CLIMATE CHANGE AND MIGRATION: **framing the nexus in Cambodia**

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RESILIACT: Resilience-strenghtening of local communities through a transnational EU Aid Volunteers capacity building action (2018-3895)

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Introduction

Climate change represents the greatest challenge ever faced by human social, political and economic systems. The evidence available today on the impacts of climate change, its human causes, the speed of change and the interconnections between different aspects of climate change (e.g. global warming, melting ice and rising sea levels or extreme weather events) is growing progressively sophisticated, allowing for better and more specific assessments of current and future impacts.

Over the last decade, large-scale displacements triggered by climate and weather-related hazards have increasingly occurred in many parts of the world. As a result, people across Africa, Asia and Latin America are moving in response to unpredictable environmental patterns. For instance, the governments of Bangladesh, Papua New Guinea and small island states, such as the Solomon Islands, have already had to resettle people because of rising seas.[1]

Southeast Asia, in particular, is one of the areas in the world that is most prone to natural disasters that cause considerable displacements. In fact, eleven million people have already migrated within and outside the Southeast Asian region (ILO, 2015[2]) and most of these displacements are caused by climate and weather-related disasters. In this specific context, evidence from the field[3] shows that due to several reasons, such as flaws in disseminating information and awareness and lack of trust between communities and the government, the irregular channels remain popular for migration, along with all their associated risks of human trafficking and exploitation. In this context, the impacts of climate change further expose people to exploitative forms of migration. Smuggling of drought-affected migrants from Cambodia to Thailand has been reported (IOM, 2016[4]), while limited specific protection is offered for people displaced by climate change.

Therefore, understanding the consequences of climate change on the lives of rural people in this part of Asia appears crucial, as do making rural communities more resilient, and investigating the links between food security, migration and climate adaptation.

Against this background, the project **"RESILIACT: Resilience-strenghtening of local communities through a transnational EU Aid Volunteers capacity building action (2018-3895)"** (hereafter RESILIACT project) aims to contribute to strengthening the resilience of the most vulnerable and disaster-affected communities and the European Union's capacity to provide needs-based humanitarian aid on migration-related issues, climate change and disaster risk reduction and management, in order to save and preserve life in humanitarian crises.

This document is part of joint research analysis carried out by a research group at the Royal University of Phnom Penh (RUPP - Cambodia) composed of professors and researchers at the MSc programme in Climate Change and the Policy and Advocacy department of WeWorld-GVC Onlus. This action was developed under the **RESILIACT project**, a 24-month initiative led by WeWorld-GVC and implemented with three EU partners (Alianza por la Solidaridad, Action Against Hunger Spain, WeWorld Italy) and 19 third-country partners, of which nine in Latin America and the Caribbean (GVC Bolivia, Guatemala, Nicaragua, Peru; Alianza Haiti; Action Against Hunger Guatemala, Nicaragua, Peru; WeWorld Brazil), three in Africa (WeWorld Benin, Kenya, Tanzania), and seven in Asia (GVC Cambodia, Thailand; WeWorld Nepal, India, Cambodia; LSWC; LPN).

This document reports the results of the research carried out and the sharing between the team of experts, and is enriched by the field analyses and key persons' interviews jointly selected by WeWorld-GVC and RUPP, and conducted by the latter at the local level.

Due to the crisis generated by the Covid-19 outbreaks in Cambodia, Thailand and worldwide, and because of the resulting security measures taken by national governments, the initially envisaged work plan and activities underwent some changes and variations, such as a decrease in field visits. However, consultations with policy-makers and other Cambodian experts on the topic made it possible to complete the work.

This paper incorporates and develops teaching material prepared for two capacity-building sessions provided through online training on climate change and migration, with a focus on the Cambodian and Mekong region case study. Particular attention is given to three provinces: Siem Reap, Battambang and Koh Kong, where adverse climate events are strong and migration (internal and to Thailand) is relevant. The training was held on 19-20 November 2020 and 20-21 May 2021 by the authors and addressed WeWorld-GVC Onlus' internal staff and partners in Cambodia, Thailand, India and Nepal. The present document has significantly benefitted from the comments and reflections proposed by the participants in the two capacity-building sessions, WeWorld-GVC staff in the four countries (Cambodia, India, Nepal, Thailand), the Legal Support for Children and Women (LSCW) in Cambodia, Labour Protection Network (LPN) in Thailand, and the Rural Literacy and Health Programme non-governmental organization (India).

More specifically, the training sessions were carried out with the intention of providing better knowledge to respond to climate-related migration challenges. This means understanding challenges, policy framework, opportunities and good practices in order to assess and design strategies and potential interventions in terms of adaptation to climate change at community level, especially addressing women, to reduce the risk of unsafe migration as a last resort and to enhance the potential that migration itself can have as an adaptation tool.

1 *"Science for Environment Policy": European Commission DG Environment News Alert Service*, edited by SCU, The University of the West of England, Bristol, September 2015.
2 International Labour Organization, *https://www.ilo.org/asia/media-centre*
3 Experience matured by WeWorld-GVC in Southeast Asia since 2011. For more information, please visit the website *https://www.migra-info.org*
4 *Assessing vulnerabilities and responses to environmental changes in Cambodia*, International Organization of Migration, 2016.

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1

BACKGROUND AND RATIONALE OF THE TRAINING MATERIALS

INTRODUCTION

Climate change impact is an undeniable fact since it affects all aspect of social life and security both at local and regional level (Gueldry et al., 2019). Historical evidence suggests that climate change affects health/disease, food availability, political stability and migration, to name but a few aspects (ibid.). Climate justice, as derived from environmental justice, advocates for the right to respect the diversity of ethnic groups, gender, race and socio-economic context so that people can live in safe communities free from pollution and threatening conditions (ibid.). Humans are not simply adapting to climate change, but are co-producing climate in ongoing and imbalanced ways (Taylor, 2015). The impact of climate is mostly caused by human action.

Climate change impact on migration has noticeably curbed further interest in the latter issue, with fewer studies, both direct and indirect, targeting the topic. Prolonged drought, an increase in intense storms, and rising sea levels are pushing people to move from their homes and homelands (McLeman, 2014). The impact of climate change on migration also needs to be understood from a historical perspective. Firstly, we need to grasp how people have adapted to changing environments and climate variability. Secondly, we need to combine the theory of climate change impacts and consequences together with migration, to yield a better tool for comprehending their inter-relationship.

Recent studies in Southeast Asia show that migration-based livelihoods have been made accessible to the geographically mobile, who include rural-urban, rural-rural and transnational migrants (Elmhirst et al., 2018). This occurrence is driven by two contexts: vulnerability and resilience[5]. By vulnerability, we mean that both social and economic systems are not only affected by floods, but also by social and political precariousness and marginalization (a lack of access to livelihood, exclusion from political processes, and the type of capital and assets available within households in response to floods in order to be resilient against environmental shocks and stress). To cope with these factors, we are not only focusing on existing social-ecological system buffers or the ability to bound back, but also on governance, institutions and the capacity of individuals, groups and marginalized groups to cope with the changes.

Some basic concepts in climate hazard and disaster in rural and urban areas are not yet fully understood. Existing studies conducted elsewhere focus on drought, temperature, heat and cold waves, precipitation, flooding and rising sea levels. These are known as hydro-meteorological hazards (Wamsler, 2014). Others pivot on natural hazards that do not directly involve water, such as extreme winds and wildfire.

With adequate capacity and knowledge of both legal and socio-ecological systems, migration stands as part of livelihood adaptation. Despite existing studies and analysis of experiences, the logics behind migration and key drivers remain complex. For instance, a study by Barber and Lem (2012) traced back classical work to understand the logic of human mobility. Firstly, it is connected with what Marx termed economic transformation as the logic of capitalism. Secondly, it is linked with Weber's work on the relationship between economy and society and the formation of capitalism, social transformation and crisis. These factors are driven by the economic liberalization and infrastructure development that is generating imbalanced development within the country and its neighbouring nations (Barberet al., 2012). Migration is the manifestation of an ongoing trend in growth in capitalism and an uneven development process. The political economy of migration is connected with a Marxist approach to study, migration and remittance returns. Transnational migration is also linked to social reproduction and capitalist movement and its evolution.

Within ASEAN countries, labour migration, marriage, displacement, trafficking, place of preference, life course and state sponsors are all part of migration trends (Fielding, 2016). Labour migration remain the most dominant among the working class as a means to seek money, security, livelihoods and decent jobs.

Fielding (2016) showed that migration to Thailand is associated with modernization and economic growth, given that the country remains one of those with the highest income in the Mekong region. Most migrants use brokers to move to Thailand, a method which, for financial reasons, has been and is the norm for hundreds of thousands of Burmese, Cambodians, Chinese and Laotians. Migration is the key sources for economic growth in Thailand, which also offers key social services such as housing, healthcare and education, but at the same times long working hour and low wages for migrants. In contrast, migrant workers in Cambodia have often reported problems encountered with floods and drought in their homelands. Many farmers seek employment in neighbouring countries, which include Vietnam and Thailand. These migrants expose themselves to many high risks through jobs in difficult, dirty and dangerous sectors (the three Ds), which include farming, industry, construction, and domestic work. Trafficking also targets men, women and children, as sex workers or slaves on fishing vessels. Another source of migration is women who, through brokers, become wives of men from other countries, such as South Korea or China. Within this scenario, the three Cambodian provinces of Siem Reap, Battambang and Koh Kong are hotspots.

5 The extent to which institutions, societies or ecosystems are prepared for the future and likely to reduce losses and damages.

1.1 HOW TO USE THIS DOCUMENT

This document is designed to provide an overview to help expand knowledge, awareness and critical thought on the relationship between climate change and migration, and addresses a broad audience and a wide range of professional roles. The materials selected cover a large range of topic and themes, mostly focusing on climate change and migration from subregional (Camobdia and Thailand), national and local perspectives.

The material is structured by building from key debate and from interaction between climate impact models, adaptations and mitigation mainly based on the work by the Intergovernmental Panel on Climate Change (IPCC) and a number of theories on human migration. Both sources provide synergies to formulate a central guideline in understanding the logic behind climate change and migration, which is missing in the country policy narrative and development intervention.

The material and concepts in this document can also be used as a manual to provide alternative thinking to the static mainstream approach on climate adaption and migration intervention. It is mainly based on a people–centred and actor-oriented approach, where the potential to create co-learning among development agents should be harnessed.

The teaching practice guide adopted from the Participatory Adult Learning Approach (PALA) inspired this material. Its method has been applied and tested during various training situations over the past years, and these include undergraduate student classes, special seminars and workshops for civil society, NGOs, grassroots movements and government officials in Cambodia. It has also been used by academics working on water infrastructure development in the region including Thailand, Myanmar, Lao PDR and Vietnam.

The featured climate change maps have been adopted from grey literature and established maps by experts from the Master of Science in Climate Change programme at RUPP.

The case studies include scenarios for planning, climate change adaptation, disaster risk reduction and preparedness, and dealing with prominent social aspects of migration.

The findings resulting from WeWorld-GVC and its partners' experience in working with migrants, potential migrants, returnees and their families and communities in the north-western provinces of Cambodia (Siem Reap, Battambang, Banteay Meanchey, Oddar Meanchey), in Koh Kong and in Thailand (Samut Prakan and Trat provinces) since 2013 all enrich the literature with information linked to practical experience[6]. This is particularly relevant if we consider that irregular migration to Thailand is still predominant at the moment, and therefore it is a multifaceted matter regarding which it is hard to depict the real situation from analysis based on official data alone.

The material included in this document can be used to manage training sessions that should ideally be organized as shown in Table 1 (p. 9).

Interactive elements should be built into the session in various ways. At the beginning of the session, trainees should contribute to formulating expectations and be involved in checking pre-existing knowledge. Where participants have a specific background in one of the session topics, they should be brought into delivery of the session.

Discussion and exercises at the end of each session provide opportunities to discuss application of the material in the participants' work contexts and to check progress. While the manual is aimed at the general, non-specialized audience, the suggestions at the end of each session provide opportunities to go deeper into specific topics of interest.

Relevance for the instructors and trainees is ensured by using issues and case studies from the Mekong countries and Cambodia, and will reflect on practical planning instruments.

Table 2 (p. 9) provides an overview and proposal on how material included in this document can be used to design and organize the training course divided into modules and sessions. It is recommended that, after the first module, a second module focusing on International Perspectives on Climate Change and Migration should be included. This part is outside the scope of the present document but was presented in the training delivered within the RESILIACT project held on 19-20 November 2020 by the Policy and Advocacy department of WeWorld-GVC Onlus and it helped in providing basic information on the main concepts of climate change and migration.

6 For more information, please visit the website *www.migra-info.org*

TABLE 1: KEY GUIDING SESSION

ITEMS	DESCRIPTIONS
Purpose and learning objectives	Statement on the purpose of the session, and the knowledge and skills the trainee should acquire by the end of the session
Key reading	Suggested key reading list (for preparation, handouts)
Content	Session content, in text, lists, tables, case studies, maps
Key aspects	Summary of the most important aspects in the session
Discussion topic and exercises	Open sharing, application and suggestions
Additional resources	Suggestions for follow-up

TABLE 2: KEY MODULES AND SESSIONS

MODULES	SESSIONS
Module 1: Background and Rationale of the Trainings Materials	Introduction 1.1. How to use this document Reference list
Recommended as Module 2 but not object of this document: International Perspectives on Climate Change and Migration	Key concepts and framework on climate change and migration Can we talk about climate migration (or Why and how)? Dealing with climate change and migration: international regulatory frameworks
Module 2: Climate Change and Migration: Sub-regional Perspectives	Introduction. 2.1. Climate change and migration: case studies from Cambodia and Thailand. 2.1.1. Remittances. 2.1.2. Outcomes of migration. 2.1.3. Suggested recommendations to both countries 2.2. Selected regulatory frameworks on climate change and adaptation strategies from Cambodia. 2.2.1. International regulatory frameworks. 2.2.2. Climate change policies in Cambodia. 2.2.3. Institutional structure and mainstreaming climate change into national-level policy. 2.2.4. Subnational (by province, district, commune) policies and guidelines. 2.2.5. MoWA programme directions in Gender and Climate Change Strategic Plan (2014-2023). 2.2.6. Disaster management. 2.2.7 Labour migration policy for Cambodia. Reference list
Module 3: Climate Change Models, and Vulnerability Risk Assessment for Cambodia	Introduction. 3.1. Climate change models for Cambodia. 3.1.1 Modelling the impact of climate change on economic growth: the CEGIM. 3.1.2 Climate downscaling models. 3.2. Climate change impact in Cambodia. 3.3. Climate vulnerability in Cambodia 3.3.1. Climate variability: El Niño, La Niña. 3.3.2. Understanding local development planning. 3.3.3. Climate change vulnerability assessment. 3.3.3.1. Developing indicators. 3.3.3.2. Data analysis. Reference list
Module 4: Intertwining Migration, Adaptation to Climate Change and Resilience	Introduction. 4.1. Dimension of migration in the key selected provinces. 4.2. Migration drivers. 4.3. Climate, migration and vulnerability. 4.3.1. Environmental shocks/stress and migration. 4.3.2. From sea to city. 4.4. Is migration a strategy for adapting to climate change in Cambodia? 4.5. Strengthening resilience. Reference list
Module 5: Final Considerations and Way Forward	Introduction. 5.1. Existing knowledge and implementation gaps. 5.2. Resource mobilization and financial gaps. 5.3. Key suggested actions in dealing with climate change and migrations. Reference list
Additional materials	ANNEX I: Building Social Capital Through Small-Business Development

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2

CLIMATE CHANGE AND MIGRATION: SUBREGIONAL PERSPECTIVES

INTRODUCTION

The purpose of this chapter is to examine how we understand climate change impact and migration in Southeast Asia, with a focus on Cambodia and its relation with Thailand regarding the international migration flow. The connection between climate change and migration is often linked with the mainstream approach to understanding natural hazards, human ecology and climate change impact and where individuals, households and communities adapt or need to cope with these. When people are unable to adjust to climate change by reducing or avoiding potential damage and if they are not able to take advantage of opportunity, they are considered as having low adaptive capacity.

These arguments pick up on the research work conducted by the IPCC and the structure of the work by the United Nations Framework Convention on Climate Change (UNFCCC), which also believe structural issues such as economic, political and social forces shape people's vulnerability and their capacity to adapt – aspects that are strongly connected to migration as a last choice. Drawing on these studies, the following parts of this document set out the relationship between vulnerability and the adaptation used in climate change impact, accompanied by the research on migration synergies to understand climate change and migration.

In a broader perspective, the chapter is divided into two parts. The first section examines characteristics, reasons and patterns of migration as well as their consequences, plus evidence from Cambodia and Thailand. The second examines dominant regulatory frameworks, the current planning framework and adaptation strategies, by drawing experience from Cambodia. In this context, we focus more on the legal and policy framework from global down to sub-regional, national, provincial and communal levels.

FIGURE 1: MAP SHOWING CAMBODIA LOCATED WITHIN THE GMS REGION

2.1 CLIMATE CHANGE AND MIGRATION: CASE STUDIES FROM CAMBODIA AND THAILAND

Similarly to other countries in the region, both Cambodia and Thailand have encountered border conflict, which implies the need of diplomatic relations and the safety of their migrant workers. Eight Cambodian provinces border with Thailand: Preah Vihear, Oddar Meanchey, Banteay Meanchey, Battambang, Pailin, Pursat, Sihanoukville and Koh Kong. Access through internal border gates has been significantly improved and more gates have opened (MMN and AMC, 2008). Both countries are members of the Association of Southeast Asian Nations (ASEAN) and the Greater Mekong Subregion (GMS) economic corridor.

The primary destination country for Cambodian international migrant workers is Thailand, with workers commonly migrating into the fishing, agriculture, livestock, construction and manufacturing industries and service sector, including domestic work.

TABLE 3: CAMBODIAN MIGRATION WORKERS REGISTERED IN THAILAND

Source: IOM and ACRM, 2019

PROVINCE	NUMBER OF REGISTERED CAMBODIAN MIGRANTS	NUMBER OF SURVEY RESPONDENTS	PER CENT OF RESPONDENTS	NUMBER OF QUALITATIVE INTERVIEWS
Bangkok and Nonthaburi	95,337	179	19.9	33
Cholburi	54,122	253	22.5	18
Rayong	23,608	125	13.9	17
Samut Prakarn	27,835	107	11.9	17
Pathumthani	75,947	132	14.7	18
Sakaeo	12,840*	104	11.5	199
TOTAL	289,689	901	100	122

For decades, Thailand has been considered one of the most stable nations in the region if compared with neighbouring countries. Its situation provides the country with a better position to develop and industrialize an economy where a key source of cheap labour and natural resources are extracted not only from its own country but also from neighbouring ones.

According to a 2019 study by the International Organization of Migration (IOM) and the Asian Research Centre for Migration (ARCM), when the Royal Thai Government completed the latest round of migrant worker registrations in March 2018, it recorded 391,000 workers from Cambodia out of a total of 1.97 million workers from nearby countries (Myanmar with 1.4 million, and 130,000 from Lao PDR). The study showed that work permits for Cambodian migrants counted 148,109 people who went through national ID verification, 226,452 who went through Memorandum of Understanding (MoU), and 16,279 through seasonal or daily passes (IOM and ARCM, 2019). The study also suggested that, although Cambodia's economy has improved since the early 1990s, wage labour and work availability remain key factors attracting workers to Thailand. To regulate the labour flow between the two countries, the work permit has been formalized through a Memorandum of Understanding (MoU).

Cambodian migrants were found to be paying US $120 on average for a passport, even though the Cambodian Government has announced passports for migrant workers should only cost US $4[7].

Indeed, data collected during the fieldwork conducted by WeWorld-GVC since 2013 with migrants in the north-western provinces of Cambodia and in two Thai provinces dealing with more than 100,000 migrants highlights that the cost of migration through the MoU is much more expensive. From the research sponsored by WeWorld-GVC in 2020 and carried out by Asian Institute of Technology of Bangkok[8], the costs for MoU migrant workers are the following:

- Visa: 1,900 baht (US $63)
- Work permit: 1,900 baht (US $63)
- Guarantee: 1,000 baht (US $33)
- Health check-up: 500 baht (US $16; although this depends on the hospital)
- Heath insurance: 3,200 baht (US $107)

By adding these expenses to the passport cost and to the expenditure that is often due to intermediaries, plus that of transport to reach the agency where the documents can be issued, travel to Thailand and the not uncommon more or less explicit forms of corruption, the total cost of migrating following the regular procedure under the MoU could reach the range of US $500-700.

Almost 400,000 Cambodian workers were reported as officially registered in Thailand in 2018 (IOM and ARCM, 2019).

Although the type of legal documents the Cambodia workers are required to have remains varied, the most dominant is the 'work permit' plus 'black or red passport'.

Figure 2 (p. 15) shows the percentage of legal status documents held by Cambodian workers migrating to Thailand following authorized procedures.

It is worth mentioning that the rate of irregular migration from Cambodia to Thailand is still predominant. According to a study conducted by the International Labour Organization (ILO), the International Organization for Migration (IOM) and Rapid Asia 2017[9], the percentage of Cambodian migrants using irregular channels was 69%. This was due to a number of factors, especially the length of the procedures through the authorized channels (136 days against 18) and costs (US $548 against US $123).

These results are confirmed by the findings that WeWorld-GVC have reported while working in the north-western Cambodian provinces.

Official data regarding registered Cambodian migrant workers in Thailand shows an increasing number of Cambodian people working in the neighbouring country since June 2019 due to the possibility of regularization that Thailand has opened for migrants present in the country (Figure 3, p. 15). The window opened for regularization reveals that the number of Cambodian migrants in the country is much higher than the official data reported. In 2020, closure of the regularization procedure and the number of migrants returning home due to the explosion of the Covid-19 pandemic

7 International Organization for Migration, and Asian Research Centre for Migration, 2019, p.5.

8 Kusakabe et al (2020). *The study 'Labour Migration and Human Trafficking – Laws, Regulations and Policies.* Final Research' was conducted under the framework of the project Mig-Right: Supporting and advocating Cambodian migrants' rights in Thailand, preventing violation and human trafficking (EIDHR/2016/376-943), co-financed by the European Union and implemented by WeWorld-GVC in partnership with Labour Rights Promotion Network Foundation (LPN) in Thailand and Legal Support for Children and Women (LSCW) in Cambodia.

9 Harkins B., Lindgren D. & Suravoranon T. (2017). *Risks and rewards: Outcomes of labour migration in South-East Asia,* International Labour Organization (ILO), International Organization of Migration (IOM) and Rapid Asia, 2017.

FIGURE 2: LEGAL STATUS DOCUMENTATION REGISTERED BY CAMBODIA WORKERS IN THAILAND

Source: IOM and ACRM, 2019

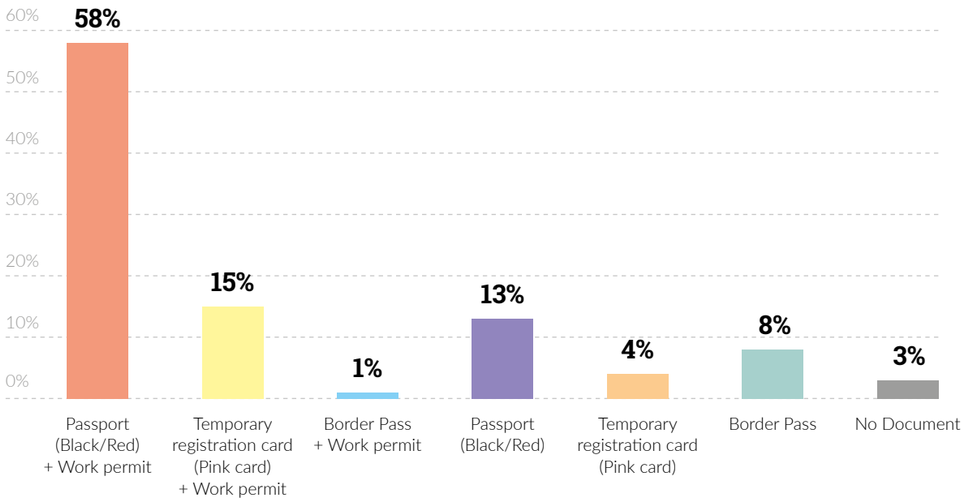


FIGURE 3: NUMBER OF REGISTERED CAMBODIAN MIGRANT WORKERS BY TYPES OF REGISTRATION

Source: Kusakabe et al., upon data of Thai Department of Employment, 2020

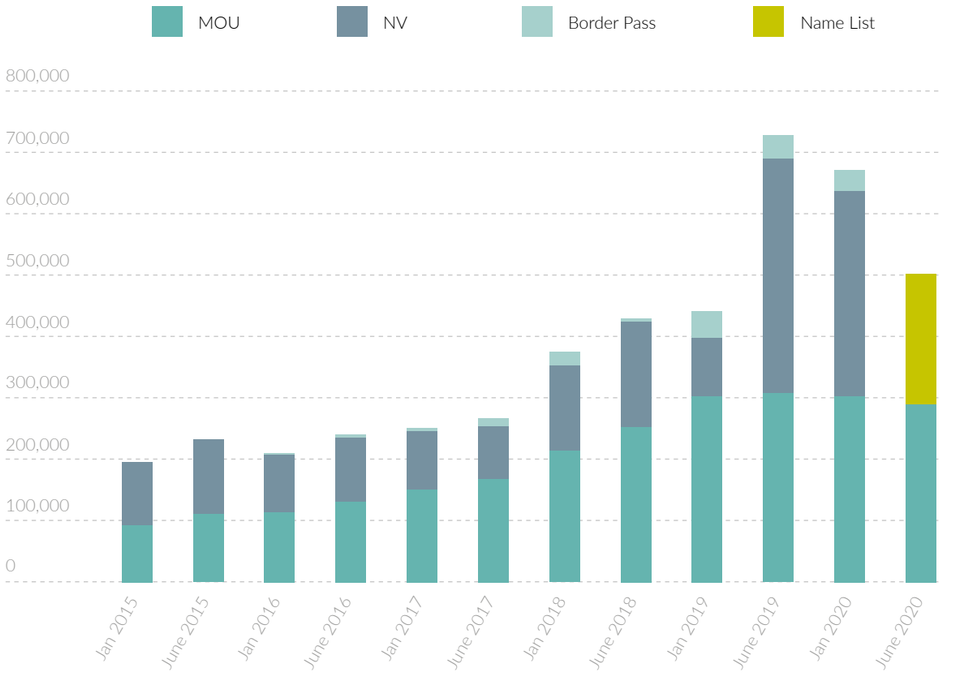


FIGURE 4: FACTORS FOR CAMBODIAN WORKERS MIGRATING TO THAILAND

Source: IOM and ACRM, 2019

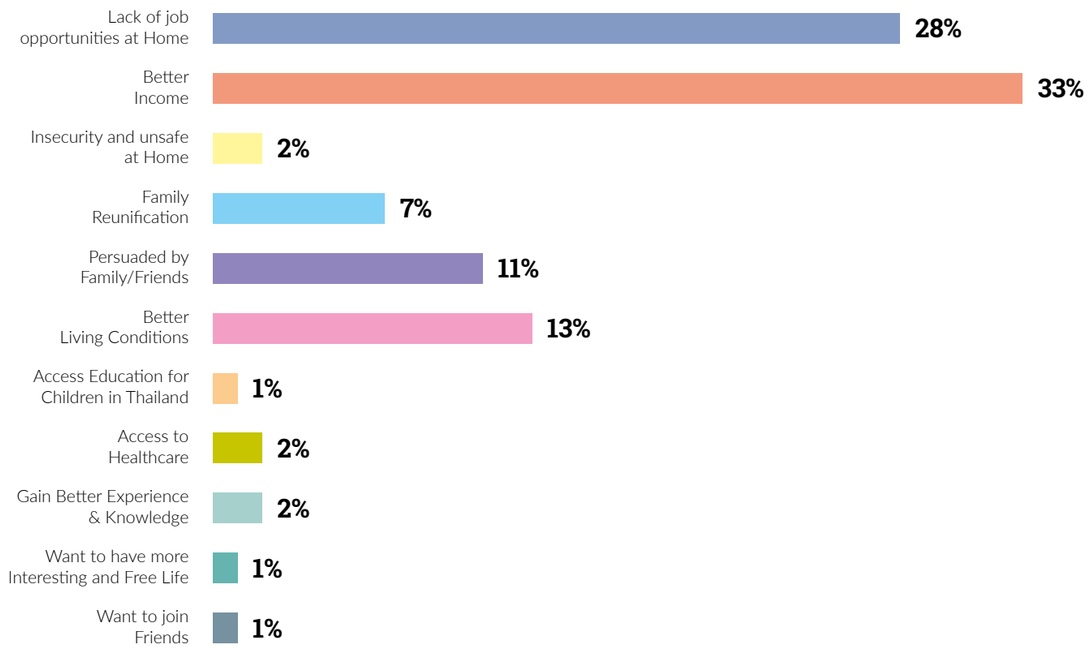
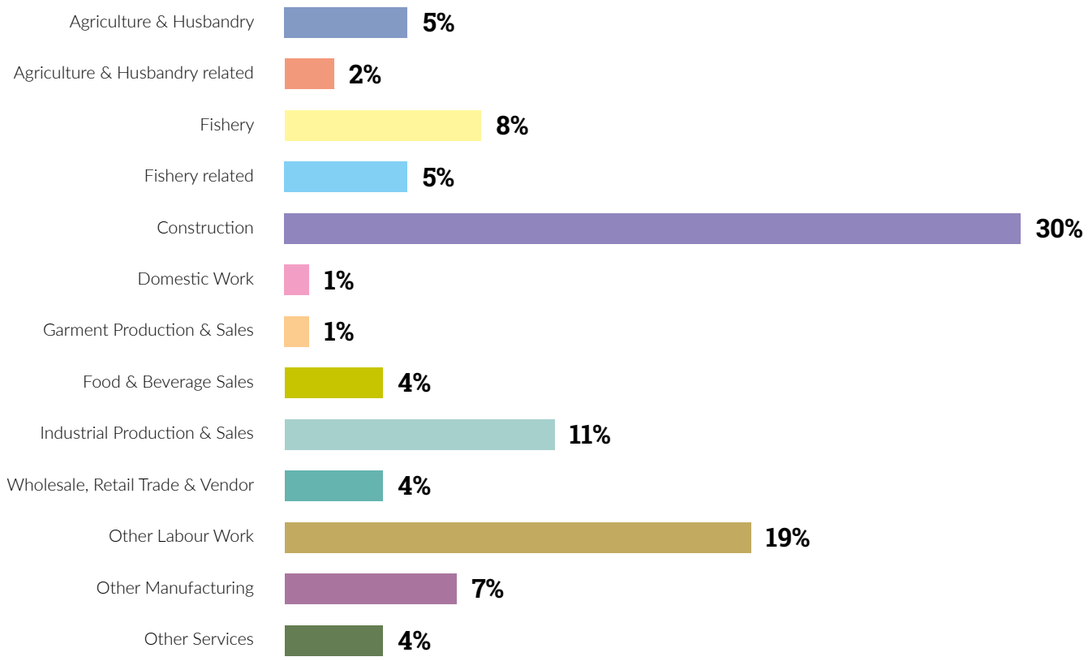


FIGURE 5: TYPE OF OCCUPATION HELD BY CAMBODIA MIGRANT WORKERS IN THAILAND

Source: IOM and ACRM, 2019



could explain the reduction in the number of registered Cambodian worker migrants in Thailand.

The different procedures introduced to regularize migrants already in Thailand and carried out in recent years have reduced the amount of people working without documents or the proper ones. However, time constraints in those procedures, and restrictions and increasing costs due to health certification required during the COVID-19 pandemic have all resulted in a worsening situation with an expected increase in the use of irregular routes[10].

Regarding the reasons for migration, the study by IOM and ARCM explains that economic reasons (better income and lack of job opportunities at home) are the most relevant drivers for moving to Thailand (61%). Family reunification and persuasion by family members or friends, as factors linked to social capital, are also relevant (18%) (see Figure 4, p. 16).

As shown by Figure 5 (p. 16), the leading sector of employment for Cambodian migrants is construction (30%), followed by the agro-food industry (20%), while a sizeable percentage is involved in other labour work (19%). It is clear from the chart below that Cambodian migrants are employed in types of work characterized by a low skills level. It should be noted that Thai law allows only some categories of jobs to be done by migrants[11].

Irregular migrants are more often employed in the most physically demanding and three-D jobs (dirty, dangerous, difficult).

10 Kusakabe et al., 2020.

11 For more information, please see Kusakabe et al. (2018). The study 'Labour Migration and Human Trafficking – An analysis of Laws, Regulations and Policies in Thailand and Cambodia' was conducted within the framework of the project Mig-Right: Supporting and advocating Cambodian migrants' rights in Thailand, preventing violation and human trafficking (EIDHR/2016/376-943), co-financed by the European Union and implemented by WeWorld-GVC in partnership with Labour Rights Promotion Network Foundation (LPN) in Thailand and Legal Support for Children and Women (LSCW) in Cambodia.

2.1.1 REMITTANCES

Total remittance estimates for all 374,561 registered Cambodian workers in 2018 expected THB 14.725 billion or US $460 million to be returned per year (IOM and ARCM, 2019). Within the framework of the EU project MIGRA-SAFE, GVC prepared a study in 2016 with Cambodia Development Resource Institute (CDRI) and the organization 2050 on the impact of Cambodian migrants' remittances in the provinces of Siem Reap, Battambang and Banteay Meanchey[12].

The results found that *"consumption is the major use of remittances. In other words, migrant households greatly rely on remittances to stabilize family consumption. Similarly, evidence from the survey suggests that much basic consumption is financed by remittances without which migrant households would be vulnerable to food insecurity. When asked about the major items remittances were spent on, 92.2% of respondents said consumption. Other items included health care (61%), debt repayment (39.8%) and children's education (30%)"*[13].

The study also found positive associations between remittance receipt and children's school attendance. Instead, mixed positive and negative effects were registered regarding the health of family members left behind. While there is increased capacity to afford medical services, the absence of key family members may have adverse health outcomes.

If remittances are expanding the number of durable items after migration as well as improving the quality of housing, rarely remittances are converted into an increase in assets and productive investments. In fact, in the case of households with migrants *"the share of residential plots increased very slightly by 0.4 percentage points [...]. By contrast, the proportion of wet-season rice plots dropped from 40.8% to 38.4%. Like the majority of Cambodians, the sample households in the three provinces grow rain-fed rice and therefore own only wet-season rice land." Moreover, "the numbers of farm animals have declined since migration."*[14]

TABLE 4: DISTRIBUTION OF REMITTANCES SPENT ON MAJOR ITEMS

Source: Vutha et al., 2016

	N	%
General consumption/expenditure	461	92.2
Debt repayment	199	39.8
Health treatment	305	61.0
Children's education and training	150	30.0
Buy household appliances	69	13.8
Marriage and other ceremonies	79	15.8
Fertiliser	81	16.2
TOTAL	1,344	100

12 Vutha et al., 2016.

13 More than one answer was allowed.

14 Vutha et al., 2016.

In general, the study showed that "migration has enabled many families to move out of poverty". Table 6 describes respondents' socio-economic status before and after migration. There are significant declines in the proportions of 'very poor' and 'poor' migrant households, and concomitant increases in the proportions of those in the 'average' and 'well-off' categories.

This implies that migration and remittances have a poverty-reducing effect. Although this finding is based on perceptions and recall, it is consistent with several previous CDRI studies as well as those by Tong (2012) and Roth et al. (2014).

Lastly, *"the relationship between migration and community development is not straightforward. Although migration can contribute to community development through improved living standards, the absence of productive labour may lead to lower participation in community programmes."*[15]

15 Vutha et al., 2016.

TABLE 5: LIVESTOCK HELD BEFORE AND AFTER MIGRATION

Source: Vutha et al., 2016

TYPE OF LIVESTOCK	BEFORE	AFTER	PERCENTAGE CHANGE (%)
Cow	248	156	-37.1
Buffalo	10	4	-60.0
Pig	135	91	-32.6
Horse	2	6	200.0
Chicken	392	368	-6.1
Duck	82	89	8.5

TABLE 6: SOCIO-ECONOMIC STATUS BEFORE AND AFTER MIGRATION

Source: Vutha et al., 2016

STATUS OF HHS	BEFORE MIGRATION		AFTER MIGRATION	
	NO.	%	NO.	%
Very poor	81	16.2	24	4.8
Poor	195	139.0	120	24.0
Average	220	44.0	298	59.6
Well-off	4	0.8	56	11.2
Rich	0	0.0	2	0.4
TOTAL	500	100	500	100

2.1.2 OUTCOMES OF MIGRATION

In general, migration has varying results for Cambodian migrants in terms of life progress, and this is largely linked to the characteristics of the migration itself (safe or unsafe migration, the reasons driving it, etc.) and of the migrant (soft and professional skills, education, economic capacity, social capital, etc.). The study promoted by ILO, IOM and Rapid Asia (2017) underlines well that the main positive impact is mostly in response to the need for employment and an improvement in debts, but the negative outcomes in terms of income and health/social problems (severe boredom, anxiety and depression, especially in migrants employed in the construction sector) are reported in high percentages. Moreover, women employed in low status jobs are often victims of social discrimination and stigma once back at home.

Low percentages of migrants report positive outcomes in terms of income, savings and assets, which means most are exposed to the difficulties of reintegration once back in their place of origin. The study states that 93% of migrants face financial challenges upon return, while only 4% of those facing difficulties of various types are assisted through reintegration services.

Moreover, as regards skills gained by migrant workers in Thailand, in the majority of cases these are null, and language and other non-specific skills are dominant, as is shown in Figure 7 (p. 20).

FIGURE 6: MIGRATION OUTCOME INDEX RESULTS BY COUNTRY OF ORIGIN: CAMBODIA (n. of migrants=1,808; in %)

Source: ILO, IOM, RAPID ASIA, 2017

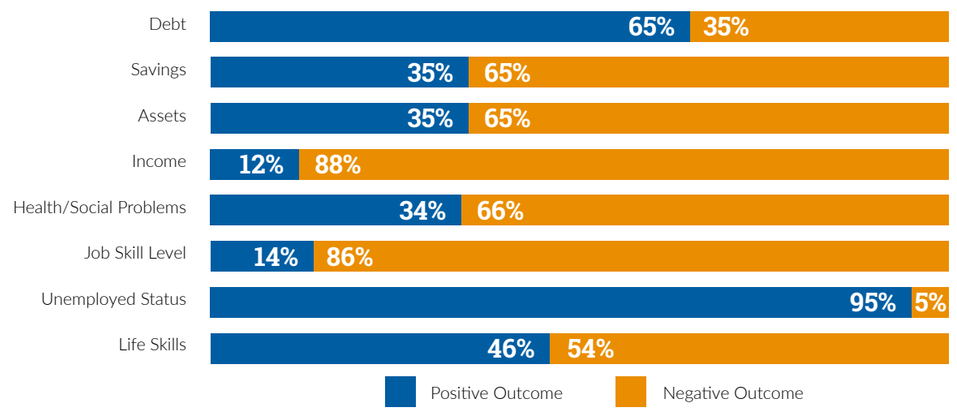
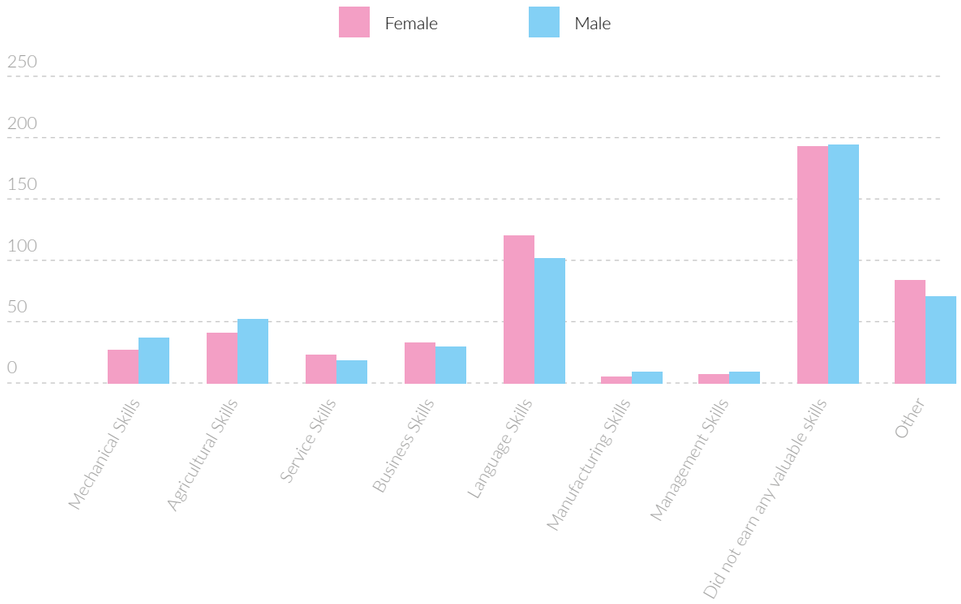


FIGURE 7: SKILLS THAT RESPONDENTS ACQUIRED BY WORKING IN THAILAND, BY GENDER

Source: IOM and ACRM, 2019

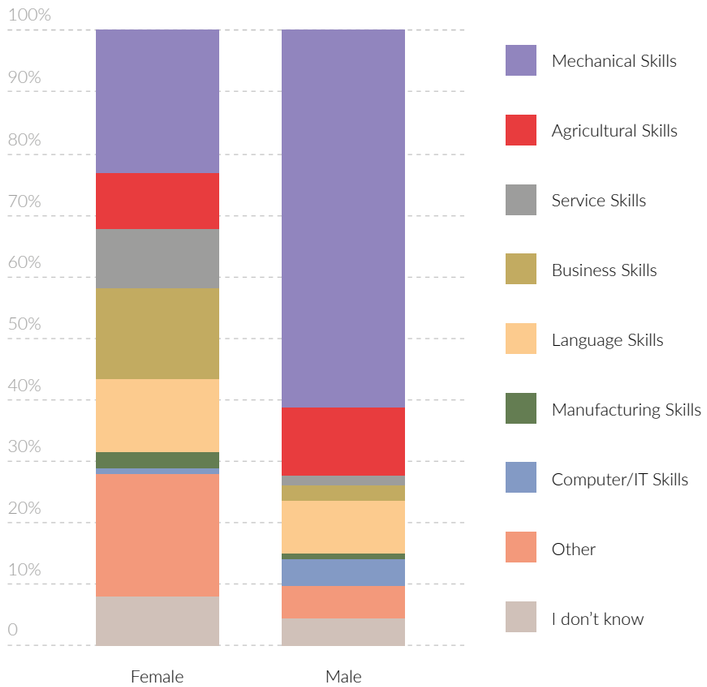


Although migrants from neighbouring countries work in Thailand primarily in unskilled jobs, some have gained specific skills from their working experience and have become semi-skilled workers (IOM and ARCM, 2019).

As Figure 8 illustrates, the main interest for both female and male migrants is in training in mechanical skills. However, women show a greater interest in a variety of skills including in language, agriculture, services and business.

FIGURE 8: MOST APPEALING SKILLS FOR MIGRANTS, BY GENDER

Source: IOM and ACRM, 2019



2.1.3 SUGGESTED RECOMMENDATIONS TO BOTH COUNTRIES

Two forms of recommendations are made by the survey conducted by IOM and ARCM (2019):

» Firstly, in addressing the Thai and Cambodia governments, the study suggests to both nations to increase cooperation, to expand the scope of the MoU on labour migration permits and regulations, and to ensure a minimum wage to women. Health and accident insurance, plus larger sums of money sent back home electronically would enable workers to gain support from government-sponsored skill programmes. Migration should be incorporated within national development planning, and return migrants should be encouraged to increase their farming productivity.

» The second specifically addresses the Cambodia government. These recommendations include: (i) provide migrants with adequate pre-departure training geared to the relevant educational level, (ii) establish safe loans for migrant workers rather than from predator money lenders, (iii) cooperate with labour contractors for safe delivery of remittances, (iv) provide training for returnees on setting up their own business and incentivize their agricultural productivity.

PROTECT CAMBODIAN WORKER MIGRANTS

Such measures – as recommended during the two international conferences *"Cross border cooperation on Labour Migration and Human Trafficking between Cambodia and Thailand"* led by WeWorld-GVC and held in Thailand and Cambodia in 2018[16] and 2019[17], and in the study promoted by WeWorld-GVC and conducted by Kusakabe et al. (2020) – should be accompanied by effective initiatives to inform migrants, make regular migration channels affordable and safe, and apply a zero-cost recruitment policy. Despite the better results achieved in recent years, more still needs to be done to expand the migrants' capacity to make migration an advantageous experience enabling them to profit from it, in order to curb the need to migrate as a last-resort approach. This also means fostering awareness of migrants' rights, ensuring migrants can form groups to claim their rights, and allowing them to easily change employer in Thailand. Lastly, the protection system needs boosting against exploitation, while forced labour and other abuse should be punished and victims should be able to access justice, compensation and reintegration.

16 *https://www.migra-info.org/1st-international-exchange-for-dialogue/*
17 *https://www.migra-info.org/2nd-international-exchange-for-dialogue/*

2.2 SELECTED REGULATORY FRAMEWORKS ON CLIMATE CHANGE AND ADAPTATION STRATEGIES FROM CAMBODIA

Cambodia is considered one of the countries in Asia most vulnerable to the impacts of climate change and extreme climate events. Current climate hazards and long-term climate change have been identified as significant environmental and developmental issues in Cambodia. Due to climate change impacts, Cambodia encounters economic loss almost every year, including damage to road infrastructure, agricultural production, transport, tourism and education; this is especially caused by heavy flooding from the Mekong River and Cardamom Mountains. In order to respond to climate change impacts, the Royal Government of Cambodia has created key policy instruments at both national and provincial levels to take adaptation action to combat climate change. These include the Cambodia Climate Change Strategic Plan 2014-2023 and the Sectoral Climate Change Strategic Plans for key ministries such as agriculture, water, land management, health, mines and energy, industry, disaster management, education, gender, transport, and rural development.

Mainstreaming of climate change policy at the subnational level is supported by the National Committee for Subnational Democratic Development, an inter-ministerial body supported by the Ministry of Interior.

In recent years, Cambodia has taken steps forward in acknowledging that climate change has a specific gender impact. Moreover, as regards labour migration (internal and in Southeast Asia), this is considered relevant for the country in its development process and, for this reason, a specific policy framework has been put in place. However, a clear approach directly linking migration to climate change in terms of consequence and response is still lacking.

2.2.1 INTERNATIONAL REGULATORY FRAMEWORKS

Climate change is one of the greatest challenges that the world is facing. Among others, it presents several threats to international cooperation. Self-interested individual states have mixed attitudes to cooperation unless material benefit is to be gained (Stern, 2007). Collective action by independent sovereign nations is challenging this. In the field of climate change, there is no supranational authority to provide coercive sanctions, so international cooperation needs nations to perceive sufficient benefits to make them willing to sign international treaties or other agreements that share a joint vision of responsible behaviour. They must also recognize that without their involvement, international collective action may fail (ibid.). UNFCCC is a global framework to mobilize collective action and commitment with two focus areas: (i) establish funding mechanisms for adaptation, (ii) focus adaptation on countries that are geographically vulnerable to both flooding and drought, as well as and Least Developed Countries (LDCs). The latter have lower adaptive capacity than advanced countries: they possess limited financial resources, skills and technologies, and have high levels of poverty and a high reliance on climate-sensitive sectors such as agriculture and fisheries.

Adaptation fund projects have demonstrated global environmental benefits, as in the cases of:

- Global Environment Facility (GEF) Trust Fund
- GEF Strategic Priority on Adaptation (small-grants fund)
- Special Climate Change Fund (for additional costs of adaptation measures)
- Funds addressed to LDCs.

To have access to Adaptation funds, developing countries are requested to develop national strategic action plans following safeguard policies, ensuring full participation by indigenous peoples (IPs), local communities and other stakeholders.

2.2.2 CLIMATE CHANGE POLICIES IN CAMBODIA

Cambodia is a member of the United Nations, and has ratified many UN laws, regulations, treaties and conventions. Since 2008, key action and policies addressing climate change have gained more support both through institutions and action plans. Most policies observing and anticipating climate change impacts mention flooding, drought, a rise in sea levels, intense storms, and tropical diseases. Priority sectors for adaptation include forestry, water, infrastructure, coastal zones, human health, fisheries, and agriculture.

In order to respond to future impacts and trends in climate change, as well as to support the **National Strategic Development Plan** (NSDP), the **Cambodia Climate Change Strategic Plan** (CCCSP 2014-2023)[18] has been developed.

18 National Climate Change Committee, 2013.

TABLE 7: NATIONAL ADAPTATION PLAN (NAP) PROCESS AND MILESTONES

Source: adapted from NAP Global Network, 2017

2006	2013	2014	2016	2017
Cambodia's National Climate Change Committee: Comprising ministries and government agencies, this was created to coordinate policies, strategies and programmes that address climate change.	**Cambodia Climate Change Strategic Plan 2014-2023:** It has created a national framework to respond to climate change, which was integrated in the National Strategic Development Plan, 2014-2018	**Cambodia's Climate Change Financing Framework (2014):** This promotes a shared approach to defining climate finance and assessing its current level and prospects for future financing	**Cambodia Climate Change Action Plan:** Developed through 15 ministries to deliver CCCSP strategies and priorities, it has identified 171 actions (93% focused on adaptation) and financing gaps	**Cambodia's National Adaptation Plan Financing Framework and Implementation Plan (NAPFFIP):** Its main purpose is to bring the NAP process in Cambodia closer to implementation, with the specific aim of increasing the possibilities for Cambodia to access additional adaptation finance.

CAMBODIA CLIMATE CHANGE STRATEGIC PLAN (CCCSP 2014-2023)

VISION: Cambodia develops towards a green, low-carbon, climate-resilient, equitable, sustainable and knowledge-based society.

MISSION: Creating a national framework for engaging the public sector, the private sector, civil society organizations and development partners in a participatory process for responding to climate change to support sustainable development.

GOALS:

- Reducing people's vulnerability to climate change impact and critical systems (natural and societal), particularly regarding the most vulnerable persons;
- Shifting towards a green development pathway by promoting low-carbon development and technologies;
- Promoting public awareness and participation in climate change response actions.

To achieve this vision, mission and goals, the Royal Government of Cambodia (RGC) has identified

EIGHT STRATEGIC OBJECTIVES:

1. Promote climate resilience by improving food, water and energy security;
2. Reduce sectoral, regional and gender vulnerability to and health risks of climate change impacts;
3. Ensure the climate resilience of critical ecosystems (Tonl Sap Lake, Mekong River, coastal ecosystems, highlands, etc.), biodiversity, protected areas and cultural heritage sites;
4. Promote low-carbon planning and technologies to support sustainable development;
5. Improve capacities, knowledge and awareness for climate change responses;
6. Promote adaptive social protection and participatory approaches in reducing loss and damage due to climate change;
7. Strengthen institutions and coordination frameworks for national climate change responses;
8. Strengthen collaboration and active participation in sub regional and global climate change processes.

For effective CCCSP implementation, the ministries concerned – including Ministry of Agriculture Forestry and Fisheries, Ministry of Environment, Ministry of Water Resources and Meteorology, Ministry of Rural Development, and Ministry of Public Works and Transport – then established their own respective Climate Change Action Plans.

In order to implement the CCCSP, sectoral climate change strategic plans were formulated by 15 government ministries, covering environment, agriculture, water, land management and construction, mines and energy, industry, health, education, gender, disaster, public works and transport, and rural development.

At the same time, with the aim of turning these strategic plans into real actions on the ground, the abovementioned ministries created five-year Climate Change Action Plans (CCAPs), covering the key priority actions for both adaptation and mitigation measures, and defining the budget needed to implement the projects identified in relation to the actions.

In order to support such efforts, the Royal Government of Cambodia has developed the national programmes to back CCAP implementation with financial support (grants and loans) from development partners such as:

- Pilot Program for Climate Resilience (PPCR) - Phase I, between 2011 and 2012, was funded by World Bank (WB) and Climate Investment Funds (CIF)
- PPCR – Phase II – Strategic Program for Climate Resilience (SPCR), between 2013 and 2019, was funded by Asian Development Bank (ADB) and CIF
- Bilateral donors, who have funded many other sectoral projects to implement the CCAPs.

2.2.3 INSTITUTIONAL STRUCTURE AND MAINSTREAMING CLIMATE CHANGE INTO NATIONAL-LEVEL POLICY

Under these policy instruments and national programmes aimed at combatting or mitigating climate change impacts, Cambodia has developed and implemented appropriate adaptation practices for water resources, agriculture, infrastructure, protected areas, and engineering design in the form of the following:

- Development of Adaption Guide for Agriculture in 2017.
- Guidelines for Mainstreaming Climate Resilience for Crop Diversification in 2019.
- Development of Adaptation Guide for Water Resources in 2017.
- Guidelines for Ecosystem-Based Adaptation for Water Resources in 2019.
- Development of Green Infrastructure Guide for public works and transport sectors in 2017.
- Guidelines for Mainstreaming Climate Resilience into Development Planning of Roads in 2019
- Development of Green Rural Infrastructure Adaptation Guide in 2017.
- Guidelines for Mainstreaming Climate Resilience into Development Planning of Small Irrigation Schemes and Rural Water Supply in 2019.
- The mainstreaming guidelines for protected area management with climate change in 2019. These are being applied in Cambodia's infrastructure projects/programmes.

The **National Council for Sustainable Development (NCSD)** – an inter-ministerial body with representatives from 36 ministries/agencies and provincial/district government – oversees climate change response, and prepares, coordinates and monitors the implementation of relevant policies, strategies, legal instruments, plans and programmes, including the implementation of the CCCSP and the sectoral Climate Change Action Plans.

It is composed of:

- **Department of Climate Change** (DCC), which has a forefront role in implementing the country's response to climate change (e.g. it develops climate-relevant legal and fiscal instruments, policies, strategies, action plans, programmes and projects to mitigate greenhouse gases (GHGs) and to adapt to climate change; it coordinates and supports the legal and policy programming instruments; it mobilizes and manages resources; and it builds partnerships to scale up implementation. It also serves as the national focal point for the UNFCCC.
- **Climate Change Technical Working Group (CCTWG)**, a multi-sectoral group chaired by the Deputy Secretary General of the NCSD. It provides technical and advisory support on climate change to the members of the NCSD and ensures coordination, through biennial meetings, with non-governmental partners such as NGOS, the academic world, the private sector and other development actors.

2.2.4 SUBNATIONAL (BY PROVINCE, DISTRICT, COMMUNE) POLICIES AND GUIDELINES

Under the general framework of the **Cambodia Climate Change Strategic Plan** (CCCSP 2014-2023) and initiatives by the Cambodian government regarding climate change, Cambodia has put strong actions in place, with a cross-sectoral approach, to combat climate change impact in the country.

For each sectoral ministry, there are line departments in each province; therefore, these departments follow the policies and strategies adopted by the central ministries, and are implementers of these policies and strategies related to climate change and disaster.

For subnational coordination, the **National Committee for Subnational Democratic Development** (NCDD)[19], the ministerial body coordinated by the Ministry of Interior in cooperation with the Ministry of Planning, has prepared the **guidelines on mainstreaming climate change and disaster management into provincial, district and commune/Sangkat** investment and development plans.

The guidelines trace out the processes, tools and techniques to integrate climate change impacts and disaster risk reduction into the plans. The guidelines are the key policy instrument that requires subnational government officials to include climate change and disaster management in their plans, with funding support from central government and applicable development partners.

The following charts (Figures 9 and 10, at p. 26) show the planning processes for development and investment plans.

19 This is a ministerial body coordinated by the Ministry of Interior and is in charge of mainstreaming climate resilience into subnational government at the provincial, district and communal levels.

CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT STRATEGIES

Climate change issues have been integrated in relevant national strategies to strengthen policy coherence and achieve the sustainable development goals (SDGs).
Some examples are:

- **2018:** Rectangular Strategy Phase IV (2019-2023) integrated climate change in its fourth pillar 'Sustainable and Inclusive Development', and its subsection 'Ensuring Environmental Sustainability and Pre-emptive Response to Climate Change'.
- **2019:** Localization of SDG-13 was completed, resulting in five indicators on climate change, and so the indicators in the NSDP 2019-2023 were aligned with the SDG-13 ones.
- **2019:** The draft Environment and Natural Resources Code has allocated a title to climate change. Once the ENR Code is approved, its Title on Climate Change will provide a solid legal framework for climate change work and for future climate change regulations.

Lastly, it is worth mentioning that Cambodia launched the national climate change monitoring and evaluation (M&E) approach in 2017, which provides a good baseline to understand progress in addressing climate change.

FIGURE 9: THE GUIDELINES ON MAINSTREAMING CLIMATE CHANGE INTO THE PROVINCIAL, DISTRICT AND COMMUNE/SANGKAT DEVELOPMENT PLANNING PROCESS ADOPTED IN 2017

Source: National Committee for Subnational Democratic Development (NCDD)

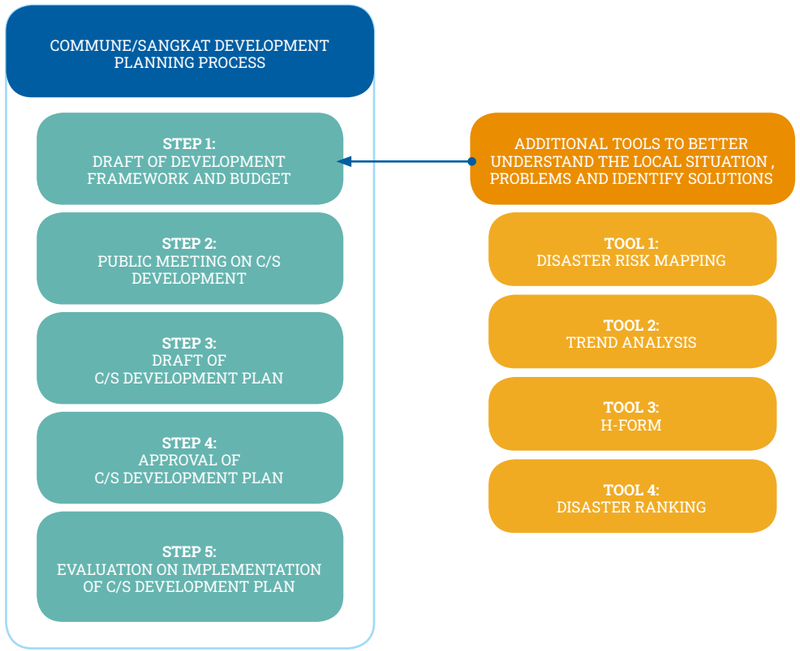
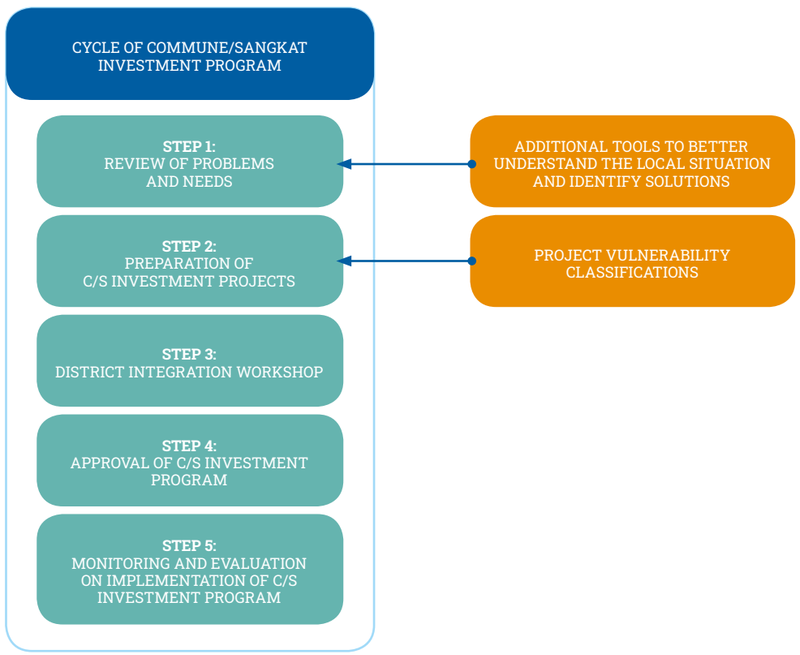


FIGURE 10: THE GUIDELINES ON MAINSTREAMING CLIMATE CHANGE INTO THE PROVINCIAL, DISTRICT AND COMMUNE/SANGKAT INVESTMENT PROGRAMME ADOPTED IN 2017

Source: National Committee for Subnational Democratic Development (NCDD)

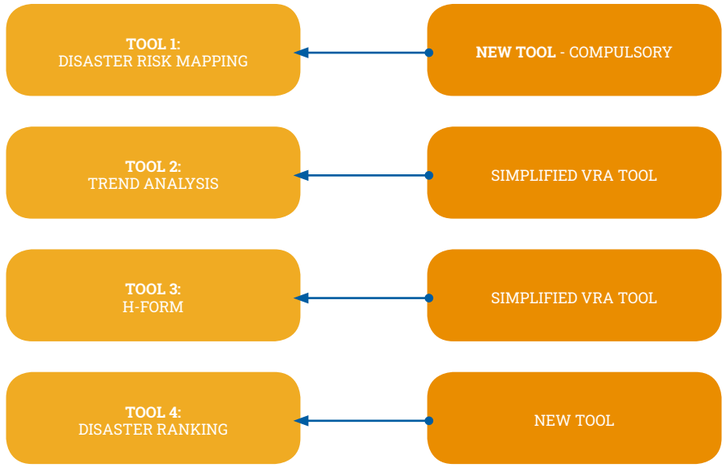


At an early stage, the abovementioned process did not address climate change impact and natural disaster, so these aspects were subsequently integrated through the assessment tool known as Vulnerability Reduction Assessment (VRA) tool. The VRA tool was originally developed by UNDP (United Nations Development Programme) through Small Grant Projects (SGP) funded by GEF program (Global Environment Facility Trust Fund) in Cambodia. The tool was later mainstreamed into sub-national development programme for commune development planning where climate change and vulnerability assessment are integrated. The VRA tool does not address migration specifically since the tool focuses mainly on the perception of the community regarding vulnerability and adaptive capacity to climate change[20]. In Cambodia, the VRA primarily focuses its attention on the impact of floods and droughts.

20 Please see UNDP Cambodia, 2014. Practitioner's Handbook: Implementing the Vulnerability Reduction Assessment. 2nd Edition. Phnom Penh, Cambodia.

FIGURE 11: VULNERABILITY REDUCTION ASSESSMENT (VRA) TOOL

Source: National Committee for Subnational Democratic Development (NCDD)



GENDER AND CLIMATE CHANGE

The Cambodia Climate Change Strategic Plan 2014-23 explicitly expresses the need for attention on gender issues when tackling climate change, especially in rural areas. More specifically, the plan states: *"The RGC recognizes that the rural poor of Cambodia, the majority of whom are women, are most vulnerable to climate change impacts because of their high dependence on agriculture and natural resources. This vulnerable group is very susceptible to diseases because of their limited resources and capacity to adapt to climate change impacts, including the lack of preparedness to cope with climate risks and hazards. Therefore, there is a need to mainstream gender into climate change response measures, such as into existing policies and laws, SCCSPs, in order for this cross-cutting issue to be supported by all government agencies especially at national and subnational levels, development partners, NGOs, civil society organizations (CSOs), research and academia and the private sector"*[21].

21 National Climate Change Committee (2013).

2.2.5 MINISTRY OF WOMAN AFFAIR PROGRAMME DIRECTIONS IN GENDER AND CLIMATE CHANGE STRATEGIC PLAN (2014-2023)

Under the national framework of CCCSP, the Ministry of Women's Affairs (MoWA) has developed its Gender and Climate Change Strategic Plan spanning a 10-year period from 2014 to 2023. The plan has purposefully outlined the key strategic directions for gender in the following way:

- Implement the Gender and Climate Change Strategic Plan;
- Encourage female involvement in decision-making on climate change adaptation and mitigation and on natural disaster management at all levels and domains;
- Increase the awareness level on gender and climate change, including natural disasters, within MoWA and its decentralized offices and in stakeholders;
- Increase the capacity level of MoWA, its decentralized offices and stakeholders on gender integrated vulnerability and capacity assessment, planning methods for climate change adaptation and mitigation, and natural disaster management;
- Deliver targeted intervention for women with high levels of vulnerability, to strengthen their climate change adaptation and mitigation capacities and empowerment (e.g. food security, nutrition, sustainable access to clean water, urban and rural livelihoods, waste management, access to information and formation of support groups);
- Improve research and development to increase the availability of data and information on gender and climate change;
- Draw up best practices and lessons learned on gender and climate change for scaling up learning and sharing.

2.2.6 DISASTER MANAGEMENT

The Law on Disaster Management was enacted in 2015. Its aims are to regulate:

1. prevention, adaptation and mitigation during the period prior to disaster due to natural or human-made causes;
2. emergency response during the disaster;
3. recovery during the post-disaster period.

The National Committee for Disaster Management leads the coordination of the disaster management system (together with ministries, institutions, armed forces, the public sector, the private sector and civil society in promoting safety and resilience to disaster), promotes intervention guidelines, supports territorial bodies and coordinates with international actors for cooperation.

Sub-committees at national and provincial levels ensure the completion of the Committee's missions at provincial level. In addition, district/Khan and commune/Sangkat committees for disaster management have specific responsibility to manage disaster occurring within their administration territories.

A considerable part of the law concerns rights and obligations. It also reminds of the human rights to dignity and prosperity and relief aid when disaster affects individuals. In addition, people are entitled to the right to obtain resources to allow them to adopt measures of prevention, disaster risk reduction and livelihood restoration after a disaster.

Furthermore, they also have the obligation to actively take part in disaster risk reduction, as well as climate change adaptation, prevention and preparedness, and emergency response. This also means reporting any case that could cause a disaster, caring for the environment, and solidarity in the community as ways of avoiding disasters and/or dealing with them.

DISASTER MANAGEMENT FRAMEWORK

Four central articles of this law explain how the disaster management framework is envisaged:

Article 10 Prevention and mitigation activities shall focus on the pre-disaster period by identifying various hazards. Regulations and measures will be formulated for strengthening public awareness and cooperation in the development and implementation of hazard risk prevention programmes, including climate change adaptation.

Article 11 The preparedness activities shall focus on the pre-disaster period by taking action to develop early warning systems, strategies, contingency plans and emergency response plans for mitigating disaster losses, standard operating procedures for the disaster relief operation, table top exercises and simulation exercises.

Article 12 The emergency response activities shall focus on the period of the disaster by taking immediate action to lead, command and coordinate the emergency response operation, obstruct the spreading of hazards, and mobilize humanitarian assistance, basic materials, equipment, and human and financial resources for disaster relief.

Article 13 The recovery activities shall focus on the post-disaster period, including rehabilitation and reconstruction.

PLATFORM FOR REAL-TIME IMPACT AND SITUATION MONITORING (PRISM)

In 2020 Cambodia adopted the PRISM platform promoted by the World Food Programme (WFP) to help in assessing potential risk and in forecasting the impact of climate hazards on the most vulnerable communities, with the aim to design risk-reduction activities and focus disaster responses.

"The goal of PRISM is to empower governments with the wealth of data and information available on climate risk. The platform provides tools to understand where to direct resources to reach populations most in need of protection and assistance. PRISM brings together national disaster management authorities, national meteorological offices and key line ministries such as agriculture, health, and social welfare to collectively monitor risks, prioritize responses and inform programmes and policies.

The primary outputs of PRISM are interactive maps and charts, along with tables and reports. The system can generate standard climate risk monitoring indicators as well as risk and impact analytical products, which are adapted for each hazard and the populations at risk to them.

The indicators on hazards – including droughts and floods – can be monitored over time through intuitive and interactive maps. Charts and related tables help to quantify the extent of a hazard by administrative area (such as provinces and districts). In addition, the system can automatically produce risk and impact indicators based on the known vulnerabilities and exposure to hazards at any point in time. All of this information can be exported from the system for further analysis and reporting.

PRISM integrates with mobile data collection platforms – including open source solutions such as ODK and Kobo Toolbox. This allows users to visualize data collected from impacted areas in real-time, alongside the hazard information automatically generated by the platform"[22].

22 *https://innovation.wfp.org/project/prism*

2.2.7 LABOUR MIGRATION POLICY FOR CAMBODIA

Since 2010, the Royal Government of Cambodia and the Ministry of Labour and Vocational Training have adopted periodical labour migration policies. The Labour Migration Policy for Cambodia 2015-2018 built on the previous one (2010-15) and it provides that:

"The overall Policy objective is to develop a comprehensive and effective labour migration governance framework that protects and empowers women and men throughout the migration cycle, ensures that migration is an informed choice, and enables a positive and profitable experience for individual workers, their families and communities, that also contributes to the development of Cambodia. Recognizing and responding to the distinct needs of migrant workers with respect to their gender, sector, legal status and other individual characteristics, is central to the Policy and its effective implementation"[23].

The policy is focused on three specific objectives:

1. formulation and implementation of rights-based and gender-sensitive policy and legislation through social dialogue at all levels;
2. protection and empowerment of men and women migrant workers regardless of their status, through all stages of the migration process;
3. harnessing labour migration and mobility to enhance social and economic development in Cambodia, recognizing that migrant workers are agents of innovation and development.

It encompasses 17 policy goals that include: international framework, institutional framework, legislative/regulatory framework, supervision of recruitment and placement, support services, migration on the national development agenda, migrants' remittances and investments, and return and reintegration.

23 Policy on Labour Migration for Cambodia 2015-2018, Ministry of Labour and Vocational Training, and International Labour Organization, December 2014. Available at: *https://asean.org/storage/2016/05/Policy-on-Labour-Migration-for-Cambodia-December-2014.pdf*

In recent years, the Cambodian government has improved its regulatory framework to foster safe and profitable migration, and has agreed with the ASEAN consensus on the Protection and Promotion of the Rights of Migrant Workers and on the Global Compact for Safe, Orderly and Regular Migration. These aim to: a) protect migrants' rights, and reduce the risks and vulnerability migrants face; b) mitigate factors and drivers that create barriers to building and maintaining sustainable livelihoods in their countries of origin; c) address communities' concerns and recognize changes in demography, economy, society and environment that may affect and/or result from migration; d) create enabling conditions for migrants to contribute to sustainable development at all levels through their human, economic and social capacities.

Thus, the Royal Government of Cambodia has put in place a mechanism based on the following:

- *"The ministry of Labour and Vocational Training is the leading ministry in the management of migrant workers in the collaboration with Ministry of Interior and Ministry of Foreign Affairs and International Cooperation. Private sectors are also engaged in this process.*
- *Employment Policy for Cambodia 2015-2025, TVET Policy for Cambodia 2017-2025, and Labour Migration Policy for Cambodia 2019-2023.*
- *Labour Law, Law on Social Security, Criminal Law, Law on Anti-trafficking.*
- *Sub-decree 190 issued in 2011 on the management of Cambodian migrant workers abroad.*
- *Development Strategic Plan of the Field of Labour and Vocational Training 2019-2023 – Five-year National Strategic Plan for counter-trafficking 2019-2023.*
- *Bilateral Agreement between Cambodia and receiving country on management of workers. Besides, regional and international instruments relating to labour migration have also been observed during the establishment process of the national policy, laws and regulations on the management of migrant workers."*[24]

A clear purpose emerges from this background: in order to ensure that migration for employment is voluntary, regular, safe and orderly, migrants are protected through rights-based governance, and their contribution to sustainable development has to be supported. These aspects have several implications regarding the relations between climate change and migration, in terms of reducing the impact of climate variation on a migration seen as a last resort to solve the problems caused by global warming. They pave the way to strengthening migration as a strategic adaptation tool including the possibility to draw advantage from it to build more resilience at origin and destination territories.

Pursuing this same direction, the Labour Migration Policy 2019-2023 expresses a strong commitment to: recognizing migrant workers' rights; reducing the risk of abuse; enhancing the value of labour migration in producing maximum benefit to contribute to the achievement of sustainable development; increasing livelihood for migrants, their families and communities; overcoming exploitation practices; increasing awareness of migrants, institutions, civil society and the private sector.

The Policy emphasizes the importance of recognizing skills and enhancing opportunities for safe migration channels, especially for women. Moreover, it fosters services to support and reintegrate migrants, including programmes for social protection.

24 Asia-Pacific Regional Review of Implementation of the Global Compact for Safe, Orderly and Regular Migration, 10-12 March 2021, speech by H.E. Hou Vudthy, Secretary of State, Ministry of Labour and Vocational Training, Kingdom of Cambodia.

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3

CLIMATE CHANGE MODELS, AND VULNERABILITY RISK ASSESSMENT FOR CAMBODIA

INTRODUCTION

Climate has a direct and relevant impact on the development process of all territories and communities. For this reason, reading the existing results of ongoing climate change and predicting its future evolution are of paramount importance in order to shape a sustainable and peaceful future. With this purpose in mind, here in this chapter we present the main models that can help to predict and assess the consequences of different GHG emission scenarios in terms of main climate events, with a focus on the floods and droughts that primarily affect the country.

This chapter is extensively extracted from various sources, to match training needs, and mainly for Cambodia's context. This section should not be cited as an original source.

The impacts presented are mostly targeted on which consequences can lead to the most vulnerable people, those who more frequently choose migration as a response to poverty and a lack of opportunities. For this reason, the impact is analysed focusing on rural areas, where around 90% of the poor live (World Bank; UNDP, 2020) and from where the largest amount of migration originates. Therefore, agriculture is the sector where attention is concentrated, as the main source of livelihood and being the economic segment that is most sensitive to climate change.

In order to identify the factors that influence the development pathway and design policy to mitigate the risks of negative impacts and to address these, the vulnerability assessment model is presented.

3.1 CLIMATE CHANGE MODELS FOR CAMBODIA

Climate models are an extension of weather forecasting. Whereas weather models make predictions over specific areas and short timespans, climate models are instead broader and analyse longer timespans. They predict how average conditions will change in a region over the coming decades.

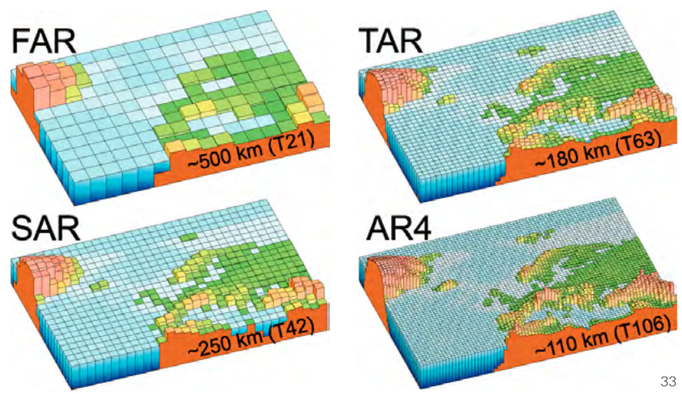
Climate models include more atmospheric, oceanic and land processes – such as ocean circulation and melting glaciers – than weather models do. These models are typically generated from mathematical equations that use thousands of data points to simulate the transfer of energy and water that takes place in climate systems.

Scientists use climate models to understand complex Earth systems. These models allow them to test hypotheses and draw conclusions on past and future climate systems. This can help them determine whether abnormal weather events or intense storms are a result of changes in climate or just part of the routine climate variation. For example, when predicting tropical cyclones during hurricane season, scientists can use climate models to predict the number of tropical storms that may form off the coast and in what regions they are likely to make landfall. A huge number of climate models are used in the world today. They have different spatial resolutions, such as FAR, SAR, TAR and AR4, with grids representing 500 km, 250 km, 180 km and 110 km respectively, (Figure 12 below) and are the fruit of progressive evolution in generating climate models.

FIGURE 12: EVOLUTION OF CLIMATE CHANGE MODELS
Geographic resolution characteristic of the generations of climate models used in the Intergovernmental Panel on Climate Change assessment reports: FAR (IPCC, 1990), SAR (IPCC, 1996), TAR (IPCC, 2001a) and AR4 (2007)

The illustrations show how successive generations of these global models give increasing detail in visualizing northern Europe, and offer better horizontal resolution for use in short-term climate simulations.

Source: IPCC, 2007, please see *https://archive.ipcc.ch/publications_and_data/ar4/wg1/en/ch1s1-5.html*



Other than spatial resolution (also known as climate downscaling), other variables factored into the models including wind, temperature, precipitation, humidity, cloudiness, pressure, visibility and air quality. These variables are strongly connected to the rest of the natural world, meaning that climate also involves other aspects of the atmosphere, oceans, land surface and ice (the cryosphere). Therefore, the climate is not a single thing, but instead a sprawling system of many processes that interact with each other in complicated ways.

3.1.1 MODELLING THE IMPACT OF CLIMATE CHANGE ON ECONOMIC GROWTH: THE CEGIM

As will be further analysed in paragraph 3.2, Cambodia is highly vulnerable to climate change. Rising temperatures are expected to reduce productivity in the agriculture, fisheries and forestry fields and to reduce labour productivity across most sectors. In addition, changing rainfall patterns will lead to increased flooding, drought and intense storms, which will also lessen resource productivity, especially in agriculture and fisheries, and increase damage from extreme events, affecting roads, water supply and other infrastructure. Rising sea levels will cause flooding and storm damage in coastal areas, affecting urban areas and natural resources[25].

As the previous chapter explained, in order to respond to climate change impact and challenges, the Cambodian government has adopted a Climate Change Strategic Plan (CCCSP) and sectoral Climate Change Action Plans (CCAPs), in 2013, and the Nationally Determined Contribution (NDC) to the Paris Climate Agreement, in 2015.

In 2019, in order to take further steps, the Ministry of Economy and Finance (MEF) and the National Council for Sustainable Development (NCSD) developed a **Climate Economic Growth Impact Model (CEGIM), which considers and interprets the economic impacts of climate change at the sector level.** The CEGIM is the fruit of a collaborative study conducted by the MEF, the Ministry of Environment (MoE) and the NCSD, with financial and technical support from the United Nations Development Program (UNDP), the European Union and Sweden. The model is a tool to scientifically compute estimates of the impact of climate change on Cambodia's economic development in the medium and long terms, enabling the quantification of climate change impacts and providing evidence and support in developing more realistic and effective policy options, strategies and programmes to sustain the nation's long-term progress and ensure optimal outcomes[26].

Above all, the CEGIM model[27] is recommended as it is good in terms of model accessibility and is easy to use. The CEGIM is a simple economic model, built on a spreadsheet, that aims to distil the key features of the most widely used models of the economic impact of climate change (e.g. PAGE and DICE). The CEGIM is driven by a production function that determines GDP in any year from the stocks of capital (K) and labour (L) in that year.

Capital is determined by investment and therefore, in theory, covers institutions and technology as well as infrastructure and equipment. Labour is based on employment data. A simple linear function (e.g. GDP = a + bK + cL) is preferred to a classic Cobb Douglas function and allows for changes in capital productivity (i.e. 'b') and labour productivity (i.e. 'c').

Data regarding production, capital stocks, depreciation and employment functions are calibrated for each sector, and based on national historical series and statistics.

The CEGIM accommodates the three types of direct loss and damage (L&D) provoked by climate change in the following ways:

- Loss of income reduces GDP in the year of loss but has no direct effect on subsequent GDP.
- Heat stress and health effects reduce GDP through labour productivity (i.e. 'c').
- Damage to assets from extreme events and sea-level rise reduces capital stocks (i.e. 'K').
- Any reduction in GDP indirectly reduces future GDP by reducing investment and, hence, K.

In the model, evidence on loss and damage estimates of the values of the different types of L&D come from research, case studies, stakeholder consultation, physiological studies, damage assessments and evaluations. A wide range of evidence has been reviewed, giving greater weight to the sources considered most authoritative and most closely applicable to Cambodia. The table below summarizes evidence sources.

Lastly, the model takes into account different climate change scenarios as defined in the IPCC assessment reports.

By using the CEGIM model, the economic impact of climate change in Cambodia can be summarized as shown below. It appears clear that the greatest impact is expected in labour productivity, and agriculture and industry will be the most affected sectors.

CLIMATE CHANGE ECONOMIC MODELS

The foundations of climate change economic modelling were laid in the late 1990s and early 2000s and include development of the Policy Analysis for the Greenhouse Effect (PAGE) model (Hope, 2011), the Dynamic Integrated Climate and Economy (DICE) model (Nordhaus and Boyer, 2000), and the Climate Framework for Uncertainty, Negotiation and Distribution (FUND) model (Tol, 2002)[28]. The models are neoclassical growth models in which growth is related to capital (financial and natural), labour and energy (both carbon and non-carbon). These models have mostly been used to explore optimal global mitigation policy, and the associated carbon pricing, rather than to optimize national adaptation policy[29].

28 National Council for Sustainable Development (NCSD), Ministry of Environment (MoE) and Ministry of Economy and Finance (MEF), (2019)
29 Ibid.

25 National Council for Sustainable Development (NCSD), Ministry of Environment (MoE) and Ministry of Economy and Finance (MEF), (2019).

26 Ibid.
27 Ibid.

FIGURE 13: OVERVIEW OF CEGIM
Source: MEF and NCSD, 2019

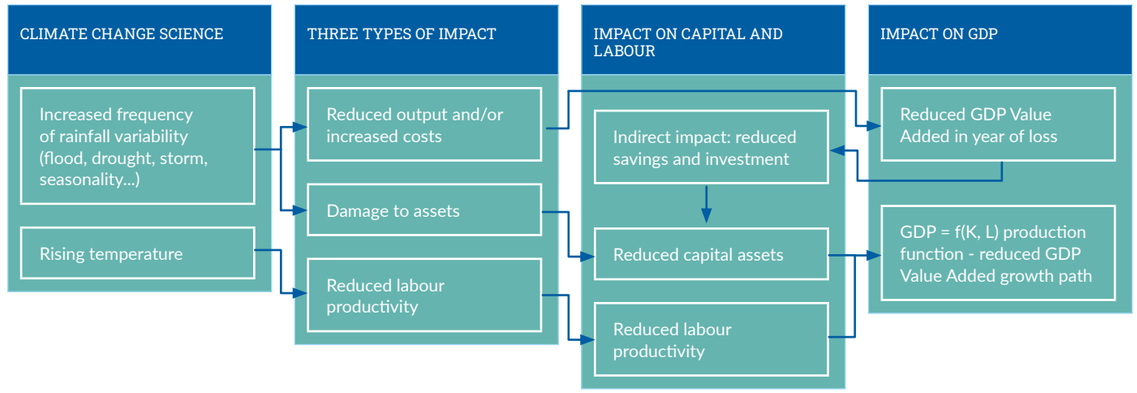


FIGURE 14: TYPE OF LOSS AND DAMAGE EXPRESSED AS % GDP AND % OF TOTAL L&D
Source: MEF and NCSD, 2019

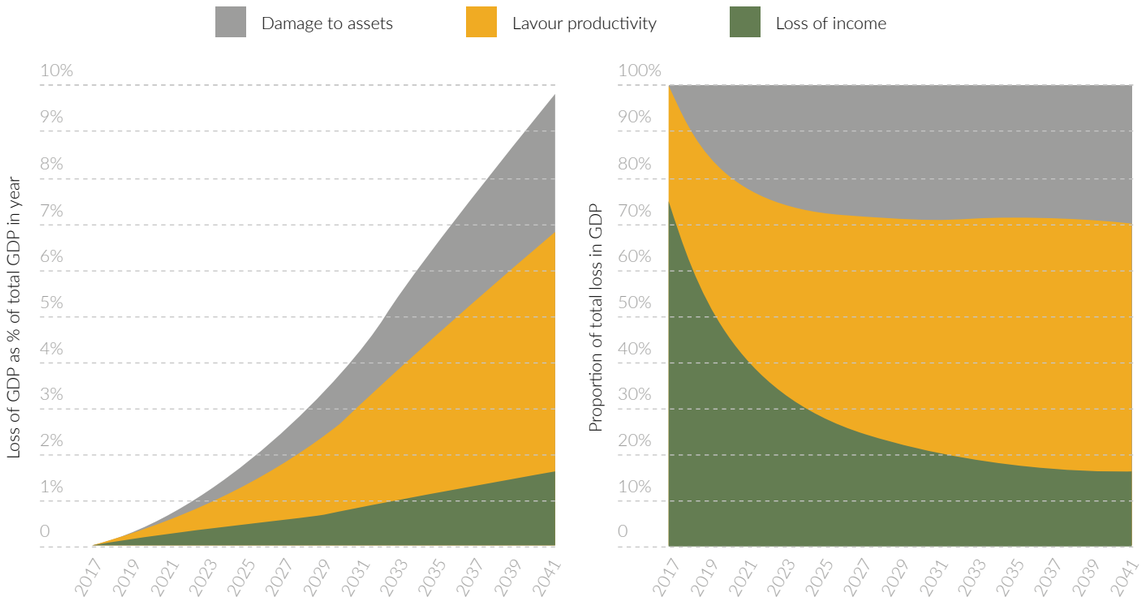
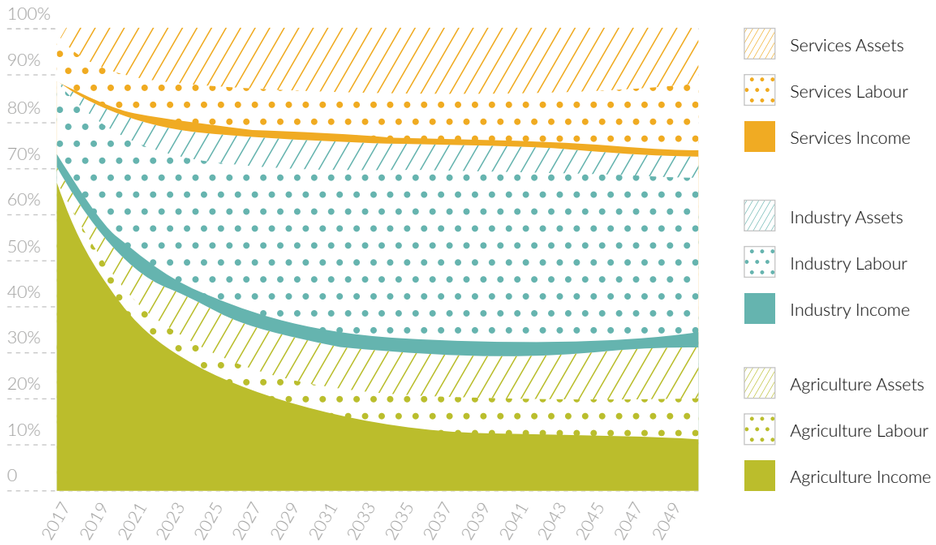


FIGURE 15: SHARE OF ECONOMIC IMPACT OF CLIMATE CHANGE BY MAIN SECTOR AND TYPE OF LOSS AND DAMAGE

Source: MEF and NCSD, 2019



3.1.2 CLIMATE DOWNSCALING MODELS[31]

It should be noted that there are other climate models used to understand Cambodian climate. Climate projection analysis is based on WorldClim climate data (Version 1.4), which is freely available in the public domain (*http://www.worldclim.org/*)[32].

WorldClim is a set of global climate layers that can be used for mapping and spatial modelling. The dataset includes the main climatic variables (monthly minimum, mean and maximum temperature, precipitation, solar radiation, wind speed and water vapour pressure) as well as 19 derived bioclimatic variables (e.g. annual mean temperature, temperature seasonality, annual precipitation, and so forth)[33].

The current rainfall data from WorldClim is compared with observed data. The observed data is the monthly average rainfall from Sandan Station, between 1985 and 2018. The WorldClim data covers the 1960-1990 period. The observed data is slightly higher than the WorldClim data, but there is no significant difference, giving confidence in the use of both datasets.

The WorldClim data runs several models with four different scenarios of greenhouse gas[34] emissions and aerosols, and RCP scenarios (Representative Concentration Pathways)[35], including RCP2.6, RCP4.5, RCP6.0 and RCP8.5. This analysis uses the most extreme CO_2 emission scenario, RCP8.5, with two timeframes of 2050[36] and 2070 to understand the projected change in temperature and rainfall within the north-eastern area of Cambodia.

31 This section is based on the report Prey Lang Extended Landscape: Assessment of Biodiversity Threat, USAID, 2021.

32 For a comprehensive analysis of data, please see: Hijmans, R.J., et al. (2005).

33 Food and Agriculture Organization of the United Nations (FAO), *http://www.fao.org/land-water/land/land-governance/land-resources-planning-toolbox/category/details/zh/c/1043064/*

34 They are CO_2, N_2O, CH_4, SF_6, HFCs, PFCs and water steam.

35 A Representative Concentration Pathway (RCP) is a greenhouse gas concentration (not emissions) trajectory adopted by the IPCC. Four pathways (RCP2.6, RCP4.5, RCP6.0 and RCP8.5) were used for climate modelling and research for the IPCC fifth Assessment Report (AR5) in 2014. The pathways describe different climate futures, all of which are considered possible depending on the volume of greenhouse gases (GHG) emitted in the years to come.

36 Average rainfall between 2041-2060 is in the year 2050, and between 2061-2080 it is in 2070.

HEAT STRESS IN CAMBODIA

A 2019 study by the International Labour Organization (ILO)[30] found that climate change and the resulting global warming of the planet is a cause for worker distress and a threat to many economies' productivity. This phenomenon is called heat stress, meaning that the body receives more heat than it can tolerate without physiological impairment. This can increase workers' occupational risks and vulnerability and it can lead to heat stroke and ultimately to death. Heat stress mainly affects outdoor workers, such as those engaged in construction and agriculture.

It is estimated that by 2030 the total productivity loss in South Asia and West Africa may reach 5% of total working hours, either because it is too hot to work or because workers have to perform their tasks at a slower pace. Heat stress is often associated with (and exacerbated by) other challenges such as a lack of social protection, high rates of informality and working poverty. South Asia and West Africa, since they have large proportions of agricultural and/or construction employment and poor and precarious conditions in the labour market, are expected to suffer from greater productivity losses.

In terms of migration, heat stress – together with many other driving factors such as inequality, lack of opportunities or social ties, conflicts and other security issues – may lead to agricultural workers leaving the rural areas in search of better prospects in urban areas or other countries.

Cambodia is particularly affected by heat stress. In fact, in 1995, more than 5% of GDP was lost as a result of heat stress in Thailand, Cambodia and Bangladesh. Agricultural employment in Cambodia is projected to decline by 46% between 1995 and 2030, resulting not only in fewer workers outdoors, operating at high intensity, but also in more workers employed in the industrial and service sectors, where work is typically done indoors.

Furthermore, it is estimated that in Cambodia in 2015 there was a loss of 4.3% of daylight working hours as a result of high temperatures. This percentage is expected to rise through to 2030 and the projected temperature increase will put extra pressure on the most vulnerable workers.

30 International Labour Organization, *Working on a warmer planet: The impact of heat stress on labour productivity and decent work*, International Labour Office – Geneva, ILO, 2019.

FIGURE 16: OBSERVED AND CURRENT RAINFALL DATA FOR THE NORTH-EASTERN PROVINCES OF CAMBODIA

Source: USAID, Assessment of Impacts of Development and Climate Changes on Natural Resources in Prey Lang Extended Landscape, 2020

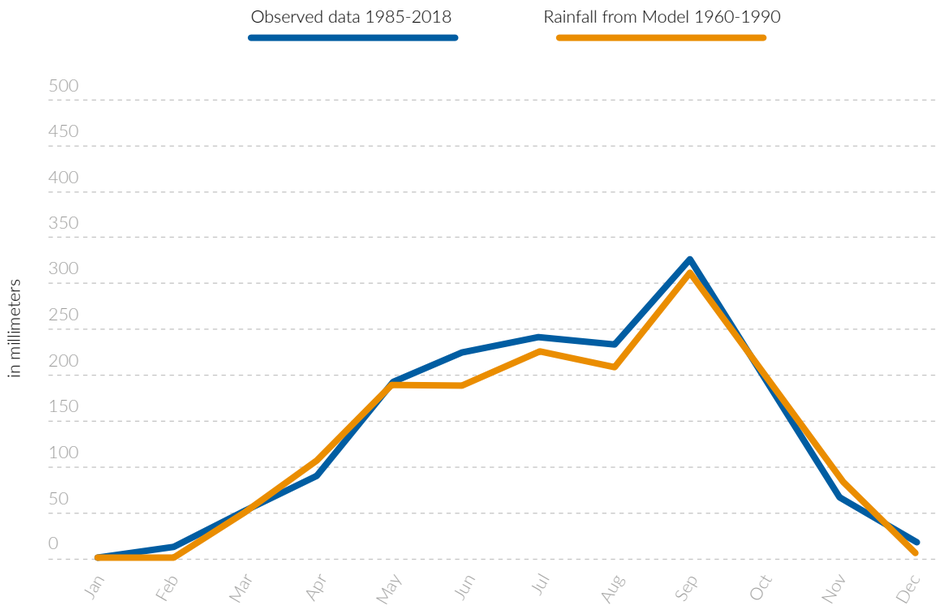


FIGURE 17: COMPARISON OF HISTORICAL AND MULTIPLE GCM MODELS FOR 2050 AND 2070

Source: USAID, Assessment of Impacts of Development and Climate Changes on Natural Resources in Prey Lang Extended Landscape, 2020

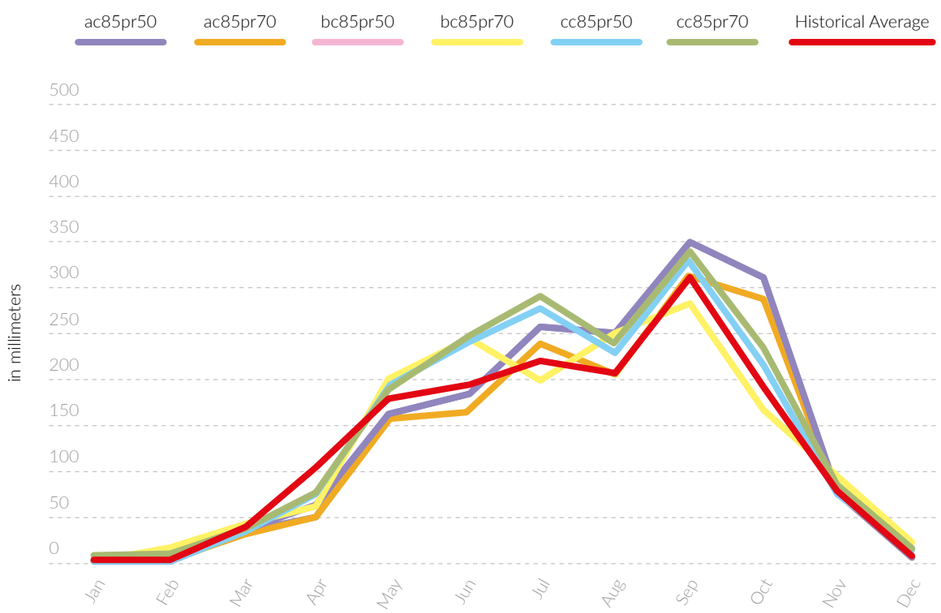


FIGURE 18: PRECIPITATION PROJECTIONS BY PROVINCE

Source: USAID, Assessment of Impacts of Development and Climate Changes on Natural Resources in Prey Lang Extended Landscape, 2020

Figure 17 (p. 38) shows how multiple general circulation models (GCMs) – ACCESS1-0 or ac for short, BCC-CSM1-1 or bc, and CCSM4 or cc – were compared. The model closest to the Cambodian research to date is CCSM4[37] regarding both timeframes and projects.

The model showed that rainfall is expected to increase by 11% and 15% respectively for the years 2050 and 2070. The analysis used CCSM4 data to understand and project rainfall patterns in the four north-eastern provinces.

The projected rainfall in the four provinces is predicted to increase (as shown in Figure 18 and Table 8) by 13% and 17% in 2050 and 2070, respectively. The majority of the rain is predicted to fall from June to September.

The dry spell is expected to remain the same for Kampong Thom and Kratie and to be more pronounced in Preah Vihear and Stung Treng. All the north-eastern provinces are projected to experience less rainfall during the early season, March-May, and similar amounts during the diminishing period of October-November.

The projected rainfall under the RCP8.5 scenario poses a risk to rural livelihoods if farmers are unable to adapt to the changes in rainfall and seasonality. It is likely that dry-season rice (December-April) will be affected by declining rainfall and communities will experience more frequent unpredictable floods and dry spells.

As shown in Table 8 (p. 40), Stung Treng is the most sensitive to projected rainfall change, followed by Kampong Thom, with predicted increases of 21% and 18% respectively for the year 2070. Preah Vihear and Kratie are predicted to change less, with projected rainfall increases at 13% and 16%, respectively.

37 The Community Climate System Model (CCSM) is a coupled climate model for simulating Earth's climate system. Composed of five separate models simultaneously simulating Earth's atmosphere, oceans, land, land-ice, and sea-ice, plus one central coupler component, CCSM allows researchers to conduct fundamental research into Earth's past, present and future climate states, *https://www.cesm.ucar.edu/models/ccsm4.0/ccsm/*

TABLE 8: PROJECTED PERCENTAGE RAINFALL INCREASED BY PROVINCE

Source: USAID, Assessment of Impacts of Development and Climate Changes on Natural Resources in Prey Lang Extended Landscape, 2020

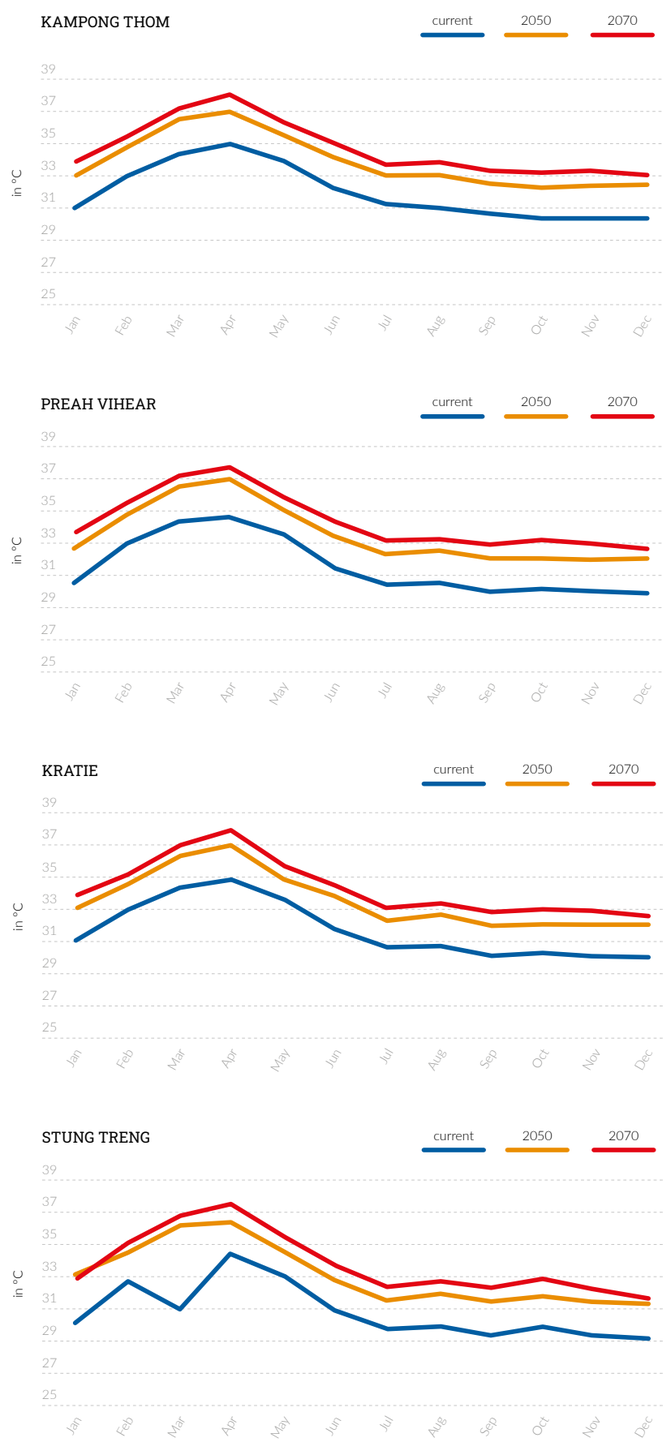
PROVINCE	2050 (in percent)	2070 (in percent)
Kampong Thom	14	18
Preah Vihear	8	13
Kratie	13	16
Stung Treng	16	21

It is expected that temperature projections for all four provinces will increase on average by 2.0 to 2.8 degrees Celsius in 2050 and 2070, respectively, as shown in Figure 19 and Table 9. The trends are predicted to follow a similar pattern, with the highest temperatures occurring from February to April and cooler temperatures from May to January. However, the highest temperature currently experienced is foreseen as being the coolest temperature in 2050, becoming even hotter in February and March. With the overall temperature increase, the incidence of forest fires, diseases, and pests that thrive in warmer temperatures will also increase. Evaporation rates will rise, depleting standing water supplies, and there will be other consequences from heat-related causes.

The trends in predicted temperature changes are similar in three provinces, with Stung Treng showing an anomaly. In Stung Treng, the coolest period, which now occurs in March, might diminish noticeably. Similar to projected rainfall, Stung Treng is also the most sensitive for predicted rising temperatures, with increases of 2.3 °C and 3.0 °C in 2050 and 2070, respectively. As the increasing temperatures heat the earth's surface, more water evaporates, creating convectional rainfall, which may lead to frequent and severe weather events, contributing to erratic flooding.

FIGURE 19: TEMPERATURE PROJECTIONS BY PROVINCE

Source: USAID, Assessment of Impacts of Development and Climate Changes on Natural Resources in Prey Lang Extended Landscape, 2020



Climate variability both spatial and temporal as shown in Figure 20, in terms of changing in rainfall distribution, will imposed drought and flood in rain-fed agriculture.

When we view this rainfall variability across the regions of Cambodia, it appears that most of the Tonle Sap area, such as western Kampong Thom, and other provinces in the lower Mekong region, are highly vulnerable to climate change as they are in Cambodia's agricultural area yet receive less rainfall than other regions.

TABLE 9: PROJECTED TEMPERATURE INCREASE BY PROVINCE

Source: USAID, Assessment of Impacts of Development and Climate Changes on Natural Resources in Prey Lang Extended Landscape, 2020

PROVINCE	2050 (in degree Celsius)	2070 (in degree Celsius)
Kampong Thom	2.0	2.7
Preah Vihear	1.9	2.6
Kratie	2.0	2.8
Stung Treng	2.3	3.0

FIGURE 20: SPATIAL DISTRIBUTION OF ANNUAL AVERAGE RAINFALL IN CAMBODIA

Source: Author's Calculation with data from MoWRAM

3.2
CLIMATE CHANGE IMPACT IN CAMBODIA

Cambodia is considered one of the most vulnerable countries to climate change impacts such as floods and droughts. According to the Cambodian National Council for Sustainable Development (NCSD), *"Cambodia has been exposed to disaster more frequently and severely, as indicated by key facts as below:*

- *The 2002 drought affected over 2 million Cambodians throughout 8 provinces, significantly impacting their livelihoods (SNC, 2010);*
- *Loss and damage caused by the 2009 typhoon Ketsana was estimated at US$ 132 million and resulted in 43 fatalities (NCDM, 2010);*
- *According to the International Disaster Database (EM-DAT), the natural disaster in 2011 resulted in economic losses to Cambodia of about 4.3% of its GDP (CCCSP, 2013);*
- *The severe floods of 2013 affected 1.8 million people across 20 provinces in Cambodia, causing losses and damages to a total of US$ 356.3 million (NCDM, 2013);*
- *The heatwave phenomena in 2016 profoundly affected water supply, agriculture, and livestock in most provinces in Cambodia."*[38]

Climate change poses significant challenges to the development of Cambodia. Extreme events such as floods and drought, which are projected to increase in frequency and intensity, will particularly affect food security and agriculture, which is characterized by smallholding and subsistence farming livelihoods and a reduced level of infrastructure, and these factors make production deeply dependant on rainfall[39].

Above all, the NCSD has identified that, under future climate conditions (2025 and 2050), **most of Cambodia's agricultural areas will be exposed to higher drought risks**. Moreover, the growing period for most agricultural areas will be less than five months (between two and three months) and efforts to increase the planting index beyond 1.0 may be impossible without the development of irrigation facilities[40].

A change in **crop productivity** under changing climate is not only due to the shifts in rainfall, since climate change will also occur because of rising global temperatures resulting from increasing CO_2 concentrations in the atmosphere. In short, higher carbon dioxide levels and environmental temperatures and altered water availability under climate change conditions will influence food production, availability, accessibility and quality through their direct effect on crop yields.

Under elevated CO_2, crop productivity will increase, while under higher temperatures, crop productivity will decrease, due to the shortened growing season for non-photoperiod-sensitive crops. Fortunately, the study conducted by the Ministry of Environment illustrated that in Cambodia, under the elevated CO_2 in both scenarios, rice production output in the major provinces will vary more than under current conditions, and the yield of wet-season rice will be greater than dry-season rice, contrasting with the historical pattern of yield trends and yield anomalies which have illustrated that in most of the major rice-growing areas, the rate of yield increase in dry-season rice is faster than that of wet-season rice.

However, the elevated CO_2 also indicates that rainfall will increase significantly in lowland areas. Therefore, under the changing climate, the frequency and intensity of flood occurrence may increase, which in turn would cause serious damage to rice crops, exposing farmers to higher risk, particularly concerning wet-season rice.

While **rice production** is projected to suffer serious damage from flooding in the lowland areas bordering the Mekong and its tributaries, other studies show that rice production is also vulnerable to climate changes in the weather because most of the paddy fields are rain-fed, and droughts are geographically widespread. Severe drought affecting grain yield mostly occur late in the growing season, and longer-duration genotypes are more likely to encounter drought during grain-filling.

In Cambodia, drought can occur any time during the wet-season, and rice production may be greatly reduced. For instance, lowland rice production in the Mekong region is generally low because crops are cultivated under rain-fed conditions and often exposed to drought. The occurrence of drought is in association with the long absence of heavy rainfall events, and the development of drought is further enhanced with the low clay content of the soil. The impact of drought on grain yield mostly depends on the degree of drought severity.

In addition, **pest outbreaks** have been identified **as another impact of climate change on rice production**. Therefore, flooding, drought and pests are all factors negatively impacting rice production, and the figures show that floods accounted for 70% of rice production losses between 1998 and 2002, while drought accounted for 20% of losses, and pests and disease for 10%[41].

With 13.5% of the population living below the national poverty line (UNDP, World Bank, Asian Development Bank, 2014) and a rural population of more than 70% (UNDP; World Bank; National Institute of Statistics, 2020)[42], which includes 90% of the country's poor, the population is highly vulnerable to the impact of disaster on food security. Farmers in Cambodia are already living with the consequences of climate variability resulting in floods and droughts, and will be vulnerable to further variation. Serious flooding and drought have occurred frequently and heavily affect the population in general but more specifically the agricultural sector and all four dimensions of food security: food availability, access to food, stability of food supplies, and food utilization. Unless sufficient adaptation measures are adopted, this region will face inequitable food security concerns.

Prey Veng, Takeo, Kampong Cham, Battambang, and Siem Reap account for more than 50% of national rice production, but floods and droughts occur almost every year in these rice-producing provinces. Due to the severe and frequent natural hazards such as flooding and drought in Cambodia, **rice production losses have been significant**; therefore, the vast majority of rural vulnerable households are exposed to food shortage or famine in some areas.

On the rural front, not only livelihoods from agriculture, but also those from fishing and forestry are ever more subject to frequent floods and droughts. After typhoon Ketsana in 2009, approximately 49,000 families were experiencing a food shortage before the disaster, and this brings vulnerability to daily difficulties that affect not only the individuals but the whole of society. **Flood and drought**, particularly, **are two climate events recognized as the main causes of poverty increase and chronic food insecurity in Cambodia**. Therefore, these two issues have to be explicitly addressed in order to improve agriculture.

A 2010 study noted that: *"According to the Holdridge Classification System, under current climatic conditions, Cambodia's forest is dominated by dry forest (60%), followed by wet forest (20%) and moist forest (20%). Under changing climate, the area of wet forest would decrease while moist forest would increase and dry forest would remain the same.*

FIGURE 21: THE FOUR DIMENSIONS OF FOOD SECURITY

38 *https://ncsd.moe.gov.kh/dcc/department-climate-change*

39 As reported in Cambodia Climate Change Strategic Plan 2014-23 (NCCC, 2013) only 7-8% of the total production land area in Cambodia is under full irrigation; it is also difficult for Cambodia to achieve 5% annual agricultural growth in order to meet the target for agricultural production exports by 2030 under climate change impacts (e.g. drought), especially for some cash crops such as rice, without further investment in the expansion of irrigation schemes.

40 Ministry of Environment (2015).

41 Ministry of Environment. Vulnerability and Adaptation Assessment to Climate Change in Cambodia; Ministry of Environment: Phnom Penh, Cambodia, 2001.

42 Please see *https://www.worldbank.org/en/country/cambodia/overview; https://www.kh.undp.org/content/cambodia/en/home/countryinfo.html; https://www.adb.org/countries/cambodia/poverty#accordion-0-0; https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=KH.* See also National Institute of Statistics; *https://www.nis.gov.kh/index.php/km/15-gpc/79-press-release-of-the-2019-cambodia-general-population-census.*

This change indicated that forest productivity and biodiversity might also change. The high rate of deforestation may accelerate the loss of forest biodiversity and reduce forest productivity due to the increase in human activities in the forest areas."[43]

Overall, the change in soil water availability, caused by the combined effects of changes in temperature and rainfall, will directly impact the **productivity of forests** (NCSD, 2017)[44].

The magnitude of changes in the forested areas due to climate change depends on the General Circulation Model (GCM) and emission scenarios used in the analysis[45]. In the abovementioned 2010 study[46], the pattern of change in forest type due to climate change was quite similar to studies by Japan's Centre for Climate System Research (CCSR) and by Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO).

The 2010 study also noted that further research on the impact of climate change on forest biodiversity and forest productivity needs to be carried out. Based on studies of other neighbouring countries, it is feasible that the forest productivity of Cambodian forested areas may change under changing climate, and some species may disappear. However, further evaluation requires more data in terms of quantity and quality. Nonetheless, this is another prominent problem possibly facing the country.

The impact of climate change on **human health** is not well understood yet. However, it has been reported that climate change will have indirect and direct impacts on human health. The direct impacts include exposure to temperature extremes. The frequency and/or intensity of extreme weather events may increase and this could result in deaths, injuries, psychological disorders and damage to public health infrastructure. Instead, the indirect impacts include disturbance to ecological ecosystems; this causes changes in geographical range and the incidence of vector-borne diseases, infectious diseases, malnutrition and hunger, which in turn affect child growth and development[47]. Furthermore, **sea level rises may force population displacement and cause damage to infrastructure**. This will lead to an increased risk of infectious diseases and psychological disorders.

Based on the climate change scenario, it appears that the promotion of education schemes will have positive impacts on malaria incidence. Furthermore, a study noted that *"other factors for welfare such as safe water supply, good sanitary facility, and hygiene education should also strongly influence the number of cases. Under changing climate, it was found that the average number of malaria cases in most of the provinces in Cambodia would consistently decrease under the SRES B1 scenario ranging from –1 to –62%. In contrast, under SRES A2*[48] *the number of malaria cases gradually increases ranging from –1 to 16%. For future studies, it is recommended that the model to estimate malaria cases needs to be improved using longer historical data and to cover most of the sensitive areas. Continued observation and good database management would be priority activities for facilitating the studies."*[49]

Against this background, the Cambodian National Council for Sustainable Development has indeed noted that: *"the outbreaks of some diseases such as malaria and dengue fever linked to climate change, will pose significant challenges to Cambodia. Similarly, sanitation and pollution of freshwater, e.g. during flood events are likely to increase incidences of cholera and other water-borne diseases."*[50]

The **coastal zone** of Cambodia comprises three provinces (**Sihanoukville, Kampot and Koh Kong**) and one autonomous city (Kep). The total area covered by these provinces and the autonomous city is about 17,237 km^2.

According to the Fourth Assessment Report by the IPCC, sea levels in the region are projected to rise under various scenarios: relative to 1980-1999, by 2090 the sea level will rise 0.18-0.43 m under a low emission scenario (SRES B1), 0.21-0.52 m under a medium emission scenario (SRES A1B), and 0.23-0.56 m under a high emission scenario (SRES A2). This predicts a 0.56-metre rise under the high emissions scenario (A2), which would cause permanent inundation of about 25,000 hectares of coastal Cambodia within 90 years[51].

For the purpose of this study, Koh Kong was the only province to be taken into account, as it covers over 64% of the coastal zone (11,160 km^2) and is the most vulnerable to the impact of sea-level rise according to a preliminary analysis of 1m-sea-level rise impacts on the Cambodian coastal zone. This is because most areas along the coastline in this province are low-lying. The above-mentioned 2010 study indicated that if the sea level rises by up to 1 m, about 0.4% (4,444 ha) of the area will then be under water (Table 10).

Table 10 shows the extent of land loss with a 1-metre rise in sea levels. If the sea level were to rise by only 0.5 m, smaller areas would go under water. However, if the global effort to reduce GHG emissions is not carried out (SRES A2 scenario), rainfall might increase under changing climate and the water flow in the **rivers** may also increase and, as a result, riverside areas might be exposed to more frequent flooding. Under the SRES A2 scenario, the rainfall in the main four river basins (Stung Metoek, Stung Russei Chrum, Stung Sala Munthun, and Stung Chhay Areng) in the Koh Kong province would increase by between 2% and 15% and this would translate into an increase in water flow in the four river basins of between 2 and 10 m^3/s. Under SRES B1, rainfall might decrease by between 2% and 5%, which may not have a significant impact on the river flow.

Lastly, climate change is expected to severely affect the quality of the country's current **infrastructure**. Flooding causes damage to road systems (pivotal in economic development to facilitate people's movements and the flow of goods and services both within and to the region), drainage structures, irrigation systems, and other connected infrastructure such as bridges and culverts, with significant economic loss.

43 Nguyen, H., Shaw, R. & Prabhakar S.V.R.K., *'Climate Change Impacts and Climate Change Adaptation Mechanisms'*, in Shaw R., Pulhin J. & Pereira J., *Climate Change Adaptation and Disaster Risk Reduction: An Asian Perspective – Community, Environment and Disaster Risk Management*. Emerald Group Publishing, 2010.

44 National Adaptation Plan Process in Cambodia (2017) General Secretariat of National Council for Sustainable Development (NCSD)/Ministry of Environment, Kingdom of Cambodia, Phnom Penh, p. 3.

45 Nguyen, H., Shaw, R. & Prabhakar S.V.R.K., *'Climate Change Impacts and Climate Change Adaptation Mechanisms'*, in Shaw R., Pulhin J. & Pereira J., *Climate Change Adaptation and Disaster Risk Reduction: An Asian Perspective – Community, Environment and Disaster Risk Management*. Emerald Group Publishing, 2010, pp. 69-70.

46 Ibid.

47 Ibid., pp. 69-70.

48 SRES scenarios are elaborated by ICCP and *"cover a wide range of the main driving forces of future emissions, from demographic to technological and economic developments. As required by the Terms of Reference, none of the scenarios in the set includes any future policies that explicitly address climate change, although all scenarios necessarily encompass various policies of other types. The set of SRES emissions scenarios is based on an extensive assessment of the literature, six alternative modelling approaches, and an 'open process' that solicited wide participation and feedback from many groups and individuals. The SRES scenarios include the range of emissions of all relevant species of greenhouse gases (GHGs) and sulfur and their driving forces."* Special Report Emissions Scenarios (SRES), Summary for Policy Makers, 2000, Intergovernmental Panel on Climate Change. ISBN: 92-9169-113-5, *https://www.ipcc.ch/site/assets/uploads/2018/03/sres-en.pdf*

49 Nguyen, H., Shaw, R. & Prabhakar S.V.R.K., *'Climate Change Impacts and Climate Change Adaptation Mechanisms'*, in Shaw R., Pulhin J. & Pereira J., *Climate Change Adaptation and Disaster Risk Reduction: An Asian Perspective – Community, Environment and Disaster Risk Management*. Emerald Group Publishing, 2010, p.71.

50 *https://ncsd.moe.gov.kh/dcc/department-climate-change*

51 National Climate Change Committee (2013).

TABLE 10: AREA OF LAND TO BE LOST BY A 1-METRE SEA-LEVEL RISE IN KOH KONG PROVINCE

Source: USAID, Assessment of Impacts of Development and Climate Changes on Natural Resources in Prey Lang Extended Landscape, 2020

N°	DESCRIPTION	AREA UNDER WATER (ha)
1	City/Town	297.6
2	Village	77.9
3	Swimming Beach	10.4
4	Marsh	32.5
5	Forest	181.8
6	Secondary Forest	3.5
7	Shrub	12.7
8	Mangrove	3114.3
9	Grassland	301.2
10	Rice paddy	29.6
11	Crops	9.8
12	Shrimp Farm	345.2
13	Others	46
	TOTAL	4462.5

3.3
CLIMATE VULNERABILITY IN CAMBODIA.

Atmospheric scientists investigating whether human influences are changing Earth's climate are faced with a significant problem: **How do we detect climate change?** We know that weather can be highly variable on a daily, weekly or even yearly basis, but climate, which is based on longer time scales, can be variable as well. If the last 30 years have been generally warmer worldwide than the previous 30 years, would this be solid evidence that the climate is changing in a particular direction? Or could this simply be a long-term, normal statistical fluctuation in climate? This is a critical and surprisingly difficult question for atmospheric scientists to answer. While computer models may predict climate change, citizens are unlikely to support significant social, economic and/or technological changes to slow the rate of change unless they are sure that the climate is truly changing, and not just experiencing random variability.

In order to start answering these questions, it is important to understand what constitutes normal **climate variability versus actual climate change**. It is possible to think of climate variability as the way climatic variables (such as temperature and precipitation) depart from an average range, shifting either above or below the average value. For example, the average maximum temperature in April in Phnom Penh may be 32 °C (averaged over the last 30 years), but each year, April's daily maximum temperature will be less than or greater than this long-term average value. Similarly, for any given year (e.g. 1998, as shown in FIgure 22), Phnom Penh's mean maximum temperature for July might be 41 °C, but the maximum temperature on any given day within that month will depart from the monthly average value. Although daily weather data depart from the climatic mean, we consider the climate stable if the long-term average does not significantly change.

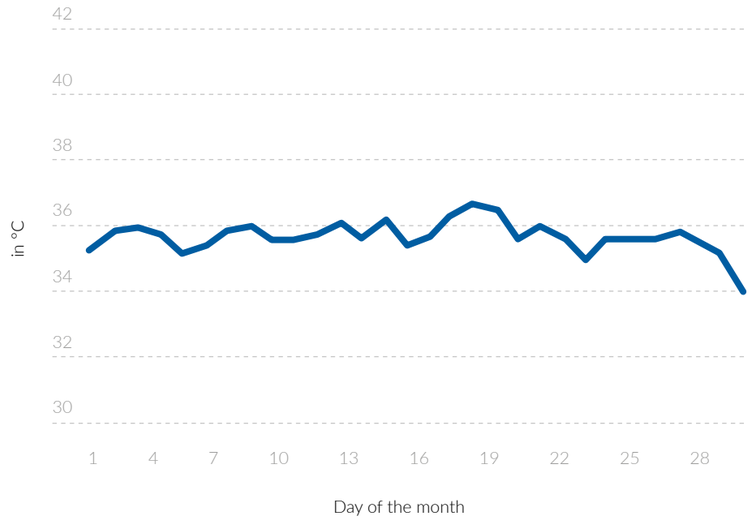
Climate change can be defined as a trend in one or more climatic variables characterized by a smooth continuous increase or decrease in the average value during the recorded period. As we look at 30-year average values, however, we also detect variability. For example, the 30-year average July temperature from 1971 to 2000 was lower by approximately 1 °C than that of 1941 to 1970.

FIGURE 22: MAXIMUM DAILY TEMPERATURE IN PHNOM PENH IN APRIL 1998

Source: Author's Calculation with data from MoWRAM

FIGURE 23: MAXIMUM AVERAGE TEMPERATURE IN PHNOM PENH IN APRIL 1997-2011

Source: Author's Calculation with data from MoWRAM



WEATHER OR CLIMATE CHANGE?

Weather refers to atmospheric conditions that occur locally over short periods of time – from minutes to hours or days. When we open the window we can see the weather, whether it is raining, cloudy or we are in the middle of a thunderstorm. Weather is the combination of temperature, rain, wind etc. experienced in a specific place and time.

Climate refers to the long-term regional or even global averages in temperature, humidity and rainfall patterns over seasons, years or decades.

SUDDEN-ONSET AND SLOW-ONSET CLIMATE EVENTS

Sudden-onset events refer to discrete weather events that occur suddenly. They have an immediate and clear impact and their duration does not exceed a few days. They mainly come in the form of floods, intense storms, typhoons etc.[52].

By contrast, **slow-onset events** refer to risks and impacts of climate change associated with long-term climate phenomena, which imply gradual environmental transformation such as rising temperatures, desertification and drought, loss of biodiversity, land and forest degradation, glacial retreat, ocean acidification, higher sea levels and salinization[53].

52 There are other sudden-onset natural events, such as earthquake or volcanic eruption, which are not immediately linked to climate change.
53 Introduced by the Cancun Agreement (COP16).

Does this mean that global climate change has started? Usually, when we read about global climate change, we think about global warming. In this case, however, a slight cooling was observed. Hence, it is very important to bear in mind that this is temperature data for one location only. If we had picked different years or even months to use as examples, we would likely have seen even different results. For instance, during the same period, the global average yearly temperature grew warmer, but at this location, for April, the average temperature was cooler. This seemingly contradictory example illustrates the effects selection of a sample point/area can have on time and space in determining climate trends.

Climatologists also grapple with the occurrence of 'extreme' events. These specific climate events depart from the average in some significant way. For example, days that exceed 40 °C in Phnom Penh may be considered 'extreme'. While any given summer day in Phnom Penh might be 40+ °C, under conditions of climatic warming, we would expect the frequency of such extreme days to increase. In other words, **the probability that a given summer day would exceed 40 °C is higher under climatic warming than in a stable climate.**

Both climatic averages and the probability of climate extremes are, by definition, statistical measurements based on probabilities, not certainties. This makes the absolute detection of climate trends difficult to predict and very difficult to measure, except by looking at long-term historical data. Without waiting decades to decide whether climate change is 'real' and whether we should respond, we are left to 'play the odds'.

3.3.1 CLIMATE VARIABILITY: EL NIÑO, LA NIÑA

Besides the global climate that can affect Cambodia's climate, the subregional climate also has a strong influence and includes a phenomenon known as El Niño Southern Oscillation (ENSO). This regional climate drives a swing between too wet (La Niña) and too dry (El Niño).

El Niño and La Niña are two opposing climate patterns that break normal conditions in the Pacific Ocean when the trade winds blow west along the equator, taking warm water from South America towards Asia. To replace that warm water, cold water rises from the depths – a process called upwelling. El Niño and La Niña can both have global impacts on weather, wildfires, ecosystems and economies.

El Niño is an oceanic and atmospheric phenomenon in the Pacific Ocean, during which unusually warm ocean conditions appear along the western coast of Ecuador and Peru, causing climatic disturbances of varying severity. The term was originally used to describe the warm southward current that appears in the region every December, but it is now reserved for occurrences that are exceptionally intense and persistent. These occur every three to seven years and can affect climates around the world for more than a year. Because a fluctuation in air pressure and wind patterns in the South Pacific accompanies El Niño, the phenomenon is known as the El Niño Southern Oscillation, or ENSO. During El Niño, however, the easterly trade winds collapse or even reverse. While the slight weakening of the winds causes a modest change in sea surface temperatures, the change in the wind and pressure increases. The warm water of the western Pacific flows back eastwards and sea surface temperatures increase significantly off the western coast of South America. As this happens, the wet weather conditions traditionally present in the western Pacific move to the east, and the arid conditions common in the east appear in the west. This brings heavy rains to South America and can cause droughts in Southeast Asia, India and southern Africa. Occasionally, El Niño's effect strengthens the easterly trade winds in the western equatorial Atlantic region, and as a result, an unusual cooling may occur in the El Niño Southern Oscillation.

Another climate calamity is **La Niña**, which is a coupled ocean-atmosphere phenomenon similar to El Niño. During a period of La Niña, the temperature across the equatorial Eastern Central Pacific Ocean is lower than normal by 0.5 °C. An episode of La Niña is defined as a period of La Niña conditions lasting at least 5 months. The name La Niña originates from Spanish, meaning 'the little girl', analogous to El Niño, meaning 'the little boy'.

La Niña – sometimes referred to as 'anti-El Niño' – is the opposite of El Niño, and the former's effects are often the reverse of the latter's, e.g. El Niño might cause a dry period in a certain area, while La Niña would typically cause a wet period in the same place. La Niña is often preceded by a strong El Niño. El Niño is famous for its potentially catastrophic impact on the weather along both the Chilean and Australian coasts.

Coupled with climate change, El Niño Southern Oscillation (ENSO) will intensify Cambodia's already fragile vulnerability, especially in the agricultural sector, since the ENSO events will increase the frequency of extreme weather. There is a great deal of literature on the impact of the 1997-98 El Niño event in Asia and other countries around the Pacific Ocean. Event impacts ranged from political unrest to infrastructure and agricultural consequences. Cambodia was also affected by the event but there is no study on its extent.

The main El Niño or La Niña events of the past are: El Niño in 1972/73, 1987/88, 1991/92, and **1982/83, 1997/1998 and 2015/2016** (the strongest); and La Niña in 1973/74, 1975/76, 1988/89, 1998/99, 1999/2000, 2007/08, 2010/11 and 2020/21[54]. The 2015/16 El Niño broke warming records in the central Pacific, represented by the NINO3.4 and NINO4 indices. At its peak in November 2015, the NINO3.4 SST anomaly reached an increase of 3.0 °C, breaking the previous record of 2.8 °C set in January 1983. Drought occurred in Cambodia from December 2015 to May 2016, with widespread water shortages during March-May 2016[55]. From June 2007 onwards, data indicated a moderate La Niña event, which strengthened in early 2008 and weakened by early 2009; the 2007-2008 and 2020-21 La Niña events were the strongest since the 1988-1989 event. The 2020-21 event started alerting from August 2020 and peaked in December 2020-January 2021. This event led to heavy rainfall in Cambodia and flooded more than 19 provinces, including Phnom Penh and especially Khan Dangkor.

3.3.2 UNDERSTANDING LOCAL DEVELOPMENT PLANNING

Flood and drought are the two extremes of climate calamities. While flooding is devastating, drought is known as one of the most significant natural disasters, even compared to earthquakes. Estimates based on general circulation models (CCSR and CSIRO) predict that Cambodia will have more rainfall, with uneven distribution and higher temperatures; likewise, people have perceived that the rainfall is shifting and is of shorter duration during the wet season. High **poverty rates** and drought, for instance, are closely associated in Kampong Speu and other Cambodian provinces. These environmental hazards are the key constraints in agricultural development in Cambodia (Chhinh et al., 2014).

In the National Strategic Development Plan (NSDP) Update 2019-2023, the Royal Government of Cambodia (RGC) recognized that although the agriculture sector is decreasing in terms of contribution to GDP and workforce – passing respectively from 30.7% of GDP in 2014 to 23.5% in 2018[56] and from 54.2% of the total workforce in 2010 to 37% in 2017 – the sector remains pivotal in addressing poverty and achieving the sustainable development goals (SGDs) of the 2030 Agenda.

In fact, the poverty rate is found to be higher in rural areas. The general census conducted by the National Institute of Statistics (NIS) of Cambodia in 2019[57] showed that more than 60% of Cambodians live in rural areas and the majority depend on subsistence paddy-rice farming. According to official estimates, the poverty rate in 2014 was 13.5%. Although the rate has decreased from that of 47.8% in 2007 (World Bank, 2020), the World Bank estimates that **around 4.5 million people remain near-poor and vulnerable to falling back into poverty when exposed to economic and other external shocks**[58].

In this context, about **90% of the poor live in the countryside** (World Bank; UNDP, 2020). Above all, estimates indicate that poverty has increased due to the COVID-19 pandemic (World Bank, 2020)[59]. In fact, the World Bank states that: *"more than 710,000 households (2.8 million people) received cash transfers during the Covid-19 in January 2021, while only 560,000 households (2.3 million people) were eligible in early June 2020. This implies that* ***at least 150,000 households*** *(0.5 million people)* ***have been identified as newly poor*** *between June 2020 and January 2021."*[60]

Moreover, as seen before, paddy rice in Cambodia is dependent on being **fed by rain**, and highly prone to drought. By 2018, the total paddy cultivated land was 3.34 million hectares (2.74 million hectares of rainy season paddy and 0.59 million of dry-season paddy), of which only 802,387 hectares of rice plantation was irrigated.

Based on the Ministry of Environment study in 2001[61], rice production loss due to flooding was more than 70% of total production in 1996-2000, while to drought it was about 20%[62]. According to the Cambodia National Adaptation Plan Process (2017), based on data from the past 20 years, losses in production were mainly due to flooding (about 62%) and drought (about 36%). Under future climate conditions, most of Cambodia's agricultural areas will be exposed to higher drought and flood risks. Under the high emission scenario, the wet-season rice yield (rain-fed) will decrease continuously until 2080, and could fall by up to 70% of current yield levels. Similarly, for dry-season rice (irrigated rice), yields could decrease by 40%. Under the low emission scenario, the predicted yield decrease is much less, ranging from 60% to about 20%[63].

With limitations in providing irrigation facilities, **drought** is found to be the second-ranking natural disaster after flooding in Cambodia.

Agricultural development does not only rely on irrigation facilities but also on other factors, especially **the biophysical and socio-economic factors** affecting individual farmers. For example, in overcoming unpredictable weather, while the vast majority of rice fields are rain-fed, experts recommend tackling drought resistance with high-yield varieties (HYV) when the cost of construction of irrigation is too high. In terms of biophysical factors, natural climate variability such as drought may affect farmers in the rain-fed sector. Soil quality, pest control and crop varieties are other aspects that may reduce rice yield. While different rice varieties will yield differently, there are prerequisites to maximize yield, such as proper fertilizer use, and water and weed management.

Socio-economic factors also play an important role in contributing to rice yield. Researchers have demonstrated that access to credit is critical when farmers are faced with shocks such as drought. A study found that farmers who had access to crop extension services experienced a production gain of up to 16.2% (Yu et al., 2011). They also found that the higher the literacy rate of the household head, the higher the yield, meaning that there is a strong correlation between general education in farmers and improving learning on farming practices.

Therefore, agricultural development in Cambodia should be based on an assessment of the agrarian context and the risks faced by farmers, and can be viewed through a risk and *vulnerability framework*. Risk and vulnerability assessment takes into account the main aspects farmers can use as guidance for agricultural development. Some development models posit that society has inherited a progression of vulnerability, including: 1) root causes (e.g. limited access to resources), 2) dynamic pressures (lack of education), and 3) unsafe conditions (livelihoods at risk). **When a high vulnerability is combined with exacerbated hazards (e.g. drought, floods), households will probably experience disaster.**

To ensure development coherence, assessment of risk of climate change and therefore of vulnerability and adaptation capacity across scales (households, communes, and agro-ecological zones) should be carried out to identify the factors that contribute to vulnerability as a whole, so that policy design is oriented from the bottom up.

3.3.3 CLIMATE CHANGE VULNERABILITY ASSESSMENT

In Cambodia the Ministry of Environment has adopted a vulnerability and adaptation assessment tool (V&A) based on the framework estabilished by the IPCC, in order to understand and estimate risks to climate change and identify intervention to strenghten resilience.

Vulnerability *"is the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude and rate of climate change and variation to which a system is exposed (exposure), its sensitivity, and its adaptive capacity".*[64]

Sensitivity *"is the degree to which a system is affected, either adversely or beneficially,*

54 *https://psl.noaa.gov/gcos_wgsp/Timeseries/Data/nino34.long.anom.data*

55 See also *http://www.fao.org/cambodia/news/rss/detail-events/zh/c/1207777*

56 Industry contributed about 34.4% and services about 42.1% in 2018.

57 National Institute of Statistics, Ministry of Planning (2020).

58 Please see *https://www.worldbank.org/en/country/cambodia/overview*. Last Updated: Apr 14, 2021.

59 Ibid.

60 Ibid.

61 Ministry of Environment (2001).

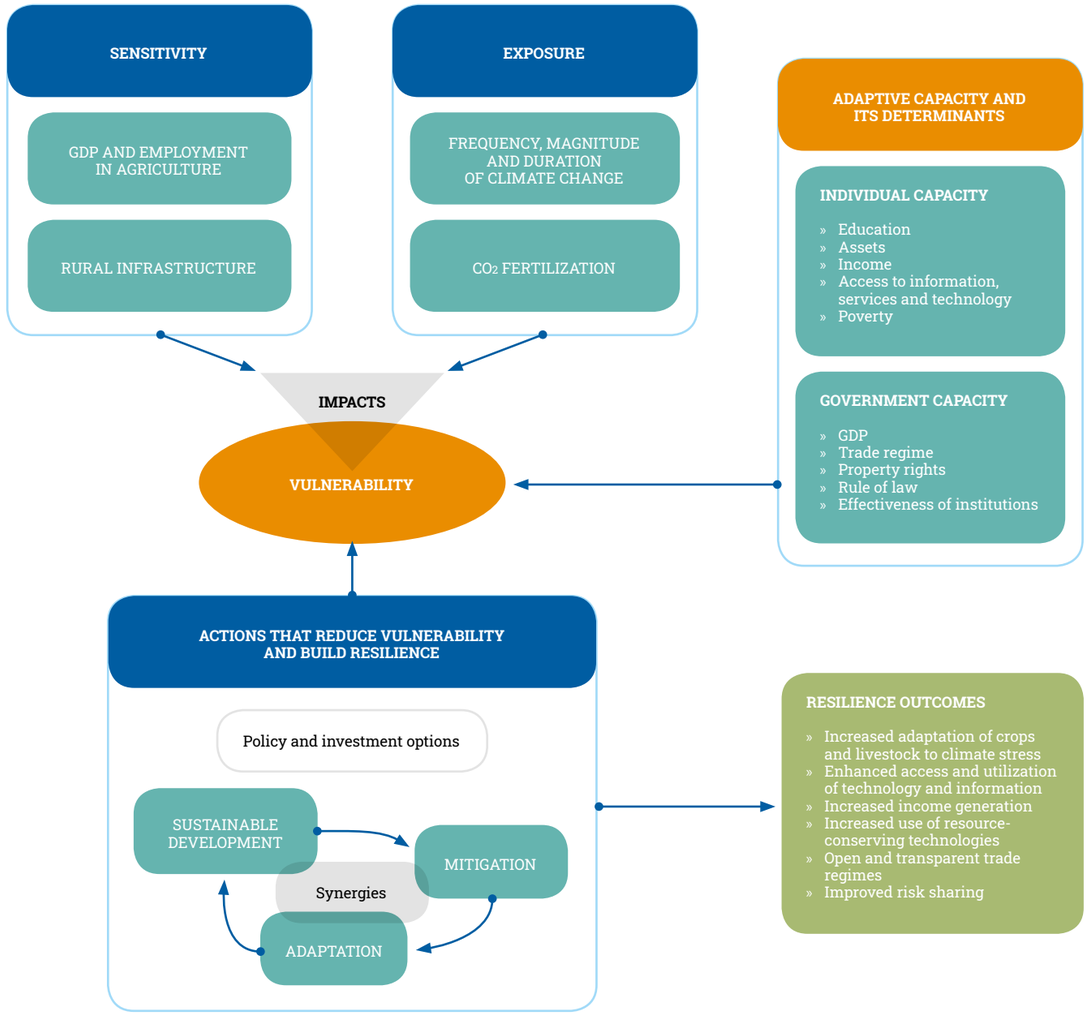
62 Chhinh et al. (2015).

63 General Secretariat of National Council for Sustainable Development - NCSD (2017).

64 IPCC. See https://archive.ipcc.ch/ipccreports/tar/wg2/index.php?idp=8.

FIGURE 24: CONCEPTUAL FRAMEWORK FOR BUILDING RESILIENCE IN THE AGRICULTURE SECTOR

Source: IPCC



by climate-related stimuli. Climate-related stimuli encompass all the elements of climate change, including mean climate characteristics, climate variability, and the frequency and magnitude of extremes. The effect may be direct (e.g. a change in crop yield in response to a change in the mean, range or variability of temperature) or indirect (e.g. damage caused by an increase in the frequency of coastal flooding due to sea-level rise)."[65]

Adaptive capacity is the ability of a system to adjust to climate change (actual or expected climate), including climate variability and extremes, to moderate or to avoid potential damage, to take advantage of opportunities, or to cope with the consequences. Figure 24 visually explains the concept of vulnerability.

The meaning of 'vulnerability' is not limited to the IPCC's definition but varies. In Cambodia, we define vulnerability as anything that increases the likelihood of a person suffering disadvantage or deprivation of any kind. In line with the RGC's policies and priorities, and conditions within the country, the measures of vulnerability chosen for this analysis are poverty, child malnutrition, educational needs, and vulnerability to natural disasters.

However, the National Social Protection Strategy (NSPS) of Cambodia defines **vulnerable people** as: (1) those who live below the poverty line; (2) those who cannot cope with shocks or have a high level of exposure to shock (people living under or near the poverty line tend to be the most vulnerable); and (3) infants and children, women, girls of reproductive age, food-insecure households, ethnic minorities, the elderly, the chronically ill, people living with HIV/AIDS and people with disabilities.

65 Ibid.

3.3.3.1 DEVELOPING INDICATORS

The indicators discussed here are mainly related to relative vulnerability, especially in agriculture and food security, due to the limited space and in order to gain a better understanding regarding the agricultural sectors. The 'climatic hazards', 'sensitivity', and 'adaptive capacity' indicators have been developed in the context of the agriculture and food-security sectors only.

CLIMATIC HAZARDS (EXPOSURE)

In Cambodia, the climatic hazards are temperature changes, flooding, drought, intense storms, and pest outbreaks.

Flooding is divided into two categories: seasonal flooding and flash floods. A **flood** is an overflow of an expanse of water that submerges land. A flood is also defined as a temporary covering by water of land not normally covered by water. In the sense of 'flowing water', the word flood may also be applied to the inflow of the tide. Flooding may result from the volume of water within a body of water, such as a river or lake, which overflows or breaks its banks, with the result that some of the water escapes its usual boundaries.

While the size of a lake or other body of water will vary with seasonal changes in precipitation and snowmelt, this event is not a significant flood unless such escapes of water endanger land areas used by humans, such as a village, city or another inhabited area.

Floods can also occur in rivers, when the flow exceeds the capacity of the river channel, particularly at bends or meanders. Floods often cause damage to homes and businesses if these are located in natural flood plains of rivers. While flood damage risk can be virtually eliminated by moving away from rivers and other bodies of water, since the start of history people have lived and worked near water to seek sustenance and capitalize on the gains of cheap and easy travel and trade by means of the water. That humans continue to inhabit areas threatened by flood damage is evidence that the perceived value of living near water exceeds the cost of repeated periodic floods.

A **flash flood** is a rapid flooding of geomorphic low-lying areas – washes, rivers, dry lakes, and basins. It may be caused by heavy rain associated with a storm, hurricane or tropical storm, or by melted water from ice or snow flowing from ice sheets or snowfields. Flash floods may occur after the collapse of a natural ice or debris dam, or a human structure such as a man-made dam, as happened in the Johnstown Flood of 1889. Flash floods are distinguished from typical flooding by a timescale of fewer than six hours. The subsequent temporary availability of water is often utilized by plants with rapid germination and a short growth cycle, and by specially adapted animal life.

A **drought** is an extended period of days, months or years when a region experiences a deficiency in its water supply. Generally, this occurs when a region receives consistently below-average precipitation. It can have a substantial impact on the ecosystem and agriculture of the affected region. Although droughts can persist for several years, even a short, intense drought can cause significant damage and harm the local economy.

This global phenomenon has a widespread impact on agriculture. The United Nations estimates that an area of fertile soil the size of Ukraine is lost every year because of drought, deforestation and climate instability. Lengthy periods of drought have long been a key trigger for mass migration and have played a key role in several ongoing migrations and other humanitarian crises.

A **storm** is any disturbed state of an astronomical body's atmosphere, especially affecting its surface, and strongly implying severe weather. It may be characterized by a strong wind, thunder and lightning (a thunderstorm), heavy precipitation, including ice (an ice storm), or wind transporting some substance through the atmosphere (as in a dust storm, snowstorm, hailstorm, etc.). Storms generally lead to significant negative impacts on lives and property, such as heavy rains, lightning, wildfires or vertical wind shear, which can cause airplane crashes. However, weather systems with significant rainfall can alleviate drought in the places they move through.

A **pest outbreak** is a rise in the live numbers of an insect species, resulting from an imbalance between births and deaths over a given period. The birth rate is influenced by many things, including the weather, quality of the food received by adults during development, and the degree of crowding by individuals. Crowding affects the birth rate partly by affecting food quality but also by more direct influences such as stimulating individuals' restlessness. The death rate is mainly altered by climate and natural enemies or disease; crowding may lead to cannibalism or starvation. Moreover, crowding may also lead to emigration, which, like death, leads to a reduction in the number of individuals in an area. Insects and mites can damage crops, while weeds might compete with field crops for nutrients and water, plants may choke irrigation channels or drainage systems, rodents might eat young plants and grain, and birds may eat seedlings or stored foodstuffs.

SENSITIVITY

Sensitivity is calculated as the amount of damage expected to be caused to a system by a particular event. When the agricultural sector experiences any of the above natural hazards, this affects several of its aspects, such as the area selected for planting, the harvesting area and yield, among others. We can also measure the changes in agriculture inputs in terms of increased labour forces, fertilizers and maintenance. Last but not least, changes in technology are also reflecting the sensitivity indicators in agriculture.

Besides the above physical sensitivity indicators, the Asian Development Bank (ADB) has highlighted that **agriculture** – which is the principal source of livelihood for more than 60% of the population of Asia and the Pacific – **is extremely vulnerable to climate change, and therefore billions of people in the region will be sensitive to the impacts climate change will have on agricultural production systems**[66]. In addition, disturbances in food

66 Asian Development Bank (2011). Vulnerability, Risk Reduction, and Adaptation to Climate Change. Phnom Penh.

supply will have implications for the wider population, who are net food purchasers. Moreover, **global food security will be sensitive to the impacts of climate change in Asia and the Pacific**, a region that is expected to account for one-third of total global cereal demand and two-thirds of total meat demand over the next several decades, and accounts for significant net cereal exports.

Rural population density (people per km² of arable land), irrigated land (% of cropland), agriculture (% of GDP), agriculture employment (% of total employment), dietary energy consumption (kcal/person/day), and proportion of undernourished people in the total population present important indicators for use in assessing the vulnerability of the agriculture sector to climate change in the countries of Asia and the Pacific[67].

ADAPTIVE CAPACITY

Adaptive capacity is the capacity to cope with or recover from stress. Generally, the adaptive capacity is the index of different aspects:

- biophysical vulnerability index (e.g. the severity of soil degradation, depth of soil cover, and groundwater scarcity);
- social vulnerability index (levels of human and social capital as indicated by literacy rates and gender equity, and alternative economic activities as indicated by the proportion of farmers and agricultural labours);
- technological vulnerability index (irrigation rate, composite index for infrastructure development).

It has been noted that the vulnerability of subsistence farmers in developing Asia is mostly associated with their physical location in the tropical area, poor socio-economic conditions, and policy distortions limiting their capacity to adapt to climate change. We could also state that the impacts of climate change in the region could be much smaller than the impact of socio-economic development.

Agricultural adaptation may be grouped into two broad categories. The first includes the measures to adapt agriculture to changing climate through stress-tolerant crops, varieties and cropping systems. The second features the option to amend or adapt the biophysical environment through irrigation, water conservation, terracing, and so forth.

3.3.3.2 DATA ANALYSIS

ANALYTICAL FRAMEWORK

Vulnerability assessment analysis depends on the vulnerability framework. In this chapter we set out where to find the functions of exposure (to the hazard), sensitivity (reducing or increasing yield), and adaptive capacity (having access to credit, or livelihood diversifications, agricultural adaptation, etc.), all of which have been based on the IPCC framework. This concept can be expressed in a mathematics formula as: **Vulnerability = f(exposure, sensitivity, adaptive capacity).**

Figures 25 and 26 (p. 53) provide more details on the composite indicators of sensitivity and adaptive capacity.

WEIGHTING AND INDEXING

As the above figures shows, to gain the indices (0 to 1), the weight of each determinant must be provided. In the case study regarding adaptive capacity, the weights provided were socio-economics 0.5, technology 0.25, and infrastructure 0.25; and in the case of sensitivity assessment, they were natural 0.28, human 0.24, infrastructure 0.25 and livelihood 0.23. The weights can be decided on from focus group discussion, literature, or expert judgment. However, other approaches can be used to gain the adaptive capacity of any system.

STRENGTHS AND LIMITATIONS OF INDICES

An index, or indicator, is a number representing the value of an aggregate of goods, services, wages or other measurable quantity in comparison with a reference number for a previous period. Composite indicators (CIs) can be used to compare country performance and are increasingly recognized as a useful tool in policy analysis and public communication.
The number of CIs in existence around the world is growing year by year. They provide simple comparisons of countries yet can be used to illustrate complex and sometimes elusive issues in wide-ranging fields, such as the environment, economy, society, or technological development.
It is often easier to allow data users and the general public to interpret composite indicators than to ask them to identify common trends across many separate indicators, and thus CIs have proven useful in benchmarking country performance.
However, they can send misleading policy messages if they are poorly constructed or misinterpreted. Their 'big picture' results may invite users (especially policy-makers) to draw simplistic analytical or policy conclusions. Composite indicators must be seen as a means of initiating discussion and stimulating public interest. Their relevance should be gauged concerning the constituencies affected by the composite index.

67 Asian Development Bank (2011). Vulnerability, Risk Reduction, and Adaptation to Climate Change. Phnom Penh.

FIGURE 25: SUGGESTED WEIGHTS FOR SENSITIVITY ASSESSMENT

Source: Yusuf et al., 2010

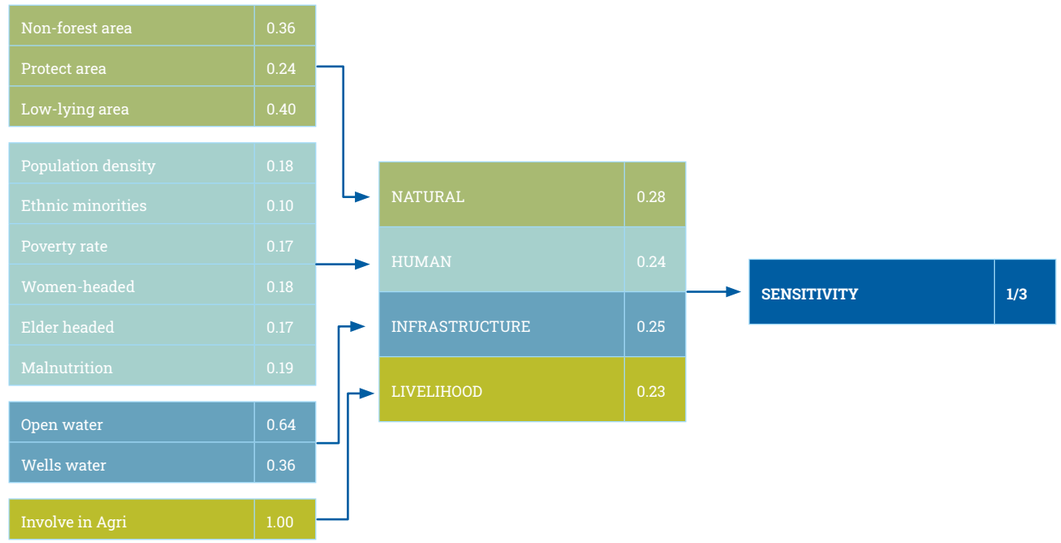
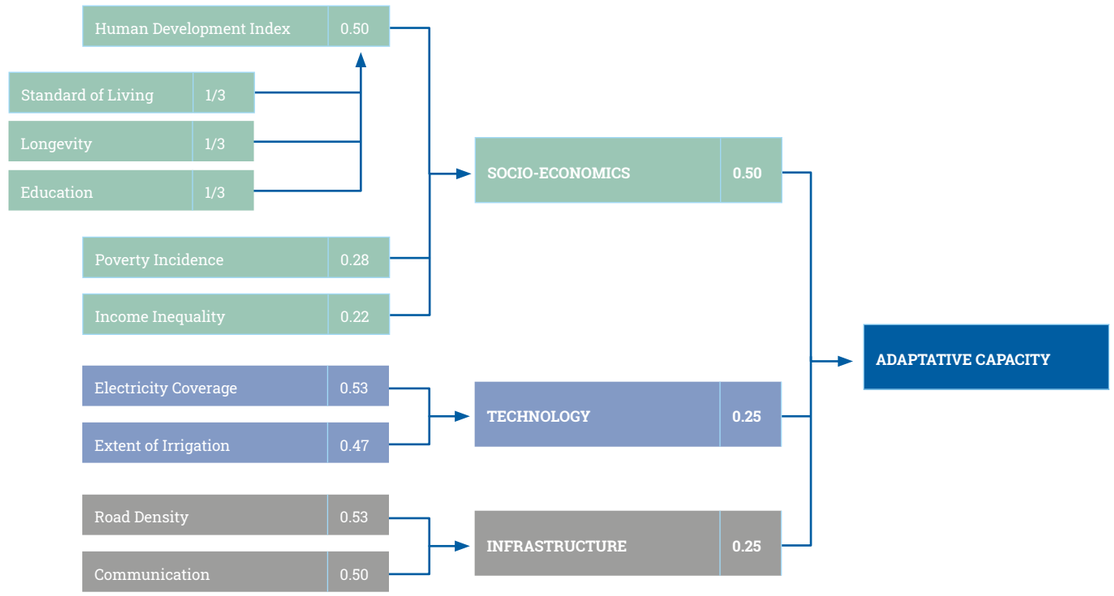


FIGURE 26: SUGGESTED WEIGHT FOR ADAPTIVE CAPACITY

Source: Yusuf et al., 2010



To obtain the overall index of climate change vulnerability to flash floods (as shown in Figure 27), each of the normalized indicators of exposure (multiple hazard risk exposure), sensitivity (human and ecological), and adaptive capacity were averaged. To identify the vulnerable areas, the regions were ranked according to the index and the list was divided into four equal parts. Those provinces/districts falling in the fourth quartile were considered the vulnerable areas, and further classified as mildly vulnerable, moderately vulnerable or highly vulnerable, as in Figure 27.

By following the same process, we calculated drought vulnerability, as in Figure 28. The compositions of exposure, sensitivity and adaptive capacity identify vulnerability to each kind of adverse slow-onset or sudden-onset climate change event, such as flash floods, drought etc.; these in turn contribute to overall vulnerability (Figure 29, p. 55).

FIGURE 27: MAPS OF FLASH FLOOD RELATIVE VULNERABILITY (top), FLASH FLOOD HAZARD (bottom left), FLASH FLOOD SENSITIVITY (bottom middle), AND FLASH FLOOD INVERSE ADAPTIVE CAPACITY (bottom right)

Source: Chhinh et al., 2014

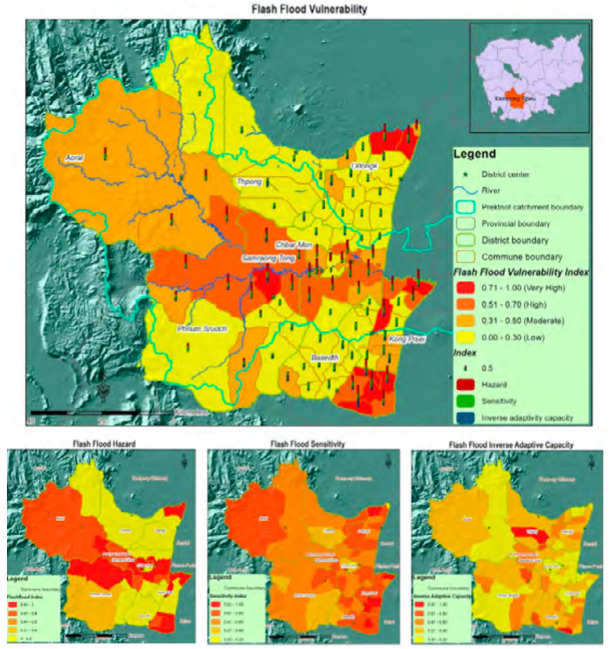


FIGURE 28: MAP OF DROUGHT VULNERABILITY

Source: Chhinh et al., 2014

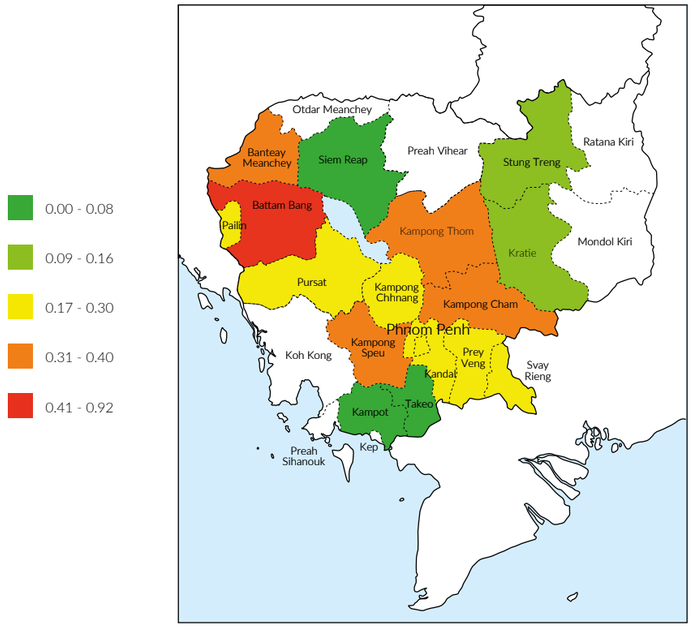
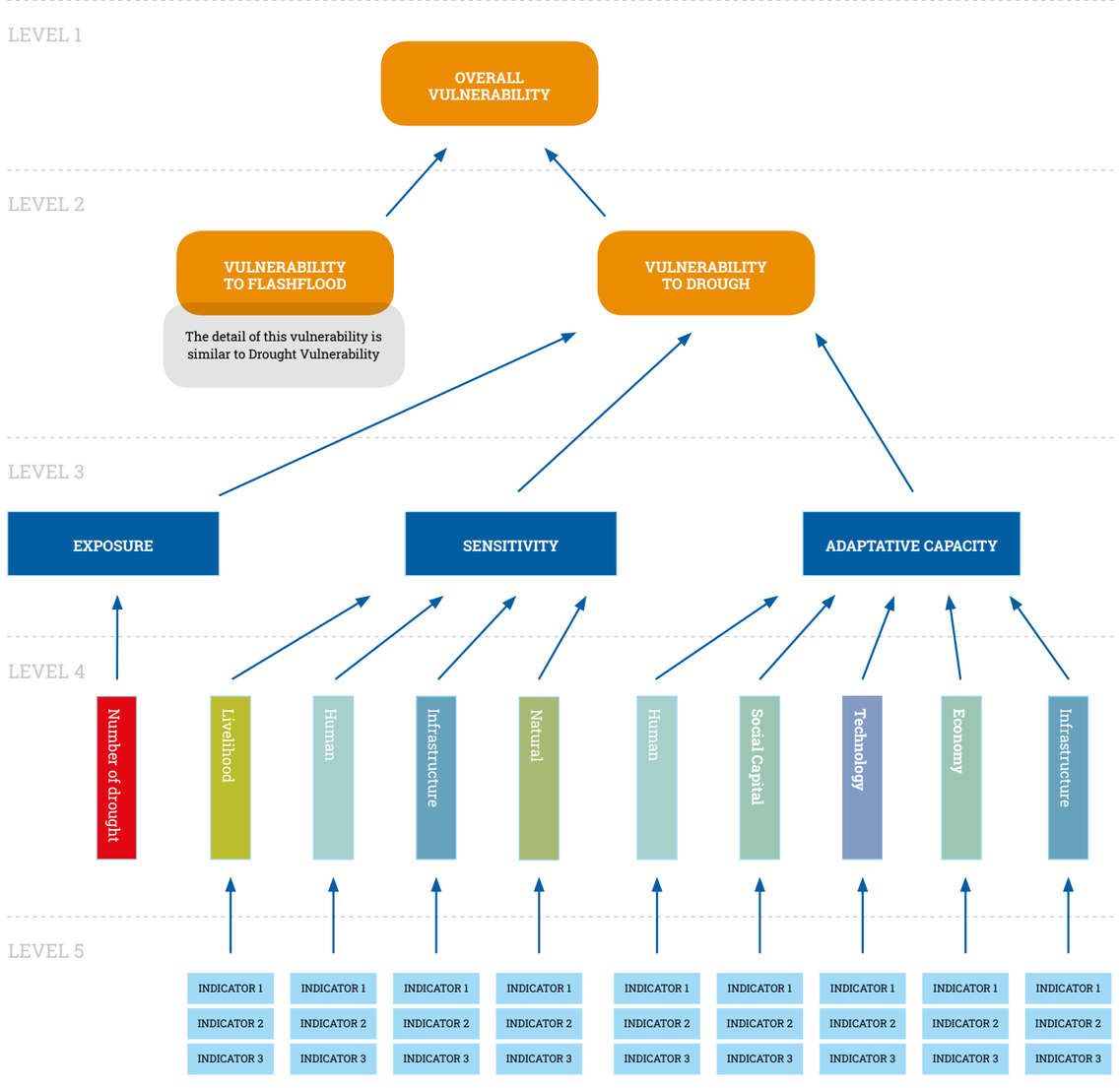


FIGURE 29: PROCESS TO IDENTIFY VULNERABILITY

Source: Yusuf et al., 2010



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4

INTERTWINING MIGRATION, ADAPTATION TO CLIMATE CHANGE AND RESILIENCE

INTRODUCTION

This chapter, focusing on three selected provinces – Siem Reap, Battambang and Koh Kong –, builds on the issues explored in the previous sections linked with migration, vulnerability and climate change, to reflect on whether migration is positive as an adaptation measure. The strong connection between migration, economy and climate conditions in the Cambodian rural context opens to considering the role that social capital and an increase in economic opportunities – especially from a gender perspective – can play in strengthening community resilience.

4.1 DIMENSION OF MIGRATION IN THE KEY SELECTED PROVINCES

According to the last national census in Cambodia in 2019, the percentage of migrants was 21.5%, with migrants constituting 35.3% of the population in urban areas and 12.4% in rural areas. Around 60% of migrants of both sexes have previously resided in another province. This indicates that current migration movements are predominantly inter-provincial (while 37.1% occurs within the same province). Only 4.1% of the population has migrated outside Cambodia.

Overall, migration towards and within the urban areas covers more than 64% of movements:

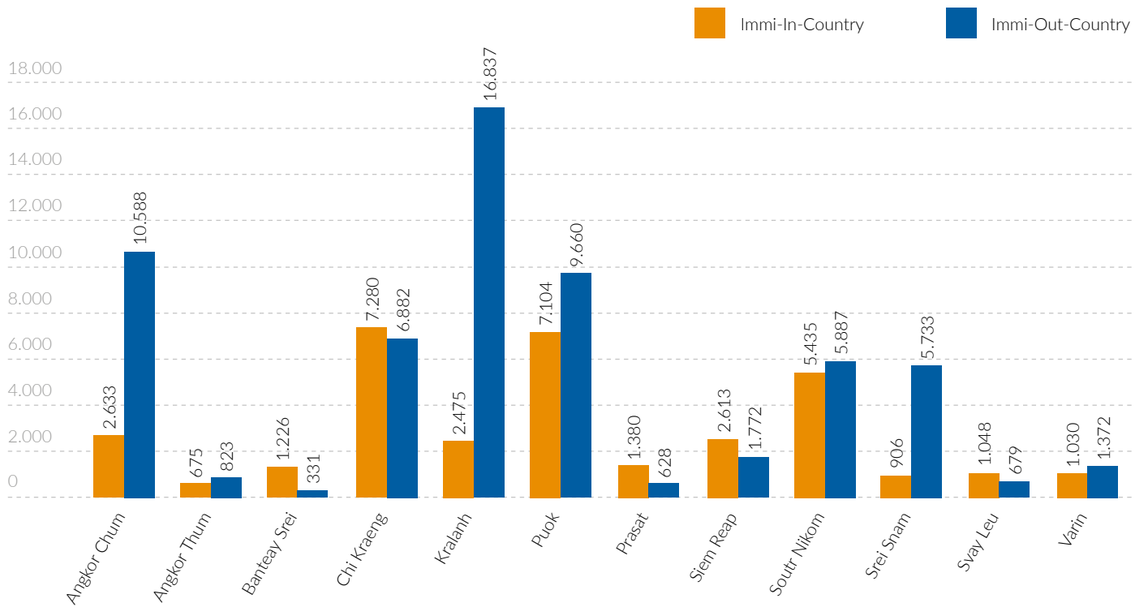
- 29% rural to rural,
- 34% rural to urban,
- 30% urban to urban
- 7% urban to rural.

Over 30% of people move because of work, and 58% for family reasons, to follow others who have already migrated or to marry.

The level of registered migration in the three provinces of Cambodia bordering with Thailand – Siem Reap, Batttambang and Koh Kong – is relevant, especially if we consider that the majority of migrants are irregular and may not be recorded in the figures. Especially in the north-western

FIGURE 30: SIEM REAP - NUMBER OF MIGRATIONS INSIDE AND OUTSIDE CAMBODIA TO SEEK WORK

Source: adapted from Provincial Department of Planning (PDP), 2019



provinces, migration abroad towards Thailand is preferred to in-country movement.

SIEM REAP PROVINCE

Siem Reap consists of 12 districts. Among these, seven are associated with Tonle Sap Lake, where people's livelihoods are varied through both natural resource-dependent and diverse livelihoods. As of 2018[68], there were 232,220 families in the province, with a total population of 1,096,248. The 18-60 age group accounted for 52.84%. The total number of people from active age groups migrating within Cambodia was 33,805 and 61,192 outside the country.

BATTAMBANG

Battambang consists of 15 districts (and one city). Total families as of 2018[70] were 276,452, with 1,312,051 as its total population. 52.18% are people aged 18-60 years old. 68,275 people from the active ages groups are reported to have migrated within the country, while 109,477 have migrated abroad. Battambang is one of the war-torn provinces and many people are migrants from other provinces or returnees from former refugee camps. In some areas, a lack of access to land remains one of the factors for migration. Through the Kamping Pouy irrigation scheme, many quality paddy fields were bought up by wealthy families from the towns because local people often needed money urgently due to internal conflict and family sickness (Pilgrim et al., 2012).

KOH KONG PROVINCE

Koh Kong is one of the four coastal provinces in Cambodia. Above all, these coastal zones are seen as sources of growth for the country, with Sihanoukville taking the lead with the Belt and Road Initiative (BRI)[71]. Koh Kong and Kampot are also seen as connected to these trends. Koh Kong is rich in natural resources, has more available mangrove forest than other coastal provinces as well as currently the largest hydropower development. The town is described as the sleeping town waiting for growth in term of tourism, industrialization, special economic zones, fish production sites and natural conservation areas.

68 Provincial Department of Planning (PDP), 2019.

70 Provincial Department of Planning (PDP), 2019.

71 China's transcontinental long-term policy and investment program which aims at *"infrastructure development and acceleration of the economic integration of countries along the route of the historic Silk Road"* (see *https://www.beltroad-initiative.com/belt-and-road/*).

CHONG KNEAS VILLAGE

Chong Kneas is known as the 'floating village' since all its residents are seasonal nomads who live on small houses built on floating platforms allowing their homes to rise and fall with the water levels over the year. Originally from another mooring down the river, the residents float along with the current until they settle on a new home location[69].

69 International Organization of Migration, and Asian Research Centre for Migration (2019).

FIGURE 31: BATTAMBANG - TOTAL MIGRATION (IN AND OUT OF CAMBODIA) FOR EACH DISTRICT

Source: adapted from Provincial Department of Planning (PDP), 2019

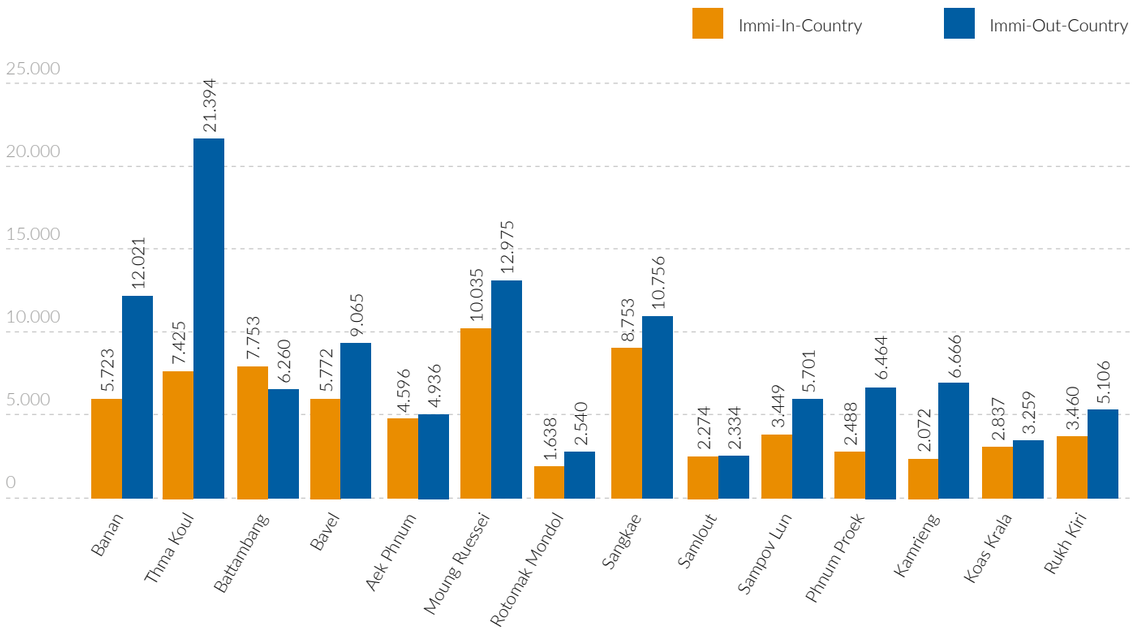
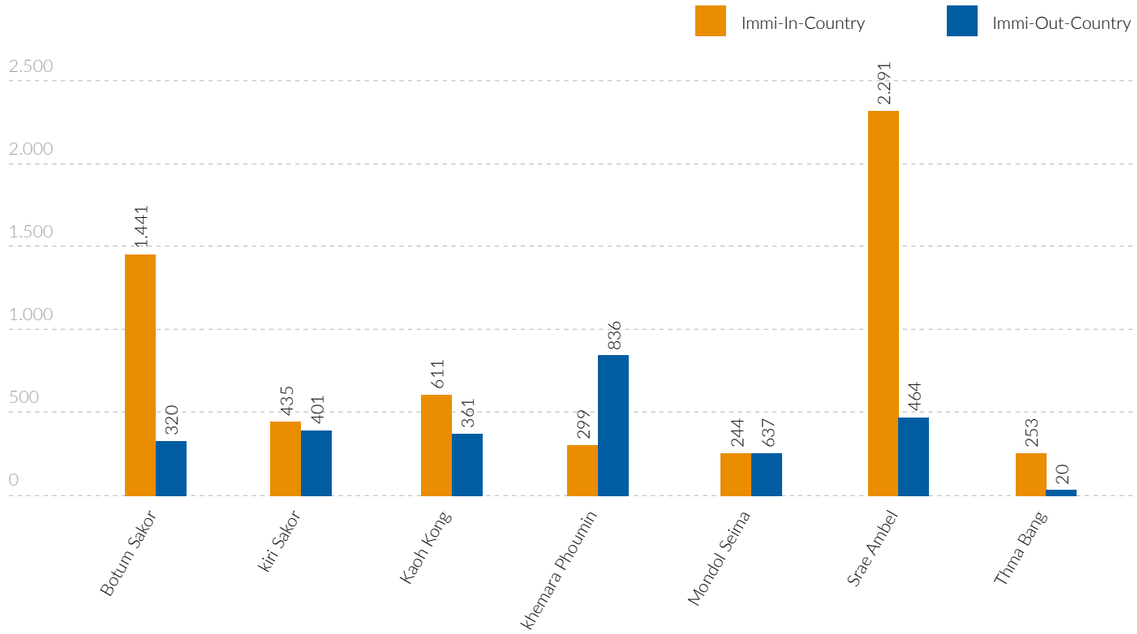


FIGURE 32: KOH KONG - NUMBER OF MIGRANTS MOVING WITHIN AND OUTSIDE CAMBODIA FROM EACH DISTRICT

Source: adapted from Provincial Department of Planning (PDP), 2019



As of 2018[72], the province still had a small population, with 29,894 families and a total population of 136,675 spread over seven districts (including one town). Migration for work in the 18-60 age group was reported as 5,574 within the country, with 3,039 people going abroad.

Koh Kong and Kep, another coastal province, are seen as examples of positive migration. Koh Kong is the province of marine fishing, fruit tree plantations (mango, rambtan and pineapple), casinos, tourism, and flourishing businesses linked with Thailand. Krong Keab attracts migrants with marine fishing, tourism, some rice cultivation, and fruit tree plantations (durian).

4.2 MIGRATION DRIVERS

Based on the literature and a review of documentation, we are aware of several factors acting as key drivers for the people migrating from villages in provinces in the Tonle Sap Lake area.

First and foremost, migration is driven by the demand side of economic growth, this being the shift away from the agricultural base of **rice cultivation, fishing or rice-fish businesses**. These forms of livelihood have been constantly reported as **vulnerable to floods and drought**. The out-migration has been pushed with the introduction of **garment industries, and tourism, construction and agricultural jobs in other provinces and across the border**. These pulling factors are also facilitated by communication and infrastructure development for regional connectivity.

Second is the shift in the supply side for agricultural inputs, the **decline in natural resource dependency**, and the increased population with income opportunities from other places (Ballard et al., 2007).

Third is the **demand for labour and work across the border**, while fourth is the **need to pay back debt** or an individual's pursuit of **bright lights** in the urban areas or far beyond the country (Parsons, 2016).

72 Provincial Department of Planning (PDP), 2019.

FIGURE 33: INTERNAL MIGRATION IN CAMBODIA A CASE STUDY OF PUSH-PULL FACTORS OF MIGRATION INTO PHNOM PENH

Source: adapted from Walton, Marcia 2008

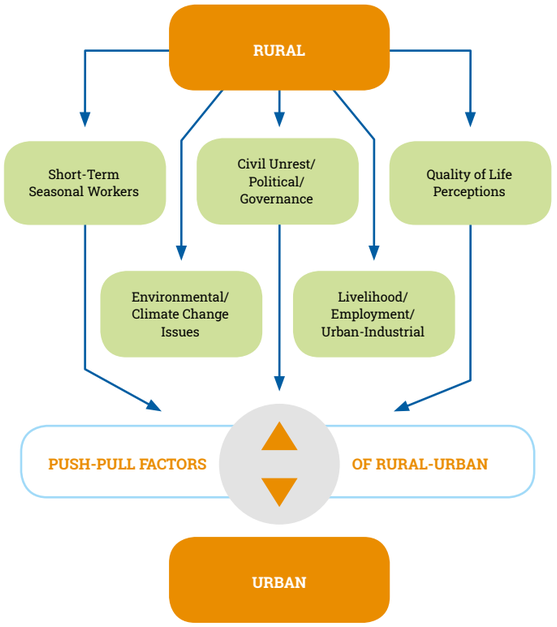


FIGURE 34: INTERNAL MIGRATION IN CAMBODIA A CASE STUDY OF PUSH-PULL FACTORS OF MIGRATION INTO PHNOM PENH

Source: adapted from Haapala, Ulla 2003

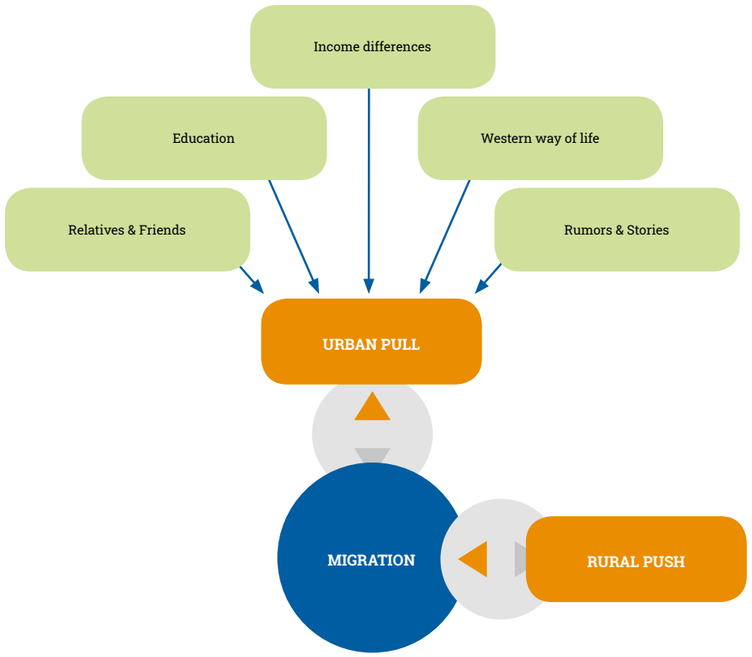


FIGURE 35: MAIN OCCUPATION FOR CAMBODIAN MIGRANT WORKERS FROM BATTAMBANG, BANTEAY MEANCHEY AND SIEM REAP IN THAILAND

Source: Vhuta et al., 2016

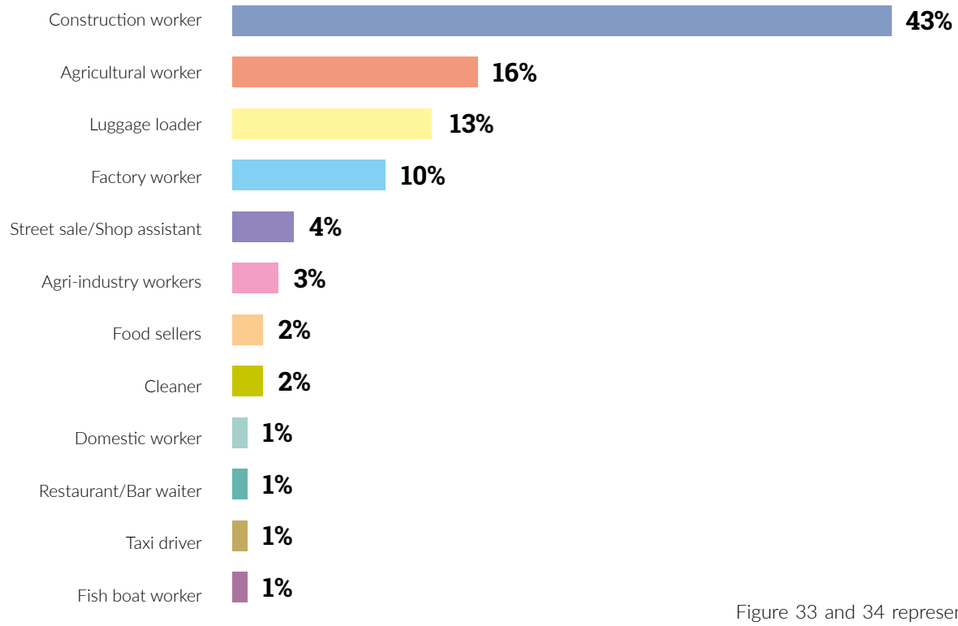


FIGURE 36: CAMBODIANS' REASONS FOR MIGRATING TO THAILAND: PEOPLE FROM BATTAMBANG, BANTEAY MEANCHEY AND SIEM REAP

Source: Vhuta et al., 2016

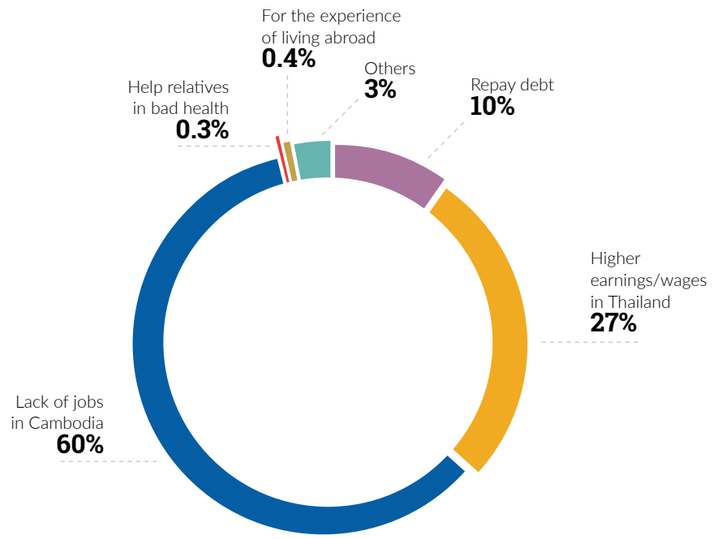


Figure 33 and 34 represent the dynamics of different push-pull factors in rural-urban migration within Cambodia and towards the rest of Southeast Asia.

Reasons driving international migration from the north-western provinces were investigated in the already mentioned study by CDRI and GVC[73] conducted in the three provinces of Battambang, Banteay Meanchey and Siem Reap. A lack of jobs in Cambodia and high earnings/wages in Thailand motivated migration decisions for 87% of those interviewed.

There was a very low level of education in about 65% of cases (no schooling or only completion of primary school) and just 28% finished lower secondary school.

Data on occupation in Thailand confirms the trend of Cambodian migrants to Thailand at a national level (see section 2.1) with 43% of migrants involved in the construction sector, 16% in agriculture and 3% in agro-industry (see Figure 35).

Employment in construction and other services confirms the urban destination for a large number of Cambodian migrants to Thailand.

73 Vutha et al. (2016).

4.3 CLIMATE, MIGRATION AND VULNERABILITY

4.3.1 ENVIRONMENTAL SHOCKS/STRESS AND MIGRATION

A number of studies indicate the negative impact of climate change on the livelihood of agricultural villages in the Tonle Sap basin due to an increase in temperatures, the frequency of extreme weather events such as floods and droughts, and a shift in rainfall patterns. These have all resulted in negative effects in crop production, which in turn increase food insecurity and poverty in the most vulnerable households. According to one study carried out by IOM in 2016[74], migration is one of the coping strategies adopted to overcome damage and losses occurring from and linked to climate variability. Migration is viewed as an integrated crucial path in the income-generating strategy to diversify sources of income and weak risk in a context where the economic and environmental factors are closely intertwined drivers.

Other research conducted by Bylander (2016) analysed the relationship between environmental shocks or stress and international migration. Despite its limitations, the study points out an association between migration to Thailand and drought reported in the previous year, poor rainfall reported in the previous rainy season, and household crop loss during the previous harvest, and these factors deserve further investigation.

4.3.2 FROM SEA TO CITY

The study by Asif (2019) on three coastal fishing villages in Koh Kong underlines the correlation between people's migration from the three villages and climate change impact. Most of the villagers interviewed in the research, whether they lived on the island or the mainland, resided in houses made of wood with metal roofing. The map below shows the study sites: the villages of Peam Krasop, Koh Sralao, and Koh Kapi, all inside conservation areas (Peam Krasop wildlife sanctuary and Koh Kapi Ramsar Site).

The migration rate in all three villages was in the 44%-61% range and included both national and international (Thailand mainly) destinations. The study showed that migrants from the coastal fishing villages said their main motivation for migrating involved either employment or higher education. Employment is the primary reason for both males and females migrating to Koh Kong town.

It emerged that small coastal fishing communities have to cope with an increase in intense storms and rising sea levels. Fishermen's lives at sea are constantly faced with risks and something goes wrong sooner or later, such as the boat leaking, losing the fishing net, or an unpredictable life-threatening storm – these are key challenges. Drawing on these case studies, the author emphasized the importance of approaching urban planning not only in terms of infrastructure – such as the water supply developed by private sectors – or infrastructure challenges and climate risk, but also in social effects such as the welfare impacts of migration from rural to urban areas. Building social capital and small businesses among fishermen and small coastal communities remains one of the adaptation strategies against climate change and migration.

The study promoted by IOM (2016) outlined similar problems for the fishing villages in the Tonle Sap basin. Heavy rains and severe floods, sudden strong winds, and more common and longer droughts, coupled with the significant rise in temperatures, and more frequent cases of lightning resulted in destroyed houses and assets and reduced fish numbers (due to the higher temperatures). Migration (internally towards Phnom Penh and externally to Thailand and Korea) is one of the coping strategies to respond to the decrease in economic opportunities due to different and multifaceted factors, including climate change.

FIGURE 37: MAP SHOWING THE STUDY VILLAGES (Peam Krasop, Koh Sralao, Koh Kapi) IN KOH KONG

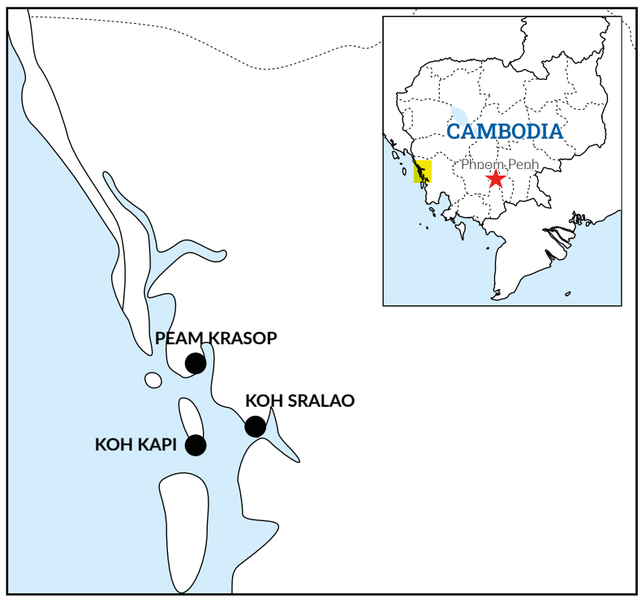


TABLE 11: KOH KONG - MIGRATION FROM THREE FISHING VILLAGES

Source: adapted from Asif, 2019

LOCATION	VILLAGE SIZE (# of households)	LIVELIHOOD	PREVALENCE OF MIGRATION	DESTINATION OF MIGRANTS
Peam Krasaop	147	Fishing (82%); unemployed (12%); miscellaneous (6%)	8 out of 18 (44%)	Phnom Penh (50%); Thailand (50%)
Koh Sralao	200	Fishing (65%); farming (10%); miscellaneous (25%)	19 out of 31 (61%)	Koh Kong Town (28%); Phnom Penh (28%); Thailand (15%); Sihanoukville (13%); Kampung Cham (5%); Kampot (5%); Preah Veng (3%); Kandal (3%); Malaysia (3%)
Koh Kapic	100	Fishing (62%); fish farming (6%); retired (6%); miscellaneous (26%)	15 out of 32 (47%)	Phnom Penh (24%); Thailand (24%); Koh Kong Town (19%); Kampung Speu (5%); 3% each from: Lam Dam village, Battambang, Siem Reap, Sihanoukville, Takeo, Kampung Treach, Kampot, Srey Ambal.

74 Oudry, G., Pak, K. & Chea, C. (2016). *Assessing Vulnerabilities and Responses to Environmental Changes in Cambodia*. International Organization for Migration (IOM), Phnom Penh, 2016

4.4 IS MIGRATION A STRATEGY FOR ADAPTING TO CLIMATE CHANGE IN CAMBODIA?

Migration can be considered as a continuum, moving from a mere response to the need to survive (forced migration) to a proactive initiative where households assess all the available options to adjust to hazards and choose migration consciously, as more fitting to spread risks, diversify livelihoods and increase income (adaptation). In this dimension, when elements of anticipation and planning by migrants can be detected, and households succeed in mediating environmental risks, then migration may be considered an adaptation instrument[75].

Following the reflection proposed by Vinke (2020) to understand whether migration is a strategy for adapting to climate change for Cambodian households, it could be useful to consider the following factors:

- as previously reported, in Cambodia migration is linked to a complex of reasons, including environmental ones. Coping strategies to face climate events resulting in reduced livelihoods and damage to assets vary, and rarely is migration the first choice. In many cases, especially for the poor, it is *"more linked to short-term coping rather than anticipatory adaptation"*;
- as explained in Chapter II, remittances improve consumption patterns and food security as well as investments in human capital such as education and health. However, a lack of parental care due to migration can jeopardize final results. Moreover, productive investments seem not to be directly generated by remittances if not accompanied by programmes to build the capacities of the people left behind and the returnees. Lastly, financial challenges seem to affect a large majority of returnees and their reintegration capacity, pushing them into a continual cycle of migration;
- negative immaterial effects linked to unsafe migration, such as psychological trauma or physical violence and sickness are not rare (involving 66% of migrants, as results from the study by ILO, IOM and Rapid Asia, 2017), and these can annul sometimes positive gains in terms of income. In many cases, migration results in a reduction in ecosystem services, provoking further negative environmental consequences (maladaptive migration). Furthermore, in the case of Cambodia, especially for the most vulnerable families, *"existing structural inequalities can reproduce socio-ecological vulnerabilities, which enable some to migrate while forcing others to remain in areas of risks"*[76]. Migration can heighten the marginality of those families who cannot rely on at least one member as being able to migrate (and his/her remittances), and this context is generally linked to households with high vulnerability (widow head of family, members with disability, extremely poor people who can afford neither the cost of migration nor to contract debts);
- even though the Cambodian government is intensifying its commitment towards sustainable development and adaptation, the negative impacts of climate change are exacerbated by the still lacking infrastructure such as small, medium and large irrigation systems, or high dependence on agriculture activities coupled with scarce opportunities for income differentiation in rural areas, or an effective social protection system, and other structural gaps and shortages in adaptation measures. Migration is therefore the individual's response to more general systemic problems that need to be tackled.

In conclusion, even if migration can be an opportunity for Cambodian households, it does not necessarily lead in all circumstances to increased adaptive capacities, but can also have negative consequence in terms of human development, which in turn can foster vulnerabilities. Moreover, in a more general perspective, if Cambodian migration continues to be characterized by labour exploitation in large numbers, then it will fuel an extractive economic system oriented to environmental and equality detriment, worsening future scenarios in a vicious cycle.

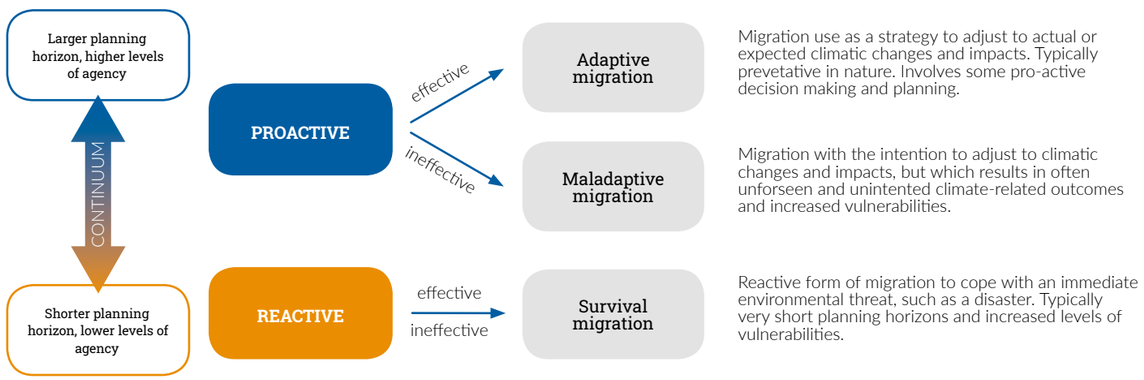
In this context, intervention at different levels to mitigate the negative effects of migration and to enhance its potential as an adaptation strategy against poverty and climate change should be fostered.

75 Migration as Adaptation?, Vinke, K., Bergmann, J., Blocher, J., Upadhyay, H. & Hoffmann, R., in Migration Studies, Volume 8, Issue 4, December 2020, pp. 626–634, *https://doi.org/10.1093/migration/mnaa029*.

76 Ibid.

FIGURE 38: CONCEPTUAL SCHEMA OF CLIMATE MIGRATION OUTCOMES

Source: Vinke et al., 2020; based on Vinke, 2019



4.5 STRENGTHENING RESILIENCE

In the case of Cambodia, the conceptual representation of migration within a system for adapting to climate events, as proposed by McLeman (2014) and set out in Figure 39, may be useful to understanding how the adaptation measures can be shaped, while considering the aim to enhance the positive contribution that migration can bring. The model starts from the framework for the drivers of migration[77] and adapts to different separate macro (relating to systemic factors), meso (community and specific population) and micro (households) levels to highlight that adaptation measures can be inserted at different stages, each causing impact on the other levels. This could mean that, for instance, if investments have been made at the macro level, such as in infrastructure or alert-based prevention systems, when an adverse climate event occurs, this measure can cope with or reduce potential damage, avoiding it affecting the community and, in turn, household decisions. It also means that if the adaptation strategy is inadequate at a higher level, it implies that decisions should be taken at a lower stage, downscaling responsibility.

In addition, the model includes a range of aspects related to migration, such as migration into the community from other territories and by returnees, as well as different grades of willingness behind the migration decision (including forced migration and trapped people unable to migrate even if it would be their best option).

Lastly, the diagram underlines the role that capital – social, economic/financial or human – can have in catalysing the transmission of an action from one level of the system to another, and therefore influencing decisions to migrate when adverse climate events/disasters occur.

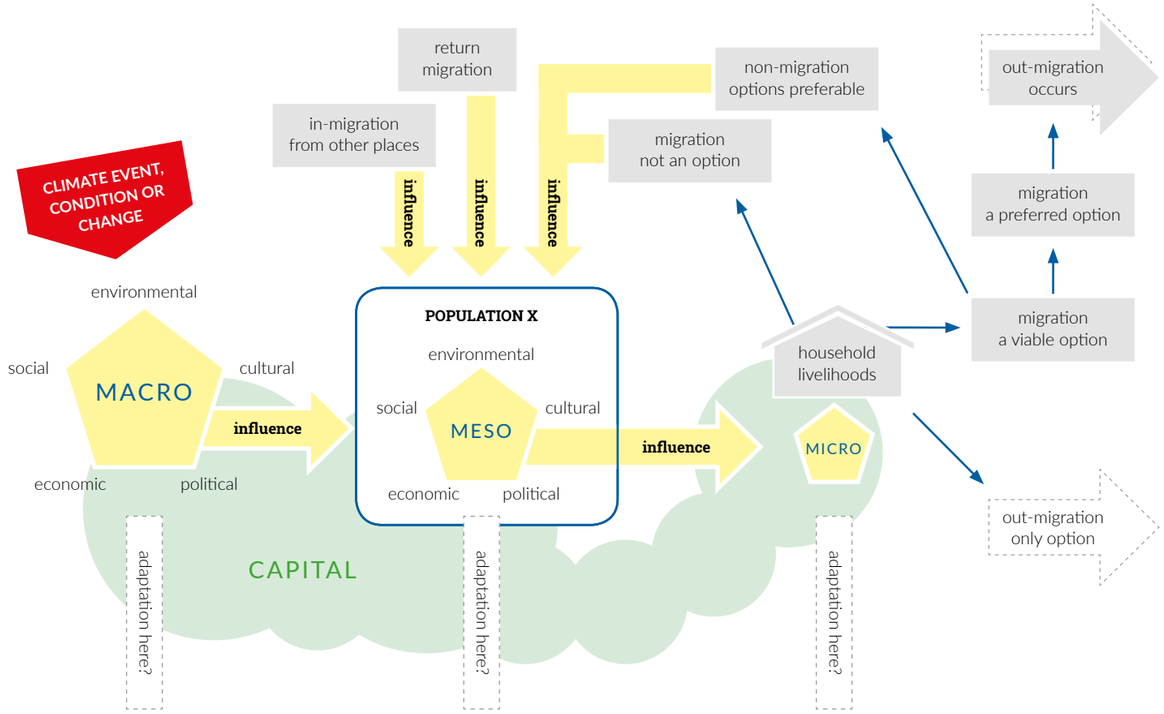
As already discussed in this document, in the Cambodian context, climate effects on assets and livelihoods and an interest to find better economic opportunities are closely linked to considering the availability of economic capacity (financial resources or assets) and social capital (relationships and networks, and their size and quality).

Therefore, it is paramount to take into account those factors in understanding migration choices and designing adaptation strategies. In fact, as explained, migration is mainly interrelated to the need to repay debts and a lack of other economic opportunities, which can be exacerbated by climate changes. When migration occurs in a context lacking other options and with fragility in effective policy to facilitate safe migration, then that migration is, in most cases, irregular and exposed to exploitation. Its potential to increase adaptive capacity is questionable.

77 Black et al. 2011.

FIGURE 39: CONCEPTUAL REPRESENTATION OF MIGRATION WITHIN AN ADAPTIVE SYSTEM, INCLUDED CAPITAL

Source: McLeman, 2014



In this case, the following are necessary:

- adaptation measures preventing negative consequences caused by climate-connected loss and damage regarding investments at all levels;
- integration within policies of measures that strengthen safe migration, acknowledge human, social and economic rights, and protect migrants against exploitation, while increasing their rights awareness and soft and professional skills to avoid exploitation;
- community-level initiatives to increase economic and labour opportunities to build capacities and skills that make migration 'an option' instead of 'the only option' and to enable people to build resilience by taking advantage of remittances in a more medium/long-term investment perspective.

With the purpose of strengthening economic opportunity and fostering migration as an adaptation choice against climate change, social capital is pivotal.

Social capital is considered as networks (volunteer associations, membership, family connections, workplace contacts, friends and acquaintances). Trust is also another form of social capital (personal trust, trust in and from society, confidence and reciprocity), norms and values (obligations, identity and solidarity, or democracy; O'Brien & O'Keefe, 2014).

The results of the participatory poverty assessment in Tonle Sap province by Ballard et al. (2007) showed that building social capital offers considerable potential in analysing how people respond to natural disasters such as floods and droughts (Ballard et al., 2007). The primary source of social trust is found in norms of reciprocity and networks of civic engagement, which can be measured by people's participation in associations.

Social capital is also seen as social learning among communities. The lack of association capacities in Cambodia, caused also by the heavy heritage of the Khmer Rouge period that disrupted social relations, leads to difficulties in pooling land resources, financial capital and skills for profitable investments and innovation to go beyond the dominant subsistence economy in the rural areas. In this sense, better gender equality also needs to be boosted, acknowledging the contribution women can give to a more sustainable and just community.

Following this direction, Annex I "Building Social Capital through Small-Business Development" of the present document proposes a training module to build people's capacities at community level so that they may actively take part in the development transformation process within their territory while increasing resilience against climate change. The module is designed to address all people, including women, migrants, potential migrants and returnees as well as the people left behind. A gender-sensitive approach is used and the potential of social capital is encouraged.

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5 FINAL CONSIDERATIONS AND WAY FORWARD

INTRODUCTION

In this conclusion we lay out the existing knowledge and implementation gaps in dealing with adaptation to climate change and migration, and the financial challenges are also highlighted. Lastly, based on the authors' studies and experiences, some recommendations are proposed to stimulate readers and users on constructive reflection to trace out possible paths of action.

5.1 EXISTING KNOWLEDGE AND IMPLEMENTATION GAPS

High exposure to floods and droughts and lack of capacity through a combination of low income levels, skills and infrastructure all increase Cambodia's vulnerability. Rising sea levels and temperatures (2-4 °C higher by 2100), shifts in the distribution and frequency of weather-related disasters, and changes in precipitation patterns will result from climate change in Cambodia, which in turn could lead to health and life risks. Climate change has been recognized by the RGC as a threat to Cambodia's economy and growth prospects, and therefore the government is committed to supporting and funding climate change adaptation and mitigation.

The Cambodia National Adaptation Plan (NAP), with technical support from UN agencies and bilateral aid, has formulated the Country Climate Change Strategies Plan (CCCSP) and sectoral Climate Change Action Plans.

The NAP process, coordinated by the Department of Climate Change at the National Council for Sustainable Development (NCSD), takes a medium- and long-term approach to reducing vulnerability to the adverse effects of climate change, while facilitating the integration of adaptation into relevant new and existing policies, strategies, programmes and activities. **Cambodia**'s Updated **Nationally Determined Contribution (NDC)** describes the NAP process as one of four strategic priorities in implementation of Cambodia's climate change adaptation policy (NAP Global Network, 2019).

Key observed and anticipated climate change impacts include flooding, drought, rising sea levels, intense storms and tropical diseases, while key prioritized sectors for adaptation include forestry, water, infrastructure, coastal zones, human health, fisheries and agriculture. However, the correlation between climate change and migration has so far been absent from this policy narrative.

Moreover, as analysed in the mid-term review of Cambodia Climate Change Strategic Plan 2014-2023[78] drawn up in 2019, the implementation of milestones is on track but remains partial, with more substantial progress between 2014 and 2017 than in the subsequent two-year period:

- 15 (or 29%) of the 52 milestones had been fully achieved;
- 21 (or 40%) had been partially achieved;
- 16 (31%) had not been achieved at all.

48.8% of communes were classified in 2014 as highly or quite vulnerable to floods, droughts and storms, and in 2016 only a small number of those had addressed the main problems, resulting in a 4% decrease in vulnerable communities. This can be evaluated in light of limited understanding of climate change at a local level (communities, municipalities and districts) and gaps in capacity to plan, implement and evaluate how to tackle the challenge.

Mainstreaming information on climate change requires more effort, and this is crucial to improving joint awareness, knowledge and capacities, especially at a local level. It is of paramount importance to consider that climate change expenditure by subnational authorities represented only 1% of total climate change expenditure in the 2012-2017 period (expenditure by NGOs represented 1.9% for the same period) against the expenditure by central government, which has steadily increased and absorbing 97% of available resources.

Furthermore, although the gender-based vulnerabilities to climate change have been recognized by the policy framework, these are still absent from the dissemination of understanding and skills to be systematically integrated at different levels of action.

The mid-term review also highlighted the need to take into due consideration demographic and socio-economic factors and trends that are interconnected with climate change needs and capacity for adaptation, such as urbanization or slow-onset changes, to mention but a few.

We also noted that in no document on the policy framework regarding the Cambodian strategy on climate change and its implementation is migration taken into consideration, nor is its potential role of adaptation analysed. Although the country has, since 2014, duly considered migration as an objective in its development pathway, and *"a positive and profitable experience for individual workers, their families and communities, which also contributes to the development of Cambodia"*[79], the connection with climate change is not focused on, nor is it even mentioned.

78 Garcia et al. (2019).

79 Ministry of Labour and Vocational Training, and International Labour Organization (2014).

5.2 RESOURCE MOBILIZATION AND FINANCIAL GAPS

Resource mobilization and financial gaps remain key problems in addressing key drivers of climate change and migration. Despite all ongoing efforts, the financial demand remains high since a significant amount of the financial needs determined in the CCAPs remains unfulfilled. In August 2015, the Climate Financing Framework calculated that the estimated cost of the total public response amounted to US $1.1 billion for the 2014-2018 period, based on existing action plans and estimates for sectors which did not have an action plan at the time.

Analysis conducted by the GIZ Climate Finance Readiness Programme attempted to calculate the financing gap for CCAP implementation. It concluded that roughly half of the US $865 million needed to implement the climate change priority actions determined by line ministries up to the 2018–2019 period remains unfunded. This is a significant gap and further resource mobilization efforts should aim to close it. The finance demand is determined by several factors, notably the absorption capacity of implementing agencies, the adaptation goals/targets, and the degree of trade-offs between impacts of climate change, the costs of adaptation and the residual costs after adaptation.

For resource mobilization, we observe that financial mechanisms for adaptation should be more innovative. Public-private partnerships, payment for ecosystem services (such as REDD+) and other mechanisms that also leverage private funds should be tested and further developed.

The following drivers have been identified to attract private climate investment in adaptation:

- supply chain resilience: supply chain risks (e.g. business continuity by suppliers during extreme weather events) can be mitigated by working with suppliers to strengthen their resilience;
- compliance: foreign-owned companies and Cambodian companies with business links abroad should have to comply with the more stringent environmental, social and governance regulations that are in force in other countries and apply these in the Cambodian context, thus providing access to essential services. In this direction, the introduction of mandatory human rights and environmental due diligence throughout the value chain for all companies producing and/or commercializing their products in Europe – rules now in the process of being issued by the European Union – is strongly welcomed. This approach could have a propulsive role in improving respect for environmental and worker rights (including those of migrants, whose rights are the most infringed), while providing an example to mainstream due diligence practices at local and international levels.

5.3 KEY SUGGESTED ACTIONS IN DEALING WITH CLIMATE CHANGE AND MIGRATIONS

Key climate adaptation and mitigation actions seem to favour infrastructure or are hard-engineering based, and mostly influenced by dominant groups and policy-makers. This approach often fails to be human-centred or rights-based, generating a situation in which vulnerable groups and marginalized people are often ignored or even fail to benefit from these interventions.

Experiences from our recent research based on agricultural livelihoods show that even when the government or donors manage to provide irrigation and rural infrastructure to double crops or rice production, migration out of the community still takes place in large numbers. In addition, new social groups – mostly business-oriented and ruling parties – often control the production means through these forms of intervention and give less space to marginalized groups, who then have unequal power in relations and less access to security within the development schemes. Extreme weather such as flooding, droughts and intense storms remain intensified in Cambodia.

Key aspects that need to be addressed include:

- (i) **Establishing economic diversification and equitable resource distribution**; (ii) **building up social capital** connected with place, sense of community, citizen participation, social support, and cooperation, among other aspects; (iii) **building up community resilience**, which includes **enhancing good governance** by community leaders, problem-solving skills, community actions and access to information, justice and assets (Brown 2016).
- **Enhancing co-learning among migrant workers** on social norms and values among the local community and authority. This can also be done by creating access to livelihood assets and diversification (O'Brien & O'Keefe, 2014).
- **Rebalancing unequal power relations** among social groups within the community, given that climate change often creates uneven access to credit, well-being, irrigation and security. Social norms and regulatory frameworks need to be enhanced, along with the need to respect marginalized groups and diversity (Taylor, 2015).
- **Strengthening of a rights-based approach** that includes a regulatory framework and justice among migrants, communities and key actors in cross-border governance (Gueldry et al. , 2019).
- **Rethinking of the connections between climate change, food security and migration**. In particular: (i) household food security, which mostly impacts on agricultural production, which in turn affects mostly low-income groups of people, and (ii) the missing link between social norms and the regulatory framework on migration rights should be addressed within development intervention (McLeman, 2014).

Moreover, we consider the following action fundamental:

- **Expand and disseminate knowledge on how migration can be a measure to adapt to climate change**; mainstream this in all existing policy and action frameworks, and interventions to enable migration to respond positively in adjusting to climate change, also taking opportunities for development.
- Strengthen **localization of climate change and safe migration strategies through capacity building** by local policy-makers, public and institutional officials, awareness-raising in stakeholders, and inclusion of CSOs/NGOs and citizens in sound participative processes for implementation and monitoring.
- **Foster gender-based initiatives** at all levels to address climate and migration challenges and increase resilience in a more equitable manner.
- Improve **private-sector engagement in respecting people's fundamental rights and environmental rights**, and adopt low GHG emission strategies, which are pivotal to sustainable development.

In conclusion, investing in local initiatives to strengthen resilience through economic opportunities and to foster social capital, participative and effective local planning and implementation of climate change strategy is recommended. Considering the relevance that migration has in response to the intertwined development and environmental challenges in Cambodia, policies and programmes should take the phenomenon into due consideration in order to strengthen its positive contribution as an adaptation strategy. Cambodia's recent speech (2021) at the Asia-Pacific Regional Review of Implementation of the Global Compact for Safe, Orderly and Regular Migration to promote voluntary, safe, rights-based migration, for which it aims to *"mitigate the factors hindering people from building sustainable livelihoods in the country, to reduce the risks of the people at different stages of migration for employment, to address the communities' concerns while societies undergo environmental changes, and to create the conditions facilitating the contributions by migrant workers to the national sustainable development"*, gives reason for hope.

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Annex I: BUILDING SOCIAL CAPITAL THROUGH SMALL-BUSINESS DEVELOPMENT

The purpose of this section is to help training attendees understand how can we build social networking and human capital among migrants, potential migrants and those left behind, in order to be more responsive against climate change and development transformation processes within their local area.

Each segment features methods, materials, estimated times and notes for the instructors to ensure the session is more flexible according to participant type. It is mostly aimed at NGO staff, local government, and local agents working to improve small businesses and enterprisers.

The training session is about five hours long, and divides into two parts. The first part looks at an introduction to the human and business life cycles over about two hours, while the second part explores business concepts and covers seven topics, as listed in the table.

MAIN MODULES AND DURATION

I	Introduction to training on the human and business life cycles	2 hrs
II	Business concepts Lesson 1: What does business group mean? Lesson 2: Ten features for business success Lesson 3: Business map Lesson 4: Selecting a business idea Lesson 5: Successful sales Lesson 6: Costing Lesson 7: Community marketing	3 hrs

INTRODUCTION: HUMAN AND BUSINESS LIFE CYCLES

In general, women of all ages have fewer opportunities than men do, but have more responsibilities and greater workloads. In addition to working or earning money, women typically do all the housework to support their children and take care of the family. In some societies and religions, men are usually the decision-makers, in both public and private affairs.

In many societies, there are differences and inequalities between girls and boys and between women and men, as well as between the opportunities, responsibilities, rights and interests they receive and the actions they take. While cultures vary, they have one thing in common: gender relations around the world define inequalities and imbalances in relationships between the two sexes. Differences still exist between, for example, girls' and boys' education and training, women's and men's workloads, access to and management of resources and benefits, and in the role of men and women in decision-making.

Gender equality, or equality between men and women, refers to the equal rights, responsibilities, opportunities, interests and values of women and men:

- in the workplace and in enterprise;
- in the relationship between work and life.

Examining the life cycle of an enterprise through gender is about ensuring that women and men have equal opportunities to succeed in life and in business. All people need to be considered with dignity and conditions should be created for them to participate in developing their full potential and leading a quality of life. This does not mean that women and men need to have everything the same. Women and men might have different needs, but they must have equal rights, responsibilities and opportunities, and be considered and given fairness. This problem is also present when doing business.

Stages in the human life cycle:

- **Birth and baby care**
  - The first step in growing up as a child
  - Education and adolescence
  - Choosing a direction during youth
  - Adult maturity
  - Middle age
  - Retirement
  - Death or rebirth
- **Business/Enterprise life cycle**
  - Thinking about business ideas
  - Planning and preparation
  - Launch
  - Early progress
  - Development and expansion
- **Comparing business life cycle to life cycle in agricultural work**
  - Thinking about what to plant
  - Land preparation
  - Sowing/growing
  - Planting/transplanting
  - Harvest

HUMAN VERSUS ENTERPRISE LIFE CYCLES

The human life cycle and the business life cycle are not the same. Business is something that has its own life and develops independently of the business owner, just like a child who is independent of his or her parents. This can be an important lesson for women starting a business.

Poor women who start small businesses often find it difficult to use the income from the business to meet the basic needs of the family. In general, women receive limited training in business management, and they are not sure whether they are making a profit or a loss because they are too busy spending most of their time meeting family needs.

By not paying close attention to the business, the business then reaches the point of bankruptcy or failure. Therefore, women in enterprise need to learn how to look at business and finance separately from their own finances.

HUMAN LIFE CYCLE	ENTERPRISE LIFE CYCLE
Planning and birth: the birth of a baby	Thinking about a new business and planning. Opening a new business; setting up a proper support system
The first months of growing up until school age	Looking in the chosen direction and creating certain expectations
Learning youth skills, experiences, responsibilities, first steps, choosing friends	Promoting the enterprise and the enterprise's products or services; finding suppliers and new customers.
Graduating to being an adult and self-reliant	Live reviewing of successful product planning and the planning process. Investing in education, training and research; investing in new tools
Maturity is reached when you know how to choose a partner, build a life and raise a family	Having friends or partners who have confidence in doing business. Ability to draw on people and profitability to continue to invest for stability and growth.
Middle age: The stage of strengthening and expanding on life. This can include a mid-life crisis or the start of a new job or career (personal and career changes occur)	Strengthening and extending options. The dangers of losing business enthusiasm, or competitors capturing customers' needs. Continuing training. The importance of objective review, and reassessment of staffing needs.
Middle age until retirement	Continuing a business, keeping the business the same or growing. Training others to take on tasks gradually.
Death or rebirth	Organizing a responsible business transfer. Giving an enterprise to a daughter or a son to take over. Continuing in changing the enterprise or starting a new business.

COMPARING THE BUSINESS CYCLE TO A RIVER OR FLOWING RIVER

» It stems from groundwater: Enterprisers have business ideas on their own or with others.

» The water is from a source: What is the background motivating enterprisers to start a business?

» Some of the initial obstacles encountered in navigating the river can be waterfalls or rapids (initial problems in business), drought (lack of money), lack of clear direction (lack of plan), or lack of trust (little experience in doing business). If the river current (business) jerks up and down, try and find other routes until you settle on more comfortable progress.

» When the current is strong, the river can start moving smoothly: the river flows smoothly and the enterpriser has a successful business.

» The river flows down to a gorge, and it encounters many new obstacles: other people can try to divert it (business competition) or build irrigation to drain it.

» It supplies resources (people depend on it for income). If too much water is pumped out (business resources), the river will dry up.

» Rivers can be polluted: If people do not properly maintain them, rivers (businesses) can become polluted or dry up. Enterprisers may not be interested in thinking about accounting work, or may not be aware of what system is needed to prevent leakage (poor inventory control, theft, late or non-payment).

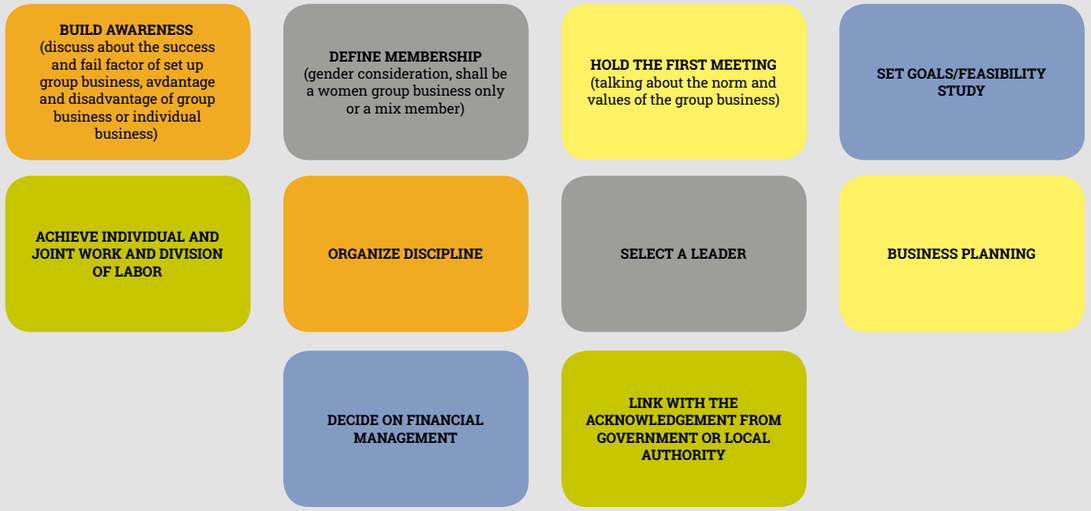
» Streams can spread or tighten water flow, they can divide into other rivers before they flow into the sea, or two or more rivers can merge. Business owners can split a business into smaller parts or merge with other businesses.

LESSON 1: WHAT DOES BUSINESS GROUP MEAN?

1.1 BUSINESS GROUPS

1. **Business group** refers to a group of two or more people who work together to create and run a business.

2. **Steps to create a business group:**



1.2 SUCCESS AND FAILURE OF BUSINESS GROUPS

Some **business groups are successful** but some fail. Success can be due to:

» Members' interests and commitments
» Equality among members
» Proper and fair division of labour
» Principles agreed by all members
» Good leadership
» Good communication
» Skills in problem solving
» Proper financial management

Some business groups comprise only women and some groups are made up of women and men working together, so **understanding gender issues** in a group is very important.

DEFINITION OF GENDER EQUALITY

Sex – Global biological differences between men and women

Gender – Social differences and relationships between the sexes:

» These can be learned
» They change all the time
» There are differences in society and between societies.

Values, rules and personalities of gender (gender mindset): Ideas about what women and men should look like, be like and how they should act.

Gender Role – Refers to what men and women actually do. Gender equality or equality between women and men includes:

» Human rights as well as labour rights
» Equality and fair distribution
» Responsibilities and equal opportunities
» Workload, decision-making and income aspects.

1.3. ADVANTAGES AND DISADVANTAGES OF BUSINESS TYPES

	ADVANTAGES	DISADVANTAGES
INDIVIDUAL BUSINESS	» Decisions can be made quickly and easily and respond to individual needs. » Profit is individual	» An individual business is less powerful » Higher costs » All responsibilities and workload belong to the single enterpriser
GROUP BUSINESS	» Workload can be shared » Integrated resources » A group has the power, voice and influence to negotiate » Members can learn from each other » Costs savings » A group can negotiate for cheaper prices when buying raw materials together » A group can mass produce and meet bulk order requirements » A big business means more profit	» It takes longer to get things done » The business may not meet the needs of different members. » Some members may take advantage of others » Running a business together is difficult if there is little or no trust in team members

LESSON 2: TEN FEATURES FOR BUSINESS SUCCESS

In order for our business to be successful, we need to remember the following ten features

We need to:

» Search for opportunity

» Have tough resistance

» Commit to contracts

» Satisfy demand for quality and efficiency

» Dare to plan

» Set goals

» Conduct systematic planning and monitoring

» Find information

» Manage integration and networking

» Have self-confidence.

TRANSACTION SCHEDULE: EXAMPLE: A NECKLACE BUSINESS

ENTERPRISER FEATURES	FEATURES
Finding information	About nylon yarn, about the selection criteria used by the contractor during purchasing
Looking for opportunities	To buy needles or thread. When you hear needles and thread are on the market, go outside the lighted classroom
Struggling to persuade	Buyers, so improve production for better sales in the second round
Quality and efficiency requirements	Check the total number of necklaces promised for the order by following the quality guidelines: only prime-quality necklaces are accepted
Setting goals, commitments	You must commit
Systematic planning	Arrange the beads on a flat surface, copy the sample, count the number of beads, set production time.

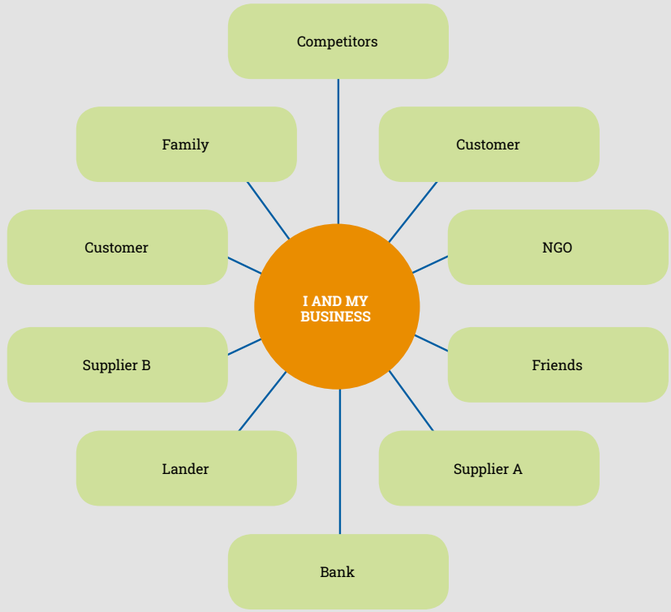
LESSON 3: BUSINESS MAP

A **business map** is an exercise that gives those who are planning to set up a business or are running a business the space to understand the geographical situation and the area where they want to start up, what opportunities there are and what obstacles may affect creation and development. Grow your business.

Some important **points to analyse are**:

» Needs
» Supply - quality and quantity of raw materials or products for sale.
» Opportunity or cost due to geographical location (near to/far from agricultural land, raw materials and customers)
» Competitors
» The role of business support from institutions
» The role of community support from institutions
» The roles of networking and communication

MAP OF BUSINESS ENVIRONMENT



LESSON 4: SELECTING A BUSINESS IDEA

Innovation is the key to development for both new and existing businesses, especially for women who want to grow their small business to be more profitable. **New ideas** for setting out business ideas should be based on the resources and experience of existing participants, so this part of the training involves a practical assessment of possible business ideas.

4.1 CRITERIA FOR SELECTING A BUSINESS IDEA

The three criteria for choosing a business idea are: **Skills - Resources – Needs**

» **Skills** refers to our knowledge or ability to do something (e.g. chicken-breeding skills, cake-making skills).
» **Resources** includes financial resources (e.g. savings, loans, farmland), human resources (e.g. family members/young capable members), raw materials (e.g. fruits and vegetables, fish, firewood, bamboo, clay, rock).
» **Needs** refers to services or products that the community needs, that have never existed in the community or that are attractive.

4.2 EVALUATING OUR SELECTED BUSINESS IDEAS

We should measure the following:

» **Skills and abilities.** Assess yourself and how much and how many skills you need (skills that come from learning, and innate skills from society). If you do not have these skills, do you think you can find someone who has these skills to help you? Also ask yourself if you can afford to pay someone to help you (additional costs from hiring someone mean a reduction in profits). If the required skills can be acquired without significant obstacles, the appraisal result is very positive. On the other hand, if you have few or no skills and no one to help you, then the assessment outcome is low.

» **Resources.**
› **Equipment available.** We need to ensure we have the skills to use any tool planned for inclusion. In other cases, the equipment may not be available locally or may not be easy to repair or

may be too expensive to invest in.

› **Consumption of raw materials.** Please remember and never forget that any business enterprise requires raw materials. These raw materials are converted into other products (production) or are used to provide services, or are simply sold at a higher price (commerce). If all the required raw materials are available throughout the year, the assessment result is very positive. On the other hand, if the raw materials are insufficient or fluctuate seasonally, the appraisal feedback is broken down into a more detailed chronology to assess this.

› **Financial resources.** As in the cases of start-ups and working capital. When starting a new business, financial resources to invest are vital. This might be to buy equipment, buy land or cover initial expenses. These resources can be acquired through borrowing or leasing. As for cash/money, a working capital is needed for daily business activities, such as money to buy raw materials, pay salaries to employees or buy additional equipment. If you think you already have enough money to start this business, the assessment will return a high rating. On the other hand, if you have nothing (e.g. no money or savings), the evaluation will generate a very poor rating.

» **Needs**. Needs are the products or services that the customer is looking for. When considering the point of demand, it is important that we pay attention to the level of competition in the local market, the size of the demand that can be met by the use of traditional or non-traditional skills and the demand itself, taking into account individuals, institutions and other businesses. Demand size is also related to the purchasing power of customers: they may need a product or service, but do not have the money to buy it. In this case, the actual demand is minimal.

We can use a three-level tree model (i.e., skills, resources, and needs) to evaluate our choice of business ideas. Remember: how risky is the business idea we have chosen?

Examples of risk: Handicrafts are sold to a single broker or exclusive buyer. In this case, the broker (agent or distributor) is your real market. However, in reality, the producer depends on other distant markets, a market that you may be completely unfamiliar with (e.g. involving foreign clients). In the event of an economic crisis or new trends in this market, the agents or distributors (brokers) may lose their business and, as a result, the producers will experience the same outcome, in a knock-on effect. Competition can also be considered a risk factor.

CHECK!
MICRO BUSINESS IDEAS SELECTION CHART

NAME OF BUSINESS IDEA	SKILLS AND CAPABILITIES	EQUIPMENT INTENDED TO USE	RAW MATERIALS	FINANCIAL RESOURCES (START-UP CAPITAL)	ADEQUATE REQUIREMENTS

LESSON 5: SUCCESSFUL SALES

5.1 MARKETING

There are five important points (5Ps) that we need to consider when finding a market:
» Product
» Price
» Place/Distribution
» Promotion/Advertising
» People.

PRODUCT OR SERVICE: What do you sell?
» Decide what products and/or services you sell.
» Find out if someone sells a similar product or service. How are they produced and/or delivered to customers?

PRICE: Find out what customers like or dislike. **Can they afford it at your selling price?**
» Locate (quality) raw materials at a reasonable price.
» Calculate how many products or services can be delivered to customers in a given period.
» Improve the quality of products or services.
» Make your product or service more attractive. How do you package it?
» Provide services with product sales.

Selling price: Set the selling price to make a profit.
» Calculate production and sales costs
» Set the selling price
» Compare with competitors' product prices
» Set special price offers to attract customers to buy your product
» Check if the customer's purchase is based on price or quality or both.
» Requirements may change seasonally, year by year, at different locations or by type of customer. Do you have different pricings?

PLACE/DISTRIBUTION: Find the best way to distribute your product.
» Who sells your products?
› Do you use retailers, subcontractors or other agents, or do you sell them yourself?
› Take your product to market or to sell to customers
› What transportation means is used for distribution and what is the cost?
› Team up with other traders to sell or distribute together.
» Where to sell: Walk from home to the local market or shops.
» How to maintain/store the product and cost of storage.
» Place (location) and business location conditions (clean and dry).

PROMOTION/ADVERTISING: Create ways to attract customers to buy your product.
» Place the product in a good place (e.g. put fresh leaves under the fruit you sell).
» Close in on the price to be seen.
» Disable minor product information (e.g. ingredients, manufacture date for food products).
» Examine the sales behaviour (customer friendliness) from your employees and yourself.
» Conduct business properly and protect yourself and the people who sell your products or services.
» Decorate places, products or services to attract customers to visit your stall/shop/building.
» Find ways to introduce new products (hand out free samples to show how to use the product).
» **Find out how to advertise** (music, promotional activities, special discounts)

PEOPLE: Communication, behaviour and reputation.
Good communication between enterprisers (producers, sellers, marketers) and customers, suppliers and other important people in the business.
» Entrepreneurial attitude (friendly, competent)
» The reputation of an enterpriser in a specific place (village or area)

LIST OF QUESTIONS FOR SMALL MARKET RESEARCH
Sample questions for **customer preference interviews** with staff or store owners.
» Who is the buyer? Customer history? Are they also consumers? (Not all are clear)
» Why do they buy? Price, habits, reputation, requirements, etc.
» What do they buy? Size, quality, colour, style, etc. (fashion)
» Where do they buy? Markets, houses, post offices, supermarkets, locations, etc.
» How do they buy? Cash, pre-purchase payment, credit, etc.
» Do they buy often? How regularly?
» How much do they buy? Consumer quantities, in bulk, etc.

SAMPLE QUESTIONS FOR **INTERVIEWING** EMPLOYEES OR STORE OWNERS **ABOUT COMPETITION**
» Who are your competitors?
» What are their strong points?
» What are their disadvantages?
» Is there a lot of competition?
» What do you need to do to attract customers to your store and prevent them from going to your competitors' stores?

HIGHLIGHTING FOR OBSERVATION. Use all your senses: sight, hearing, taste, touch and smell.
» Is the place easy to get to?
» Is the in-store display neat and attractive?
» How do the sellers treat customers?

5.2 INCOME MANAGEMENT

Why it is necessary to manage cash inflows and outflows for a business and how to manage them.

BENEFITS OF SIMPLE ACCOUNTING:
» You need to know the amount of money coming in and going out of your business
» You can check your expenses regularly
» You can better manage your money (plan ahead)
» You can check how much you have sold (sales activity)
» You can check your losses and profits
» You can make comparisons (cost/product sales, forecast business results, actual turnover, comparisons with competitors and coping, etc.)
» You can check who owes you money at any time (through borrowing or trust buying)
» You can check if money is being stolen or going missing.

LESSON 6: COSTING

6.1 CALCULATING THE COST OF A PRODUCT OR SERVICE

» List the **cost of raw materials, labour and equipment**.

» Think of **start-up costs** and **operating costs** to keep this business operational.
  › Start-up cost: this is the initial cost it takes to create a business, such as the cost of buying land or equipment.
  › Operating expenses: these are the expenses you have in order to keep the business running, such as the cost of renting or purchasing raw materials. Operating expenses can be fixed costs and variable costs.
  › Fixed costs: these do not vary with the amount of goods or services produced and sold by the business (e.g. renting a shop or market stall, car or motorbike, paying staff salaries, etc.)
  › Variable costs: These change according to the amount of goods and services produced and sold by the business (e.g. raw materials, labour costs, additional labour, transport costs, such as fuel for cars and motorcycles).

» **Depreciation**.

» Consider **labour costs**.

6.2 METHODS TO SET THE SELLING PRICE

There are three ways to set a selling price

» Set the selling price based on the **cost**: the cost of any specific product plus X% (X% is the percentage we raise the price by, or the amount of profit).

» Set the selling price based on **competitors' prices**: How much do competitors sell at?

» **Market pricing**: Can customers afford it?

LESSON 7: COMMUNITY MARKETING

General information about community marketing.

7.1 DEFINITION

The activities of the general public also present important processes for exchanging products, groceries, food, consumables and other items to support daily life, especially where two-thirds of rural people are engaged in agriculture, handicrafts or manufacturing enterprises. Funds can be attracted from customers through community-based production chains by connecting region-to-region contacts between vendors-manufacturers, buyers-carriers, and consumers-suppliers. Mobility and aggregation characteristics.

WHAT DOES COMMUNITY MARKETING OFFER?

» A place where products are bought and sold
» A place where many sellers bring things to sell
» A place where buyers often come to look for materials to purchase
» A place where buyers meet with sellers to exchange products
» A place for bartering, negotiation and advocacy in doing business where enterprisers often meet with service providers and service recipients, consult on needs and evaluate their businesses to learn from each other's experience.
» A production system for business activities, business planning, pricing, advertising, product display, and goods distribution to meet the needs of customers, respecting their real goals and objectives.

7.2 COMMUNITY MARKETING MANAGEMENT

Organizing business processes requires abilities in persuasive negotiation, as well as in attracting customers, communication, solidarity, cooperation, understanding needs and situations in all circumstances, managing the inflow and outflow of goods, and so on.

UNDERSTANDING THE CONTEXT OF COMMUNITY MARKETING.

These needs in the community market are volatile, depending on the product/service's season of use, due to the small production quantities, volatility, unstable demand due to price fluctuations, and the types of items that community farmers produce for display at the market, including:
» products from agriculture
» products from handicrafts

THE FUNDAMENTALS OF MARKET INFORMATION.

It is a good idea to analyse the marketing work involved during the process of gathering information on the competition to determine the cost or start-up capital in the business plan to suit the price of the goods and to establish the profit margin to avoid losses, and to be effective.
» Compete according to the circumstances of a specific time
» To prevent losses, have a specific expenditure plan.
» Bankruptcy prevention requires monitoring and evaluation
» Establish real needs, with specific goals and objectives
» Distribute to and receive information from specific sources.

BENEFITS OF MARKET INFORMATION.

» You know customers' needs
» You know the sources of various service providers
» You know the source you need in order to find other services
» You know the fluctuation price of various goods
» You know production locations for the export/import of various types of items

7.3 CHALLENGES IN DOING BUSINESS IN THE COMMUNITY MARKET

HUMAN ISSUES.

» Lack of skills, ideas, knowledge, experience
» Not flexible under the circumstances
» Do not know the situation of people in each age group
» No geographically correct studies.

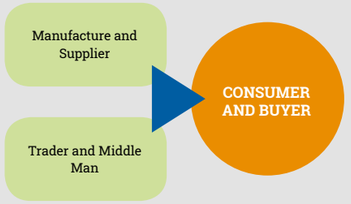
NATURAL ISSUES.

» No specific environmental studies on drought, floods, hurricanes, etc.
» Climate change is a hazard for initial capital
» No budget plan for expenses
» Lack of budget

7.4 ANALYSIS OF THE PRODUCTION PROCESS IN THE MARKET

In order to know the stages of production, it is necessary to focus on the actual activities in each area, from the marketing process to the pricing, from who determines and who lowers the price, to who produces what. As a buyer, what is the quality like? Do the price, quality and quantity of the goods match? Who is best, the seller, the producer or the buyer?

The most important factor in doing business in a three-party market must be the mutual understanding that a successful and influential business venture in this community market is the key to doing business. The diagram below shows the triangular connection in the market-chain production process.



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