Research Piece

# Anticipating the Impacts of Climate Change Related Human Mobility in Pakistan and Viet Nam

## Insights from a Participatory Foresight Process

This publication is authored by:
**Aarathi Krishnan**, Senior Advisor on Strategic Foresight – UNDP Regional Bureau for Asia and the Pacific
**Beth Allen**, Programme Analyst on Risk Anticipation and Foresight – UNDP Crisis Bureau
**Sophia Robele**, Foresight Specialist – UNDP Regional Bureau for Asia and the Pacific
**Aaron Martin**, PhD Candidate – Rutgers University
**Wajiha Khan**, Research Intern – UNDP Crisis Bureau

With support from:
**Ioana Creitaru,** Global Disaster Preparedness Lead – UNDP Crisis Bureau
**Samantha Happ**, Consultant – UNDP Regional Bureau for Asia and the Pacific
**George May**, Migrant Protection and Development Specialist, UNDP Regional Bureau for Asia and the Pacific
**Sebastian Boll**, Migration and Displacement Specialist, UNDP Regional Bureau for Asia and the Pacific

**Citation**: UNDP (2024). *Anticipating the Impacts of Climate Change Related Human Mobility in Pakistan and Viet Nam.* New York, New York.

We'd like to acknowledge **Zainab Kakal**, UNDP Pacific and **Tshering Lhamo**, UNDP Bhutan for their co-facilitation and analytical support in this work, and the following colleagues for their research and analysis support: **David Tan**, **Rachel Yue**, UNDP Malaysia; **Ranel Ram Cheng**, **Irina Velasco**, UNDP Philippines; **Aisha Marzuki**, UNDP Indonesia; and **Kevin L. Li**, Kings College London for research support. Thank you as well to the UNDP Pakistan and UNDP Viet Nam Country Offices and their UN, civil society, academia, and government counterparts for their participation in the foresight, analysis and validation processes that informed this paper's findings.

The predictive analytics and scenario modelling described in this paper, to be discussed further in a later publication, was done by **Bryan Jones**, International Consultant.

---

# Contents

# Summary

This report is critical component of the ongoing UNDP Predictive Analytics, Human Mobility and Urbanization Project: Anticipating the Challenges and Opportunities of Climate Change Related Human Mobility in Asia-Pacific which seeks to anticipate the scale and nature of internal climate change-related human mobility in Pakistan and Viet Nam up to 2050.

The insights presented within this report are the outcome of a participatory foresight process which was applied in collaboration with experts and stakeholders in Pakistan and Viet Nam. They elaborate key risks, opportunities, uncertainties, and interconnected variables influencing the future of human mobility in these locales, as a basis for testing the assumptions and robustness of current policy, identifying existing or novel anticipatory solutions and risk mitigation measures, and prioritizing investments in further research.

Key thematic areas discussed are:

- **Water scarcity is a key driver of climate change-related mobility up to 2050**. In particular, the human mobility-related drivers for Karachi and Ho Chi Minh City underline complex relationships at the nexus of urban and rural development, water scarcity, and mobility.
- **Climate change-related loss of agricultural livelihoods will drive rural-urban human mobility**, presenting rural development initiatives as opportunities to both strengthen food security and help to reduce the pressure on Karachi and Ho Chi Minh City by allowing some populations to adapt in place.
- **Potential reverse migration from urban to rural areas**, triggered by the impacts of in-migration, is identified after a deeper look at the complexity and multi-faceted impacts of climate change-related urban in-migration up to 2050.
- **Questions are raised as to what societies will consider to be a 'climate migrant' by 2050,** and the ways in which this definition will respond to the complex spectrum of dislocation.
- **Human mobility is a critical adaptive response** and means of recovery from climate change-related hazards. However, policy should be cognizant of both voluntary and involuntary immobility when considering mobility as an adaptive response.
- **Labour mobility and adaptation policies can provide an opportunity** to increase resilience and enhance development. However, challenges and barriers exist for those working in the informal economy.
- **The complexities associated with human mobility will necessitate making difficult trade-offs** and choices in the face of seemingly more immediate concerns.

As is often the nature of more long-term and anticipatory insights, these findings offer pathways for shaping more future-fit human mobility policies in Viet Nam and Pakistan rather than prescriptive recommendations. Further to this, the findings of this report provide a strong rationale for the necessity of investments to mitigate climate impacts that drive mobility and prepare for an inevitable uptick in rural-urban migration up to 2050.

# Background

## Climate Change & Human Mobility

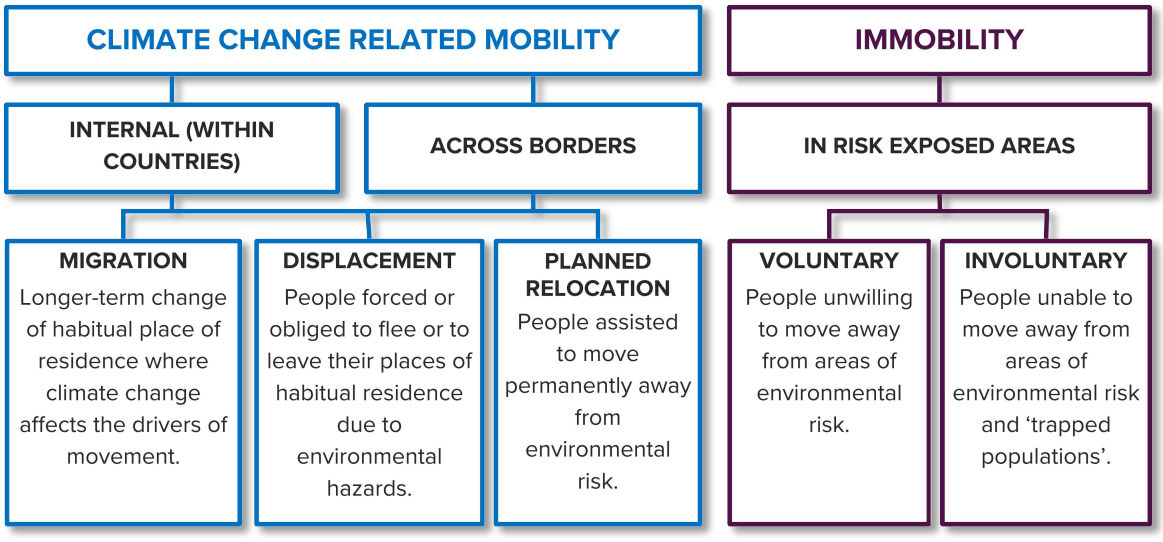
In the age of human-induced climate change, communities across Asia and the Pacific are becoming increasingly susceptible to rising sea levels and extreme weather events, such as droughts, flooding and tropical storms.[1] Predictions about the impact of climate change on human mobility suggest that, without significant action, the world could see 143 million internal 'climate migrants' by 2050.[2]

**"Internal climate migrants are rapidly becoming the human face of climate change."**[i]

Human mobility, and immobility, in the context of climate change can take many forms (Figure 1). This report uses climate change-related human mobility, or climate mobility, to refer to the movement of those who – for reasons of sudden or slow-onset climate change – leave their habitual place of residence, either temporarily or permanently.

The variety and complexity of the drivers of human mobility presents challenges to anticipating future mobility and informing adaptable and anticipatory policy-making. Given this reality, it is imperative that development actors bring other tools to bear to anticipate and prepare for future migratory patterns and ensure that those who move, and their hosting communities, have their human rights protected and can contribute meaningfully to the communities in which they live.

**Figure 1: Human Mobility and Immobility in the Context of Climate Change (Adapted from the Groundswell Report)**




[i] Groundswell report: Preparing for Internal Climate Migration

## Anticipating Climate Mobility

The UNDP Predictive Analytics, Human Mobility and Urbanization Project: Anticipating the Challenges and Opportunities of Climate change-related Human Mobility in Asia-Pacific is an ongoing joint initiative between UNDP's Regional Bureau for Asia and the Pacific Foresight Network, Crisis Bureau's Disaster Risk Reduction for Building Resilience Team and Recovery Solutions and Human Mobility Team at Bangkok Regional Hub, UNDP Country Offices in Pakistan and Viet Nam, and Accelerator Lab colleagues from across the Asia and the Pacific region.

Seeking to anticipate the scale and nature of internal climate change-related human mobility in two focus countries – Pakistan and Viet Nam – up to 2050, **the initiative has produced a series of anticipatory policy and programmatic pathways which harness the developmental potential of migration while also mitigating the impacts of its associated challenges.** To achieve this goal, predictive analytics have been blended with strategic foresight to anticipate the scale and nature of human mobility within Pakistan and Viet Nam to Karachi and Ho Chi Minh City respectively up to 2050, including its corresponding development implications.

This report presents the findings of participatory foresight processes which were applied in collaboration with experts and stakeholders in Pakistan and Viet Nam. Taking place throughout 2023, these processes brought together a multiplicity of perspectives to test assumptions and identify gaps in predictive models. The ongoing testing and refining of predictive models allows for a more comprehensive picture of emerging risks and opportunities spurred by the evolving climate change and mobility landscape.

### Pathways to Anticipation

Strategic foresight is **a pathway to anticipating uncertain futures**, to "help us act in the present to shape the future we want.". Foresight **is not** about making predictions about the future of human mobility.

Instead, it is about **generating better insights into how human mobility is evolving in relation to climate change**, so decision-makers can consider and adopt anticipatory policies ensuring that all people have the best opportunities to thrive.

## Focus Country: Viet Nam

Due to its coastal geography, densely populated deltas, and dependence on agriculture and aquaculture, Viet Nam is particularly sensitive to the impacts of climate change. This includes slow-onset hazards like sea-level rise and rapid, catastrophic events like typhoons or flooding. As a result of this exposure, Viet Nam is the world's sixth-most climate-vulnerable country, with the World Bank estimating nearly 2.7 billion USD in annual disaster losses.[3]

**Viet Nam is shaped by the convergence of climatic stresses and rapid urbanisation.**[4] In part as a function of these forces, almost 15 percent of the total population are classified as internal migrants.[5] The interaction of climate change and urban migration flows is particularly apparent in **Ho Chi Minh City** and the bordering Mekong Delta region. Taken together, this area comprises one of the most dynamic and heavily populated regions of the country, with substantial socioeconomic and demographic exchange between the low-lying delta and Viet Nam's largest city.[6] The Mekong Delta is simultaneously one of the most fertile places on earth, accounting for one-third of Viet Nam's GDP, and one of the most vulnerable to climate change impacts.[7] The destabilizing effects of climate change-related threats on rural economic livelihoods in the delta create the conditions for increased in-migration to Ho Chi Minh City.

Photo: UNDP Viet Nam

## Focus Country: Pakistan

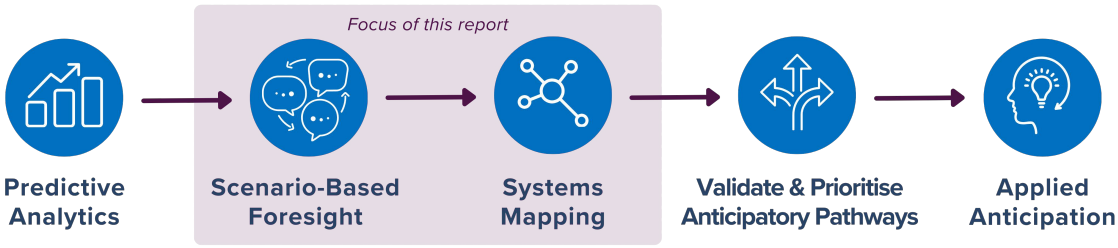
With a population of just under 230 million, Pakistan is currently the 5th largest country by population size in the world. It is estimated to reach a population of 300 million by 2050, with urban populations expected to make up more than 52 percent of the population.[8] Due to its exposure and vulnerability to climate change-related hazards, Pakistan was identified as the world's fifth-most climate-vulnerable country, with further estimates indicating that Pakistan also had the third-highest number of internally displaced people globally due to the impacts of disasters.[9]

**Pakistan has, over the course of the last century, been a nation shaped by migration.** Internal migration flows dominate, with estimates placing the internal migrant population as roughly four times larger than the emigrant population.[10] **Karachi**, located in Sindh province in southern Pakistan, is the country's largest city. Pakistan's cosmopolitan and economic capital, Karachi is responsible for roughly 20 percent of Pakistan's total GDP, and as the nation's only major port, over 95 percent of foreign trade passes through the city.[11] Karachi's position as the nation's clear economic powerhouse has made it the primary destination of rural-to-urban migrants from across the country, making it one of the 20 fastest growing cities in the world.[12]

Photo: UNDP Pakistan

## Approach

The UNDP Predictive Analytics, Human Mobility and Urbanization Project: *Anticipating the Challenges and Opportunities of Climate change-related Human Mobility in Asia-Pacific* utilizes a five-phase research approach which is outlined below. This report focuses on the insights generated in Phase 2: Scenario-Based Foresight and Phase 3: Systems Mapping.




**PHASE 1:**

### Predictive Analytics

Using historical data and statistical modelling techniques, future national-level population change, urbanisation rates, and geographic distributions were estimated for Ho Chi Minh City and Karachi based on combinations of socioeconomic and climate change projections up to 2050. The work built upon and localized the techniques applied in the World Bank's Groundswell report and produced upper and lower limits of the projected scale of human mobility patterns to account for the uncertainty in results.

**PHASE 2:**

### Scenario-Based Foresight

The scenarios produced in Phase 1 were used as the foundation of participatory foresight processes, which were applied in collaboration with experts and stakeholders in Pakistan and Viet Nam. This brought together a multiplicity of perspectives to test assumptions and identify gaps in the predictive models for a more comprehensive picture of emerging risks and opportunities spurred by the evolving climate and mobility landscape.

**PHASE 3:**

### Systems Mapping

Using the insights generated in Phase 1 & 2, systems mapping explored the connections, patterns, impacts, trends, and policy gaps in each country's respective human mobility systems. The findings of this systems mapping were then used to inform further research and analysis, which underpinned policy ideation.

**PHASE 4:**

### Validation & Prioritisation of Anticipatory Pathways

Experts and stakeholders from across Asia-Pacific provided further analysis to validate and prioritize anticipatory solutions to prepare for future mobility patterns and identify where existing policies could be strengthened or scaled.

**PHASE 5:**

### Applied Anticipation

A series of anticipatory policy and programmatic pathways were identified by the research team drawing on stakeholder perspectives, which harness the developmental potential of human mobility while also mitigating the associated challenges. The foresight process also identified emergent challenges and opportunities for implementing such policies up to 2050.

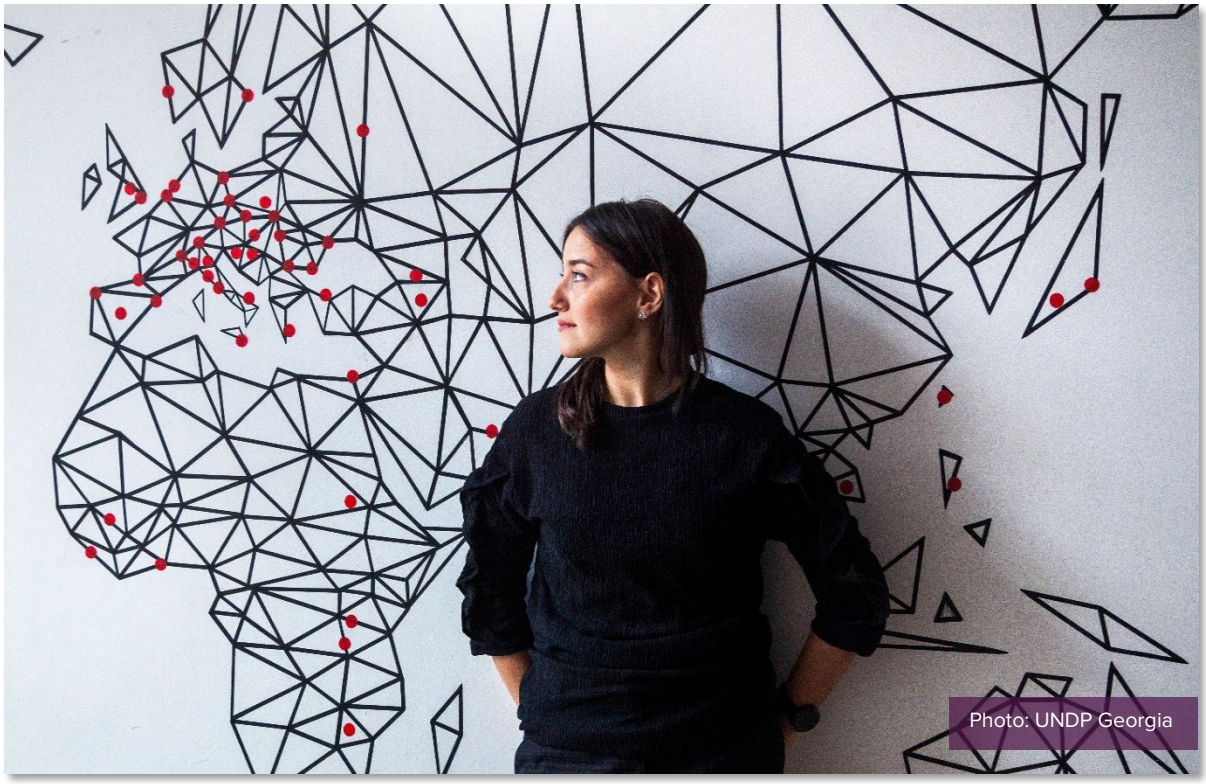
# Scenario Based Foresight

## Method

In this stage of the research, scenarios were used as the foundation of a participatory foresight process which was conducted in collaboration with experts and stakeholders in Pakistan and Viet Nam. The scenarios were informed by the findings of predictive models from Phase 1 of the research initiative which used socioeconomic and climate change projections up to 2050 to estimate the upper and lower limits of the projected scale of human mobility patterns to Karachi and Ho Chi Minh City.

Alongside the findings of the predictive modelling, participants in the foresight process were presented with *A Picture of 2030* for analysis and to stimulate discussion about the influences upon human mobility and resilience, and the uncertainties still faced. The "Iceberg" model was applied as a tool to guide systemic thinking which considered the scenarios' patterns & trends, underlying structures, and mental models which were influencing the mobility system.

The scenario-based approach adopted in this phase brought together a multiplicity of perspectives to test assumptions and identify gaps in the predictive models for a more comprehensive picture of emerging risks and opportunities spurred by the evolving climate and mobility landscape. The initial findings of this phase are found below.



## Insight Summary: Viet Nam

In a participatory foresight process, specialists from sectors such as inclusive growth, climate change, migration, economics, governance, and human rights were engaged in a series of exploratory exercises based upon the aforementioned findings of the predictive models.

As part of this process, participants were presented with *A Picture of 2030,* shown in Box 1, for analysis and to stimulate discussion about the influences upon human mobility and resilience, and the uncertainties still faced.

The insights generated captured the uncertainty and complexity within the mobility system, as well as the implications of that system upon development. Insights discussed local, regional, and national implications for Viet Nam and Ho Chi Minh City, a generalised summary of which are shown below in Table 1.

**Box 1: A Picture of 2030…**

Major migration to urban areas has over-burdened social service systems, exacerbated inequities and unemployment, particularly for youth in out-migration sites. More have entered the informal sector in cities, while poor farming households in rural areas are experiencing more acute poverty levels and seeing a feminization and aging of the population. Increased frequency of extreme weather events, including extreme heat and flooding, as well as knock-on effects of rapid urbanisation on sanitation and public health and access to basic services, is creating more instability in societies and declining trust in institutions. The profile of city dwellers is shifting, with greater divisions between English speaking and Western-influenced populations and those coming from more traditional ways of living.

**Table 1: Key insights generated for Viet Nam in the participatory foresight exercises**

| Variables for Human Mobility & Resilience | Uncertainties |
|---|---|
| • Interlinkages between water security and liveability of geographic hotspots<br>• Social networks as investments for coping and adaptation strategies<br>• Rising informality, demographic transitions and social protection<br>• Connections between energy transitions, digitalisation, and future of work<br>• Balancing urban and rural investments, looking beyond existing urban centres<br>• Governance – coordination between central and local government; effects of shrinking civic space on climate mitigation | • Potential disruptions resulting from regional/global economic decline<br>• Effects of shifting culture (e.g., preferences for eco-lifestyles, appreciation of traditional values) on migration or reverse migration patterns<br>• Role of the Mekong Delta and the development models that shape it<br>• What new social dynamics will human mobility produce, including potential ethnic or other tensions?<br>• Effects of climate events and related movements on food security |

## Insight Summary: Pakistan

In a participatory foresight process, specialists from sectors such as livelihoods, climate change, economics, governance, human rights, migration, and health were engaged in a series of exploratory exercises based upon the aforementioned findings of the predictive models.

As part of this process, participants were presented with *A Picture of 2030,* shown in Box 2, for analysis and to stimulate discussion about the influences upon human mobility and resilience, and the uncertainties still faced.

The insights generated captured the uncertainty and complexity within the mobility system, as well as the implications of that system upon development. Insights discussed local, regional, and national implications for Pakistan and Karachi, a generalised summary of which are shown below in Table 2.

**Box 2: A Picture of 2030…**

Rapid urbanisation in the absence of proactive regulations or equitable land property rights has exacerbated climate change and environmental damage, including through large real estate projects in Karachi further displacing populations. Influx into urban centres has put pressure on infrastructure – made worse by increased flooding, heatwaves, drought and weather fluctuations. Vulnerable groups particularly in dense informal settlements are at higher risk of water-borne and other disease. Social divisions have heightened, as socioeconomic insecurities and sectarian conflict have triggered more crime and fear, compelling more to move to gated housing. Urban encroachment and population growth has exacerbated natural resource depletion, deforestation and reduction of agricultural lands, creating more food scarcity.

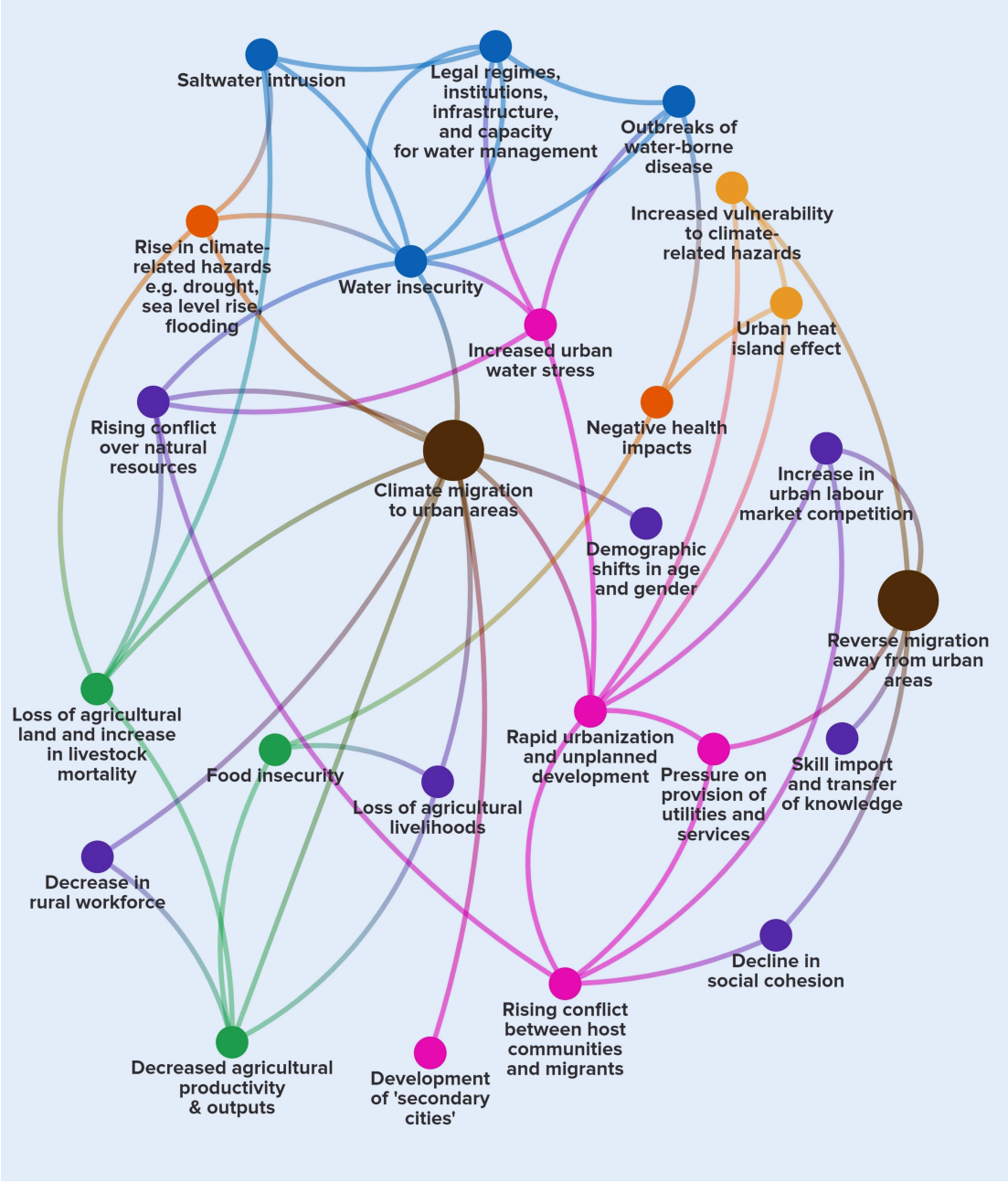
**Table 2: Key insights generated for Pakistan in the participatory foresight exercises**

| Variables for Human Mobility & Resilience | Uncertainties |
|---|---|
| • Livelihood and asset loss as a key driver<br>• Links between public fear and insecurity and a rise in sectarian, anti-poor and anti-migrant policies and corruption<br>• Rapid urbanisation triggering environmental damage, thereby affecting agricultural production, food security, and social cohesion<br>• Significance of water stewardship policies, investments in mass transit and physical infrastructure to strengthen liveability of Karachi and other regions | • Risks to culture and solidarity associated with relocating populations in ways that don't honour local values and traditions<br>• Trade-offs of channelling investment into Karachi over secondary cities or rural areas<br>• Industries to invest in that might support positive human mobility trends<br>• Differing gender impacts & the emergence of new vulnerable groups |

# Mapping the System

Building upon the findings of the Scenario-Based Foresight process, systems mapping has been used to identify the relationships, interconnections, and assumptions which exist between elements of the climate change-related human mobility system.[13]

*The below map presents a consolidated snapshot of the key interconnected variables affecting the trajectories of, and development outcomes influenced by, human mobility systems for both countries in the coming decades. The variables contained within this map, and the interconnections they share, can change over time as the system grows and evolves.*



# Anticipating Complex Challenges & Opportunities

This section will expand upon the insights generated from the scenario-based foresight process and systems mapping. It focuses on less obvious relationships and patterns in the system map shown above, instead **highlighting influential nuances, uncertainties, and feedback loops** which can guide the prioritisation of anticipatory human mobility strategies.

Photo: UNDP Pakistan/Shuja Hakim

## Anticipating Water Scarcity Challenges

Hydrometeorological hazards like floods, storms, and drought are projected to increase in their frequency and severity by 2050 as climatic changes disrupt precipitation patterns.[14] Sea-level rise is also projected to worsen the salinization of groundwater, decreasing the availability of safe, clean water for livelihoods, human well-being, and ecosystems in coastal areas. **The resultant water scarcity is expected to be a major driver of global climate change-related mobility up to 2050.**[15]

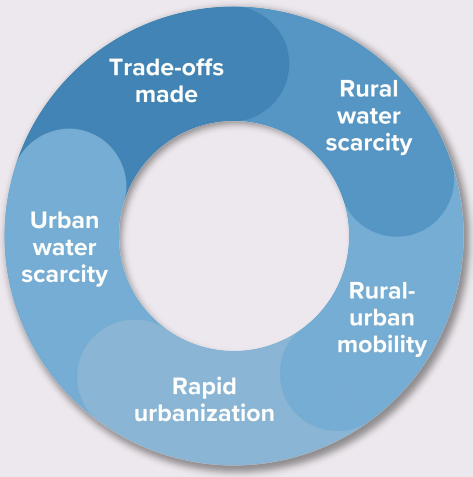
While issues tied to water scarcity stood out as a prominent long-term risk cluster for both cities from the foresight process, with numerous cascading effects on mobility, it is recognized these effects are already well documented in existing literature. This section namely seeks to reinforce this as a priority area, highlighting a few key interlinkages and trade-offs anticipated to be increasingly significant for human mobility trends. In particular, the human mobility-related drivers for Karachi and Ho Chi Minh City underline a complex set of relationships at the nexus of urban and rural development, water scarcity, and climate change-related mobility.

**Box 3: A Picture of 2050...**

*The Vicious Cycle of Scarcity at the Urban-Rural Nexus*

Decreasing availability of safe, clean water for livelihoods, human well-being, and ecosystems in coastal and rural areas has been further exacerbated by saltwater intrusion, increasing supply costs, and the depletion and pollution of groundwater.[16] When available safe, clean water for communities, livelihoods, and ecosystems does not meet the demand, rural out-migration occurs, resulting in rapid urbanisation for Karachi and Ho Chi Minh City. It is projected with high confidence that **increasing water demand, alongside the impacts of climate change on the frequency and scale of hydro-meteorological hazards, will exacerbate challenges for urban water security by 2050**, driven by urban population growth, rapid urbanisation, and inadequate investment.[17]

**As the mismatch between water supply and demand increases, trade-offs will need to be made** which call for growing scrutiny of water management and allocation. In both Viet Nam and Pakistan, where around 90 percent of water is currently used by agriculture and aquaculture**,** a rapid growth in demand from growing industries and increasing urbanisation forces increased groundwater extraction and complex anticipatory water resource management decisions to be made. Water is re-allocated from the agricultural sector to urban areas, decreasing the availability of safe, clean water for livelihoods and repeating the cycle of scarcity.[18]



### What if... 2050 sees a wave of water conflict?

The scenarios developed in this research looked ahead to a future where political stability will be maintained. But what if this is not the case?

Both Pakistan and Viet Nam rely on international rivers to source some of their water. Viet Nam in particular depends on international rivers for more than 60 percent of their total average annual surface water discharge – in the Mekong Delta, this figure is as high as 95 percent. International agreements such as the Indus Water Treaty and 1995 Mekong Agreement seek to assure the sustainable management of those water sources. However, as climate change increasingly threatens water security, water stress may induce international tensions and conflict which threaten Viet Nam and Pakistan's international water resources.

Although it is recognized that water scarcity has historically led to more cooperation than conflict, it has been projected that due to the combined impact of climate change and increasing demands for water, disputes over shared water resources will rise.

## Feeding a Changing World

The agricultural sector plays a crucial role in livelihood and income security for many across Pakistan and Viet Nam, making up 38 percent and 29 percent of employment respectively.[19] The Mekong Delta is Viet Nam's most productive agricultural area and home to half of the country's rice production, 95 percent of rice exports, and a third of agricultural GDP.[20] Similarly, the Indus is a crucial feature within Pakistan's agricultural sector.[21] Looking to 2050, both the **Indus and Mekong Deltas have crucial roles** in ensuring national, and international, food security and providing local livelihoods.

### Changing Deltas, Changing Futures

A key insight from the foresight process underlined that "the Mekong Delta must feed Viet Nam and the world", yet the Mekong and Indus deltas face multiple climate and mobility related challenges which threaten agricultural production. With 95 percent of jobs in the sector heavily dependent on water availability, water scarcity threatens to bring cascading impacts upon agricultural production and food security via declining crop yields, decreasing livestock productivity, increasing food shortages, and diminishing nutrition security.[22] Extreme heat presents additional challenges by mid-century, when the **annual time worked per worker in the agricultural sector is projected to decrease by as much as 28.7 hours for Pakistan and 9.1 hours for Viet Nam**.[23]

Declining agricultural productivity can have multifaceted and systemic impacts on livelihoods, poverty, and food security. In Viet Nam, the world's second-largest exporter of rice, it has been projected that by 2050 annual rice production could be reduced by 3-9 million tonnes due to the impacts of climate change.[24] Loss of agricultural livelihoods will also contribute to rising unemployment and poverty in rural areas, driving rural-urban human mobility.[25] Disruptions to food production and access are also already contributing to rising food insecurity, with the prevalence of moderate or severe food insecurity in Pakistan and Viet Nam at 32.6 percent and 7.6 percent, respectively.[26]

**Food insecurity will also have gendered impacts and may reinforce marginalisation of people with pre-existing vulnerabilities**.[27] The gender dynamics, however, are complex and will need to be contextualised. The interlinked challenges of human mobility and food insecurity need to address growing inequity in access to food, overall health outcomes, political instability, and short-medium- and long-run economic impacts.

### Adaptation as a Path to Secure Futures – Making Mobility a Choice

Rural development initiatives in support of traditional agriculture and pastoralism, flood mitigation to prevent the degradation of agricultural land, more efficient agricultural practices, and crop diversification could strengthen food security and help to reduce the pressure on Karachi and Ho Chi Minh City by allowing some populations to adapt in place.[28]

**"Addressing decent work deficits and their interaction with climate-related impacts as root causes of migration can help make migration a choice, not a necessity."**[ii]

One such example is in Eastern Uganda, where communities have been adapting to the impacts of climate change on agriculture through 'Climate Smart Agriculture' (CSA). Here, land productivity was increased through the promotion of soil and water conservation, capacity-building amongst farmers, school pupils and extension officers at the local Government level.[29] Such approaches can strengthen agricultural livelihoods and outputs. Human mobility, however, brings **uncertainty to these opportunities, as rural-urban out-migration decreases rural engagement in agriculture**, which may lead to further downward pressure on agricultural output and reinforce patterns in out-migration.

## A Future of Cities?

A variety of factors can influence individuals or groups to leave one location and attract them to another location.[30] This dynamic is particularly evident in the context of human mobility, with a plethora of climate related factors driving people from rural areas, such as loss of agricultural livelihoods and rise in climate change-related hazards, while benefits offered by cities, such as livelihood opportunities drive urban in-migration.[31]

A deeper look at the complexity and multi-faceted impacts of climate change-related urban in-migration up to 2050, however, reveals the emergence of a more cyclical phenomena – **a reversed effect in cities like Karachi and Ho Chi Minh City, where the impacts of in-migration trigger reverse migration from urban to rural areas.**

### Barriers on the Road to Sustainable and Resilient Urban Futures

Projections for 2050 indicate an increasingly urbanised world, with 70 percent of the global population projected to reside in urban areas.[32] As increasing human mobility drives rapid urbanisation for Karachi and Ho Chi Minh City, a

[ii] International Labour Organization 2023

multitude of impacts will be experienced, such as increasing urban sprawl, land-use changes, increasing congestion, and changes to the urban risk profile (see Building Resilience in a Future of Risk). In addition to applying pressure to the funding and capacities of urban governments, this urbanisation presents complex challenges for the implementation of climate-resilient and sustainable urban development for Karachi and Ho Chi Minh City. [33] Factors such as these can motivate reverse migration to rural areas as people struggle to reap the potential benefits associated with migration and face growing inequality and inequity in urban centres, hindering prospects for a better quality of life.

### Informal Settlements on the Rise at the Nexus of Human Mobility and Housing

**Of particular concern when considering increasing urbanisation is the expansion of informal settlements in cities.** Existing housing policy to reduce informal settlements in Pakistan is increasingly challenged by a lack of supply and unaffordable housing in Karachi. The National Housing Policy 2001 – which intended to regulate lower-income housing and increase supply – has faced challenges due to rising demand for housing outpacing supply, a focus on home buyers and not renters, and a lack of community participation resulting in housing which did not fit the needs of the people, which can drive the increase of informal settlements. [34] **Additional underlying dynamics influencing the increase in informal settlements are complex and uncertain looking ahead to 2050, highlighting the need for more research to yield further information on this relationship.**

### Slipping Through the Net: Failures in Social Protection

**Policies concerning population and employment registration systems** can have important implications for climate migrants and their eligibility for social protection measures, acting as further drivers of reverse migration. In Viet Nam's cities, participation in social insurance for internal migrants is lower than for permanent residents, with one study finding only 2 percent of migrants in Ha Noi and Ho Chi Minh City have social insurance.[35] Here, **the Hộ Khâu registration system** classifies households into different categories to record and restrict changes to people's residency. Although the system is less strictly enforced now compared to preceding years, migrants still face barriers when accessing public services such as insurance, education, and programs for poverty reduction.[36] System reformation can create a more secure urban environment for migrants and speed up the move to more urbanised societies.[37]

**Those working in the informal economy also often lack entitlement to social insurance, which is normally distributed through formal employment-based entitlements.**

As internal migrants are overrepresented in the informal economy, this can be a particular challenge for them.[38] In Ha Noi and Ho Chi Minh City, 94 percent of migrants work in the informal sector, and only 5 percent of these have a labour contract. Here, labour market segmentation exists between informal and formal migrant workers, often contributing to wage disparity between urban workers.[39] This has impacts on migrants' eligibility for social and labour protection, with only 10 percent of informal workers having accident insurance provided by their employers and only 2 percent having social insurance.[40] Studies have also shown that workers in Viet Nam's informal sector are restricted by cost when it comes

to private health insurance, reducing the likelihood of participation in such insurance amongst internal migrants.[41]

### Human Mobility's Toll on Social Cohesion

Through its impact on lifestyles and livelihoods, climate change-mobility driven urbanisation may exacerbate challenges related to the integration of migrants' diverse ethnic, religious, and cultural backgrounds. **Disruption to social cohesion may be aggravated in the absence of policy that is not cognizant of cultural pluralism, heterogeneity among migrant population, and importance of traditional knowledge in local sustainable development.[42]**

Studies have found that those who have migrated are less likely to engage with social and community activities when unfamiliar with their new environment, driving loneliness and feelings of social exclusion. In Viet Nam, the impacts of this social exclusion have been found to expose women to a greater risk of violence and sexual abuse.[43] Those who have migrated also face substantial discrimination in employment in larger cities due to the perception of an 'outsider' identity, causing unfair pay practices.[44]

**Box 4: What Happens after the Push? Looking to Iran for a Pre-Pandemic Story of Reverse Migration**

There is limited literature available on reverse migration, both for Asia Pacific and globally. Much of what is available explores the post-COVID-19 context, where reverse migration from urban centres to rural areas was observed globally. To develop an understanding of how reverse migration might influence Pakistan and Viet Nam outside of the pandemic context, we can look to Iran, where reverse migration from urban to rural areas had become a notable migratory pattern.

Push factors in Iran's urban environment such as air pollution, high land and housing prices, and the rising cost of living acted as drivers of reverse migration, in contrast to rural pull factors such as low land and housing prices, and lower costs of living. In these circumstances, **regions with close access to urban areas, or those located near provincial capitals, are popular destinations for reverse migration**. This allows migrants to enjoy the benefits of both urban centres, such as employment, decent income, as well as a lower cost of living, affordable housing, clean air, and favourable weather conditions. However, reverse migration also presented challenges with reintegration associated with reduced social cohesion and civic participation, lack of infrastructure, and increased social problems.[45]

## Building Resilience in a Future of Risk

Hazards alone do not cause disasters— it is instead a community's exposure, vulnerability, and capacity to cope with a hazardous event that causes disasters. Climate change can affect disaster risk through an increase in the likelihood and severity of climate change-related hazards; and through increases in vulnerability and **exposure to those hazards due to factors like ecosystem degradation, reduced**

**water and food security, and loss of livelihoods**. [46]

### Human Mobility: From Adaptation Failure to Adaptive Response

Human mobility is often viewed as a failure of adaptation. However, it is also an important adaptive response to, and a key means of recovery from, climate change-related hazards such as sea-level rise, extreme heat, and floods.[47]

Yet not all people are able to—or wish to—migrate due to the impacts of climate change, increasing the exposure of communities to climate change-related hazards.

**Involuntary immobility can be due to financial constraints, societal expectations, care responsibilities, and geographical barriers.**

**Local perceptions may also influence immobility** – in Pakistan, for example, the focus of provincial governments upon discouraging rural-to-urban migration can discourage human mobility as an adaptive response for those living in rural areas.[48] For Viet Nam, existing policy for rural areas – such as seed and rice subsidies – also discourages mobility to Ho Chi Minh City due to its increasing population pressures.[49]

Under Viet Nam's 'Living with Floods' (LWF) policy, a resettlement program launched to relocate residents of the Mekong Delta affected by severe flooding, migration to Ho Chi Minh City was further discouraged through relocations which took place at shorter distances of around 1-2 km. In providing those who moved with stability and physical security, LWF has been favoured by older residents who do not want to leave their communities. However, it presented challenges in providing livelihood opportunities for those whose livelihoods were threatened by flooding, such as agriculture.[50] **Inclusion of communities in climate change adaptation decision-making** is key to ensure such planning and development choices do not exacerbate vulnerability, both for areas of in- and out-migration.[51]

### Adapting in Place: Lessons on Voluntary Immobility from the Pacific Islands

Voluntary immobility can span from cultural, historical, and spiritual attachments to places, as well as the self-determination of affected populations. The 'victimhood narrative' erases the agency of those populations when deciding whether and when they will move due to climate impacts. Instead, in Fiji, community consultation approaches ensure affected populations are able to voice their needs with governments and be the final decision-makers on their mobility, with a consideration on maintaining the human rights and dignity of those who choose to stay. Further **recognizing the cultural and spiritual significance of place to communities, climate-response plans from the Pacific Islands support those who choose not to move**. Tuvalu expressly places relocation as the last resort in adaptation, with both Tuvalu and Kiribati prioritizing adaptation in place.[52]

### What's Hiding in the Gender Data Gap?

Women and girls are disproportionately impacted by the impacts of climate change-related disasters, which underscores the significance of **understanding women's participation in human mobility as an adaptation response**.[53] However, gender disaggregated data on human mobility for Pakistan and Viet Nam does not exist. A view on all internal migration indicates that in both Viet Nam and Pakistan, the proportion of female internal migrants has been increasing, with available data showing that women now represent more than half of internal migrants between the

ages of 15-59 in Viet Nam, and 60 percent of the migrant population over the age of 10 in Pakistan.[54] For Pakistan, a gendered analysis of this data shows that men more often move internally due to drivers associated with human mobility, such as employment and livelihoods, whereas women's mobility is predominantly driven by marriage and family-related reasons.[55] **A key area for additional futures-oriented research and data collection for policy setting lies in understanding the differentiated impact of climate change-related disasters on women's mobility** and the ways by which future and emerging risks will influence it in the coming decades.

### Out of the Frying Pan and into the Fire – the Future of Urban Risk

**Rapid urbanisation and unplanned development** can increase the exposure and vulnerability of city dwellers to climate change-related hazards such as flooding, storms, and extreme heat. In Viet Nam, the Mekong Delta has been highlighted as an area where poorly planned urban development is exacerbating the impacts of flooding in cities as *"city plans rarely reflect climate risks or disaster risk resilience".*[56] Similarly, for Pakistan, the **implementation and strengthening of data-driven early warning systems by the Provincial Disaster Management Agencies** represents an anticipatory policy pathway for reducing the risk of urban flooding in Karachi.

Extreme heat also poses significant challenges for Karachi and Ho Chi Minh City, where projected average annual temperature increases for Pakistan and Viet Nam will be exacerbated by the "Urban Heat Island Effect".[57] Extreme urban heat can cause heat stress related illnesses and hospitalizations, and indirectly impact health services.[58] **Consideration of green spaces in urban development can reduce the intensity of urban heat**, with a study in Ho Chi Minh City finding that "every increase in green space of square kilometres per 1000 people can prevent 7.4 deaths resulting from heat".[59] Studies in Karachi have shown a disparity in the accessibility of healthcare in response to urban heat, suggesting that **reinforcing equitable access to healthcare is crucial to combating the risks of urban heat**.[60]

### When Displacement Becomes Migration?

**When combined with rapid urbanisation, climate change can significantly increase the future risk and costs of disaster displacement.[61]** Viet Nam saw 5.1 million internal displacements between 2008 and 2021, the majority of which (almost 90 percent) were attributed to anticipatory evacuations of areas exposed to storms.[62] A similar picture can be seen in in Pakistan, where between 2008 and 2021, sudden-onset disasters internally displaced 16.6 million people. More than 11 million of those displacements occurred in the 2010 floods, where 55 percent of houses in the affected districts were destroyed and most of the population had not recovered within 6 months.[63]

**With climate change contributing to a rise in the frequency and severity of such events, the likelihood of homes being destroyed and anticipatory evacuations turning into longer-term displacements may continue to increase looking ahead to 2050.** This also raises questions as to what societies will consider to be a 'climate migrant' by 2050, and the ways this definition will respond to the complex spectrum of dislocation to ensure that policies safeguard resilience for those who are temporarily to more permanently displaced.

## Labour Mobility as a Pathway to Sustainable Futures

Livelihood crises will be among the most severe risks over the next decade, making the relationship between livelihoods and human mobility a crucial area of focus to inform anticipatory policy decisions.[64]

The role of livelihood loss as a driver of mobility has been previously identified in this report as we explored the nexus of climate change, mobility, and agriculture. But human mobility, and thus labour mobility, can also offer pathways to resilient and sustainable development for both areas of in- and out-migration.

**"Well-managed and rights-based labour mobility and adaptation policies can provide an opportunity to boost resilience and enhance development while reducing the risk of future displacement."**[iii]

The mobility of labour through climate migration can be a tool used to increase resilience through the transfer of knowledge and skills between areas of in- and out- migration, generation of remittances, and the development of networks which encourage entrepreneurship and the creation of new markets.[65]

### Leveraging Data to Shape Anticipatory Pathways: Closing a Mismatch in the Labour Market

As highlighted in the UNDP Anticipating Risks and Uncertainties for Asia and the Pacific report, a growing body of research is investigating the mismatch between education and desired skills in the job market.[66] For Karachi and Ho Chi Minh City, a **mismatch between the skills of in-migrants and those needed by the labour market** can be a barrier to harnessing positive outcomes of labour mobility, contributing to higher levels of unemployment in urban areas.

**More robust data and analysis of the skills profiles of climate migrants can support governments to reduce labour shortages in cities** by matching incoming capacities with the needs, as well as inform the implementation of skills-development programmes for migrants based on high-demand skills. **Value chain analysis** can also be applied to identify sectors which hold potential for new job creation, enabling those who migrate to access decent and more sustainable work.[67]

For example, in Pakistan, data from Sindh Province's Technical Education and Vocational Training Authority (STEVTA), which covers Karachi, indicated that education and vocational training provision was biased towards longer-term education in technical-skills, rather than shorter-term vocational training, which aims to provide on-the-job skills.[68] **The STEVTA in Pakistan presents one pathway for anticipatory investments**, notably through the implementation of thorough needs assessments and mapping to identify the specific skills and competencies required by workers to meet changing demands and market trends. This could be supplemented by **feasibility assessments of local markets and business trends, and strengthening partnerships between research institutions, businesses, and government** agencies for better knowledge transfer in the pursuit of data-driven anticipatory policy.

For Viet Nam, less data on skills and education is available at the local level for Ho Chi Minh City metropolitan areas. National data, however, indicates that more than half of the national working population are undereducated, reinforcing the requirement for policy which supports education and vocational training for

[iii] International Labour Organization 2023

climate migrants.[69] A key anticipatory investment area for steering human mobility towards positive outcomes lies in establishing **education and vocational training to ensure workers are empowered to start working in new employment sectors before migration**, as well as training to build information technology (IT) literacy.

### Rise of the Rural – Silver Linings to Dark Clouds

This section expands upon the insights on reverse migration explored earlier in this report to develop an understanding of those impacts on work and livelihoods, building off a case study of mobility trends that unfolded in the rural Pacific during COVID-19. In several Pacific Island countries, urban-rural reverse mobility increased amongst former tourism workers, raising challenges for their reintegration into rural livelihoods. These barriers, however, prompted the adoption of new and traditional strategies to sustain livelihoods and wellbeing. For example, reverse migrants adapted to rural living by relearning traditional Indigenous knowledge, skill diversification, and reconnecting with their social and ecological systems[70].

These experiences echo the findings of the foresight process, suggesting that **nature-based solutions for adaptation offer anticipatory pathways to strengthening livelihoods, and protecting infrastructure and transportation**. Similarly, signals identified in the *Anticipating Risks and Uncertainties for Asia and the Pacific* report suggest rising environmental consciousness and greater mobilisation for climate action amongst youth. The transition to green economies will also create significant new job opportunities for both Viet Nam and Pakistan. **Investments in the green transition**, broader application of ESG standards, and climate-change adaptation all are expected to have strong positive impacts on job creation, alongside an increasingly growing demand for green jobs.[71]

### The Care Burden

The burden of unpaid care also threatens gender equity in labour mobility. Often performed by women and girls, care work is essential for reproducing the labour force and underpins economic growth. However, care work remains a largely unrecognized variable which can support sustainable economic growth and societal well-being (ESCAP, 2021).

**Social protection offers a path to reducing the impacts of the care burden on women**, and a case has been made for governments to invest in care-related policies for infrastructure, social protection, services, and employment (ESCAP, 2022). The formation of gender responsive care policies has also been identified as a wider issue in the healthcare sector by the World Health Organisation, stating that "gender-transformative policies … through all levels of health governance would help achieve gender parity and gender equality".[72] However, aforementioned barriers to accessing social protection for climate migrants exist, and when considering anticipatory care-related policies moving forward, signal scanning has also showed growing resentment towards social protection interventions in the region, presenting additional challenges for care-related policy development.

# Envisioning Policy Futures

**This section examines the landscape within which decision-makers will have to anticipate human mobility – the challenges, opportunities, uncertainties, and scenarios that may accelerate or impede future-fit planning and action. It reflects upon the likelihood of investments in urban policy that would allow municipalities to move from conceiving of upticks in mobility as a burden to a potential force for sustainable development.**

As this report reflects, a plethora of drivers of change will influence migration trends, including the likelihood of harnessing the potential benefits of migration rather than reinforcing existing inequities, attitudes, and perceptions. Translating knowledge about key change levers into decisions and tangible investments, however, is not just a matter of having the right evidence. A range of potential future enablers and barriers to anticipatory decision-making exist in the form of evolving societal beliefs and values, the national and global political economy, and the effects of social movements on the balance of power and resources, among other forces. Some of these long-term trends and their implications for the implementation of anticipatory human mobility policy in Pakistan and Viet Nam are shared below.

Photo: UNDP Viet Nam

## Shifting Demographics

The recent forecast of a global population of 9.7 billion by 2050 emphasizes the significance of population trends for effective development planning.[73] For Pakistan, projections place the median age at 27.3 by 2050, signalling a larger proportion of youth by mid-century, necessitating policy measures and strategic investments to take advantage of the demographic dividend.[74] In contrast, current trends illustrate that the mean and median age for Viet Nam is increasing, which points towards an ageing population, an increasing age dependency ratio, and a closing of the demographic window of opportunity period by 2050.[75] This has implications for Viet Nam's growth rate, labour force participation, social assistance programs, and health infrastructure.[76] Population and demographic trends in both countries, therefore, will influence culture and social relations, economic prospects and labour force participation, social services and wellbeing, and political discourse.[77] **The boundaries of what is politically possible in terms of policy that impact incoming internal migrants will be shaped by these forces.**

## Climate Justice – A Shift in Global Views

Among global factors that will also influence how likely decision-makers are to choose to invest in urban policy that responds to mobility futures is the evolution of global views on development financing and accountability as it relates to climate justice movements and decoloniality discourse in development. This includes the question of "who should pay for [climate mitigation and adaptation] programs and how much countries that historically emitted the most greenhouse gases should contribute."[78] **The answers to these questions will fundamentally shape resource availability to meet the needs of climate migrants and resulting policy directions.**

Additionally, Viet Nam and Pakistan governments' ability to direct resources to those most affected and continue to anticipate future needs will be influenced by the evolution of how people understand what is an appropriate response to repeated loss and damage to an area as a result of climate impacts, and the extent to which migration becomes a predominant adaptation strategy. This includes **shifting perceptions of climate migration from being a problem versus an ordinary phenomenon may drive long-term policy possibilities**. This may help direct attention to failures of development, ineffective governance, anticipation, and adaptation that underpin negative consequences and strain of urban in-migration.[79]

## Shifting Perceptions of Development and Migration

Shifting perceptions of migrants, inequality, and development in the context of climate change are among the more uncertain drivers of change which are likely to influence mobility and policy possibilities. Centrally, these include views of those populations most affected by climate-induced migration, host communities, policymakers at local and national level, as well as the attitudes of other countries whose decisions impact on Viet Nam and Pakistan in relation to:

- **Perceptions of relative socio-economic insecurity which can influence public support for social protection** policies, particularly for migrants. For example, a study of Pakistan's national unconditional cash transfers programme in 2010 showed

that while it helped uplift vulnerable populations, uneven distribution of such assistance can foment discontent by making other segments of the population "feel relatively worse off"[80];

- Evolution in the **interpretation and enforcement of rights**, particularly those at the nexus of planetary and human well-being such as rights for climate refugees and for Nature itself[81];
- Dominant **values or ideologies framing development decisions**, such as prioritisation of GDP growth over more justice-focused measures as well as associated global agenda setting – for example, Agenda 2030 and the Sustainable Development Goals; and
- Shifts in larger global development **paradigms that could affect access to resources, technology, or knowledge** for the two countries to achieve the types of policy investments needed. [82]

## Navigating Trade-Offs Between Urban and Rural Development

As policymakers confront the increasingly complex trade-offs between channelling more resources into urban over rural development, and interventions that cushion the short-term socioeconomic consequences of climate events over investments that enable resilience and inclusive growth in the longer term, the question of **societal values and mental models guiding prioritisation** decisions will become that much more important. For Viet Nam, for example, competing views exist regarding the role of the Mekong Delta in the country's development, as well as the role of physical infrastructure investments over other channels for advancing development outcomes. **Infrastructure investments must be considered against the risk of further disruption** as well, as large infrastructure development projects in Asia and the Pacific have shown to "induce radical environmental disruptions and are sometimes associated with environmental factors of migration," particularly for predominantly rural or agricultural-based populations.[83]

# Conclusion

This report serves as an exploration of the anticipated challenges and opportunities associated with climate change-related human mobility in Asia-Pacific, focusing on Pakistan and Viet Nam. This collaborative effort across UNDP culminated in a rich set of findings derived from participatory foresight processes and systems mapping.

**The interconnected drivers of human mobility patterns revealed in this report underscore the uncertainty and complexity of the climate change-related mobility landscape**. Key thematic areas such as water scarcity, agriculture, urbanization, resilience, and labour mobility have been examined, providing nuanced insights into the multifaceted nature of human mobility up to 2050.

The report recognizes **mobility as a crucial adaptive response and means of recovery from climate change-related disasters**, yet also considers the nuances behind both voluntary and involuntary immobility when considering mobility as an adaptive response. The evolving definition of a 'climate migrant' and the implications for policies safeguarding resilience are highlighted, emphasizing **the need for nuanced and flexible approaches which address the diverse spectrum of displacement scenarios.** As cities like Karachi and Ho Chi Minh City face the impacts of in-migration, the report further **emphasizes the necessity of making difficult trade-offs and choices**.

In conclusion, the findings contained within this report not only contribute valuable insights to the ongoing *Anticipating the Challenges and Opportunities of Climate change-related Human Mobility in Asia-Pacific* initiative, but also provide a foundation for evidence-based decision-making. The challenges and opportunities outlined within should guide policymakers, development practitioners, and stakeholders in Viet Nam, Pakistan, and beyond, urging them to consider the long-term implications of climate change-related human mobility and to **implement adaptive, inclusive, and resilient policies that address both the immediate and future needs of the affected populations**.

# Annex: Key Terminology

### Climate

Climate is the average of weather patterns in a specific area over a longer period of time, usually 30 or more years, that represents the overall state of the climate system.[iv]

### Climate Change

Climate change refers to the long term changes in the Earth's climate over time, either due to natural variability or as a result of human activity.[iv]

### Disaster

A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.[v]

### Exposure

The situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas.[v]

### Hazard

A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.[v]

### Risk

The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity.[v]

### Strategic Foresight

Strategic foresight is a structured and systematic way of using ideas about the future to anticipate and better prepare for change. It is about exploring different plausible futures that could arise, and the opportunities and challenges they could present. We then use those ideas to make better decisions and act now.[vi]

### Vulnerability

The conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.[v]

---

[iv] See: Intergovernmental Panel on Climate Change (IPCC) Glossary of terms; UNDP, The Climate Dictionary
[v] See: Sendai Framework Terminology on Disaster Risk Reduction
[vi] See: OECD, Strategic Foresight

# References


[1] World Meteorological Organisation (2023). State of the Global Climate Report 2022.
[2] Rigaud et al. (2018). Groundswell: Preparing for Internal Climate Migration. Washington, DC: The World Bank.
[3] Eckstein et al. (2020). Global climate risk index 2020; Rentschler et al. (2020). Resilient Shores: Vietnam's Coastal Development Between Opportunity and Disaster Risk.
[4] Asian Development Bank (2012). Viet Nam: Urban Sector Assessment, Strategy, and Road Map; United Nations Development Programme (2014). Migration, Resettlement, and Climate Change in Viet Nam.
[5] United Nations Population Fund (2016). The 2015 National Internal Migration Survey: Major Findings.
[6] Rentschler et al. (2020). Resilient Shores: Vietnam's Coastal Development Between Opportunity and Disaster Risk.
[7] Behr (2019). Vietnam and the Mekong Delta: Drafting a Plan to Ensure Greater Productivity and Climate-Resilience.
[8] Alverio et al. (2023). Displaced to Cities: Conflict, Climate Change, And Rural-To-Urban Migration.
[9] Eckstein et al. (2020). Global climate risk index 2020; Alverio et al. (2023). Displaced to Cities: Conflict, Climate Change, And Rural-To-Urban Migration.
[10] Alverio et al. (2023). Displaced to Cities: Conflict, Climate Change, And Rural-To-Urban Migration.
[11] Karachi Metropolitan Corporation (KMC) (2020). Karchi Economy.
[12] Satterthwaite, D. (2020). The world's fastest growing cities. International Institute for Environment and Development (IIED).
[13] United Nations Development Programme (2023). Choosing Your Tomorrows: Using Foresight and Anticipatory Governance to Explore Multiple Futures in Support of Risk-Informed Development
[14] IPCC (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.
[15] International Organization for Migration (2023). Water and Its Extremes: Shaping Development and Mobility.
[16] World Bank Group (2019). Vietnam: Toward a Safe, Clean, and Resilient Water System. World Bank, Washington, DC.
[17] Caretta et al. (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.
[18] United Nations Educational, Scientific and Cultural Organization & United Nations Water (2023). UN World Water Development Report 2023.; World Bank Group (2019). Vietnam: Toward a Safe, Clean, and Resilient Water System. World Bank, Washington, DC.
*Read more on the nexus of urban-rural development, water scarcity, and migration: IOM; UNESCAP*
[19] The World Bank (2021). Employment in agriculture (% of total employment) (modeled ILO estimate) - Vietnam, Pakistan; The World Bank (2021). Agriculture, forestry, and fishing, value added (% of GDP) - Vietnam, Pakistan.
[20] The World Bank (2022). Half a World Apart, Vietnam and the Sahel Face Climate-fueled Food Challenges.
[21] Sohail et al. (2014). Indus Basin Waters A Main Resource of Water in Pakistan: An Analytical Approach. *Current World Environ,* 9(3): 670-685.
[22] United Nations Educational, Scientific and Cultural Organization (2017). Migration and its interdependencies with water scarcity, gender and youth employment; World Bank (2022). Pakistan Country Climate and Development Report. CCDR Series. Washington, DC; World Bank (2022). Vietnam Country Climate and Development Report. CCDR Series; United Nations Development Programme (2023). Anticipating Risks and Uncertainties for Asia and the Pacific: A Hybrid Horizon Scanning Report Key Risks Report; Intergovernmental Panel on Climate Change (2022). Sixth Assessment Report. Cross Chapter Paper 3: Deserts, Semi-Arid Areas and Desertification.
[23] United Nations Development Programme (2023). Human Climate Horizons — Pakistan; United Nations Development Programme (2023). Human Climate Horizons — Viet Nam.
[24] World Bank Group (2019). Vietnam: Toward a Safe, Clean, and Resilient Water System. World Bank, Washington, DC.
[25] Food and Agriculture Organization (2016). Migration, Agriculture and Rural Development. Addressing the Root Causes of Migration and Harnessing its Potential for Development.
[26] United Nations Development Programme (2022). Human Development Report 2021-22; Food and Agriculture Organization (2022). Suite of Food Security Indicators.
[27] Internal Displacement Monitoring Centre (2023). Global Report on Internal Displacement 2023.

[28] World Bank Group (2019). Vietnam: Toward a Safe, Clean, and Resilient Water System. World Bank, Washington, DC.
[29] United Nations Development Programme (2022). UNDP's Climate Smart Agriculture project spurs food production and resilience to climate shocks.
[30] Castelli, F. (2018). Drivers of migration: why do people move? *Journal of Travel Medicine*, 25(1): 1-7.
[31] UN Habitat (2022) Envisaging the Future of Cities
[32] United Nations (2022). The Sustainable Development Goals Report 2022.
[33] United Nations Development Programme (2019). Urbanisation in Pakistan.
[34] Tariq et al. (2018). Appraisal of National Housing Policy - A Case of Pakistan. *Technical Journal,* 23(3).
[35] Mubiru, F. (2014). Access to Social Protection of Migrant Workers. Policy Brief. Ha Noi: ActionAid.
[36] United Nations Educational, Scientific and Cultural Organization (2018). Overview of Internal Migration in Viet Nam.
[37] Overseas Development Institute (2006). Internal migration, poverty and development in Asia.
[38] Overseas Development Institute (2016). Internal migrants and social protection: a review of eligibility and take-up.
[39] Overseas Development Institute (2006). Internal migration, poverty and development in Asia.
[40] Duong, L.B., Linh, T.G. and Thao, N.T.P. (2011). Social Protection for Rural-Urban Migrants in Vietnam: Current situation, Challenges and Opportunities. *Centre for Social Protection* Research Report 8, IDS.
[41] Mubiru, F. (2014). Access to social protection of migrant workers. Policy Brief. Ha Noi: ActionAid.
[42] United Nations Environment Programme (2016). Environment, Religion and Culture in the Context of the 2030 Agenda for Sustainable Development. United Nations Environment Programme, Nairobi.
[43] Anderson et al. (2017). Women in the Wind: Analysis of Migration, Youth Economic Empowerment and Gender in Viet Nam and the Philippines. Plan International.
[44] Nguyen, B. (2022). Internal migration and earnings: Do migrant entrepreneurs and migrant employees differ?
[45] Rezvani et al. (2022). Spatio-temporal analysis of reverse migrations (city to village) in Iran. *Journal of Rural Research*.
[46] World Meteorological Organization (2009). Disaster Risk Reduction, Climate Risk Management and Sustainable Development.
[47] Rigaud et al. (2018). Groundswell: Preparing for Internal Climate Migration. Washington, DC: The World Bank.
[48] Qaisrani et al. (2021). Migration-relevant policies in Pakistan. MIGNEX Background Paper. Oslo: Peace Research Institute Oslo.
[49] Zickgraf, C. (2019). Keeping People in Place: Political Factors of (Im)mobility and Climate Change. *Social Sciences,* 8: 228.
[50] Zickgraf, C. (2019). Keeping People in Place: Political Factors of (Im)mobility and Climate Change. *Social Sciences,* 8: 228.
[51] Stojanov et al. (2021). Human mobility and Development Cooperation. *Popul Environ*, 43(2): 209-231.
[52] Farbotko, C. (2018). No Retreat: Climate Change and Voluntary Immobility in the Pacific Islands.
[53] UN Women (2023). Disaster Risk Reduction.
[54] General Statistics Office (2016). The 2015 National Internal Migration Survey: Major Findings; Pakistan Bureau of Statistics (2021). Labour Force Survey 2020-21; United Nations Educational, Scientific and Cultural Organization (2018). Overview of Internal Migration in Viet Nam.
[55] Qaisrani et al. (2021). Migration-relevant policies in Pakistan. MIGNEX Background Paper. Oslo: Peace Research Institute Oslo.
[56] World Bank Group (2019). Vietnam: Toward a Safe, Clean, and Resilient Water System. World Bank, Washington, DC.
[57] United Nations Development Programme (2023). UNDP Human Climate Horizons — Viet Nam; United Nations Development Programme (2023). UNDP Human Climate Horizons — Pakistan.
[58] World Health Organization (2018). Fact Sheet: Heat and Health.
[59] Dang et al. (2018). Green Space and Deaths Attributable to the Urban Heat Island Effect in Ho Chi Minh City. *American Journal of Public Health* ,108(52): S137- S143.
[60] Atif et al. (2020). Surface urban heat islands in the mega city of Karachi, their spatial distribution and health emergency response infrastructure. *The Journal of the Pakistan Medical Association*, 70(4): 705-712.
[61] Internal Displacement Monitoring Centre (2022). Disaster Displacement in Asia and the Pacific.
[62] Internal Displacement Monitoring Centre (2018). Viet Nam Disasters, poverty and displacement.
[63] Kirsch et al. (2012). Impact of the 2010 Pakistan Floods on Rural and Urban Populations at Six Months. *PLoS Curr*, 4.
[64] World Economic Forum (2022). Global Risks Report 2022.
[65] International Labour Organisation (2022). Climate change, displacement and labour migration.

[66] International Labour Organisation (2020). Global Employment Trends for Youth 2020: Asia and the Pacific.
[67] International Labour Organization (2022). Human mobility and labour migration related to climate change in a just transition towards environmentally sustainable economies and societies for all.
[68] Sindh Technical Education and Vocational Training Authority (2013). Sindh Employment Trends.
[69] Quang, H.L. and Tran-Nam, B. (2019). Qualification mismatch in the labor market and the impact on earnings: evidence from Vietnam. *Journal of Economics and Development*, 21(2): 223-233.
[70] Movono et al. (2022). Silver linings around dark clouds: Tourism, Covid-19 and a return to traditional values, villages and the vanua. Asia Pacific Viewpoint, 63(2): 164-179.
[71] World Economic Forum (2023). Future of Jobs 2023 Report.
[72] World Health Organisation (2020). Ensuring gender-responsive health systems.
[73] United Nations Department of Economic and Social Affairs, Population Division (2022). World Population Prospects 2022: Summary of Results. UN DESA/POP/2022/TR/NO. 3.
[74] United Nations, Department of Economic and Social Affairs, Population Division (2022). World Population Prospects, Data Portal.
[75] United Nations, Department of Economic and Social Affairs, Population Division (2022). World Population Prospects, Graphs/Profiles; United Nations Population Fund and General Statistics Office (2021). Viet Nam Population Projection for the period 2019-2069.
[76] Glinskaya et al. (2021). Vietnam - Adapting to an Aging Society (English). Washington, DC: World Bank Group.
[77] United Nations Population Fund (2023). State of World Population 2023 - 8 Billion Lives, Infinite Possibilities: The case for rights and choices.
[78] Irfan, U. (2022). Why we still don't yet know how bad climate migration will get. *Vox Media*.
[79] Irfan, U. (2022). Why we still don't yet know how bad climate migration will get. *Vox Media*.
[80] International Food Policy Research Institute (2023). How relative poverty influences responses to social protection programs: Evidence from Pakistan.
[81] United Nations Development Programme (2022). UNDP RBAP Foresight Brief: New Categories of Rights. New York, New York.
[82] United Nations Development Programme (2022). UNDP RBAP: Anticipating Risks and Uncertainties for Asia and the Pacific: A Hybrid Horizon Scanning Report - 2022. New York, New York.
[83] Asian Development Bank (2012). Addressing Climate Change and Migration in Asia and the Pacific.