Inequalities and environmental changes in the Mekong region

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Inequalities and Environmental Changes In the Mekong Region

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Although there are manifold conceptualizations of the "Mekong", richness and dynamism are commonly used to characterize the politics, economies, ethnicities, societies and ecologies of a highly diverse region. Policy and investment decisions are being formulated and enacted in an increasingly connected region subject to a changing climate regime, a rapidly growing population, accelerating gross domestic product, changing foreign investment flows, a young and expanding labour force and migration away from smallholder agriculture. Popular and leadership aspirations suggest an ambitious trend towards expanded trade, mining, agriculture, natural resource utilization and increasing industrialization. There is also a concomitant increase in the demands for a more equitable distribution of the benefits and costs of development programs. National and sub-national decisions on large-scale development investments are triggering ripple effects throughout the region, affecting the trajectories of factors influencing hydrological flows, wetland area and functions, fish migration, forest diversity and sediment-nutrient transportation, in turn disproportionally altering the livelihoods, forced migration and adaptive opportunities of the most vulnerable. As a corollary, while dynamism continues, richness is being degraded and unevenly distributed.

The ambitions prescribed in national development programs have been underpinned by a legacy of political alliances and power asymmetries, country-specific institutional histories, cultural biases, tenuous "traditional" property rights and ideological preferences. Institutional biases and norms can also affect the level and reproduction of inequalities, reinforcing exclusion based on gender, race, class, ethnicity and disability.

Development decisions affecting natural resource conditions and status, and the distribution of benefits, costs and impacts amongst affected interests and communities have generally been made independently and are reliant on a constrained set of metrics. Notions of equity-equality are typically expressed in economic terms, albeit referencing important indicators of wealth distribution such as the Gini coefficient.

In contrast, gender, group and ethnic biases affecting the equity and parity of procedural justice and the statutory recognition of traditional land and water rights have been obscured or omitted during policy deliberations. The regulating, cultural and non-market provisioning ecosystem services of wetlands, forest and water systems have tended to remain "invisible" and have only been incorporated to a limited extent into the decision-making process.

The critical interdependence of equity and natural resource management are however increasingly recognized by decision makers, the research community and civil society concerned with Mekong sustainability. Recent initiatives have seen the principles and aspirations of distributional justice, gender parity and the sustainable management of natural resources articulated and ratified throughout national and supra-national policy instruments, treaties, conventions, development plans and statutory laws of the Mekong River Riparian countries. Supra-national and updated national instruments are increasingly framed by principles set out by, for example, the Sustainable Development Goals, and guided by multi-factor development indices such the Human Well Being Index, Human Capital Index and the Multi-Dimensional Poverty Index.

However, these policy initiatives have not yet emerged as an operational praxis and the upward trajectories of distributional inequalities continue unabated, affecting the most vulnerable. Examples of this lack of implementation and policy enforcement actions include the opaque granting of land and water concessions subject to traditional common property rights, as well as the ongoing decline of forests, fish and river sediments, which affect the communities that depend on them.

The present volume makes a timely and practical contribution to research endeavours and policy debates concerned with sustainability in the Mekong region.

The authors notably address the problem of variable interpretations and implied meanings of equity contained in the Sustainable Development Goals (SDGs). Apart from goals 11-14, the remaining SDGs refer to equitable access, sharing or opportunities as an outcome of sustainable development. What is not immediately evident from the SDG framework and language is a clear understanding of what equity entails. Variable interpretations and the interchangeability of equity, justice and equality have compromised the formulation of a coherent analytical framework and comparative analysis of efforts to correct inequalities.

The authors propose a clearly defined and tractable working definition of equity by classifying economic, political, social, cultural, environmental, spatial, and knowledge-based inequalities into three distinct classes. Distributional equity refers to the allocation of resources, costs, and benefits among people and groups; recognitional equity refers to the acknowledgment of and respect for identity, values, and associated rights; finally, procedural equity highlights participation in the decision-making process, the asymmetries of power and influence, and jurisprudence or the capacity to be legally recognized and represented during disputes and conflict resolution.

This typology improves analytical sensitivity by describing the equity "of what" and "between whom," which also resonates with practical notions of vulnerability: from the vulnerability of "whom" (e.g. communities and/or ecosystems) to "what hazards and stressors" (e.g. uncertain water access, reduced nutrient and sediment loads, global warming, political decisions).

A systematic mapping of documented relationships between equity and natural environment factors and variables represents the second major contribution of this volume. The rigorous and systematic mapping and analysis of thousands of publications reveals relationships between equity and natural resources in the Mekong, disentangling reported environmental stressors or change (the "what"), across a range of affected communities and groups (the "whom"), as well as the implications for equity. The document mapping exercise and text analysis reveal; i) the multiple disciplines engaged in the equity-natural resource nexus; ii) the focus on climate change, resource rights and access, and exposure to pollutants as the three dominant research themes; and iii) an accelerating research focus and interest from 2011 through 2020.

The separation of the environment-population group-equity classes into an enumerated matrix represents a substantial step in improved diagnostics and analytical sensitivity. Analytical sensitivity, in turn, acts as a basis for defining the problem characteristics of collective decision making, an improved understanding of the capabilities of vulnerable groups to exercise choice, and importantly, differentiating the environment-equity interactions into those that matter and those that do not. The matrix provides a basis for more equitable negotiations between competing decision influencers and actors by rendering the interactions between the three equity classes and natural resource "values" both legible and visible. Making equity-environmental interactions legible is a major achieve-

ment of this volume. Despite increasing acknowledgment by national and regional decision makers, equity-environmental interactions are either invisible, illegible or ignored in the majority of contemporary Mekong development debates.

The compendium of Mekong case studies investigating the equity-justice-natural resource condition nexus represents the third contribution of this volume. Multi-factorial indices (such as the SDGs, the Human Development Index and the Human Capital Index) that guide national policy development tend to be aggregated and are usually reported at the national level, thereby obscuring inequalities and disparities in environmental conditions that only become apparent when considered through finer geographical, gender, linguistic and ethnic lenses. We hope that the local case studies presented in this volume will contribute to the development and refinement of a responsive scientific research agenda capable of contributing to more balanced and procedurally just development decisions.

The volume includes a set of important recommendations to bridge science policy boundaries. There is at least one additional recommendation that warrants further investigation. That is, establishing whether the priority equity-environment relationships revealed in the document mapping matrix are consistent with the priorities of affected population cohorts and decision makers, or are an artefact of academic interests and accessible funding.

What is the link between Cambodian sand dredgers along the banks of the Mekong River, urban farmers in Phnom Penh who are witnessing a drastic reduction in lake and wetland areas, and the Vietnamese farmers of the Mekong Delta who are turning away from rice-growing to migrate to Ho Chi Minh City, the country's economic capital, in search of a better life? Or between Laotian workers in the mining industry in Xaysomboun Province, and the peasant farmers of the mountainous provinces in northern Thailand, who are increasingly dependent on the expansion of corn monoculture in the hands of multinational firms? Not to mention the Ta'ang tea farmers in Myanmar faced with the rollout strategy for a new economic development corridor on the Chinese border?

All these examples relate to one of the greatest challenges of the twenty-first century: the joint acceleration of inequalities and environmental damage. Recent studies have shown that this challenge exists all around the world, but the Mekong River Basin provides an ideal illustration (Islam and Winkel, 2017; Hamann *et al.*, 2018). The region is home to an ethnic mosaic of more than 250 million people, following the river as it runs through the Indochinese peninsula, exposed to a full range of climate and environmental upheavals.

If proof were needed, the COVID-19 crisis reminds us of the extent to which ecological destruction can lead to healthcare inequalities and socioeconomic crises. Conversely, it also shows us how inequalities are themselves a major obstacle to the social cohesion that is necessary to undertake ecological reconstruction.

The integrative role of the Mekong River

This is especially true in Southeast Asia and in particular in the following five countries of the Mekong which form an original geographical entity: Cambodia, Lao PDR, Myanmar, Thailand, and Vietnam.

Three forms of shared landscape stand out in the Mekong Basin. First, the highland range in Southeast Asia which was recently given the name Zomia by anthropologist James Scott (2010). This is a shared mountainous area, home to a great number of ethnic groups. With territories at altitudes above 300 meters, highland populations here have resisted all state authority for centuries. Second, the Mekong River originates in the foothills of the Himalayas in China and flows through the basin. Historically, it is on the meanders of this river at the foot of the

mountains that centers of power formed through history, with organized societies and the development of highly diverse agriculture. Third are the coasts of the Gulf of Thailand and the South China Sea. In this region, typhoons are frequent and often destructive, but the people have learned to live with the water, whether in the immense delta of the river or on the steeper coastlines.

These countries are experiencing exceptional economic growth, driven by globalization and China's emergence. Although they have not all experienced the same rates of growth and are not all at the same economic development level, they do exhibit a clear common trend. Geopolitically, the five countries are learning to live together, after sometimes ignoring or opposing each other. A new balance is being struck both within the region and with neighboring nations. Given their close proximity with the emerging Chinese superpower, these countries share geopolitical constraints and opportunities which imply a delicate balance between imitation and autonomy. It is clear that the Mekong River plays a central integrative role in the peaceful development of the "angle of Asia" (Bruneau, 2006).

An environment suffering from disrupted ecological balances

The rapid integration of the Mekong River Basin into the global economy has placed considerable pressure on natural resources, and the environmental challenges in the region are huge (De Koninck and Rousseau, 2013). Dam construction, excessive groundwater extraction, fast-moving urban and infrastructure development, deforestation for export agriculture, and mining have all caused major environmental disruption and threatened the lives and livelihoods of millions of people, the most vulnerable of whom have paid a heavy price.

Multiple forms of pollution – both urban and rural – and environmental damage, which affect the population unequally, are combined with climate impacts that will arise before 2050. Scenarios predict a one-meter sea level rise, leading to the displacement of 7 million inhabitants and the flooding of areas where more than 14.2 million people live in the Vietnamese part of the Mekong Delta (ADB, 2013).

The river itself is central to the relationships between inequalities in development and environmental damage: more than 20 hydroelectric dams are being built or are at the study phase in southern China, Lao PDR, on the border between Lao PDR and Thailand, and in Cambodia, with little concern for the externalities generated for neighboring countries (e.g., reduced or accelerated flow, nutrient supply). In the long term, melting

Himalayan glaciers could greatly affect the river's flow and consequently the dams' energy supply. Ultimately, transportation and energy projects along this development corridor are making the basin better connected while endangering ecological balances (Tertrais, 2014; Lagrée and Salenson 2016; Lagrée, 2018).

Toward a science for the sustainability of the Mekong River Basin

Beyond these readily apparent observations, we must note a lack of truly integrated knowledge of the complex links between the environment and inequalities in the region.

In the systematic mapping study we have conducted (Huynh *et al.*, 2021a), we attempt to draw up a comprehensive inventory of all the studies on the subject: 18,286 scientific and gray literature publications were collected and categorized by title and summary, 6,042 English papers were examined, and in the end 2,355 were included in the systematic mapping. These articles were published between 1978 and 2020 and allow us to provide a comprehensive overview of empirical research carried out on the subject. Above all, they highlight perspectives to move toward a science of sustainability in the Mekong River Basin, that will include environmental, social, and economic perspectives (Huynh *et al.*, 2021b).

The first observation is that research into these transdisciplinary themes is largely underfunded, in particular in Cambodia and Lao PDR. Furthermore, some categories of the population are understudied: the poor suburban and urban classes, women, migrants, and refugees. Existing studies also make little mention of environmental dynamics such as changes to agriculture driven by foreign investments for export purposes, biodiversity losses more broadly, or even health problems, although the current crisis does show their crucial importance.

Ultimately, this mapping work seems to call for a less fragmented, more integrated regional and disciplinary approach to the question of the links between environmental damage and inequality dynamics in the region. It is only by turning toward a science of sustainability on the scale of the Mekong River Basin as a whole that we can hope to stimulate dialog on the public policies to be implemented. In that respect, this part concludes with a discussion toward new research paradigms on inequalities and environmental transition under the broader concept of just transition.

Overview

This book, with contributions from a range of experts, sets out to gather current case studies concerning the environmental changes and inequalities nexus in the region. With no attempt to complete, but rather to create a (re)opening of the realm, the book presents evidence from several primary angles.

The first chapter visits the impacts of disasters, floods in particular, with a case study in Thailand's Yom River basin. In this research, vulnerable and marginalized people are the focus, using micro-level analysis to investigate individual performativity and social identity in order to portray essential gaps in community-based adaptation to flooding under multiple discourses and challenges of river basin governance.

The angle taken in the following chapters, the relation between environmental changes and inequalities, relates to the impacts of resource exploitation on the development of local communities. Three case studies are developed in Cambodia, Lao PDR, and Myanmar. Sand mining in Phnom Penh provides evidence of the precarious livelihoods linked to, and impacted by, sand mining, albeit in rather different ways between urban farmers in Phnom Penh and sand laborers. Later, a mining case study in Laos investigates the conflicts between mining companies carrying out development projects and village communities to whom mining appears as a threat to the physical and symbolic integrity of the environment. In that respect, the relation between extractive companies, inhabitants, and national and local governments is studied to shed light on the social injustice of the unequal impacts of mining compensation and mitigation mechanisms on communities.

The following case study is a special one, which accommodates a combination of academic research and activism. The author uses extensive field research combined with his own work directly supporting the researched communities. This study investigates the impact of the China-Myanmar economic corridor on customary land rights of the Ta'ang people in Myanmar: a heated issue in the region, where increasing global economic extension is hampering the customary land (tenure) and livelihood of the local people. The study also provides key empirical insight into how political situations can worsen impacts for certain population groups.

The volume concludes with two chapters researching inequality within two dominant dynamics of the region. One chapter analyses the impact of commercially intensified maize farming on smallholders in northern Thailand. The author argues how centralized capital that is tied into global value chains of production can easily adapt to localized problems within the

production system. As the market reaches out to the geographical periphery of Thailand, the disproportionate burden of risk is placed on the smallholder, exacerbating economic, social, and environmental inequalities. The final chapter examines the complex issue of migration, taking the Vietnamese Mekong Delta as an observatory case study. It sheds light on the interactions between the environment and socioeconomic inequality in migration patterns, through the perspective of migrant vulnerability and capacity in the context of urban integration.

Through this representative set of case studies, the book aims to make a first step toward collecting analyses and viewpoints regarding the environmental changes and inequalities nexus in Mekong countries.

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Map of South-East Asia/Mekong countries

Source: https://www.chiangraitimes.com/chiangrai-news/greater-mekong-subregion-single-visa-plan-edges-forward/

Environmental changes and inequalities in the Mekong region: a systematic mapping

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Part 1.

Rising inequalities and accelerating environmental changes are two of the most significant challenges of the twenty-first century. But how do they relate to one another? Do they have common dynamic factors? We will try to address this question at the regional scale of the Mekong countries, which benefit from both an ecological and socioeconomic coherence. COVID-19 has tested and, in one way or another, revealed embedded societal inequalities. The virus does not confine itself to zones that are known for their difficult conditions; rather, vulnerable families present in all settings can be affected, from rural to urban areas, from Lao PDR and Cambodia to Thailand, Myanmar, and Vietnam, and from poor to non-poor households. Such unprecedented crises, similar to natural disasters, challenge response mechanisms at all levels: individuals, households, countries, and regions.

1.1. Equality and its current position on the research and development agenda

Equality is currently at the center of the development agenda, both for for its relevance to and interdependence with growth dynamics and poverty alleviation. In the Mekong region, extensive interventions on land, water, and other resources in the last decades have fueled economic gains, while leaving significant negative impacts on the environment and communities, especially the most vulnerable, which includes minority ethnic groups, the poor, fishers, women, children, migrants, and smallholders. These social groups are likely to become even more vulnerable soon. Adding to the problem, vulnerability to climate change is also socially differentiated and those consistently identified as the most vulnerable to climate risk are those who are already socially vulnerable. The reverse is also true. Indeed, inequalities often lead to an overuse of natural resources through different channels. Different human activities and behaviors may also hinder attempts toward environmental protection. As noted by various authors (Cushing *et al.*, 2015; Boyce, 2007), inequality has often been discussed in its economic (income-related) dimension (Piketty, 2014) without focusing on the diverse and holistic dimensions of inequalities in relation to different environmental dynamics.

In a global-scale review, Hamann *et al.* (2018) show that, far from being independent from each other, inequality and the biosphere interact in many different ways — or "pathways" — including through the presence of unequal societies, which leads to increased environmental degradation (emphasized in

Cushing *et al.* 2015). The economic and social studies around the global increase in inequalities (Piketty, 2014) would then expand to become ecological, too. More often than not, the impacts of environmental changes vary between groups of people and are strongly informed by existing social inequalities. Environmental changes put disadvantaged population groups at significantly higher risks, as confirmed by Chancel and Piketty (2015) in the case of climate change. Further, Mohai *et al.* (2009) conclude that exposure to pollution and other environmental risks is unequally distributed by race and class. There have been reviews on the relationship between inequalities and the biosphere (Hamann *et al*., 2018), and environment quality and health (Cushing *et al*., 2015). Putting an emphasis on the nexus between inequality and the environment helps identify the people at risk and/or the disadvantaged group(s), which is a step toward understanding the winners and losers of environmental policies supporting sustainable development (Boyce, 2007).

Different typologies of inequalities have been investigated by a range of academic and political institutions. This includes the economic, political, environmental, social, cultural, spatial, and knowledge-based inequalities defined by the 2016 World Social Science Report (ISSC, 2016), and the tripartite typology of equity (distributional, recognitional, and procedural equity) used by Schreckenberg *et al.* (2016) and Leach *et al.* (2018) developed from Fraser (1996). There are also the distributional, recognitional, and contextual equities used by McDermott *et al.* (2013). The notion of "environmental justice" first emerged as early as the 1820s, but was only mentioned in the United States in the mid-1980s (Mohai *et al*., 2009), before reaching Europe in the 1990s. The Organization for Economic Co-operation and Development defines four different types of inequalities: exposure and access inequalities, policy effect inequalities, impact inequalities, and policy making inequalities (Laurent, 2011). Inequalities are increasingly becoming a critical factor affecting "a fair and equitable process of moving towards a post-carbon society" (McCauley and Heffron, 2018). In that discussion, the notion of just transition is also embedded within a political trade-off. Any ecological pathway must be made compatible with the pursuit of "climate justice" for current and future generations exposed to social and ecological disruptions (Newell and Mulvaney, 2013).

1.2 Inequalities and environmental changes: a systematic mapping in five Mekong countries

The Mekong River basin plays a crucial role for the livelihoods of millions of people in Cambodia, China, Lao PDR, Myanmar, Thailand, and Vietnam. At the same time, these countries have witnessed some of the most rapid socioeconomic — and sometimes political — changes in the last few decades. While Thailand has explicitly aligned itself with both globalization and anti-globalization discourses at different points in time, in the case of Lao PDR, Vietnam, and Cambodia, it is difficult to separate the advent of post-Cold War globalization discourse from the more general opening of these economies. This opening has been associated with the move from command economies — semi-autarkic in the case of Lao PDR and Democratic Kampuchea in the latter 1970s — toward more open market economies following Lao PDR and Vietnam's reforms of the mid-1980s, and Cambodia's transition and end to international isolation after 1991 (Hirsch, 2001). The determinants of inequalities are thus embedded in rapidly changing institutions which have both national and regional histories. These idiosyncratic evolutions of inequalities are also becoming increasingly embedded in common ecological constraints.

The current environmental changes in the region include, but are not limited to: the construction of dams, over-extraction of underground water, pollution from fast developing cities, deforestation, and sand extraction (Stibig *et al*., 2014; Simpson, 2007; Hirsch, 2016). These activities have caused great environmental disturbances and threatened the life and livelihoods of millions of people, among which the most vulnerable have been severely affected. Climate change adds to these ongoing environmental problems by increasing the region's fragility. Predictions state that even a sea-level rise of 1m would cause the displacement of 7 million inhabitants and flood the homes of more than 14.2 million people in Vietnam's Mekong Delta (ADB, 2013). Furthermore, it should be noted that climate change is only one of the many drivers for vulnerability: other social and environmental stressors, including social marginalization, poverty, and a lack of access and rights to natural resources, should also be taken into account. In growing economies, each inhabitant faces these issues — including the climate change risk — differently (O'Brien, 2012; O'Brien and Sygna, 2013). In fact, the decisions on economic growth in the last decades have put more people, assets, and resources in the path of encroaching climate change (McElwee, 2017).

At this stage of knowledge, numerous studies have tackled one specific aspect of the relationship between environmental changes and inequalities in the region, but no holistic assessment has been conducted so far. Until this scattered knowledge is properly mapped — which would highlight the diverse quality of the studies, their data sources, their representativeness, the need for further studies (or, on the contrary, their well-established results) — a holistic view will not be possible, and it will be difficult for local and national decision makers, let alone regional institutions, to take science-based action. The current systematic review conducted by a regional team is the first step toward a better and more comprehensive understanding of the topic (see full detail of the review in Huynh *et al*., 2021).

Our research adopts systematic mapping methods (Armstrong *et al*., 2011; Petticrew and Roberts, 2008) to study how the multidimensional variables of inequality and environmental changes relate to and interact with each other. The review took place from October 2019 to February 2021, following the steps detailed in Box 1. Both scientific and gray literature are included. The search terms used and number of items achieved are carefully recorded. The screening processes are made with transparent criteria, and the reviewers followed the rule below to decide the inclusion or exclusion of items.

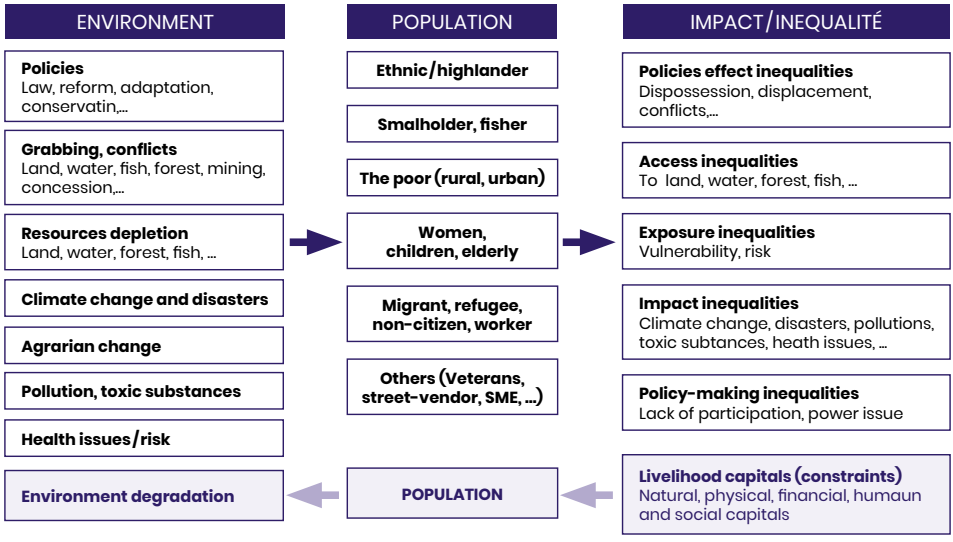
Box 1. Steps for the systematic mapping applied in the Mekong environmental changes and inequalities project (2019–2021)

1. Formulate the scoping question: What is known from the existing literature about the inequality-environmental changes nexus?
2. Contact and formulate the expert committee
3. Establish a test list using expert advice
4. Identify the search terms (PECO approach: Population, Exposure, Comparator, Outcome)
5. Search on various platforms including Web of Science, Science Direct, Wiley Online, Taylor & Francis Online, ProQuest, SpringerLink, SAGE Publishing, JSTOR, and institutional websites, databases, and libraries
6. Search for gray literature
7. Refine the results (three levels: title, abstract, full text). Results criteria are developed with experts
8. Quantity and mapping analysis

This systematic mapping is based on the relationship between environmental changes and inequalities. It is therefore necessary to select relevant keywords. We follow Leach *et al.*'s definition for equality (2019), which is as follows: "ensuring that everyone has what they need for wellbeing in a given context, implying 'more for those who need it'" rather than "treating everyone in the same way, or evenly distributing a given 'pie'". Inequalities or inequities can be economic, political, social, cultural, environmental, spatial, and knowledge-based (McDermott *et al.*, 2013; ISSC and IDS, 2016; Leach *et al.*, 2019), which is put under the tripartite typology of distributional, recognitional, and procedural equity (Schreckenberg, 2016; Leach *et al.*, 2019, developed from Fraser, 1996), or distributional, recognitional, and contextual equity (McDermott *et al., ibid.)*. Distributional equity refers to how resources, costs, and benefits are allocated or shared among people and groups; recognitional equity refers to the acknowledgment of and respect for identity, values, and associated rights; and procedural or contextual equity highlights how decisions are made, and the extent to which different groups are able to influence these or have their voices represented or incorporated. Among others, history, culture, and norms also affect the level and reproduction of inequalities. They often maintain and even reinforce social exclusion based on gender, race, class, caste, ethnicity, disability, and other axes of difference (ISSC, 2016).

Figure 1. ***Practical systematic mapping scheme to summarize the two-way relationship between environmental changes and inequalities in the Mekong region***

Source: author's construction.



The total items collected were 18,286 English texts, 1,112 Thai texts, 143 Vietnamese texts, 19 Laotian texts, 7 Burmese texts, and 2 Khmer texts. Only English, Thai, and Vietnamese texts were screened at the title and abstract stages, and only English items entered full-text screening for the mapping. 6,042 items, published between 1961 and 2020, entered full-text screening for systematic mapping. In total, 2,355 texts (32.4%) were included in the mapping. In addition, 96 items overlapped with the studies presented in the previously included papers. They are not included in the mapping. Due to time and access constraints, there were 674 items for which no full text was found, and which were therefore not screened.

1.3. Systematic mapping results

Journal articles constitute the majority of the literature included (66%), with other text types including book sections, theses, conference papers, reports, and unpublished manuscripts [1] (Figure 3). A fair number of reports (17%) reveal the attention that institutions — especially non-governmental organizations (NGOs) — pay to the inequality-related aspects of environmental change (Hirsch, 2001; Yasuda, 2015; Partelow *et al*., 2020). Most of the studies are about the relationship between environmental change and inequality in Thailand (38% of the studies, including the regional ones — Mekong, Southeast Asia, Asia and global scale) or Vietnam (24%), with less publications about Cambodia (12%), while Myanmar (8%) and Lao PDR (8%) have the least mention. This demonstrates the difference between countries in scientific awareness of this topic and the capacity of research facilities. The first decade of the 2000s witnessed a significant increase in studies in the area — 6.7 times compared to the previous decade — especially in Vietnam and Thailand. The following decade (2011–2020) witnessed a boom in studies on vulnerable groups regarding the impacts of environmental stressors — 2.6 times higher than in the previous decade.

Since the 1990s, Mekong governments have invested in large-scale infrastructure projects such as roads, dams, and commercial agriculture, to replace subsistence shifting cultivation including opium production. In the first decade of the 2000s, the economic gains of large-scale development started to be questioned in the face of visible negative impacts — especially

1. Due to time and language constraints, research and works in local languages are not included in this table. Media with a different structural nature such as newspaper articles, blog posts, etc., are also excluded.

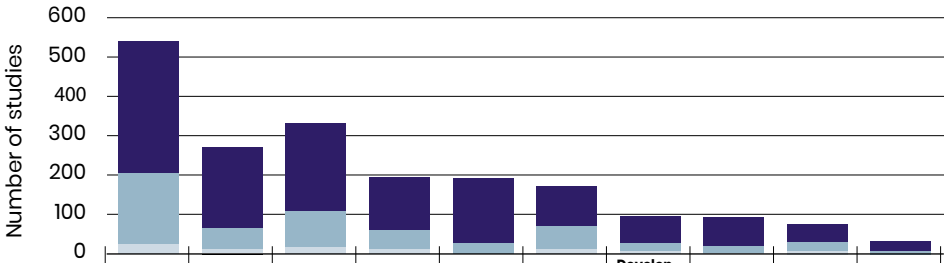
on local communities, some of which face more problems than others. The included items illustrate how the impact of investments and policies has been subjected to growing interest since the 2001–2010 period. During that time, researchers and institutions conducted research on:

1. the effects of hydropower and infrastructure investments on resettled/displaced communities;
2. the drawbacks of conservation policies such as national parks and protected areas: such discussions had already taken place in Thailand in the early 1990s, responding to the country's related policy implementations since the 1960s;
3. the commercialization of agriculture and land concession for agriculture, which led to tenure and livelihood insecurity for some communities across the region.

It was also in the first decade of the 2000s that studies were able to catalogue a range of environmental movements, including the "jump of scale" resistance to globalization in Thailand — which had begun in the 1990s — and a similar but more poorly articulated resistance to local processes in Lao PDR (Hirsch, 2001). There were also movements against dam building and the phenomenon of large-scale (cross-border) land acquisitions known as "land grabs" (Gorman and Beban, 2016), with support for such movements starting in local communities and moving upwards to local NGOs and then international organizations. Under this theme, most publications are about cases in Thailand (Figure 2).

In the 2000–2010 period, there was an upsurge in reports on environmental movements against large-scale, military-backed projects in Myanmar. This period marked the expansion of studies on the impact of climate change and natural disasters, followed by discussions on adaptation and resilience in the years after. Nominal events are especially studied for their impacts, such as the 2004 tsunami in Thailand, flooding in various regions, and the Mekong region's severe drought and salinity intrusion. In the 2011–2020 period, and in particular since 2015, there was an increase in studies on the gender impacts of environmental change and pollution in the region. Also, in the last 5 years, more studies have highlighted the issue of rights — followed by injustices and inequalities to a lesser, but increasing, extent. Owing to this focus on rights, political ecology appears to be the most dominant discipline applied in the reviewed studies in this period.

Figure 2. ***Distribution of literature by discipline and time period***
Source: author's construction.



	Political Ecology	Anthro-pologie Sociology	Health Science	Social Ecology	Environ-mental Science	N/A (Assess-ment	Develop-ment Sustain-able	Behavior/ Psycho-logie	Policy Analysis	Economics
2011-2020	336	205	226	134	165	102	68	72	46	23
2001-2011	179	54	90	49	24	56	20	17	22	6
1991-2000	21	10	14	9	2	11	5	1	5	1
1978-1990	3	1	3	2	1	1	2	1	2	

Among the different domains within the environment-inequality relationship, three stand out as the dominant ones within the full texts we analyzed: rights issues and land conflicts (including land grabbing and concession), forests and forest products, water, and other resources – 967 Population – Exposure – Outcome (PEO) relations presented; Climate change and disaster impacts on vulnerable groups - 533 PEO relations recorded; and a growing interest on Pollution – 299 cases (Figure 3).

Figure 3. ***Linkage between keywords from the 2,355 chosen full texts, showing three dominant themes***
Source: author's construction.

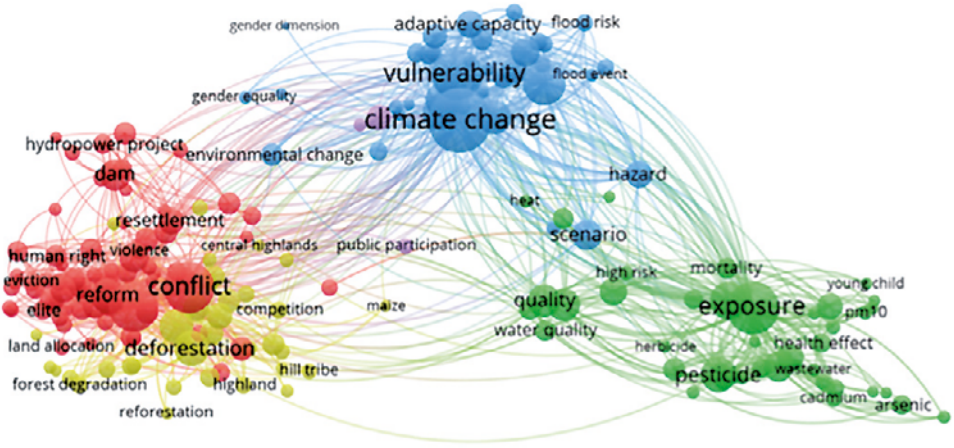
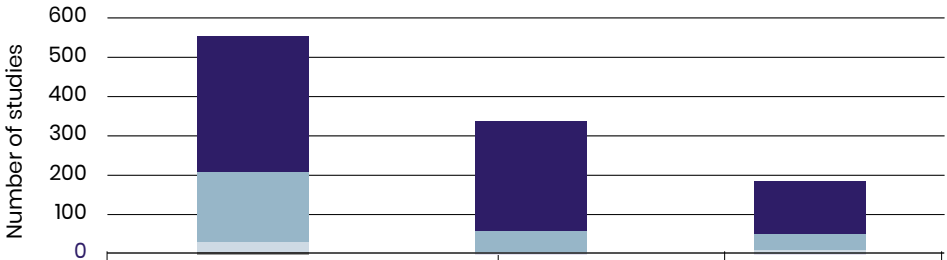


Figure 4. ***Distribution of studies in three dominant themes, by publication period***
Source: author's construction.



	Right and Access to Ressources	Climate Change and Disaster	Pollution and Toxic Substances
2011-2020	595	479	230
2001-2011	302	91	72
1991-2000	43	9	16
1978-1990	11	1	2

Studies in all three domains significantly increase from the first decade of the 2000s onwards. In particular, the data shows no research on the relationship between climate change and inequalities before 2000. This implies the shifting focus on vulnerable groups, who were likely not on the region's economic development radar in the 1990s. Between 2000–2010 and 2011–2020, there is growth of more than 400% and 300% respectively on studies focusing on the inequalities linking to climate change/disaster impacts and to pollution and toxic substances issues (Figure 4).

1.3.1. Domination of ethnic studies and rights issues: Recognising inequalities as the root cause

The uplands and their shifting agriculture have long been the target of "development." Until the early 1990s, the governments of Thailand, Lao PDR, Cambodia, Vietnam, and Myanmar often considered highlanders and hill tribes as the cause of forest degradation. Their farming practice of shifting cultivation has been blamed for various environmental problems, including lowland flooding and upland erosion. Such identification provides legitimacy for agrarian changes to cash crops or "boom crops" such as maize, coffee, cacao, rubber, and palm oil (Mertz *et al*., 2009; Thongmanivong *et al*., 2009; De Koninck, 2011; Fold and Hirsch, 2009). This paves the way for land concession and grabbing by way of large-scale plantations, invested in mainly by lowlanders and even foreign investors. Is the investments

include rubber plantations in Lao PDR and Cambodia by Chinese and Vietnamese investors (Global_Witness, 2013; Kenney-Lazar, 2009). The common expectation for expanding market-based farming was better income for the highland farmers. However, in Nan, Thailand for instance, where only 10% of land is arable land, forest encroachment for maize farming grew significantly in the 2000s yet local poverty has also increased. This is something which Pampasit and Pampasit (2018) explore, in a study which questions the relationship between poverty and the commercialization of farming.

In the face of increased commercial cropping, local communities have also been finding ways to adapt, which may include taking risks and opportunities. In a study about the Philippines and Thailand, Dressler and Roth (2011) confirm that farmers can both welcome emerging market opportunities and feel coerced by them, transforming from "passively" engaging with markets to an "active" negotiation. Swidden farmers become more vulnerable while attempting to increase their income (Cramb *et al.*, 2009). In addition, Kong *et al.* (2019) report, in the case of using forest land for maize and cassava cultivation in northwestern Cambodia, that boom crops engage smallholders in a risky business of growing crops that are part of a wider capitalist mode of production. It traps them in indebtedness and wage labor, or leads them to migrate to Thailand. The result is a wider socioeconomic gap between different farmers, with wealth accumulated among the most privileged ones (Kong *et al.*, 2019). Within this process, inequalities continue to play a role in increasing social differentiation: livelihood capitals (human, physical, natural, financial, and social) influence whether one can adapt and benefit from the changes, or fall into insecurity (e.g., land right issues, debt). Often, the poorer, smaller farmers become losers in the commercial cropping market.

Beside investments on the upland with infrastructure projects, mining and crop cultivation have created the region's biggest era of land and water grabs (Shepard and Mittal, 2009; Neef *et al.*, 2013; Hirsch and Scurrah, 2015; Cotula, 2012); 255 texts document these dynamics in the database (Table 1). The issue exists within the landscape of land concession, acquisition, and resettlement for projects. Ethnic minorities, indigenous groups with customary tenure systems, and poor people with temporary rights are often at highest risk of dispossession, displacement, resettlement, or even forced eviction. Cambodia and Lao PDR are among the region's countries with land governance systems that have strongly supported large-scale investments since the 1990s. Myanmar's call for investments in the 2010s,

combined with a strict top-down structure controlled by the military, had driven insecurity in local communities' rights to land, water, forest, and other resources. In Myanmar, it is the continuity of serial, historical land grabbing practices as well as decades-old conflicts that are shaping and reshaping farmers' land use rights (Suhardiman *et al*., 2019). The ongoing land reforms in Cambodia and Myanmar are not yet helping, due to overlapping claims over land and difficulties in registering rights (Suhardiman *et al*., 2019; Scurrah and Hirsch, 2015).

In the Mekong region, the state is often the primary initiator and implementor of land reforms. Such a top-down approach to land registration, allocation, and (re)distribution may limit the potential of land reforms to achieve desirable changes in land tenure and land use in practice (Sikor and Müller, 2009). In the end, land reforms led by the interest to encourage private and foreign investment in agriculture, while often stating in propaganda as to create wealth and reduce poverty, could formalize ongoing inequities and create new injustices (McCarthy, 2018). Indeed, there is still a gap between the policy reform that recognizes customary/communal land rights in the National Land Use Policy, and the ongoing land grabbing in Myanmar. Thus, as Oldenburg and Neef (2014) state, it risks perpetuating and aggravating resource conflicts, with distributional inequities and tenure insecurity affecting the majority of the rural poor. The authors call for policy reform to move beyond the state's legal-centric approach, which views farmers' land use rights, in the absence of a formal legal title, as illegitimate. In addition, Suhardiman *et al*. (2019) argue the importance of understanding that "people may lack formal title to their land, yet, this does not mean that they lack the right to use the land," as well as asserting that legal-centric approaches to land governance reform are so far unable to deliver justice.

Table 1. ***Distribution of literature across environmental changes and population groups.***
Source: author's construction.

Green = least number of studies found; red = greatest number of studies found; gray = irrelevant

Distribution of literature across types of environmental change and population groups	Ethnic/highlander	Poor	Farmer/smallholder	Fisher/seafarer	Women	Children	Elderly	Migrant	Worker	Refugee/non-citizen	Indigenous	Communities	Disadvantaged	Rural people	Urban people	Others (SME, elite, vendor), veterans
National park/protected area	62	4	9	3	3				1		3	3		3		
Hydropower/water infrastructure	25	10	11	7							6	58	1	33		
Climate change	9	53	72	3	16	5		2	8		4	43	5	3	7	
Resources reform/policy (land, water, forest)	82	38	75	12	19			2	2	5	17	5	4	9	2	1
Health issues-caused agent	5	13	8		10	6	2		5	3		10	6	8		
Agrarian change	17	7	34		6			2	1	1	1	3	1	3		
Pesticide	5		57	1	4	7	1		9			7		5		
Disasters (incl. extreme events)	17	47	41	6	12	8	7	8	7	1		84	20	27	15	3
Pollution (air, water, etc.)	2	5	4	1	2	23	4		11			40	4	17	18	2
Resource depletion (land, water, fish, forest)	22	14	13	8		6		1			1	2	1	8	1	
Resource grab/acquisition/concession (land, water, forest, fish)	57	28	77	6	10	5	2	2		3	15	25	5	20		1
Mining	14	3	2	1	3	4			7		4	5				
Environmental changes	5	13			1	3		1			1	11				
Toxic substances	2	2	4	4	3	9			8			15	1	18	3	1

Considered to be destroyers of the forest, ethnic groups in upland areas which have become national parks and protected areas are subjected to resettlement — 62 studies from our sample directly address the issue. Since the 1970s, protected area networks in mainland Southeast Asian countries have developed significantly, occupying 4–25% of their respective national areas (Déry and Vanhooren, 2011). Most of the areas are found in the mountainous domains of ethnic minority peoples. Such integration into larger national and international systems place local people in a disadvantaged position of power (Déry and Vanhooren, 2011). In the 62 studies, 31 are about conflicts between communities and the government and the communities' resistance (Table 2). The notions of "our lands are our lives" (Park, 2019) and "our forest, our life" (Conservation Alliance of Tanawthari, 2018) are predominant in such contexts. Protected coastal areas such as the mangrove reserves in Thailand and Vietnam, or water-based biosphere reserves such as Tonle Sap in Cambodia, also pose risks to the livelihood of local communities.

The inclusion of the remote highlands in top-down policies often appears to be a form of state territorialization of the land and forest (Lestrelin, 2011; Woods, 2019; Ramcilovik-Suominen, 2019; Suhardiman *et al.*, 2019; Vandergeest and Peluso, 1998). It is seen as part of the state agenda to incorporate people living in these areas into the general state-managed space. In this context, literature had recorded movements, resistance from the ethnic groups. Heated protests and movements, with the support of NGOs, have flooded literature and media in Thailand and Myanmar. Conflict and resistance in this area are found in the literature sample mainly in relation to cases of protected area, land and water policies and grabbing (Figure 6). For some, it is the "struggle for life" (Diepart *et al.*, 2019).

Table 2. ***Distribution of evidence across types of environmental change and inequalities***
Source: author's construction.

Green = least number of studies found; red = greatest number of studies found; gray = irrelevant

	WELLBEING						CONFLICTS AND RIGHTS						GENDER	RISK AND CAPACITY				
Distribution of evidence across types of environmental change and inequalities	Health issue	Poverty	Wellbeing	Life cost	Migration	Displacement	Land/Water/Fish /Forest rights	Eviction	Human-right violation	Access reduction	Conflicts/Resistance	Social disruption	Gender-deviated impact	Vulnerability	Health risk	Adaptation (capacity)	Resilience (capacity)	Inequality/Injustice
National park/ Protected area		3	15	1	1	5	10	1	8	8	31	1	2					
Hydropower/Water infrastructure	3	1	73	1	1	19	2		5	9	13	4	3	8	2	2		3
Climate change	8	9	58	4	18	5	1			2		1	8	79	13	33	6	2
Adaptation policy			3															
Resources reform/policy (land, water, forest)		12	58		2	5	75		6	14	52	16	4	2		3		17
Health issues-caused agent	33	5	12	5								4	1	6	29			1
Agrarian change	3	8	30		2		9			2	6	15	3	1	2	5		1
Pesticide	31		1											2	62			
Disasters (incl. extreme events)	24	14	64	13	7	5	4		3	7	4	3	5	99	8	24	14	
Pollution (air, water, etc.)	37		10		9					1	2			5	73	1	1	
Resource depletion (land, water, fish, forest)	1	5	30		1		5			8	12	6		2	4		1	1
Resource grab/ concession (land, water, forest, fish)	7	1	52		2	8	56	8	24	10	49	6	1	4	6	1		7
Mining	7	1	14				5	2	3		4	1	1		8			
Environmental changes	3	4	12		1	2					6	1		5		3	1	
Toxic substances	19		1								1				52			

1.3.2. Climate change and disaster impact: A trending research interest

Climate change and its impacts are at the center of attention all around the world. This is also illustrated in our systematic mapping of the Mekong region. As UNESCAP (2018) confirms, natural disasters cause disproportionately greater impacts on poorer countries and households and therefore exacerbate inequalities among countries, but also between the rich and the poor; climate change also magnifies the risk of disasters. Our research shows that existing studies discuss aspects such as exposure and/or vulnerability to climate change and disasters — e.g., flood, drought, heat, storm, extreme event, erosion — and their impact on the livelihoods and wellbeing of different groups (Table 1). The local community in general, the poor, and smallholders are the populations most discussed (Table 2)). In addition, there is growing interest in how women specifically are affected by climate change and disasters. On some (rare) occasions, post-tsunami dispossession of land rights (Cohen, 2011; Bristol, 2009) is also highlighted, showing the growing interest in a topic for which studies are still limited in number.

A limited amount of works mentioned and discussed the inequalities of climate and disaster mitigation and adaptation policies. This highlights a lack of knowledge in the field. Although these policies aim to adapt rural and urban spaces to climate change and other environmental stressors, they often include communities being resettled, causing disturbances in livelihood and social life. Top-down planning is showing its limits by not accommodating the various needs of resettled households. In addition, governments and studies tend to focus solely on the issue of climate change — this is, however, only one of numerous problems facing modern urban systems with dense urban conditions, often making the system more sensitive to changes and intensifying climate impacts (Storch *et al.*, 2016; Revi *et al.*, 2014; Pelling *et al.*, 2015; Eriksen *et al.*, 2015). Integrating adaptation into "development-as-usual" paradigms thus risks reproducing a system that creates vulnerability in the first place (Eriksen *et al.*, 2015).

1.3.3. Pollution, migration, migrants: Growing concerns

Air pollution (such as haze), water pollution, and toxic substance risks involving arsenic, lead, and cadmium from mining sites are next in line concerning representation in our database (Table 1 and 2). In Asia, studies show that air pollution is estimated to claim over 4 million lives per year, mainly in

developing countries; poor and disadvantaged groups are disproportionally impacted by pollution (UNESCAP, 2018). Health issues and risks are the main concern, with a higher number of studies focusing on the risks rather than the issues found. This implies the need for evidence to conclude on the impact of pollution on different groups of people. It is also worth noticing that most works on pollution are from Vietnam and Thailand, which highlights the regional imbalance of research facilities, as well as an awareness imbalance among local researchers and decision makers in the Mekong region regarding the importance of environmental impact on human wellbeing.

While international and internal migration (e.g., rural-urban migration) in the Mekong region has been widely studied, environment-induced migration has not. Despite evidence of huge numbers of environmental migrants and refugees worldwide (Myers, 1993), the environment is only one factor among many others affecting the decision to migrate. In our literature mapping, migration is also expressed in the urban migrants' vulnerability to disasters and policy/reform in urban settings. In the current literature, migration gains little attention compared to land grabbing. This is the case of Vietnamese who cross the border into Cambodia, engaging in international migration for the purposes of accessing land for production. Gorman and Beban (2016) conclude that on the Cambodian border, Vietnamese migrants have strived to ameliorate these underlying sources of precarity and strengthen their access to land through the active cultivation of new social relations; whether such relations will be enough to maintain their access over the long term in such a dynamic environment remains to be seen. Similarly, while studies exist on the conflicts between lowlanders and highlanders, less attention is paid to why and whether environmental issues play a role in the migration of the lowlander in the first place.

1.3.4. Community-based resource management: An alternative

Knowledge production and policy making in the Mekong region has increasingly expanded in the direction of finding alternatives for resource management and conservation. In the last decade, Thailand and Vietnam have "opened up" protected spaces for community-based management (Huy, 2006; Pinthukas, 2019; Sikor *et al.*, 2013, and many other works). Indeed, it is not unusual for community-based water management systems to arise, in part, because of the failure of state-based arrangements (Lebel *et al.*, 2005).

Despite these attempts, a lack of participation from, and lack of recognition toward, the role of local communities are hindering the process. This situation is exacerbated by the presence of inequalities. As a larger problem, the global discourse of conservation in the last decades has stereotyped some communities as "ecological sinners," causing public prejudices (Tomforde, 2003) and disregarding their changing practices. A study from the first decade of the 2000s shows how decentralization and devolution of forest management to communities were generally slow and given less attention despite outcry from the communities themselves (Benjamin, 2008). Scientific scholars continue finding evidence to prove the benefits of property rights for protecting resources at the same time as improving the livelihood of local communities. For instance, Chankrajang (2019) asserts that securing communal property rights and exploiting nested layers of governance from the state to the local communities could enhance the governance of the commons and lead to better environmental outcomes. Another policy to simultaneously protect forests and sustain the livelihood of local communities is the Payments for Ecosystem Services incentive (PES). The idea has been discussed in various forms such as "payments for pollution control," where the payments serve as a complement or alternative to the "polluter-pays" principle, and "payments for the conservation of natural resources and ecosystems." However, Neef and Thomas (2009) conclude that further development, testing, and refinement of viable, effective, and sustainable PES mechanisms in the context of the diverse conditions found in Southeast Asia will be a complex and long-term process.

In the land governance sector, researchers have warned governments in the Mekong region on how the active involvement of local people is essential in planning, implementing, monitoring, and evaluating development and conservation programs in swidden lands (discussed by Cramb *et al*., 2009 in relation to Cambodia, and Suhardiman *et al*., 2019 in relation to Myanmar). The recent announcements made by the Cambodian government to cancel economic land concessions and re-allocate land to smallholder famers are positive steps. However, Diepart (2016) argues that the process needs to materialize quickly, as land is already being reappropriated by corporate and individual actors who have been taking advantage of the absence of a clear vision, policies, and mechanisms. All in all, giving communities a role in strategy development could open new land reform processes and modalities which were unavailable in the top-down state-driven system.

1.4. Implications for research and practice : for a paradigm shift on sustainable development and complexity analysis in the Mekong countries

Benjamin Buclet, Stéphane Lagrée

This systematic mapping presents the analysis of literature on the relationship between environmental changes and inequalities in Cambodia, Lao PDR, Myanmar, Thailand, and Vietnam. With 2,355 out of 6,042 studies found included in the mapping, we provide an overview of the available knowledge and knowledge gaps, as well as a set of databases for further exploitation. Researchers, policy makers, and institutions could use this analysis to further work on:

1. topics for which data is already available, facilitating content analysis which could result in direct advice for policy action (e.g., tenure and rights issues, climate change/ disaster and inequalities, pollution and inequalities);
2. knowledge gaps that require more data, through initiating research and development projects that will develop the knowledge pool and provide bases for policy recommendations.

Taking inequality into account is indeed the only way to make sure policies are on track to achieve the SDGs; as Lebel (2013) states: "for marginalized groups adaptation should be about pursuing social justice in development — empowering and providing options and opportunities to exercise choice." As of 2019–2020, under the new shock and environmental stress of the COVID-19 pandemic, inequality and social differentiation have revealed, in some contexts, some issues that were previously hidden.

Based on the available data analysis, the authors recommend particular considerations for policy making and studies in the Mekong region:

- Future policy and development projects should be aware of and take into account the root causes: the nature of ethnicity identification bias (as "forest destroyers" in forest conservation policy), the current structure and statehood where real community participation is not present, and the undervalued consideration of indigenous, local livelihood compared to trending investment gains. This is crucial for both the climate and biodiversity policy agendas.

- Research institutions should focus more on the notions of equality, equity, and justice, which will hopefully facilitate direct research dynamics and discussions on the topic. Scientific and policy-built institutions should enhance their connections with, and development of, research on environmental inequalities toward sustainability. Sustainability science and perspective could be a gateway to the future. A specific regional study on how these multidimensional variables of inequality and environmental changes relate and interact with each other could be useful. This could aim at building a scientific base for policy action as well as identifying under-investigated research questions.

Database collected through the mapping could be in use for further research and analysis. They can be found here: https://www.zotero.org/groups/2366065/mekong_equality/collections/EWDLR984

Climate change adds uncertainty to the ongoing environmental and resource-use issues of the Mekong basin. In this context, transboundary governance of natural resources faces challenges from high degrees of uncertainty, contested outcomes, and multiple actors with various interests. Current issues derive mainly from the perspective of national sovereignty and owned business. At the same time, current "undeniable" issues of environmental damage and climate change are a driver for progress. Miller *et al.* (2020) assert that history has shown that times of crisis, rupture, and displacement create opportunities to enact flexible governance.

Along with institutional trials and practices based on the principles of proactive regional planning, and holistic cross-border assessment and decision-making, transboundary governance is part of the urgent need to move toward a "fair environmental transition." Again, all in all, the environmental changes, related to the acceleration of climate change and coupled with the management of water and related natural resources, raise the crucial question of interactions with inequalities, the social contract and economic growth at the scale of the Mekong countries. It is urgent to develop actions that tackle issues surrounding environmental transition and inequalities in Mekong countries; in order to respond to this challenge, hereafter four areas of recommendations are proposed in the field of knowledge and capacity building.

The first is by undertaking an ambitious and extensive production of scientific knowledge on the different dimensions of the inequality-environmental transition nexus. This effort will result in a critical mass of knowledge to contribute to a deeper understanding of the societal changes necessary for the success of the environmental transition in the Mekong countries (Huynh *et al.*, 2021). This research falls under the umbrella of sustainability science. This science of interactions, defined more by the questions it addresses than by any one scientific discipline, focuses on understanding the relationships of ecological and social phenomena studied at all scales, using a methodology based on a systemic approach to the humanity-environment-society triad. Interdisciplinary by nature, sustainability science encourages scientists to work with communities and to develop solutions for and with all stakeholders. In fact, in today's highly complex and difficult Human-environment systems — which associate diverse stakeholders with different interests, uncertainty, and embedded injustice — the growing field of sustainability science has adopted a variety of useful approaches (such as coproduction of knowledge, and hands — on testing of interventions with local stakeholders), capable of assisting much-needed transformations (Messerli *et al.*, 2019).

The second and third recommendations are the core elements of an innovative way of doing research. First, it involves systematically linking researchers and their institutions with other stakeholders — policymakers, media, civil society, the private sector — who are directly concerned by and have stakes in the foreseen outputs. This link is expected to enhance the impact of scientific findings through their direct integration, simultaneously with their publication, into concrete actions, collective practices, and public policies, which can be promoted through the undertaking of PhDs integrated into an ambitious framework of activities. Second, based on the connections and network consolidated during implementation of the research, it is a matter of going further and making use of the knowledge produced. This is an important question about the format and visualization that scientific knowledge takes, carried out so that the results of research are understood beyond academic circles alone. The organization of regular and specific events for dialogue and exchange between scientists and other stakeholders will also enhance the impact of the findings. It is by supporting researchers and their institutions in their efforts for dissemination, and using modern means of communication, that scientific progress will be considered by decision makers at its true value, i.e., indisputable knowledge, resulting from rigorous work, demonstrated and validated by the scientific community.

The fourth ax of recommendation is an intense capacity building effort targeting higher education and research institutions in Mekong countries, to ensure leverage effects and start a virtuous cycle leading to the science-based monitoring of environmental transition. The fundamental principle guiding the program at this level is the belief that good research — that is, research that solves, or helps to solve, problems — requires skills that go far beyond scientific skills. Project writing, communication, management of financial and human resources, legal and ethical issues, communication, and outreach are all essential elements for embodied research. And yet, these skills, which are peripheral to the purely scientific activity of research, are often ignored in higher education and research institutions in Southeast Asia.

Communication and knowledge management are central. Non-academic stakeholders' opinions and the extended peer community must play a role in monitoring the quality of the research process and results. The knowledge produced should be systematically shaped to be understood and disseminated beyond the academic sector, fueling societal debates and directing the processes of change toward environmental transition.

This paradigm shift on sustainable development represents a unique opportunity for higher education and research institutions to position themselves as actors of change, by enabling science to influence collective decisions. They will be integrated into an international network committed to a responsible and pragmatic approach to research, leading to connected science. The participation of non-academic actors in the formulation, monitoring, and political and economic enhancement of the findings will ensure the development of close links between partners, producers, and seekers of scientific expertise.

The long-term impact of these actions will stem from concrete and visible expected outcomes, both in terms of new knowledge and capacity building. They must bring about profound changes in the way research is carried out, and in the use of scientific results by economic and social actors, highlighting their usefulness and relevance to societal challenges. This connected science approach can be replicated in other contexts. It would lead to the production of white papers, roadmaps to environmental transition, contributing to identify solutions to the most urgent socio-environmental problems faced by humanity.

Finally, the core of these recommendations is to contribute to building the next generation of policymakers for the environmental transition, a network of leading sustainability science experts in the Mekong countries, as well as a network of local community actors and NGOs. Building local interdisciplinary scientific knowledge, guiding evidence-based public policies, and fostering scientific and policy regional coordination will ultimately help bring about the socioeconomic conditions for ecologically resilient economies in the region.

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Insights from six case studies in the Mekong countries

Part 2.

2.1. Social identities and unequal vulnerabilities in the structural transition to community-based flood risk governance in the Yom River Basin (Thailand)

Phaothai Sin-ampol, Katherine A. Daniell, Rebecca M. Colvin

In response to the urgency of sustainability and climate change, the Lower Yom watershed in Thailand is the site of a pilot project in floodwater detention. This has been claimed as a "participatory management" approach that develops drainage systems, micro-scale structural mitigation, and livelihood changes under community-based adaptation to flooding. This study adopted a participatory research approach to explore how different social groups experience vulnerability, as well as the changes brought about by the pilot project. This research develops a micro-level, social identity-based analysis of experiences in the pilot model. Data were gathered through in-depth interviews with 38 organizational representatives and 44 individuals from urban and rural communities to capture the strengths of, and barriers to, adaptation to flooding. Participatory action research workshops at the local level, focusing on interpersonal learning, were also employed to motivate subgroups to discuss their vulnerabilities in the context of flooding and how to stabilize adaptation measures. The results show that community policy drafts were able to articulate approaches to help vulnerable groups by improving flood protection, drainage capacity for water security, flood retention conditions, and livelihood alternatives. However, a key sentiment that *"flooding is acceptable, but no flooding is better"* confirmed a reluctance among rural farmers, workers, the elderly, and physically exposed citizens to live with floods. From this analysis, it can be interpreted that genuine participation to support flood risk governance from the local level requires substantial effort. Engaging stakeholders beyond governments to create a more effective power balance may support the revision of existing measures and initiate a means of improving practices for community-based flood adaptation.

2.1.1. Introduction

In the transition to a higher economic status within the Mekong region, dams and other engineering solutions for water resources management have frequently been adopted by governments. However, comprehensive water management that involves both structural and non-structural measures is typically required to improve food and income security, agriculture

and fishery practices, water distribution techniques, flood and drought risk reduction, ecosystem, climate uncertainties, and other dimensions (Mekong River Commission, 2016). In such a multi-faceted water management situation, it is not easy to adopt inclusivity when developing water management strategies. Maladapted water management practices can generate disputes at multiple social levels, as well as water discharges of unwanted qualities and quantities (Blake and Robins, 2016). Integrated water resources management (IWRM), which focuses on the interlinkages of land, water, and other resources in balancing economic growth, social justice, and environmental security, has been proposed as one potential way forward (United Nations, 2014). But, to achieve its stated goals, IWRM must specifically empower diverse local groups in fostering collaborative governance. Tailor-made adaptation measures from rural farmers, urban wage labors, and other poor individuals in the context of Asian countries can maintain the livelihoods of the most vulnerable in society (IPCC, 2014).

Since the devastating impacts of the 2011 floods in Thailand — which is highly exposed to the sea — the country has given greater recognition to the fact that floods are a major climate-related disaster (UNESCAP, 2015). The metropolitan region located at the downstream Chao Phraya River basin has been safeguarded to support national prosperity by structural flood prevention strategies in the northern tributaries (Marks, 2015). Since the 1980s, the Thai government has focused on the Yom River Basin, one of Thailand's major northern tributaries, as the construction site for the Kaeng Sue Ten dam in the upstream watershed, as illustrated in Map 1. This project was defined as a part of the Mekong-Chao Phraya and Kok-Ing-Yom-Nan interbasin transfers (Sretthachau, 2000). However, these dams were socially contentious. The dam project proposals did not provide the opportunity for meaningful community engagement, disseminate clear information, or seek to generate equal benefit sharing. Instead, the project seemed likely to intensify ongoing conflicts between affected local communities and the government (Sathirathai, 1994; Kaosa-ard, 1995). Local champions in long-lasting protests led by non-governmental agencies and civil society networks against top-down decision making forced the state authorities to turn to a new regime. This new regime prioritized management options such as improving the drainage network by providing flood detention zones (Settasirote *et al.*, 2007).

Map 1. ***Research sites in the Lower Yom River Basin***

Source: Adapted from Wikipedia (Map credits: Kmusser, using Digital Chart of the World and GTOPO data.)

Kaeng Sue Ten Dam

Project

Pilot flood detention zone

Yom-Nan diversion canal

Urban research site

In 2017, the Thai government introduced the new pilot flood detention strategy for the Lower Yom watershed: a low-lying floodplain, coupled with an interbasin transfer and drainage capacity improvement. Since then, a number of social and behavioral adaptation strategies have also been implemented. Cropping and irrigation schedules have been co-defined by the local irrigation office and local citizens within the pilot area to adapt to localized detention of floodwater. Rural farmers are expected to live with flooding for up to four months and sustain daily life by catching fish using commercial incentives. Through the project, farmers also obtained excess irrigation water from the interbasin drainage network to secure rice production during the dry season. The wet rice growing period was shifted a month earlier from May-August to April-June each year, with short-day rice varieties used in order to enable cultivation prior to floods (Yom Nan Operation and Maintenance Office, 2017).

These changes and consequences for local agricultural practices have been experienced differently by different social groups depending on their locations, livelihood patterns, and historical contexts. After two years of pilot model implementation, the majority of the local population living in the main low-lying zone of the pilot model perceived better results in income source distribution, land replenishment, and pest control (Sinampol, Chaipimonplin, and Songka, 2020). By contrast, rice farmers in the other zones of the model were impacted by flooding similar to that in the detention area, but they could not access adequate assistance and had difficulty in optimizing their income. As a result, these groups of farmers have fallen into the endless cycle of high-risk investment with relatively low return and debt accumulation (Boonwanno, 2019). It should be noted that the historical contexts of riverine culture in some parts of the pilot model area are juxtaposed with recent infrastructure development. This has reduced human-water interdependence as well as the scale of the land-based rice production system (Sathapanawatthana, 2003). Social and environmental changes in the pilot model also include the relations between rural and urban communities within the same watershed. This latter connection — the urban-rural interdependence on flood retention policy — has been understudied, particularly in the context of Thailand and the Mekong region.

This study investigates institutional procedures at the national and river basin levels involved in reshaping participation-oriented discourses regarding flood detention practices in the Lower Yom watershed. We aim to identify to what extent the governance model embraces bottom-up demands to reshape policy making. This inquiry was undertaken through the analysis

of different social vulnerability conditions characterized by performative identities of individuals and social groups in both urban and rural communities affected by this management scheme. By understanding the dynamics of individuals' interactions with local landscapes based on social, economic, demographic, and psychological contexts, different adaptation barriers can be identified. Participatory Action Research (PAR) undertaken with local citizens in both the urban and rural sites uncovered a substantial transition to community-based adaptation choices based on locally initiated policy blueprints.

In order to chart the gradual transformation in flood risk governance of the Yom River Basin and more generally, we have divided this paper into six sections. Following this introduction, the key concept of "performing social identities" for community-based flood risk governance is elaborated. A brief description of data collection methods and research sites are provided to illustrate how PAR was applied. The results section provides an analysis of the "participation by invitation" discourses that affected individuals and created vulnerable social groups. It also demonstrates how local policy blueprints in both rural and urban communities were exercised to help reduce adaptation gaps. The discussion and conclusion then provide insight into the necessity of greater equity in governance relationships.

2.1.2. Community-based flood risk governance and the performance of social identities

Engaging with the lived subjective experience of powerless groups will improve knowledge integration, empower bottom-up transformation, and contribute to framing adaptation practices (Head, 2010; Jasanoff, 2010; Moser and Boykoff, 2013). A promising means to explore this lived subjective experience is via the framework of performativity, which reveals "the workings of power in the production of rules of norms" (Gregory *et al*., 2009). At an individual level, performativity is a repetitive and experimental action in everyday life: it helps an individual to act against existing political paradigms and socioeconomic complexities in the real world in order to improve wellbeing. The way performativity is shaped by powerful discourses can be interrogated through the observation of emotions, memories, texts, spatial practices, and social identities (Gregson and Rose, 2000; Buizer and Turnhout, 2011). For our research, we apply this concept of performativity to investigate how acts of speech, identities, practices, and other actions manifest in communities vulnerable to flooding.

Social identity concerns the way in which individuals come to identify with social groups, and as a result accept the group identity as part of a sense of self (Haslam, 2004). Additionally, it outlines the nature of relationships between identity groups, even where boundaries are flexible and overlapping. This allows for the identification of people who share similar conditions, as well as supporting self-esteem and decision making, enhancing safety nets, and protecting against emerging risks for survival (Rowley and Moldoveanu, 2003; Korostelina, 2007). In the era of modernity, grouping is also understood as a weapon that vulnerable people can use to contest the inequality that is present in the obligation to be responsible for absorbing their own risks. Reintroducing social, economic, and other attributes to label group members is considered a community level strategy for sustainable policy (Bauman, 2000; Middlemiss, 2014). Group members share mental support and empathy, as well as foster trust and inclusiveness beyond fixed, observable categories (e.g., age, race, gender) (Platow *et al*., 2021). Each subgroup may still express a negative salience of identities that suggest vulnerability (Korostelina, 2007), for example the label "poor person." They might also divert particular identities to compete with outgroups and favor the ingroup members in terms of resource distribution (Fielding and Hornsey, 2016; Tosun and Schoenefeld, 2017). In natural resources management, social identity is particularly relevant when negotiating outcomes between conflicting groups and stakeholders (Colvin *et al*., 2015). It is therefore necessary to examine social groups and their relations in community-based flood risk governance.

Water resources management is a regime that integrates changes into both hydrological and social systems, with power relations across agencies (Swyngedouw, 2009). IWRM was introduced to improve sustainable land and water practices, minimize conditions of vulnerability in adapting to climate change, and link with local livelihood measures to achieve social equity (United Nations, 2014; IPCC, 2014). In some cases, the government applied IWRM as a panacea for legitimating structural-led practices and mitigate water risks instead of raising public participation to find integrative solutions (Mukhtarov and Cherp, 2014). Water authorities under the neoliberal-technocratic paradigm prioritized over-engineered flood protection measures — dams, irrigation, and water infrastructure — to favor urban, industrial, and commercial prosperity. Those benefits are likely to surpass the livelihood needs of some marginalized citizens who are powerless in terms of gender and ethnicity, or who usually live in rural areas (Swyngedouw, 2009; Richert *et al*., 2017). These infrastructures may also increase the incidence of pseudo-

disasters, deteriorate the balance of ecosystems, limit the willingness to adapt and prevent learning to live with floods (Abramovitz, 2001; Manuta *et al*., 2006).

Likewise, there is a social stratification that can be observed with flooding impacts, even though it could provide trade-offs in suitable location for settlement, agriculture, and commercial activities. For example, living near the river may support water use, but homes and farms would need to be safeguarded by flood protection measures (Wenger, 2014; Feldman, 2017). To avoid this effect, the 56th article of the Water Resources Act of Thailand (2018) legitimizes land use control under the water drainage schematic diagram. Any land use must not divert or block water flow. In a crisis period, non-residential buildings may be demolished to alleviate impacts: if this is harmful to some population groups, the government is responsible for compensation. In addition, flooding may exclude poor people, women, and the elderly living in flood-prone areas from social relations, as well as limiting income generation opportunities, which may add excess burden in terms of minimizing flood damage (Walter and Burningham, 2011). Flood disadvantage has emerged as an indicator of social injustice in management, and shines a light on the most vulnerable (Sayers, Penning-Rowsell, and Horritt, 2017). Climate change has been adding further stress to the environment and accentuating water control practices that affect the distribution of equal interests among various social groups (Swyngedouw, 2009).

To work in such a complex environment, effective water governance requires the use of hybrid governance regimes incorporating state government, private sector actors, and affected communities, instead of only state-centric government control. It also requires a dialogue of knowledge and experiences to be effectively organized or coordinated across multiple scales and levels of water governance regimes (Daniell and Barreteau, 2014). It was the local community's over-dependency on ineffective top-down administration that hindered successful flood risk management during the severe flooding in central Thailand in 2011 (Marks and Lebel, 2017). Understanding the root causes of cultural, neoliberal, and institutional politics affecting communities in framing water management strategies is thus necessary. Public actors, non-governmental agencies, and civil society networks should collaborate to deliver bottom-up messages from various social groups and mainstream them into policy integration (Gaventa, 2006; Suhardiman, Nicol, and Mapedza, 2017). Reflecting the experiences, landscape-based knowledge, values, and cultures of marginalized people through social, cul-

tural, and environmental interactions with the riverscape will strengthen community resilience and challenge a one-size-fits-all policy approach (Bartel *et al*., 2018; Cooper, Chakraborty, and Chakraborty, 2018). Incorporating a range of different stakeholders' voices might be valuable in supporting the adjustment of local adaptation conditions.

Participatory mechanisms can be used to define the local climate-related challenges that can be managed through community-based adaptation. They can also help to identify vulnerability issues among different social groups, limit harmful impacts, and enhance the abilities of climate risk reduction (Spires, Shackleton, and Cundill, 2014; Ford *et al*., 2016). The integration of practices and socio-cultural values into root cause analysis and resilience building can all form part of the process (Ayers and Forsyth, 2009; Groulx, 2017). A range of authors note the importance of working actively and in democratic dialogue with local agencies as the "entry point" for mainstreaming adaptation and development policies (Marshall, Hine, and East, 2017; Kirkby, Williams, and Huq, 2018), particularly for poor citizens, indigenous people, resource-dependent villagers, and other grassroots groups (Gogoi *et al*., 2014; McNamara and Buggy, 2017), including vulnerable urban dwellers who have often been neglected (Archer *et al*., 2014; Picketts *et al*., 2012). However, community-based adaptation is merely a buzzword for some governments. This concept, firstly, is ineffectively adopted in settings of weak governance, and where there are unequal power relations and a lack of trust between governments and local stakeholders (Wright *et al*., 2014; Faulkner, Ayers, and Huq, 2015). Secondly, a lack of reconciliation between external macro-level frameworks and locally specific demands may not be sufficient to ensure context-based values are taken into account. Disintegration of scientific forecasting and empirical circumstances of climate risks due to ineffective knowledge communication may also obstruct appropriate coping measures (Van Aalst, Cannon, and Burton, 2008; Dodman and Mitlin, 2013). Therefore, decoding individual practices that fail to adequately translate into effective coping strategies may alleviate adaptation pitfalls.

In summary, the idea of performative social identities has emerged to clarify the role of lived experience at a sub-community level in strengthening community-based flood risk governance within complex and dynamic social-environmental systems. Learning from the bottom up — from the individual and (sub)community levels — could prove instrumental to negotiating multiple demands across stakeholders in the context of challenging existing government-provided flood risk governance. Regardless of whether adaptation outcomes are suc-

cessful, this research uses participatory learning to demonstrate linkages between urban and rural communities in the context of living with floods sustainably. This defines a set of physical, socio-economic, political, and environmental dynamics underpinning the establishment of local-initiated policy measures.

2.1.3. Research methodology: Sustainability science and participatory learning approaches

Transformation and paradigm shifts, as discussed in sustainability science literature, typically require collective action. Improving regulation and leveraging bottom-up mindset shifts can support changes in path dependencies in political-economic regimes that have previously exploited nature and society, as well as fostering better socioecological conditions (Gopel, 2016). Sustainability science requires an integration of knowledge beyond scientific claims to serve better decisions and behaviors. Technological and market-based options cannot remain the only dominant means of defining policies and achieving outcomes based on quantitative goals. In addition, there is a need to trace back the root causes of worldviews impacting on governing nature. Thus, sustainability science should highlight humankind as an integral part of the natural world and put effort into identifying and supporting decisions to support environmental systems and inequality reduction (González-Márquez, and Toledo, 2020). Integrating cultural values, justice approaches, and property ownership and management rights into democratic participation is one means of developing societal support for sustainable and resilient systems. However, as this approach also challenges the conventional paradigm of economic prosperity and political domination from the center (Vogt and Weber, 2019), it can often face challenging political battles.

PAR and Problem Structuring Methods (PSMs) are central to data inquiries with stakeholders at multiple levels and scales. Accompanied by community-based adaptation, both methodologies support the clarification of unequal power relations among individuals, communities, and agencies (Kindon, 2016). Mackenzie *et al*. (2012, 12) note that "Action research becomes Participatory Action Research depending on who is involved in each of those stages, and to what extent." Taking such a stance, what our research explored through discourse was the state of vulnerability across individuals and subgroups, and policy making exchanges between urban and rural communities of the Lower Yom watershed. Our research used an adjusted form of Bradbury's participatory stages (2015) — intrapersonal and interpersonal learning — to aid our participatory research activities.

PSMs help to engage diverse experiences when addressing problems, uncertainties, and shared ideas concerning unequal power relations in a group format (Rosenhead, 2006; Shaw, Franco, and Westcombe, 2006). Multiple bottom-up suggestions from ongoing dialogues are then able to define possible future measures and open further discussion (Midgley *et al.*, 2013; Ormerod, 2014). Our research gathered information using specific qualitative-based methods that fit the nature of each participant group. To avoid unintended conflict during the participatory process, stakeholders were invited to share opinions, clarify problems, and find solutions at different stages (Mingers and Rosenhead, 2004; Barreteau, Bots, and Daniell, 2010). Apart from interviews with guideline questions, participatory learning tools such as cognitive mapping, transect walks, learning by doing village tasks, matrix ranking, and seasonal calendars were useful in visualizing modes of thinking (Chambers, 1994). We developed intrapersonal and interpersonal learning schemes to collect the data from August 2018 to May 2019. The researchers facilitated both learning processes by developing flexible enquiries and tailor-made qualitative tools.

2.1.3.1. Intrapersonal learning

First, the intrapersonal learning stage allowed us to obtain individuals' personal experiences toward flooding impacts and their opinion of flood management strategies. For policy makers and practitioners, this research incorporated 38 semi-structured interviews with state, non-state, and academic representatives on water resources, natural resources and environmental management, development policies, manufacturing, and local administration at national, regional, and local levels. Key ideas that emerged from these discussions were the principal ideologies of flood-related planning and its significance, the roles of each actor in either helping or hindering policy measures, and recommendations for improving management practices. The information was triangulated by direct observation as a participant in policy making processes at a provincial level. We also retrieved other publicly available gray literature (e.g. from websites, departmental databases, governmental publications). The policy ideas retrieved from both the interviews conducted and the gray literature was then categorized into seven themes — participation and knowledge, infrastructure and river basin management, policy making procedures, integration across agencies, water-related informatics, local administration, and livelihoods — in order to determine how the discourses were reproduced to impact on individuals' capacity to adapt to floods.

The participatory learning processes on each research site began with in-depth individual interviews. These interviews shed light on experiences, values, and daily activities regarding flooding impacts and opinions toward flood risk management at multiple levels. Individuals recruited for the interviews covered a range of employment groups, socio-economic statuses, genders, locations, and other attributes. Local respondents played an important role in identifying people with similar or different identities. The facilitator stopped interviewing when individual interviews could no longer generate new understanding or referred to redundant flood adaptation contexts (i.e., conceptual saturation) (Francis *et al*., 2010). The minimum number of samples per community, in order to achieve a general comprehension of individual experiences, was 12 people (following Guest, Bunce, and Johnson, 2006). We ended up going beyond that, having interviewed a total of 44 individuals — 26 urban participants and 18 rural participants.

Narrative analysis was used to describe everyday practices to see how each individual thinks, makes sense of the world, and performs with other people and the landscape. Content analysis categorized individual words and phrases into 17 themes in relation to lived experiences of flood risks. Both schemes of analyses were triangulated across respondents to clarify daily interactions in flood adaptation from the local, individual, and community levels to existing top-level government policies, and vice versa. These conditions are essential to the formation of social identities at a community level.

2.1.3.2. Interpersonal learning

This learning stage addressed shared issues that were identified as influencing social vulnerability across subgroups. A local debate was set up to find primary context-based solutions by means of community-initiated planning. The foremost process was a subgroup discussion, which was useful to understand identity dynamics reshaped by each subgroup. This was then linked with an on-ground survey to illustrate physical settings, the spatial division of impacts, and diverse senses of creating territories in presenting specific identities. Next, we developed participatory tools for subgroup members to exchange problems and articulate their identities. Indirect discussion and simple photo elicitation facilitated interaction between participants at the urban sites, who felt uncomfortable joining face-to-face sessions with other groups. By contrast, face-to-face meetings at a subgroup level were welcomed at rural sites. Visual-based methods, including local cognitive mapping, simple

illustrations, and seasonal calendars, were created to extract representations of identities related to interactions with the riverscape. At this stage, a total of 21 additional people engaged in supporting the primary group of 18 individuals who had already participated in individual interviews.

As a result of the subgroup discussions, additional questions could be formulated, which were explored in a subsequent kick-off meeting to develop a local flood-related adaption policy blueprint. The facilitator followed a similar discussion structure, but this stage encouraged different groups in sharing solutions. For urban sites, essential tools that led the discussion included ranking via an urgency-importance graph, Venn diagrams (Chambers, 1994), and oral discussion. Rural participants applied local cognitive mapping to pilot guidelines of policy ideas to discuss and vote on the prioritization of the main policy dimensions. Local leaders participated in framing guidelines before bringing them to the kick-off stage. Different levels of comparative analysis were conducted at both sub-stages — across subgroups and communities — to illustrate similarities, differences, and linkages of identity formation, the response to related stakeholders, and prioritization of policy measures. The resulting policy blueprints articulated several possibilities and obstacles for a community-level transformation in flood governance.

2.1.3.3. Research sites

Both research sites are located in Sukhothai Province, at the Lower Yom watershed in Thailand's lower northern region. A pilot flood detention model is present in this area, as well as an interbasin transfer. Following the research gap in finding urban-rural interlinkages of adaptation, one urban community (purple star) and one rural community (green star) were chosen (Figure 1). Due to ethical considerations, our research cannot reveal the name of these two settlements to protect the privacy and safety of participants.

The urban research site, located near the Yom River, is occupied by commercial and residential buildings, with a relatively high population density (approximately 1,300 people per km2). Most households are located along the river, while the commercial area expands along the avenue. In terms of flooding, this riverine town is classified as a repeatedly flooded area by the Provincial Disaster Mitigation and Prevention Office. At least one flooding event occurs each year. In 2011, villagers reported 7–10 distinct inundation events, each one lasting for 3–5 days in September with 0.5–1m of floodwater depth. Flooding timing and intensity heavily depend on the management of water sluice gates, the flood retention zone, and the interbasin

drainage network — structures which have been fully implemented as a collective water infrastructure management system since 2017. Regarding flood prevention, state and local agencies finished constructing a 1.2-meter dike and conducted a channel improvement project along the embankment in mid-2019 (Photo 1). Approximately half the urban houses were modified to reduce flood exposure through ground leveling works. Urban residents reported primary employment in the public service, local businesses (as merchants), and through daily wage labor. At least 22% of the total population are elderly.

Photo 1. ***Urban research site with flood dike and river channel improvement***
Source: Authors' photo.

The rural research site is classified as a retention area by the Provincial Disaster Mitigation and Prevention Office and has also been integrated within the Yom-Nan pilot flood detention model (Bang Rakam Model) since 2017. With 28.5 km^2 of large low-lying areas, rice paddy fields occupy 99% of land use with at least one month of annual flooding (between late August to November, depending on each year) at 1–3m of floodwater depth. 20% of housing clusters are scattered within the low-lying fields. A local sub-district organization has invested in road embankment to protect settlements and some paddy fields from excess floodwater (Photo 2). The irrigation office has announced its plans to divert water from Nan River to local canals to support local farming. This village has a population of 500–600, with the majority being late- to middle-aged rice farmers. During flooding periods, the rural residents tend to commute to work as day laborers in the construction sector, whether they possess land or not. A local fishery is defined by the local irrigation agency as a supplementary income source. Some local farmers engage in husbandry production or polyculture.

Photo 2. ***Rural research site and road embankment***
Source: Authors' photo.

2.1.4. Results

The findings of our research are presented in three parts. First, we explore "participation by invitation" as a dominant discourse shaping management regimes in the present decade. Second, individual responses are investigated to determine whether or not this emerging policy approach creates equitable benefit and risk sharing between individuals and groups. Third, we explore three characteristics of identities that could be deemed "vulnerable" in the face of living with floods, as well as how they motivated greater demands in rearranging policy measures from the community level upwards.

2.1.4.1. The emergence of "participation by invitation" discourses and effects on individuals

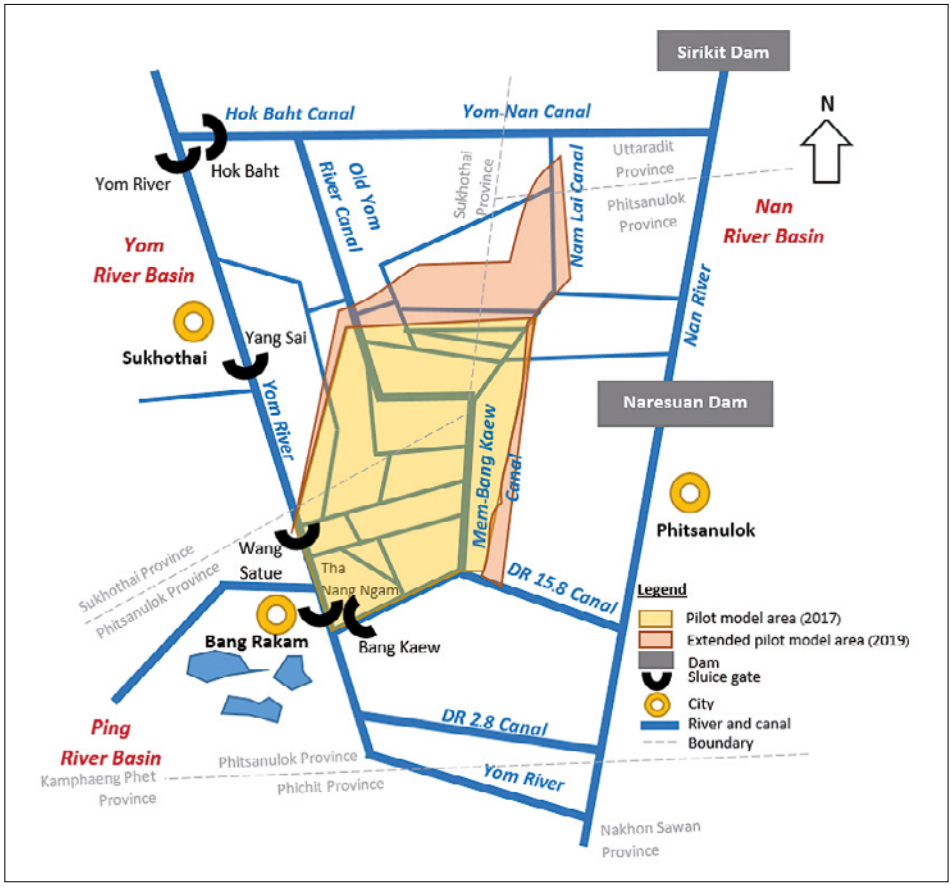
After 2017, flood risk management policies in the Lower Yom watershed have been gradually altered to "participation by invitation" discourses led by the government, resulting in an integrative area-based approach becoming the core policy. A gradual shift from purely technocratic-scientific knowledge to non-structural measures is supposed to enhance livelihoods and suitable land use, as well as forest and ecosystem balance. Under this scheme, however, structural techniques and hierarchical administration are still powerful. Key state organiza-

tions in irrigation, water resources, water informatics, and local administration have considered medium and small-scale gray structures as a central issue to improving flood prevention systems, protecting settlements and farmland from damages, and increasing water storage capacities for agricultural use during the dry season in four ways, listed below.

- *Interbasin transfer network infrastructure.* The central government allocated a budget to construct four main waterways for interbasin transfer with the Nan River. Currently, the drainage capacity of the main diversion canals (Hok Baht and Yom-Nan) is being improved to reach a maximum of 500 m^3/sec (Office of National Water Resources, 2020). Tributary networks have also been developed to drain floodwater to the detention area (Figure 4). In addition, the Royal Irrigation Department has built two sluice gates, with the construction of another two ongoing, to regulate peak runoff and redistribute through the drainage network.
- *Flood detention zone.* Initiated in 2017, this primary participatory flood risk management model stores floodwater for up to four months annually (August to November). The irrigation office introduced four principles for this model, including interbasin transfer for flood and drought alleviation, irrigation and cropping schedules, adaptation to extreme climate and weather events by occupational adjustment, and integration across state agencies. The expansion of the pilot model area in 2019 has the potential to store 550 million m^3 of water over 61,120 hectares.
- *Provincial quick-win projects.* Three of four urgent measures in provincial planning might be implemented by 2020, including: 1) parallel water drainage networks in both eastern and western sides of the Yom River, 2) flood detention zones around Sukhothai city, and 3) the establishment of community water user groups (International College of Digital Innovation, Chiang Mai University, 2019).
- *Improvement of flood fortification.* Each sub-district administrative organization (SAO) utilized their provincial annual budget to invest in flood prevention measures for the river and main canals. The urban SAO proposed maintenance work in stormwater drainage and dike systems, obtaining assistance from the Department of Public Works and Town Planning to finalize flood dikes and channel improvement construction in 2019.

The rural SAO also elevated two road embankments to alleviate daily turbulence in transportation and may decrease the likelihood of early flooding.

Figure 5. ***Schematic diagram of the pilot flood detention management scheme***
Source: Modified from Yom Nan Operation and Maintenance Office, 2017.



Both the urban and rural citizens perceived gradual changes in discourse from dam-oriented management to participation by invitation, in line with the approaches listed above. After the 2011 flooding, housing modifications in riverine towns became widely accepted as a key individual adaptation strategy to avoid the feelings of loss, anxiety, sadness, and disappointment that can result from flooding impact. Individuals evaluated the necessity to apply single or multiple adjustments, or even no change, based on their different levels of willingness, remaining financial capacities, and physical constraints at each location. Better-off individuals in commercial zones invested in land reclamation and ground leveling, although the flood exposure level was lower. In housing estates, residents only have the possibility of improving floor materials, which decreases cleaning difficulties but does not mitigate flooding. The fact that flood prevention structures were not completed until 2019 delayed the home-modification decisions of moderate-income residents, poor residents, and elderly people. Studying the various domestic adaptation patterns allowed us to differentiate individual values toward materials, social agencies, and knowledge in relation to flood risk management at multiple levels.

Until recently, the pilot detention scheme's irrigation schedule has set the rhythm for rural rice farming. However, field-level decision making is more important for survival and most rural farmers did not actually choose this pilot schedule, which introduced longer flooding periods compared with a pre-detention period. This situation limits the ability to generate an income from rice and increases rice farmers' disappointment in state-provided management, particularly as the current rice subsidy program from the central government no longer assures a sufficient revenue. As a result, rice farmers established a tight collaboration with an SAO and village leaders, limiting flooding intensity and shortening inundation duration by building a temporary levee and monitoring flood risk and levels during peak days for rice cultivation. Some rice farmers cannot start in line with the timetable because of insufficient irrigation water. As a result, the cultivation date arrives too late, resulting in a partial loss of income from rice. Even though rice farmers realized the possible damages that could be incurred with late rice growing, compared to a strict following of the irrigation schedule, they were willing to take the risk to repay their debts and uphold their image of land-based commercial rice farmers.

In summary, urban participants stated various forms of housing modification as a key action, whereas we notice multiple patterns in rural farmers' activity through the timing of rice cultivation. Under the key statement expressed frequently by the

affected population — "flooding is acceptable, but no flooding is better" — individuals may either agree with better outcomes or be reluctant to live with floods. Each opinion was clearly reflected in the individuals' differing daily performativity. With a certain, but unequal, level of state-centric infrastructure and occupation support between communities and individuals, current flood policies generated a wide discrepancy in the individual responsibility to cope with flood damage. Some urban residents can afford to reduce flood risks by themselves, whereas rural farmers and day laborers in cities have limited livelihood alternatives. Therefore, decision making and coping capacity clearly differ greatly between — and even within — a certain location.

2.1.4.2. Performative social identities of vulnerable groups

In the context of housing modification and rice cultivation timing, individuals took different approaches to adapt to flood risks. Although state agencies attempted to supply gray infrastructure and a livelihood transition scheme to alleviate flooding impacts, the current discourse has still left behind socially vulnerable groups. Social injustice in participatory flood risk management occurred both between urban-rural communities and among different social groups within a community. Local citizens defined themselves, or were defined by other subgroups, as "vulnerable" in what can be divided into three different categories. These identities were expressed by more than 75% of the total affected citizens.

2.1.4.2.1. Traditionally diversified rural rice farmers

During the interpersonal learning stage, 12 rural farmers, with 17 additional individuals from the subgroups, identified themselves as "vulnerable" under flood detention conditions. Apart from major changes in rice production and supplementary income policies, the disadvantages produced from a lack of fishing skills, the physical exposure of paddy field locations, and gender divisions within livelihood diversification are the controlling factors. These determinants hindered access to benefits from flood detention policies and made individuals reluctant to adopt local fishery use as a part of their livelihood. Fishing could compensate for a loss in rice growing, but not all villagers had the skills necessary for intensive fishing practices, especially in the case of women. In addition, traveling to a market to sell fish during a flood was considered dangerous for women, so they were assigned to domestic and community-based tasks (e.g., weed and pest control, watering rice, feeding

cattle, processing fish). These activities are dependent on male farmers finding ways to sustain productivity levels or diversify their income.

Since the new paradigm of living with flooding would not provide sufficient advantages in livelihood security, the case has only strengthened for rice farmers to diversify into land-based occupations, which they are traditionally accustomed to do. Intensifying rice production throughout the year was maintained by being less concerned about timing in cropping and floodwater retention. Local leaders were not strict in forcing rural farmers to follow the schedules strictly, while also advocating for additional nonwater-based jobs. It is important to note that this mindset is expanding among rural residents, despite the fact that it is totally contrary to state policies implementing new methods for flood alleviation, controlling land use, and promoting mixed agriculture.

2.1.4.2.2. Physically exposed citizens and socially vulnerable urban villagers

Ten urban residents classified themselves as "vulnerable". Since their houses are in physically exposed riverine zones, they prioritized flood dike and channel improvement as essential measures. Many of them called themselves "villagers," sharing a status with, and/or empathizing with, members of relatively low-income groups who settled in the zone protected by the dike. They also considered social relations as crucial, while criticizing the townsfolk who did not participate in community adaptation. Regarding wealth disadvantage, they established tight relationships with neighbors and local state agencies during flooding crises. By the time wealthy individuals adjusted their houses by land leveling, these group members had faced many obstacles, in particular inadequate savings due to daily jobs being interrupted for days or weeks due to flooding. They would thus be less tolerant to negative impacts if state agencies did not improve flood drainage systems and fortification, regulate land reclamation practices strictly, and encourage solidarity across groups within a community. In sum, this group purposively used passive self-adaptation to overcome vulnerable conditions. Although wealthier individuals who can adapt better to flooding have the right to invest in a better life, they should be concerned by the fact that others have a lower adaptation capacity.

2.1.4.2.3. Elderly townsfolk

Although the seven elderly townsfolk involved in our study have money, knowledge, and social networks, they no longer have any motivation to adapt their housing or move to a safer settlement. They believe it is more worthwhile to spend money on healthcare and household consumption. For this reason, they rely on social security programs and official assistance. Due to their increased reliance on drainage networks, they started rethinking the trade-offs of using a detention zone for urban flood alleviation and cooperating with neighbors and local agencies to a certain level. While they did not actually identify themselves as "the most vulnerable," in practice they would be considered vulnerable to flooding impacts due to health constraints and place attachment, which become major challenges for assistance during a critical period and increase the burden for response and recovery teams. Relevant agencies take particular notice of this issue where there is a growing aged population in a city displaying no efforts to adapt to flooding.

2.1.4.3. Local policy blueprints for micro-level transformation

As an enthusiastic beginning to changing policies from the community level upwards, different community subgroups gathered together to characterize adaptation choices. In the kick-off meeting, there was a clear positive response to a strategy of compromise regarding food adaptation measures. The policy ideas in each village (Table 3) mostly indicated previous determinants that reduce the negative salience of vulnerable identities. Local policy blueprints were designed by local citizens to alleviate damages in the daily existence of rural farmers, urban day laborers, physically exposed citizens, and the elderly. The core policy measures suggested by both communities focused on structural-based strategies in floods and water security, as well as — for the elderly — the provision of assistance in the critical flooding period. The additional policy measures were non-structural, supplementary suggestions for expanding flood risk management in an integrated way.

Table 3 ***Core and additional policy ideas, classified by research site***
Source: author's construction.

POLICY IDEAS	URBAN COMMUNITY	RURAL COMMUNITY
Core policy	Assistance for vulnerable social groups during crisis (especially the elderly)	Water security and intra-basin reliance (e.g. water storage and drainage systems)
	Flood risk mitigation measures (e.g., drainage systems, reservoirs, embankments)	Collaborative management of the pilot detention model based on local consent
Additional policy	Meaningful participation and transparent management at community level	Standardized policies and practices in rice farming and mixed agriculture
	Headwater forest protection and environmental and climate change management	Context-based jobs for additional income (food processing, vegetable growing, animal husbandry)

Each policy idea leads to different potential projects with different levels of urgency for implementation. From this ranking exercise, we can identify which ideas the local population favors, and which ones could relate to favorable structural changes for both urban and rural communities.

2.1.4.3.1. Highly important issues

- *Community-based storage and flood mitigation infra-structure.* Communities know their own water use contexts and flood characteristics better than any other party. By designing community structures, therefore, flood damage — in terms of direct damage and the knock-on impact on livelihoods — can be alleviated. Regional and local state agencies should provide the right to communities to adjust structural mitigation choices for long-term solutions based on adequate finance and resources granted for each SAO.
- *Drainage network and retention area.* This scheme provides wide-ranging benefits for every social group. Developing the detention zone should not be at the expense of rural farmers in low-lying zones. The state government should consult communities and only proceed with their full consent when making context-specific agreements in terms of spatial coverage, time duration, and occupation choices before implementing this policy at wider scales. Additionally, the benefit in rejuvenating wetland ecosystems should be balanced with the interests of farmers.

- *Livelihood improvement.* The authorities must rearrange livelihood-related policies to facilitate managerial, technical, and scientific knowledge, in order to innovate local-initiated employment schemes, either agriculture or non-farm activities. Rather than burdening disadvantaged citizens with risks, it is essential to understand local demands through social, cultural, and geographical characteristics. This kick-off process allowed rural villages to diversify their livelihoods to secure domestic consumption, absorb future shocks, eliminate chronic poverty, and modernize lifestyles to a certain extent, through sustainable production systems.

2.1.4.3.2. Supporting policy issues in relation to structural changes

- *Meaningful engagement across levels.* Promoting collaboration from the individual and community levels upwards requires a deep understanding of unequal power relations across actors. Multi-stakeholder discussions with community participation can facilitate on-the-ground learning and define new rules for social equity instead of one-way communication from the state. Academic, civil society, and non-governmental institutions will be useful in balancing power within a community. Local state bodies can diversify the new norms of coordination to suit with time, consent to join, and social relations, and to maximize the potential to share problems and solutions. Channels for participation should not be singular and must consider accessibility for all.
- *Water and climate monitoring for effective risk communication.* The most effective way to disseminate risk communication, in terms of downscaling climate impacts to particular flood risk contexts, is a combination of scientific climate information from the national database and the local use of tools and social media. The state government plays an important role in developing long-term scenarios, particularly seasonally and annually, to facilitate the preparedness of local agriculture and settlement improvement, leading to proactive adaptation in the future.

Local policy development motivated residents and stakeholders in both the urban and rural areas to compromise and share responsibility in helping vulnerable social groups. Learning from performative social identities can upscale the daily experiences of micro-level actors to challenge ideology-based knowledge of the authorities. These performative social identities

uncover local preferences, points of convergence, and potential conflict. They provide a means for learning about real people's real experiences, and thereby for structuring policy interventions around this genuine lived experience. Results from community policy blueprints illustrate promising directions for future policy development that coheres with the local lived experience. Additionally, this learning process was initiated to address the significance of the repetitive discussion of high-level policy conditions impacting on actors at a community and individual level.

2.1.5. Discussion

The community-based learning stages revealed unequal relations across subgroups within a community, and between urban and rural sites. The changing performance of social identities among individuals may stabilize flood adaptation demands. These on-the-ground experiences are useful for disadvantaged social groups to participate in the modification of their local natural environment. Place making and social identities were obvious in challenging the governing policy know-ledge. Forming vulnerability-focused identities highlights certain socio-economic attributes with a specific psychological sense to either create empathy (Platow *et al*., 2021) or favor in-group members in the future (Colvin *et al*., 2015). Meanwhile, the negative salience of identities helps powerless citizens to express their vulnerability by declaring a lack of equal opportunities to respond to risks. However, this does not mean that contestation always ends in conflict.

Bottom-up participatory mechanisms can identify context-based vulnerability and adaptation strategies within a community, as well as mainstreaming adaptation and development strategies to national policies based on the perceptions of local, economically disadvantaged villagers. This case study clearly reflected that robust governance systems at multiple levels are also necessary in fostering community engagement, but that these should not be created in a traditional state-centric administration. Rearranging levels and scales of administrative systems will be the next step for strengthening water governance (Daniell and Barreteau, 2014). Providing wider spaces for non-governmental and civil society partners can organize learning from the bottom and make a transition to tailor-made policies (Gaventa, 2006; Bartel *et al*., 2016).

Although the government combined gray and green measures to decrease damages in urban areas, rural citizens still struggled to diversify their income. Apart from rural residents, other vulnerable groups including poor people, women, and the

elderly are likely to be overloaded by technocratic living-with-flood policies. In fact, the stratification of social equity should not occur in a way that manipulates disadvantage in sharing flood risks (Walter and Burningham, 2011; Wenger, 2014; Sayers *et al.*, 2017). A road to IWRM and social equity must be reframed in more participatory, integrated, and practical terms instead of building infrastructure for centralized economic growth.

This research pointed out an ambitious demand to characterize participatory learning systems to uncover unequal vulnerabilities at the individual and community level. Exploring inequality might be done in multiple ways, but this study touched on a daily performative action that each individual may not recognize as an opportunity to challenge policy making. Linking experiences and identities can enable broad and meaningful engagement that seeks to reshape fair and just adaptation measures in relation to floods. Initiating a transformative action at a structural level, however, requires wider involvement from institutions and a more complicated design of participatory mechanisms. Co-exchange of adaptation experiences and ideas will be a possible action to adjust remaining measures and innovate more effective strategies for actual implementation. Individuals can be meaningful actors for community-based flood risk governance transformation.

2.1.6. Conclusion

The floodwater detention model in the Lower Yom watershed imposes adverse effects on local citizens although the government claims to use a participatory approach. This paper explores vulnerable conditions at a community level between urban and rural contexts in the adaptation to floods using PAR and PSMs. The outcome of community policy drafts highlighted policy ideas which challenged the existing policy framework. Currently, the state of vulnerability across subgroups and communities differs due to an unequal sharing of risk burdens. Based on whether individuals implemented housing adjustment or the timing of rice growing, flood victims who perceived themselves — or were defined by other people — as vulnerable have become the majority group. Social, demographic, economic, and physical determinants exchanged and shaped a particular identity to represent less willingness to take on effective adaptation actions. In other words, the performance aligning with social identities reinforced, in some cases, a fatalistic approach to adaptation. When given the opportunity in the bottom-up kick-off meeting, vulnerable citizens rearranged community policies to better align with their priorities. Their primary ideas included

the connection of planning across villages to minimize physical and economic damages for poor and aged populations, as well as increased livelihood security for rural farmers. This participatory learning indicates the importance of community action in transforming flood risk governance.

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2.2. Displaced Sand, Displaced People: The Livelihood Impacts of Sand Mining (Cambodia)

Melissa Marschke, Jean-François Rousseau, Laura Beckwith, Lukas Van Arragon , Laura Schoenberger

This chapter focuses on the livelihood impacts of river sand mining in Cambodia. We draw on two examples: (a) that of sand miners, working directly in riverbed sand mining in and around Phnom Penh; and (b), those of urban farmers, whose livelihoods are impacted by the sand infill of urban wetlands. What is consistent across both our cases is how these livelihoods — both connected to sand — are temporal in nature, with limited longer-term prospects. Our cases highlight those losses include, but are certainly not limited to, household livelihoods: the social, economic, and ecological consequences of unabated sand exploitation are profound. We argue that the governance vacuum highlighted by our sand mining and infill case studies will impact the type of development seen in and around Phnom Penh, the jobs people can access, and the environment in which people live. Serious sand governance is needed, particularly in conjunction with, or as part of, a more inclusive urban development strategy for Phnom Penh.

2.2.1. Introduction

Sand scarcity is an emerging global crisis (Torres *et al*., 2017). Sand dredgers, pumpers, and miners extract sand found in rivers, oceans, estuaries, and beaches at a pace faster than natural replenishment rates (UNEP, 2019). Much of this demand is linked to skyrocketing urbanization: sand is the main ingredient in the concrete used for roads, houses, and high rises. China, for example, consumed more sand between 2011 and 2013 than the US did during the entire twentieth century (Swanson, 2015). The global urban population is expected to grow from 4.3 billion people today to 5.2 billion in 2030, particularly in Global South cities (World Urbanization Report, 2018). Sand is also used as infill for wetlands or state-territorial expansion — known as land reclamation — along with dam building, beach replenishment, and a host of other human — made products (Beiser, 2019; Bendixen *et al*., 2019). Sand is the world's third most utilized natural resource after air and water (UNEP, 2019); even so, the vast socio-ecological consequences of sand labor and land infill are widely understudied, including in Cambodia.

Cambodia is one of the countries at the heart of sand exploitation. For example, over 80 million metric tons of Cambodian sand have been used as infill for Singapore's territorial expansion (Comaroff, 2014; Lamb *et al.* 2019). Most of Cambodia's sand trade is absent from the country's official trade logs, and this lack of transparency complicates efforts to protest against the negative impacts this sector drives. For nearly a decade, Cambodian fishers opposed sand dredging in their mangrove-estuary fishing grounds, but it was only with extensive advocacy work and international media attention that coastal sand exports were banned in 2017 (Lamb *et al.*, 2019). This unchecked exploitation of coastal sand sits within Cambodia's longer history of the state using resources such as trees, fish, or land to accumulate capital and contribute to a process of elite capture or smuggling by powerful urbanites close to the political regime (Le Billion, 2002; Sneddon, 2007; Diepart and Schoenberger, 2017). The uneven development model that sand exploitation fosters involves ever increasing economic and sociocultural inequalities between a small urban-based elite and the majority of the population living in rural and urban areas. For most workers, when sand opportunities do emerge, they are short-term, low-paid, and transient.

Available data suggest that the 2017 ban on sand exports resulted in a significant drop in Cambodia's sand trade, with Singapore, Taiwan, and other Asian countries no longer reporting sand imports from Cambodia (DESA/UNSD, 2020). However, sand mining continues, particularly along Cambodia's rivers. The sand extracted is used to meet domestic demand as Cambodia's cities grow. In the capital, Phnom Penh, schemes to create new ground for development through the infilling of local lakes and wetlands are rampant (Brickell, 2014; Sahmakum Teang Tnaut, 2019). Indeed, sand extraction supports Cambodia's ongoing real estate boom (Fauveaud, 2016), including the satellite cities mushrooming at the edges of Phnom Penh. In contrast to this visible, overt, everyday use of sand, particularly river sand in and around Phnom Penh, official sand production statistics are difficult to access. There is little sense as to the volume of sand being extracted from riverbeds. Nor is there a sense of how sand labor livelihoods are being produced, or how peri-urban ones are being impacted by wetland infill. What seems more certain, however, is that sand, as a resource, plays an important role in Phnom Penh's (under)development.

This paper aims to document several livelihood opportunities that have emerged with the growth of the sand industry, and to probe how other livelihoods are in the process of being destroyed by the same industry. To achieve this dual aim, we

examine two cases: (a) that of sand miners, working directly in riverbed sand mining in and around Phnom Penh and along the Mekong River; and (b), that of peri-urban farmers whose livelihoods are impacted by wetland infill. What is consistent across both our cases is how these livelihoods — both connected to sand — are transient. For sand miners and peri-urban farmers, this means that they have no guarantee that they will be able to maintain their livelihoods over the medium or longer term. It also compels them to constantly consider livelihood trade-offs and to scramble to find new livelihood options. Beyond documenting the sand-related livelihood opportunities and insecurities that our research collaborators experienced, our two cases ultimately speak to the consequences of not managing sand mining or infill and their impacts on the type of development seen in and around Phnom Penh, on the jobs people can access, and on the environment in which people live. In that regard, our findings provide insights into development processes that span beyond our sand mining and infill case studies.

Our paper builds on data obtained through more than 50 open-ended, qualitative interviews with both men working in sand pumping sites or on sand barges along the Tonle, Mekong, and Bassac rivers, and with urban farmers (female and male) working in Phnom Penh's wetlands. These are complementary and cumulative rather than comparative case studies; we use these two examples to illustrate how sand exploitation can both create and destroy livelihoods, and situate these cases within Cambodia's broader development processes and the associated riverine ecologies that are now under strain. We also draw from on our long history of working on sand (Marschke, 2012; Lamb *et al*., 2019) and urban wetlands (Beckwith, 2020) in Cambodia, and from peer-reviewed sand articles, United Nations Environment Program sand reports, the United Nations sand trade data, along with non-governmental organization and media reports.

2.2.2. Sand infill and river dredging in and around Phnom Penh

Situated on an extensive floodplain at the confluence of three rivers — Mekong, Sap, and Bassac — in the lower Mekong River basin, Phnom Penh was originally surrounded by lakes and wetlands. The central districts of the city previously contained 25 lakes, 16 of which are now completely filled in (Sahmakum Teang Tnaut, 2019). Wetland infilling has likewise proceeded apace and led, since 2003, to the drying out of 40% of Phnom Penh's wetland areas (Sahmakum Teang Tnaut, 2019). The city's built-up area increased six-fold between 1990–2005, and land

reclamation projects totaling 6,000 ha of natural lakes and wetlands have accommodated this growth (Mialhe *et al.*, 2019). Many of these former lakes and wetlands now host megaprojects, led by private developers, both foreign and domestic, that all rely on nearby river sand. Cambodia's construction sector thus emerged as the largest contributor to Cambodia's economic growth by 2015 (Fauveaud, 2016).

Rapid urbanization in Phnom Penh — including in the Lake Tompun area we introduce later — and elsewhere along the Mekong has resulted in rates of sand extraction that are higher than natural replenishment levels. Natural replenishment levels in the Mekong watershed have decreased over the last decades, partly due to upstream hydropower expansion in both Lao PDR and China (Bravard *et al.*, 2013).[2] Recent estimates posit that 80 million tons of sand are withdrawn from the Cambodian section of the Mekong watershed yearly, whereas natural replenishment rates average 5 million tons per year (National Public Radio, 2020). This imbalance poses serious sustainability challenges, including habitat disruptions that impact a range of species: macroinvertebrate, plant, aquatic, mammal, bird and, of course, human beings. Some species adapt, others less so (Torres *et al.*, 2017).

Moreover, sand mining and upstream damming-driven sediment intakes trigger significant erosional processes, as lowered sediment discharge acts as a sediment sink for riverbed and riverside aggregates (Jordan *et al.*, 2019). This explains why photos of houses collapsing into the Mekong River are becoming abundant, with riverbank instability being a real issue (Figure 1) (Grundy-Warr and Lin, 2020; Hackney *et al.*, 2020). After sand is extracted, its addition elsewhere as infill further alters ecosystems, including squashing the macroinvertebrate species found in sand, along with the aquatic plant species found in urban farms. Other wetland functions are altered or lost in favor of a landscape that can handle the built form.

2. Dams create obstacles to sediment transport; sand and other aggregates thereby deposit and accumulate behind such infrastructure.

Photo 3. ***Erosion along the Mekong River, Cambodia***
Credit: L. Van Arragon, October 16, 2019

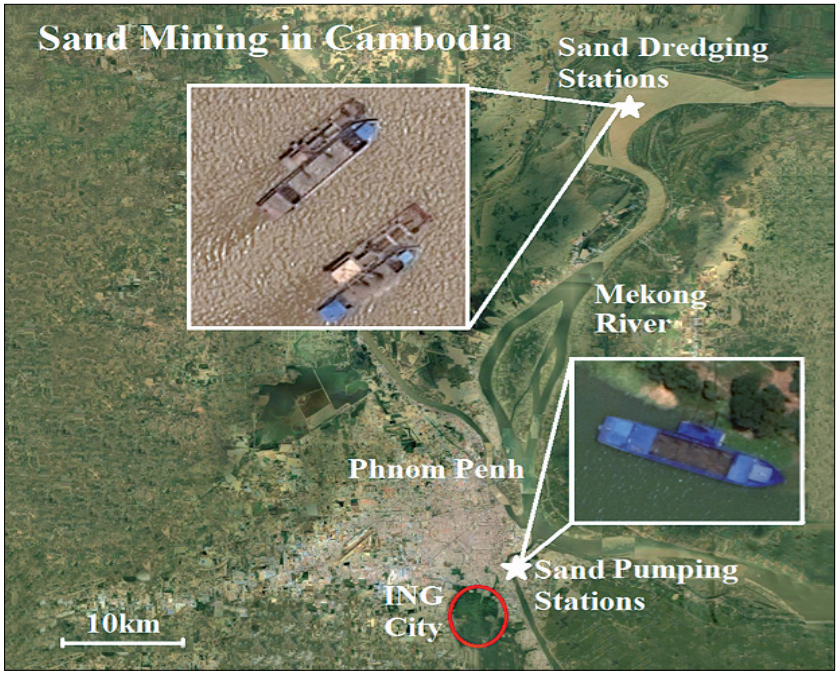
In addition to their ecological impacts, sand mining and infill drive livelihood changes for a wide range of social actors directly or indirectly involved in these activities. However, as of today, very little is known about sand miner livelihoods: sand mining does not appear in Cambodia's socioeconomic statistics, and much of this sector operates within the informal economy. Research devoted to the implications of sand mining, particularly in terms of livelihoods, has so far been very limited. Our first case on sand work begins to address this gap.

As for the loss of Phnom Penh's lakes and wetland areas to infill, earlier research has documented how high-end and commercial real estate developments have repeatedly led to the eviction of low-income communities who have been occupying many of these lakes and wetlands for decades. These evictions are poorly compensated, if at all, leaving many former residents without housing, assets or income (McGinn, 2015). In one high profile example, 3,000 households were violently evicted from the 90 ha Boeung Kak lake area in the city center (Sahmakum Teang Tnaut, 2016). In 2007, the Phnom Penh government transferred this valuable real estate to Shukaku Inc. — a private company that belonged to a senator and donor to Cambodia's ruling political party — at far below market price (Kry, 2014). Until

their eviction and resettlement in distant camps, households had relied on the lake for income through fishing or growing aquatic vegetables, meaning the infill resulted in a loss of both their homes and livelihoods. The evictions elicited massive protests which gained international attention, led to the imprisonment of many local activists (mostly women), and eventually to the suspension of all World Bank funding to Cambodia (Brickell, 2014). Yet, over a decade later, the company had not completed the construction of the planned satellite city (Sahmakum Teang Tnaut, 2019). This example exemplifies both how and why Phnom Penh's history of social exclusion through forced eviction and limited access to housing options for the poor in the urban center remains a real issue (Brickell, 2014; Kent 2016; Talocci and Boano 2018).

Our second case adds to this scholarship by further detailing the livelihood challenges and trade-offs associated with such infill schemes and probing into the social consequences, including relating to public health, that span beyond the household scale and impact the population of Phnom Penh as a whole (Photo 4).

Photo 4. ***Map showing ING City boundaries, covering Tompun and Cheung Ek wetlands, sand pumping stations in Phnom Penh, and sand dredging stations further along the Mekong River***
Source: Google Maps.



2.2.3. Two case examples

2.2.3.1. Sand work

Sand work involves the movement of workers, boats, and sand. Workers travel up and down Phnom Penh's rivers along various sand pumping stations; pumping stations in turn move in response to fluctuating sand resource availability and local demand. Sand, once offloaded, is transported to various infill and construction sites. For the most part, perhaps due to such mobility on the river, the sand industry is a masculine space: men account for the majority of boat drivers, sand pumpers, and boat owners. Sand workers tend to live together in pumping stations, or they congregate on the river at night when sleeping on boats. Women may be involved as cooks, if married or related to a boat captain. Men most often leave their family as they pursue this work, and send remittances back home. Sexism along with rigid conceptualizations of gender norms continue to be barriers for female entry (Lamb *et al*., 2017).

Men from rural areas are drawn to sand work: poverty, limited educational opportunities, and few livelihood options serve as push factors. It also appears that many workers enter sand work through word of mouth and connections. Although workers know they will work in relatively isolated areas, and that they may sleep on sand barges for long periods of time, this work is seen as a less risky and less physically demanding job than construction work. As one worker explained: "Sand dredging is better than construction because the pay is about the same, but in construction you do heavy labor eight or more hours a day. Here it's a lot less busy" (interview, November 26, 2019).

Entry level jobs in the sand industry consist of pumping sand from already-filled sand barges onto land. Workers achieving this task earn anywhere between USD 300–500, an amount significantly higher than the monthly minimum wage of USD 190 in Cambodia.[3] Commenting on why this work is less sought-after in the sand mining industry, another laborer explained: "The job is really hard at first! You need to hold down a powerful hose with your foot, bend it into the right direction with your hands, and hold it in place for long periods of time" (interview, October 9, 2019).

3. In January 2020, Cambodia's minimum wage was USD 190. The monthly minimum wage is what garment factory workers earn before overtime. In 2017, urban household income averaged USD 700 per month in Phnom Penh, in contrast to the rural average household income of USD 430.

Pumpers work in teams of eight to ten, equipped with powerful hoses to suspend the sand in water so it can be easily pumped and unloaded from the sand barge through a large rubber tube (Photo 5). A pumping station leader operates the engines of the sand pump: this work is far less physical and is one of the most wanted jobs in the sand industry. To empty a sand barge filled with 800m3 of sand takes an hour for a group of eight to ten sand pumpers. On a busy day, sand pump workers can empty six or seven barges. Some teams are paid based on the amount of sand they are able to pump per day, while others receive a fixed salary monthly. Most sand pumpers live and work in and around Phnom Penh to accommodate the huge sand demand from construction and wetland infill.

Photo 5. ***Labourers blast water at sand so it can be pumped out of the barge through large tubes. Up to ten labourers work for an hour to empty one boat. They often live and sleep at the pumping station***

Credit: L. van Arragon, October 9, 2019.

Another entry level job is sand dredging. The dredgers we met worked in pairs in remote locations along the Mekong River, on small metal platforms far from the shore: "We sleep in the middle of the Mekong on the dredging station. We can only go to land if we're lucky to catch a fisher sailing by who agrees to take us there" (interview, November 26, 2019). If "lucky," dredgers leave the stations and go onshore to buy supplies every few

days. Their daily work, which consists of operating pumps that suck sand from the riverbed, is not generally physically demanding. Yet, they also regularly need to repair pump engines, which can be finicky and time-consuming.

A more lucrative job in the sand industry is that of a sand barge captain, which yields around USD 800 per month: a fairly decent wage compared to Cambodian averages. Boat captains sail barges for hundreds of kilometers along the Bassac, Tonle Sap, or Mekong rivers in multi-day voyages between Phnom Penh and sand extraction sites. These workers may sail with their wife — as a household livelihood strategy — or with a young male assistant, whom they pay around USD 200 per month from their own salary. Captain work is less physical than sand pumping or dredging, but requires navigation skills, management capacity, and involves higher levels of responsibility. The sand barge captains we interviewed were all connected to the boat owners hiring them, most of whom were Vietnamese businesspeople. Indeed, it appears that Vietnamese actors have invested massively in sand barges and dredgers, and predominantly oversee sand mining operations ongoing in and around Phnom Penh. This also suggests that sand may be partially exported to Vietnam without appearing in official trade logs.

One commonality between all the above jobs is that labor in the overall sand mining industry is precarious, similar to many occupations in Cambodia's informal economy. Workers do not sign written contracts, they are not unionized, and are at the mercy of their bosses; sand laborers can indeed be hired and fired at will and they do not always get paid for their work. This is different from manufacturing jobs, including in the garment industry, where Cambodia's labor code affords workers some rights and better protection. As one interviewee noted: "I used to work for a sand company that often didn't pay our salaries on time. If you work for a smaller sand company, you are at risk of not getting paid if the customers don't pay for their sand. You have to work for a boss who has good connections; he can avoid those situations" (interview, October 15, 2019).

Sand workers explained that there is little room for professional growth in the sand business as it takes too long for them to gain trust from their superiors, including Vietnamese boat owners that tend to only promote fellow Vietnamese or Vietnamese-speaking men to important positions such as boat captain. Horizontal movement between less well-paid jobs is more frequent, with workers switching jobs and/or sand companies based on their preferences. For example, a sand pumper may decide to work in a more remote location as a sand dredger because this involves less physical labor, while a sand

dredger may switch to being a sand pumper in order to live closer to or in Phnom Penh. A captain may also be 'demoted' to being a sand pumper in Phnom Penh because they are not willing to constantly travel up and down the river.

Working at sand pumping stations is a less mobile livelihood, particularly where sand can be poured from the pumping station directly into a wetland area or to a construction site. As this occurs, sand workers must maintain the sand pumps that continuously pump large quantities of sand. One worker we spoke with had been stationed with his family at the same sand pumping station for over two years. He was responsible for maintaining the sand pump and ensuring a continuous supply of sand was being pumped into the wetland. This worker was further responsible for guarding the sand station when no sand was being pumped. This hints at frequent imbalances between sand supply and demand resulting in week or month-long periods during which workers do not work, nor receive any salary. Sand laborers are nonetheless compelled to live at and guard their sand stations during these periods in order to keep their job.

Thereby, entry level sand mining jobs are more lucrative and less demanding than equivalents in the construction sector, but sand work nonetheless requires that laborers be flexible and available. Workers are often mobile, both geographically and in their occupations, but have few opportunities to attain higher level jobs such as a sand barge captain. Sand mining thus creates transient and relatively marginal sand labor livelihoods. Sand infill also impacts other kinds of livelihoods. As sand is being pumped through hundreds or thousands of meters of plastic tubing, sometimes for many years (Photo 6), land that is both physically and legally suitable for construction is produced (Doyle, 2012), sustaining Phnom Penh's rapid urban expansion. While this happens, thousands of lower-income residents deriving their livelihood from the now disappearing wetlands lose their livelihoods, including those we introduce below (Beckwith, 2020).

Photo 6. ***Filling in vast wetland areas like Tompun Lake can take years. Pipes are laid across many kilometres, allowing sand to be continuously fed into the wetland area***
Credit: L. Beckwith, June, 2018.

2.2.3.2. Livelihoods lost with sand infill[4]

Our second case study highlights the loss of urban farming livelihoods to sand infill, focusing on southern Phnom Penh, where Cambodia's largest satellite city, ING City, is being built on top of two of the few remaining urban wetlands (Atelier Parisien d'Urbanisme, 2019). An immense volume of sand is necessary to complete this infill, since the two wetlands — Tompun and Cheung Ek — expand to over 2,000 ha in the rainy season (Sovann *et al.*, 2015). In one village on the shore of Lake Tompun, farming was the main source of income for 69% of households. Morning glory, a type of aquatic spinach, is grown on the water's surface alongside other aquatic vegetables, which are then sold in local markets, forming an important component of Cambodian diets. Though wetland farming has never been easy, households have generally been able to support their families with this work and in so doing, benefited from the proximity to the city which offers access to public services often lacking in rural areas. Yet, it is

4. This section draws on Beckwith's detailed doctoral research (2020).

becoming increasingly difficult for them to achieve this as urban farming has become a far less lucrative livelihood activity over time. As a result, farmers now make anywhere between USD 100 to USD 200 per month, far less than what they were able to earn in the past.

The transformation of the Tompun and Cheung Ek wetlands into ING City is a process of both ecological and social change. Sand infill is dramatically altering the wetland landscape (Figure 3), as one interviewee explains:

> *"It is very hard. I don't even know what to say. In the past, I loved the scenery. As I got up in the morning and came out of the house, I saw the pasture and morning glory fields. It was beautiful. It was so green. Now, it is full of white sand. In the past, as we opened our eyes, we felt the clean breeze and now, when we open our eyes, a cloud of dust flies in our eyes."* (Interview, June 2018)

Farming livelihoods have become less viable since work on ING City and sand infill began in 2011. Phnom Penh, a city of 1.5 million people, is not equipped with a central sewage treatment facility and these wetlands remain the "lynchpin in the management and treatment of the majority of Phnom Penh's waste water" (The slow creep of sand infill has resulted in less water exchange throughout the wetland areas, preventing the intake of fresh water that would normally help to flush wastewater out. Interviewees observe that they now rely on greater quantities of chemical inputs to produce aquatic vegetables, and have experienced severe skin rashes in recent years.

These health impacts may be further compounded by wastewater entering the wetland, as it contains multiple contaminants including nitrogen, phosphorous, *E. coli*, and detergents (Sovann *et al*., 2015). Whereas the aquatic plants grown by farmers serve as filters to clean urban wastewater, rising contamination levels and shrinking wetland areas reduce the capacity of the morning glory fields to serve as filters. As a resident commented:

> *"Wastewater from Phnom Penh has always come in but the lake used to be bigger so it didn't make such an impact. But now that the lake is filling the amount of water is less so and the amount of wastewater coming in makes an impact. [I] think the amount of wastewater is the same but the lake is smaller."* (Interview, March 2018, as cited in Beckwith [2020])

In a few more years, most urban farmers will no longer be able to farm, as wetlands will be completely swept away by the ongoing construction. Luxury commercial and residential ventures are already beginning to dominate the landscape as ING City develops (Photo 7). While some of these urban farmers will be able to remain in their homes, a victory given the rate of eviction and land grabbing in Cambodia (Brickell, 2014), their wetland farming area will no longer exist. Families will therefore need to find another livelihood.

Photo 7. ***A pile of sand grows behind morning glory fields. The sand will be leveled and used as new land, likely in the construction of gated communities for the city's wealthy residents***

Credit: L. Beckwith, September 17, 2018.

This livelihood transition will not be easy, particularly for older farmers, many of whom are migrants who have turned to urban farming after trying other options such as construction and found working conditions to be poor and wages low. Nevertheless, urban farmers do not want to return to the countryside to farm rice, as successive years of drought have made this untenable. For example, since 1960, temperatures in Cambodia have risen by 0.8°C with a projected increase of up to 4.3°C by 2090, along with an increased likelihood of heatwaves which will impact households in rural and urban areas alike (Thoeun, 2015). Urban farmers would unanimously prefer to continue farming here, but there are few wetland areas left around Phnom Penh,

and what is left is already occupied. Still, urban farmers are committed to remaining in Phnom Penh as they greatly value the access to higher quality services, such as health centers and schools, that is afforded by living in the city.

As one older resident explains:

"If they fill in the wetland and don't allow us to live here anymore, we will look for a new place. I don't know where to go yet. If we had money, we would have ideas about where to buy here and there, but we don't have money. If we move back to our hometown, we will have nothing to do to earn a living. I wouldn't move, because living here allows my grandchildren to go to school." (Interview, March, 2018)

In sum, people recognize that sand infill will destroy urban farming, and that other livelihood strategies need to be in place by the time the Tompun and Cheung Ek wetlands are completely gone. With so few options available, hope is pinned on the next generation, with children and grandchildren encouraged to focus on their education in order to strive for 'better' jobs. However, Cambodia's development pathway makes it unlikely that such jobs will be accessible to all residents (Horlings and Marschke, 2020).

2.2.4. Discussion and conclusion

Although significant attention has been paid to land grabbing, forestry loss, and overfishing in Cambodia (Diepart *et al.*, 2019; Le Billon, 2000; Loughlin and Milne, 2020; Marschke, 2012; Schoenberger, 2017), illustrating how resulting commodity reallocations impact local livelihoods, this has not been the case for sand. Sand extraction is a serious issue, given the scale at which it is taking place on Cambodia's rivers and Phnom Penh's reliance on sand as infill for urban expansion. Phnom Penh's prioritization of luxury real estate and commercial development indicates that the local vision of urban expansion comes at the expense of the urban poor, as evidenced by the case of morning glory farmers (Fauvaud 2016; Beckwith, 2020). Sand is a vital ingredient for Phnom Penh's urban development process: as infill, to enclose wetlands or lakes to help build up the cities' land mass, and again in the concrete used for building the infrastructure that fuels urban expansion. This also creates livelihoods, even if transient in nature.

As our two examples show, sand plays an important role in Phnom Penh's development. The livelihoods linked to — or impacted by — sand are temporary in nature, and how they evolve is linked to Phnom Penh's broader development pro-

cesses. Experiences are uneven at best for sand workers who often remain in entry level jobs, and for urban farmers, who were able to sustain urban farming livelihoods at one point in time, but now cope with diminishing returns. The other consequences of unabated sand mining and infill in general, and those linked with erosion, habitat destruction, and biodiversity loss in particular, may not be immediately felt, but will have significant impacts nonetheless. In sum, sustained sand exploitation drives major socioecological repercussions which are set to intensify in the future (Kothari and Arnall, 2020).

We shall now further reflect on the livelihood, environmental, and development challenges associated with sand mining. Firstly, sand exploitation can disrupt and upend livelihoods. Sand dredging and pumping does offer livelihood opportunities for a few young men, namely those willing to work on barges or at remote sand pumping stations. Even though such livelihoods are limited in terms of advancement, and temporary in nature, they are seen as more appealing than alternatives such as construction work. Sand work may also be easier for younger men to access than factory work, where women are favored for employment (Horlings and Marschke, 2020), but this work is not without its burdens. Contracts are non-existent, workers are only paid when sand is dredged or offloaded, and men must live far from their homes and families as sand dredging increasingly occurs further away from towns. Workers acknowledge that there will be a limit to this work: sand is a finite resource.

The consequences of sand exploitation unfold differently for urban wetland farmers. Here, the steady rhythm of sand being pumped into wetland spaces takes time, resulting in a gradual change to the ecosystem and landscape. Urban farmers observe how sand infill steadily degrades their environment, and they mourn the green wetland spaces as they slowly recede. Sand infill further impedes natural flood cycles that made farming in wastewater viable, and crops now need more pesticides to grow. Farmers take on greater financial risk even as the contribution that their farming makes to municipal wastewater treatment goes unrecognized and, in fact, is slowly coming to an end. Farmers know that urban farming cannot last, but it is less clear what their alternative options may be, other than the hope that the next generations will be better prepared to secure jobs in the city.

Secondly, sand exploitation and infill disrupt ecological systems. Wetland infill has proceeded almost without interruption, perhaps linked to the "light touch" seen in Phnom Penh's urban planning processes. Little information about the government's plans for urban expansion or wetland conservation (if at

all) is available publicly. From a public health perspective, if no wastewater treatment solution is found for Phnom Penh, the loss of wetlands as a natural wastewater treatment system will trigger serious health consequences. Yet, any alternative solution will be costly to build and maintain; an irony given that the current system of relying on natural wetlands achieved such treatment for free while further providing nourishing food for the city and sustaining urban farmer livelihoods (Beckwith, 2020). Although our two cases did not provide detailed insights into how sand exploitation contributes to erosion processes, the interviewees all agree that biodiversity loss will emerge with wetland infill. This is another area that warrants careful attention.

Thirdly, while the urbanization of Phnom Penh has created diverse economic opportunities, the sand industry likely contributes to growing inequalities rather than broader development goals. Instead of addressing the needs of the majority of Phnom Penh's residents, the pattern of urban expansion has been focused on wealth creation for a minority. Lakes and wetlands have been filled in for elite residents, shopping malls, and gated communities, yielding profits for developers and foreign investors first and foremost. Space that formerly housed low-income residents has been lost, and those that have been allowed to remain will need to shift livelihood strategies. Although a citywide Master Plan was approved for Phnom Penh in 2015, its details remain undisclosed and were not open to public consultation or scrutiny. This lack of transparency compromises efforts to challenge existing patterns of urban expansion (Beckwith, 2020). While we agree that sand, in the form of concrete, is key to ensuring people's right to housing and safe living spaces, Phnom Penh requires a more environmentally sustainable and socially inclusive urban growth process.

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2.3. Social justice and mining exploitation in Lao PDR

Éric Mottet, Frédéric Lasserre

The objective of this chapter is to analyze recent developments in the mining industry in Lao PDR. It will also aim at understanding the ambiguities and limits of local people's involvement in mining projects. Lao PDR's mining sector has the potential to play an important role in developing the country's economy and achieving social justice. However, in addition to the potential benefits, mining can bring significant environmental and social consequences, some of which can already be observed in Lao PDR. For example, mining has been linked to social problems stemming from a lack of cooperation with local communities, environmental degradation, and increased pressure on water resources. The elements presented and analyzed were assembled through ten field studies carried out between May 2008 and May 2017. The surveys include, on the one hand, the observation of mining infrastructures and, on the other hand, interviews with a panel of actors involved in the country's mining sector, actors from non-governmental development organizations present in Lao PDR, and local specialists. People we met in areas that were directly impacted by extractive activity were rather favorable toward mining operations due to the benefits they bring. They also result in the territory being reorganized, providing access and development facilities that have developed considerably over several years. In the most remote areas, communication with local people is more difficult, and is generally hampered by the lack of knowledge of the mine executives who — largely originating from urban centers, dominant ethnic groups, or foreign countries — have sporadic contact with local people on the issue of mining. Many people's perception of mining projects is thus tainted with great mistrust, although in many cases mines do provide employment opportunities and additional sources of income or, in other words, a form of partial social justice.

Landlocked in the heart of continental Southeast Asia, the Lao People's Democratic Republic, or Lao PDR, is a rather small country (236,800 km^2) with around seven million inhabitants. Its residents are among the poorest on the planet with a GDP of USD 2,535 per person in 2019 (World Bank, 2020). Like neighboring countries, such as China (in 1978) and Vietnam (in 1986), the country embarked in 1986 on the path to a socialist market economy. The reforms, involving a shift in economic policy toward external markets, aimed at attracting foreign investment with a view to, among other things, developing the country's natural

resources for export and reducing poverty (Mottet and Lasserre, 2014). The Laotian state relies mainly on foreign direct investment to pursue its economic development, which is centered on major mining projects. In Lao PDR, these major mining projects symbolize the appropriation of resources by the central government and the private sector in the name of a policy of regional integration and reclaiming control over territorial margins. In other words, these policies illustrate the priority given to national interests (especially those of the political class), as well as those of the private sector and the neighboring countries of China and Vietnam, at the risk of neglecting the concerns and needs of local people.

2.3.1. Research objectives

Our research is a study that empirically analyzes the implementation of the mining sector in Lao PDR, a country where the rise of mining is already an observable reality. The first part of this chapter looks at how the mining sector in Lao PDR interacts with territories and host societies through the interplay of multiple actors. These actors sometimes display antagonistic interests. Mining companies carry out development projects in a rural world where mining appears to local people as a threat to the physical and symbolic integrity of the environment. Mining can therefore give rise to land conflicts with the village communities present in concession areas. These conflicts question the role of the Laotian state at both the macroeconomic and microeconomic levels, as well as its capacity to regulate conflicts and put in place "social justice" mechanisms to manage resources and production territories.

The second part of the chapter raises the question of relations between extractive companies, inhabitants, and national and local governments. It sheds light on the uneven impact of mining compensation and mitigation mechanisms on communities residing in Phu Bia Mining's direct area of influence. However, it also highlights that in a peripheral area where the state power's presence and capacity of action are unequal (except on the military level), the mining company acts as a local development partner and represents an opportunity for social ascent for minority ethnic communities.

2.3.2. Theoretical framework

This research falls within the theoretical framework of geopolitics: "*Geopolitics is an overall method of geographical analysis of concrete socio-political situations viewed as loca-*

lised and the usual representations which describe them. It determines the geographical coordinates of a situation and socio-political process and deciphers the cartographic discourses and images which 'accompany' them." (Foucher, 2000). Geopolitics is a branch of geography that has known, since the end of the nineteenth century, three main schools of thought. Appearing at the turn of the twentieth century, the materialist school placed greater emphasis, according to a very deterministic mechanism, on the link between the parameters of the physical and political geography of states. After 1945, the realist school sought to analyze the modes of deployment of power policies in space (O'Tuathail, Dalby, and Routledge, 1998; Lasserre and Gonon, 2001; Chautard, 2009; Gourdin, 2010). The geographical school, which this research references, seeks to study power rivalries over territories, at various scales, and the representations of actors in these rivalries (Lacoste, 1976; Raffestin, Lopreno, and Pasteur, 1995; Giblin, 2016; Lasserre, Gonon, and Mottet, 2020). Indeed, the construction of a new China-led digital connectivity — because it generates ambitious yet often conflicting projects on how to organize and structure networks — is a good example of a contemporary, contradictory issue that is the subject of geopolitical analysis (Gumuchian, 1991; Subra, 2007, 2016).

2.3.3. Methodology and sources

The elements presented and analyzed below were acquired through ten field studies carried out between May 2008 and May 2017. The surveys include, on the one hand, the observation of mining infrastructures and, on the other hand, interviews with a panel of actors involved in the country's mining sector, actors from the development world present in Lao PDR, and local specialists. The actors interviewed during the semi-structured interviews are representatives of the Government of Lao PDR and Laotian agencies, the National Assembly, the Prime Minister's Office, employees of Phu Bia Mining, the Cooperation Committee with Laos (Comité de coopération avec le Laos, CCL), the French National Research Institute for Sustainable Development (Institut de recherche pour le développement, IRD), the French Development Agency (Agence française de développement, AFD), the Oxford Committee for Famine Relief (OXFAM) in Lao PDR; the Group for Research and Technology Exchanges (Groupe de recherche et d'échange technologique, GRET), the French School of the Far East (École française d'Extrême-Orient, EFEO), and the Swiss Red Cross in Lao PDR.

During these interviews, we mainly aimed at having our interviewees discuss the presence of foreign actors and the political, economic, social, environmental, and territorial issues at stake the management of the Laotian mining sector. Around twenty non-directive interviews were conducted with local people directly affected by the mining projects. For these interviews, we chose not to impose a guiding framework for these talks, but rather to have a discussion. Conducting interviews as a conversation is a strategy to minimize the artificiality of the interview situation (Olivier de Sardan, 1995). In a political context where official or agreed-upon discourse is the norm, the methodology adopted for the study makes it possible to break away from the rigidity of the questionnaire format, which is often perceived by the informant as an interrogation. For the researcher, it creates a listening situation that leaves room for improvisation while remaining as close as possible to the local mode of communication, especially with residents from ethnic minorities, who are often not at ease with anything reminiscent of government control. This type of interview, however, does not break free from a conversation framework, but rather takes the form of a checklist of points to be addressed (Bolderston, 2012; Edwards and Holland, 2013). Conducting interviews as a conversation guided the research during fieldwork at both the local and village level. In addition, open discussion with the Laotian interviewees often brought us pleasant surprises and opened up new fields of reflection.

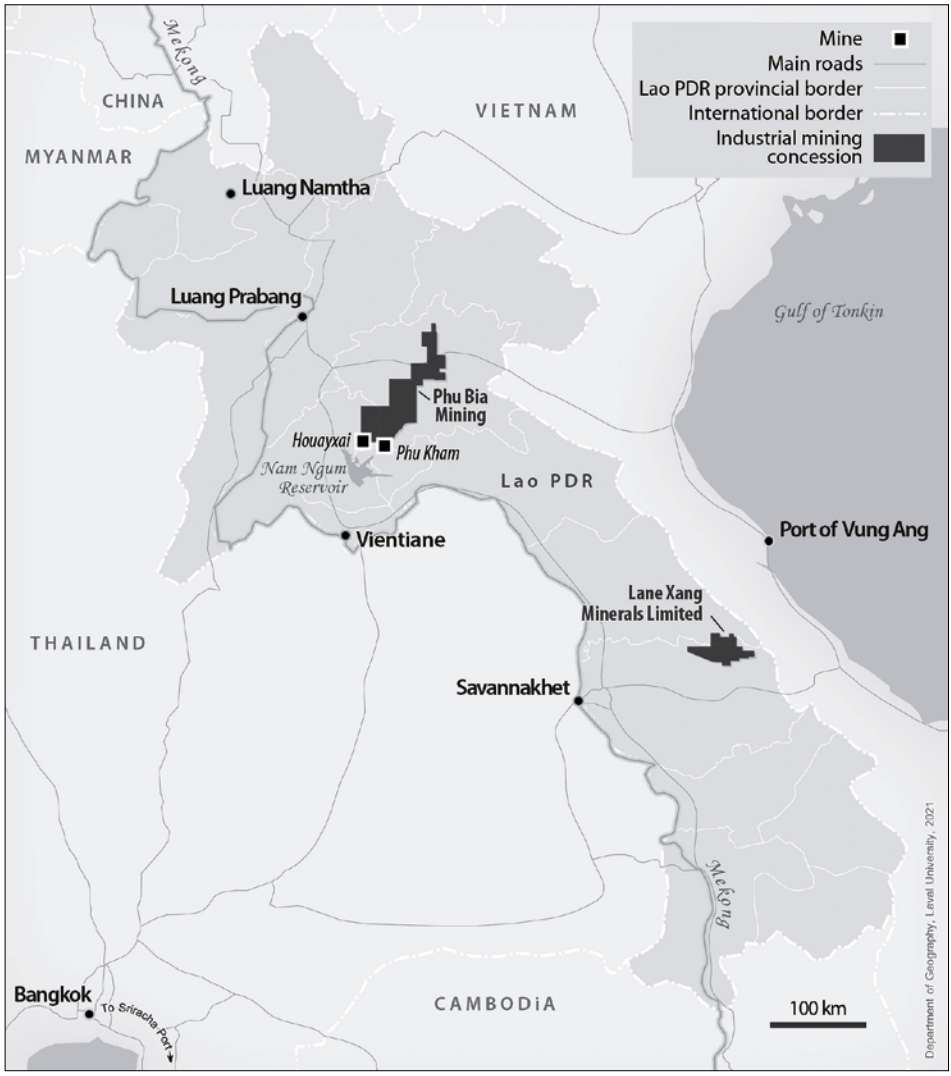
2.3.4. Exploitation mechanisms, virtual absence of disputes, and systemic corruption

Lao PDR is rich in mineral resources. Companies prospect,[5] explore,[6] and exploit minerals such as gold, copper, silver, zinc, lead, tin, coal, lignite, gypsum, gems, silicon, and sapphire.[7] Gold, copper, and silver are by far the minerals most exploited and exported. However, the history of large industrial mining operations is very recent, only dating back about fifteen years.[8] The massive influx of foreign investors in the early 2000s led to an increase in the number of mines and mining properties in the exploitation or advanced exploration stages, particularly in

5. Prospecting generally involves the search for deposits in a large geographical area through the analysis of existing literature and geological mapping, rock fragments, and aerial photographs.
6. Exploration includes prospecting, sampling, mapping, and drilling to search for deposits and determine their exact location.
7. Lao PDR ranks as one of the most resource-rich countries in Asia. More than 570 mineral deposits have been identified.
8. Ore and metal exports, including gold, began in 2003.

the gold, copper, and silver sector. In 2020, two major mining firms were active in Lao PDR: Phu Bia Mining (PBM) located in the Xaysomboun Province, approximately 120 km to the north-east of Vientiane (Phu Kham and Houayxai mines); and Lane Xang Minerals Limited[9] in Sepon, in the southern province of Savannakhet.

Map 2. ***Mining firms in Lao PDR***
Source: Ministry of Natural Resources and Environment, Lao PDR, 2012.



9. Chifeng Jilong Gold Mining (China) bought a 90% stake in the mine's operator, Lane Xang Minerals, from MMG China Minmetals Corporation in 2018 for USD 275 million.

The presence of these two major industrial mines on national territory made Lao PDR stand out in the rankings of mineral-producing countries in the Asia-Pacific region.[10] The country had been markedly absent from these rankings until 2003 when the Sepon gold mine was commissioned,[11] followed by the copper mine in 2004. In 2015, Lao PDR represented 0.72% (6.8 metric tons) of total gold production in the Asia-Pacific. As for copper concentrate, merely 2.3% of the total regional volume was extracted in 2011 in Lao PDR (US Geological Survey, 2017), a figure which rose to 4.1% in 2015. These very modest figures put in perspective the importance of the Laotian mining industry in the Asia-Pacific region, an area dominated indeed by the production of the three mining giants of Australia, China, and India.

2.3.4.1. A mining law introducing the consideration of environmental, but not social, risks

Adopted in May 1997, the Mining Law (No. 04/97/NA) constitutes the second piece of Laotian legislation to directly tackle mining exploitation.[12] Implemented by decree in 2002, the main objectives of this law are to determine the management and exploitation system of the resource, to confirm state ownership over all minerals, and to increase the contribution of this economic sector of activity. This policy, aimed at promoting and developing the mining sector, is articulated around several other pieces of legislation such as:

- the Law on Investment Promotion (No. 02/09/NA) (GoL, 2009),
- the Law on the Management of Foreign Investment (No. 11/04/NA) (GoL, 2004), and
- the Tax Law (No. 04/05/NA) (GoL, 2005).

The Mining Law, revised in 2006, suffers from numerous deficiencies that render it non-operational. These include the lack of human and legislative resources to regulate the mining industry on the one hand, and the environmental impact of the sector on the other. This situation led to the definition of a new mining code in December 2008 called the Law on Minerals (No.

10. The United States Geological Survey (USGS) Asia-Pacific ranking takes into account the production of 28 countries.
11. The Sepon mine stopped the mine's gold operations in December 2013 because of depleting ore reserves and lower margins. The rapid rise in the price of gold following the COVID-19 crisis made it possible for Chifeng Jilong Gold Mining to resume gold production at Sepon Mine in 2020.
12. The Mineral Exploration and Production Agreement (MEPA) served as a negotiating framework with the Government of Lao PDR until the Mining Law was enacted.

04/08/NA) (GoL, 2008), which was revised again in December 2011 (No. 04/11/NA). When this revised law was enforced in May 2012, the 2008 mining code was abrogated.

It is in this "environmentally friendly" context that the Laotian government decided to transfer some of the responsibilities of the Department of Geology and Mines (DGM)[13] — which had been under the authority of the Ministry of Energy and Mines since 2006[14] — to the Ministry of Natural Resources and Environment (MoNRE), created in August 2011. In practical terms, the issues of policy development for socioeconomic growth regarding the mining industry, formerly a responsibility of the DGM, are now under the responsibility of the MoNRE.

The introduction of the 2011 revised Law on Minerals initiated a process to truly address environmental risks. Thus, according to the 2011 law, exploitation permits could only be granted on the condition that companies follow a mining permit procedure divided into several stages. This would be a mandatory prerequisite for the implementation of a mining project. As a first step, the company must obtain a prospecting license valid for two years and extendable for a further year (Article 36). When sufficient information has been provided, an exploration permit (three years + two years) is granted (Article 36). If the company decides to exploit the explored field(s), an economic and environmental feasibility[15] study (one year + one year) must be carried out. This feasibility study is a development and exploitation plan for the deposit. It must include a study of economic profitability and social and environmental impacts, an impact mitigation plan, and an environmental monitoring plan. If the feasibility study is conclusive, a license to build the infrastructure (two years + one year) and an operating license (twenty years + five years) is awarded (Article 44). Licensees must also open and maintain a trust account to establish a fund with a view to covering the costs of preserving and rehabilitating the environment.

Several state actors are involved in the mining licensing process. Through a series of shuttles of the permit application, three ministries must issue a favorable (or unfavorable) opinion. These are the Ministry of Planning and Investment, the Ministry of Energy and Mines-Department of Mines, and the MoNRE. At the

13. Since March 2007, the DGM has been structured as two distinct departments: the Department of Geology and the Department of Mines.
14. Until June 2006, the DGM was under the authority of the Ministry of Industry and Handi-craft.
15. For industrial-type mining projects, the Laotian central government requires an environmental assessment that is usually included in the feasibility study. Although the number of environmental standards is steadily growing — especially because of pressure from foreign donors — studies are not reputed to be very thorough.

heart of the process, the Prime Minister's Office (PMO) has the power to block any request. Although the DOM has lost some of its former power to the MoNRE, the DOM remains the manager and the first interlocutor of the mining companies present in Lao PDR.

With the successive Mining Law (1997) and Laws on Minerals (2008 and 2011), which are inseparable from the Law on Investment Promotion, the Government of Lao PDR has clearly expressed its support for a neoliberal system with an environment conducive to the development of the mining sector. These investments can take different forms. They are either a "business cooperation" through a contract, or the creation of a joint venture between a foreign company and a Laotian company, or a company wholly owned by foreign interests or Laotian capital.

In line with the commitment made in the 8th Five-Year National Socio-Economic Development Plan (2016–2020), which outlines the socioeconomic orientation of the country for the next five years, the 2011 Law on Minerals is currently under revision. Amendments to the mining code should reportedly aim, among other things, at developing an environmentally friendly and sustainable mining industry through adhering to international best practice, while setting up clear mechanisms for settling disputes arising from mining activities. Since 2017, a multitude of stakeholders — including representatives of international organizations, foreign embassies, development partners, and the mining sector (Vientiane Times, 2017a) — have been examining the draft amendment of the Mining Law. At the request of these external actors, the new version of the mining law will have to incorporate the principles of good governance put forth by the three main United Nations pillars, namely international peace and security, human rights, and development.

2.3.4.2. A difficult, if not impossible socioenvironmental questioning

Non-governmental organizations (NGOs), whose function is to sensitize governments, populations, and the international community to socioenvironmental problems, are essential actors in the co-management of mining operations, whether it be for the defense of affected populations, the management of conflict risks, or the development of public participation in mining activities. However, in a country like Lao PDR, the pressure maintained by the government on companies is such that NGOs and civil society have a hard time developing a truly influential socioenvironmental activism. In Lao PDR, the government's policy on civil liberties and the political rights of the population, including civil society actors and the defense of the environment, is very coercive.

This is especially noticeable among NGOs and non-profit organizations that receive international funding. The dramatic deterioration in the leeway of associations and NGOs, especially on socioenvironmental issues, began to intensify when the country officially expelled Anne-Sophie Gindroz, the head of the Swiss NGO Helvetas, on December 9, 2012, with only forty-eight hours' notice. The trigger for this decision was a letter from Gindroz addressed to all donor countries and other donors the day before a working meeting, bringing together thirty-five countries and forty-two organizations, on the conditions of granting international aid to Lao PDR — aid on which the country is still largely dependent. In this letter, the director of Helvetas stressed that the Laotian government represented "an environment hostile to the development of civil society by stifling freedom of expression" and "a country led by a single party regime leaving little room for a democratic debate and where to interfere in this restricted space implies dire consequences."[16] While the expulsion went virtually unnoticed by the international community — except in the world of development aid in Lao PDR and by a few Swiss newspapers — the mysterious disappearance of Lao activist Sombath Somphone, on December 15, 2012, six days later, attracted much more attention. This is because Sombath Somphone is not just anyone. As the winner of the Ramon Magsaysay Award (regarded as Asia's equivalent to the Nobel Prize) in the Community Leadership category in 2005, he is a prominent figure in Laotian civil society. An environmental activist and defender of the rural communities and poorest citizens of Lao PDR, he is highly respected and internationally recognized for his community development work. He was stopped on a main thoroughfare in Vientiane by traffic police for a paper check, before being taken away in a white van by unidentified individuals. According to the international community present in Lao PDR, the problems Sombath Somphone faced started in October 2012 at the 9th Asia-Europe People's Forum held in Vientiane before the November 2012 ASEM Summit.[17] During the forum, jointly organized by Sombath Somphone and the Laotian government, reports state that the debates quickly highlighted participants' concerns over a series of mining development projects (but also hydroelectric and cash crop projects) that had encroached on villagers' lands, damaging the environment and obstructing social justice. As he defended the villagers, Sombath Somphone was reportedly intimidated during the forum and was never to be seen again.

16. Authors' translation. Unless otherwise stated, all translations in this article are by the authors.
17. The Asia-Europe Meeting brings together fifty-one member countries, almost all states from Europe and Asia-Oceania, and two regional organizations.

2.3.4.3. Managing the country and its mineral resources: The role of corruption and cronyism

To study Lao PDR, an understanding of the concentric circles of power (village, district, province, central state, private enterprise, etc.) makes it possible to approach the decision-making hierarchy by highlighting the confrontations and entanglement of different political levels and the economic world.

A growing heterogeneity of power relations between leaders characterizes the structure of the party-state. In Lao PDR, the struggle is first and foremost a power struggle, not a political one. This struggle generates the payment of bribes, corruption, and cronyism. Because of the revenues they generate and the way the actors use them, Lao PDR's natural resources contribute to funding and perpetuating rivalries of power. Thus, the national elite and local bureaucracy have made substantial efforts to capture the economic rent of these natural resources.

The economic liberalization associated with the implementation of the New Economic Mechanism, far from announcing the decline of the party-state, has facilitated the conversion of some of the urban and provincial political and military elites into private entrepreneurs — a reconversion made simpler by a decentralized administration. This results in a patronage system that strengthens alliances between the political world and the business world. Practices in the rapidly expanding mining concessions market in the provinces are tainted by the collusion of political, administrative, and economic powers, resulting in a significant diversion of public assets. In the Corruptions Perceptions Index established by the NGO Transparency International, Lao PDR ranked 130th out of 180 countries and territories assessed on their level of corruption in 2019. It had previously ranked 158th out of 180 in 2009, 160th out of 174 in 2012, and 139th out of 168 in 2016.

These practices, repeatedly denounced by foreign observers and international NGOs present on Laotian soil, contribute to producing a rent economy that allows the current Laotian political system to remain in place and even become stronger. Indeed, economic growth, driven by the dynamism of neighboring countries and private entrepreneurs from China, Thailand, and Vietnam, generates an increase in revenues from corruption that sustain the Laotian administration. This financial perfusion appeases officials who are frustrated with their low wages (which have been in line with the country's monthly minimum wage of USD 132 since 2018) in addition to making it possible to distribute income to the Party's senior leaders, their families,

and their patronage networks. Through the creation of new legal rents (e.g., mines), they participate in forming a ruling class that has become the manager of resources and lands of a privatized state and of its integration into the regional economy.

Cronyism, built around kinship, neighborhood, or friendship ties, tends to favor corruption, bribery, and rivalry between clans at the expense of promoting the interests of the Laotian population. Of course, the very nature of Laotian government allows this type of practice to flourish. These clan connections obviously influence government decisions — whether at the district, provincial, or central level — in the regulation of business. Despite the introduction of an anti-corruption law in 2005, how can the apparent weakness of control over the state apparatus be interpreted? Would Vientiane lack the authority and means of regulation vis-à-vis the several levels of increasingly powerful and corrupt administration?

It should be kept in mind that Vientiane's slow response on the issue of repression of local corruption, especially regarding mineral resources, is rooted in the fact that these practices allowed a very real economic growth, albeit timid, for territories without access to national and international programs. These territories had felt left behind because they were generally located far away from major development corridors (or economic corridors). Tapping into the financial resources offered by corruption was seen as a way to make up for this isolation. This "alternative" mode of operation has gradually become a response from the local scale, eager to enjoy the fruits of growth promised by Vientiane and international agencies but seeing few development projects taking off.

However, over the past few years, the government has demonstrated its determination to tackle corruption by passing a series of laws and regulations targeting money laundering, such as the Law on Anti-Money Laundering and Counter-Financing of Terrorism (2014, and entered into force in 2015), to ensure compliance with international standards.

2.3.4.4. Moratorium on the allocation of new mining concessions, 2007–2015

Between 2007 and 2012, the Laotian government suspended the granting of new mining concessions through the establishment of three moratoriums,[18] notably because of the overlap of concession areas granted to multiple entities by the various administrative levels (government, province, district) and the conflicts that arose from this confusion. During this period, the successive moratoriums did not seem to have had any notable effects on foreign direct investment directly oriented toward the mining resources or on the constantly expanding number of mining sites prospected, explored, or exploited. The establishment of three successive moratoriums between 2007 and 2012, suspending the granting of new mining concessions until December 31, 2015, was decided at the same time as the fight against corruption. This crackdown can be interpreted as the Laotian government realizing that it needed to establish new rules in the allocation of concessions that had become uncontrollable over time as a result of competition between the districts, provinces, and the central state on the one hand, and patronage networks mingling with the political elite and business community on the other.

In Lao PDR, several levels of government have the power to grant concessions:

- districts may allocate concessions of three ha or less,
- provinces can grant concessions of less than one hundred ha,
- the Ministry of Energy and Mines has the authority to approve concessions of up to ten thousand ha, and
- larger concessions require a decision by the National Assembly.

In fact, if the June 2012 moratorium marked a pause in the concession system, it signaled Vientiane's willingness to create order so as to bring more money into the coffers of the state. In

18. Former prime minister Bouasone Bouphavanh announced on May 9, 2007, the establishment of a moratorium, without setting a date, on land concessions larger than one thousand hectares allocated to the mining and agricultural sector, highlighting the shortcomings of the concessionary policy. The moratorium was suspended in June 2009 before being reinstated the following month, setting the maximum surface area for a mining concession at one thousand ha (the moratorium allowed exceptions issued by the central government). The third moratorium, from June 2012 to December 31, 2015, suspended the granting of any new mining concessions.

the central government's mind, the state strategy of the extraversion of resources is the one of the few ways to "produce"-development and support national growth.

With the June 2012 moratorium, Laotian leaders seem to have recognized the need to establish a better strategy for allocating mining concessions. However, in the case of a country as opaque as Lao PDR, the real motivations for such a decision may be more complex than the mere desire to make the granting process more transparent. It is highly likely that the central government, being bypassed by the provinces and districts, felt it did not receive its fair share of the concession system. In an uncompleted regional integration process, this could undermine its economic and geopolitical margin of maneuver, particularly with a view to creating a new system of equitable multilateral relations with neighboring countries.

Finally, the moratorium on mining also intends to calm concerns raised by the World Bank and members of the National Assembly after a series of development projects encroached on villagers' lands and damaged the environment and well-being of local people. Too often, socioenvironmental impact studies are sloppy; authorizations are granted through an opaque process which, upon the company's arrival, provoke land conflicts with the village communities present in the concession areas (Vientiane Times, 2015). As such, it should be noted that when Lao PDR was established in 1975, land ownership was transferred to "the people" represented by the party-state. In 1994, under pressure from the World Bank, the government introduced land allocation, notably to encourage village communities to protect the environment. This land reform stipulates that "*the land belongs to all the Lao represented by the government. The Lao citizen has the right of possession and use, to transmit the land in the form of inheritance, the right of offering, to rent the land, to sell or to purchase the rights of possession and use of the land.*" Article 43 of the Land Law of 1997 provides for the establishment of a land registration procedure in a uniform manner throughout the country. Land titles have actually been registered and distributed, but it is very common for there to be two or three deeds for the same parcel of land! This generates conflicts and the settling of accounts in which the richest or most powerful always come out as the winners, because the bribes they pay to have their title prevail over that of others (Ducourtieux, Laffort, and Sacklokham, 2004).

2.3.5. Phu Kham's (PBM) mining development: A project in the heart of the revolutionary territory of Xaysomboun

Generally speaking, the impact of mining on the national economy, particularly on state revenue, appears to be significant.[19] Apart from the revenue sent directly to the National Treasury, the benefits are also significant for the local communities living near the mining sites. However, while economic results appear to be positive at the national level, land and social conflicts are concerning in many cases, particularly in the Phu Bia Mining company-operated area, in Xaysomboun Province (See Map above).

2.3.5.1. Xaysomboun: A former special military zone

Since the creation of Lao PDR (1975), an attitude of suspicion toward certain ethnic groups has set in. This is partly explained by the difficulties that the present communist regime had in the early years with maintaining the country's territorial integrity and preventing the threat of social implosion in the face of the many internal and external pressures it faced (Tan, 2011). Among these difficulties are an ongoing anti-communist Hmong guerrilla group, an economic blockade from Thailand, the flight of urban elites to foreign countries, a disastrous collectivization policy (1978), and the deterioration of diplomatic relations with China following the Sino-Vietnamese conflict (1979). In a politically and socially unstable context, the ethnic question became a major issue, especially as the peculiarities of the mountain population were perceived as serious impediments to constructing a socialist state. As a result, mountain people were and still are stigmatized as destroyers of forests, opium producers, and isolated populations, and therefore worthy of suspicion. This perception was compounded by the archaic religious practices they displayed, such as animism, messianism, and conversion to Christianity. Consequently, the main concern in Vientiane was to control and conquer the ethnic threat (McCaskill and Kempe, 1997).

Among the mountain people, the Hmong ethnic group is considered to be the most "problematic" since it benefits from an active diaspora abroad (in the United States and France for example), it has control over opium production as a means of generating income, and its religion — animism with shamanic

19. Gross mineral export value is higher than USD 8 billion (2011–2015), covering 60% of the country's total exports.

rites — allows it to keep a distance from Lao culture (Culas, 2005). In particular, the Hmong, used as a "secret army" by France and the Central Intelligence Agency in the fight against the Pathet Lao communist movement,[20] paid a heavy price for their commitment alongside French and American "neocolonialists." From 1975, tens of thousands of Hmong left the country for fear of reprisals. Part of the Hmong remained in Lao PDR and continued their resistance in the mountains, an anti-communist struggle quickly crushed by the Lao army with the help of thirty thousand Vietnamese soldiers (Culas and Michaud, 1997; Evans, 2002). Nevertheless, the defeat was not complete; a small number continued the struggle thanks to the financial and logistical support of the Hmong diaspora (Tan, 2011). During the 1990s, from the Phou Bia Mountains, the Hmong led attacks against the positions of the Laotian army. The Xaysomboun special zone (7,105 km²) — created in 1994, under military administration, and prohibited to foreign observers — was set up to better control and isolate the pockets of Hmong resistance. As the special zone was dissolved in 2006, until December 2013 one part of its territory was reallocated to the province of Vientiane to the south, and the other part to the province of Xiengkhouang to the north. Since December 31, 2013, Xaysomboun officially became the seventeenth province of Lao PDR (Le Rénovateur, 2014). For several years now, the Laotian government has shown signs of reconciliation with the Hmong community by offering to repatriate several thousand of them from Thailand. However, according to the Hmong diaspora (Lao Hmong Human Rights Council, the security paranoia before the Southeast Asian (SEA) Games[21] in 2009 reportedly resulted in offensives being carried out in the province of Xiengkhouang by the Laotian army, assisted by Vietnamese special units. Directed against the Hmong Christians and dissident groups hiding in the mountains of Phou Bia and Phou Da Phao, these attacks were reported to have left over one hundred people wounded or dead, serving to confirm the political instability and security of a region which was one of the country's two largest mining areas.

20. The Pathet Lao (Lao State) regrouped all pro-independence, nationalist, and later communist movements and organizations. Since the victory of the Pathet Lao communist movement in 1975, Laos has become the Lao People's Democratic Republic or Lao PDR.
21. Organized for the first time in Vientiane (December 9–18, 2009), the SEA Games are a multi-sport competition in which the eleven countries from Southeast Asia take part. Formerly called SEAP Games (Southeast Asian Peninsular Games), the SEA Games are the biggest sporting event in the region. Held every two years since the first Thai edition in 1959, the SEA Games are organized by the Southeast Asian Games Federation and overseen by the International Olympic Committee and the Olympic Council of Asia.

The repression of the Hmong people by the Lao army came back to the forefront in 2018. According to the Unrepresented Nations and Peoples Organization (UNPO) — which relays information from an organization of Hmong exiles based in the United States, called the Congress of World Hmong People — fighting broke out in October 2018 between a group of about thirty Hmong and a group of Lao soldiers (Unrepresented Nations and Peoples Organization, 2018) near Mount Bia (Phou Bia). According to UNPO, at least seven people were injured and nine killed, including women and children. Apparently, the group remained hidden for almost a month in the forest. To dislodge them, Lao military forces reportedly bombed the area, deploying heavy artillery. In addition, it was reported that chemical weapons were also used (Unrepresented Nations and Peoples Organization, 2018). Although it is very difficult to separate fact from fiction, as both sides give a biased version of events, flare-ups between the Hmong ethnic group and the central government can be observed at a time when the latter is calling for greater solidarity between ethnic groups and all Lao people, at home and abroad, and setting the socioeconomic development of the country as a goal. Moreover, to show its willingness to embrace the ethnic groups present in the territory, the National Assembly has accepted the Bru ethnic group (mainly present in the province of Savannakhet) as the fiftieth official ethnic group of the country (Lao News Agency, 2018).

2.3.5.2. The Phu Kham Copper-Gold and Ban Houayxai Gold-Silver Operations

Located in a mountainous region dominated by Mount Bia (Phou Bia) — the highest point in Lao PDR at 2,820 meters — the Phu Kham ("Mountain of Gold" in Laotian) and Ban Houayxai mines are owned by Phu Bia Mining (PBM), a subsidiary of the Australian company PanAust (Brisbane) also present in Myanmar and Papua New Guinea. In 2015, against all odds, a Chinese investment group, Guangdong Rising Assets Management Co., Ltd. (GRAM[22]), took control of PanAust through an unconditional takeover bid (Kjellerup Vægt og Maskinfabrik, 2016), an operation set up for a friendly or hostile takeover. GRAM's acquisition strengthens the Chinese investment group's strategy to acquire copper deposits in Southeast Asia (Hoyle and Winning, 2015).

22. GRAM is a Chinese state-owned company regulated under the State-owned Assets Supervision and Administration Commission, the People's Government of the Guangdong Province in China. GRAM operates as an investment company in mineral resource development, electronics, industrial waste management, real estate, and finance.

Today, PanAust is an Australian incorporated company that is owned by Guangdong Rising H.K. (Holding) Limited which is a wholly owned subsidiary of GRAM. Registered in Lao PDR as a joint venture, PBM is 90% owned by PanAust and 10% by the Lao government.[23] According to Phu Bia Mining, the company accounted for over 2.4% (USD 427 million) of Lao PDR's 2018 real GDP.[24]

Phu Kham and Ban Houayxai, open-pit mines rich in gold, copper, and silver, required an investment of several hundred million US dollars. However, the ore is not processed on site, but is trucked[25] over one thousand kilometers to the Thai port of Sriracha or, since 2012, to the Vietnamese port of Vung Ang located about 650 km away (PanAust, 2014).[26] The ore concentrate is then shipped to different smelters located in China, India, and South Korea, while BHP Billiton — an Anglo-Australian multinational and the world's largest mining company — manages all sales of ore concentrates (International Council on Mining and Metals, 2011). PBM, which has operated Phu Kham since 2007 and Ban Houayxai since 2012, estimates that the site can be mined until 2025. PBM was granted a 2,636 km² concession — a very large territory in which only a few dozen square kilometers are actually explored and exploited (See Map above).

2.3.6. Between social justice and conflicts

Established in the heart of inhabited areas, PanAust's mines are embedded in the daily lives of various local communities. As such, PanAust considers "local communities" to be the populations directly or indirectly affected by all the operations of the mining company (PanAust, 2012). PBM considers that the mines directly impact several villages because of their proximity. In addition, there are about twenty other rural villages along the roads used day and night by mining staff and equipment. In order to minimize the impact on local people, PBM set up compensation and mitigation systems.

23. In May 2011, the Lao government exercised its right of option on 10% of the shares of PBM's capital. The future dividends (royalties and interests) resulting from the exploitation are planned to be used to repay the sum borrowed from PanAust.
24. In 2018, PBM's contributions of approximately USD 86 million to the Government of Lao PDR (payroll tax, import service fee, road tax, income tax, royalties, concession fees, dividend).
25. A convoy of three trucks (and two SUVs) belonging to the Thai-Laotian company Deuan Sawanh Group Co., Ltd. departs daily to Sriracha (Thailand) and Vung Ang (Vietnam) with gold/copper/silver concentrate stored in secure containers of 25 tons (see map). On the way back, the empty containers are used to transport goods to the Phu Kham site.
26. PanAust's own admission is that the new road to the port of Vung Ang reduces logistical (and political?) risks as it offers a second option to the multinational.

Job creation for local people[27] is without a doubt the most visible economic compensation in communities directly affected by mining. In 2018, 27% of employees were residents of neighboring communities, or 893 out of 3,292 people (PanAust, 2019), of which 94% were Laotian[28] and 18% were women. If we do not take into account foreign workers (266) from Southeast Asian and Western countries, the percentage of national workers is 92% of the total number (up to December 31, 2018). Comparing the volume of local jobs generated by PBM to the total population of Xaysomboun province (102,000 inhabitants in 2018), approximately 1% of the province inhabitants directly benefit from mine exploitation. Mainly confined to positions of unskilled and semi-skilled personnel (56%), local people are totally absent from management positions (1 person). In 2018, at 79% of these positions were held by expatriates and 21% by Laotians from other districts and provinces (down from 84% in 2012). This situation is not without serious problems. In fact, the lack of knowledge of the local context, the permanent turnover of employees, and the rigidity of the system put in place by the mine create recurring tensions between villagers and Laotian mine personnel.[29] It seems difficult for members of the local communities affected by the mining activity to get management jobs at one of the mines.

In addition to job creation, PBM also benefits communities where the Phu Kham and Ban Houayxai mines are located by buying some of its food from local producers. In 2018, Phu Bia Mining bought nearly USD 1,093,566 worth of food (PanAust, 2019). Moreover, since 2010, they have spent nearly USD 6.5 million on food. Fresh vegetables, farmed fish, eggs, fruit, drinkable water, and cloth bags are provided by about 150 small family businesses, mainly from Nam Mo, as well as some neighboring villages.

27. Village population present in the district before 2005.
28. It is interesting to note that since 2012, PanAust no longer reports data on the ethnic origin of employees in its annual reports.
29. Interview with a former chief of Nan Gnone village, Nan Gnone, February 2012.

Photo 8. ***Gardens producing food for Phu Bia Mining (Nam Mo Village)***
Credit: Eric Mottet, February 2012.

These family businesses were set up by the Community Development Fund [30] (CDF) through a microcredit program. In 2017 and 2018, the CDF received a total of USD 836,000,[31] of which 80% was for the villages affected by the Phu Kham mine (PanAust, 2018 and 2019). A portion of the money paid for the purchase of food is directly deposited in the Village Savings and Credit Fund [32] (VSCF). According to PanAust, this fund enabled nearly all villagers to access financial services by contracting different types of loans from the Fund. Beyond food and goods purchases, PBM also focuses on:

- education: building schools, purchasing supplies, setting up extracurricular programs and adult literacy programs,
- health: opening two clinics, purchasing an ambulance, running disease prevention campaigns,
- infrastructure: building latrines in village houses, improving road drainage, rebuilding roads and bridges, and
- developing small businesses.

30. In 2013, PanAust was awarded the Sustainability Leadership Award at Singapore's Asia Mining Congress for creating and supporting business opportunities in villages around the Phu Kham mine.
31. PBM's revenue of USD 768 million for the sale (and export) of copper, gold, and silver in 2018.
32. Twelve villages participate in the VSCF microcredit program (16,000 people).

In the case of Nam Mo and Nam Gnone villages, directly impacted by the Phu Kham mine, the positive economic impact of mining activities on the affected communities remains real, albeit uncertain in the medium and long term. However, the two villages, with different ethnic origins, seem to have experienced opposite trajectories.

The Khmo village of Nam Mo, located below the Phu Kham mine, is undoubtedly the major beneficiary of the compensation and mitigation systems established by PBM. Indeed, the vast majority of food purchased from villagers by the Phu Kham mine is provided by the village of Nam Mo.[33] In a few years, the self-managed village fund made it possible to finance loans for villagers who want to build a single-story dwelling, so that traditional houses on stilts are practically no longer part of the Nam Mo landscape. The reality of the Nam Gnone Hmong village is quite different.

Photo 9. ***Nam Gnone village***
Credit: Eric Mottet, February 2012.

33. Interview with a former chief of Nan Mo village, Xaysomboun, March 2012.

Apart from direct jobs, economic activity around the new market, and some infrastructure financed by PBM (community center), mining's real contribution to improving the living conditions of villagers remains much less tangible.

First of all, the extreme proximity of the mining activities has an impact on Nam Gnone and its population. Located on a hill, the village is literally surrounded by the extractive activities of the Phu Kham Copper-Gold Operation.

Photo 10. ***Information on the next explosion***
Credit: Eric Mottet, February 2012.

Paradoxically, although located high above the open pit, the population is permanently exposed to diffuse dust coming from the mine, in particular raised by the constant ballet of Caterpillar 777D dump trucks weighing more than 100 tons each.

Photo 11. ***Unceasing ballet of Caterpillar 777D trucks***
Credit: Photo credit: Eric Mottet, February 2012.

The nuisances are such that the life of the villagers is now punctuated by the sound of incessantly programmed explosions. These major nuisances are the source of a disagreement within the Hmong community between the older and younger generations. While everyone agrees that PBM and the Lao government should pay for the displacement of the village of Nam Gnone — set to disappear in the medium term as it faces the inexorable advance of the mine towards the village — the elderly want a relocation to the former village site — the pre-1975 site — whereas young people want to relocate to the neighboring province of Boulikhamsay. This situation explains the lack of involvement of the Nam Gnone village in agriculture and the sale of foodstuffs at the mine. For everyone, "the village is without a future".[34] In the specific case of the relocation of entire villages for mining — a rare situation in Lao PDR as mines mainly encroach on forest and agricultural areas — planning for village movements and regroupings is the responsibility of district chiefs' cabinets and provincial governors. Planning for land allocation, however, rests on the local and provincial offices of the Ministry of Agriculture and Forestry.

34. Interview with a former chief of Nan Gnone village, Nan Gnone, March 2012.

As for the Phu Kham mine, except for community and compensation projects (e.g., gardens, village funds, priority hiring), displaced populations have not received financial compensation (see text box below) for two reasons. First, PBM was established in Xaysomboum while the zone was still a special area under military administration. Second, the 1994 land reform was not implemented in this region until the dissolution of the special zone in 2006.

Box 2. Decree on compensation and resettlement management in development projects

Since Decree 84 was issued on April 5, 2016, those who lose land because of mining development projects (if the mining venture is indeed recognized as such) are entitled to compensation for their loss of income, property, crops, and plants. Project managers are required to ensure that the living conditions of displaced people will be as good or better than they were before the project started. In other words, the private company must financially support the relocation of displaced people. As for the province, it is responsible for finding land for the displaced. The fact remains that the cost of compensations granted to expropriated residents is rarely accurately established. In addition, in most cases, neither the mine manager nor the provincial government actually pays expropriation benefits.

In addition, the Phu Kham mine is a source of worrying social conflicts. Serious tensions between the Hmong ethnic group in Xaysomboun district and Lao PBM employees are legion. Several shootings took place in 2006 and 2013 [35] but, without question, the most serious incident occurred in May 2011, when several armed individuals entered the PBM camp at night and opened fire on the security guards, killing or injuring several of them. The next night, another equally deadly shooting took place in the village of Nam Gnone. Minimizing the scale of the events, PanAust, in a press release dated May 16, only said that "unknown assailants fired on a PBM security vehicle" (Iannucci, 2011), causing the temporary suspension of production of the Phu Kham Copper-Gold Operation. However, some local sources claim that the incidents, reportedly minimized by both PBM and

35. Interview with a former Phu Bia Mining general supervisor, Vientiane, February 2012 and 2014.

the Laotian government, resulted in seven deaths.[36] The weeks following these serious incidents were particularly tense, with mine personnel traveling to the villages only accompanied by an armed escort.[37] In Nam Gnone, compensation and mitigation systems are far from having satisfied villagers and are still considered to be very inadequate. In this case, the weight of recent history must not be neglected in this failure. The Hmong perceive no difference between PBM's activities and those of the Lao state, which gives rise to considerable mistrust of the government's intentions for the mining venture. In this case, the tensions between the Hmong and the government, already real because the Hmong are historically anti-socialist, are exacerbated by the low benefits of the mining projects of Phu Kham and Houayxai.

Ultimately, although there are differences between the Nam Mo and Nam Gnone villages in terms of socioeconomic benefits and social justice, local people are very concerned about the planned shutdown of the Phu Kham mine (2025) and of its compensation system (Keolangsy, 2017). The village chiefs want to anticipate PBM ceasing to be a regular and substantial buyer of local produce by insisting the provincial government set up a distribution network outside small local markets, an option that seems possible today thanks to the road network built to exploit the minerals of the region.

2.3.7. Conclusion

Since 2016, Vientiane is determined to put in place binding measures for the mining sector, while the central government appears to have tightened the criteria for granting permits and is bringing domestic and foreign companies already present on Laotian soil into line. Of the 657 mining projects identified in 2016 (Vientiane Times, 2017b), only 226 were authorized by the central government to prospect, explore, or operate concessions, and 24 companies were reportedly notified their approval had been canceled in 2017 (Vientiane Times, 2017a). The strengthening of licensing rules is clearly slowing down the sector, but without compromising it, as the promotion of the mining industry is indeed identified as a development strategy in the 8th Five-Year National Socio-Economic Development Plan (2016–2020) and most likely will be in the 9th Five-Year National Socio-Economic Development Plan (2021–2025; still under discussion).

36. Interviews with PBM employees, Xaysomboun and Vientiane districts, March 2012.
37. Interview with a former Phu Bia Mining general supervisor, Vientiane, February 2012.

The question of whether people have the opportunity to reject a mining project or to favor alternatives to the proposed development model through a process of social justice has no reality in Lao PDR, a country with a regime characterized by a selective application of the law, and where consensus on socio-environmental issues is rare. But giving primacy to the goal of accumulating wealth over that of social justice does not mean that the Laotian regime does not factor in the well-being of the people. In fact, in the case of PBM's mines, mining has made it possible to open up this peripheral region that was previously difficult to access and is now connected by road to the rest of the country. Conversely, one may be concerned about the effects of the exploitation on the environment, but also on the willingness of certain ethnic groups (mainly the Hmong) to stay away from the national development scheme decided by the central government with the help of international mining companies (and an increasing numbers of Chinese firms in recent years), which has then been forced upon communities in a top-down manner, without consultation with local populations. There will thus likely be in-depth changes to the way the territory is organized; whether these will be positive remains to be seen. Opinions diverge quite strongly on this point. People we met in areas directly impacted by extractive activity are rather favorable to mining operations due to the benefits they bring. These operations also result in a new organization of the territory, with access and development facilities that have increased considerably over several years. In the most remote areas, communication with local people is more difficult, and is generally hampered by the mine executives' lack of knowledge — executives who usually come from urban centers, dominant ethnic groups, and foreign countries, who have sporadic contact with local people on the issue of mining. The perception of the mine project is thus tainted with great mistrust, although in many cases mines do provide employment opportunities and additional sources of income — in other words, a form of partial social justice.

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2.4. Customary land tenure under "development": the impact of the China-Myanmar Economic Corridor on the Ta'ang tea farming communities in Northern Myanmar

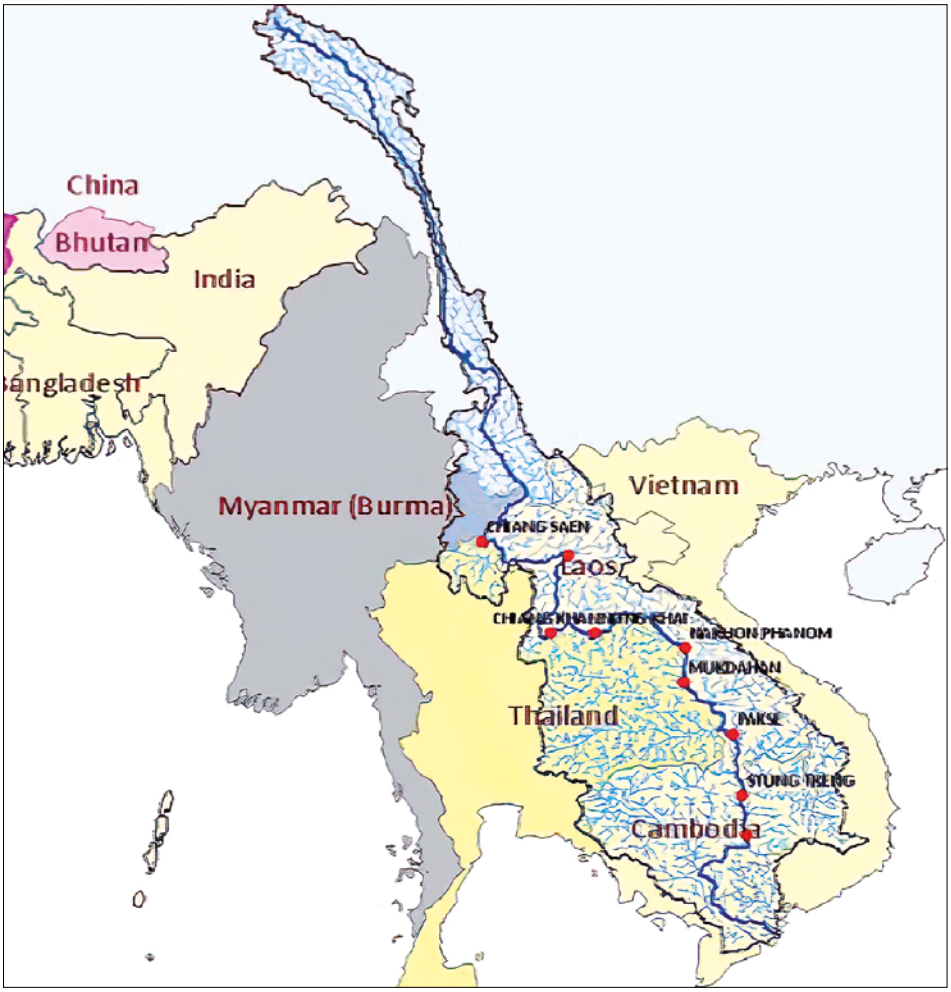
Stephen Nyein Han Tun

Life and politics in Myanmar have changed significantly since 2012, after decades of military dictatorship with centralized politics. This "opening up" provided hopes for the nation's economic growth, among which the China-Myanmar Economic Corridor (CMEC) as part of the One Belt One Road (OBOR) Initiative is the most notable. However, concerns were soon raised about the continuing disturbances and potential impacts of the large-scale land concession. This research, taking both an academic and activism perspective, employs a critical ethnography approach to study how the Ta'ang people — the earliest settlers in Northeast Myanmar — are affected by the project and how they deal with its impacts. The fieldwork is composed mainly of interviews with stakeholders including tea farmers, local civil society organizations, political parties, and armed groups. Through the case study and literature review regarding land policies in different periods in Burma/Myanmar, the author argues that the capital accumulation model for global energy markets is a threat to the survival of the customary land tenure system and the livelihoods of indigenous Ta'ang tea-growing communities, including those of the women. Statutory law amendments have shaped state legal land dispossession politics in favor of large-scale land-based investments such as the CMEC. Going beyond official reports, promises made in the context of CMEC — land and resource compensation, social engagement, environmental assessment, waste treatment, and water access security — have not yet been met. To conclude, the author analyzes the rights of indigenous peoples and customary land tenure with reference to the United Nations Declaration on the Rights of Indigenous Peoples and the customary land rights outlined in Myanmar's 2016 National Land Use Policy.

2.4.1. Land governance in Myanmar

Myanmar, formerly known as Burma until 1989, is home to 135 cultural and linguistic groups (Dittmer, 2010; Lo Bianco, 2016). The country was once known as "the Golden Land" and "the Asian rice bowl" thanks to its Mekong and Irrawaddy basins. Sadly, it has also become notorious as a state shaped largely by civil war between the ruling government and various armed ethnic groups, since independence from the British in 1948 (Stokke, Vakulchuk and Øverland, 2018).

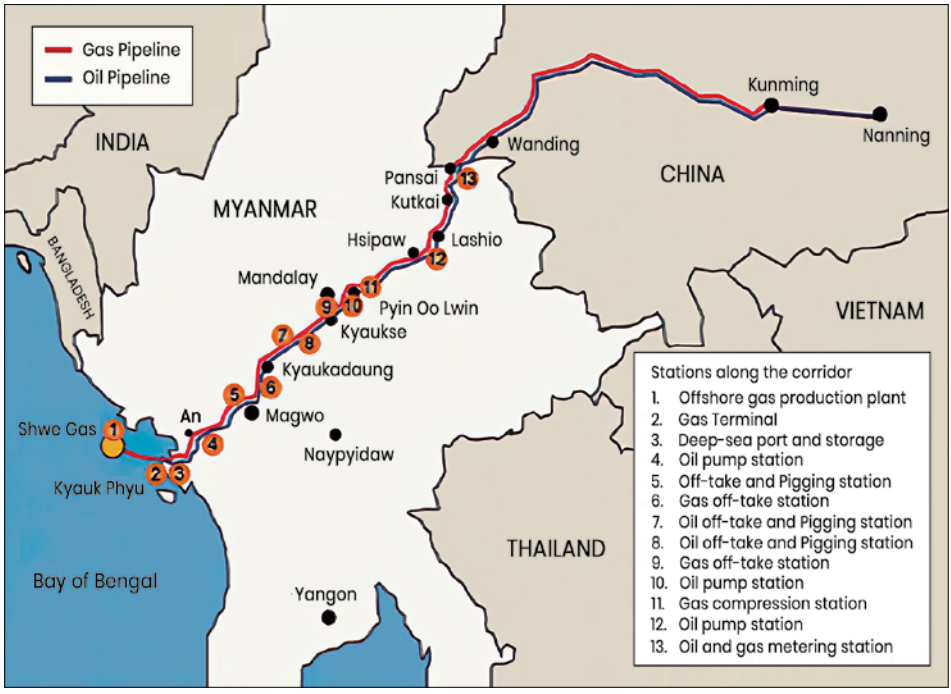
Map 3. ***Myanmar within the Mekong Basin***
Source: Bahadur et al. (2013).



The China-Myanmar Economic Development Corridor (CMEC)

The CMEC is a key component of China's One Belt One Road Initiative (OBOR) and has accelerated Myanmar's political, social, and economic changes. Although the Shwe gas and oil pipeline project was initiated prior to the establishment of the CMEC in Myanmar, the two projects have now merged under OBOR investment (Gong, 2019). The construction of the pipelines started in 2009 and finished in 2013, costing USD 1.04 billion (Zhao, 2011). The project includes a 793 km gas pipeline and a 771 km oil pipeline, both of which run from Kyaukphyu in Rakhine State, through Muse (Northeast Myanmar) to Ruili in China's Yunnan Province.

Map 4. ***The CMEC gas and oil pipelines***
Source: Anand (2019).



The merged CMEC-Shwe pipeline project is owned and operated by major enterprises from four countries:

- Hong Kong: the Southeast Asia Pipeline Company Limited,
- Myanmar: the Myanmar Oil and Gas Enterprise,
- Korea: the China National Petroleum Corp. Southeast Asia Pipeline Company Limited, the Daewoo International Cooperation, and Korea Gas Corporation,
- India: the Oil and Natural Gas Corporation Limited, Caspian E & PBV, and the Gas Authority of India Limited (Myanmar-China Oil and Gas Pipeline Project, 2014).

In addition, highways and railways, under the "Southern Route Highway and Railway Project", will be built along the Shwe gas and oil pipelines from Kunming to Northeast Myanmar and continue to lowland areas such as Mandalay and the Kyaukphyu Special Economic Zone (SEZ) and deep-sea port project in Rakhine State (Zhao, 2011).

The project's promoters argue that the project takes into account environmental and social issues while showing collaborative relationship between China and Myanmar. They promise that the Shwe gas and oil pipelines will benefit Myanmar's people in Mandalay, Lashio, and Muse with "2 million tons of crude oil and 2 million cubic meters of gas for the first time" at a low price (Su, 2016). However, local people have expressed doubts about the promised benefits. One local from Lashio said: "*We're not sure about this low price of oil and gas issue. I don't think that kind of situation will ever happen for the civilians.*" (interview with the author in Lashio township, December 10, 2018).

According to activists, CMEC has impacted negatively upon the communities through which the pipelines pass (Shwe Gas Movement, 2013). The pipelines cross a large area, from Northeast Myanmar to the coastal area of Rakhine State. In the northeastern Shan State, the Ta'ang ethnic group has been subjected to 42,940 acres of land dispossession, with 8,588 families evicted from their native lands. As reported by the Ta'ang Students and Youth Organization (2011) — a non-governmental organization (NGO) that has monitored the project and voiced their fight for local people's rights — land grabbing and livelihood insecurity for local people are among the obvious signs of the project's impacts, along with the degradation of forest resources. The Belt and Road Initiative (BRI) and CMEC's new railway/highway corridor, for which planning began in Northeast Myanmar in 2019, might pose additional threats in that respect.

The impacts of these pipelines have not been comprehensively analyzed in existing academic research, especially in

the context of customary land tenure rights. This present study, therefore, takes the Ta'ang tea farming community — early settlers in Northeast Myanmar — as a case study to investigate the impacts of regional development projects and government redirection on the customary land tenure of ethnic peoples.

The politics of Myanmar's large-scale investment

Many studies on large-scale investment policy already exist, with respect to economic reforms and laws promoting large-scale infrastructure projects, trade, foreign investment, large-scale land investment, hydroelectric dams, and the mining sector. Most of them discuss the relevant primary concepts and accurately reflect the national situation. However, there are notable gaps in the existing research concerning ethnic minorities, such the tea farming communities in the Northeast.

Simpson (2018) discusses the impacts of environmental/natural resource policies. The problems mainly derive from corrupt officials, poor environmental management, the revitalization of ineffective environmental laws during the Thein Sein administration, and the civilian government. Based on multiple case studies — from the Myitsone Dam, Dawei coal power station, Nagis cyclone, and large-scale dams in Ayeyarwady and Thanlwin, to the SEZ in Tenasserim — this research paper highlights the necessity of an efficient and strategic government-led environmental policy in Myanmar. To reach a situation where this policy can be implemented, it is essential to address past issues such as ineffective environmental governance during the military era and issues in developing environmental laws during the civilian-led government period. The author also argues the importance of civil society's role in implementing "environmental governance" under the leadership of a civilian government.

Jones (2018) studies economic reforms and large-scale investments from the post-colonial period to the era of the civilian government. He shows that Myanmar is still in an "underdevelopment trap" and that current national economic development only benefits the few, while generating corruption and social conflicts. "Capital accumulation" is dominated by the state, the military, and their allies, while most of the population works for a low income. The latest civilian government has not tackled these challenges. Development discussions in Myanmar present two contradictions. On the one hand, while catching up to the universal trend of economic gain, foreign direct investment in Myanmar and trade policy reforms, along with "domestic political change and liberalization" and the removal of international sanctions, positively boost exports of agricultural

products, natural resources including gas and oil, and mineral products Bissinger (2018). On the other hand, Scurrah, Hirsch, and Woods (2015) argue, using a political economy approach, that Myanmar's foreign direct investment economy and development programs in agribusiness — particularly rubber plantation — impact livelihood security, property relations, and the land security of smallholders, farmers, and ethnic populations. In addition, some studies point to the relation between investing foreign money in national economic development plans and certain human rights abuses. In particular, the transfer of natural resources into the hands of the authorities has altered the livelihoods of the poor (Global Witness, 2015). Similarly, the Food Security Working Group (2011) condemns the economic system of agribusiness development created by the State Council for the Restoration of Law and Order, as well as the government's 1993 land dispossession policy affecting thousands of farmers in the lowlands and highlands (Tanintharyi and Kachin States).

Considering both sides of the economic development argument in Myanmar, Woods (2012) establishes his case around the coexistence of ethnic conflicts and resource accumulation in Kachin State and Northern Shan State — in particular the areas of Lashio and Kuthkai — in what he calls "ceasefire capitalism". By focusing on timber trading and rubber plantation, he shows how ceasefires with different ethnic armed groups are often based on land and resource concessions to their alliances, who could be political elites or businessmen from Myanmar, or the leaders of these groups. Yet, all processes systematically ignore the welfare of the upland ethnic populations.

So far, most studies about China's BRI and CMEC carry out analysis at the national or international scale. The local impacts of these developments are barely considered. For example, studies may conduct analysis at the ASEAN level, about the relation between investors and governments, or about the expansion of China's policy (Su, 2016; Liu, Yamaguchi & Yoshikawa, 2017; Gong, 2019). When it comes to China's investments in Myanmar, studies also focus on Chinese geo-economic policy and geo-strategy, or on China's economic development in Guangdong province (Yoshikawa, 2016; Malik, 2017), as well as how economic corridors integrate economic growth among underdeveloped regions in the Greater Mekong Subregion (Banomyong *et al.*, 2016). Focusing on Myanmar, research is carried out from other angles: the domination of Tatmadaw power — the Tatmadaw is the official name of Myanmar's armed forces —, the state's land policies, and the various impacts of different interventions. For example, studies have been conducted on the exercise of Tatmadaw power and crony capitalism in rubber plantations, the state's

land law amendments for economic development in the case of farmers from Karen State, the government's foreign investment policy reform, and the State Law and Order Restoration Council's reconstitution of agribusiness development policy and land policy in Tanintharyi State and Kachin State (Scurrah *et al.*, 2015; Global Witness, 2015; Food Security Working Group, 2012).

These studies contribute to understanding the link between political and socioeconomic dynamics in the dispossession of land and other resources. This issue derives from centralized land policy, which has been shaped by a range of powerful actors. In this context, it is crucial to understand the reciprocal relationship of these actors, which includes the state, the army, ethnic groups, and militias. Many scholars focus on the capital accumulation of these actors, but also of international financial institutions, colonizers, agribusiness, mining, and infrastructure mega-corporations, at both national and transnational levels (Harvey, 2005; Nesadurai, 2013; Roudart and Mazoyer, 2016; Gironde and Portilla, 2015).

This paper, based on a literature review and field study, argues that the CMEC threatens the customary land tenure system and livelihoods of the ethnic Ta'ang people. Going beyond the case study, it is revealed that, more often than not, the land legal reforms that favor large-scale land investments such as the CMEC only benefit a few at the expense of ethnic peoples' rights.

2.4.2. Research sites and methodologies

Research started in December 2018, with the fieldwork finishing in January 2019. 60 Ta'ang tea farmers — males and females, young (aged 15-35) and older (aged 36+) — from 4 research sites were observed and interviewed. Critical qualitative research is the fundamental tool in this research. The strength of adopting such an ethnographic approach is that local tea farmers' voices are empowered, and their experiences are considered in all their diversity (Creswell, 2007). Key informant interviews, participant observations, focus group discussions, and life history interviews with semi-structured questions were used, following the guidelines outlined by Mason (2002). These research methods were crucial to point out hidden information, the different perceptions of informants, and to understand the contextual "social meaning, social world and discourse" (Mason, *ibid.*).

In addition, 4 adult representatives from the Ta'ang literature and cultural committee, as well as 10 representatives from local civil societies, ethnic armed groups, and state military forces — including one Tatmadaw officer — were also interviewed about their view on the matters, their experience regarding CMEC, and their perception regarding changing customary land tenure rights.

Box 3. Different techniques were implemented throughout this study, including interviews, observations (participative), written sources, and case studies. These connected methods respond to each other: an interview may confirm an observation, a case study, or documents for consultation. Through the filter of fieldwork, initial hypotheses become analyses, ultimately transformed into interpretations that have the value of research results.

Photo 12. ***Ta'ang Rumai tea farmers before an interview in Kyi village***
Credit: author, December 2018.

Northern Shan State and the ethnic Ta'ang area

In the 2008 Constitution of Myanmar, some indigenous regions are recognized as areas of administrative autonomy. These regions include Ta'ang (Palaung),[38] Wa, Pa O, Danu, Kokhang, and Nagaland (Constitution of the Republic of the Union of Myanmar, 2008). Although Ta'ang territory historically includes several areas — such as Moegok, Kutkhai, Namkham, and Moemeik — only two townships, Namhsan and Mongtong, have been granted autonomous status. The Ta'ang ethnic group's territory is located in Northeast and Southeast Myanmar: Northern Shan State and Southern Shan State. In Northeast Myanmar, the Ta'ang people live in the townships of Namhsan, Mongngo, Mongtong, and Namkham. Namhsan is the traditional center of Ta'ang life and culture. Ta'ang people also live in the township areas of Kyautmae, Hsipaw, Mongton, Moegok, Namtu, Muse, and Loikai. In Southeast Myanmar, they live in the townships of Kalaw, Kaungbo, Ywatsoud, Namsang, Mongkai, Mongshu, Kohein, Nyuangshwe, Aungban, Mongton, Tachilek and Kyaing tong[39] (interview conducted by the author in Namhsan township on December 8, 2018).

Historically, the Tawngpeng Palace in Namhsan was the Ta'ang capital. It was not under Shan State political administration (Milne, 1924). Linguistically, the 28 dialects of the Ta'ang language belong to the Austroasiatic (Mon-Khmer) family (Sidwell, 2010). The community's estimated total population is 1.5 million, including 148,000 Samlong — known in Burmese as Golden Palaung —, 258,000 Ruching — Silver Palaung —, and 137,000 Rumai — Black Palaung — (Eberhard, Simons and Fennig, 2019a, 2019b, 2019c).

Based on participant observations, Ta'ang in the researched sites have traditionally found employment in all aspects of the tea economy including cultivation, harvesting, drying, processing and packaging, as well as local wholesale trade, and transportation and trade in markets in major cities across the country. In addition, many Ta'ang have turned to other types of crops such as oranges, Chinese varieties of rice, corn, and sugarcane. *Taungya* rice farming is the second basic economic activity of the Rumai Ta'ang — in all four research sites. Since 1980, many households have had to depend on both the rice and

38. The term "Palaung" is used by people not belonging to the Ta'ang community.
39. In order to facilitate references to particular regions in Myanmar throughout this article, see "Shan State – Myanmar", *Myanmar Information Management Unit:* https://themimu.info/sites/themimu.info/files/documents/State_Map_Tsp_Shan_MIMU940v02_06Jul2015_Topo_A1.pdf.

tea economy, as tea alone could not sustain their livelihood development. Although tea farming has traditionally been the main business of the Rumai Ta'ang people, those living in the Mongwi, Mongtong, and Namtu areas are in the process of transitioning to t*aungya* rice farming. This is a method in which one variety of brown rice and one variety of black rice is cultivated in terraces on the slopes of high mountains. Terracing these mountains is, however, permanently changing the land and eliminating forests and their ecosystems.

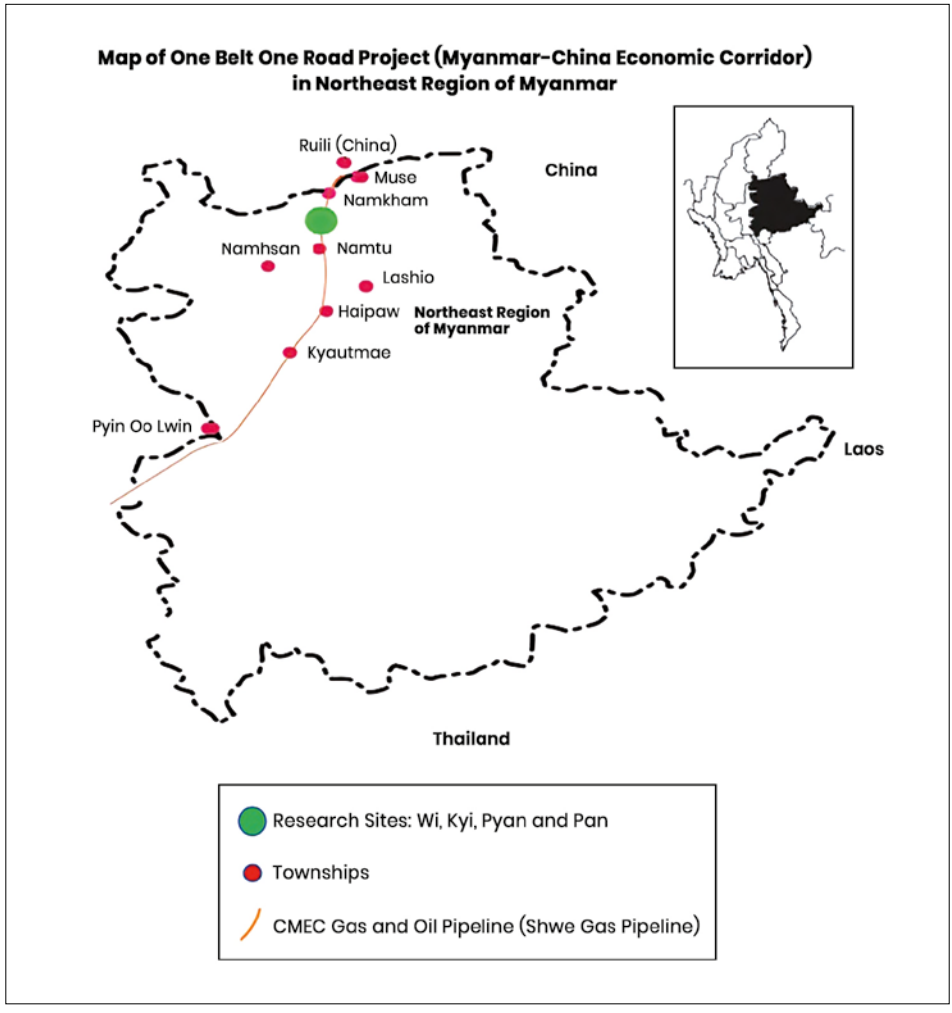
Beside agriculture, many Ta'ang youth migrate to Mandalay, Yangon, or to China or Thailand to join the ranks of low-wage migrant workers. They face language barriers and discrimination, working in temporary jobs in breweries, noodle stores, or restaurants. Many, both male and female, seek refuge in Buddhist temples in Hsipaw, Pyin Oo Lwin, Mandalay, Sagaing, or Yangon to access educational development opportunities.

During Myanmar's military socialist era, a great amount of land was confiscated by Ne Win's Tatmadaw government throughout the Ta'ang region in Northeast Myanmar. Between 1962 and 1970, two large-scale properties were seized: Tawngpeng Palace and the Bombay Burmah Tea Corporation Limited. The latter, a tea factory, was renamed the "Burmese Military Tea Factory" and the military took over production. In the town of Namhsan, too, a lot of land was seized, such as the Chinese Buddhist School, the Methodist Christian Church's property, and many of the area's tea plantations. In addition, while the descendants of the Tawngpeng rulers donated Tawngpeng Palace to the local tribal council in 1970, to be used as a hospital and social services hall for the benefit of the Ta'ang local indigenous people and to allow community-wide access to the building, the Tatmadaw has commandeered it since 2013 as a military officers' hostel and administrative offices. They have denied the local tribal council access to the area — even though it is the council to whom the Palace was given, which also holds the rights to the land and buildings — by fencing the land and installing guarded gates and a military checkpoint. No one can access this ancient Ta'ang site, which has now effectively become military property.

According to a study by the Ta'ang Students and Youth Organization (2011), the Tatmadaw was among the main actors of land confiscation in Ta'ang regions between 1999 and 2011. Tea land traditionally used by local tea farmers has been confiscated for new projects, among them new military camps, a hydropower dam, and a gas pipeline project. Total land confiscation amounts to 42,940 acres, among which the hydropower dam alone accounted for 37,882 acres.

This already precarious situation in which the Ta'ang tea farmers find themselves has worsened since giant investment projects — in particular the CMEC — have entered Ta'ang territory. The government has actively favored such projects by easing the national land use policy for large-scale land concessions, casting aside indigenous agrarian communities and generating conflict. The consequences are not surprising: Northeast Myanmar has become a contested area between the Tatmadaw and different indigenous armed groups, especially those groups of the Northern Alliance, with civilians — including Ta'ang tea farmers — caught between the warring parties.

Map 5. ***Shan State, research sites, and the CMEC gas and oil pipeline***
Source: author's construction.



Among the 120 or so villages that have been impacted by the CMEC pipeline construction, this research has focused on four villages: Wee, Pyan, Kyi, and Pan, mainly populated by the Rumai Ta'ang group. All are located along CMEC's gas and oil pipelines and in close proximity to other Chinese mining, hydroelectric dam, and teak wood production projects in the Namkham region.

Map 6. ***Satellite image of the four research sites***
Source: Google Earth

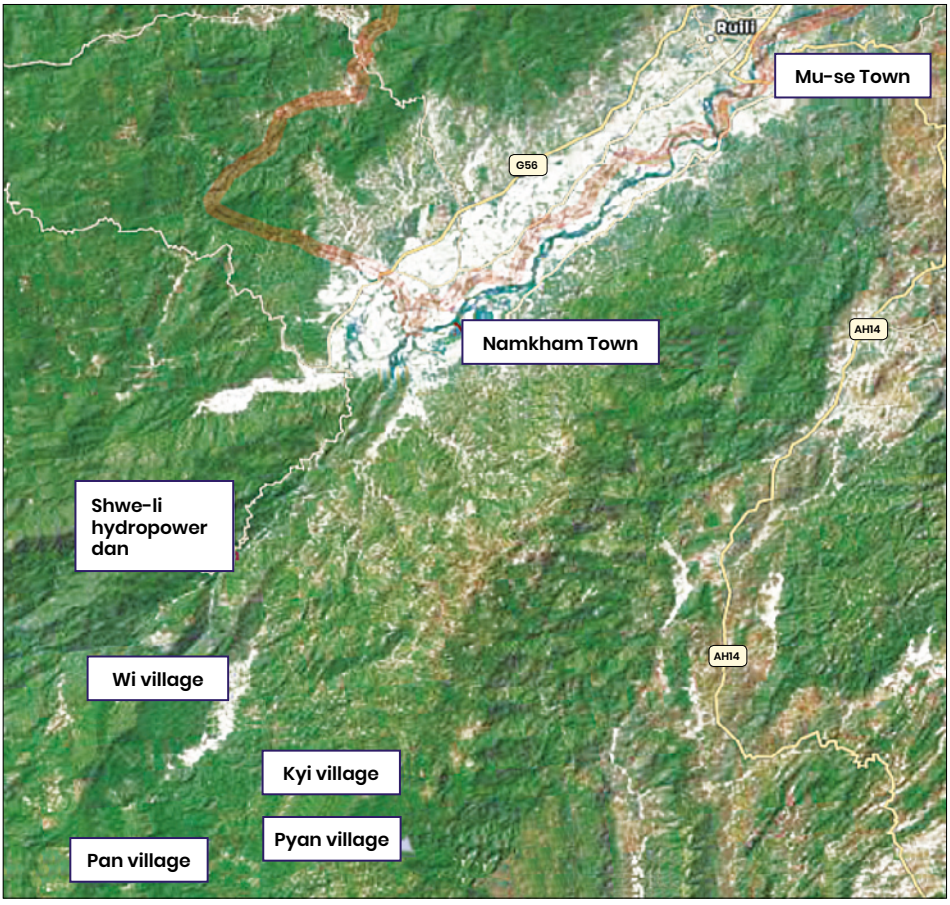


Table 4. ***Population, Ethnicity and Geographical Information***
Source: author's construction.

VILLAGE/ RESEARCH SITE	POPULATION	ETHNICITY	GEOGRAPHICAL INFORMATION
Wi	2000	Kokhang Chinese, Ta'ang, Shan, and Burmese	Near Shweli Hydropower Dam, Southwest Region of Namkham
Pyan	300	Ta'ang	Southeast of Wi village
Kyi	250	Ta'ang	Southeast of Wi village
Pan	250	Ta'ang, Kachin, and Kokhang Chinese	South of Wi village

The four research sites are geographically and ethnically connected. The Wi village is the largest and at the center of all Ta'ang villages in this region. Many local markets, shops, and Burmese government offices are located in Wi. In this village, Ta'ang is the majority group and the Shan, Kachin, and Chinese are the minority groups. Recently, many Chinese have moved into Wi to buy teak wood, mined silver, and rare wild animals. The Wi Chinese militia and the Tatmadaw military are also based in this village. In the villages of Kyi, Pyan, and Pan, Ta'ang are the majority, although some Kachin also reside there.

2.4.3. Findings

2.4.3.1. Customary land rights before CMEC

Customary land tenure is still widely practiced by the Ta'ang community. Most of the Ta'ang people do not have state-provided land use certificates (form #7) or land titles (form #105): while a few from Wi, coming from Namhsan, Mongtong, and Namkham, do have these certificates, they are exceptions (interview conducted by the author in Wi township, December 20, 2018), and no respondents from the other three villages have these certificates despite their long history of settlement on the land. In addition, there is no written record of land ownership, and instead each villager knows their land ownership and those of others based on the verbal and informal records of village leaders. The boundaries of a tea land parcel are recognized by rows of trees, streams, or geographical locations such as the village entrance or being located beside a temple. Residential properties are often marked by trees, a vegetable

garden, another house, or a fence. The villagers use lan, a Ta'ang length measurement system, where one *lan* is equal to two walking steps: around 1.8 meters.

According to the interviewees, the Ta'ang people's customary land practices have been widely used as the norm for land ownership and transfer in these four villages, from ancient times to the present. Rights to use, lease, exchange, and access land, forest, and other resources have been traditionally practiced by both Ta'ang tea farmers and non-Ta'ang people. In this customary land tenure system, men are recognized as dominant in the kinship structure: the man is the head of the family, the older brother has priority over siblings, and men constitute the political structure of villages. The village chief and elders explain that, in the Ta'ang traditional land tenure system, female members have no right to possess and own land, whether residential or agricultural properties:

"[...] *land, cars, and other precious property cannot belong to a daughter. The parents' inheritance always goes to the elder brother and the younger brother. Inheritance is only by a male. The women have to follow their husbands to live at their house when they are married. During his life, the property of her husband belongs to her. However, when her husband dies, this property goes to her husband's brothers if she does not have a son.*"

(Interview conducted by the author in Wi, December 27, 2018.)

According to participant observations and focus group interviews, every household in each of the target villages owns a rice field. Although tea plantation was still the primary source of income for families before the CMEC project installation, this has shifted more and more toward rice farming and other economic products, including raising domestic cattle and collecting wood for charcoal as well as gathering vegetables from the forest. Land for cultivation is distributed by an annual rotational system within one tribal group or one village. This land cannot be sold or leased to other people, whether or not these other people come from the same village, but it can be exchanged within the same ethnic community. Privately owned tea and rice land, on the other hand, can be sold or rented to other villagers but not to people outside the village.

The customary land tenure systems differ slightly in each of the three central Ta'ang regions: Namhsan, Mongtong, and Namkham. In Namhsan, most villagers work in the tea business rather than rice farming; in Mongtong and Namkham, the villagers depend on both tea and rice farming for their livelihood development.

In addition, the four research sites present differences regarding legal document ownership. While in all cases, community leaders — social and religious chiefs and the village head, recognized by the government — are the most important actors in the governance of local customary land laws and rules, differences arise from knowledge and education levels and perspectives on land rights. The Ta'ang and other ethnic groups (Kachin and Shan) in the villages of Kyi, Pyan, and Pan do not have the knowledge or ability to access land titles through the state system. They keep land ownership records at the local level in accordance with their customary land demarcation practices, merely recording exchanges and transfers of land from one person to another. Although the state's Vacant, Fallow, and Virgin Land laws recognize illegal ownership, this system is considered an informal or primitive practice compared to modern state-run documentation and certification systems, yet villagers did not need state-recognized land titles until their land was taken away for large-scale projects.

It might have been interesting to see how this long-established and operational local system could have evolved by redeveloping it with local people to recognize women's rights and international guidelines on land, property, and human rights, but the government chose a different direction in creating the CMEC. As a matter of fact, although the Ta'ang have been practicing their customary land tenure system without oversight by state actors since the sixteenth century, their situation changed dramatically when Chinese mega-investors needed their land for construction and their customary practices were completely ignored by national land laws.

2.4.3.2. The CMEC gas and oil pipeline: Impact on environment and communities

Most informants in the villages studied declare that the CMEC pipeline construction project, initiated in collaboration with state representatives, was carried out without taking into account their traditional land use system:

"*The Chinese company came here with Burmese military troops. So, we had to listen to what they said. They used our community forest and land, and said 'do not raise any questions, and do not say anything.' Before China's gas and oil pipeline projects, there was no Burmese military or any military operations on our land. We have only local Wi militias who have a good connection with the Burmese military.*"

(Focus group conducted by the author in Wi, December 15, 2018)

Waste and stones

The waste generated during construction (stones and sand) has severely impacted nearby farmland and *taungya* land, but tea growers have had no opportunity to request appropriate compensation. A tea farmer from Wi village shared his bitter experience:

"*The waste from the pipeline construction has caused problems for my farmland, which is located beside the pipelines. Let me explain it clearly. For example, to bury the pipelines, the workers dig the ground. After that, the two pipelines are buried in good soil, free from big rocks and sand. The pipeline construction workers then discard the debris, which includes big stones, rocks, and sand, beside the pipelines. In the rainy season, this poor-quality soil widely spreads out across the rice fields and tea land. Although my farmland plots were not included in the land use of the pipelines, they were indirectly affected by the pipeline project. Not just me, many villagers were similarly suffering. However, we, the local farmers, could not complain to the people in charge of the project because we were afraid.*"

(Interview conducted by the author in Wi, December 14, 2018)

The findings in the four research sites reflect that most affected tea farmers had no opportunities to contest the practices of the Shwe gas and oil pipelines project. These practices include workers cutting down trees, blocking natural streams, and using tea and rice land as well as community forests for construction. No mechanism was in place to protect villagers' rights. The community forests in Wi and Kyi villages, for instance, were used without obtaining consent from the local tea farmers. The farmers thus reported that the projects simultaneously broke the customary land tenure system and imposed threat and stress upon them. A tea farmer from the village of Kyi confided to us:

"*The China Shwe gas and oil pipelines crossed my tea land and forest in 2010. Before these projects, I had the right to claim for my property. No one can occupy my land because we need to respect the rights of ownership. However, after the arrival of the Chinese construction company, Chinese workers and the local authorities did not ask any permission to use my land and forest.*"

(Interview conducted by the author in Kyi, December 30, 2018)

Our field interviews show that villagers recognize land ownership, never take or invade other people's property, and trust the local authorities to understand and respect the existing system. However, the passage of Shwe gas and oil pipelines through the area has raised concerns that their livelihoods will deteriorate and that they will be powerless in the face of similar interventions in the future.

Another problem is the occupation of large areas of land by Chinese workers who are part of Shwe's gas and oil pipeline projects. Many properties in the community forest, for example, are now owned by Chinese. Similarly, a large Chinese silver mining factory was built in the nearby village of Sing. Local army leaders and militias have legitimized and authorized land and resource concessions, while local tea farmers seemed to have no power to claim compensation for the large-scale acquisition of land and resources, nor did they have any right to control and claim their traditional land or receive compensation for the profits made by the Chinese companies.

Compensations

In our case studies, the foreign company, the army, and the local government officers were the primary decision-makers for land compensation. However, the process was far from being fair or transparent. The compensation rate offered was lower than in other places within the Namkham region, according to data from the four research sites. For instance, one acre of tea and rice land received about 80 lakhs (approximately USD 4,500) in Namkham, while Wi village tea farmers only received about 35 lakhs (USD 2,000). Compensation offered in the other three villages was even lower, while discrepancy among the three also existed. While the tea farmers in Kyi and Pyan villages received a compensation of 15 lakhs (about USD 1,000) per acre, their fellow tea farmers in Pan only received 40,000 kyats (USD 30). The following table illustrates the compensation rates in Namkham and selected research sites.

NAMKHAM REGION	WI RESEARCH SITE	KYI RESEARCH SITE	PYAN RESEARCH SITE	PAN RESEARCH SITE
80 lakhs	35 lakhs	15 lakhs	15 lakhs	40,000 kyats
approx. USD 4,500	approx. USD 2,000	approx. USD 1,000	approx. USD 1,000	approx. USD 30

The compensation policy at Pya and Pan villages unveiled complex issues. A farmer from Pya gave the following example:

"*China's project crosses near my tea lands and some of my land's territory is used by the project. Now, we cannot grow tea trees in that area. A small stream is also blocked by pipeline construction. After the rainy season, in the first year, the waste soil spread over the tea lands and the taungya rice lands. The biggest problem is the big stones. China's pipeline construction placed big stones beside the pipeline, which can be seen along the pipeline. Many tea trees are destroyed by it. I explained this to the village heads and our people. But we don't have any chance to claim back from the Chinese project or the Burmese government.*"

(Interview conducted by the author in Pya, December 29, 2018)

According to field data, the land of five local families was directly affected by the Chinese project, but this case shows that some villagers did not have access to any compensation for the indirect impacts of the project's construction. These impacts included: (1) loss of access to water because the water system was altered after the project was built; and (2) the destruction of tea trees — some of which were 10 years old and produced high quality tea — by rocks.

Furthermore, according to the informants, in cases where compensation for lost crops was actually considered, it was unfair to tea farmers. While farmers who grow rice twice a year received two lots of compensation, most farmers from our research sites grow rice once a year and harvest tea once a year, but only obtained compensation once. Apart from inadequate compensation and the lack of a negotiation mechanism, there was also a question of transparency in the handling of compensation by the local leader in the Pan village, as revealed by a group of Ta'ang women:

"*We did not have a chance to discuss compensation. The Chinese company, Burmese officers and a Kachin village leader talked about compensation on our behalf. The compensation was meager. We had to pay money to the Kachin village head for his travel expenses from other villages to collect the compensation. However, the Kachin village head claimed he had lost all the compensation money on the way between Wi and Pan village when he returned from Wi village. So, almost all the villagers in Pan village did not get compensation, except for only a few who got half of it. Later, the Kachin village head moved to Namkham and bought a big house. We complained about this case to the authority in Wi village, but they still haven't taken any action. Thus, the compensation was not handled in a transparent, honest manner.*"

(Interview conducted by the author in Pan, January 20, 2019)

Another farmer from the same village affirmed:

"*The gas and oil pipeline used my land. At that time, I did not know anything about them. They did not ask permission from our village, either. They came to the village and gave compensation, but the compensation went to the wrong people. I mean that they did not give the compensation to me… but I am the original owner! They gave compensation to a person who has a good relationship with them… the China company and government officers; all the villagers know about it! But the man who got money did not give any money back to me. After that, I went to the Namkham regional government office. I argued to them that this was my land, but so far the authorities have given me no reply!*"

(Interview conducted by the author in Pan, January 1, 2019)

This study found that the compensation in Pan was slightly different from the other villages. First, the Pan villagers did not have a chance to participate in the meeting regarding compensation with the leaders of the Shwe gas and oil pipelines projects and local authorities. Second, the compensation rate was lower than those paid in the other research sites. The story of "losing money" as provided by the village head, who was from another ethnic group, raised further questions about transparency in the handling of compensation. Most villagers in Pan did not receive compensation from the village head, who was primarily responsible for distributing it. According to a local car driver of non-Ta'ang ethnicity who has lived in the area for over forty years, the voices and complaints of the villagers were not

heard, as the responsible local authorities did not seem interested in their problems.[40] The driver also pointed out that the Namkham farmers received more compensation than other farmers from the villages of Wee, Kyi, Pya, and Pan.

The CMEC project, along with Tatmadaw military and local government officers, were the main decision-making bodies for land compensation in this case. With no consent from local populations, no or ineffective public consultation, and no legal safeguarding of local people's rights, the compensation structure decided upon was opaque and unfair to farmers and villages alike.

2.4.3.3. Broken promises

The pipeline developers have failed to meet their commitments to follow international and national laws regarding environmental impact assessment. They claimed that the projects were "non-polluting ecological projects" and that an environmental impact assessment survey (EIA) was conducted by a Thailand-based team of international experts following guidelines from the World Bank, as well as international and national principles (Myanmar-China Oil and Gas Pipeline Project, 2014). They also stated that the project was using an arsenal of tools for "emergency restoration" — namely land and waste clean-up — as well as a restoration system that recreates cultivable conditions after the project, a "topsoil protection" system for agricultural land, a "water protection" system, the establishment of waste management, drinking water wells, and irrigation systems; donations of money, livestock, and medicine; and the construction of a new school, an orphanage, and buildings for the elderly.

However, our findings demonstrate that the pipelines' construction in fact cut down many trees, blocked natural streams, and made use of both tea and rice lands without consent from the farmers, with inadequate or no compensation. All informants in the villages responded that large amounts of waste, including boulders and sand from the construction sites, impacted tea and farm land during and after project implementation.

Furthermore, the project developers stated that compensation for the land used was given directly to the landowners according to the local market price, and that crops were compensated at three times higher than the market price. They

40. We hired the services of this car driver for the survey and were able to speak with him in his spare time.

claimed to have obtained "consent for land compensation" before acquiring the land (Myanmar-China Oil and Gas Pipeline Project, 2014.). In reality, however, this study found that the project did not honor its commitments. For instance, villagers from Pan did not all receive compensation at the same rate, and some did not receive any at all.

Photo 13. ***Wi Village. Natural streams are changed by CMEC gas and oil infrastructure***
Credit: author, December 2019.

The Myanmar government did not have an EIA policy in place when the CMEC's Shwe gas and oil pipelines began to be installed in Myanmar in 2009 (Raitzer, Samson and Nam, 2015). Even though the EIA policy was later enacted in the 2016 National Land Use Policy (NLUP), claiming to recognize the "international practices and human rights standards, effective valuation system, relocation and rehabilitation" of affected people (National Land Resource Management Central Committee, 2016), it does not regulate compensation rates and procedures for affected people. It is fair to state that current national institutions in Myanmar fall short of providing protection to local ethnic populations in the face of large-scale projects.

The practices of developers and local authorities also contradicted the requirements of the Foreign Investment Law (2012) and the Law on Legal Land Acquisition (2015). According to the former, commercial investors can legally evict local people from their land if it is necessary for project development, but compensation for the land used must be considered in light of the current local price. Similarly, the Law on Legal Land Acquisition stipulates that compensation for land must take into

account the market price. Therefore, the manner in which the project promoters and local authorities dealt with the question of compensation, without proper public consultation, did not comply with the provisions of these laws. It might be interesting, from this legal perspective, for the project to invite experts from NGOs and civil society to assess the project's impacts during and after construction in order to calculate fairer compensation.

2.4.3.4. Customary land rights violation

The concept of land tenure must take into account multiple aspects: rights of access, withdrawal, management, exclusion, alienation, control, use, lease, and exchange. Land tenure is based on rules that are not statutory laws, but customary rights recognized by the "gaze of communities" (Allaverdian *et al.*, 2018). It also requires an ability to finely grasp political and socio-economic relationships, understand constitutional law, and comprehend the organizational network and technical constraints, since a customary land tenure system must be able to provide the right to legally claim land before an impartial judge (FAO, 2002).

In the case of the CMEC project, farmers' rights to claim or control their land and access benefits or justice have been neglected, a situation fostered by the state's assemblage of legal land dispossession tools: the 1894 Law on Legal Land Acquisition, the 1991 and 2008 Constitutional Land Regulations, the 2012 (and 2020) Agricultural Land Act, the Virgin, Fallow and Vacant Land Management Acts, the Foreign Investment Act (Section 64), and the 2019 National Land Demarcation Act.

The pipeline construction had multiple impacts on farmers, who were helpless in the face of trees falling, natural waterways for public water stations being rerouted, and the pipelines crossing over tea lands and rice fields. In the Wi region, for instance, the communal forest area which people from the villages of Panhankyi and Phapyan rely on for subsidence and religious activities has been facing a serious issue with the development of the CMEC oil and gas project. A group of Ta'ang tea farmers explains:

"*We have a good forest around our Wi village. This forest is big, and it also has flatlands. People use this flatland to heat their tea and patty rice in the sunshine. Everyone can freely use this land. We have full authority to control this forest. In this forest we harvest natural vegetables, mushrooms, bamboo shoots, bamboo, small wood, herbs, and orchids. The forest has a lot of natural food for us, and is also a religious area: it is a traditional*

Nat (spirit) place. People from Panhankyi, Phapyan, and other villages can also access this forest. The situation changed when China's gas and oil pipeline came to this area. Most of the land is now divided and owned by rich Chinese people. These people came with the company. They said they are from this company and they have close relationships with a general of the Burmese army. We don't want to go against them because we are afraid of Burmese armed groups."

(Interview conducted by the author in Wi, December 18, 2018)

Similarly, a tea farmer from Kyi village explains:

"*In the past, we, villagers, could control our land and natural resources from being damaged by outsiders and Chinese. We knew that burning the forest was not good as it could affect the natural environment. No one could fish in the village's stream without having permission from the village. However, when the project came to our villages, it did not respect our customary law and invaded the village's land, cut down the trees, and dug into the ground for the pipelines. Villagers are afraid because the Burmese military guards the project. They have guns.*"

(Interview conducted by the author in Kyi, December 30, 2018)

According to international law, Ta'ang tea farmers have the right to control their land —including the common areas and natural resources that form a part of that land — as they have lived there for generations. Each village has a territorial boundary that is recognized by the inhabitants of other villages. Land disputes between different villages or within the village community are regulated by religious leaders, village chiefs, or association leaders. The problem is that the CMEC-BRI project did not ask permission from any of these bodies, nor from the inhabitants, when they used the land to build the project infrastructure.

Photo 14. ***Wi Region. An old stream is blocked***
Credit: author, December 2018.

Many tea lands and rice fields have been affected by the project, either from construction waste such as rocks and sand, or because of the use of this land for pipeline construction. Interviews with local farmers, as well as the data collected, show that in 2009, rice production in Wi and Pan villages declined from a maximum of 640kg/acre to 300kg/acre for Wi, and down to 100kg/acre for Pan. All the tea growers interviewed specifically mentioned that production for the local tea variety, *taungya*, had fallen by more than half in Wi, by about 60% in the villages of Kyi and Pyan, and by more than 80% in Pan. Nowadays, only a few farmers grow this local brown rice, and most tea farmers buy rice from China. The decline in tea and rice production has had a negative impact on the livelihood development of local tea farmers, particularly due to increased expenditure on external inputs in order to compensate for soil degradation.

Photo 15. ***Wi Village. Local woman showing uncultivable farmland as a result of the CMEC gas and oil infrastructure***

Credit: author, 2018 December.

In addition to its environmental effects, the project is also described as having led to instability and insecurity for farmers:

"*Everything changed during and after the construction of the gas and oil pipelines. Many Tatmadaw soldiers and Chinese citizens have gathered here. Our lands, rivers, and forests are no longer safe. Sometimes armed conflicts break out. Our villagers have to flee and it is not safe to work on the tea lands, farmlands, or forests.*"

(Interview conducted by the author in Wi, December 20, 2018)

The four village chiefs as well as the Ta'ang chiefs — members of the cultural and literary committee of the Wi village — denounced the violation of traditional land use and community access and turned to the authorities. Their complaints were not acted upon.

Photo 16. ***The CMEC gas and oil pipeline. A road between Wi and Namkham Region***
Credit: author, December 2018..

Photo 17. ***Trucks from a Chinese mine company***
Credit: author, Wi village, December 2018.

2.4.3.5. Legalizing land dispossession: Part of a process of capital accumulation

In light of these testimonies, the CMEC can be seen as an economic project based in part on the expropriation and banishment of the customary and local forms of the indigenous populations' economy, dispossessing them of their lands and natural resources in favor of capitalist investment and development, and primarily for the benefit of China's industrial production and development. Harvey (2003) discusses a similar issue when he talks about peasant groups in Europe being"displaced and disbanded" from the fifteenth to eighteenth centuries by capitalist accumulation. However, in Harvey's concept of *accumulation by dispossession* (Levien, 2013), the importance of political relationships and pressures has been neglected. What is at play in Myanmar is what Levien (2011, 2012) has described as "an extra-economic process of coercive expropriation" through state assistance on the question of land accumulation and dispossession. The interplay of the market mechanism (Harvey, 2005) and the role and practices of the state and its political structure and alliances are the key driving forces of land dispossession in the Ta'ang tea farmers context. Land dispossession policies are legalized and legitimized by various state authorities, both military and civilian, because facilitating large-scale investments is crucially important for developing the national economy.

Although Myanmar ostensibly shifted from a military-based government to a civilian government in 2016, the top-down political system has remained mostly unchanged. The Tatmadaw and civilian governments practice a centralized power structure that not only plays a key role in national level control, but also applies coercive socioeconomic power at the national and regional levels.

The ability of CMEC investors to take land from tea farmers with no regard for local land rights, and to provide inadequate or no compensation, has been made possible by the legal structures in place that legitimize large-scale land dispossession. In the 2008 Constitution and 2012 Land Law, the State is recognized as the ultimate owner of all land in the Union", while all "State-owned natural resources" and land can be used for economic development (Central Committee for National Land Resource Management, 2016). In that respect, the law considers Ta'ang tea farming land as"vacant, agricultural, and virgin land". Even though Section 64 of the Foreign Investment Act asserts that the state recognizes ethnic people's rights, (Ingalls *et al.*, 2018) this does not translate to a clear and legally binding recognition of the rights of land ownership for indigenous peoples.

The collection of land laws that exist in Myanmar, from the 1894 Legal Land Acquisition Act to the 2008 Constitution's land policy and the related National Land Use laws, seem to effectively exist as state tools for legal land dispossession, facilitated by various amendments to the NLUP over time. This pattern shows the importance of understanding both the historical development of land policies and political structure: both affect land dispossession and work in favor of business investors, top political leaders, and their allies rather than local community groups and civil society.

This field research also highlights how the Burmese government's current land tenure policy legalizes and legitimizes land dispossession strategies. According to the 2018 Land Policy, all ethnic people must register their customary lands, otherwise they are considered as illegal land users by the state (Liu, 2019). In the 2019 National Land Demarcation act (Parliamentary Law Article 11), the state is the only actor that can demarcate and legitimate land territory, which effectively rejects local customary land demarcation practices. Moreover, when land is registered and demarcated by the state, it becomes state-owned land, which means that customary land tenures are not recognized by Myanmar's government to this day.

As this research has shown, the Tatmadaw appears to be the primary actor securing CMEC oil and gas projects. For instance, during field investigations in December 2018, a group of tea farmers confided to us that Tatmadaw personnel acted as security guards for these projects. In contrast with the 2008 Constitution's priority on national defense, in which the Tatmadaw is constitutionally required to protect citizens (Article 340 of the Constitution of the Republic of the Union of Myanmar 2008), this highlights the strong yet ambiguous relationship between CMEC project investors and the government, with the Tatmadaw assisting the CMEC project rather than the local tea farmers in Northeast Myanmar.

The United Nations Declaration on the Rights of Indigenous Peoples clearly mentions indigenous peoples' land rights. Article 10, for example, states:

Indigenous peoples shall not be forcibly removed from their land or territories. No relocation shall take place without the free, prior, and informed consent of the indigenous peoples concerned and after agreement on just and fair compensation and, where possible, with the option return.

(United Nations, 2007)

Similarly, the NLUP states:

Chapter (III) Basic Principles – 8.(a) to legally recognize and protect legitimate land tenure rights of people, as recognized by the local community, with particular attention to vulnerable groups such as smallholder farmers, the poor, ethnic nationalities and women.

(Allaverdian *et al*., 2018).

Despite this, Ta'ang farmers along with many other minority groups in Myanmar face insecurity regarding their customary land tenure, since their land has been legally categorized as vacant, fallow, and virgin, and they do not have a legal land use certificate which could secure their land ownership. Some international NGOs, local NGOs, and civil society organizations are trying to propose customary tenure policies at the state and union levels. The problem is that their voices, decisions, and participation are still excluded when it comes to policy implementation. In another aspect, since many investments — in mining, hydroelectric dams, and infrastructure, for example — come from Australia, Switzerland, France, Korea, China, Japan, and other developed countries, most local NGOs are reluctant to address human rights, land rights, and environmental justice due to concerns that this will lead to a freezing of financial support from international NGOs based in these countries. When local NGOs do address these issues, whether at the regional or field level, the impact is ineffective because their actions do not (at least until now) have any influence in national land law.

2.4.4. A deadlock at the crossroads of "development"

Land has become a fundamental asset for capital and national development in Myanmar. The land of the ethnic group regions — Shan, Kachin, Ta'ang, Karan, Karani, and Rakhine — is rich in natural resources including fish, gas and oil, timber, teak, mines, jade, and rubies. Rohingya land, located on the border of Rakhine State, is an ideal location for a SEZ and has some of the country's best soil for large-scale agriculture, as is already the case in the regions of Tanintharyi, Sagaing, and Ayeyarwady. Land capitalism is seen as the basis for the country's economic development, so every effort is being made to prioritize land investments by foreign financiers and investors while facilitating their large-scale activities by changing land laws. Thus, the state is seen to favor large-scale development over the socioeconomic development of small-scale farmers and local people. One of the objectives of our present research is to show that if there

is no legal basis for the protection of property, land, and other resource rights, then sustainable peace and unity will never be achieved in these ethnic areas. Instead, we will see an increase in livelihood insecurity, extreme poverty, and mass internal migration to as inhabitants of these areas attempt to find safer places to live, which will soon become a substantial problem in these areas of Northeast Myanmar.

In short, while the official line recognizes the importance of foreign direct investments for the country's future by stimulating economic growth, reducing poverty, and developing education, serious research into the actual situation on the ground with local communities leads to a much more nuanced view. The state, through its land laws and use of the military, is facilitating large-scale land investments, and many armed ethnic organizations are taking advantage of investments entering their controlled territories. At the bottom of the power ladder among these two powerful actors, local ethnic groups are in no position to compete for ownership, management, or a stake in land and resources. Peace and negotiation processes unfortunately do not appear to be prioritized in this context.

This is even more the case since February 1, 2021, when the Tatmadaw took over from the National League for Democracy (NLD) government and restructured the governance system by establishing military rule. A public uprising emerged, transformed into a civil disobedience movement, and was met with severe repression. Notable NLD leaders, politicians, and activists were assassinated by the Tatmadaw, which is also suspected of having tortured countless journalists, doctors, and nurses who resisted. Although the civil movement continued on the path of non-violence, many young people preferred to resist with arms and eventually formed People's Defense Forces throughout Myanmar. Numerous armed conflicts have since taken place in various parts of Myanmar, particularly in the provinces mentioned above, where the movement is being structured using the logistics of existing armed militias. Sustainable peace, federal democracy, and ceasefire negotiations are necessary for Myanmar's future, but nobody knows when this conflict will end and when a civilian government will be restored.[41]

41. Many NLD government leaders, Burmese democracy alliances, academic educators and activists are forming National Unity Government (NUG) and structuring a federal democracy government in 2022. Notably, the Ministry of Human Rights Department emerge under the governance structure of NUG. This is a good sign for the future federal and democratic country.

In the meantime, and although the situation is much more complicated with the Tatmadaw government in power and using the previous military governance structure, coercive mechanism and hegemonic ideology„ it is important and necessary that academic and research institutions and international community, in collaboration with different stakeholders and local civil society, continue to unveil, describe, study, and monitor impacts of large-scale projects like CMEC, especially the ones promoted by the OBOR initiative in Myanmar. This is one of the ways to achieve a form of policy development that suits all groups. Further studies should also go beyond single methodologies to adopt a more interdisciplinary approach and extend the analysis to other vulnerable groups and minorities. From the CMEC highway and railroad construction and the Namtu-Bawdwin mega mine, to the Shweli hydroelectric dams, large-scale agribusiness, and the SEZ, it is essential to study how these projects shape people's lives, human security, human right violations, land dynamics, resource use systems, and the environment.

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2.5. Maize production in North Thailand: Corporate gains for smallholder pains

Daniel Hayward

Maize is a key cash crop in Thailand, primarily used in animal feed to support poultry production. Between 2008 and 2015, an increase in land-use for cultivation took place in the north of the country, principally stimulated by high crop prices, but with corporate and government support to promote the crop. In recent years, production practices have come under intense scrutiny. Media reports highlight farmer encroachment on state forestlands, leading to deforestation and biodiversity loss. Forest clearances and the burning of crop stubble are seen to contribute to an annual haze in North Thailand. The intensive use of chemicals is associated with polluted water sources and soil degradation. Much blame falls on farmers, despite the fact that they bear the production risks of price drops, low output, or polluting practices. Meanwhile, multinationals involved throughout the meat value chain promote sustainability schemes to deflect attention from their role, despite maintaining market control. Indeed, companies can benefit from recent expansions into Myanmar and Lao PDR, where new markets compensate for problems elsewhere, spread financial risk, and open up further avenues to generate capital. In this sense, maize production is seen to compound inequality, centralizing returns for corporations at the expense of rural peripheries.

2.5.1. Introduction

Alongside rice, cassava, rubber, oil palm, and sugar cane, maize production has emerged as a key cash crop in Thailand. Its commercial use appeared in the 1950s (Ekasingh *et al*., 2004), expanding during the 1960s and 1970s when an industrializing agricultural sector extended its use of land. As a "flex" crop, maize can be used for human or animal consumption, or in biofuels (Ranum, Peña-Rosas, and Garcia-Casal, 2014; Woods, 2015a). Since the 1980s, the greatest influence on maize production in Thailand has been the growth of the poultry industry. According to UN trade figures, for over a decade Thailand has been the world's largest exporter of prepared — as opposed to uncooked — chicken meat products (ITC, 2020). In 2020, exports were valued at over USD 2.5 billion, which is more than twice that of China, the second highest exporter. Maize is the core ingredient and generally accounts for 55–65% of animal feed, and over 95% of maize production in Thailand is processed into feed (Grudloyma,

2014). The meat production value chain is controlled by a number of multinational conglomerates. The largest player in the Thai meat production system is the Charoen Pokphand (CP) Group, a multinational originating in Thailand that dominates multiple areas of the value chain from producer to consumer. In terms of maize this includes seed development and production, the provision of fertilizers and pesticides, and product conversion into animal feed.

In recent years, media reports have scrutinized maize production practices. For example, in May 2016 the Nation newspaper reported on a conservation group headed by a famous rapper, a former candidate for Bangkok governor, and an advertising film director (Santichai, 2016). The group had formed in response to images of "bald" mountains in Nan Province, which had become an internet sensation (Photo 1). These images were attributed to the effect of deforestation, including the encroachment of farmers on protected forest areas in order to grow maize. Through the Plant It Now Group, the celebrities encouraged farmers to find a sustainable income through growing forests rather than chopping them down. The story is indicative of how maize production became a hot media topic in 2015 to 2016 owing to its association with a number of questionable practices. As well as forest encroachment, these issues included the haze created by burning stubble, and water pollution from the use of chemical fertilizers and pesticides. Attention was primarily focused upon production in the north of Thailand, casting a questioning eye upon both farmer and company.

This chapter aims to pick up these issues and take a closer look at the impacts of maize cultivation. How has the geographical production system — which has garnered significant attention in the north of Thailand — changed in recent years? What evidence is there behind the critiques of production techniques? How do the impacts of maize production differ in their effect on local producers (smallholders) and corporate leaders? By exploring these questions, the chapter aims to show how centralized capital that is tied into global value chains of production can adapt to localized problems within the production system. Therefore, as the market reaches out to the geographic periphery of Thailand, the disproportionate burden of risk is placed on the smallholder, exacerbating economic, social, and environmental inequalities.

Photo 18. ***"Bald" mountains in Nan Province. Such images helped place the issue of maize land encroachment and degradation in the public eye***
Credit: Mohigan

The chapter is split into several sections. The first section addresses the methods used in the study, in particular explaining how activist research linking maize to a wider meat production system has been reframed with respect to issues of inequality and the environment. The findings are then subdivided. Firstly, an exploration of government data on maize and land-use change uncovers changing cultivation practices around Thailand. Rather than highlighting a national surge in production, the evidence points to a geographical shift to the north of the country, creating a localized crop boom. Secondly, consideration is given to environmental outcomes, namely deforestation (which may include encroachment on protected state forestland), air pollution as a result of burning practices to clear land or to prepare for a new growing season, and water contamination and soil degradation, particularly following the use of controversial chemical fertilizers and pesticides. All these practices have brought negative attention upon maize farmers. The third section of findings provides an economic analysis that shows how farmers often end up in debt as a result of the fact

that they frequently carry the burden of risk in maize production. Fourthly, multinational involvement in the maize value chain is considered, including: close relationships with political actors that can impact upon agricultural policy, the installation of sustainability projects in reaction to negative media attention and how they might represent greenwashing for market control rather than genuine attempts to improve environmental practices in the value chain, and how production trends beyond Thailand offer opportunities to expand into new markets and spread production risks. The final section draws together findings for a discussion on how production shifts to peripheral areas of Thailand are not a guarantee of equalizing development. Indeed, with corporate maximization of capital gains, and the burden of risk shifted onto farmers, the geographical expansion of maize can be seen to exacerbate inequalities, at the expense of environmental conditions.

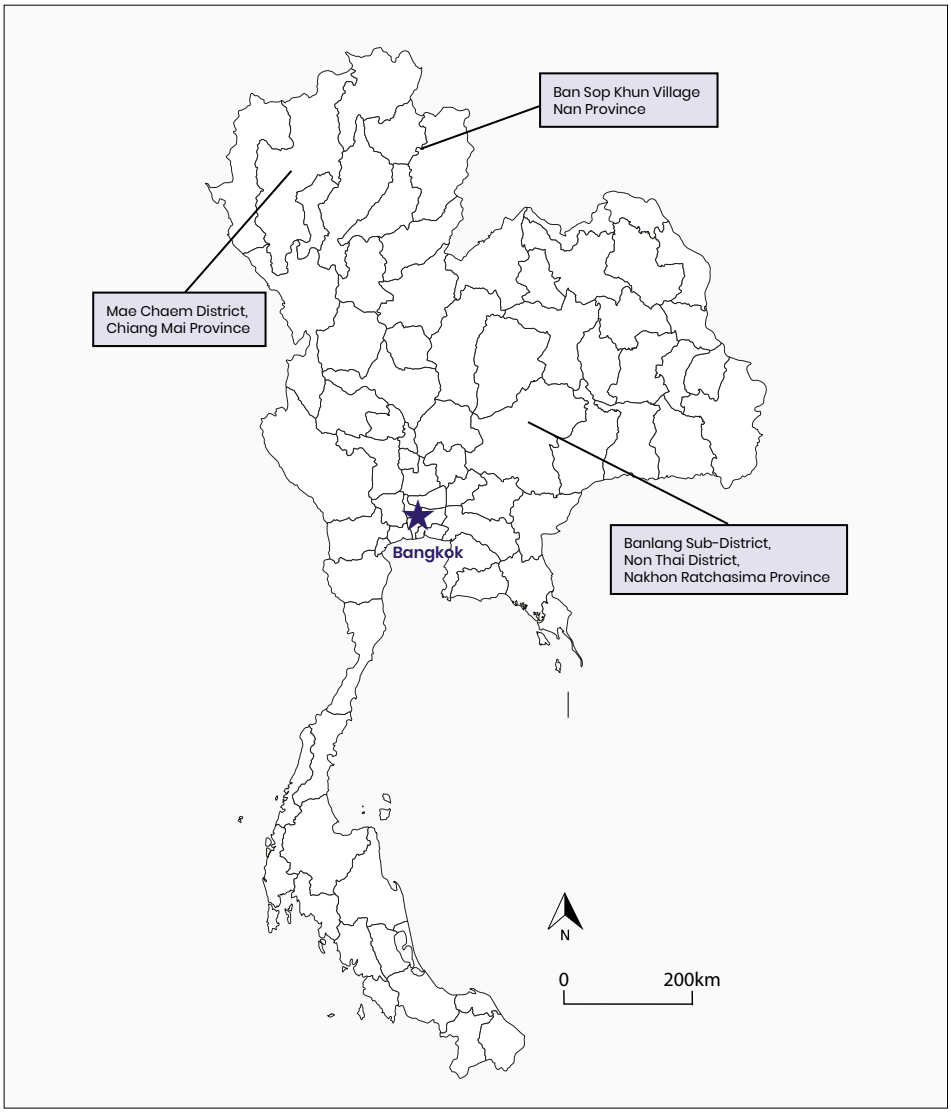
2.5.2. Methods and case study villages

The core research for this chapter is the result of a five-month study conducted from January to May 2018. Working as a consultant for Greenpeace Southeast Asia, an assignment was set to look into land-use changes in relation to maize in Thailand, the corporate influence, the environmental outcomes, and how these factors relate to a wider global poultry value chain. The research involved three months spent on a literature review and two months visiting a number of field sites. The review involved consultation with data sets from the Thai National Statistical Office and Office of Agricultural Economics (OAE), academic articles, reports from non-governmental organizations, and stories from mass media. The fieldwork took place at three sites around Thailand: the Chiang Mai and Nan Provinces in the north of the country, and the Nakhon Ratchasima Province in the northeast. Data from these three sites have been used in this updated study (Map 7).

Firstly, Mae Chaem is the largest district in the northern province of Chiang Mai, and includes Thailand's highest mountain, Doi Inthanon. It gained national notoriety for the production of maize on untitled land, with 95% of land used for the crop in 2016 lacking ownership documents (Prachachat Turakij, 2016). Interviews were conducted with three low-income, maize-producing households in three villages: Kong Khaek Tai and Ban Om Meng villages in Kong Kheak Subdistrict; and Ban Sop Wak village in Mae Na Chon Subdistrict. Interviews would commence with open-ended questions to build up a rapport with the respondent and allow them to tell their own story of experiences cultivating

maize. Subsequently, structured questions were used to learn about the production cycle, the profitability of their most recent growing season, information on outstanding debt, the environmental impacts of farming, and labor needs. These interviews showed that maize was generally cultivated for animal feed and seed production, with farmers sometimes alternating between the two options.

Map 7. ***Maize case study sites in Thailand***
Source: Vector map acquired courtesy of Free Vector Maps.com



Secondly, the village of Ban Sop Khun is located in the highlands of North Thailand on the provincial border between Nan and Phayao. Its population stands at around one thousand residents made up of three hundred families. Its residents are predominantly Tai, the majority ethnicity comprising 75% of the population in Thailand. Around twenty-five years ago, in the aftermath of local conflicts between the Thai government and communist insurgents, maize was introduced to the area, and has shown significant expansion over the last ten years. Intermediaries, from both lowland areas and within the village, have informal contracts with farmers, providing seeds, fertilizer, and pesticides, before buying and transporting the harvested crop out of the village. During the visit to the village, interviews were held with two maize-cultivating households following the model from Mae Chaem. Further semi-structured interviews were held with the head of the village cooperative for local coffee production, CP representatives for an organic coffee project, an academic conducting an assessment on this project, and a local health center worker.

Thirdly, the subdistrict of Banlang (Non Thai District) is found in Nakhon Ratchasima (Khorat) Province, the gateway to Northeast Thailand about a three-hour drive from Bangkok. The province can be seen as a heartland of industrialized agriculture in Thailand. In terms of land tenure rights, most of Khorat is held under fully titled rights. The subdistrict consists of approximately 52,000 rai (8,320 ha) of agricultural land, of which 25,000 *rai* (4,000 ha) is planted with rice and 14,000 *rai* (2,240 ha) with maize. In 2016, the site was chosen for a pilot sustainable maize project that involved local farmers, led by Bangkok Produce Merchandising, a subsidiary of CP. A focus group meeting was held with six farming households involved in the project, and a representative of the local municipality that had signed a contract with CP. This involved open discussion to learn about the scheme, its implementation, and outcomes. Afterward, discussions continued with the farming households, following the semi-structured interviews outlined above.

For this chapter, secondary data sourced during the initial study have been updated where possible to 2020. There has been a reorganization of findings in order to take on board the lenses of inequality and the environment. For example, an exploration of maize seed growers is omitted in order to focus on crop production for animal feed. Finally, ethical considerations have been applied to the presentation of data and analysis. During the initial fieldwork, visits were made to corporate projects connected to maize in my facility as a university-affiliated academic researcher. While I did not lie about my role as a researcher for Greenpeace, I did choose to omit this information, as I reco-

gnized that corporate representatives would be less open to speaking about maize-related issues should this identity be known. As a result, any information obtained in this covert manner has been left out of the chapter, although any information that could be verified in the public domain has been included.

2.5.3. Land-use change in maize production

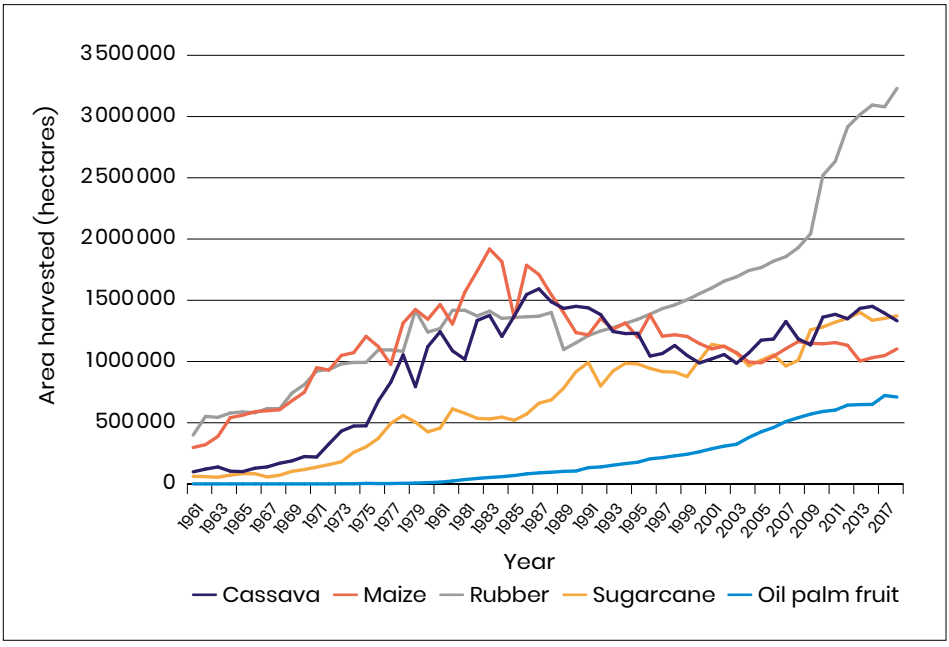
2.5.3.1. A boom in the North

Maize is grown in a variety of locations in Thailand, from lowlands and uplands to highlands. There are two possible growing seasons, with the vast majority of the crop being planted during the wet season (May to July) and harvested around four months later. Less than 10% of the total annual output is planted during the dry season (December to January). It is a crop that does not need much water, requiring 40–50% less water than rice production (Grudloyma, 2014). Therefore, the ideal conditions are found in upland rainfed areas, which have an average rainfall of 1,100–1,200 mm per year. A total of 98% of maize is grown in such areas, with the southern part of the country being too wet for cultivation. For farmers who benefit from prime conditions, maize does not demand much attention during its cultivation. It therefore allows time to carry out alternative work, which makes it a popular crop. Thailand is the chief producer in Mainland Southeast Asia, having developed a key role in processing maize into animal feed and become a global leading producer of prepared poultry products. Yet in 2019–2020, production is only expected to meet 64% of the demand for animal feed, with feed supplies offset by alternative ingredients, including imported wheat (Prasertsri, 2019). Although various multinational companies are involved in the maize to meat value chain, the biggest corporate presence in Thailand is the CP Group, a company that has left its domestic origins behind to a become global conglomerate that oversees much of the maize production within the region and controls multiple components within the chain.

Land-use for Thai maize production peaked during the 1980s, with over 1.9 million ha harvested in 1985 (Graph 1). Benefiting from a transformation to industrialized and commercialized practices in agriculture, the amount of land harvested then was nearly double that of today, consequently placing maize as the crop with highest national land-use after paddy rice. Technological advances soon followed, with the highest gains in yield in the 1990s as Thailand became a leader in research and development in seed technology (Napasintuwong, 2017).

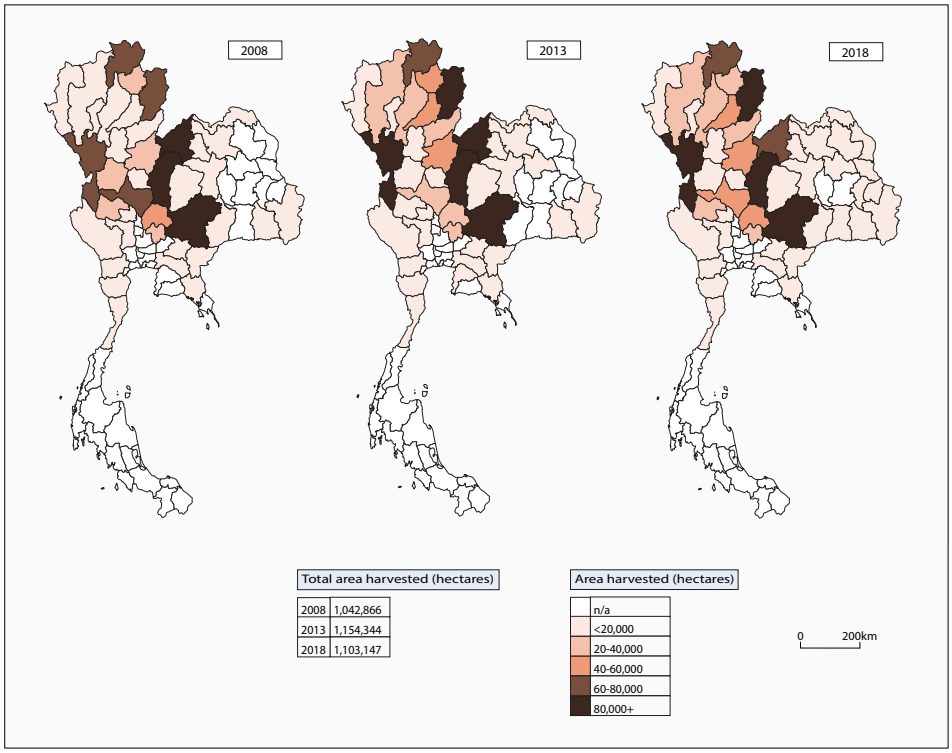
However, in the intervening years up to 2008, the production area dropped, falling behind cassava, sugar cane, and rubber. Between 2008 and 2015, there was an increase in land-use for maize production but nothing approaching the levels seen in the mid-1980s. Nevertheless, in connection to issues arising from these increases, it is worth taking a closer look at the distribution of production to look at changes around the country. Unfortunately, remote sensing land-use data from the Thai government department, Geo-Informatics and Space Technology Development Agency, is only available from 2014 onwards, and so fails to capture a longitudinal perspective taking into account the growth of maize in the late 2000s. As an alternative (if less precise) measure, provincial level data is available from the Office of Agricultural Economics. The map below compares the area harvested by province over three selected years. The year 2008 represents a moment when production areas started to increase after twenty years of decline. Then, at five-year intervals, 2013 sees a near peak of this increase, with 2018 being the most recent available production figures at the time of writing.

Figure 6. ***Major crops of Thailand by area harvested in ha***
Source: FAOSTAT, 2020; OAE, 2020b[42].



42. To give a clear image of maize in relation to crops with similar levels of land-use, rice has been excluded from this graph. For example, in 2016, 8.7 million ha were harvested for rice after a high of nearly 12 million ha in 2010.

Map 8. ***Land-use in maize production (as area harvested) by province in 2008, 2013, and 2018***
Source: OAE, 2020a and 2020b; vector map acquired courtesy of Free Vector Maps.com.

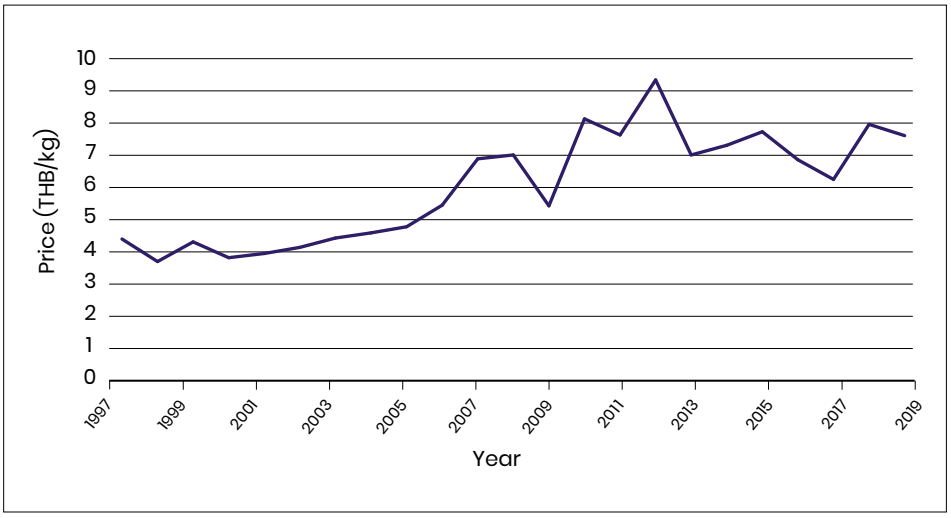


Comparing the maps, there is a clear shift between 2008 and 2013 in the density of cultivation from the center of the country to the north, with an increase in land area harvested in provinces such as Nan, Chiang Mai, Lamphun, Lampang, Phrae, Phayao, and Tak. Indeed, farmers interviewed in the north frequently referred to the notion of a boom over this period. It is important, however, to avoid making generalizations in terms of a national surge. Instead, increases should refer to the north of Thailand rather than the country as a whole. The years 2013 to 2016 saw annual decreases in production, both in terms of areas harvested (1,154,344 to 1,003,967 ha, a decrease of 13%) and output (4,876,000 to 4,029,000 tons, a decrease of 17.4%) (OAE, 2020b). Between 2016 and 2018, production showed a slight recovery, and the 2018 map shows that harvesting areas in the north have on the whole retained their status as core production zones. What is interesting is that, despite an overall reduction in area harvested between 2013 and 2018, new provinces are farming maize in the northeast of Thailand. It is a crop that continues to expand into new areas.

2.5.3.2. Drivers of land-use change

There are a number of reasons for increased land-use in maize production and the shift to the north of the country. A general increase in production in Thailand was stimulated by high crop prices, particularly from 2007 to 2012 (Graph 2). During the field visit to Ban Sop Khun, Nan Province, residents explained how villagers who had moved away returned to clear land for maize, lured by potential profits. The rise in prices is linked to an increased demand for animal feed as meat (in particular poultry) production markets have expanded in the country. Corporations and intermediaries have sought out new areas for production, setting up for the provision of inputs, drying and storage facilities, transportation, and access to processing plants to convert maize into animal feed. The upland conditions in many parts of the north, together with low operating costs, have made this a favorable location for the expansion of growing areas. With maize being a relatively easy crop to grow, inputs made readily available, and access to financial support mechanisms, many farmers took the initiative to clear land in the hope to profit from high prices.

Figure 7. ***Average price of maize (THB/kg) per growing season June–May***
Source: OAE, 2020a.



The Thai government has done much to support maize production, and there have been various pledging schemes when prices have dropped. In November 2016, the Thai cabinet approved a support program through the Bank for Agriculture and Agricultural Cooperatives (BAAC) to encourage off-season maize production on rice fields (Prasertsri, 2017). However, there has been little response to the initiative, with the take-up well below the initial aim to convert 2 million rai (320,000 ha). In 2017, the government introduced tariffs to counter extensive importing of wheat as a feed ingredient substitute that was seen to undermine domestic maize production by driving down prices. As a result, feed mills have been required to apply for a feed wheat import permit, maintain a 3:1 domestic maize absorption rate, and prohibited from reselling the purchased product (Prasertsri, 2017). A further threat to maize prices has been a quota and tariff-fee window (February 1 to August 31) for lower-priced imports from Lao PDR, Cambodia, and Myanmar. The government has intervened to crack down on reselling such maize in Thailand, which would otherwise threaten domestic prices. Most recently, in 2020, a support package was put together for corn and cassava growers affected by the COVID-19 pandemic.

There are numerous influences, such as pricing or climatic conditions during a particular growing season, that will affect how much land is used to grow maize. A post-2013 drop in production carries a significant political influence. Between May 22, 2014, when Thailand's military seized power through a coup, and March 24, 2019, when new elections were held, a military junta maintained control of Thailand. During this period, the junta reasserted a long-standing aim to increase forest cover from 32% to 40% of national land. In 2014, Orders 64 and 66 were issued to call an end to deforestation, illegal logging, and forest land encroachment (FTA Watch, Justice for Peace Foundation, and Land Watch Working Group, 2015; NCPO, 2014a, 2014b).

This has placed a spotlight on ambiguously claimed areas, with farmers labeled as encroachers even if their presence there precedes the state drawing of boundaries. Maize in particular has come to the forefront of land development debates, with companies such as CP implementing policies that they would only buy the crop produced on clearly titled land. Subsequently, farmers have encountered difficulty selling their maize produced from areas claimed as state forest land (Prasertsri, 2017). The outcomes for farmers will be considered in due course. But first of all, it is important to consider further societal concerns over the environmental impact of maize production.

2.5.4. Outcomes for the environment

2.5.4.1. Deforestation

The issue of deforestation, and by implication farmer encroachment on state forestlands, is one that has attracted the attention of a number of stakeholder groups, including the military, urban middle-class environmentalists, Buddhist activists, and royalist thinktanks. The aim to achieve 40% forest cover reflects a desire by government and military to control land and the resources contained therein, as well as implementing conservation aims for the country. Nevertheless, images of "bald" mountains in Nan Province (Photo 18) have galvanized public opinion against forestland encroachment and conversion in northern uplands and highlands. In January 2018 it was reported that "up to 8.6 million rai (1.27 million ha) of high-mountain watershed areas in 13 provinces had been heavily cleared, with 800,000 encroachers involved" (Wongruang, 2018).

Maize became closely associated with this controversy during the boom of new production in the north of Thailand. This led in particular to the demonization of farmers by a conservationist lobby, which resents what are seen as unsustainable and immoral practices. Yet such a view simplifies the issue somewhat. Firstly, farmers are not the only actors in a production chain that influences forest clearances. Secondly, land demarcation often creates confusion at ground level. For example, the village and surrounding farmland of Ban Sop Khun overlaps with many administrative categories (Photo 19). The area is split between the Nan and Phayao provinces, and encompasses a wildlife sanctuary, a National Reserved Forest, Nanthaburi National Park, a royal project, and a community forest. Among these conflicting interests, residential and farmland areas are all located on untitled land for the villagers, with all land-related taxation withdrawn to avoid claims. Even so, BAAC has provided over THB 100 million in loans to the village, principally for maize production and animal husbandry.

Photo 19. ***Cleared land around Ban Sop Khun village, Nan Province. None of the land is titled to villagers, with a complex overlap of land types found***
Credit: author.

Despite all this uncertainty, and the recent media spotlight against production on cleared forestland in Nan, maize is still grown and sold from this untitled land. Yet farmers in many other areas that have been claimed as state forestland have encountered difficulty selling their produce (Prasertsri, 2017), with companies such as CP distancing themselves from the practice. For example, only 10% of land in the whole district of Mae Chaem, Chiang Mai Province is fully titled — a deed for land is called a chanote in Thai. Field research here uncovered how when companies purchasing maize distanced themselves from land encroachment and clearances — regardless of the longevity of families living in the area — and refused to buy their produce, farmers had to accept lower prices from alternative sources, depriving them of the chance to make a profit. Indeed, despite the role of companies in the maize value chain, they too have laid responsibility for forest destruction at the feet of farmers (Wangkiat, 2015). With land policies having tightened under the military government seeking to increase forest cover, farmers have found themselves alienated by both the army, an accusing public, and companies who encouraged them to grow maize but now refuse to buy their produce.

As a counter narrative, these very farmers represent the poor that have been forced to the peripheries of available land, who must cope with inadequate transportation connections as a result of population growth and the industrialization of existing land (Ekasingh *et al*., 2004). The case of the Mae Chaem Model shows how schemes accounting for and supporting such actors can succeed in improving environmental management regimes. Mae Chaem gained a reputation as a center of deforestation, with the highest number of burning hotspots in Thailand (Ekachai, 2020; Saengpassa, 2016). However, an inclusive program of land-use, resource management, and forest conservation between district officials, academics, and local communities led to a significant decline in burning in 2015. While officials promised land-use rights, villagers helped in surveillance programs against new clearings and fires. Private sector actors involved in initiatives, which included CP, were bound to operate according to Corporate Social Responsibility. Meanwhile, participating communities attempted to move away from maize production to more sustainable crops such as bamboo and coffee. However, a recent Bangkok Post article warns that poor practices have since returned (Ekachai, 2020). This is in conjunction with a changeover of personnel within the local authorities, who have installed draconian zero tolerance measures rather than continuing policies to support community livelihoods.

2.5.4.2. Northern haze

During certain periods of the year, large areas of Southeast Asia become cloaked in a nauseous smog. This reached global attention in 2015 due to severe smoke from forest fires in Borneo and Sumatra, linked to oil palm plantations, which reached as far as South Thailand (BBC, 2013; Holmes, 2015). More recently, the focus within Thailand has switched to the north of the country where a blanket of smoke is found between January and May. Chiang Mai has recorded some of the worst global figures for PM 2.5 in recent years (Bangkok Post, 2020). The smoke contributes to climate change and respiratory problems in humans and animals. Furthermore, air pollution has also been linked to a higher mortality rate as a result of coronavirus infections (Carrington, 2020). A number of contributing factors have been put forward regarding the haze in North Thailand, including:

- forest clearances to create new farmland,
- burning to reveal and obtain a valuable mushroom from forest floors,

- naturally occurring forest fires during the hot season,
- the reduction of stubble to plant new crops,
- political protest against government policies toward forest dwellers,
- urban-based activities such as intensive use of motorized transportation, and
- industrial practices.

The timing of the smoke often falls within the dry season when farmers are preparing their land for the next round of planting, or when clearances for new plantations are taking place (Hui Yee, 2016). Fingers have also been pointed at cross-border air pollution originating from maize production in Shan State, Myanmar, and travelling into North Thailand. Using satellite imagery, Greenpeace Southeast Asia mapped out fire hotspots within maize plantation areas (Greenpeace Southeast Asia, 2019). Between December 2018 and May 2019, they found 6,879 fire hotspots within plantations in Upper Northern Thailand, and 14,828 hotspots within plantations in Shan State. Although the proportional contribution of maize-related activities to haze is not made clear, the aforementioned study confirms their influence.

There are various proposed solutions to the role of maize in air pollution. The government's land reclamation project counters deforestation and encroachment on state forestland. Maize stubble could be used as biofuel (Luchaichana, Loahalidanond, and Kerdsuwan, 2017; Pan-in and Sukasem, 2017), or the crop could be relayed with legumes as an alternative means of returning nutrients to the soil (Punyalue *et al*., 2015; Yap, de Neergaard, and Bech Bruun, 2017). In the pilot project for sustainable maize production in Nakhon Ratchasima Province, farmers plough over the used soil — including waste components of previous crops — to avoid the need to burn the land, and also relay the crop with legumes to retain soil fertility. Yet the field visits to the Nan and Chiang Mai Provinces highlighted that farmers who do not have access to support programs are not being provided with the knowledge and technological or financial support they need to deviate from present practices. Unfortunately, burning remains the easiest and cheapest way to prepare for a new season.

2.5.4.3. A chemical "romance"

Thailand is an intensive user of chemical support in farming, with the imports of fertilizers and pesticides rising during the 2000s (Kaewboonchoo, Kongtip, and Woskie, 2015). In 2015, the earliest year for which figures are available at the Office of Agricultural Economics, 96.1% of all land planted with maize was treated with chemical fertilizers, while only 9.4% was prepared with manure (OAE, 2020a). Pesticide use includes high-toxicity chemicals banned in other countries, and "there is little regulation of the sale, use, or application of these potentially toxic chemicals" (Kaewboonchoo, Kongtip, and Woskie, 2015). In 2016, a study by Naresuan University in Nan Province found dangerous levels of pesticides from maize production in river and bottled water samples (Petcharoen, 2016; Thai PBS, 2016). A collective of civil society groups in Thailand, including the Thailand Pesticide Alert Network, the Alternative Agriculture Network, and the Foundation for Consumers, have been campaigning since 2016 to ban or regulate three of the most commonly used pesticides in Thailand (BIOTHAI, 2018). These are:

- paraquat, an herbicide that is already banned in forty countries and impacts upon human respiratory and nervous systems, causing fatalities in the case of extended contact or ingestion;
- chlorpyrifos, an insecticide banned in Europe that carries a risk of neurological complications, impacting on child development; and
- glyphosate, an herbicide that remains widely available globally, although studies suggest but do not yet prove that it can have a carcinogenic effect.

On May 15, 2020, the National Hazardous Substances Committee voted to ban paraquat and chlorpyrifos, effective from June 1, 2020 (Wipatayotin, 2020). Debate continues to rage, with farmer groups complaining about potential loss of productivity, while activists lobby for a further prohibition on glyphosate.

Photo 20. ***A local farmer on the way to spray chemicals on maize crops in Ban Sop Khun village, Nan Province***
Credit: author.

Ironically, the health risks of maize cultivation are highest for the farmers themselves, whether through contact with chemicals or respiratory disorders from burning practices. In 2015, the Nan Provincial Public Health Office claimed that 39% of the 20,182 farmers living in the province showed high levels of chemicals in their blood (Wipatayotin, 2016). During interviews conducted for this study, one farmer in Mae Chaem warned of the effects of chemical weed killers, such as skin rashes or dizziness after use. This farmer also echoed concerns about soil degradation, noting how over the last ten years he has had to double the amount of fertilizer he uses to obtain a productive yield. The chemical romance in maize production facilitates an over intensification in land-use, impacting upon yields and soil

quality. So, despite being highlighted as an "easy" crop, the longevity of the financial return to farmers, alongside the long-term effect on the soils farmed, must be questioned.

2.5.5. Farmers' debt

With domestic prices increasing between 2005 and 2012 to an average of over THB 9 per kilogram, maize appeared to be a profitable choice of crop. Yet some farmers have ended up in debt. How can this be? Debt is commonly associated with loans taken out to support provisions to grow maize. Intermediaries provide production inputs, with the cost deducted from the sale of the crop output, although it is also common for these roles to be separate. There is a risk that farmers get caught in a debt trap where they are unable to negotiate prices for either inputs or output, and further loans are taken out to support spiraling debt rather than increase productivity and profit (Bisonyabut *et al.*, 2018). Even the state agricultural lender BAAC has become seen as a cause of debt, although this reflects its extensive role in providing loans rather than any intention toward impoverished farmers.

There are two other factors that may compound debt. Firstly, diminishing yields due to soil degradation challenge the farmers' ability to achieve a significant return from maize production over an extended number of growing seasons, a problem unsolved by mechanization (Ekasingh *et al.*, 2004). Secondly, prices have decreased since 2012. The Thai government has made moves to appease farmers' fears. After protests about the dropping prices, the government advised a guaranteed price of THB 8 per kilogram, and in 2016 the Thai Feed Mill Association and CP claimed they would follow such a rate (Matichon, 2016). There has been some recent improvement from a decade average annual low of THB 6.25 per kilogram in 2017 (Figure 8).

A consequence of falling into debt is that even if farmers wish to transition into more sustainable practices or alternative crops, they may be unable to do so. Indeed, they may be obliged to clear new land as a possible means to increase productivity (Rossi and Na Nan, 2017). Any income made when harvesting the crop is then used to repay the loans. The costs of inputs, such as seeds and supporting chemicals, can set the farmer into a cycle of debt that is hard to break (Bruun *et al.*, 2017; Ekasingh *et al.*, 2004; Yap, de Neergaard, and Bech Bruun, 2017). This can be particularly burdensome for those without land titles, who incur higher costs through informal lending from intermediaries (Rossi and Na Nan, 2017). Despite the negative press surrounding maize production on untitled land in Mae Chaem, a market chain has

become embedded into agricultural life, so it has become hard for households to switch to other crops without taking on what is perceived as a significant financial risk. This chimes with the work of Mahanty and Milne (2016) who compare cassava production in Cambodia to "gateway drugs" that set the user on a path to addiction and risk. Cassava as a "gateway crop" offers an entry point into industrialized and financialized agriculture, where farmers find themselves locked into capitalist relations with more powerful actors. In the village of Ban Sop Wak, Mae Chaem, which is situated in a National Reserved Forest, the female head of one household lamented how they would prefer to stop growing maize completely, noting an ongoing problem with soil degradation. However, her family remains dependent on the crop since there are no market avenues to pursue alternatives. As a further capital restriction, out of the THB 100,000 of annual profit (USD 3,000) made from maize — once costs are deducted — THB 50,000 must go toward loan payments.

An interesting parallel can be drawn between the case of Thailand and recent studies of maize production in Shan State (Myanmar). Kevin Woods shows how initial subsidies for inputs could support farmer profits, but also how, once removed, costs would skyrocket, particularly affecting the poorest families (Woods, 2015a, 2015b, 2020). Higher-capital households in farming communities might possess sufficient capital to negotiate their way through such terrain, benefit from the crop, and monopolize local resources, but less wealthy families would be dependent upon loans and fall into a downward spiral of debt, threatening existing assets such as land. In this way, maize production can exacerbate the distribution of wealth in rural communities, and impact upon the fabric of social life in villages. This could fit with the image of debt presented in Thailand thus far.

As a contrast, a recent study by the Food Security Policy Project collected data from 886 maize growing and 678 non-maize growing households in Southern Shan State (Fang and Belton, 2020). The report claims that farmers have either made a profit or broken even on more than 80% of maize harvests over the last ten years. An image is presented of a profitable crop, with little influence on intra-community inequality. Indeed, few farmers are purchasing seeds or fertilizer through credit, therefore avoiding debt from crippling loans, although they do remain susceptible to volatile prices. This more positive view fits better with an observation in Thailand where:

> "[...] *after thirty years of corn production [...] the peasantry in Nan considers this cash crop the most suitable for their knowledge and needs and shows a strong cultural resistance to the introduction of new crops and new agricultural techniques that are different from those used in industrial maize plantations.*"
>
> (Rossi and Na Nan, 2017, 77)

In light of these findings, it is imperative that further research is conducted to gain a clear picture of the situation in Thailand. This will help to establish whether smallholders are indeed suffering from debt and market limitations, and if so, what disparities can be found between groups who profit and those who lose out from maize production.

2.5.6. The involvement of multinationals in the maize value chain

2.5.6.1. A cozy relationship

The maize value chain is underpinned by multinational companies who provide seeds, fertilizers, pesticides, loans, and the ultimate collection of the crop. These include Betagro and Cargill, but the most significant in Thailand is the CP Group. Established in Bangkok in the 1920s by two ethnic Chinese brothers, CP has emerged as Thailand's largest conglomerate, with investments in over twenty countries (CP, 2018a; Laurujisawat, 2012). It is now the largest global producer of animal feed, and the sixth highest broiler producer (WATTAgNet, 2018). By the 1980s, CP dominated the poultry industry in Thailand, and has integrated itself into all phases of meat production.

Maize growing does not strictly involve contract farming, with companies such as CP directly engaging farmers only for seed production. Instead, smallholders deal with intermediaries through a variety of transactions that may comprise different inputs purchased or included as part of a loan, and the final purchase of the crop. On the one hand, farmers may have greater autonomy to pick and choose the best deal to buy inputs and sell their produce, and so have greater control over the production process. On the other hand, production risks fall on farmers, who must bear the weight of short and long-term environmental dangers (Rossi and Na Nan, 2017; Singh, 2005). Meanwhile, closer relationships are found between corporate actors and policymakers. In a 2010 study, Faccio compared political connections for companies in forty-seven countries, finding that Thailand has one of the highest levels of corporate leverage (Faccio, 2010). This links back to a tradition of political patronage that has accompanied Thailand's economic development over the last

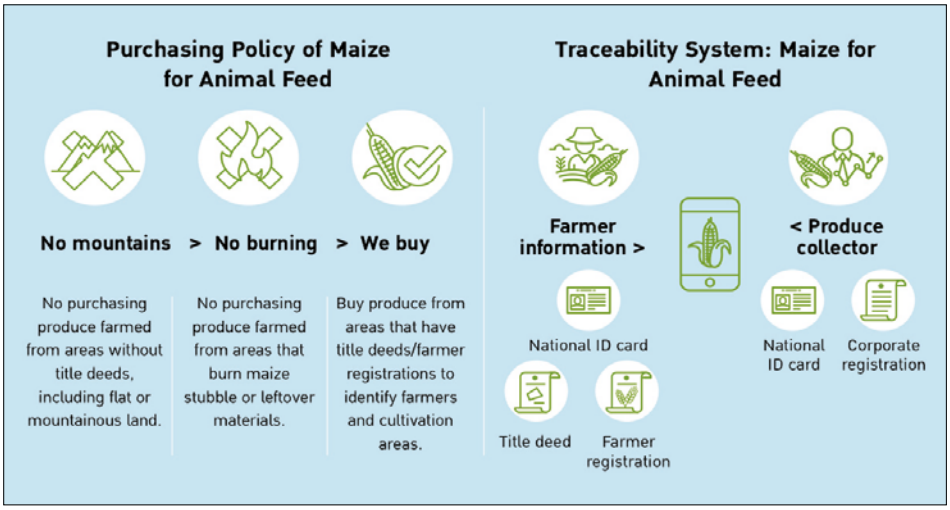
150 years. Lobbying mechanisms for the animal feed and meat sector include: ex-government officials serving on company boards, corporate figures on governmental advisory committees such as for the National Bureau of Agricultural Commodity and Food Standards, an executive presence for companies in major trade associations such as the Thai Feed Mill Association, and a strong corporate network with figures in politics, banking, and other connected institutions.

Two examples highlight corporate influence in policy. The first is the scheme to entice rice farmers to convert to maize. The Memorandum of Understanding for the project was signed by the Department of Agricultural Extension, the Thai Seed Trade Association, BAAC, and two feed mill companies including a subsidiary of CP. At the time, civil society commentators speculated that companies were in line to be the true beneficiaries of the scheme (TCIJ, 2016). The second example is the input of CP feed mills in pricing decisions for maize (Chaikiattiyos and Yoovatana, 2016). Companies have also lobbied to postpone the ban on the paraquat, chlorpyrifos, and glyphosate pesticides; limit restrictions on wheat imports as a feed substitute to maize; and influence tariffs and quotas on crops from neighboring countries. It should be acknowledged that corporate figures do not always call the shots, and a farmer or environmental lobby can also influence policy decisions. However, what is clear is that they are happy to invest time and energy into lobbying over affairs that might impact on their own financial returns. On the other hand, farmers tend to keep their distance when it comes to the social or environmental outcomes of production, or contentious issues such as land-use for maize.

2.5.6.2. Greenwashing for market control

The power of corporations within the maize value chain does not place them above criticism. For example, CP's policies have been criticized for encouraging both the clearing of forests and slash-and-burn techniques (Charoensuthipan, 2016). Since receiving bad publicity, CP has promoted a series of environmentally friendly initiatives to avoid loss of reputation and revenue. In 2016, they set up a traceability system for maize sourced from titled or government-authorized land (Diagram 1). Farmers can register themselves online and are then able to sell their produce directly into the mainstream market (CP, 2018c). This has proved problematic for many farmers using untitled land, even if this does not represent recent encroachment on state forestland. Nevertheless, it has still been possible for some such producers to sell their crop, as in the case of Ban Sop Khun village.

Diagram 1. ***An infographic from CP on their maize traceability scheme***
Source: CP, 2018b, 252.



In 2015, CP set up an organic coffee project at Ban Sop Khun village together with administrative, agricultural, and forestry departments, under the concept of green cleaning (CP, 2018b; Photo 21). Initial planting involved plots from 49 families using 384.82 *rai* of land (61.6 ha), and subsequent project phases have seen a total of 60–70 families involved, which represents 15–20% of the total number of families in the village. No family can farm more than fifteen rai for organic coffee. Formal contracts between the company and the families involve the provision of seedlings, organic fertilizer, field staff assistance, and support for other crops until beans are produced three years after planting. The produce is sold back to CP, a transaction that accounts for other financial support during the project.

Photo 21. ***Coffee planting outside Ban Sop Khun village, Nan Province***
Credit: author.

A third initiative by CP is a "Self-sufficient Farmers, Sustainable Maize" project, which from 2014 was piloted in Banlang Sub-district, Nakhon Ratchasima Province. With the support of academic experts, adaptations were made to the existing maize cultivation process, including ploughing over the used soil to avoid burning, reduced use of herbicides, soil analysis to determine the optimal fertilizer type, and relay cropping with legumes to improve the retention of soil fertility (Photo 5). Although no direct contract was signed with farmers to provide inputs, the higher quality maize would be bought by CP at above market prices and transported to a nearby feed factory. Any remaining substandard maize could then be sold to intermediaries at a lower rate. In its 2018 Sustainability Report, CP noted that the scheme had been rolled out to involve 8,720 farmers and 225,694 *rai* (36,000 ha and 3% of all land harvested for the crop) across 23 provinces of Thailand (CP, 2018b).

Photo 22. ***Newly prepared soil for maize planting in Banlang Sub-district has been turned over to avoid a need for burning***
Credit: author.

While there are many positive features in these schemes, one must be careful to judge this as the sole face of CP. Sustainable agricultural projects should be welcomed and encouraged, but they may also be used to deflect attention from the fact that companies helped to create the problems in the first place. In fact, CP have gone on record blaming northern communities for the annual smog rather than accept their own role encouraging farmers to transition to industrialized mono-cro-pping (Wangkiat, 2015). There is also a canny strategy at play in promoting sustainability schemes. By promoting itself as a green organization with the organic coffee project, CP can maintain access to land under tenuous security without the associated controversy. It also maintains market control, where land usage can be adapted through a wide range of production

systems — in this case to coffee for its range of retail stores. This does not solve the land conversion issue, but instead sidesteps the matter and reinvents the narrative to the company's benefit. As an alternative approach, companies could take a more interactive role in partnership with farmers, with a greater rollout of sustainability schemes to lessen the environmental impacts of production. This could include providing first-hand support with technology transfer, accessibility to necessary equipment (such as ploughs to turn over stubble into the soil), and responsible contracting with farmers that does not lead to spiraling debt. Such partnerships could also incorporate government stakeholders who provide leasehold titles on degraded forestland and so give farmers greater tenure security.

2.5.6.3. Profit without borders

One way of looking at maize cultivation and its growth in North Thailand is to see it as a process of extracting capital out of fringe areas of the country, rather than investing into the development of local communities. This image bears out when looking at production at a regional level. Recent years have seen growth in the maize production system in Myanmar and Lao PDR. This represents an extension and expansion of the value chain, both in domestic and regional terms, and involves many of the multinational companies found in Thailand. CP has long been the key foreign investor, its geographical origins providing a comparative advantage around the Association of Southeast Asian Nations (ASEAN) region. Most famously, the company was the first foreign investor in China, and now owns two hundred subsidiaries operating in that country (Woods, 2015a, 2015b). However, there is space for many companies — both foreign and domestic — to set up in the feed industry of Myanmar and Lao PDR as domestic livestock and poultry sectors expand. Although Thai companies often supply inputs for maize production in Myanmar and Lao PDR, the bulk of the crop is exported to China. CP follows the chain and benefits from maize seed produced in Thailand, planted in Myanmar or Lao PDR, and then processed for livestock or poultry feed in China. Despite high imports from Myanmar and Lao PDR, domestic production in China is also increasing, and has done so consistently over the past eighteen years. Complementary intensifications of production systems in multiple countries only serve to profit the multinationals. At a domestic level, feed and livestock industries are growing in Myanmar and particularly Lao PDR, catalyzing increases in foreign and domestic investment for maize.

Extension and expansion provide many options for multinationals involved in the maize value chain to deal with unforeseen or uncontrollable changes in production. These new markets benefit from lower production costs and minimal state interventions, with agricultural policy creating, at best, an enabling environment for production. In Myanmar and Lao PDR, maize production is largely left to private sector relations with brokers and farmers. The case study of Woods (2015a) demonstrates how maize production in Shan State is providing for the feed market in China. As demand increases for maize as animal feed in Thailand, cheaper costs in neighboring countries may prove attractive in comparison to the expansion of a domestic production area. Indeed, we can see here how a globalized production system acts to bypass any particular domestic issue, reducing the role of individual states in determining standards while maintaining access, in the case of maize, to a global market for prepared poultry products. In this way, a company like CP can be criticized for its role in the conversion of forestland in Thailand, and for implementing small-scale sustainability projects to burnish its image at home, while maximizing profits by displacing questionable practices and benefiting from access to land in neighboring countries.

2.5.7. Discussion

There are various ways to read the case of maize production and its recent rise in North Thailand. In one sense, the movement of capital-generating activities to the periphery of the country represents a positive, inclusive journey of economic development. With demand for maize as animal feed increasing, agribusiness actors are looking for new markets, opening up new opportunities for rural populations to participate in income-generating activities. Many farmers have been happy to grow this crop, since it does not demand much attention during cultivation, allowing time for other work. However, a closer look at the outcomes reveals a more disturbing picture. While the main profits of production are monopolized further up the value chain in the processing of animal feed and the fashioning of meat products, local farmers are confronted with the precarity of debt, environmental pollution, and soil degradation. These are the people most likely to suffer from the effects of chemical use whether directly into their body or through polluted water sources. They remain at the beck and call of market prices, having jumped on high prices before 2014 and then losing out to the subsequent downturn. Many would like to move away from chemical-intensive farming, but are unable to do so due

to already being in debt. The comparison of maize to cassava as a "gateway crop" feels an apt one, locking farmers into capitalist relations that make it hard to escape the negative impacts of established cultivation practices. This is then compounded by demonization at the hands of a range of actors including urban environmentalists, religious and royalist groups, military forces, and even the corporations who encouraged their participation in maize farming in the first place. The image of the farmer as forest destroyer is one that maintains socioeconomic and class divides in Thailand. While the anger against farmers is reignited when the haze returns each year, where are the incentives for the farmers to change their ways and to see that draconian anti-pollution and land reclamation policies do nothing to support low-income families who lack secure land tenure?

There are various ways to perceive the growth of inequality in maize production, with various measures that could be applied looking at the parameters of center-periphery, the exacerbation of wealth status within communities, farming and non-farming households, increasing environmental fragility, and national borders. There is no singular trend, but corporations with a core role in the value chain bear a responsibility here not to compound economic hardships for farmers already struggling to make a living on the periphery of society. So, have companies fully monopolized profit? Of course, economic reality is not quite so simple. It is true that companies have received criticism, in particular for their role in land encroachment and the annual haze in the north. Yet unlike smallholders frequently confined to this part of Thailand, they are in a position to maneuver themselves away from controversy and financial consequences. At the local level, traceability and sustainability schemes can reformulate the narrative of corporate involvement in questionable agribusiness practices. While environmentally friendly initiatives should be both welcomed and encouraged, companies need to be held accountable if schemes merely greenwash controversies to protect their corporate image and maintain market control. At present, a sustainable maize scheme is practiced on 3% of land harvested for the crop. But where is this taking place in Thailand? Does it support farmers on the peripheries whose livelihoods are the most precarious? Could such a scheme improve traceability by including land-use rights as part of the program? As with the Mae Chaem Model, showing loyalty and support to farmers' needs can pay multiple dividends.

Unlike farmers bound to their local landscape, multinationals are involved throughout the value chain and have many options to protect their economic interests. In particular, com-

panies like CP can benefit from recent expansions into Myanmar and Lao PDR with lower production costs or emerging consumer demand. They cater not only to growing domestic demand in these countries but also a growing demand for maize in China. Thailand is involved in this regional growth, primarily in the provision of seeds, but the value chain can be shifted as necessary to maximize market potential. This shows how new markets can compensate for problems elsewhere, spread financial risk, and open up further avenues to generate capital. Indeed, despite land-use for maize decreasing after a 2013 price high, the geographical expansion into new parts of Thailand — including many provinces of the northeast — continues. Farmers on the other hand do not have this luxury, and instead must carry the burden of localized risks, bearing the costs of price drops, low output, or polluting production methods. The evidence from Shan State presents a conflicting picture regarding the profitability of maize, and whether it is contributing to inequalities within farming communities. It is vital that a clear picture of financial outcomes in Thailand is produced, accounting for wealth distribution within rural communities and potential shifts in socioeconomic relations.

With governments around the region questioning the effectiveness of large-scale land acquisitions, there is a search for alternative forms of agricultural investment. Maize cultivation shows us how, even when farmers retain access and control of their land within an industrialized process, this process can still act to create inequalities as a result of development implemented to the detriment of rural peripheries. Furthermore, while the Thai government has implemented policies to support farmers and has not been insensitive to protests when prices have fallen, it has also displayed close relationships with the corporate world, swapping positions on advisory panels and executive boards.

The example of the Mae Chaem Model is one that offers some hope but also a warning. Its multi-stakeholder approach that actually gives some value to the smallholder led to significant improvements against deforestation and the burning of land. While one could be cynical about the private sector jumping on the success of this case, it is hard to see a solution to harmful maize cultivation practices without the involvement of associated companies. However, persistence is needed to maintain successful outcomes over time. In Mae Chaem, a reversion to zero tolerance approaches that marginalize local communities has seen an increase in damaging land practices. One hopes that future initiatives may learn from this example, and that acting on farmer pains may become a gain for all.

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2.6. Rural-urban migration and environmental change: vulnerability nexus from the Vietnamese Mekong Delta to Ho Chi Minh City

Clara Jullien, Ngo Thi Thu Trang, Gwenn Pulliat

The Mekong Delta in Vietnam is a major agricultural area increasingly exposed to a wide range of environmental changes and hazards resulting both from climate change and local human intervention. Local inhabitants who live mainly off agriculture must adapt, either on site or through migration. The development of the industry and service sectors in urban areas attracts most rural inhabitants who decide to migrate. This chapter examines the interplay between the environment and socioeconomic inequality in spontaneous migration patterns through the perspective of vulnerability. It aims to understand the out-migration trajectories that connect the Mekong Delta to Ho Chi Minh City, while highlighting the inequalities that both produce and result from the exposure to intensifying environmental hazards. The paper draws on a literature review on migration and environment in the Mekong Delta, as well as the results from a 2019 research project conducted by the Oxford Committee for Relief Famine (Oxfam). It is revealed that migrants come to the city searching for higher and more stable incomes, although environmental factors may also be hidden behind economic factors influencing the decision to migrate by affecting income sources in the delta. However, migrants are likely to find themselves facing economic, social, legal, and environmental precarity and insecurity in the city.

Considering the attention it attracts from local and international researchers in all fields related to the environment, the Mekong Delta could be considered a global laboratory of environmental change. Indeed, it is exposed to a wide range of environmental changes and hazards, among which some are probably related to climate change. The sea level rise, for instance, is particularly alarming in this low-lying area irrigated by the nine branches of the Mekong River, especially as this rise is one of the causes of water and soil salinization in the area.

The crucial importance of the Mekong Delta for the agricultural economy of Southeast Asia partly explains the concerns regarding these changes. Thanks to the precipitation regime, on the one hand, and the Mekong River carrying sediments from upstream — over more than 4,700 km — on the other hand, the Mekong Delta is one of the most fertile areas of the globe. The floods during the rainy season are essential to the delta's agri-

culture. Therefore, in this specific deltaic context, flooding is not univocally considered as a threat, but also as a resource. While floods cause deaths, disruption, and damages, they also contribute to alluvial deposition, rice field agrosystems, and water management (Danh and Mushtaq, 2011). These favorable conditions for agriculture are linked to the delta's high population density. From the 1970s, and especially since the opening to an international market economy in 1986 — the Đổi mới set of reforms — and subsequent decollectivization, the delta has experienced a major economic take-off. It rapidly turned into the "rice bowl" of Vietnam and a major region of international exportation.

In this context, the combination of sea level rise and land subsidence, rising salinity of soil and water, and increasing un-predictability of precipitation regimes and drought cycles appear as major threats to the local agricultural economy. Meanwhile, the large majority of delta inhabitants earn their living from agriculture. According to the 2016 rural, agricultural and fishery census, 81% of households in the Mekong Delta were engaged in agriculture activity (GSO, 2018a). In 2019, the Mekong Delta was home to 48% of the country's grainy food crop surface area, 54% of the rice field surface area, and 72% of the aquaculture surface area, while accounting for only 12% of the national surface area (GSO, preliminary results 2019[43]). Therefore, delta farmers must adapt in order to maintain their incomes and livelihoods. One option is to change farming practices: in the Mekong delta, these practices have been studied extensively from various perspectives, from agronomy to social sciences to computer-based modeling. For instance, Chapman and Darby (2016) analyzed rice farming adaptation strategies: in the upper region of the delta, the transition from low dikes to sediment-excluding high dikes results in a change from double to triple cropping, which reveals itself to be more advantageous for wealthy large land farmers than for poor small land farmers. A major shift is also visible from rice production to shrimp farming, which proves to be more suitable to brackish water (Smagjl *et al.*, 2015). In addition, local inhabitants can turn away from agriculture and find employment in other sectors, such as industry. However, local job opportunities outside the agricultural sector remain scarce, and accessing local industrial areas often requires moving within the delta.

43. "General Statistics Office," https://www.gso.gov.vn/.

Another option for farmers to adapt to environmental issues is to migrate outside the Mekong Delta entirely. The present chapter focuses on this strategy. We include both voluntary migration and displacement forced by the impossibility to stay — but, in both cases, where the household nonetheless decides for itself when and where to go. In contrast, relocations that are organized by public authorities, aiming at resettling at-risk households in safer areas, are not considered in this paper: since households do not choose whether to migrate or not, nor where to resettle, this category of movement is considered outside the scope of spontaneous migration. More specifically, this chapter studies the migration path from the Mekong Delta to the metropolis of Ho Chi Minh City, located at the limit of the delta.

Farmers are not all equally exposed to environmental events, nor do they possess an equal capacity to respond to those events. Likewise, farmers who choose to migrate do not all have the same assets to settle in a new area and obtain new livelihoods. In this chapter, we want to address the linkages between environmental pressures and socioeconomic inequalities. To do so, we examine the interplay between the environment and socioeconomic inequality in migration patterns through the perspective of vulnerability. Does uneven vulnerability to environmental changes translate into socioeconomic inequalities after migration?

The Intergovernmental Panel for Climate Change gives a general definition of vulnerability as "the propensity or predisposition to be adversely affected" (Field *et al*., 2014). However, the definition of vulnerability as a socially constructed, Western-oriented, multidimensional concept is far from consensual among the various fields of research from physical, to social and psychological sciences. Following Cardona (2003, 1), we define vulnerability as "the physical, economic, political or social susceptibility or predisposition of a community to damage in the case of a destabilizing phenomenon of natural or anthropogenic origin." The vulnerability of a system exposed to a hazard encompasses the notions of sensitivity and adaptive capacity, understood as the ability to absorb a shock, to self-organize, and to adapt (Adger, 2006). Adger highlights the inherent paradox of vulnerability, simultaneously involving powerlessness and the ability to adapt. Vulnerability, being objective or perceived, dynamic over time and multiscale, brings up governance issues (*ibid*.). Moreover, Gallopin adds that vulnerability is specific to a certain perturbation, but that multiple perturbations interact together (Gallopin, 2006). Brooks points out a main source of confusion in the use of vulnerability: the need to differentiate between biophysical vulnerability and social vulnerability. The

first would be function of the probability of the occurrence of a specific hazard, whereas the last would encompass "all those properties of a system independent of the hazard(s) to which it is exposed, that mediate the outcome of a hazard event" (Brooks, 2003, 5). The definition proposed by Gallopin allows to join the two: "a property of a system expressed/revealed when the system is exposed to the perturbation" (Gallopin, 2006, 297).

The social, economic, and political dimensions of vulnerability stress its structural and anthropogenic roots (O'Keefe, Westgate and Wisner, 1976). Vulnerability reveals socioeconomic as well as spatial inequalities. Socioeconomic inequalities often result in differentiated exposure to environmental hazards, while it may also affect one's ability to cope with and recover after an event. Additionally, the onset of an event often implies cost and loss for affected people, which can be more detrimental to households in a precarious socioeconomic situation. Therefore, vulnerability to environmental events is a lens through which the creation of socioeconomic inequalities in this changing context can be highlighted. Environmental vulnerability, socioeconomic precarity, and migration patterns are intertwined: this chapter sheds light on these manifold relationships. It thus contributes to the understanding of the out-migration trajectories that connect the Mekong Delta to Ho Chi Minh City, while giving a special attention to inequalities that both produce and result from the exposure to intensifying environmental hazards. Various external factors of multidimensional vulnerability in the departure and arrival areas are questioned, as detailed in the chart below (Table 5).

Table 5. ***Possible vulnerability factors for rural migrants from the Mekong Delta to Ho Chi Minh City***

Source: author's construction.

	MEKONG DELTA	HO CHI MINH CITY
Environmental vulnerabilities	Loss of harvests, decrease of land surface or land productivity due to flood, drought, erosion, salinization, sea level rise	Pollution
	Damaged housing due to flood or erosion	Damaged housing due to flood
Economic vulnerabilities	Mechanization of agriculture reducing the need for labor	Job precarity
	Price variations on the farming products market	Cost of daily expenses
	Pressure on the farmland market	Cost of housing
	Land expropriation for infrastructure and development projects	
	Relocation procedures from risk areas	
Social vulnerabilities	Social pressure	Marginalization / isolation
Political and legal vulnerabilities		Residential registration system

This paper draws on a literature review on migration and environment in the Vietnamese Mekong Delta conducted with the French Research Institute for Development (IRD), within the framework of the 2019 Movindeltas Project and the 2020 Inequalities and Environmental Changes in the Lower Mekong River Basin Project. The literature review is followed by results from a 2019 research project conducted by Oxfam focusing on migration from the Mekong Delta to Ho Chi Minh City in a context of environmental change.[44]

44. This research is funded by Oxfam in the framework of the project "Climate change and migration: The status and role of Oxfam in promoting urgent changes and climate change response strategies in the Mekong Delta."

2.6.1. Living in a risky environment

2.6.1.1. Living with floods: A long history of adjustments

It is first necessary to provide some geographical and historical background to the Vietnamese part of the Mekong Delta. The Mekong Delta has been populated relatively recently when compared to its counterpart in North Vietnam, the Red River Delta. From the seventeenth century onwards, human settlements in the Vietnamese Mekong Delta were fueled by migrations from the North and from the western part of the peninsula (Khmer population). They first remained dispersed across the flooded areas, thanks to a relatively light channeling work of watercourses and the foundation of military colonies. Over the nineteenth and twentieth centuries, due to the Mekong Delta's location on historical commercial sea roads, French colonizers shaped the delta by building light dikes and circulation networks in order to foster agricultural development (Biggs, 2010; Fanchette, 2004). This political will to strengthen the agricultural development of the delta remained even after the political switch: after reunification in 1975, the Vietnamese communist government adopted a settlement policy that sent a significant proportion of city dwellers to the countryside in order to root the political regime into the country's rural substrate, including the Mekong Delta. In addition, since this period and particularly during the late 1980s and 1990s, the government has transformed the delta's agriculture to meet the population's food needs and to fit into the global market. This policy has turned out to be successful: the shift from single cropping to double or triple cropping has resulted in a rapid expansion of rice-sown areas. In particular, the area dedicated to short duration, high-yielding rice varieties more than tripled in twenty years. Between 1976 and 1995, the total rice production of the delta increased by 35% (Young *et al.*, 2002). The Mekong Delta has turned into a major region for national and international exports of agricultural products.

Meanwhile, at the pace of these development phases, the inhabitants of the Mekong Delta have learned how to live with hazards, especially with floods, and how to take advantage of them in their farming activity. During the monsoon season, between 12,000 and 19,000 km^2 of the delta are naturally flooded regardless of climate change, particularly in the northern part which includes the Plain of Reeds and the Long Xuyen Quadrangle (Liao, Le and Nguyen, 2016). Adapted cultures such as floating rice and aquaculture, boat transport, protection infrastructure such as dikes, and housing built on stilts characte-

rize the way of life for many delta inhabitants. The delta is now home to 17.3 million people — 18% of the national population — on 12% of the country's total surface area (GSO, 2020).

2.6.1.2. Rising pressures on the delta's environment: From climate change to local anthropic activity

The delta's environmental situation is changing at a growing speed. The Mekong Delta is considered one of the most exposed regions to the effects of climate change, and the Vietnamese authorities give particular attention to the forecast of environmental changes. These changes are various. In its projections, the Vietnamese Ministry of Natural Resources and Environment (MONRE) expects an increase in average temperature and rainfall (in terms of annual and rainy season levels), while rainfall may decrease during the dry season, especially in the South (MONRE, 2009). According to the envisaged scenarios based on the various levels of carbon emissions estimated by the Intergovernmental Panel on Climate Change (IPCC), the sea level may rise by 28–33cm by the year 2050 and by 65–100cm by 2100, relative to the 1980–1999 baseline period. These estimations are minimal, based only on local observations of the sea level in Vung Tau. They do not consider other factors like waves, tides, storms surges, and floods. The MONRE has established flood maps of the Mekong Delta for each sea level rise (SLR) scenario, showing in particular the exposure of the coastal provinces. Depending on the SLR, MONRE estimates that between 12.8% and 37.8% of the delta area will be underwater by 2100. Temperature and rainfall will increase faster than previously expected, and the different projected SLRs are slightly higher than previously estimated.[45]

Regarding flood risk, the intensity and frequency of floods tend to increase, hence disturbing farming cycles and threatening settlements. However, it is difficult to map the future risk of floods. For example, using hydrodynamic modeling and a geographic information system, Dinh *et al.* assessed the extent of flood prone areas in the Long Xuyen Quadrangle: the area located between the Bassac River, the West Sea, and the Cambodian border (Dinh *et al.*, 2012). The model is calibrated based on the 2000 flooding observations and then run to provide 2050 simulations according to the different SLR scenarios defined by MONRE. It includes variations in storm surge levels, cyclone fre-

45. Vietnam updates climate change scenarios," Reliefweb, March 31, 2016, https://reliefweb.int/report/viet-nam/vietnam-updates-climate-change-scenarios.

quency, awareness, preparedness, and recovery time. The multiplicity of factors that play a part in a flood event makes it very challenging to accurately predict the extent of flooding.

Nonetheless, the current environmental conditions and ongoing evolutions in the delta are not exclusively related to climate change. Human intervention in the delta, upstream and downstream, has a significant impact on its ecosystem, especially on land and water, as pointed out by numerous scientific studies conducted in the Vietnamese part of the delta during the last decade (Syvitsky *et al.*, 2009). These anthropogenic factors combine with the effects of climate change to foster floods, submersion, salinization, and erosion.

Land subsidence is an example of such a combination of natural and anthropogenic actions. Recently, the Rise and Fall Project led by Utrecht University provided new data on the situation of the Mekong Delta in the face of climate change. It showed that the delta's ground elevation has been considerably overestimated (Minderhoud, 2019). The usual models using satellite data estimated the elevation of the delta between 2.6m and 3.3m above mean sea level (MSL) while the new model, developed using topographical map elevations, concludes that the average elevation is actually no more than 0.8m above MSL. This new estimation shows the alarming vulnerability of the delta to SLR, much higher than previously assessed by the authorities. Minderhoud points out the impact of groundwater extraction on land subsidence, that adds up to natural subsidence and urbanization weight. According to this model, the current average subsidence rate due to groundwater extraction amounts to 9mm per year, with areas subsiding over 25mm per year. If groundwater extraction is not limited, "extraction-induced subsidence could potentially drown almost the entire Mekong delta" (Minderhoud, 2019, 13). In the same project, Eslami highlights the role of anthropogenic sediment starvation in tidal amplification and salt intrusion (Eslami *et al.*, 2019). This research shows the impact of dam construction upstream on sediment starvation downstream. The lack of sediment results in bed level incisions, which lead to tidal amplification and an increased salinity rate in channeling waters. Moreover, sand mining also contributes to riverbank erosion and tidal variation. These dynamics affect both the delta's agricultural production and living areas.

This shows that environmental changes in the Mekong Delta go well beyond climate change, and combine both the effects of global warming and the results of the local uses of land and water resources. The changes have a negative impact on agricultural production and are forcing those who derive most of their livelihoods from agriculture to adapt. Farmers are

often among lower-income households, who have difficulties coping with hazards and adjusting to a changing environment. In 2018, 5.8% of households in the Mekong Delta were considered to be suffering from multidimensional poverty, despite the fact that the delta is one of the better-off regions in the country (GSO, 2019). Multidimensional poverty affected 6.8% of households at the national level, including the extremely poor population of the Northern Midlands and Mountains as well as the Central Highlands (GSO, 2019). Therefore, these figures suggest that households are unequally vulnerable to environmental changes and have unequal resources to adapt. Among the coping and adapting strategies are livelihood diversification or a change in livelihoods, including changing location for better access to non-agricultural jobs.

2.6.2. Migration as a response to environmental changes

2.6.2.1. The environment as a factor in the rural-urban migration decision

For delta inhabitants, migration is one way to react to these environmental changes. Previous research showed that the decision to migrate can result from a combination of social, economic, political, and environmental factors (Miller, 2019; Dun, 2011; UNDP, 2014; Warner *et al.*, 2010). For individuals, or more likely for households, this decision-making process might be influenced by access to resources such as economic resources, land, information, social networks, communication technologies, or public services (Van der Geest, Nguyen and Nguyen, 2014; Nguyen, Grote and Sharma, 2017). Indeed, migrating requires a certain level of assets, leaving this option out of reach for some people (Kniveton, Smith and Wood, 2011).

With that in mind, several major recent studies have focused on the relationship between the environment and migration in Vietnam. We can name three major recent projects here. In 2007, the project EACH FOR, funded by the European Union and the International Organization for Migration, disputed this question in the case of the Mekong Delta, along with other international study cases. Focusing on flooding, the study shows that environmental change is a trigger for independent migration decisions (whether internal or international) when livelihoods are negatively affected (Warner *et al.*, 2012; Dun, 2011; Warner *et al.*, 2010). The German-Vietnamese WISDOM project (Phases I and II), conducted between 2007 and 2013, also addressed this question in the framework of a broader mission: to provide the delta with an information system encompassing hydrology,

environment, land use, and population changes.[46] The project studied in particular the case of peri-urban areas in the delta as an "interface", for these areas are the meeting points of structural transformations including migration and environmental change. Interestingly, the project highlights the blurred boundary between rural and urban in the Vietnamese context, and the multiple "hybrid mosaics" that it composes (Garschagen, Renaud and Birkmann, 2011, 9). Later, the MECLEP project, led by the Erasmus Rotterdam University and Can Tho University, highlighted poverty and livelihood insecurity as the main reasons for migrating from the rural Mekong Delta areas to Can Tho and Ho Chi Minh City, including migration from a relocation site (Chun, 2014, 2015). The results emphasized the multiplicity of factors involved and the ambiguity that can exist between environmental and economic factors (Nguyen, Leonardelli and Dipierri, 2017; Anh, Leonardelli and Dipierri, 2016; Entzinger and Scholten, 2016). Environmental factors do not necessarily stand out as factors of migration identified by households themselves, but can be indirect factors through affecting means of livelihood.

Other research provided insights on this topic in the context of central Vietnam (Haemmerli *et al.*, 2016) and the Mekong Delta (Oanh and Truong, 2017). Another study conducted by Koubi *et al.* (2016) on the same topic took the Mekong Delta and the Central Coast as departure areas, with Ho Chi Minh City and Hanoi as the destinations. It stood out that rapid-onset and short-term events were significantly likely to lead to a decision to migrate, whereas slow-onset and long-term events had little to no influence (*ibid.*). The speed of an event and its temporal perception by inhabitants play a major role in the migration decision process. This observation is consistent with the results of other studies. Berrang-Ford, Ford and Paterson (2011) report that climate variability and short-term events, such as floods or droughts, appear to lead more frequently to adaptive responses than long-term changes in seasonal or annual temperature or precipitations. Likewise, the consequences of a specific flood or other weather-related event may be the trigger for the decision to migrate, although certainly not the only factor.

With the economic transition toward industrialization and the development of the services sector within or close to cities, migrations tend to lead people out of rural areas toward urban areas (Nguyen and Luu, 2016). In 1996, based on a study in the region of Hanoi, Li already explained how, from the late 1980s and 1990s, while restrictions on mobility were being eased and transportation was developing, rural migrants moved to cities seeking

46. Retrieved from https://wisdom.eoc.dlr.de/.

for jobs after the increase in agricultural productivity had left many farmers unemployed (Li, 1996). According to a study conducted by the Mekong Migration Network and the Asian Migrant Centre in 2013, Ho Chi Minh City attracts more than 60% of migrants coming from the Mekong Delta (MMN and AMC, 2013). The Mekong Delta is characterized by a very high out-migration rate. The results from the last national statistical census conducted in 2019 reveal that the out-migration rate of the Mekong Delta is now up to 4.5%, which puts its net-migration rate at - 4%. This is the highest out-migration rate and the lowest net-migration rate out of all the country's regions. Only Can Tho and Long An in the Mekong Delta keep a positive net-migration rate. Most of the migration flow heads to the Southeast Region including Ho Chi Minh City and other industrial provinces such as Binh Duong (GSO, 2020). In 2019, the in-migration rate of Ho Chi Minh City was up to 9.1% (GSO, 2020). Officially, 714,000 people migrated in this direction between 2004 and 2009, out of the delta's 16.7 million inhabitants in 2004, creating a major migration corridor (GSO, 2009, as cited in Entzinger and Scholten, 2016). The 2014 intercensal survey on migration and urbanization counted the number of inter-provincial in-migrants and out-migrants by regions in the same year — i.e., people over the age of 5 who reported having a different province of residence 5 years prior to the time of the survey. Out of all the out-migrants from the Mekong Delta recorded on that date (762,555 people), 76.5% had moved to the Southeast Region (583,358 people) (GSO and UNFPA, 2016a).

2.6.2.2. Economic development, land tenure, and vulnerability in the Mekong Delta

Small local farmers in the Mekong Delta are not only exposed to environmental changes but also to globalization. O'Brien and Leichenko designate this situation as "double exposure," highlighting that these perturbations are in constant interaction. Both trends can no longer be considered separately as they converge to increased exposure and multidimensional vulnerability (O'Brien and Leichenko, 2000). The opening to a global market economy has consequences on both the agricultural products market and the land market. Concerning the agricultural market, local farmers might suffer from fiercer competition from international producers and price variations due to fluctuations in demand. Since the end of the 1980s, Vietnam has emerged rapidly as an important producer and exporter of agricultural goods on the international market. This has resulted in a higher exposure to price variations, while safety nets remain scarce.

Concerning the land market, Vietnam's history has resulted in a hybridity between collectivism and liberalism (Mellac, Fortunel and Dac, 2010), which has led to vulnerability for local farmers. Vietnam is a socialist country with a market economy. While politically ruled under a socialist authoritarian regime, economically it tends to play a significant role in an international liberal economy. This double face of Vietnam translates into complex mechanisms in the land market.

After the 1975 reunification, the socialist land management system was extended from the northern part of the country to its southern counterpart. From that time, agricultural lands were managed by cooperatives which were later progressively dismantled. From the Land Law of 1989, users were granted the first short-term land use rights by contract with the cooperatives. Four years later, the Land Law of 1993 recognized individual long-term land use rights and land management rights — the right to exchange, cede, rent, bequeath, and mortgage land. Since then, a land use rights market has emerged. Nonetheless, the land remains administered by the state, which decides the duration and conditions of land use rights granted to Vietnamese citizens. These rights differ according to the classification of the land — rural or urban — and the function of the land — agriculture, built, forest, future construction, etc. By allowing individual transactions of land use rights, the 2003 revision of the national land law made land tenures for rural and urban lands diverge (To *et al.*, 2019). On the one hand, rural land refers to plots of land attributed for 20 years tax-free, the value of which is based on the value of agricultural production. On the other hand, urban and peri-urban land are treated as market goods in a liberal economy in order to support national economic growth (Mellac *et al.*, 2010). Farmland in the Mekong Delta has increasingly entered these market dynamics. According to a 2009 survey, only 5.1% of households in two provinces of the Mekong Delta acquired their land by state allocation, rather by inheritance or purchase, a proportion much lower than in two provinces of the Red River Delta (94.5% of state allocation) (Bui and Dang, 2011, as cited in Tran, 2018). In 2014, another survey conducted in Tien Giang and An Giang with rice-growing Vietnamese households found that only 1.9% of the land was granted by the state while 41.6% was inherited from parents, 54.3% was acquired by purchase, and 1.7% was reclaimed land (Tran, 2018). For the vast majority, small plots of land (1 ha or less) are mostly inherited, and large ones (more than 1 ha, and usually more than 5) are mainly purchased.

The recent land law evolutions give a new orientation to this dual system, as they allow land accumulation in rural areas and facilitate speculation on farmland. Provinces have strongly implemented the policy of exchanging or merging farming plots to foster large-scale fields (Government of Vietnam, 2016). During the land transactions process, farmers appear as the less powerful actors in a chain that increasingly involves foreign and Vietnamese investors and large-scale landholders. This leads some authors to see the emergence of agribusinesses as a potential threat to household-based agricultural production (To *et al*., 2019). In this context, some farmers might be deprived of their land use rights or become bound by debt. In addition, parents tend to encourage their children to seek higher incomes in sectors other than agriculture, resulting in a strong intergenerational shift in occupation. As a consequence of this outmigration trend, the lack of labor available in rural areas and the higher cost involved with hired labor tend to force farmers to either use agri-machines or sell the land. According to Garschagen *et al*., the economic transformations in rural and urban areas (industrialization, mechanization of agriculture, land accumulation) force many farmers into landlessness (2012; Marsh and MacAuley, 2002). In 2011, 14.2% of households in the Mekong Delta were landless (GSO, 2012). Deprived from land use rights, landless farmers seek wage employment, often short-term or seasonal jobs in the farming sector. Tuan demonstrates that a strong correlation exists between poverty and land title and size (Tuan, 2010, as cited in Garschagen *et al*., 2012). According to Tran, based on a survey conducted in 2014, a process of social differentiation is occurring among farmers in the delta: between well-off large-scale farmers, and landless farmers contracted for farming work on others' land (Tran, 2018). Therefore, Mekong Delta farmers face a double trend: the economic transition that strengthens competition in the agricultural, land, and job markets, as well as the rapid environmental changes that threaten the quality and even future existence of their land. Their vulnerability to environmental risks translates into a socio-economic precariousness that could be a factor influencing the decision to migrate.

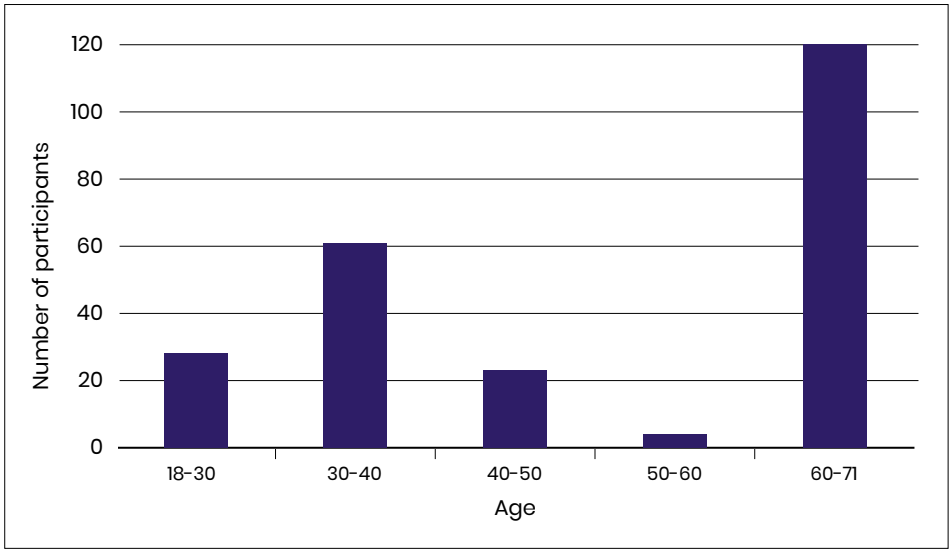
2.6.3. From environmental vulnerability to socioeconomic vulnerability?

2.6.3.1. Socioeconomic vulnerability of the migrants in the city

How does migrant exposure to environmental risks evolve after migration? Do migrants face specific vulnerabilities at their destination? In order to track the interplay between environmental change and vulnerability along migrants' trajectories, we study the living conditions of migrants in the city. To do so, we draw upon a study that Oxfam conducted in Vietnam in 2019, which dealt with climate change and migration from the Mekong Delta to Ho Chi Minh City. The study aimed to provide preliminary data to develop recommendations on the public response to the migrations occurring in a context of climate change in the Mekong Delta.

In this research, two locations in the Mekong Delta were selected: Dong Thap and Ben Tre. They were identified as departure areas, with Ho Chi Minh City as the destination. The departure sites were selected based on the importance of the environmental changes they face: landslides in both provinces, and salt water intrusion particularly in Ben Tre. Ho Chi Minh City was selected as the region's main site of attraction based on migration statistics. The study combines 28 in-depth interviews, 2 focus group discussions, and a questionnaire-based survey with 240 households. The survey targeted households in the departure sites — 60 in Ben Tre and 60 in Dong Thap — and in the destination site — 20 in Ho Chi Minh City. The migrants surveyed in Ho Chi Minh City were selected based on three criteria: being over 18, currently working in Ho Chi Minh City, and originating from Dong Thap or Ben Tre. The survey was conducted in Binh Tan District, located on the western periphery of the metropolis, bordering the Mekong Delta. Binh Tan is a peri-urban industrial district with a rapidly growing population due to a high immigration rate. The participant selection method does not provide a representative sample of the general migrant population, as this population is very diverse and its size cannot be accurately estimated. Nevertheless, the study provides interesting insights into the trajectories and living conditions of the particular migrants surveyed. Out of the 120 survey participants in Binh Tan, 59.2 % were male and 40.8% female. The average age of the sample is 36 years, with 74.1% of participants aged under 40, and 96.6% under 60.

Figure 8. ***Participant distribution by age range***
Source: author's construction.

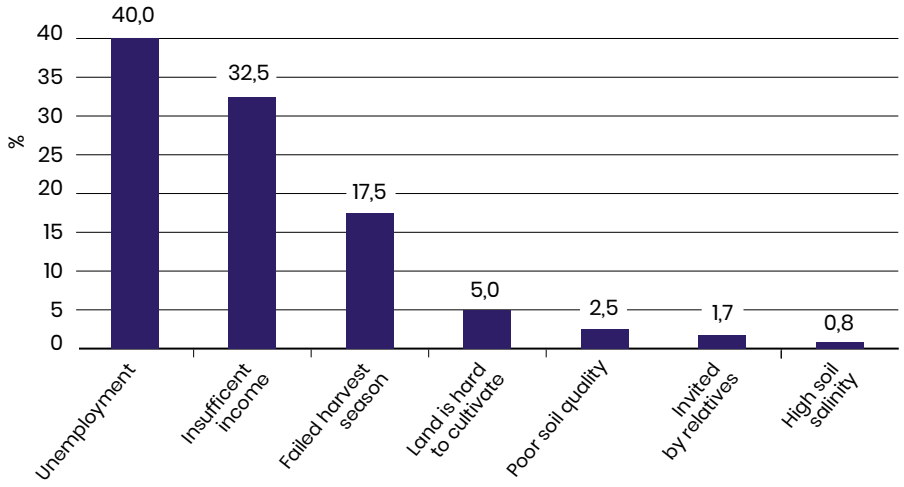


The average age when participants arrived in Ho Chi Minh City is 28. More than half the participants arrived between 18 and 30 years of age (52.5%). It is worth noting that 1 migrant out of 9 arrived before they were 18 years old (11.6%). The survey findings show that the main cause expressed by the migrants for departing their village was related to their economic activity (Figure 9). 32.5% report insufficient income, 40% were suffering from unemployment, and 17.5% had lost a harvest. Environmental causes were explicitly mentioned only by a minority (8.3%): these participants mentioned that the land was hard to cultivate, that the soil was of poor quality, or that the soil had a high salinity rate. However, the loss of a harvest can, of course, also be due to environmental events such as a drought, flood, or storm. Besides climatic causes, disease can also be considered an environmental cause, and insufficient income can result from market conditions but also from some sort of environmental degradation. As pointed out in other studies (Haemmerli *et al.*, 2016), all the economic factors invoked for the decision to migrate can ultimately be found to derive from environmental factors. However, the quantitative methodology used did not shed light on these connections. Interestingly, none of the participants selected "climate change" as their reason for migrating, meaning that they either did not consider themselves to be affected by it or were not familiar with the concept. It is impor-

tant to note that this question allowed only one answer in the list of possible causes. As a result, the level of detail and nuance of answers was of course limited. For example, it was not possible to answer both "Harvest loss" and "Natural disasters: landslides, storms and floods," or both "Insufficient income" and "Climate change."

The results are nonetheless coherent with the conclusions from previous studies conducted in 2007, 2008, and 2010 with migrants from central Vietnam (Nguyen, Raabe and Grote, 2015). This research was based on a panel data set of around 2,200 rural households from 3 provinces (Dak Lak, Thua Thien Hue, and Ha Tinh) and a survey of 299 migrants in Hanoi and Ho Chi Minh City. The evidence from these surveys also suggested that rural-urban migration for employment can be a "livelihood support strategy for households coping with agricultural and economic shocks like droughts, floods or loss of job, or with financial debts" (*ibid.*, 88) In this econometric research, the probability of migration decreases as employment opportunities in the village of origin increase.

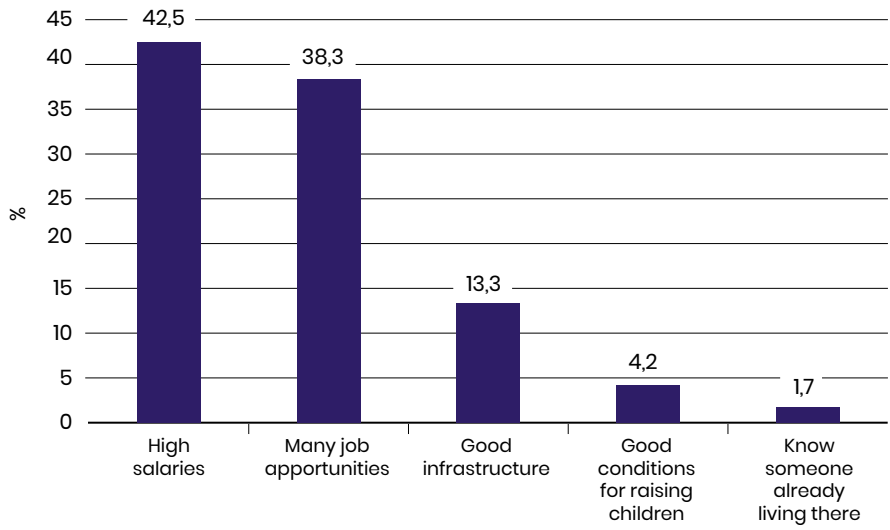
Figure 9. ***Departure causes***
Source: author's construction.



Among the 16 possible answers, 9 were not selected by any participant. These answers are: "The quality of the water for aquaculture is low," "Climate change," "Air pollution," "Natural disasters: landslides, storms and floods," "Insecurity," "Conflicts with family and neighbors," "Infrastructure and social services are not good," "Going with family" and "Other."

Just as economic factors appear to be the main drivers for leaving the place of origin, the destination choice is also strongly linked to job opportunities (Figure 10). Hence, respondents reported high salaries (42.5%) and the high number of job opportunities (38.3%) as the main reasons for choosing Ho Chi Minh City. "Good infrastructure" was also mentioned, as well as "Good conditions to raise children," both designating the desire to live in an environment associated with higher living standards and education opportunities.

Figure 10. ***Reasons for choosing Ho Chi Minh City***
Source: author's construction.

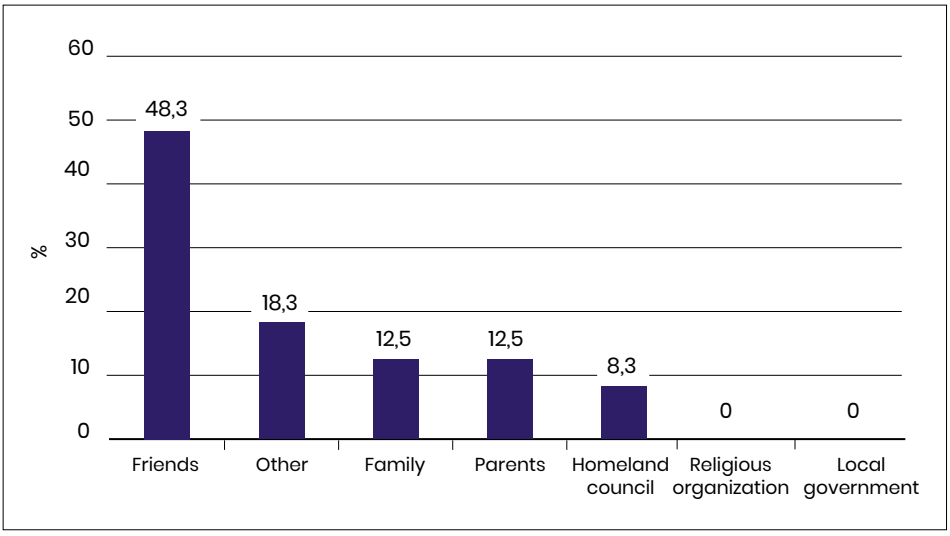


Among the 10 possible answers, 5 were not selected by any participant. These answers are: "Ho Chi Minh City is the closest destination from the location of origin," "Good quality of natural environment," "Easy access to social services," "Government order" and "Other."

Migration is a decision that is most often made at the level of the whole household and it is often a collective move. Only 22.5% of respondents declared that they migrated alone, while more than half (57.5%) declared that they migrated with their spouse, and 10% with their entire family. In addition, some migrants moved with their siblings or parents. It is worth highlighting that of the 14 participants who migrated before age 18, 6 did so alone. This proportion (42.8%) is much higher than for the entire sample. This situation of minors migrating alone is particularly alarming as they might find themselves very vulnerable in the city.

The survey shows that migrants receive help from different people during the migration process (Figure 11). Half are helped by friends (48.3%) and 25% by parents or family. In addition, the "homeland councils," which are associations of people coming from the same village or area and now living in the city, serve as a network for mutual aid among their members. None of the participants reported help from the local government (such as the local People's Committee) or religious organizations.

Figure 11. ***Help received during migration***
Source: author's construction.



Help from a social network is often important to settle into the city at the very beginning: migrants received help mostly to find accommodation (56.6%) and a job (26.5%).[47] Moreover, the main way for them to find housing is through friends (76.7%), and, to a smaller extent, through relatives (13.3%) and people coming from the same hometown (6.7%). Friends help less frequently with finding a job (20%), whereas relatives and those from the same hometown prove themselves to be more helpful (35% and 30.8%). Migrants also use social media for that matter (12.5%). Meanwhile, the large majority have not heard about recruiting agencies (9 out of 10 respondents). In the survey, only 8 migrants reported having received help from these agencies. Finally, the

47. 113 answers were considered for this question, as 7 respondents did not answer.

local government is mentioned by almost all participants as a source of information regarding the administrative procedure, but never as a way to access housing or jobs.

The migrants surveyed have a very similar economic profile. 87% are workers, with 93.3% of those working full-time, mostly under a working contract (35% with a permanent contract, 61% with a fixed-term contract, and only 4% with an oral contract). However, at the national scale, most of the population (both the rural and urban population, including the farming, fishing, and forestry sectors) works without a contract (MoH, 2017). According to an official study from the Vietnamese Ministry of Labour, Invalids and Social Affairs (MOLISA), in 2016 36% of Vietnamese wage earners had a permanent contract, 23% had a fixed-term contract, 33% had an oral contract and 7% had no contract (MOLISA, 2018). In addition, most of the participants from the Oxfam study (54%) earn between 5 and 8 million VND a month. This income level corresponds to the national average income per capita in urban areas, which was 5.6 million VND in 2018 (GSO, 2019). It is worth noting that this number has been multiplied by 3.5 over 10 years, compared to 2008. However, the profile of the migrants surveyed cannot be considered representative of the migrant population in Ho Chi Minh City given the method used to select the participants: they were contacted by canvassing in the alleys of Binh Tan District. Binh Tan District is where many factories are located, and therefore the migrants encountered in this area are likely to work in them. This may explain why the vast majority of participants work under a formal contract. The sample does not include migrants working in the informal sector or those who are unemployed, who may face even greater economic instability.

In the city, the participants share very similar housing conditions. 96.6% rent their housing (*nhà trọ*), and 100% have access to pipe water and private sanitation in the house. Living conditions in the city are partly dependent on the residential status of migrants. As a result of the residential registration policy, migrants are expected to register at the local People's Committee and with the police in order to obtain a temporary status in the new location. There are two categories for such situations: KT3 (long-term temporary permit, between 6 and 12 months renewable) and KT4 (short-term temporary permit, under 6 months). In the survey, 83.3% of respondents hold a KT4 permit, while 12.5% hold a KT3. Among the remaining 4 migrants, 3 had KT1 (full permanent residential registration) and 1 had KT2 (full permanent residential registration, but the household lives in a different sub-district from the one of registration). However, this figure is based on the migrants' own declarations and has not

been verified with the local authorities. Other studies focusing on urban-rural migrations in Vietnam show that migrants sometimes do not hold any registration at all, regardless of how long they have been in the city (Le, Tran and Nguyen, 2011). According to the National Internal Migration Survey of 2015, 12% of the migrants in Ho Chi Minh City at that date were unregistered (GSO and UNFPA, 2016b). In all cases, it is important to note that each status offers a differing number of rights, e.g., access to land property and public job offers, and the ability to enroll children at the local public school with no extra fee. This is an incentive to get registered, but also a structural source of inequality in the access to urban services.

Unregistered migrants cannot access social public services. Only the ones hired by a private employer through a legal contract can benefit from health and social insurance provided by the company. Unregistered migrants working in the informal sector, or whose employers do not respect their contracts, are excluded from health and social insurance coverage and from protection by the Labour Code (Le *et al.*, 2011). And while, as a general rule, households identified as poor by the People's Committee are eligible to free health insurance, without a local registration these households cannot qualify for such insurance in their place of destination, making them particularly vulnerable in case of health issues. In the survey, all participants declared they were covered by health insurance provided by their employers.[48] The working status is critical here: informal workers do not receive such insurance, although they can enroll in voluntary insurance. However, according to data from MOLISA, at the end of 2018 only around 270,000 people out of a total of 34 million workers without social insurance participated in voluntary social insurance—that is around 0.8% (MOLISA, 2018). The results from qualitative analyses show that many migrants are unfamiliar with voluntary social insurance because they think they are ineligible.

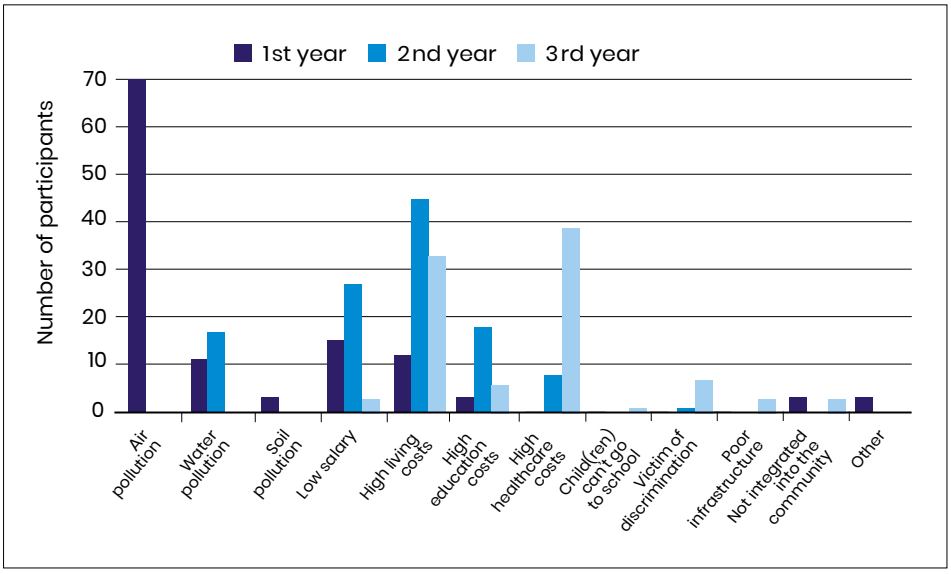
69.1% of participants declare being part of a homeland council, which gathers people living in Ho Chi Minh City who originate from the same village or area. At the same time, only 15.8% of participants report attending local neighbor meetings. These results tend to show a different network of solidarity. Within the city, migrants socialize with other migrants from their area of origin, but few participate in groups with local urban residents.

48. 120 respondents reported having health insurance, but 8 respondents did not provide an explanation regarding how they obtained this insurance.

The survey also aimed to understand the perceived risks in the city. Participants were asked to report the risks they faced during their three first years after migration. They reported a change in risks over time. During the first year, 70.8% reported having suffered from a severe sickness, with this risk almost completely disappearing in the following years. This can be interpreted as a major sign of the negative impact on health from living in the city. The change of environment could explain some of these cases, but the major pollution rate in the city could also be a significant factor. Workplace accidents and job losses are mentioned, as well as conflicts with family or neighbors. The risk of being robbed is mentioned by a significant part of the participants for the second and third years, perhaps in connection with the possession of a higher number of assets as time goes on. 90% consider that they have a safe place to live in the city, while almost all respondents who did not answer this way associate lack of safety with regular incidences of being robbed. These results show that health issues remain the main source of concern and hardship, followed by a feeling of material insecurity.

In addition, participants were asked to report sources of pressure that they faced during the first three years after moving to the city (Figure 12). Pollution is mentioned by a large majority of the participants for the first year. Low salary is a preoccupation for the first and second years but not the third year, which suggests that salaries might increase over the years or that migrants get used to their salary and adjust their expectations. The subject of costs also appears through the costs for living, education, and health. Overall, pollution in the first year, and then money from the second year appear to be the major concerns. It is interesting to note that discrimination and lack of integration with the local community do not seem to be major sources of concern.

Figure 12. ***Sources of pressure during the first three years in Ho Chi Minh City***
Source: author's construction.



Finally, the participants reported positively on their decision to migrate to the city. Almost all of them thought that the decision to leave their village was worth it (92.5%). Most (90%) intended to stay in Ho Chi Minh City over the next five years, showing that the decision to migrate is a long-term one. Interestingly, when asked the question "Do you want to come back to your hometown to live and work?" exactly half of the respondents answered "Yes," and the other half "No." Out of those who answered positively, when being asked when they intended to return to their hometowns, 29.1% selected the answer "When I get old." A fairly common migration pattern seems to apply: migrating to the city while young in order to receive higher salaries and find better job opportunities, and moving back to the countryside in old age.

The survey results presented in this chapter show that the economic factor appears as the main reason for migration, in coherence with previous studies identified in the literature review. Migrants coming from the rural Mekong Delta who are highly affected by environmental perturbations migrate to Ho Chi Minh City seeking job opportunities and income diversification. Because of the methodology used, it is important to keep in mind that this study focuses on migrants working in the industrial sector with working conditions that the migrants surveyed

themselves found decent: with a working contract, health insurance coverage, and average incomes.

However, the results also show that even though they find jobs in Ho Chi Minh City, the migrants surveyed in Binh Tan are often confronted with various forms of precarity and vulnerability. First, the average income does not necessarily translate into good living conditions which, according to the study, are decent but rather basic for migrants. This can be explained by the importance of remittances coupled with the high costs of city living (Le *et al*., 2011). In addition, while almost all migrants surveyed work under a contract, most are under a fixed-term contract, even though their average year of arrival in Ho Chi Minh City is 2010, nine years prior to the survey. The predominance of fixed-term contracts can be source of job insecurity, especially in a period of economic instability such as the COVID-19 pandemic which started one year after the study was conducted. Moreover, the difference in registration status, though it is no longer a major limitation, remains an obstacle in accessing urban services. Finally, the study highlights poor social integration with non-migrant city dwellers, whether voluntary or not.

These preliminary results are coherent with previous studies conducted on the conditions of different populations of rural migrants in Vietnamese cities (Nguyen *et al*., 2012; Le et al 2011; Agergaard *et al*., 2010). Again, vulnerabilities that may occur when arriving in the city may present themselves in a variety of forms including social, economic, legal, and environmental (Adger, 1999, 2006). It seems that formal and informal sectors of employment in the city result in two levels of vulnerability. However, this vulnerability does not impede the wish of most migrants to stay in the city long-term.

2.6.3.2. Environmental risk in the city

Beyond socioeconomic vulnerability, do migrants face specific environmental risks while in the city? Flood exposure is of particular interest, which is one of the main hazards in Ho Chi Minh City, further exacerbated by poor drainage systems (Nguyen *et al*., 2019). Lasage et al (2014) highlighted the risk of flooding in Ho Chi Minh City and the dynamic of the risk according to SLR and economic development. Ho Chi Minh City, like most Asian cities located near coasts and deltas, is facing an accelerating subsidence rate, owing to several factors including natural compaction, ground water exploitation, and the construction of high-rise buildings (Ho, 2008). Therefore, the city is increasingly vulnerable to SLR. In 2011, Storch and Downes (2011) estimated that only 55% of the current area of Ho Chi Minh City

lay more than 1m above MSL, and only 28% more than 2m above MSL. Ho (2008) also noticed a statistically significant increase in heavy rainfall in Ho Chi Minh City over the second half of the twentieth century. In addition to external factors such as heavy rains and SLR intensifying flood impacts, the urbanization process is also a major driver for increased exposure (Storch and Downes, 2011). The city was originally developed on relatively high ground, and has since expanded and densified on low-lying land and former wetland. Impermeabilization of the ground contributes to the occurrence of floods. According to the authors' simulations, in 2011 32% of residential and industrial built-up land would have been exposed to flooding in the event of maximum tide (150cm above MSL). A rise of the MSL by 100cm combined with projected land use plans was expected to flood 60% of the planned total built-up residential and industrial area by 2025. Moreover, the authors stress that in the past, the city's development had not followed land use designations, and the development of spontaneous urbanization was likely to increase exposure. Similarly, Garschagen, Renaud, and Birkmann (2011) developed some potential loop effects that can appear between environmental changes and urbanization fostered by migration in the case of Can Tho, the main city of the Mekong Delta. The city is facing an increase of slow-onset tidal flooding as well as a rising frequency and intensity of heavy rains. Migration from rural areas to the Cai Rang peri-urban area in Can Tho results in uncontrolled development that could lead to intensified flooding in the future (Garschagen *et al*., 2011). The current pattern of urban development, fueled by natural demographic growth and positive migration, which will lead to increased exposure to flood risks in the future. The relationship between environmental risks and migration is two-way: on the one hand, environmental conditions might be a factor influencing the migration decision, and on the other hand, migration may result in human pressure on the environment, potentially intensifying environmental risk.

Economic precarity in a context of high population density and a competitive housing market can potentially push migrants to settle in at-risk areas in Ho Chi Minh City (Nguyen *et al*., 2017). Areas exposed to flood risks may be possible locations for informal settlements for the urban poor, including low-income migrants. In 2010, the Asian Development Bank (ADB) estimated that extreme flooding affected about 43% of the nonpoor population of Ho Chi Minh City and about 47% of the poor[49] (ADB, 2010). According to this study, the poor will be more exposed

49. These data are extrapolated from the inter-ministerial poverty mapping task force data, collected in 2003.

to flooding by 2050 than other urban dwellers, but they may benefit marginally more from the construction of flood control infrastructures. The modeling projections for extreme flooding suggested that, without the implementation of flood control infrastructures, by 2050 about 53% of the nonpoor population and 57% of the poor would be affected. With the planned flood control infrastructure completed, the proportion of the nonpoor at risk would decline by around 15%–38%, and the number of the poor at risk by around 18%–39%. However, the ADB's study refers mostly to the rural poor in Ho Chi Minh City who depend on natural resources for their living. Migrants working in factories may not face the same difficulties. Nevertheless, poor housing quality and substandard hygiene conditions can expose migrants to health risks, which is reinforced in flood prone areas. The adaptation plan of the city also includes resettlement projects in order to protect populations living in risk areas. However, these operations also come at a cost. The disruption of local social networks, the change in living environment, and the lack of adapted job opportunities on resettlement sites can push people into precariousness and toward out-migration (Jullien and Pulliat, 2020; Miller, 2019; Entzinger and Scholten, 2015; Garschagen *et al.*, 2012; Adger, 1999).

2.6.3.3. Negotiating presence in the city

In addition to economic insecurity and potential environmental risk, the situation of migrants in the city is also complexified by their legal status. The residential registration system that remains in place today was established by the socialist government of Vietnam in 1955 in the North, and 1975 in the South. The household registration permit — *hộ khẩu* — was originally designed as an obstacle to rural-urban migration in order to limit urban development. Each Vietnamese household is registered in its original residential location, and the procedure to modify this registration appears to be particularly long, difficult, and costly. However, the official perspective on urban growth has radically switched from negative to positive over the years, especially as cities became the drivers of integration to the global economy from the end of the 1980s onward (Gibert, 2014). This is why two new temporary permits have been created (KT3 and KT4) in order to provide temporary urban dwellers with a legal status. Procedures associated with the *hộ khẩu* have also been slightly softened. As previously mentioned, keeping one's *hộ khẩu* registered in the original residential location does not hamper the ability to get a job in the private sector or from renting a house. According to the 2015 national survey on internal migra-

tion, 91% of unregistered migrants report no difficulties with having a non-updated residential registration. 44% justify not registering because it was "not necessary." In addition, migrants can obtain temporary short-term registrations quite easily by providing their identification card to their landlord, who handles the process on their behalf (GSO and UNFPA, 2016b). Nonetheless, changing one's permanent residential registration from rural to urban, when possible, may come at a cost: it means renouncing land use rights to any rural land owned, a cost not everyone is willing to pay. Farmland is often a source of food or income for the family, as well as a potential financial resource in case of land seizure, a legacy for the children and, more importantly, a guarantee to access loans (Pulliat, 2013). This cost explains the reluctance that some migrants express toward changing their permanent registration, especially if part of the household remains in that rural location.

Meanwhile, an outdated residential registration can be a hindrance to achieving safety, integration, and recognition in the city. In order to obtain a permanent registration in the city, a migrant must be able to testify living in the neighborhood for at least one year,[50] having a regular job, and stable legal housing (Liu and Dang, 2019; Pulliat, 2016). In these conditions, the urban *hộ khẩu* remains out of reach for the majority of poor migrants, preventing them from accessing urban services such as the public education system without an extra fee, public social services, or public loans. There is currently no comprehensive legal framework to protect internal migrants. In Vietnam, an internal migrant is defined as a resident of a specific administrative unit, who lived in a different administrative unit at the commune level 5 years earlier and who was aged 5 years or older at the time of census enumeration (GSO and UNFPA, 2010). Only official residences are taken into account, i.e., registrations which show that the migrant has lived in the city for over 6 months according to the residential registration system, excluding, of course, people who have migrated to the city but are unregistered there (Nguyen and Luu, 2016). This "floating population" (Gubry, Le and Nguyen, 2011) comprises a large proportion of city dwellers, who are intrinsically hard to count. No matter their crucial role in sustaining the growing suburban industries, their presence in the city remains legally and socially in the shadows, tolerated more than accepted. Consequently, they might find themselves

50. According to the National Assembly 81/2006/QH11 Law on Residence of November 29, 2006, Clause 1, Article 20. Previously, the required residence period was three years according to Decree No. 108/2005/ND-CP of August 19, 2005, and originally five years according to Decree No. 51/CP of May 10, 1997.

in situations of legal, social, economic—and sometimes environmental—vulnerability in the city, impeding them from fully accessing urban services and integrating into urban society.

The 2012–2020 Social Welfare Strategy identifies migrant workers as a disadvantaged group that requires support (Marx and Fleischer, 2010). However, national government policies merely aim to reduce spontaneous migration rather than providing substantial support. For example, Decree 190/2003/QD-TTG clearly states that its objective is to limit spontaneous migration.[51] Directive No. 39/2004/CT-TTG of November 12, 2004[52] presents "a number of guidelines and solutions to continue resolving spontaneous migration." This intention is reaffirmed in Governmental Resolution No. 22/NQ-CP of March 1, 2020.[53] However, even though controlling spontaneous migration from rural areas is presented as a priority by the Vietnamese government, its management is shared between various ministries rather than having a single ministry dedicated to this work. The Ministry of Agriculture and Rural Development has a lead part in spontaneous migration management, in cooperation with the Ministry of Planning and Investment and the Ministry of Finance, and is responsible for organized migration (or relocation). The Ministry of Public Security is in charge of residential registrations. According to the specific situation, migration management may also involve a range of different ministries,[54] bringing up the question of efficient coordination. MOLISA does not have policies to tackle the specific risks that spontaneous rural migrants encounter in the city (Le *et al*., 2011). In the Oxfam project, the research team did not find an organization or agency in charge of spontaneous migration in Dong Thap and Ben Tre. Similarly, in Ho Chi Minh City there are no specific support policies for migrants. The policy review process conducted in the project concludes that there is no specific policy for spontaneous migrants.

51 https://luatvietnam.vn/dat-dai/quyet-dinh-190-2003-qd-ttg-thu-tuong-chinh-phu-15455-d1.html.

52. https://luatvietnam.vn/an-ninh-trat-tu/chi-thi-39-2004-ct-ttg-thu-tuong-chinh-phu-16665-d1.html.

53. https://luatvietnam.vn/dat-dai/nghi-quyet-22-nq-cp-on-dinh-dan-cu-tu-do-va-quan-ly-su-dung-dat-tu-nong-lam-truong-181022-d1.html.

54. Namely, the Ministry of Labour, Invalids and Social Affairs, the Ministry of Health, the Ministry of Information and Communication, the Ministry of Education and Training, the Ministry of Transport, the Ministry of Construction, the Ministry of Justice, the Ministry of Natural Resources and Environment, the Ministry of National Defence, and the Committee for Ethnic Minority Affairs and Government Committee for Religious Affairs. See "Chỉ thị 39/2004/CT-TTg của Thủ tướng Chính phủ về một số chủ trương, giải pháp tiếp tục giải quyết tình trạng dân di cư tự do," LuatVietnam, https://luatvietnam.vn/an-ninh-trat-tu/chi-thi-39-2004-ct-ttg-thu-tuong-chinh-phu-16665-d1.html.

2.6.3.4. Rural migrants in the official vision of the city

Policies regarding spontaneous rural-urban migration are linked to both national and regional urban development policies, especially in the case of Ho Chi Minh City. This is the country's most populous city, with the fastest economic growth, and the main target of direct foreign investments (more than 15% of the country's direct foreign investments in 2016; GSO, 2018b). Urban planning exercises aim to strengthen the city's role as an economic leader, and both national and provincial authorities intend to enhance the city's international reputation, following the path of other major global cities to realize the vision of an ideal modern city with the Ho Chi Minh City motto: "civilized, clean and safe" — "*văn minh, sạch đẹp, an toàn*." By "civilized," this motto refers to an urban ideology where the rural legacy tends to disappear — be it rural architecture, farming, or other rural tropes. Of course, rural migrants do not fit this definition. Being excluded from this official vision, they become the victims of various exclusion processes. For instance, many urban dwellers share the idea that rural migrants are responsible for problems such as drug trafficking and prostitution. They also reject rural habits with the argument that they are retrograde. Leaf, reflecting on the "becoming urban" process in Asia, says: "the terminology employed in simply describing something may be consequential in prefiguring our understanding, as particular words will link to specific meanings in established academic discourses and thus shape ongoing theoretical development" (Leaf, 2011, 527). The image of the rural migrant does not fit with the official vision of the city promoted by the government.

The choice to migrate as a response to environmental vulnerability can therefore lead to new forms of vulnerability. The restrictions that remain on the access to urban services generate structural inequalities between migrants and permanent urban residents. The requirement to obtain a long-term residential registration in the city prevents most underprivileged migrants from obtaining it, regardless of the actual time they have spent in the city. While migration is often linked to poverty alleviation, it also generates vulnerabilities related to the precariousness of living conditions in the city.

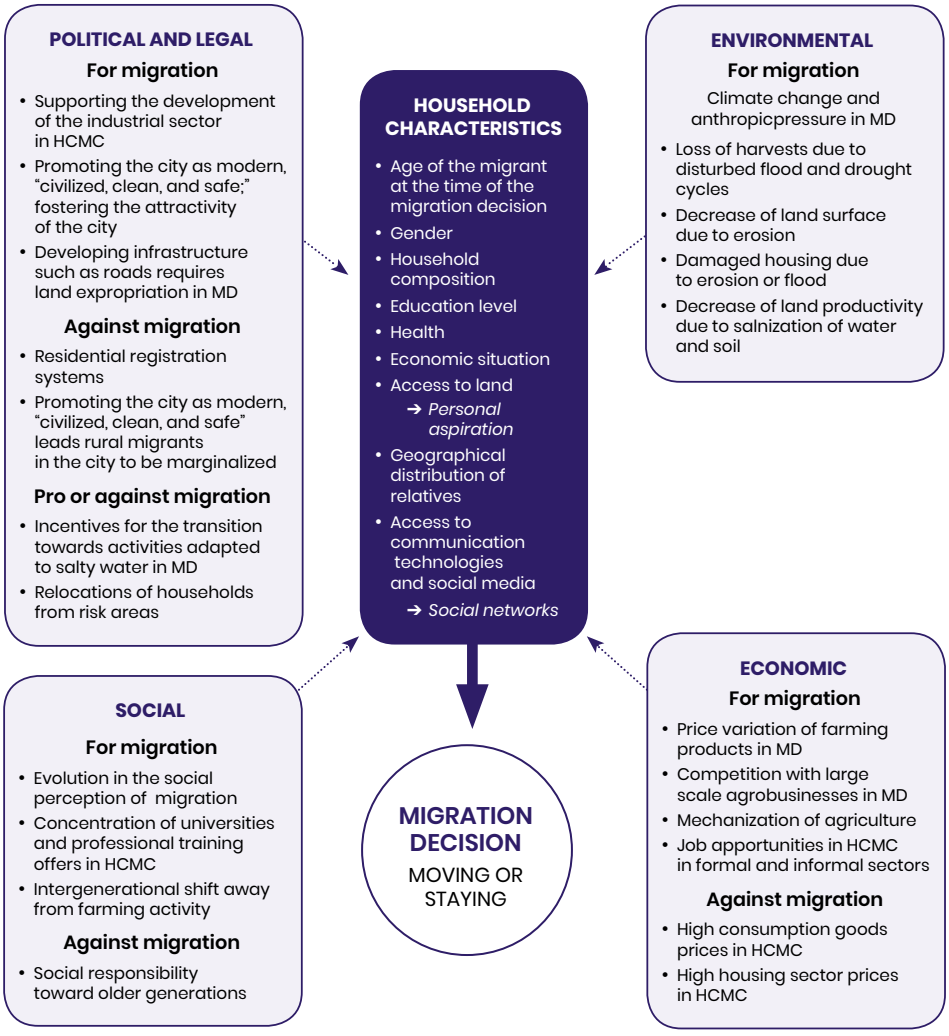
2.6.4. Conclusion

The interactions between the environment and socioeconomic inequalities at play in migration from Vietnam's Mekong Delta to Ho Chi Minh City happen to be particularly complex, constantly changing at the pace of environmental evolutions and economic variations. Our literature review highlighted this changing context, and collated substantial evidence from previous research of the complex relationship between the environment and migration in the Mekong Delta. Research projects focusing on the Delta highlight the ambivalence between environment and economy as one of multiple factors contributing to the decision to migrate. Regardless of climate change or anthropogenic actions in the Delta, the search for a higher and more stable income is the primary reason for migration to city. However, environmental factors may be hidden behind the stated economic factors. The research conducted by Oxfam in 2019 provides valuable insights into migrants' living conditions in Binh Tan District in Ho Chi Minh City, highlighting the precariousness and insecurity they experience through an economic, social, and environmental lens. In addition, complex residential registration procedures and the promotion of the official vision of the modern city converge toward excluding rural migrants in certain ways, who are nevertheless essential to the city's growing economy. Vulnerabilities faced in the departure location and expectations about the arrival location are part of a more complex set of factors that lead to the decision to migrate. Of course, expectations can be challenged by reality after some time in the city. Research shows that migrants face obstacles that make it difficult for them to move from "migrant living conditions" to better living conditions in the city, which generates the prospect of return migration. The multiplicity of factors for and against migration, whether objective or perceived, that together create the decision to become (and remain) a migrant from the Mekong Delta to Ho Chi Minh City is summarized in the graphic below (Diagram 2).[55]

55. This graphic is inspired from the conceptual framework of migration factors from Dina Ionesco, Daria Mokhnacheva and François Gemenne (Ionesco *et al.*, 2016), adapted to the local context of the Mekong Delta and Ho Chi Minh City.

Diagram 2. ***Decision factors affecting contemporary migration from the Mekong Delta (MD) to Ho Chi Minh City (HCMC) in Vietnam***

Source: authors.



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Acronyms and abbreviations

AFD	*Agence française de développement* (French Development Agency)
ANU	Australian National University
ASEAN	Association of Southeast Asian Nations
BAAC	Bank for Agriculture and Agricultural Cooperatives
BRI	Belt and Road Initiative
CCL	*Comité de coopération avec le Laos* (Cooperation Committee with Laos)
CDF	Community Development Fund
CMEC	China-Myanmar Economic Corridor
CNPC SEAP	China National Petroleum Corp. Southeast Asia Pipeline Company Limited
CP	Charoen Pokphand
CWHP	Congress World Hmong People
DGM	Department of Geology and Mines
EFEO	*École française d'Extrême-Orient* (French School of the Far East)
EIA	Environmental Impact Assessment survey
FSPP	Food Security Policy Project
IRD	*Institut de recherche pour le développement* (French National Research Institute for Sustainable Development)
IWRM	Integrated Water Resources Management
GAIL	Gas Authority of India Limited
GDP	Gross domestic product
GISTDA	Geo-Informatics and Space Technology Development Agency
GRAM	Guangdong Rising Assets Management Co., Ltd.
GRET	*Groupe de recherche et d'échange technologique* (Group for Research and Technology Exchanges)
IPCC	Intergovernmental Panel on Climate Change
KOGAS	Korea Gas Corporation
MOLISA	Ministry of Labour, Invalids and Social Affairs
MONRE	Ministry of Natural Resources and Environment
MSL	Mean Sea Level

NGOS	Non-Governmental Organizations
NLD	National League for Democracy
NUG	National Unity Government
OAE	Office of Agricultural Economics
OBOR	One Belt One Road
OECD	Organization for Economic Co-operation and Development
OXFAM	Oxford Committee for Relief Famine
PACFS	National Bureau of Agricultural Commodity and Food Standards
PAR	Participatory Action Research
PBM	Phu Bia Mining
PEO	Population – Exposure – Outcome
PES	Payments for Ecosystem Services
PSMS	Problem Structuring Methods
SAO	Sub-district administrative organisation
SEZ	Special Economic Zone
SLR	Sea Level Rise
UNPO	Unrepresented Nations and Peoples Organization
VFV	Vacant, Fallow, and Virgin Land
WANASEA	Strengthen the Production, Management and Outreach Capacities of Research in the Field of WAter and NAtural Resources in South-East Asia

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Worsening inequality, combined with changing climate and environment, are key challenges for sustainable growth and stability in the Mekong River Basin. The increasingly complex landscape calls for stepping up efforts towards establishing a sound integrated approach to sustainable development across the region. This research compilation constitutes a very valuable multi-dimensional resource for informing the necessary policies in support of a green and just transition in the Mekong region.
Koen Duchateau, First Counsellor, Head of Cooperation, Delegation of the European Union to Vietnam

A just transition in South-East Asia implies considering social and environmental dynamics together. This collective work opens up a new field while at the same time testifying to the vitality of research collaborations between France and the countries of the Mekong region. A reference for all development actors in the region.
Hélène Djoufelkit, Director of the Economic Analysis and Public Policy Department, AFD

The notion of «sustainable development» is complex because it implies, upstream, the development and dissemination of new interdisciplinary knowledge, co-constructed with society. This book is based on a rigorous analysis of existing knowledge and on several case studies that illustrate the complexity of the interdependencies between environmental change and social inequalities. In addition to its lessons, it highlights the dynamism of the collaborations between French research and development actors and their partners in Southeast Asia.
Philippe Charvis, IRD Deputy Director for Science

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