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Living with Floods:
A Case Study of Climate Change Resettlement in the Mekong Delta, Vietnam

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Abstract

In the past two decades, the ecological and humanitarian impacts of the global climate crisis have become increasingly difficult to ignore, including an estimated 20 million people displaced annually due to climate-related factors. While state-managed planned resettlement has been implemented in certain vulnerable communities around the world to deal with this influx of climate-induced mobility, very little literature has been dedicated to understanding the economic and social impacts of this type of intervention on relocated households to date. Through a case study of the Living with Floods (LWF) program in Vietnam, I seek to understand how planned resettlement in the context of climate change differs in design from the harmful and widely studied practice of development-induced displacement and resettlement (DIDR), as well as how LWF impacted wealth and subjective well-being for relocated households in the Mekong Delta. Following an application of the Risks and Reconstruction model, I find that climate resettlement emphasizes the preservation of livelihood and community ties in theory. Quantitative analysis of data from Vietnam's Ministry of Agriculture and Rural Development, however, demonstrates that households experience both a material and social impact following relocation, as the nature and structure of rural economic activities changes significantly, and standards of living improve through expanded access to social services like electricity, education, and clean water. My findings suggest that state-led climate change resettlement can be a critical tool in increasing rural resilience in the face of a rapidly warming climate when adaptation policy is coupled with targeted socioeconomic development goals.

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Introduction

In July of 2021, Zhengzhou, the capital city of China's Henan province, was rocked by record-setting heavy rainfall and flooding, reporting 7.95 inches of rainfall in a single hour alone (NPR, 2021). Over the course of the next fifteen days, extreme flooding went on to destroy an estimated $16.5 billion dollars in infrastructure and ended the lives of 400 individuals (NPR, 2021). Additionally, the destruction of property forced 204,000 people to relocate indefinitely (NPR, 2021). While this region has experienced flooding in the past, scientists warn that the intensity of the Henan floods of 2021 was exacerbated by climate change. Importantly, this shifting reality signals that such catastrophic storms are not an anomaly, but instead the beginning of a new normal where intense natural disasters are not only commonplace, but also increasing in their devastating environmental, social, and economic impact.

International responses to climate change have often prioritized addressing the environmental costs of this global crisis, while never fully reckoning with the humanitarian consequences, such as climate-induced displacement. While the adverse environmental impacts of climate change continue to manifest themselves around the world, the human cost of this catastrophe has also become increasingly difficult to ignore. In 2020 alone, over 30 million people were displaced by natural disasters or weather-related causes (OHCHR, 2022). Most of these so-called 'climate refugees' moved internally, though a smaller percentage of these people traveled across international borders. As noted by the United Nations, regardless of their final destinations, this phenomenon presents significant concern because this category of people is not currently recognized by international frameworks such as the 1951 Refugee Convention. Thus, they are not entitled to protection under international standards, putting them at risk of falling through the cracks entirely (OHCHR, 2022). Additionally, addressing the needs of these people displaced by climate change is a critical human rights issue, as those who are most vulnerable are often

indigenous people, migrants, women, children, and the poor (OHCHR, 2022). As a result, international bodies are beginning to emphasize climate adaptation policy responses that address these issues at the nexus of human rights, mobility, and climate change. Unsurprisingly, such policies have proven incredibly complex because they must consider both the environmental and human costs of climate displacement, and little scholarship has been devoted to understanding the impacts of such interventions to date.

Given the scale of the problem over the past few years, policymakers and scholars have begun to acknowledge that human mobility is an inevitable byproduct of the climate crisis. Despite this reality, there has been no significant momentum within the international community to protect these vulnerable peoples. These limitations have resulted in more experimental approaches in which it has been up to national and local governments to devise and implement adaptation policies related to climate-induced displacement. A problematic aspect of requiring local and national governments to develop these policies is that climate change is disproportionately impacting those countries that have the fewest resources to devote to climate change adaptation, placing a further burden on these governments and communities. Additionally, given the time-sensitive nature of climate change, these policy responses have often been executed on an expedited timeline and may not have been based on extensive consultation with other stakeholders, such as community members themselves. In essence, several potentially successful policies have been implemented across the world in vulnerable areas, but have been thwarted by the time and financial constraints placed on these governments.

Given that planned resettlement in the context of climate change is a relatively new phenomenon, to date very little research exists examining the impact of such a policy intervention on relocated households. Therefore, this paper seeks to contribute to the existing literature to

understand (1) how proactive, state-managed climate resettlement differs from the extensively studied development-induced displacement and resettlement (DIDR) model; and (2) how the Living with Floods program impacts wealth and subjective well-being for relocated households in the Mekong River Delta. First, through an application of Michael Cernea's Risks and Reconstruction framework, I find that the policy design of the Living with Floods in theory mitigates many of the risks associated with resettlement, primarily by creating limits on the distance over which the relocation can occur and preserving connections to original sources of livelihood and income. Quantitative analysis of data from the national Census and the Vietnamese Ministry of Agriculture and Rural Development (MARD), however, underscores that there is a significant material and social impact following the implementation of the Living with Floods policy in practice. In particular, this analysis reveals that resettlement results in a change in the nature and structure of rural employment, including a decrease in the number of households participating in agricultural activities. At the same time, LWF also tends to expand access to public services like electricity, education, clean water and sanitation, suggesting that relocation is associated with improved living conditions. While state-led resettlement has often been the source of impoverishment and community fragmentation, I argue that the Living with Floods program demonstrates that when resettlement is coupled with socioeconomic development aims, relocation can help communities increase their resilience to climate change and improve their living standards, while maintaining income and cultural connections.

Background

This paper examines one such type of policy response to climate displacement: planned resettlement. While state-led resettlement efforts are not novel, they traditionally have been implemented to aid in economic development schemes, rather than in the context of climate

change. Given that much of the climate-induced population displacement currently occurring is spontaneous and uncontrolled, policymakers fear a potential vicious cycle in which climate migrants exacerbate environmental concerns in their new host communities, leading to even more climate-related displacement on a larger scale. Most climate migrants are using established population channels to move from rural areas to urban areas, which themselves are also vulnerable to climate change and on the verge of overcapacity (OHCHR, 2022). Therefore, the historical planned resettlement model may provide a potential framework for policymakers to apply to this contemporary climate crisis in order to avoid exacerbating existing vulnerabilities in both the origin and host communities, as well as to help preserve economic and social well-being for climate migrants.

Though it has been widely accepted in the international community that climate change will inevitably lead to increased population displacement, many still view this influx of migration as simply another catastrophic consequence of the climate crisis. The repercussions and potential policy solutions of climate-induced migration have not been researched extensively, though initial research suggests that policymakers may be overlooking the potential adaptation advantages of this phenomenon. This paper seeks to understand how planned resettlement in the context of climate change affects wealth and subjective well-being for relocated households through an examination of a case study from the Mekong River Delta of Vietnam. In better understanding the economic and social impact of planned resettlement programs in climate-vulnerable regions, policymakers may be able to transform this potential humanitarian crisis into a critical climate adaptation strategy.

The Mekong River Delta

The Mekong River Delta (MRD) region spans over 15,000 square miles of southwest Vietnam, centered around the transboundary Mekong River and bordering Cambodia to the north and the South China Sea to the south. This region is home to over 20% of Vietnam's population, most of whom live in rural, agricultural villages (Delta Alliance, 2020). The Mekong River provides irrigation and helps deposit silt throughout the delta region, resulting in fertile wetlands that are an ideal environment for rice cultivation and other agricultural production such as fruit and aquaculture. The region is a critical source of economic and food security, as it is responsible for 46% of total food production and one third of Vietnam's GDP (Delta Alliance, 2020).

Today, the 'Rice Bowl of Vietnam' is under increasingly significant threats from a changing climate, with more frequent and intense flooding being of particular concern. A 2004 study found that between 2,300 and 8,800 square miles of the total 15,500 square mile area was vulnerable to flooding as a result of sea-level rise (Wassmann et al., 2004). As a result, an estimated 10 million residents of the MRD are at risk of seasonal inundation between July and December each year. Additionally, saltwater intrusion and coastal erosion generated by sea-level rise is altering the composition of the soil, greatly impacting potential future agricultural production and yield, and therefore livelihoods as well. This severity of climate-induced threats in the Mekong Delta has significantly altered the socioeconomic development of the region, and more importantly, the viability of continued settlement, thus inducing and requiring government intervention.

Living with Floods Program

Given the region's unique relationship to floods, the Vietnamese government recognized that "flood management in the Mekong Delta requires effectively controlling excessive floodwater

without compromising benefits and other development objectives" (Hoang et al., 2018, 635). Earlier structural adaptation measures like dykes and flood walls were deemed insufficient to fully address this region's vulnerability in the long-term, as well as in ensuring the preservation of livelihood and well-being (World Bank, 2021). As a result, the Vietnamese Central Government and local officials adopted an approach that seeks to 'live with floods.' Such frameworks emphasized that rather than prioritizing increased investment into modern flood control technologies like dykes and embankments, successful policy interventions needed to be responsive to the particular social and economic vulnerabilities of the region, namely the fact that the population relies on annual flooding to earn an income and grow valuable agricultural products.

Following record-breaking flooding that claimed the lives of 480 individuals in 2000, the Vietnamese Central Government formally introduced the Living with Floods program (LWF) into their national natural disaster mitigation policy (Reuters, 2011). The goal of this framework was to reduce the scale of destruction of these natural disasters, while still recognizing that a majority of the population is reliant on floods for their economic and social well-being. For the first time, a national natural disaster mitigation plan specifically addressed the need for planned resettlement in the context of climate change, stating:

> Population redistribution and rearrangement constitute an objective as well as a solution for economic, cultural and social development, security and defense protection and eco-environmental protection. Population should be distributed in concentrated and selected areas, in parallel with the stabilization and development of production and living conditions, of which production development shall be considered the most important factor. The living conditions in new places should be better than those in old places. (Decision 193/2006/GD-TTg)

Coupled with this aim was a provision requiring that the relocation only occur over short distances and should prioritize households from Poor and Near-Poor income tiers. While the policy was promulgated at the national level, given Vietnam's decentralized system, the implementation of this relocation scheme was left up to the local authorities.

The LWF policy centered around the construction of resettlement clusters for regions with deep flooding. Resettlement clusters are required to be at least 0.5 meters above the 2000 flood level, and include new public infrastructure such as schools, roads, and clinics. Additionally, households residing in the permanently flooded areas would receive preferential loans for buying houses in the resettlement clusters. Taken together, the LWF policies were intended to promulgate both mitigation and adaptation measures for climate-induced flooding in the MRD.

Between 1996 and 2011, the Vietnamese government built over 1,000 settlement clusters for households previously living in now permanently flooded regions (Danh and Shabaz, 2011). Three levels of stakeholders are involved with the implementation of the resettlement clusters, including the provincial authority, the district authority, and the commune's people committee. The provincial authority is responsible for directing the district authority to begin implementing the policy, and it also receives funds from the central government to carry out the construction. Then, it is up to the district authorities to survey the land and engage in site selection for the resettlement clusters. Lastly, the commune's people's committee monitors selection of land and manages the allocation of plots of lands to households. Following the establishment of the resettlement cluster, a new administrative body is formed and falls under the purview of the commune leadership. In principle, the LWF planned resettlement policy takes into consideration the insight of the vulnerable communities themselves, while also introducing regional oversight. Therefore, the Living with Floods program is an adaptive response to climate change that centers around planned resettlement, while also including poverty reduction aims as well.

Literature Review

Climate change is often framed as a global crisis, but its impacts are highly localized and not evenly distributed across societies or nations. Many of the risks and costs associated with the planet's warming have fallen disproportionately on those who have contributed very little to the problem (Füssel, 2010). Additionally, climate change's worst impacts are concentrated in nations who lack the adaptive capacity to respond to these pressing issues, namely Southeast Asia and the Pacific Island nations (UNHCR, 2016). Given these realities, international policy responses to climate change must take social vulnerability and resilience into account in order to avoid exacerbating these inequities.

One well-documented consequence of climate change is increased population displacement, nationally and across international borders. The United Nations High Commissioner for Refugees estimates that since 2008, an average of 21.5 million people are displaced per year as a result of weather-related stressors, such as high temperatures, floods, and wildfires (UNHCR, 2016). Thousands more flee due to long-term environmental stressors such as sea-level rise and coastal erosion (UNHCR, 2016). Equitable and proactive adaptation policy solutions are needed to address the issues at the intersection of climate change, human mobility, and social justice. One such highly debated solution that has been proposed by policymakers and scholars is planned resettlement.

Defining Vulnerability and Resilience to Climate Change

Due to the unequal distribution of the impacts of climate change and the social injustices exacerbated by historical resettlement schemes, scholars have put forth several frameworks for addressing this very sensitive challenge. Previous research has centered on the theoretical concepts of distributive and procedural justice frameworks in order to illustrate what just resettlement should look like (Otsuki, 2021; Lake, 2017; Paavola and Adger, 2006). Fair adaptation to climate

change centers around "principles of avoiding dangerous climate change, forward-looking responsibility, putting the most vulnerable first and equal participation of all" (Paavola and Adger, 2006, 602). Additional scholarship echoes these principles in an approach termed 'just resilience,' in which scholars further contend that "a concern with the distribution of climate change impacts is insufficient; a consideration of the extent to which responses to climate risks are community-driven and people's knowledge and experience of multiple risks are recognized in responses to climate risks are also critical to achieving justice" (Miller, 2020, 1575). Under this approach, particular attention is placed on social and cultural ties to place during the resettlement planning process.

History of Planned Resettlement

The practice of planned resettlement has a fraught history across the world, as it generally involves forcibly moving people in order to achieve state development goals at the expense of their well-being (Terminski, 2013). Much of the scholarship surrounding resettlement has focused on so-called development-induced displacement and resettlement (DIDR) (Terminski, 2013). Some common reasons for DIDR resettlement include moving people to build large-scale infrastructure such as dams, to extract natural resources, or to encourage tourism (Cernea, 1997). In practice, it subjugates the rights of 'dispensable' people in order for states to carry out social engineering projects and usher in economic development, though these objectives largely fail (Scudder, 1973). Given this history, scholars debate over the merit of planned resettlement as a policy response, especially as these models have often been used by the state to exert power over indigenous populations and exploit their lands, under the guise of protecting these 'vulnerable' communities (Miller, 2020).

Additionally, scholarship has generally agreed that resettlement leads to negative economic and social outcomes for those displaced. Specifically, Cernea identified the greatest risks associated with resettlement as impoverishment and social disruption (Cernea, 1997). In several development-induced displacement and resettlement schemes, communities experienced impoverishment as a result of the move (Terminski, 2013). Additionally, people often cited feelings of a loss of connection to their origin community and culture, even if they moved internally (Miller, 2020). The mechanisms behind these negative outcomes are well-documented and include a lack of job opportunities and vocational training, community cohesion, and productive assets (Miller, 2020).

Planned Resettlement in the Context of Climate Change

As the impacts of climate change continue to influence human mobility patterns, policymakers and scholars have begun to think about planned resettlement as an adaptive response to climate change. Currently, planned resettlement in the context of climate change is generally voluntary and on a small scale, so few case studies exist to analyze the design and methods of such a policy.

As planned resettlement for climate-vulnerable communities is becoming increasingly relevant, scholars have begun to search for lessons from the extensive body of DIDR literature to apply to this contemporary challenge (Wilmsen and Weber, 2015; Arnall, 2018). There are certainly similarities between the more traditional DIDR model and climate-induced resettlement, including that they influence livelihoods, are the result of human actions, and tend to affect people who are the least powerful in society (Wilmsen and Webber, 2015). Despite some features of DIDR being applicable to climate-induced resettlement policy, however, scholars find that the latter requires additional considerations, namely determining the availability of suitable land and

factoring in lead time (Ferris, 2011). Additionally, scholars also note that climate change mitigation policies such as dam projects and wind farms have the potential to lead to increased forced resettlement, further complicating the relationship between climate change responses and human mobility (de Sherbinin et al., 2011). Therefore, more attention must be given to studying the relationship between climate change, human mobility, and livelihood outcomes to understand the efficacy of planned resettlement in the specific context of climate change.

Another proposed framework exemplified by both Alaskan native communities and in Louisiana is community-based adaptation (Bronen and Chapin, 2013; GAO, 2021). In this policy model, the government and communities mutually determined that relocation was the only possible solution to safeguard these settlements from life-threatening climate-induced hazards. Additionally, other particularly successful factors of community-based adaptation include displaced communities selecting their relocation site, documentation of climate-induced changes early on to assess risk and hazards, and approving sites that are true to biophysical and cultural integrity. While resettlement is typically a top-down, state-led effort, these case studies suggest that a response grounded in the input of affected communities produces very positive results.

Resettlement in Vietnam

Vietnam, and in particular the Mekong Delta Region, provides an interesting backdrop to understand the implications of proactive climate-induced planned resettlement. For one, it is one of the regions of the world anticipated to be most affected by climate change. The local impacts of climate change comprise long-term stressors, such as sea-level rise and coastal erosion, and short-term stressors like flooding and increased frequency of natural disasters (Koubi et al., 2016). Scientific reports have found that "more than 1 million people in the [Mekong Delta] are predicted

to be directly affected by increased coastal erosion and land loss by 2050, with potential permanent inundation shifting inland by 25 to 50 km" (Entzinger and Scholten, 2015). The population in the Mekong Delta are highly reliant on the agricultural sector, specifically rice, fruit, and aquaculture, as their source of livelihood (Entzinger and Scholten, 2015). Therefore, climate effects like salt-water intrusion will have significant consequences for the local populations, as it will decrease agricultural output and therefore income. Given this particular set of vulnerabilities, the Vietnamese government, in consultation with several international development agencies, has already orchestrated several planned resettlement schemes in the region, including the Living with Floods program.

While still limited, previous research in the region has primarily relied on field work, ethnographic observations, and interviews with displaced people (Entzinger and Scholten, 2015; Koubi et al., 2016; Collins et al., 2017). In this way, the existing body of research emphasizes the social impact experienced by resettled people in their new communities, as well as barriers they face in their host communities. A common finding is that displaced people are primarily concerned about income preservation (Entzinger & Scholten, 2015). Additionally, most of this research was conducted a decade ago, but the impacts of climate change have significantly worsened since then. There is also a clear gap in the quantitative analysis, such as changes in economic activity and access to public services before and after resettlement. This knowledge is necessary to complement the subjective findings from past work in order to understand whether proactive resettlement can be an effective and just climate adaptation strategy.

Proactive and equitable public policy responses are needed urgently to address the issues at the nexus between climate change and human mobility. While scholars have generally criticized development-induced displacement and resettlement as a public policy response on social grounds,

analysis of contemporary resettlement schemes in the context of climate change have produced more divergence in opinions. Regardless, scholars all agree that climate-induced resettlement must be carried out with careful attention to community and cultural bonds, in order to avoid worsening livelihoods for those displaced.

Methodology

In order to answer both parts of the research question, this paper first draws on a theoretical analysis of the Living with Floods program using the Risks and Reconstruction model developed in the field of DIDR study to understand how proactive climate change resettlement differs from the more traditional approach. Next, a look at quantitative data from the national Census and Ministry of Agriculture and Rural Development underscores the impact of the Living with Floods Program on wealth and subjective well-being of relocated households in the Mekong River Delta in practice.

First, this paper applies Michael Cernea's Risks and Reconstruction Model to the Living with Floods program (Cernea, 1994). Developed from a synthesis of dozens of DIDR case studies, Cernea identifies eight common risk areas that arise following a resettlement event. Applying this common model from DIDR scholarship underscores how climate resettlement policy can learn from the lessons of the past to hopefully reduce harm to relocated households. Additionally, he notes that this theoretical framework is a very valuable tool for ex-post evaluation research were "findings from various independent sites can be easily compared for revealing best practices and crafting, possibly, alternative strategies" for future DIDR policies (Cernea, 1997, 1583). Additionally, it can help to identify gaps between the policy in theory and in practice, which is the second use for this theoretical approach.

Next, my study also draws on quantitative data to understand the impact of planned resettlement in the context of climate change on wealth and living conditions. Looking at outcome variables from seven resettled communes, one can begin to understand how this relocation process impacted livelihood, income, and agricultural production. The particular set of outcome variables includes poverty rate, income source, production of certain agricultural crops, the number of buffaloes, farms, and primary schools, and access to clean water, electricity, and sanitation services. These variables are selected based on a similar study conducted in a relocated community in Brazil (Randell, 2016). In this case study, the author argued that this selection of variables was the most comprehensive measure of wealth. This data was publicly available online from the Vietnam's General Statistics Office websites and was used to supplement the more qualitative understanding of the Living with Floods Program gathered through the interviews of past fieldwork in the region.

The Mekong Delta Region of Vietnam was selected to be the site of this case study given its particular vulnerability to both short-term and long-term climate and environmental stressors. Specifically, this region has experienced more intense flooding and coastal erosion over the past decades. Additionally, the government of Vietnam is one of the few nations that has already implemented a national-level climate resettlement policy, the Living with Floods Program. Therefore, the region provides an opportunity to analyze and evaluate an existing model of climate-induced resettlement, in the face of significant threats.

Originally, this analysis was going to include qualitative data from interviews and households surveys conducted with resettled households in the Mekong Delta. While I originally contacted experts by email about how to proceed, contacts said that given the language barrier and lack of access to stable Internet, as well as the political sensitivity of the policy, it would not be

feasible to conduct an adequate number of interviews for this research project. The quantitative section of this research seeks to replace the findings of household surveys, which have been used as the typical instruments for resettlement studies in the region, by looking at the data in the ten-year span following the relocation. Therefore, by conducting a quantitative analysis, this study is contributing to the literature by providing an alternative means of evaluating planned resettlement based on more objective outcomes.

Findings and Analysis

The Risks and Reconstruction Model: A Diagnostic Tool for the LWF Program

By engaging in an examination of the Living with Floods policy through the theoretical lens of the Risks and Reconstruction Model, there appears to be a more deliberate centering of livelihood and community preservation in this policy intervention, in contrast to the historical practice of development-induced displacement and resettlement. This theoretical analysis of LWF can provide a baseline for understanding the ways in which climate-induced displacement and resettlement differs from DIDR, both in design and ideally, in outcome.

Cernea's model argues that at the core of all state-managed displacement and resettlement is economic and social upheaval, which manifests itself through eight different risk areas: (1) landlessness, (2) joblessness, (3) homelessness, (4) marginalization; (5) food insecurity, (6) loss of access to common property resources, (7) increased morbidity, and (8) community disarticulation (Cernea, 1997). While not every instance of resettlement will result in all eight of these risks, even the presence of a subset can lead to significant economic and cultural loss. In his work, he urges that subsequent resettlement policies consider this model as a diagnostic tool to

ensure that the resettlement plans are appropriately mitigating these common risks and providing communities with adequate time to prepare.

In the biggest departure from the historical DIDR policy schema, the LWF program mandates that resettled populations must be relocated within rural commune boundaries, the smallest administrative unit below the district level. In particular, the policy states that:

> Population distribution shall be conducted *mainly within communes*, *districts and provinces*. Where population should be relocated to other provinces, agreement should be reached between provinces where people leave and those where they move to in order to arrange them in the planned areas so as to *stabilize their life and production for permanent settlement*. (Decision 193/2006/QD-TTg)

Maintaining the geographic proximity to the community of origin can help to diminish the risk of landlessness, joblessness, loss of access to common property resources, and community disarticulation. Given that households generally remain in or adjacent to their hometowns following the resettlement, they can still access their land (Chun, 2015). For households who rely on agricultural production, this proximity also allows them to maintain their original source of livelihood. Because many of the households being resettled are involved in agricultural production as their primary source of income, this policy permits them to maintain a similar level of income without much additional government support before and after relocation. Therefore, both the risks of landlessness and joblessness are diminished to a significant degree by virtue of the limits on the distance over which the relocation can occur.

With regards to the risk of homelessness, the Vietnamese government is responsible for the construction of permanent housing in the resettlement clusters. All resettled families are guaranteed to have access to a newly built permanent house. In addition, resettlement clusters are

required to be connected to basic infrastructure services, like a modern toilet in each home, running water, and electricity, with the goal being that:

> Population should be distributed in concentrated and selected areas, in parallel with the stabilization and development of production and living conditions, of which production development shall be considered the most important factor. *The living conditions in new places should be better than those in old places.* (Decision 193/2006/QD-TTg)

In fact, it may be largely this promise of permanent housing that motivates households to move, rather than any fear for their imminent safety as a result of flooding or the impacts of climate change (Chun, 2015). This reality is due to the fact that the LWF targets the poorest households, which typically lack permanent shelter and may even be homeless prior to this state-managed relocation. Consequently, the risk of homelessness from resettlement is eliminated entirely in the LWF model for those who elect to relocate. In practice, however, a qualitative survey from one community found that only 48% of the identified households decided to go through with the move with the remainder choosing to live in temporary housing, because many believed they could not pay off the loans within ten years, signaling one of the biggest shortcomings of this policy (Chun, 2015).

The risk of marginalization takes on both an economic and social angle, as those who have been forcibly displaced may experience "a drop in social status [and] in confidence in society and self" (Cernea, 1997, 1547). In theory, the LWF policy provides households with some agency given that the resettlement is intended to be wholly voluntary. While local officials identify potentially vulnerable households, it is ultimately up to the individuals themselves to decide if they want to go through with the move, thought there are still significant financial barriers.

Additionally, households vote using a ballot system to identify the location of their new resettlement cluster site, suggesting they have, in theory, some opportunity to voice their opinions during this relocation process.

Food insecurity is not explicitly addressed anywhere in the LWF policy. Cernea claims that "forced uprooting increases the risk that people will fall into chronic undernourishment" (Cernea, 1997, 1575). In particular, this risk occurs when households lose access to their crops and a reliable source of food. Given that this policy is designed in a way to preserve proximity to original crops, food insecurity does not appear to present significant risks to resettled populations. Similarly, relocation over short distances allows households to maintain access to common property, such as bodies of water, grazing lands, and burial sites (Cernea, 1997, 1575). As Cernea mentions, these types of assets either will not or simply cannot be compensated or recreated by governments, as they often do not take on a monetary value.

Lastly, mitigating the risk of social disarticulation seems to be at the heart of the LWF program design. Cernea writes that "the unraveling of spatially-based patterns of self-organization, interaction, and reciprocity is a net loss of valuable 'social capital,' that compounds the loss of natural and man-made capital" (Cernea, 1997, 1575). The risks of community fragmentation are great with any state-managed resettlement policy, but the LWF program resettles families within their hometowns or home communes, which often have a distinct cultural identity. As a result, the policy aims to maintain a sense of cultural connection even within their resettlement cluster. Additionally, social ties are in a way recreated with the resettlement clusters, as households are typically moving together as a larger unit, rather than on a household-by-household basis. Of course, the risk of social disarticulation exists even despite these best measures, given the impossibility of recreating the character and culture of a community that is so often tied to place.

In historical DIDR policies, none of these eight impoverishment risk areas are acknowledged in the policy design phase and planning methodologies, often by design, suggesting that these harms are not inevitable, but rather a product of negligence and inaction on the part of policymakers. Using the Risks and Reconstruction model presented by Cernea as a first diagnostic assessment of the LWF policy, it appears that many of the impoverishment risks were either explicitly mitigated or were diminished by virtue of other social justice considerations. Regardless of how well-intentioned a policy is designed, the most significant risks occur during the implementation phase. Therefore, further analysis is necessary to assess the Living with Floods Program and evaluate its impact on wealth and subjective well-being in practice.

A theoretical analysis of the Living with Floods program suggests that it eliminates many of the negative outcomes associated with development-induced displacement and resettlement. In order to understand the impact of LWF in practice, quantitative data gathered from Vietnam's General Statistics Office, including information about employment and income and social conditions, is analyzed to better understand this impact of planned resettlement on the economic and social well-being of relocated households in the Mekong River Delta region.

Restructuring of the Rural Economy

In practice, the implementation of the Living with Floods program appears to restructure the nature and structure of rural employment for households in the Mekong Delta following their relocation. Historically, the population living in this region has relied on agricultural activities as their primary source of livelihood and income, and in particular, rice paddy planting and cultivation. In the decade following the implementation of the Living with Floods program from 2001 to 2011, there has been a general decline in the number of households whose primary source of income is from agricultural activities in the whole of the Mekong Delta Region, though this

shift is primarily reflected in the resettled communities (Chun, 2015). According to the national Census, the proportion of households with a primary source of income from the agricultural and forestry sector decreased from 79.23% in 2001 to 71.81% in 2006 to 62.17% in 2011 (Figure 1). During the same time frame, the number of households with a main source of income from the services and industry sectors increased, implying that employment levels remained relatively steady. Additionally, the proportion of relocated households living below the national poverty rate decreased steadily between 2006 and 2012 (Figure 2) and average monthly income at the regional level increased (Figure 3), suggesting that while employment and income levels improved or remained the same, there were changes in the nature of employment following resettlement.

This restructuring of the rural economy is also reflected in the decrease in the number of farms in the resettlement communities of interest in the decade following relocation, with a steady decline immediately after relocation, followed by a sharp drop-off in 2010. Between 2001 and 2011, the number of farms decreased by 93.7% and 92% in two of the biggest areas of the study, though the decrease was less significant in the other five communities (Figure 4). An earlier qualitative study of a resettlement cluster in the same region stated that resettlement had encouraged many households to sell their farmland in order to pay off their loans within the ten years, which may explain the sudden decrease in operating farms in 2010 (IDM). Additionally, earlier research found that even a small increase in their commute to work after relocation discouraged them from continuing to operate their farm (IDM). This decrease in the number of farms may also be attributed to climate change adverse impacts on agricultural production in the region. Between 2001 and 2011, the average area of paddy planted has remained steady after decades of sustained growth, due a loss of agricultural productivity as a result of saltwater intrusion which threatens rice crops (Figure 5). These shifts reflect how in addition to a changing climate

which is decreasing agricultural productivity, planned resettlement, even over short distances, has resulted in households selling their farms.

Additionally, after relocation, there was a decline in the number of households raising livestock, which is considered another major agricultural activity and income source after rice production for the region. In four of the seven cases, the number of water buffaloes decreased between 2001 and 2011, suggesting a decrease in households participating in raising livestock (Figure 6). The Living with Floods program explicitly bans the presence of livestock, including buffaloes and cattle, in the new resettlement clusters, requiring households to eliminate this livelihood practice if they want to move into more permanent and safer housing. Like the selling of agricultural lands due to needing to pay off their loans and a greater commute distance, the prohibition of livestock in resettlement clusters has resulted in a further restructuring of income and economic activity away from agriculture following planned resettlement.

Within the agricultural sector in the Mekong Delta Region, there has been a greater shift towards aquaculture for households in the decade following the implementation of the LWF. This shift may be due to the fact that households are selling their croplands, but also it could be because there has been a push for Mekong Delta farmers to pursue a more sustainable source of livelihood within the agricultural sector than rice and livestock raising (United Nations, 2014). In all seven communes, the number of fish produced from aquaculture increased significantly, with the largest being a 954.7% increase in fish production (Figure 7). Development agencies have argued that this emphasis on aquaculture is the result of working with local resettled Mekong Delta farmers and equipping them with a livelihood that is equally profitable as other agricultural activities, but that is more resilient to climate stresses including sea level rise and saltwater intrusion.

While the Vietnam General Statistics Office does not collect data about debt in the five-year census, other qualitative studies from the same resettlement clusters demonstrate that a significant proportion of residents experience rising debt after their relocation. While acknowledging that their income does not change significantly and in the majority of cases actually increased steadily following their move, participants did express significant concern over the consequences of taking out loans to cover the move and their fear of having to pay it back within six to ten years (Chun, 2015).

From this data from the Census and the Ministry of Agriculture and Rural Development, it is evident that while on the surface level, the poverty rate decreases and employment levels for resettled households do not change substantially, the nature and structure of rural employment does. Further qualitative information from interviews with relocated households is needed to understand these trends, though it appears that resettlement encourages households to sell their farms and their livestock, which is a significant departure from the cultural identity and historical source of livelihood for the Mekong Delta population.

Expanded Access to Social Services

In addition to planned resettlement changing the nature and structure of employment for relocated households, another finding from the MARD data is that planned resettlement generally improves objective living conditions, including access to basic public services like electricity, education, and clean water and sanitation services. These findings can be attributed to the fact that while the Living with Floods program is primarily a climate adaptation strategy, it does have a socioeconomic development component as well.

In 2000, when the LWF was formally introduced into Vietnam's natural disaster mitigation plan, rural communities in the country still lacked access to many basic services and were living

significantly under the global poverty level (United Nations, 2014). While living standards have increased in the Mekong Delta River as a whole, these improvements are particularly pronounced in communes where resettlement occurred. As required by the Living with Floods building guidelines, resettlement clusters are intended to also promote socioeconomic development for rural communities, especially in terms of expanded access to public services. In all seven cases of resettlement examined, the proportion of households with access to electricity reached near universal levels. In the most dramatic example, in 2002 only 47.5% of households in the community had access, with the number reaching 95% by 2012 (Figure 8).

Additionally, access to all levels of education expanded following relocation to resettlement clusters as more schools were able to be built from new investment into the region. At the commune level, the total number of primary and secondary schools increased between 10.6% to 75.5%, with around four new primary schools being built each year (Figure 9). In a household survey aimed to understand the proportion of school-aged children attending kindergarten, the report found that in two of the resettlement clusters, the number of children attending kindergarten rose dramatically as a result of relocation, with the percentage increasing from 46% to 96% in one village, and 67% to 94% in another. In 2011, a decade after the implementation of LWF, 99.5% of communes had a primary school and 92.9% had a lower secondary school, suggesting vast improvements to access to education in rural communities after state-led resettlement.

Lastly, access to clean water and sanitation services is higher following relocation, though the data has been contested in other qualitative projects and access to this service still needs to be vastly improved. In 2011, 81.1% of resettled households had access to clean water and 53.3% had access to a toilet, up from 35.2% in 2008. While this data suggests expanded access to these basic

human rights as these services are mandated by law to be included for each government-built house in the resettlement cluster, interviews with relocated households from previous research suggest that implementation has been lacking in many cases. In a few instances, households report actually losing access to these services after their move.

From this analysis, it appears households who move into resettlement clusters generally see an increase in access to electricity, education, and clean water and sanitation, due to the fact that Living with Floods is both a climate adaptation strategy, as well as a policy meant to promote socioeconomic development. The quantitative data of this research may be obscuring the situation in practice, as some earlier studies have described how these services are not actually in place when families move, presenting an area for further research.

Limitations and Future Research

This study of the impact of the Living with Floods program on the material and subjective well-being of relocated households in the Mekong Delta builds on existing studies by providing a quantitative analysis to complement the qualitative findings from interviews in this field of study. While the impacts of climate resettlement in general are not yet well understood, the limited research that has been conducted has primarily concentrated on understanding the social impacts of planned resettlement, such as understanding the emotional and psychological consequences of relocation. While this perspective is critical, some researchers have expressed concern that privileging this type of qualitative, interview-based research may overemphasize planned resettlement's negative outcomes, and subsequently reduce the ability for planned resettlement to be an effective and necessary climate adaptation strategy going forward (Cernea, 1997).

There are also several areas to expand this research on the impact of the Living with Floods program further. Firstly, it is important to understand the social impact of this policy on relocated

households. Given the time and language constraints, it was not possible in this initial stage of research to contact relocated households and interview them about the social impact of the relocation. While the quantitative findings suggest that the Living with Floods program did not have a significant impact on income and expanded access to public services, this first-hand perspective from relocated households could provide further insight about communities ties and cultural identity that are critical to understanding resettlement policy more generally. Future research on Living with Floods, and climate change resettlement, should ideally use a mixed-methods approach to understand both the material and social impacts of relocation to gain a more holistic understanding of resettlement in the context of climate change.

Policy Recommendations

The most recent IPCC reports indicate that there will be a growing number of regions around the world that will become uninhabitable in the next decades due to both slow and rapid onset climate factors. As a result, it is also likely that more and more governments will want to introduce planned resettlement schemes like the Living with Floods program into their broader national adaptation strategies. While LWF as a climate resettlement policy shows promise in its attempts to maintain the material and social well-being of relocated communities, the findings from this paper suggest that there are still significant areas for improvement, including reforming the financing structure, continuing long-term investment in social services, and building out more sustainable livelihood opportunities. Additionally, the shortcomings from the Living with Floods program also point to the need to develop international legal frameworks that safeguard the rights of people displaced by climate change, as this policy is not sustainable in the long term.

Moving Away from the Loan-Based Financing Structure

The Living with Floods program differs from traditional resettlement policy in that it aims to minimize the impoverishment associated with relocation by maintaining proximity to original sources of livelihood and income. While this study suggests that poverty rates from communes where resettlement occurred did decrease following relocation, earlier research from other fieldwork suggests that these families were burdened with significant debt, often requiring them to sell off their land holdings, which is reflected in a decrease in the number of operating farms. This result is due to the fact that relocated families participating in LWF are required to take out a government loan which they must pay off after six to ten years. Beyond placing an additional economic constraint on individual relocated households, this loan-based system may leave out the poorest, and therefore most vulnerable, members of society altogether. For example, some households in the poorest income bracket have expressed a desire to stay in their original community out of fear that they will be unable to pay off the loan in time and they will subsequently be targeted by the government (Chun, 2015). As a result, the loan-based financing structure of the LWF program economically burdens relocated households in the long-term, as well as neglects the most at-risk families. Additionally, bureaucratic delays for approving these loans result in slowing down the timeline of relocation from anywhere between six months and two years, placing households at risk of preventable danger and injury associated with climate change (Chun, 2015).

Planned resettlement as a climate adaptation response is growing in popularity in other vulnerable regions around the world, so policymakers and recent reports from the United Nations acknowledge that there needs to be more consideration paid to developing the financial capacity and mechanisms for resettlement, moving beyond systems like the one in Vietnam based on loans from the central government. Recently, there has been more of a push for vulnerable communities

to apply and make use of the Adaptation Fund and the Green Climate Fund to finance these moves, which aim to help vulnerable regions implement concrete adaptation solutions. This financing mechanism was officially endorsed at the 2010 UN Climate Conference in Cancun, where it was agreed that beginning in 2020, the Green Climate Fund could be used to implement state-led resettlement policies (United Nations, 2014). Beyond lessening the material impact of relocation on individual households, this reliance on international agencies could also introduce incentives for resettlement to go beyond the bare minimum and attempt to leave resettled communities better off, a significant departure from traditional DIDR policy.

Continued Investment in Social and Public Services

One of the most successful aspects of the Living with Floods program that should be replicated in future climate planned resettlement plans is the fact that climate adaptation goals were coupled with provisions aimed to promote socioeconomic development and increase resilience in these rural communities. In particular, the policy required that resettlement clusters be connected to basic public infrastructure like electricity and primary schools, which communities of origin tended to lack. Additionally, it also encouraged the construction of new roads and health clinics to improve the quality of life of these rural households and connection with urban centers. From the most recent Census data, there was near universal access to these services within just a few years of implementing LWF, suggesting that the policy's socioeconomic development goals were a success. These advantages of LWF, however, require sustained investment into these services in order to avoid them falling into disrepair, as is already happening in certain communities.

Building off the need to reform the financing structure of LWF, there also must be sustained funding beyond simply covering the initial cost of relocation, in order to help maintain these public services and safeguard the rights of these communities in the long term. A successful resettlement

policy must consider the long-term timeline of the relocation, and secure adequate financing for not only the move itself, but also for several years to come as well. In particular, a recent UN report defines successful resettlement policy as one that secures "adequate and sustained funding at all stages of the process: from risk assessment, vulnerability mapping, and the collection of primary data, through to extended monitoring and evaluation." (United Nations, 2014). Therefore, policymakers must take into account a long-term implementation plan in order to ensure they have access to adequate funding to continue to support the host communities.

Long-term Livelihood Support

Lastly, there is evidence that in the most recent years, there has been a decline in the participation and productivity of the agricultural sector in the Mekong Delta. While these impacts were already beginning to become evident within a few years of LWF being implemented, climate risks in the last decade including sea level rise, saltwater intrusion, and coastal erosion, have resulted in the decline of agricultural livelihoods on a regional level as well. Many young people are moving out of these rural areas to find better economic opportunities in large urban centers (United Nations, 2014). The problem of this rural exodus is that these coastal megacities are already under significant climate stress themselves and are not adequately equipped to sustain a large influx of population. Additionally, these internal migrants tend to live in subpar conditions without access to the housing or job markets, as well as in close proximity to both water and air pollution. Therefore, the Living with Floods program, and subsequent climate resettlement policies, must also take into account providing long-term vocational support and encourage more sustainable livelihoods to avoid exacerbating climate migration further.

Given that a majority of the relocated households rely on agriculture for their income, this trend is very concerning and points to the need for future planned resettlement in the context of

climate change to include support for income diversification and transitioning to more climate-resilient ways of living. The diversification of livelihood sources for resettled households in the Mekong Delta includes encouraging the raising of aquaculture like shrimp, and more sustainable water management. Together, this support will help ensure that relocated households are able to continue to sustain a source of livelihood, even in the face of growing climate risks.

Conclusion

Environmental stress has always been a major motivating factor for migration, though the global climate crisis has strengthened the links between environmental change and mobility. In the Mekong Delta region, the combination of many different climate risks including slow-onset factors like sea level rise, saltwater intrusion, and coastal erosion, as well the increased intensity and frequency or flooding, compound the risks to livelihood and well-being for rural communities.

The Living with Floods program was designed to preempt the worst of the impacts of climate change in the region by proactively moving vulnerable communities to higher land and providing them with permanent and safe housing. Previous studies of state-managed resettlement, and particularly development-induced displacement and resettlement, have concluded that this type of intervention leads to material loss and community fragmentation, a design which is summarized in Cernea's Risks and Reconstruction Model. Evaluating this policy through this theoretical framework, however, LWF appears to provide a useful example for other communities wanting to implement planned resettlement as a climate adaptation strategy as it reverses many of the risks associated with DIDR as households move only over a short distance and gain access to improved infrastructure and social services.

After examining the impact of LWF using quantitative data from the Census and the Ministry of Agriculture and Rural Development, the result of the policy is more mixed. On one

hand, it seems to improve many social conditions. On the other hand, while income does not change significantly, relocated households undergo a restructuring of the sources of their employment and there is a general decline in agricultural activity, which has played a central role in the livelihood of the population of the Mekong Delta region for centuries.

There are several lessons that can be taken for future planned resettlement in the context of climate change in order to ensure that the relocation does not exacerbate existing vulnerabilities, but rather increases rural resilience. First, future community resettlement ideally should not rely on a loan-based system to cover the costs of relocation. Instead, communities can apply to multilateral development organizations or climate funds to finance the move in order to avoid burdening households and leaving the poorest members of the community out altogether. Additionally, the planning stage needs to take into account more long-term investment into the public services as this aspect of the policy is the most successful. Lastly, future planned resettlement policy should include provisions for building out long-term sustainable livelihoods, such as vocational training, as many households in the region found that they had to abandon their agricultural land, and moved into overcrowded urban centers. More effective policy could provide training or other workshops to help ease this transition in order to ensure that households are equipped for this restructuring of rural labor in the long run. Most importantly, the successes of the Living with Floods program can be attributed to the fact that this policy response was addressing a specific set of social vulnerabilities in a highly localized context, suggesting that climate adaption policy cannot be generalized, but rather must be rooted in the particular economic, social, and cultural identity of the at-risk region.

My research about the impact of the Living with Floods program in the Mekong Delta Region illustrates how resettlement can be channeled into a successful climate adaptation strategy,

as it can help to increase rural resilience and decrease vulnerability to environmental stressors. By virtue of the policy design, however, it may not be very sustainable in the long term as households are still moving within the same communes and are therefore largely at risk for the same climate risks. After two decades since the introduction of the Living with Floods program, policymakers are now turning their attention to the rural exodus that is occurring, where more and more households are moving to the coastal megacities to seek out employment opportunities, which themselves are already at over-capacity and are at extreme climate risk. Additionally, once there, these rural migrants are exposed to many harms, including lack of access to the housing and labor market, which may push them further across their country's border in the coming years. This vicious cycle underscores the need to develop a new international framework that includes climate refugees within the scope of legal protection, given that the scale of displacement is only expected to increase globally in the coming decades.

As the scale of environmental degradation and humanitarian risks continue to expand as a result of the global climate crisis, planned resettlement offers a potential framework to both improve resilience to climate shocks and promote socioeconomic development in some of the world's most vulnerable regions. As a result, future international climate agreements and development agendas need to recognize the important links between the climate crisis, mobility, and human rights in order to safeguard the rights of at-risk populations and build resilience to this global challenge.

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Appendix A

Figure 1. Primary Source of Income by for Rural Relocated Households at the Regional Level By Year

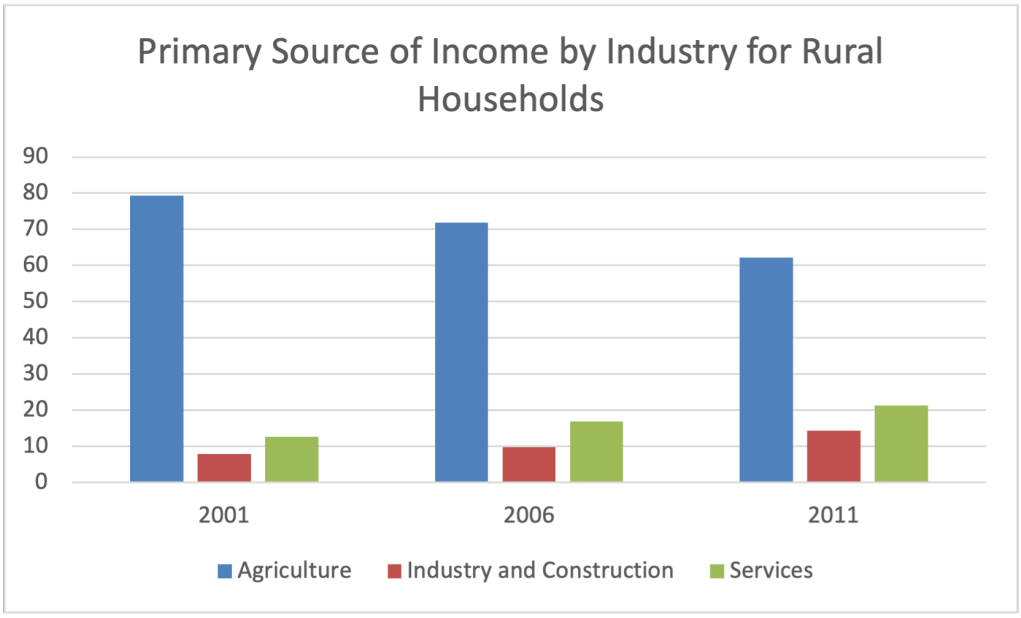

Figure 2. Poverty Rate at the Commune Level By Year

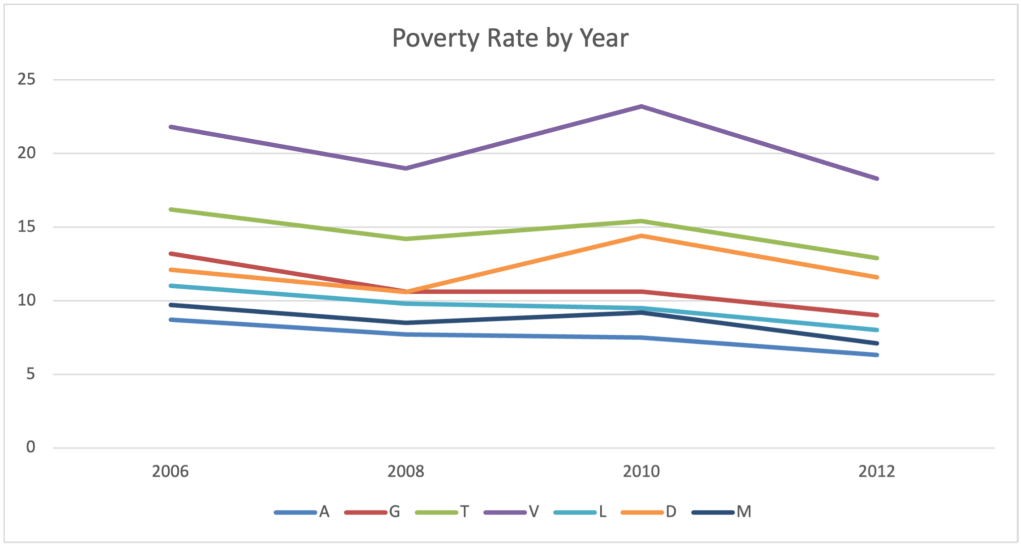

Figure 3. Average Monthly Income per Household at the Regional Level By Year (Thous. dong)

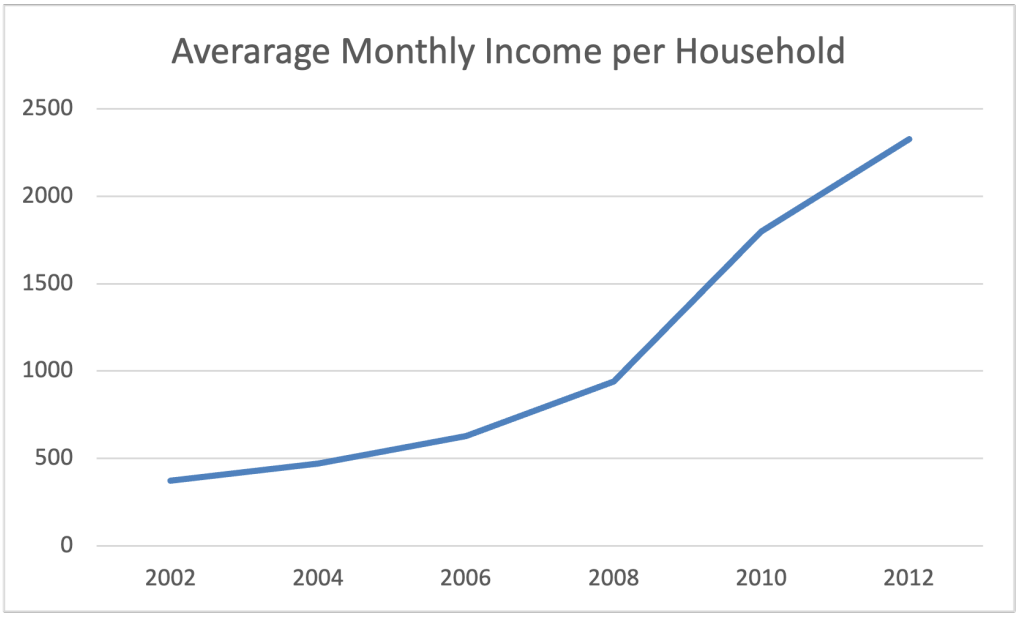

Figure 4. Number of Farms per Commune By Year

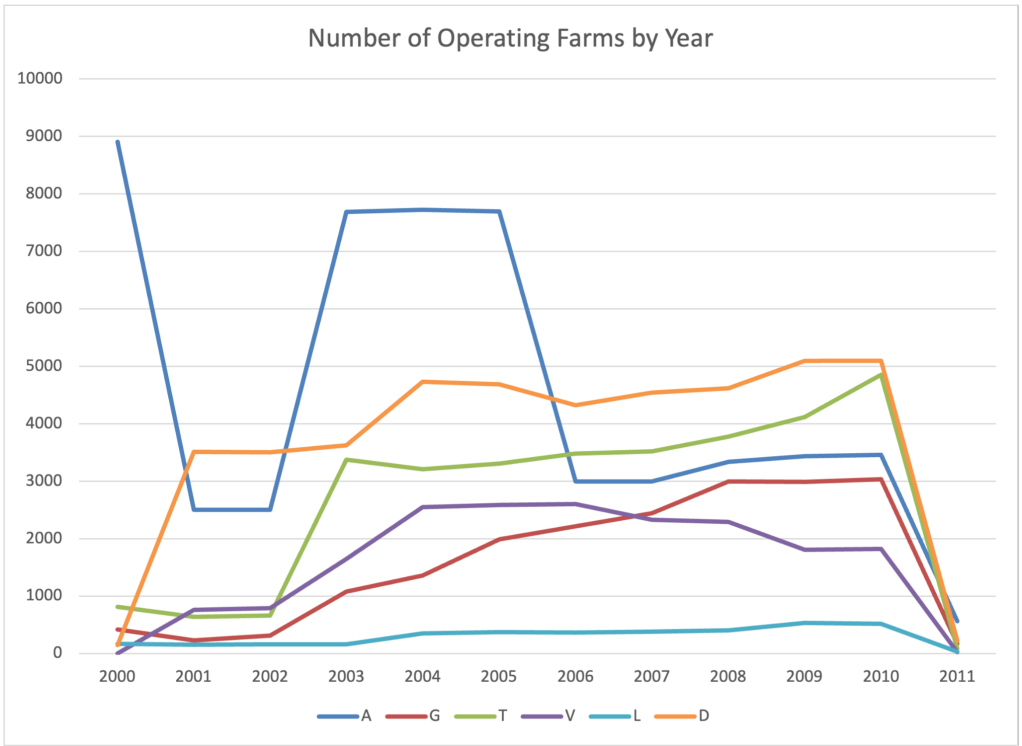

Figure 5. Planted Area of Rice Paddy Production by Commune By Year

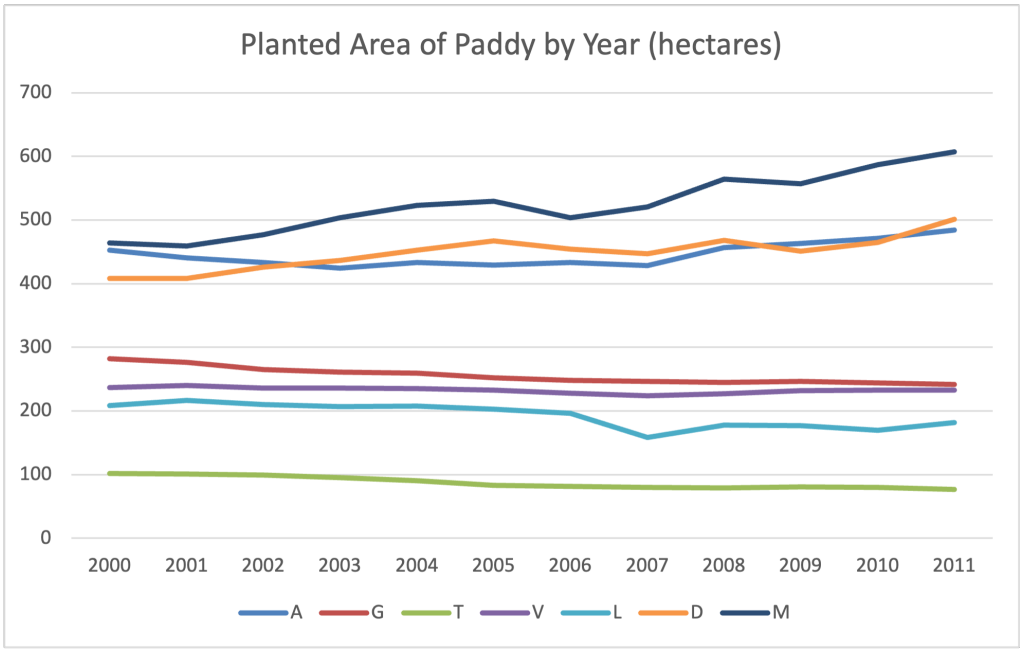

Figure 6. Number of Water Buffalo at the Commune Level By Year

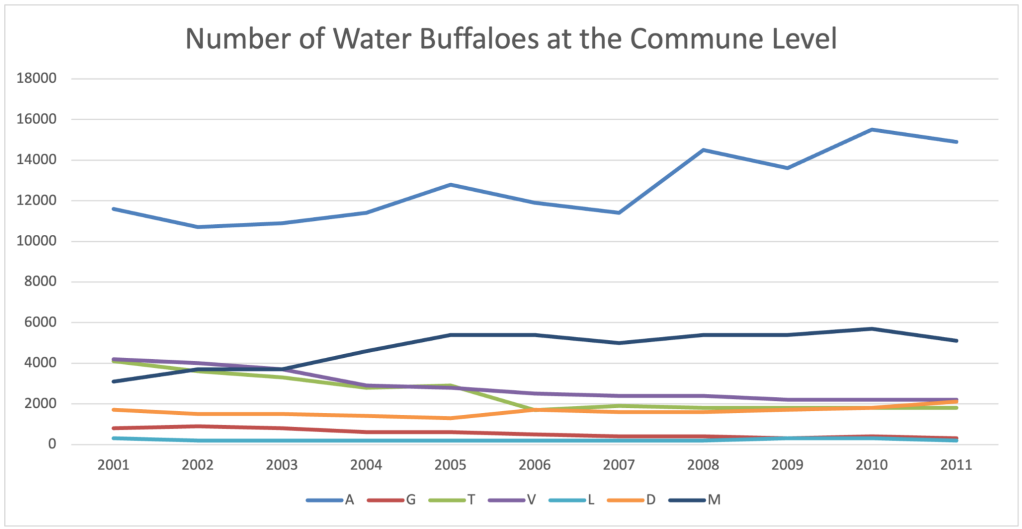

Figure 7. Production of Aquaculture Fish at the Commune Level By Year

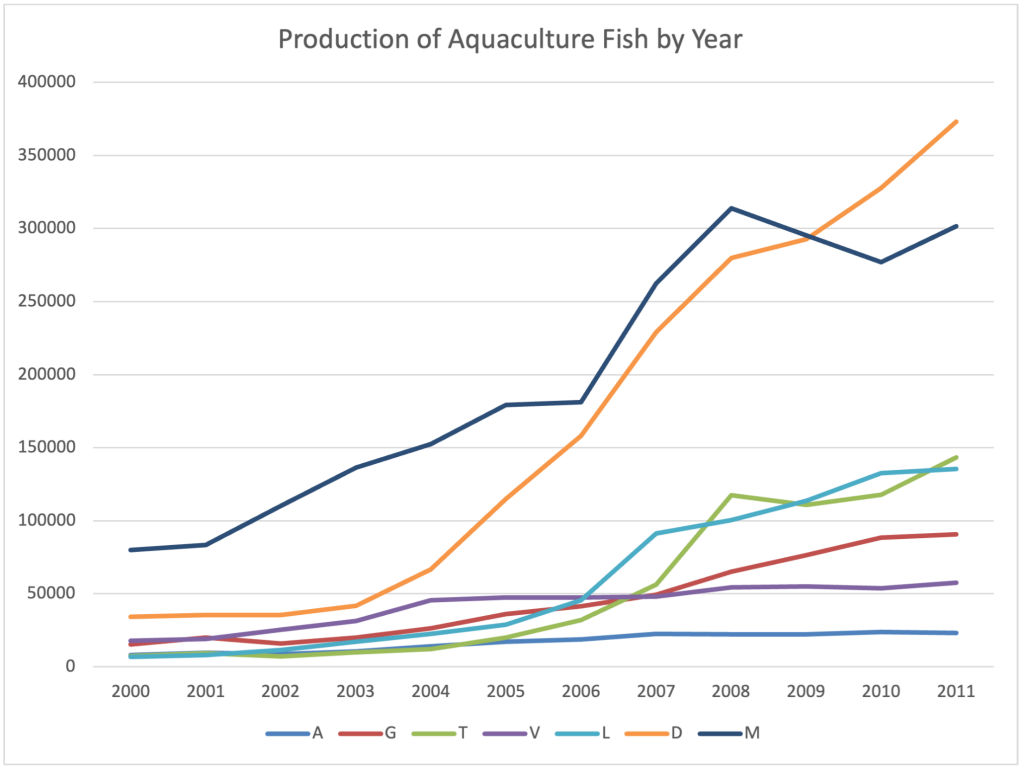

Figure 8. Proportion of Households with Access to Electricity at the Commune Level by Year

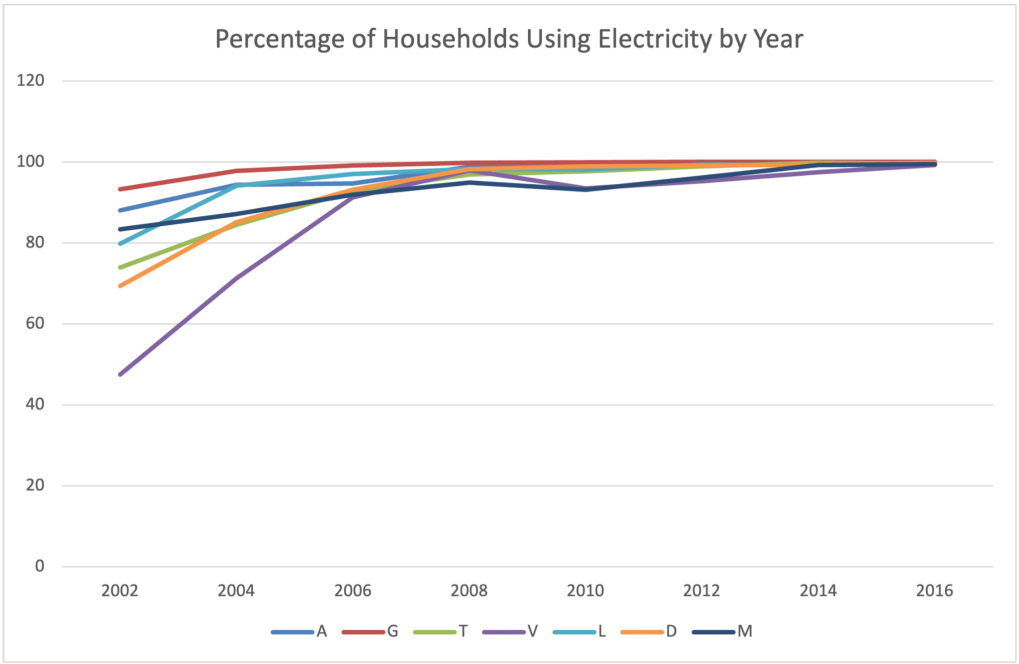

Figure 9. Number of Primary Schools at the Commune Level By Year