monitoring and forecasting early warning system.[108] Pakistan's Second National Communication on Climate Change (2018) considers large-scale migration a major cause of environmental degradation.[109] Although, Pakistan's Nationally Determined Contributions (NDC) has provided a list of national adaptation priorities, they neither provide any adaptation measures for reducing people's vulnerability to climate change nor highlight migration as a potential adaptation strategy.

Alongside the above-mentioned policy gaps, internal migration issues are also absent in many public social protection schemes and programmes. For instance, Pakistan Poverty Alleviation Fund (PPAF) aims to reduce poverty by improving access to safe drinking water, education, health and nutrition; livelihood enhancement and protection; institutional development and social mobilization and interest free loan.

Given the challenges faced by migrants and their (and displaced) families both at areas of origin and destination, integration of such programmes would help to increase livelihood opportunities and essential financial support, particularly during disasters. Likewise, through Benazir Income Support Programme (BISP) the government is trying to help not only the poverty-stricken segment of the society but also missed vulnerable migrant families.

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108 GoP, 2017   **109** GoP, 2018

5 DISCUSSION AND MAIN FINDINGS

Given that climate change impacts are all-pervasive, there is a growing interest amongst policymakers on the issue of climate-induced displacement and migration, to understand who is likely to migrate and where, what is the potential impacts on areas of origin and destination, and how to plan and manage such migratory movements.

This study investigates how climate hazards such as floods and droughts impact people at different locations and scales in Pakistan.

5.1 Climate change impacts and migration:

The study findings provide evidence of multiple risks arising from climate hazards such as floods and droughts on water, food, health, housing, and livelihoods, which may force people to migrate from their areas of origin.

For instance, sharecroppers of Tharparkar are facing a decline in farm productivity due to water scarcity caused by frequent and intense droughts. On the other hand, recurrent floods in Muzaffargarh damages crops, livestock, and housing, causing loss to farmers and landless farm labourers in terms of livelihood assets.

The impact of climate change is closely linked to the community's level of preparedness and its capacity to cope with and adapt to the changes. In terms of preparedness, the study finds many gaps:

1] Rural areas lack preparedness; they are devoid of any effective early warning system and proper flood protection infrastructure.

2] The government's failure to carry out early and effective evacuation of the vulnerable population, causing the loss of lives, livestock, and other livelihood assets.

3] District or local administration is ineffective in designating rehabilitation areas for the displaced people. During the initial period of flooding, people were forced to stay outdoors due to the lack of relief camps.

4] Relief work was critically slow and inadequate. Most people who stayed in relief camps are already deprived of social safety nets and are food insecure. The study discovers no facility regarding proper nutrition, health, sanitation, and security in the relief camps.

Flooding is also common in cities located in the proximity of rivers. River inundation, coupled with very heavy rainfall, causes havoc for the urban dwellers. The study finds an absence of flood preparedness and a culture of inaction among departments concerned in the urban administration similar to the rural areas. Most of the urban areas lack the infrastructure to drain floodwater. Although embankments were built to prevent floodwater intrusion at vulnerable urban sites, they are not properly maintained. During the 2010 megafloods, most of urban Muzaffargarh was submerged, particularly the peri-urban areas where most of the migrants reside.

In Tharparkar, the impacts of frequent and prolonged droughts are evident from water scarcity, declining farm productivity, hunger, increasing morbidity and mortality of livestock, increasing indebtedness, and unemployment. In urban areas of Mithi, Tharparkar, droughts have severely caused health and drinking water issues for the residents. In the present situation, the departments concerned are either inherently incapable of acting appropriately or lack funds to initiate the required development projects.

The farmer and landless farm labour were the hardest hit due to the decline of agricultural

productivity. Additionally, the small-scale agro-businesses are severely affected by floods and droughts, so re-establishing businesses became a formidable challenge, particularly for people with meager financial resources. The study finds that displacement has triggered many psychological issues besides other socio-economic stresses. The lack of proper nutrition, clean drinking water, unfair aid distribution, insecurity, and restlessness have caused depression and helplessness. Such issues have mainly reduced the coping or adaptive capacities of the communities.

The study finds climate-induced migration is mostly common among landless farm labour in rural areas. The direct outcome of climatic hazards, i.e., floods and droughts, is the displacement from the village and later migration to urban or other rural areas.

Another significant finding of the study is that the farm labourers and sharecropper farmers falling into debt traps because their livelihoods are directly impacted by climate change (fast and slow-onset) events. This is not only a significant driver for climate-induced migration but also depicts people's increasing vulnerability to climate change impacts besides other non-climatic factors. The debt trap and debt burden also impact people's well-being (income, health, education, and freedom) and migration outcomes.

5.2 Migration typologies:

The analysis reveals that rural-urban and urban-urban migration is predominant in the study areas in terms of migration typologies. Similarly, rural-rural and seasonal or circular migration within or across the district is also prevalent, particularly in the Tharparkar district. People migrate from flood or drought-affected rural areas to another secure rural area mainly due to social network support based on kinship and closes tribal relationships.

In Muzaffargarh, migration is, however, followed by displacement of the rural population due to floods. One or more household members migrated to cities to earn livelihoods and finance the entire family's outmigration. In this regard, the outcome of displacement and migration is mainly based on migrant's social and human capital, which defines the typology of migration, either temporary, permanent, or seasonal.

The study finds that most migrant families have no intention to return to the area of origin once they are established in (urban) destination areas. In Tharparkar, some migrants have intentions of return to their (rural) areas of origin for either sowing crops, business, or managing social ties to their fellow left-behind villagers and relatives.

Usually, one or more household members in the study areas migrate out. In contrast, the close family member (such as parents, wife, and children) stays in the (rural) origin areas. Those who have enough financial and social support moved to adjacent local towns when floods or droughts displace them. Owing to megafloods, these areas are also vulnerable to floods. In these circumstances, displaced families decided to migrate again and move to more secure places. In most cases, these places are megacities, or people migrate to Gulf countries.

5.3 Impacts of Migration:

The study shows that climate-induced migration increased many challenges at destination areas for the poor, landless, food insecure, socially oppressed, and indebted migrating families.

First, it relates to the unpleasant displacement experiences of the rural population due to floods and droughts. Rural households were least prepared for climatic hazards because they lacked training and knowledge of risks and timely information access. In urban areas, migrant families mostly reside in vulnerable locations due to affordability and lack of knowledge of the place. People not only lost their essential belongings (livestock, foodstuff, bed clothing, medicine, documents, etc.) but also least likely to have any support from the government due to their proximity to the high flood zone. Furthermore, the most pressing necessities were food, drinking water, medicine, and shelter, mainly impoverished and managed by utilizing their savings like ornaments, livestock, etc. The government also provides shelter that is usually a small tent or a room in government buildings such as schools and mosques. The accommodation is not generally suitable for large families because the family's privacy and security are compromised.

Second, lack of social support also amplifies challenges for the migrant families in destination areas. For instance, in Mithi, social and economic support by friends and family was limited. Migrant families mostly spend their resources for the sake of food, health, and shelter. In such situations, they mostly become financially dependent at the destination and take loans from shops or landlords, which are often exploitative.

Third, the majority of individuals mentioned that they were unable to get work after they migrated. To get a job, they needed to learn new skills and do different work from their origin areas for their survival. In this regard, migrants often change their professions. Trust was also an issue between migrants and the local population. It was difficult for the migrants to get a house or a room on rent without reference on

advance payments. Moreover, when a migrant wants to start any business in destination areas, he cannot gain the trust of a supplier for obtaining goods on credit.

Fourth, the level of satisfaction of access to services such as health care, water supply, shelter, privacy, sanitation, and food is mixed for migrants at destination (urban) areas. In urban areas, migrants faced a variety of access barriers to proper health care due to the poor condition of the public hospital (more patients per doctor) and inaccessibility of private hospitals. In rural areas, health care is either non-existent or inadequate as migrant's left-behind family members also report a similar lack of satisfaction to health services as a migrant member(s) at the destination.

Fifth, the flow of remittances to a left-behind family member is less evident during the initial period of migration. Migrant members cannot send remittances due to a prolonged period of unemployment, low-income, and high expenditure at destination areas. At the same time, left-behind family members are suffering from health and income issues. Moreover, migrant members took loans to manage migration costs, so remittances were also used for such settlements, thus shrinking finances significantly for (economic) well-being of left-behind family members. However, migrant members mentioned the lack of contentment as they missed their ancestral (origin) homes. The left-behind family members also felt migrant absence and underwent psychological traumas.

Sixth, access to safe drinking water is most challenging for vulnerable communities during extreme climate events. Water scarcity is equally a critical issue at areas of origin as well as the destination.

Lastly, climate-induced migration is an unplea-

sant phenomenon for women impacting their health, increasing their work burden and mental pressures.

The study also provides evidence that migration has significantly improved the income of migrant families. Although in some cases, migrant families mentioned no saving (due to increasing household expenditure) but showed agreement that their payments are better (which in some cases 4 times more) compared to origin areas.

Evidence suggests that migrant families can establish small businesses, improve business connections for generating finances, have better opportunities to get private and government jobs, and improved access to microfinance and other government support programmes.

Furthermore, improved access to health and educational facilities demonstrates one of the most important and positive migration outcomes. The findings argue that despite the

other migration challenges in urban destination areas, the migrant families showed contentment and satisfaction over their children's better education compared to rural areas.

Likewise, migrant families have now received better access to health care for pregnant women and infants in urban areas of Tharparkar. Also, recreational facilities such as playgrounds, parks, and festivals have improved the psychological growth among migrant families.

Migrant women played an active part in contributing to a family earning. Besides helping men in the field and doing day-to-day domestic work, women are also sewing and knitting traditional clothing. This income enables women to financially better-off and less dependent on men's pay for daily spending. Women also share the consequence of unsuccessful migration movements and standby their family. The evidence also suggests that migrant families showed relief from social and economic oppression faced by the landholding class or feudal in rural areas.
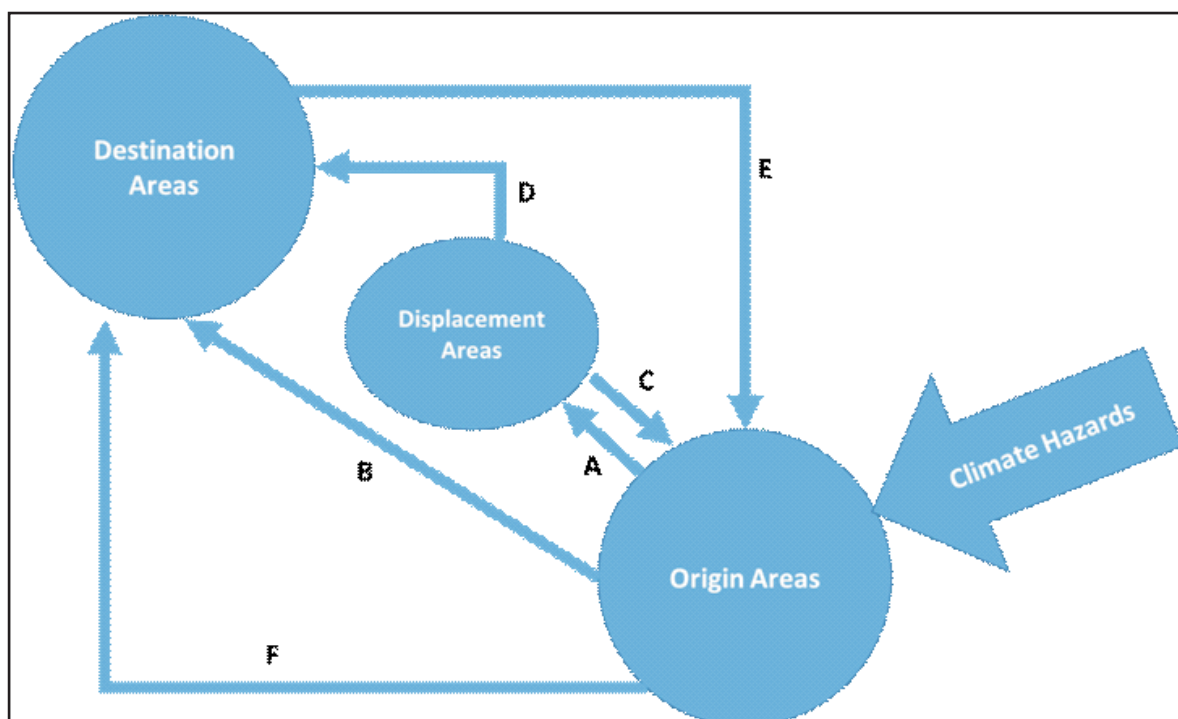

Figure 12: Paths for climate-induced displacement and migration in Pakistan.

In figure 12 origin areas represent vulnerable areas that affected due to climate change hazards. Flood or drought-affected population displaced or out-migrated from this area. Destination areas represent in-migration urban or other rural areas where most of displace or migrating population is moving. Displacement areas represent areas where displaced population temporary settled in relief camps established by either the government or non-governmental organisation or self-help basis. These areas may be a small town or other safe rural areas. Climate hazards considered for this study are floods and droughts. Path A represents displaced population from climate hazards zone moved to a small town or any other safe rural areas (displacement areas). These people include both landowner and landless rural classes. Path B represent a population, which displaced, but due to better financial resources, social network and preparedness they migrated to cities. These migrant populations include both landholding and landless ruralclasses, but the earlier class mainly followed the path. Path Crepresent a population which return to origin areas aftermath of climate hazards (i.e. floods and droughts).

The outcome of such a displacement is mostly unrewarding that increases poverty, debt, and decline in social and economic capitals. Path D represent a population which are once displaced from the origin areas able to get labour or a job that either migrated individually or with the family. Nevertheless, these displacement areas are also vulnerable to floods or droughts that cause these to migrate again, most possibly towards megacities or other urban areas of strong social and economic support. Landless rural class mostly carries out such migration. Path E represent migrant returnees either temporary or permanently to their left-behind family members. It also represents the flow of remittances to origin areas. Path F represents typical migration andhave a contextual association with climate hazards. The report does not focus on this type of migration.

Climate-induced migration is following all the paths and among all social and economic rural classes (i.e. landowner and non-landowner). Rural-urban or rural-rural internal migration predominate among other types of migration.
Source: Author's illustration based on study findings.

6 CONCLUSION & RECCOMENDATIONS

This study ascertains multiple repercussions of climate change impacts on the rural and urban livelihood patterns and opportunities. Loss of livelihoods due to frequent floods or droughts gives rise to migration in multiple directions, which has both negative and positive outcomes.

In rural areas, extreme weather events reduce agricultural productivity and profitability, affecting farm jobs and incomes, particularly for the landless farm labourers and share-croppers. Reduced income, loss of livelihood assets (such as livestock), and increased debts lead to hunger and malnutrition. In the absence of adequate access to welfare programs, health, and other public services, people are compelled to migrate.

According to the study's findings, people have limited adaptive and response capabilities to face multiple challenges posed by climate change to their life, property, and livelihoods. The absence of effective early warning systems and proper infrastructure to cope with extreme climatic events is a matter of grave concern. This has resulted in enhanced vulnerabilities that critically impact people's livelihood sources and coping strategies. Climate-induced migration exacerbates typical migration typologies such as rural-to-rural, rural-to-urban, urban-to-urban, international, and seasonal migration.

The study finds that displaced rural communities were least prepared to cope with floods and droughts. They lack training and knowledge of risks and have no information regarding the expected loss of life and livelihood assets. In urban areas, migrant families mostly reside at vulnerable locations (to floods) due to a lack of affordability and knowledge of the place.

Furthermore, lack of social support also ampli-

fies challenges to the migrant families in destination areas. Migrant families mostly spend money on food, health, and shelter from their savings. Most people mentioned that they could not get jobs or work soon after they migrated to the destination area. Ultimately, they fall into debt traps because their economic livelihoods are devastated (by flooding, drought, and other natural disasters). This situation compels them to borrow money further, thus putting them deeper in debt because of compounding interest.

Also, migrants expressed dissatisfaction in terms of access to health care, water supply, shelter, sanitation, and availability of food at destination (urban) areas. In some areas, they said they have better access to health and education facilities than their areas of origin that may be the most important and positive aspect of migration.

The flow of remittances to a left-behind family member is less evident. During the initial period of (climate-induced) migration, migrants could not send remittances due to unemployment, low income, and high expenditure at destination areas.

Moreover, climate-induced migration is likely to undermine women's well-being. Health is the most significant issue, for a migrating woman, due to floods or drought. The access to health facilities, social safety nets, and public support programmes was limited for women during and after the migration in the areas of destinations.

However, the study provides evidence that migration produced a significant improvement in the income of migrant families in terms of their engagement in informal businesses and other economic activities. This has also yielded a reduction in income volatility and climate-

induced livelihood vulnerabilities of the migrants. Migrant women played an active part in contributing to family earnings and asset generation by working in factories and learning new skills.

In Pakistan, farmers are well-aware of climatic changes and taking measures according to the situation. However, the government must become a much more cognizant and active player to support accommodation, particularly for the farmer having meager resources. Effective and timely institutional support can reduce many risks and vulnerabilities. The institution concerned often lacks knowledge of the severity of the situation and the necessary skills and training to deal with potential climate change impacts.

The role of government institutions is limited to preparing and facilitating communities during extreme climate events. Political influence in decision making regarding financial aid distribution and failure to provide necessary facilities during extreme climate events further add to the institutional inefficiency. Likewise, bureaucratic hurdles in approval and release of funds and the frequent transfer of district administrative officials also increase institutional incompetence and lack of preparedness in the vulnerable areas.

Migration is a highly complex phenomenon; an in-depth understanding can provide valuable information about societal change and patterns. There are still significant uncertainties in understanding how climate change impacts interact with different social, economic, political, and demographic migration factors, thus defining wide-ranging migration patterns and affecting migrants and their families' well-being at a broader societal scale. Moreover, equally important is why some people (belonging to the same social and econ-

omic class) do not migrate. In contrast, some others do migrate during extreme climatic conditions.

6.1 Recommendations:

Based on the research findings, some key recommendations are as follows.

Role of the provincial government and local institutions:
- Provide training, information, and resources to promote climate-resilient farming and integrated water resource management to ensure strategic water reserves for human and livestock consumption.

- Build community awareness on disaster prevention and preparedness.

- Provide better access to health, education, and essential services, including safe drinking water to counter adverse climate change impacts.

- Improve the flow of information for climate and weather-related forecasts (such as heavy rainfall, flood, and drought warnings) and undertake precautionary measures among public departments to better respond and preparedness.

- Develop the capacity of provincial and local government officials to better respond to the local level (slow and fast-onset) climatic changes by effectively monitoring and assessing vulnerable populations and identifying potential adaptation measures. The focus should also extend to the integration of migrants in local job markets for inclusive growth and development.

Role of national governments and institutions:

- Improve access to micro-finance and agro-loans for rural landless classes and small business owners.

- Enhance efforts for the economic inclusion of landless rural population through equitable representation in different sectoral policies and plans (such as agricultural and rural social protection) for better access to (career /work) information, employment opportunities, and credit facilities.

- Devise a national and subnational level internal migration policy based on social, economic, environmental, cultural, and demographic information. Additionally, the government should focus on (internal) migration planning and management, considering the potential social and economic challenges and opportunities for the migrants and their families in areas of origin and destination.

- Implement a migrants registration system across different administrative boundaries by the government to gain insights regarding internal migration flows and patterns for informed policy decisions and implementation. This would also help improve federal to local level institutional support for aid distribution and resettlement.

- Include vulnerable migrant families (both for areas of origin and destination) in the National Socio-Economic Registry (NSER) for support through national to local level social protection schemes and aid distribution such as BISP and Ehsaas Emergency Cash program.

- Revamp DRR response for extreme climatic events to improve early warning systems, evacuation procedures, the arrangement of safe shelters, food, medicines, and security of the impacted communities.

- Strengthen coordination among federal, provincial, and local level departments concerned during extreme events to rehabilitate communities properly.

Role of civil society and other stakeholders:

- Raise awareness of the issue of climate-induced migration among local to national policymakers for a policy change to address social and economic issues and challenges faced by migrant families.

- Universities and research institutions can play an instrumental role by developing postgraduate-level research programmes for a better local level understanding of migration and climate change linkages and outcomes.

- Collaborative global and regional research should be carried out, given the scale of uncertainties regarding climate change impact and anticipating migration patterns and trends. This is particularly important in terms of how internal migration during a certain period extends to international migration.

7 BIBLIOGRAPHY

Abbas, F., Ahmad, A., Safeeq, M., Ali, S., Saleem, F., Hammad, H.M. and Farhad, W., 2014. Changes in precipitation extremes over arid to semiarid and subhumid Punjab, Pakistan. Theoretical and applied climatology, 116(3-4), pp.671-680.

Abbas, F., Rehman, I., Adrees, M., Ibrahim, M., Saleem, F., Ali, S., Rizwan, M. and Salik, M.R., 2018. Prevailing trends of climatic extremes across Indus-Delta of Sindh-Pakistan. Theoretical and applied climatology, 131(3-4), pp.1101-1117.

Abid, M., Schneider, U.A. and Scheffran, J. 2016. Adaptation to climate change and its impacts on food productivity and crop income: Perspectives of farmers in rural Pakistan. Journal of Rural Studies, 47(Part A), 254-266.

Abid, M., Schneider, U.A., Scheffran, J. and Ashfaq, M. 2015. Farmers' perceptions of and adaptation strategies to climate change and their determinants: the case of Punjab province, Pakistan. Earth Syst. Dynam. 6, 225-243.

Adger, W.N. 1999. Social vulnerability to climate change and extremes in coastal Vietnam. World development, 27(2), 249-269.

Adger, W.N. 2010. Climate change, human well-being and insecurity. New Political Economy, 15(2), 275-292.

Adger, W.N. and Kelly, P.M. 1999. Social vulnerability to climate change and the architecture of entitlements. Mitigation and adaptation strategies for global change, 4(3), 253-266.

Adger, W.N., Boyd, E., Fábos, A., Fransen, S., Jolivet, D., Neville, G., De Campos, R.S. and Vijge, M.J., 2019. Migration transforms the conditions for the achievement of the Sustainable Development Goals. The Lancet Planetary Health, 3(11), pp.e440-e442.

Adger, W.N., J.M. Pulhin, J. Barnett, G.D. Dabelko, G.K. Hovelsrud, M. Levy, Ú. Oswald Spring, and C.H. Vogel, 2014: Human security. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D.

Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L.White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 755-791.

Ahmad, A.N., 2016. Disaster governance at the urban-rural interface: the 2010 floods in Pakistan's smaller cities. ZMO Working Papers 15

Ahmad, D., Afzal, M. and Rauf, A., 2019. Analysis of wheat farmers' risk perceptions and attitudes: evidence from Punjab, Pakistan. Natural Hazards, 95(3), pp.845-861.

Ahmed, A., Devadason, E.S. and Al-Amin, A.Q., 2016a. Implications of climate change damage for agriculture: sectoral evidence from Pakistan. Environmental Science and Pollution Research, 23(20), pp.20688-20699.

Ahmed, J., Mughal, M. and Klasen, S. 2016b. Great Expectations? Remittances and Asset Accumulation in Pakistan. Journal of International Development, doi: 10.1002/jid.3202.

Ahmed, K., Shahid, S., Wang, X., Nawaz, N. and Khan, N., 2019.Spatiotemporal changes in aridity of Pakistan during 1901–2016. Hydrology and Earth System Sciences, 23(7), pp.3081-3096.

Akbar, S. and Yasmeen, B., 2017. Famine in Tharparkar: An Examination of Risk, Vulnerabilities and Social Crisis. Paradigms, 11(2), pp.243-247.

Akhtar, S. and Jariko, G.A., 2018. Socio-Economic Characteristics of Poverty and Their Impact on Seasonal Migration in Tharparkar District, Sindh, Pakistan: A Logistic Regression Analysis. Grassroots, 52(1), pp.261-271.

Ali, S., Eum, H.I., Cho, J., Dan, L., Khan, F., Dairaku, K., Shrestha, M.L., Hwang, S., Nasim, W., Khan, I.A. and Fahad, S., 2019. Assessment of climate extremes in future projections downscaled by multiple statistical downscaling methods over Pakistan. Atmospheric Research, 222, pp.114-133.

Almazroui, M., Saeed, S., Saeed, F., Islam, M.N. and Ismail, M., 2020.Projections of precipitation and temperature over the South Asian countries in CMIP6. Earth Systems and Environment, 4(2), pp.297-320.

Ammani, A.A., Auta, S.J. and Aliyu, J.A., 2010. Challenges to sustainability: Applying the problem tree analysis methodology to the ADP system in Nigeria. Journal of Agricultural Extension, 14(2).

Arai, T., 2012. Rebuilding Pakistan in the aftermath of the floods: Disaster relief as conflict prevention. Journal of Peacebuilding& Development, 7(1), pp.51-65.

Aslam, A.Q., Ahmad, I., Ahmad, S.R., Hussain, Y., Hussain, M.S., Shamshad, J. and Zaidi, S.J.A., 2018. Integrated climate change risk assessment and evaluation of adaptation perspective in southern Punjab, Pakistan. Science of the Total Environment, 628, pp.1422-1436.

Bengali, K., Ahmed, Q.M. and Jamal, H., 2003. Social Development in Pakistan: Annual Review 2001: Growth, Inequality, and Poverty. Oxford University Press, USA.

Bhutto, A.W. &Bazmi, A.A. 2007. Sustainable agriculture and eradication of rural poverty in Pakistan.Natural Resource Fourm, 31 (2007), 253–262.

Brown, O., 2008. Migration and climate change (No. 31). United Nations Publications.

Channa, Z.H., 2016. Strategies For Displaced People In Development Projects: A Case Study Of Thar Coal Field Area In Sindh (Doctoral dissertation, University Of Sindh Jamshoro Sindh Pakistan).

Chaudhary, Q., Mahmood, A., Rasul, G. and Afzaal, M. 2009. Climate change Indicators of Pakistan. Technical Report No. PMD-22/2009. Islamabad: Pakistan Meteorological Department.

Chaudhry, QUZ, 2017. Climate Change Profile of Pakistan. Asian Development Ban

Christensen, J.H., Krishna Kumar, K., Aldrian, E., An, S.-I., Cavalcanti, I.F.A., de Castro, M. and Zhou, T., 2013. Climate Phenomena and their Relevance for Future Regional Climate Change. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Stocker, T.F., Qin, D., Plattner, G.-K., Tignor, M., Allen, S.K., Boschung, J., Nauels, A., Xia, Y., Bex V., and Midgley P.M. (Eds.). Cambridge, Cambridge University Press.

Deshingkar, P. and Start, D., 2003. Seasonal migration for livelihoods in India: Coping, accumulation and exclusion (Vol. 111). London: Overseas Development Institute.

Dixon, R.A. and Schaffer, A.T., 2010. Pakistan floods: Internally displaced people and the human impact. Center for Strategic and International Studies-CSIS.

Dreyer, L.C., Hauschild, M.Z. and Schierbeck, J., 2010. Characterisation of social impacts in LCA. The International Journal of Life Cycle Assessment, 15(3), pp.247-259.

Eckstein, D., Künzel, V., Schäfer, L. and Winges, M., 2019.Global climate risk index 2020. Germanwatch Available at: https://germanwatch. org/sites/germanwatch. org/files/20-2-01e% 20Global, 20.

Gazdar, H. 2003. A review of migration issues in Pakistan.Regional Conference on Migration, Development and Pro-Poor Policy Choices in Asia, 22–24 June 2003 in Dhaka, Bangladesh.

Geiger, M., &Pécoud, A. 2014.International organisations and the politics of migration.Journal of Ethnic and Migration Studies, 40(6), 865-887.

Government of Pakistan (GoP), (2012) National Climate Change Policy, Ministry of Climate Change, Islamabad, Pakistan.

Government of Pakistan (GOP), (2016) Technology Needs Assessment For Climate Change Adaptation Barrier Analysis And Enabling Framework.

Government of Pakistan (GoP), 2010.Agricultural Census 2010 – Pakistan report. Islamabad: Pakistan Bureau of Statistics.Government of Pakistan (GoP), 2015a. Pakistan Economic Survey 2014-15. Islamabad: Ministry of Finance.

Government of Pakistan (GoP), 2017.6th Population and Housing Census 2017. Islamabad: Pakistan Bureau of Statistics.

Government of Pakistan (GoP), 2017. Technology Needs Assessment for Climate Change Adaptation. Ministry of Climate change, Islamabad, Pakistan.

Government of Pakistan (GoP), 2018.Pakistan's Second National Communication on Climate Change to United Nations Framework Convention on Climate Change (UNFCCC).Ministry of Climate change, Islamabad, Pakistan.

Government of Pakistan (GoP), 2019.Pakistan Economic Survey, 2018-19, Ministry of Finance.

Government of Pakistan (GoP), Asian Development Bank (ADB), World Bank (WB), 2010.Pakistan Floods 2010: Preliminary Damage and Needs Assessment. Islamabad. Retrieved from: https://reliefweb.int/sites/reliefweb.int/files/resources/64AE3DC5BEDA4E18492577DA001FBE55-Full_Report.pdf

Gray, C. and Wise, E. 2016. Country-specific effects of climate variability on human migration. Climatic change, 135(3-4), pp.555-568.

Green Climate Fund (GCF), 2017. Country Programme.
https://www.greenclimate.fund/sites/default/files/document/pakistan-country-programme.pdf

Haberfeld, Y., Menaria, R.K., Sahoo, B.B. and Vyas, R.N., 1999. Seasonal migration of rural labor in India. Population Research and Policy Review, 18(5), pp.471-487.

Haensler, A. 2013.Climate fact sheet for Pakistan. Available at:
http://www.climate-servicecenter.de/036238/index_0036238.html.en

Herani, G.M., Mahmud, M., Qureshi, M.A. and Rajar, A.W., 2009.Livlihood Diversification1 and Opinion Polls' Analysis: Evidence From Tharparkar-Sindh (Pakistan). Indus Journal of Management & Social Science (IJMSS), 3(1), pp.64-79.

Hussain, S. S. and Mudasser, M. 2007.Prospects for wheat production under changing the climate in mountain areas of Pakistan-An econometric analysis.Agricultural Systems, 94(2), 494-501.

Ikram, F., Afzal, M., Bukhari, S.A.A. and Ahmed, B. 2016.Past and future trends in the frequency of heavy rainfall events over Pakistan.Pakistan Journal of Meteorology.12(24).

Intergovernmental Panel on Climate Change (IPCC), 2013. Climate change 2013: the physical science basis. In: Stocker, T.F., Qin, D., Plattner, G.-K., Tignor, M., Allen, S.K., Boschung, J., Nauels, A., Xia, Y., Bex, V., Midgley, P.M. (Eds.), Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Internal Displacement Monitoring Centre (I.D.M.C), 2020.Global report on internal displacement. Retrieved from: https://www.internal-displacement.org/sites/default/files/publications/documents/2020-IDMC-GRID.pdf

IOM, 2019: Glossary on Migration. International Organization for Migration (IOM). Retrieved from: https://publications.iom.int/system/files/pdf/iml_34_glossary.pdf.

IPCC, 2018: Annex I: Glossary [Matthews, J.B.R. (ed.)]. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.

Iqbal, M.M., Goheer, M.A., Noor, S.A., Salik, K.M., Sultana, H. and Khan, A.M. 2009a. Climate Change and Rice Production in Pakistan: Calibration, Validation and Application of CERES-Rice Model. GCISC-RR-15. Islamabad: Global Change Impact Studies Centre.

Iqbal, M.M., Hussain, S.S., Goheer, M.A., Sultana, H., Salik, K.M., Mudasser, M. and Khan, A.M., 2009b. Climate change and wheat production in Pakistan: calibration, validation and application of CERES-Wheat model. GCISC-RR- 14. Islamabad: Global Change Impact Studies Centre.

Iqbal, N., 2020. COVID-19 in Pakistan: Caring for the poor and vulnerable. PIDE COVID-19 Bulletin No.1. Retrieved at: https://www.pide.org.pk/pdf/PIDE-COVID-Bulletin.pdf

Iqbal, W. and Zahid, M. 2014. Historical and future trends of summer mean air temperature over South Asia. Pakistan Journal of Meteorology.10(20).

Ishfaq, M., 2019. Socioeconomic Development in Tehsil Muzaffargarh (2008-2016) (Doctoral dissertation).

Jamal, Z. and Ashraf, M., 2011. Degree of Migration and its Way: A Case Study of Potwar. Pakistan Journal of Social Sciences (PJSS), 31(2).

Jamshed, A., Birkmann, J., McMillan, J.M., Rana, I.A. and Lauer, H., 2020. The Impact of Extreme Floods on Rural Communities: Evidence from Pakistan. In Climate Change, Hazards and Adaptation Options (pp. 585-613). Springer, Cham.Janjua, S. 2009. Climate change impacts: Adaptation challenges for Pakistan.The International Journal of Climate Change: Impacts and Responses.1(4), 1-16.

Jokisch, B.D., Radel, C., Carte, L. and Schmook, B., 2019. Migration matters: How migration is critical to contemporary human–environment geography. Geography Compass, 13(8), p.e12460.

Khan, N., Shahid, S., bin Ismail, T. and Wang, X.J., 2019. Spatial distribution of unidirectional trends in temperature and temperature extremes in Pakistan. Theoretical and Applied Climatology, 136(3-4), pp.899-913.

Krakauer, N.Y., Lakhankar, T. and Dars, G.H., 2019. Precipitation trends over the Indus basin. Climate, 7(10), p.116.

Lein, H., 2009. The poorest and most vulnerable? On hazards, livelihoods and labelling of riverine communities in Bangladesh. Singapore Journal of Tropical Geography, 30(1), pp.98-113.
Maharjan, A., de Campos, R.S., Singh, C., Das, S., Srinivas, A., Bhuiyan, M.R.A., Ishaq, S., Umar, M.A., Dilshad, T., Shrestha, K. and Bhadwal, S., 2020. Migration and Household Adaptation in Climate-Sensitive Hotspots in South Asia. Current Climate Change Reports, pp.1-16.

Martin, M., Billah, M., Siddiqui, T., Black, R., &Kniveton, D. (2013). Policy analysis: Climate change and migration Bangladesh. Dhaka, Bangladesh: Refugee and Migratory Movements Research Unit (RMMRU).

Mohmand, S. and Gazdar, H., 2007. Social structures in rural Pakistan. Thematic paper prepared under TA4319, Determinants and Drivers of Poverty Reduction and ADB's Contribution in Rural Pakistan. ADB, Islamabad.

Mueller, V., Gray, C. and Kosec, K. 2014. Heat stress increases longterm human migration in rural Pakistan. Nature Climate Change, 4(3), 182-185.

Mueller, V., Sheriff, G., Dou, X. and Gray, C., 2020. Temporary migration and climate variation in eastern africa. World development, 126, p.104704.

Naveed, A., Wood, G. and Ghaus, M.U., 2017. Geography of Poverty in Pakistan: Explaining regional inequality.

Nelson, J.M., 1976. Sojourners versus new urbanites: Causes and consequences of temporary versus permanent cityward migration in developing countries. Economic Development and Cultural Change, 24(4), pp.721-757.Ahmed, M and Schmitz, M. (2011) Economic assessment of the impact of climate change on the agriculture of Pakistan.Business and Economics Horizons, 04, 1-12.

Obokata, R., Veronis, L. and Mcleman, R. 2014. Empirical research on international environmental migration: a systematic review. Population and Environment, 36(1), 111-135.

Prikhodka, D. and Zrilyi, O. 2013. Pakistan: Review of wheat sector and grain storage issues. Country highlights. Rome: Food and Agriculture Organisation.

Qaisrani, A., and Salik, K.M., 2018. The road to climate resilience: migration as an adaptation strategy. (PRISE-PB) Accessed at: https://prise.odi.org/research/the-road-to-climate-resilience-migration-as-an-adaptation-strategy/

Quddus, A., 2018. Impact of Floods on the Environment of District Muzaffargarh (Doctoral dissertation).

Qureshi, A.S. 2011. Water management in the Indus Basin in Pakistan: Challenges and Opportunities. Mountain Research and Development, 31(3), 252-260.

Rabbani M.G, Inam A., Tabrez N. A., and Tabrez S.M. 2008. The Impact of Sea Level Rise On Pakistan's Coastal Zones– In A Climate Change Scenario. Conference: 2nd International Maritime Conference 2008 At: Bahria University, Karachi Volume: Conference Proceedings.

Rahman, A.Ur. and Shaw, R. 2015. Introduction and Approaches of Disaster Risk Reduction in Pakistan.In Disaster Risk Approaches in Pakistan.pp3-30, Tokyo: Springer.

Rajar, A.W., Herani, G.M. and Dhakan, A.A., 2007. Demographic, social and economic changes in Tharparkar (1988-2006)-An Analysis.

Saeed, B., 2017. Loss & Damage from drought in Pakistan: Notes from Tharparkar. LEAD Pakistan, 33 Action Research Series.August, 2017.

Saeed, F., Almazroui, M., Islam, N. and Khan, M.S., 2017. Intensification of future heat waves in Pakistan: a study using CORDEX regional climate models ensemble. Natural Hazards, 87(3), pp.1635-1647.

Salik, K.M.,Ishfaq, S., Saeed, F., Noel, E., Syed, Q., 2015. Pakistan: Country Situation Assessment. PRISE working paper series. Published date: 11.8.2015 Available at: https://prise.odi.org/research/pakistan-country-situation-assessment/

Salik, K.M., Jahangir, S. Zahid, W. H., and ulHasson, S., 2015.Climate change vulnerability and adaptation options for the coastal communities of Pakistan. Ocean & Coastal Management, 112, pp.61-73.

Salik, K.M., Qaisrani, A., Umar, M.A. and Ali, S.M., 2017. Migration futures in Asia and Africa: economic opportunities and distributional effects–the case of Pakistan. PRISE working paper (Accessed at:https://prise.odi.org/research/migration-futures-in-asia-and-africa-economic-opportunities-and-distributional-effects-the-case-of-pakistan/)

Qazlbash, S.K., Zubair, M., Manzoor, S.A., ulHaq, A. and Baloch, M.S., 2020. Socioeconomic determinants of climate change adaptations in the flood-prone rural community of Indus Basin, Pakistan. Environmental Development, p.100603.

Shachar, A., 2020. The shifting border: Legal cartographies of migration and mobility. Manchester University Press.

Sheikh, M. M., Manzoor, N., Adnan, M., Ashraf, J. and Khan, A. M. 2009.Climate profile and past climate changes in Pakistan. GCISE report No. RR-01. Islamabad: Global Change Impact Studies Centre.

Shonchoy, A., 2010. Seasonal Migration and the Effectiveness of Micro-credit in the Lean period: Evidence from Bangladesh. Institute of Developing Economies Discussion paper No, 294.

Siddiqui, R., Samad, G., Nasir, M. and Jalil, H.H. 2010. The Impact of climate change on major agricultural crops: Evidence from Punjab, Pakistan. The Pakistan Development Review, 51(4), 261-274.

Sikander, M.U., Shah, S.A.A. and Malik, A., 2010. Inter-District Inequalities in Social Service Delivery: A Rationalised Approach towards Funds Disbursement [with Comments]. The Pakistan Development Review, pp.881-899.

Snowdon, W., Schultz, J. and Swinburn, B., 2008. Problem and solution trees: a practical approach for identifying potential interventions to improve population nutrition. Health Promotion International, 23(4), pp.345-353.

Solomon, S., 2019. Understanding the Impacts of Climate Change on Water Access and the Lives of Women in Tharparkar District, Sindh Province, Pakistan: A Literature Review, 1990-2018.

Sultana, H., Ali, N., Iqbal, M.M. and Khan, A.M. 2009. Vulnerability and adaptability of wheat production in different climatic zones of Pakistan under climate change scenarios. Climatic change, 94(1-2), 123-142.

Tariq, A., Tabasam, N., Bakhsh, K., Ashfaq, M. and Hassan, S. 2014.Food security in the context of climate change in Pakistan.Pakistan Journal of Commerce and Social Sciences.8(2), 540-550.

Thiede, B., Gray, C. and Mueller, V., 2016. Climate variability and inter-provincial migration in South America, 1970–2011. Global Environmental Change, 41, pp.228-240.

Usman, M. and Nichol, J.E., 2020. A Spatio-Temporal Analysis of Rainfall and Drought Monitoring in the Tharparkar Region of Pakistan. Remote Sensing, 12(3), p.580.

Wester, P., Mishra, A., Mukherji, A. and Shrestha, A.B., 2019. The Hindu Kush Himalaya assessment: mountains, climate change, sustainability and people (p. 627). Springer Nature.

Wilkinson, E., Kirbyshire, A., Mayhew, L., Batra, P. and Milan, A., 2016. Climate-induced migration and displacement: closing the policy gap. Overseas Development Institute (ODI), London, UK.

Wood, N.J., Burton, C.G. and Cutter, S.L., 2010.Community variations in social vulnerability to Cascadia-related tsunamis in the US Pacific Northwest. Natural Hazards, 52(2), pp.369-389.

World Bank, 2018. When Water Becomes a Hazard A Diagnostic Report on The State of Water Supply, Sanitation and Poverty in Pakistan and Its Impact on Child Stunting. Retrieved from: http://documents1.worldbank.org/curated/en/649341541535842288/pdf/131860-WP-P150794-PakistanWASHPovertyDiagnostic.pdf

Yu, W., Yang, Y., Savitsky, A., Alford, D., Brown, C., Wescoat, J., Debowicz, D. and Robinson, S. 2013.The Indus basin of Pakistan: The impacts of climate risks on water and agriculture. Washington: The World Bank.

Zahid, M. and Rasul, G. 2011. Frequency of Extreme Temperature and Precipitation events in Pakistan 1965-2009.Science International, 23(4), 313-319.

ANNEX: METHODOLOGY OF THE STUDY

The study was carried out using the participatory research method, of actively engaging with vulnerable communities, to figure out the push and pull factors of climate-induced migrations in selected hotspots. After conducting detailed literature review, two hotspots were identified to carry out this research i.e. Muzaffargarh from the province Punjab (vulnerable to floods) and Mithi from the province Sindh (vulnerable to droughts and heatwaves). These two areas of Pakistan particularly known for being disaster-hit areas. To know details of the factors, which cause climate induced migrations in communities, Sustainable Development Policy Institute (SDPI) carried out participatory research work in the month of November 2019 (see Annex Figure 1).

To analyse the role of institutions during floods and droughts in selected study sites, key informant interviews were also carried out. After the 18th amendment in the constitution of Pakistan, each province is responsible for its environmental and climate change issues. From Muzaffargarh key informant interviews carried out from the departments of health, water resource management, environment and agriculture to analyse their role during flood or post flood situations in the area. From Mithi, staff from the departments of health, education, agriculture and livestock were interviewed.

During focus group discussion problem trees, matrix scoring and mobility maps are used to build connection between causes of migration, its consequences and preferred locations of migrations (with distance between source and destination areas). These tools are effectively been used to understand cause and effect relationships, identifying policy interventions, characterisation, and mobility of people.[110]

About 10 individual Case studies from rural and urban areas of district Tharparkar and Muzaffargarh were captured focusing on family details, occupation, key causes of migration, preferred location of migration, duration of stay of migration, details of the basic facilities at destination, sources of livelihood and hardships and facilities/support availed at each location of migration.

Furthermore, a total of 9 focus group discussion (FGDs) were conducted to identify the role of migration and climate, gendered impacts and vulnerabilities, situation of left-behind family members in the sending areas and migrant families in the destination areas. In Muzaffargarh, four FGDs were conducted; two each for rural and urban areas. Whereas five FGDs were conducted in Tharparkar, including one urban (female migrant household members), four in rural areas (including two each for non-migrant and migrant male and female household members) (see Annex table 1 and 2). Total members of all FGDs in Muzaffargarh were 31, whereas in Mithi they were 61. Moreover, 6 key-informant interviews were conducted (3 from each study sites) from the officials of local government (Deputy Commissioner), agriculture and health department and livestock department.

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110 Ammani, et al. 2010; Snowdon et al. 2008; Dreyer et al. 2010; Shachar, 2020
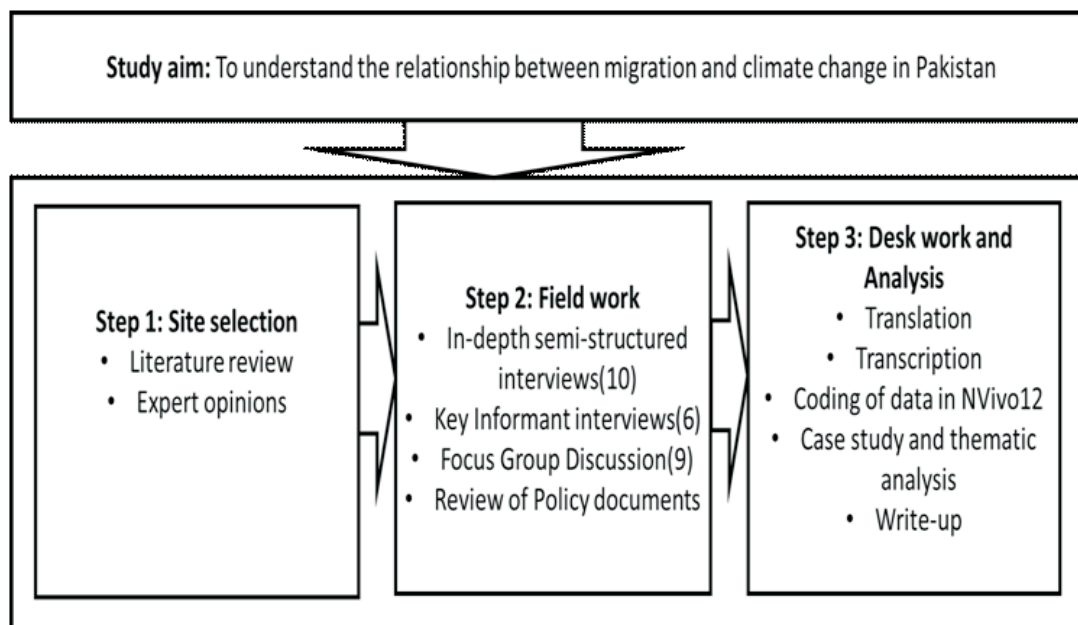
ANNEX FIGURE 1: Workflow diagram of a mixed-method approach
Source: Authors' own illustration

The interviews and FGDs conducted in local languages i.e. Punjab, Sariki and Sindhi. Therefore, the qualitative data translated into the Urdu Language during the fieldwork and then transcribed into the English language for the analysis. The data then coded in NVivo 12 for the analysis.

Sr. No.	Area: Muzaffargarh, Punjab		
	Village Name	**Gender division**	**Geographical Unit**
1	TibiHussain Abad	Male	Urban
2	Ajab Arian	Male	Rural
3	Sumbal City	Females	Urban
4	MouzaAjab Arian	Females	Rural
5	ChahNawaz	Females	Rural
	Area: Mithi, Tharparkar, Sindh		
1	MalookMehar	Mix	Rural
2	DareloParo-Islamkot	Females	Urban
3	Saraj-ud-din Tar	Mix	Rural
4	Saraj-ud-din Tar	Females	Rural
5	DareloParo-Islamkot	Mix	Urban

ANNEX TABLE 1: Table shows number of focus group discussions and case stores in the study sites.

Sr. No.	Area: Muzaffargarh, Punjab		
	Village Name	**Gender division**	**Geographical Unit**
1	Ajab Arian	Male	Rural
2	Basti Arian	Females	Rural
3	MolaTibiHussain Abad	Male	Urban
4	MohallaBukhariWala	Females	Urban
5	MohallaBukhariWala	Male	Urban
	Area: Mithi, Tharparkar, Sindh		
1	Sanghar	Females	Rural
2	Saraj-ud-din tar	Male	Rural
3	MalookMehar	Females	Rural
4	Islam Kot	Male	Urban
5	Islam Kot, MohalaDarelo	Females	Urban

ANNEX TABLE 2: Table shows number of in-depth in the study sites.

CLIMATE-INDUCED DISPLACEMENT AND MIGRATION IN PAKISTAN
## Insights from Muzaffargarh and Tharparkar districts
December 2020

The Sustainable Development Policy Institute (SDPI) is Pakistan's premier think tank working on issues pertaining to development research and policy. SDPI was founded in August 1992 as part of the recommendations of the National Conservation Strategy (NCS), also called Pakistan's Agenda 21. The organization has been at the forefront of research initiatives on environmental protection and management. Over the past three decades, SDPI has taken on a number of initiatives in this respect with partners and stakeholders in the government, civil society, academia and internationally.
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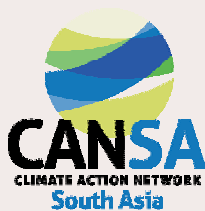
Climate Action Network – South Asia (CANSA) is a coalition of 293 organisations spread across all South Asian countries. We promote equity and sustainable development through effective climate change policies and their implementation in South Asia and at the global level.
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