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Cambodian Migration to Thailand: The Role of Environmental Shocks and Stress

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Cambodian Migration to Thailand: The Role of Environmental Shocks and Stress*

Maryann Bylander†

Abstract

This report uses nationally representative data from Cambodia to analyze the links between environmental shocks or stress and international migration. More specifically it asks whether village reports of flood, drought, and poor rainfall in 2008 are associated with household out-migration to Thailand in the following year, and what factors mediate these relationships. Results of multivariate logistic regression models suggest clear associations between international migration to Thailand and (1) reported drought in the previous year, (2) reported poor rainfall in the previous rainy season, and (3) household crop loss from the previous harvest. These results suggest the importance of environment-migration links in the Cambodian context, and the need for further research to unpack the complexity of environment-migration connections.

Keywords: Climate resilience, Environmental change and migration, International migration, Slow-onset environmental change, South-South migration.

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Executive Summary

Migration scholars have become increasingly interested in understanding the links between migration and environmental change. How do environmental shocks such as drought or flood influence migratory dynamics? Is migration more likely out of environmentally stressed areas? How does migration contribute to or inhibit climate resilience? This report explores these questions in the Cambodian context, using nationally representative data from the 2009 Cambodia Socio-Economic Survey (CSES).

Cambodia is a particularly interesting place to explore migration-environment connections because its rural populations experience routine environmental stress and high levels of poverty, climate change is expected to lead to increased environmental insecurity and more severe environmental shocks, and international migration has increased during the past decade. Moreover, although qualitative research often suggests the importance of environmental factors in shaping migration decision making in Cambodia, policy makers and researchers discussing adaptation strategies for environmental change in Cambodia tend to ignore migration-environment links. A clearer understanding of how Cambodian households are already responding to climate stress through international migration is key to building effective climate change adaptation strategies, given that research suggests that such programs are most likely to be effective when they work in coordination with preexisting livelihood strategies (Tacoli 2009).

Environmental factors are likely to be important in shaping both internal and international migratory dynamics; however, as a first step toward understanding these issues in the Cambodian context, this report focuses solely on international migration to Thailand. Cambodian migration to Thailand is an increasingly important migration pattern in Southeast Asia, with an estimated 680,000 Cambodian migrants registered with the Thai government in late 2014 (MMN 2014).

Using CSES data, this report explores the relationship between various kinds of environmental stress and international migration to Thailand. More specifically, it asks whether village reports of flood, drought, and poor rainfall in 2008 are associated with household out-migration to Thailand in the following year, and what factors mediate these relationships. Results of multivariate logistic regression models suggest clear associations between international migration to Thailand and (1) reported drought in the previous year, (2) reported poor rainfall in the previous rainy season, and (3) household crop loss in the previous harvest. In contrast, there is no robust association between reported flood in the previous year and international migration to Thailand. Multivariate models suggest various ways in which village-level characteristics mediate these relationships. Households in areas with a previous history of out-migration are more likely to have migrant household members in 2009, as are households in areas with greater access to formal credit. In contrast, households in areas with nongovernmental organization (NGO) agriculture programs are less likely to have migrant household members in 2009. Even though areas of flood and drought are more likely to be located in villages that are also marginal in other ways (less infrastructure, more remote, and so on), the relationships between drought and migration and poor rainfall and migration are not explained by village-level marginality.

These associations are *not* sufficient evidence to suggest causal relationships between drought or poor rainfall and international migration. Although the findings control for broad differences between villages,

and regional effects, they should be read as preliminary; the CSES does not allow for the kinds of complex models required to explore how household characteristics and previous migration history could shape such relationships.

However, the results do call attention to the existence of environment-migration links in the Cambodian context. For Cambodian policy makers, scholars, and development practitioners, these results suggest that further research is needed to unpack the complexity of environment-migration dynamics. Longitudinal data linked to valid measures of environmental stress or change would greatly improve the understanding of how environmental change shapes migration. Similarly, a better understanding of how households *perceive* or make decisions about migration out of environmentally stressed areas would help clarify how climate-resilience strategies can be most successful.

Although data from the CSES cannot be used to determine whether migration out of environmentally stressed areas is primarily a coping response or an adaptive strategy, it seems clear that policy makers intending to support climate resilience in environmentally stressed areas would benefit from a greater awareness of preexisting and potential migration-environment connections. In environmentally stressed areas where migration has already become an idealized or established livelihood strategy, policies aiming to build climate resilience will need to take migration preferences into account. Moreover, where households are already responding to climate stress through migration, policy makers might be able to use policies targeting migrant workers (or their families) to build climate resilience either through or alongside migration.

1. Introduction

Migration scholars have become increasingly interested in understanding how environmental factors and environmental change affect migration decision making. Clearly, both shocks (flood, drought, crop loss) and stress (resource depletion, changing rainfall patterns, and the like) can influence migration, but we are only beginning to understand the mechanisms through which environmental change enables and constrains mobility, the impacts environmentally motivated migrations have on communities, and how such migrations may mediate or increase the vulnerabilities of those experiencing environmental stress.

In part, this knowledge gap is a result of the sheer complexity of the way in which environmental factors are understood to shape migration decision making. Research to date emphasizes that where environmental factors influence migration, they tend to do so in concert with other economic, political, social, and demographic drivers (Black and others 2011; Foresight 2011). Thus, while environmental factors can directly enable or constrain migration (that is, environmental change can create hazards that directly affect migration decision making), more often they influence migration through interactions with other families of drivers, changing the economic, political, social, or demographic contexts in which would-be migrants make decisions (Black and others 2011). For instance, environmental change can alter livelihood strategies or influence social norms and value systems, each of which might then have an impact on migration dynamics (Black and others 2011). Moreover, even in the wake of significant environmental stress or change, migration decision making may be either limited or enabled by particular structural, household, or individual characteristics (Black and others 2011).¹

In Cambodia, few studies have explored the relationship between environmental stress or shocks and migration.² This is a particularly striking gap given the frequency of flood and drought throughout the country (Nang 2013; Tong and Sry 2011), the increasing interest by the Cambodian government in how climate change and the environment are affecting rural livelihoods (Nang 2013; MoE and UNDP 2011; MoE and BBC 2011), and the recognition that international migration has been increasing during the past decade (Maltoni 2010).

This paper draws on nationally representative data from the Cambodia Socio-Economic Survey (CSES) to analyze the links between reports of environmental shocks and stress and international migration to Thailand.³ In doing so, it has two related goals. In Cambodia, it seeks to draw attention to migration as a central concern in environment and climate change discussions. More broadly, it suggests the need for greater attention to environment-migration links in South-South migration dynamics.

1. For more comprehensive reviews, see KNOMAD (2014); Morrissey (2009); and Hugo and Bardsley (2014).

2. Key exceptions include Heinonen (2006) and Bylander (2013). The author is aware of no studies that are either national in scope or based on quantitative data.

3. While environmental factors are likely to be important in shaping both internal and international migration, this report focuses on international migration to Thailand, given migration's growing importance in the region. Moreover, while research on environmentally induced or motivated migrations routinely considers internal migrations, there is relatively less consideration of how short-distance international migrations are shaped by environmental factors.

In Cambodia, both international and government actors have recently focused increased attention on the links between poverty, the environment, and climate change. Specifically, they note the need to support adaptive responses to climate change, particularly among rural households. Yet these debates routinely overlook the existing ways in which households are already responding to climate stress: through migration. Such knowledge is important for both understanding the impacts of policy and shaping it (Tacoli 2009). For example, entrenched migratory dynamics clearly shape the potential for “climate-resilience” programs to be successful. In Cambodia, recent qualitative research suggests that preexisting patterns of migration pose challenges for rural development programs, particularly in areas of environmental stress (Bylander 2013, 2014a). We might expect the same to be true of programs intending to create climate-resilient livelihoods.

Moreover, it is appropriate to consider whether, and how, migration could be supported as a part of climate-resilience efforts. Such questions, typically framed around the concept of “migration as adaptation” are a relatively new focus in migration-environment debates, and broadly challenge the idea that adaptation to climate change need exclusively occur through sedentary (that is, place-based) strategies of development. Rather, they suggest that policy makers need to recognize mobility “as part of the solution [to environmental change], rather than the problem” (Tacoli 2009, 514).⁴ In the Cambodian context, migration to Thailand is a clear way in which households respond to environmental stress. At the same time, migrant workers experience high levels of exploitation and vulnerability in Thailand—much of this the result of the high costs of legal migration and the resulting insecurity that comes with irregular status. This situation suggests improvements in migration policy have the potential to also support climate resilience.

In addition, by considering the Cambodian case, this paper draws attention to the need to interrogate environment-migration links *between* countries in the Global South. Most evidence suggests that environmentally induced migrations are likely to be primarily internal and short distance (Morrissey 2009; Massey, Axinn, and Ghimire 2010; Warner and Afifi 2014). This limited relocation relates, in part, to the fact that resource loss might constrain long-distance migration opportunities because such movements tend to be costly. For instance, in Mali, Findley (1994) finds that although short-distance circular migration increased significantly during drought periods, international migration during the same period decreased. Such findings have led most migration scholars to suggest that where we do see migration in response to environmental stress, such moves will most likely be short distance, either internal or regional (Hunter and Nawrotzki 2011). Yet, the bulk of research attention on environment-migration connections focuses on internal rather than on short-distance international migrations, such as the Cambodia-Thailand corridor.

This omission may also be an artifact of the broader neglect of South-South migrations in research. Even though such movements make up approximately 50 percent of all migrations from developing countries, they receive limited scholarly attention (Hujo and Piper 2007). South-South migrations (particularly those between neighboring countries) are often less costly, less regulated, and more temporary or cyclical than

4. Notably, this call is much easier to manage within nation-states than across them. Regulations, laws, and policies can create barriers to adaptive forms of international migration (KNOMAD 2014).

South-North movements. As such, they share important characteristics with internal migrations and may be key ways that resource-poor households respond to environmental stress. International migratory patterns that are already present may be a likely way for households to respond to climate stress and environmental change.

2. Climate Change in the Cambodian Context

Climate change has recently become a central concern in the Cambodia development discourse and has been the key focus of a variety of new publications on climate change, rural livelihoods, and adaptive capacity (MoE and UNDP 2011; MoE and BBC 2011; Nang 2013; ICEM 2013; Tong and Sry 2011; Parsons, forthcoming). This attention is primarily the result of growing recognition that rural vulnerability is influenced by relatively small climate shifts, which are already occurring throughout Cambodia and are expected to continue. Temperatures across the country have risen steadily during the past 50 years (MoE 2010), rainfall patterns have shifted (Eastham and others 2008), and some scholars suggest that the incidence and severity of flooding has increased (Tong and Sry 2011; Parsons, forthcoming).

Research has identified several key ways climate change might be expected to affect Cambodia in the near future. Perhaps most critically, the predicted increases in average annual temperature are likely to mean significant changes in the “comfort zone” of fish, crops, and livestock, which will have livelihood consequences (ICEM 2013). In particular, evidence suggests that the eastern area of the country will slowly become less suited for the rubber, coffee, and cassava currently grown there (ICEM 2013). Temperature increases are also predicted to negatively affect rice yields, and increased salinity could potentially affect agriculture in coastal areas (MoE and UNDP 2011).

Climate change is also expected to lead to shifts in rainfall patterns. Existing data suggest that rainfall will increase in much of the country, reaching levels 5–15 percent higher than average by 2025, with some of the largest shifts occurring in the rice-producing lowland regions (Nang 2013). Rainfall is also expected to be less predictable than it has been in the past, with shorter wet seasons that have higher levels of rainfall, and longer and more arid dry seasons (MoE and UNDP 2011). These shifts are expected to affect household rice production because most rice farming in Cambodia is rain fed, and the majority of production takes place in the wet season. To the extent that rainfall patterns substantively shift or become less predictable (or both), they present livelihood risks for wet-season farmers (Nang 2013; MoE and UNDP 2011).

Alongside changes in rainfall, climate models also predict more intense and increasing numbers of extreme weather events such as flood and drought (MoE and UNDP 2011). Despite being a relatively normal part of the climatic cycle in Cambodia, flood and drought are already a challenging problem for rural households, particularly in the rice-producing areas of the country. The government of Cambodia estimates that losses due to flooding amount to between US\$100 million and US\$170 million each year (Nang 2013). Often these extreme weather events are concentrated in poor regions of the country, which is one reason why increased incidence of drought has been projected to lead to increases in rural poverty

(Tong and Sry 2011; Nang 2013). Taken together, climate shifts are expected to have significant impacts on rural vulnerability, agricultural production, food security, poverty, and indebtedness.

The Cambodian public is well aware of recent climate shifts, and most people regard them as a problem (MoE and BBC 2011). In a survey of 2,401 adult respondents across 24 Cambodian provinces, 99 percent of respondents reported that in their lifetime, temperatures have noticeably increased, 92 percent reported less rain over their lifetime, and 85 percent noted that seasons start and finish at different times than before. Moreover, 67 percent believed that compared with the past, drought is more frequent now and 35 percent believed that flooding is more frequent. Nearly three-quarters (74 percent) of farmers responded that their work had been badly affected by these changes.

3. Building Resilience and Adaptive Capacity

Relatively speaking, Cambodia is less exposed to climate shocks and hazards than other parts of Southeast Asia (Yusuf and Francisco 2009). Yet while only a few areas of the country are exposed to severe climate hazards, it has been suggested that “almost all provinces are vulnerable due to their low adaptive capacity,” because Cambodia currently lacks the resources, government support, and infrastructure that would enable adaptive change or mediate damage in instances of climate shocks or stress (Yusuf and Francisco 2009, 13).

In response to these concerns, a variety of stakeholders in Cambodia have begun to highlight the importance of the links between climate change, rural development, and adaptation. Much of this interest is directed by two key questions: (1) what are the likely impacts of climate change on rural livelihoods, and (2) given this, how can various stakeholders increase the resilience and adaptive capacity of households, communities, and the government?

Numerous policy and research papers consider such questions, drawing attention to climate change as a severe threat to rural livelihoods and suggesting a variety of ways to build climate-resilient livelihoods in rural areas. To date, policy recommendations aimed at increasing adaptive capacity are largely place-based strategies.⁵ For example, key broad recommendations by Cambodia’s leading development research institute for attaining “Climate Change Adaptation and Livelihoods in Inclusive Growth” include initiatives on water efficiency and irrigation management, agricultural extension services, awareness raising, climate-smart agriculture systems, the promotion of gender equity, and improved government services (Nang 2013). Similarly, specific strategies suggested by the Ministry of Environment to build climate-resilient livelihoods include conservation agriculture, a system of rice intensification, improved crop varieties, weather forecasting and crop insurance, small-scale water management schemes,

5. This is perhaps not surprising, given that most institutional adaptation mechanisms being considered globally are designed to “keep people in place” and provide alternatives to out-migration (University of Adelaide, Flinders University, and University of Waikato 2009, 25).

community forestry, alternative rural energy, floodplain fish refuges, and agroforestry (MoE and UNDP 2011).

No doubt such strategies will be important, and will be critical in supporting rural communities as they adapt to climate change. However, understanding the extent to which migration is already being used in response to climate stress is critical. Recognition of migratory dynamics is important because such dynamics can inhibit the efficacy of rural development projects, or frame the kinds of climate-resilient livelihood solutions that are most likely to succeed.⁶ Moreover, migration scholars have suggested that migration itself has potential as an adaptive response to climate change (for example, Tacoli 2009; Kartiki 2011), although this theory has been explored less in contexts of international migration.

4. Cambodian Migration to Thailand

International migration is an important livelihood strategy for a growing number of Cambodians. According to data from the Thai government, more than 680,000 Cambodians were registered as migrant workers in 2014 (MMN 2014). These workers represent approximately 5 percent of the Cambodian population. This migration pattern has grown significantly during the past two decades, shaped by dynamics on both sides of the border. In Cambodia, migration is driven by increasing landlessness, development-induced displacement, a growing youth population, joblessness, environmental insecurity, and rural indebtedness, each of which are occurring within a context of fast-paced economic growth, rising inequality, and increasing desires for social mobility (Hing, Lun, and Phann 2011; Maltoni 2006; Bylander 2013; Bylander 2014a). In Thailand, a structural demand for migrant labor ensures the availability of jobs for Cambodians both with and without legal status (Martin 2007; Hing, Lun, and Phann 2011). In addition, longstanding connections between the two countries, a relatively porous border, and a thriving migration industry of brokers and middlemen make migration possible for Cambodians both with and without legal documentation (Hing, Lun, and Phann 2011).

Research suggests that most Cambodians in Thailand are within the working-age population (Maltoni 2010); however, a significant minority of migrants are children and youth under age 18 (Pearson and others 2006; Maltoni 2010). Thailand's Ministry of Interior estimates that more than 6 percent of irregular workers are children under age 15 (Pholphirul and Rukumnuaykit 2009), and both qualitative and quantitative data suggest that many Cambodian migrants have first migration experiences before age 18 (Pearson and others 2006; Maltoni 2010; Bylander 2014b). Male migrants outnumber female migrants in most household surveys as well as among official statistics of registered migrants; however, women still make up a sizable portion of the migrant population, comprising 38 percent of registered Cambodian

6. See Bylander (2013, 2014a) for discussion of agriculture and microcredit programs in communities with high levels of environmental stress and international migration. Both agriculture and microcredit programs failed to reorient households toward local business or agricultural production, given the high levels of financial risk involved in land-based livelihoods and the relative low cost and low financial risk, and high gains, associated with migration to Thailand.

migrants in Thailand in 2007 (Sciortino and Punpuing 2009) and between 30 percent and 55 percent of migrants in household surveys (Chan 2009; Hing, Lun, and Phann 2011; Deelen and Vasuprasat 2010).

Cambodian migrants are largely concentrated in the eastern half of Thailand and in the central Bangkok area. The vast majority are temporary migrants, leaving home for periods ranging from a few months to several years and often returning annually for festivals, celebrations, or harvest (Sciortino and Punpuing 2009; Maltoni 2006). Some surveys have found that the average duration of a migrant's stay in Thailand is relatively long, with the majority living in Thailand more than three years (Huguet and Punpuing 2005). However, most studies indicate that intentions for permanent migration are rare (Maltoni 2010). In a survey by the International Labour Organization, 90 percent of Cambodians interviewed in Thailand planned to return home, though many intended to work in Thailand for a long period (Jampaklay and Kittisuksathit 2009). Surveys among return migrants report that most returnees plan to migrate again soon or very soon (Caouette and others 2006). This prospect is often true even for those who considered their migration a failure (Caouette and others 2006).⁷

Recent qualitative studies suggest clear links between international migration and perceived or real environmental stress (Maltoni 2007; IDEM and Oxfam GB 2008; Hing, Lun, and Phann 2011; MoE and UNDP 2011; Bylander 2013).⁸ Indeed, several of the most flood- and drought-prone areas of the country are also key areas of out-migration. Despite these links, ways that climate change is influencing or is likely to influence existing migratory dynamics have been the subject of little discussion.⁹ Similarly, there has been little meaningful discussion of ways that policy makers could engage with migrant workers or their families to support resilience to environmental stress.

The remainder of this paper explores the links between reports of environmental shocks or stress and international migration through nationally representative data from the 2009 Cambodia Socio-Economic Survey (CSES). Though the CSES offers limited ability to explore migration-environment connections in the kinds of complex ways that previous research has been able to do in other contexts, it offers a promising starting point for understanding the importance of environment-migration links in Cambodia.

7. The desire for, or ability to, engage in circular migration may shift over time if government policies make border crossings more difficult (Maltoni 2010). Moreover, as migration patterns move through stages of transnationalism in which transnational communities consolidate and solidify, the circular nature of migration may shift (Portes 2008).

8. Although the focus of this paper is on international migration, internal migration has also been linked to environmental stress (see Parsons, forthcoming)

9. In a telling example, Nang's (2013) extensive review of climate change adaptation and rural livelihoods fails to mention migration, either as a result of climate change or as a potential adaptive strategy itself. Similarly, although the MoE and UNDP (2011) report briefly mentions migration as a coping strategy in response to environmental shocks, it does not engage with the topic further.

5. Data and Methods

The 2009 CSES is a nationally representative survey that collected data on a variety of social, economic, and environmental variables at both the household and village levels.¹⁰ Despite the fact that the CSES is not a longitudinal survey, the data allow for an analysis of the relationship between environmental factors and migration because the survey asks specific retrospective questions about environmental shocks, rainfall perceptions, and household crop loss from the *past* wet season (2008), as well as more recent household migrations (described below). Thus, the data offer an ability to explore relationships between environmental shocks that occur at one point in time, and migrations that occur later.

The analysis that follows includes data about households as well as community-level data collected about the villages within which households are located. The key outcome of interest is *household migration*, a variable distinguishing households in which one or more household members migrated to Thailand for work (to look for a job, or to take a job) in 2009 from those households that had no migrating members. Thus, these are not household migrations in the sense that the entire household is migrating. Rather, they are households in which one or more current members departed for work in Thailand in 2009.¹¹

Key independent variables of interest and controls include the following:

High crop loss: (household level) A variable distinguishing households that reported losing more than 10 percent of their planted rice crop in the 2008 wet season.¹²

Environmental shocks: (village level) A measure of whether the village was affected by flood or drought in each of the past five years (2004–08). This factor is reported by village officials based on their recall of events.

Rainfall insecurity: (village level) A variable distinguishing whether local officials reported poor timing, amount, or distribution of rainfall in the past wet season (2008).¹³ In addition, a

10. The CSES is conducted by the National Institute of Statistics at the Cambodian Ministry of Planning, and is supported by Statistics Sweden and the Swedish International Development Cooperation Agency. The household sample surveyed 12,000 households and included questions about demographic characteristics, housing, agriculture, education, labor force participation, income, and expenditures and included both a household sample and a village-level questionnaire. Data were collected throughout 2009, and households were interviewed throughout the year. Case-wise deletion was used to eliminate the 193 cases (1.6 percent of sample) missing data on one or more variables in the analysis.

11. The majority of households with migrant members have only one household member who left for Thailand in 2009.

12. Calculated by the author, based on area that was planted minus area harvested for each plot of land. The variable was limited to wet-season rice farming, which accounts for the vast majority of rice cultivation in Cambodia, particularly among the rural poor; it was also limited to those households that reported their last harvest in 2008, also the majority of households.

13. The CSES specifically asks if rainfall over the past wet season was (1) delayed, on time, or too early in its onset; (2) distributed across months normally, better, or worse than normal; and (3) better, normal, or worse than normal in its total amount. Dummy variables for each question indicate whether the onset, distribution, and amount were worse than normal or not.

constructed dummy variable of “poor rainfall overall” indicates whether the village chief noted poor outcomes across all three measures. Note that these are not accurate measures of past rainfall, but rather based on the recollection of village leaders.

Marginality: (village level): A constructed measure of how “marginal” the village is, based on several measures of remoteness and infrastructure.¹⁴ The following section offers a more detailed discussion of marginality.

Village depopulation: (village level) A measure of whether officials report that a significant number of people have left the village during the past five years. Although this is a fairly crude proxy for previous out-migration, it is the best indicator available in the data to control for the impact of being in an area of out-migration.

Credit access: (village level) Distance from the village to the nearest formal credit provider. Formal credit has been suggested as a factor that can enable households to adapt to climate stress, and to provide a means of encouraging or promoting local investment.

NGO agriculture programs: (village level) A variable indicating that the village has an NGO providing training or technical support in agriculture. Although such NGOs might be more likely to be located in areas of climate stress, it is also likely that the support they offer may mediate environmentally motivated migrations.¹⁵

For the analysis that follows, household and village samples of the CSES were merged so that each household is linked to the characteristics of the village within which it is located. As a result, variables that are measured at the village level (for example, flood, drought, poor rainfall) are not explicitly capturing whether *households* have experienced these shocks. Rather, the data capture the local environment within which households are placed. A household may very well be located in a village reporting flood but have been unaffected in crop loss, damage, or even actual flooding. This fact has implications for the way the data should be interpreted (discussed in greater detail in the following sections). Although tables 1 and 2 show the distribution of various kinds of shocks by village, the bulk of the analysis is performed at the household level. Table 3 shows key descriptive statistics of migrant and non-migrant households, and

14. The measure includes the distance (in kilometers) the center of the village is from a range of resources: the district center; the nearest primary school, lower secondary school, and upper secondary school; the nearest market, agricultural extension worker, food shop or restaurant, and store selling manure or agro-chemicals; and the nearest bus and taxi stops. The index also includes the percentage of households in the village that have public or private electricity, the percentage of households that have piped water in their dwelling or on the premises, the presence of a motorable road, and the presence of a commercial or industrial enterprise (for example, factory, hotel, restaurant, or company employing more than 10 persons) in the village or within 10 kilometers of the village. The reliability coefficient for this index is 0.76, indicating a high level of internal consistency.

15. The CSES also collects information on government agriculture programs; however, initial analysis suggests no significant relationship between government agriculture programs and out-migration.

table 4 uses logistic regression analysis to examine the impact of various environmental factors on household migration.¹⁶

6. Results

6.1 Incidence of Environmental Shocks and Stress

Historically, floods and drought have been common in Cambodia, and this is still true today. Slightly less than half (47 percent) of the villages surveyed by the CSES in 2009 noted that they had experienced flood, drought, or both during the past five years. Drought is relatively more common than flood, though it should be clarified that these responses are based on local official *reports* of what has occurred in the village in any given year. The CSES does not specify what constitutes “drought” or “flood,” so these responses may reflect varying severity of shocks.

Table 1 reports the percentage of villages in which officials reported experiences of flood and drought between 2004 and 2008, as well as the number of villages reporting multiple shocks during the same period. Two or more years of drought during the past five years was reported by 16 percent of villages surveyed, and slightly more than 8 percent of villages (N = 61) surveyed reported two or more years of flood. In both cases, recurring shocks are clustered in particular areas of the country. Major areas of recurring drought were Battambang, Prey Veng, Kampong Speu, Svay Rieng, and Kampong Cham; and major locations of recurring flood were Battambang, Prey Veng, Banteay Meanchey, Kampong Cham, and Phnom Penh.

Table 1. Village Reports of Flood and Drought, 2004–08

Single Year Reports	Villages Reporting Drought (percent)	Villages Reporting Flood (percent)
2004	15.1	6.2
2005	13.6	4.7
2006	14.8	6.9
2007	11.7	7.6
2008	9.7	11.1
Number of Shocks During 2004–08	Cumulative Count of Droughts (percent)	Cumulative Count of Floods (percent)
None	61.3	79.9
One	22.6	11.7
Two	9.7	4.7
Three	3.4	1.1
Four	2.1	1.0
Five	0.8	1.7
Total	100	100

Number of observations: 721 villages.

Source: CSES 2009.

16. All models also control for the survey month and include regional fixed effects to account for the nested nature of the data (regional fixed effects are included for Phnom Penh and Cambodia’s four ecological zones: the Plains, Tonle Sap, Coastal/Plateau, and Mountain regions).

Of the villages surveyed, 86 (12 percent) reported experiencing at least one flood *and* at least one drought during the past five-year period. Such villages were also more likely to report multiple incidences of floods and droughts. Villages experiencing both flood and drought were primarily found in Battambang, Prey Veng, Kampong Cham, Banteay Meanchey, and Kampot. With the exception of Kampot, these regions are all major sending areas for migration to Thailand (Hing, Lun, and Phann 2011).

Table 2. Percentage of Village Officials Reporting Poor Rainfall, Wet Season 2008

Poor rainfall, total amount ¹⁷	17.2
Poor rainfall, distribution	20.0
Irregular rainfall timing	51.9
Poor rainfall over all three measures	13.3

Number of observations: 721 villages
Source: CSES 2009.

Although flood and drought are key rainfall-related climate shocks, focusing only on such extreme events may fail to capture the way that less extreme shifts in rainfall affect rural livelihoods. Table 2 reports the percentages of villages where officials reported poor rainfall related to rain in the past rainy season (2008), and highlights that local officials feel that rainfall has been problematic, poor, or worse than normal in a number of villages. Slightly more than 13 percent of villages reported poor rainfall distribution, timing, *and* amount.

Again, it is important to note that these indicators should not be mistaken for data on actual rainfall distribution, timing, or amount. Rather, they are measures of the stated recollections of the local village officials interviewed by the CSES. Given the role and power of village officials, these should be read as insightful perceptions of environmental insecurity. They may also capture shifts in rainfall that are not severe enough to be characterized as drought, but may equally lead to more insecure livelihoods or the perception of more insecure livelihoods.

Perceptions of poor rainfall are not always directly linked to instances of flood and drought, although there are correlations between actual shocks and such perceptions. For example, village officials reporting poor rainfall across all three measures were more likely to also report a drought last year, even though the majority of villages reporting poor rainfall (on all three measures) did not also report drought. This result suggests that perceptions of environmental insecurity may be quite relative, and also that there are strong perceptions that rainfall patterns are problematic beyond the extremes of flood and drought.

¹⁷ Questions read (1) Would you say that the total amount of rainfall in the last wet season was normal, better than normal, or worse than normal? (2) Would you say that the distribution of rainfall across different months was normal, better than normal, or worse than normal? (3) Would you say that the onset of rainfall was on time, delayed, or early compared with other years?

6.2 Marginality Index

Both environmental insecurity and the regularity of environmental shocks are often linked with other forms of marginality and this is particularly clear in rural Cambodia. Areas that are most susceptible to flood and drought are also more likely to lack other kinds of resources: roads, schools, markets, transportation links, electricity and running water, and businesses and commercial enterprises. The marginality index introduced above crudely captures distinctions between villages as measured by infrastructure and remoteness. This index offers a means to account for the influence that village resources may have on the ability of households to adapt to environmental shocks.

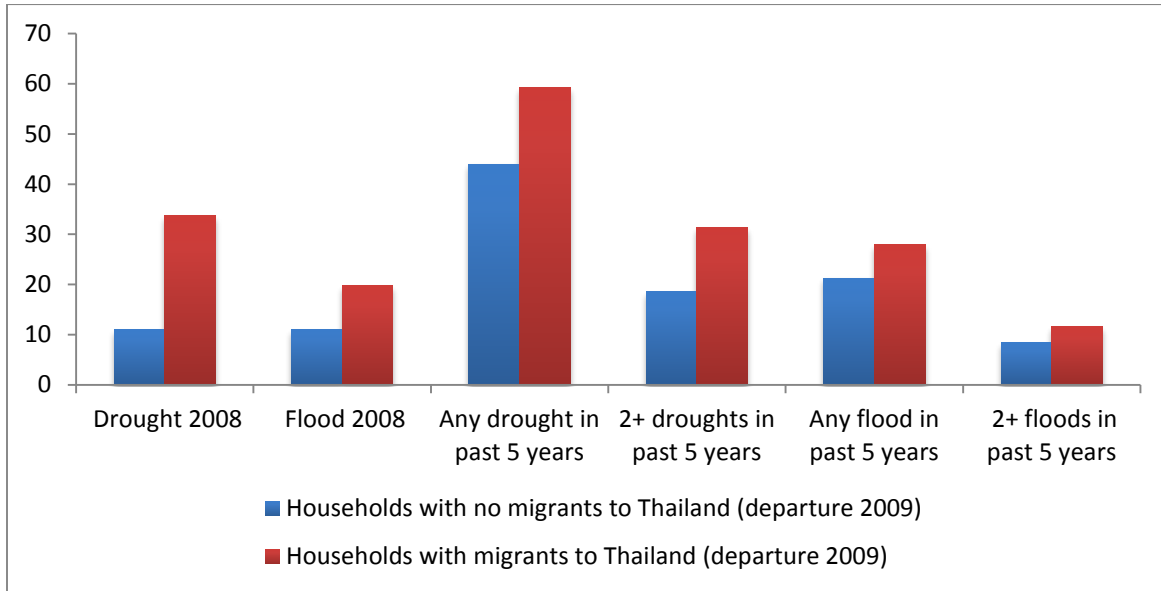
To offer a sense of what marginality means in real terms, among the *least marginal* 20 percent of villages, 94 percent have a commercial enterprise employing more than 10 people. In the average village in this group, 92 percent of households have piped in water, and 97 percent of households have electricity. All of these villages have motorable roads. On average, they are within 1–3 kilometers of markets, schools, district centers, bus stops, and shops selling manure or agro-chemicals. In contrast, the *most marginal* 20 percent of villages are, on average, 37 kilometers from the nearest bus stop, 21 kilometers from the nearest upper secondary school, 24 kilometers from the district center, 18 kilometers from the nearest market, and more than 40 kilometers away from the nearest store selling manure or agrochemicals. Only 83 percent of these villages had a motorable road. On average, in these villages 1.3 percent of households have piped in water and fewer than 4 percent of households have public or private electricity. Fewer than 15 percent of these most marginal villages have a commercial enterprise employing more than 10 people.

In Cambodia, more marginal villages are also more likely to experience both flood and drought, with a more pronounced relationship for drought. For example, in 2009 villages reporting no instance of drought during the past five years were, on average, at the 46th percentile in marginality, meaning that, on average, they were less remote and had more infrastructure than the average Cambodian village. In contrast, villages that reported one or more instances of drought in the past five years had an average marginality score in the 69th percentile. Households in more marginal areas are also significantly more likely to report negative perceptions of rainfall.

6.3 Bivariate Associations: Shocks, Stress, and Migration

Migration to Thailand originates from all parts of Cambodia, yet there are clear connections between environmental shocks and levels of out-migration. Figure 1 shows the percentage of households in areas experiencing particular kinds of shocks by migration status. Figure 1 highlights that households with out-migration in 2009 were more likely to be located in villages that had experienced both recent and chronic shocks. For example, nearly 34 percent of households that sent a migrant worker to Thailand in 2009 were located in villages characterized by recent drought. In contrast, only 11 percent of households without migrants to Thailand in 2009 were located in such areas. Households with migrants to Thailand were also more likely to be located in areas of recent flood and areas of multiple shocks.

Figure 1. Percentge of Households in Villages Reporting Environmental Shocks (2004–08), by Household Migration Status in 2009

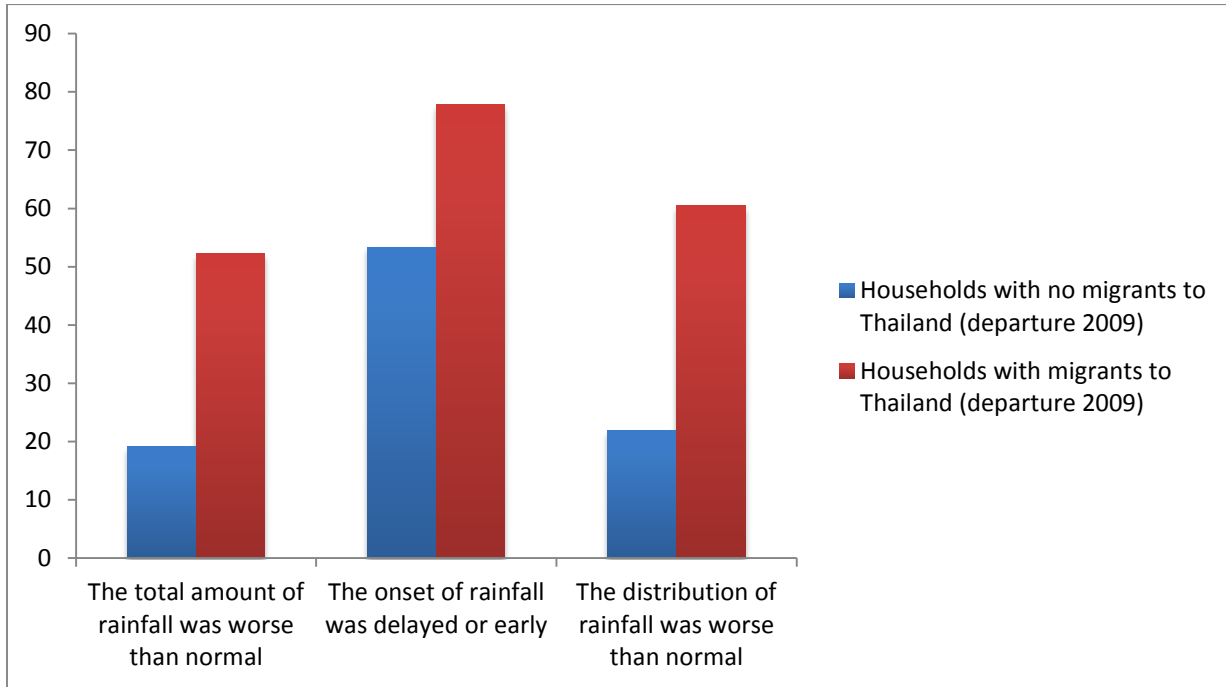


Source: CSES 2009.

Note: Total number of households is 11,807.

Figure 2 shows the percentage of households located in villages characterized as having poor rainfall (amount, onset, and distribution) in 2008. More than half of the households sending Thai migrants in 2009 were located in areas characterized as having inadequate rainfall in the previous year. In contrast, fewer than 20 percent of non-migrant-sending households were located in areas characterized by poor rain amounts in 2008. Similarly, households sending migrants to Thailand were more likely to be located in areas described as having early or delayed rainfall, and having poor rainfall distribution.

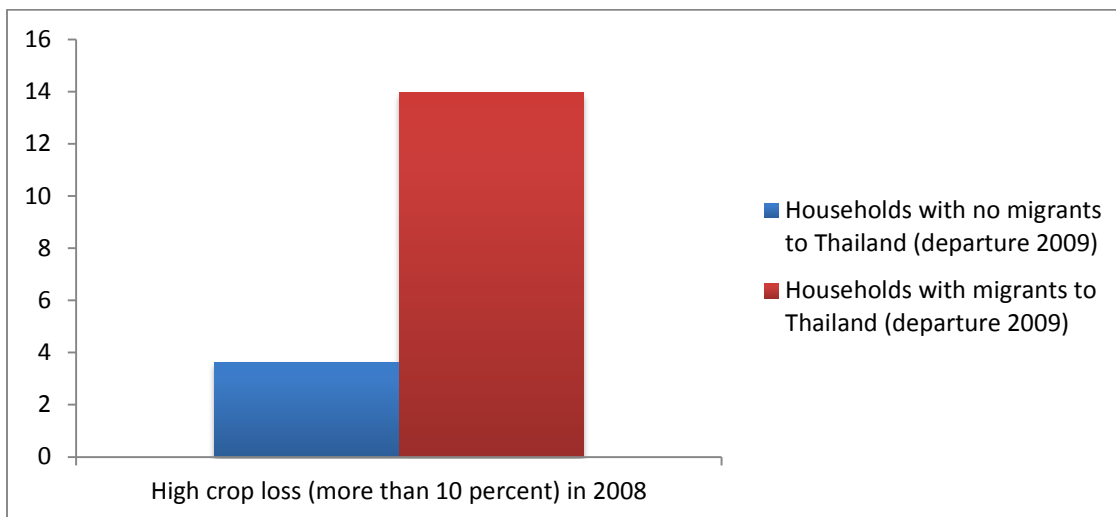
Figure 2. Percentage of Households in Villages Reporting Rainfall Insecurity (2008 rainy season), by Household Migration Status in 2009



Source: CSES 2009.

Note: Total number of households is 11,807.

Figure 3. Percentage of Households Reporting High Crop Loss in 2009, by Migration Status in 2009



Source: CSES 2009.

Note: Total number of households is 11,807.

Finally, at the household level there are also significant bivariate relationships between environmental shocks and migration (figure 3). Fourteen percent of households sending migrants in 2009 experienced a significant crop loss in the previous harvest, whereas slightly fewer than 4 percent of non-migrant-sending households reported significant losses.

Table 3 shows descriptive statistics of all variables included in the multivariate logistic regression models, with the columns showing averages or percentages among both migrant and non-migrant households. Table 3 reproduces many of the associations expressed in figures 1–3, but includes indications of the statistical significance of each bivariate relationship. Asterisks indicate degrees of statistical significance, based on chi-squared and *t*-tests.

In addition to the measures of environmental shocks and stress, table 3 introduces the village-level controls described above, all of which are included in the full models. As expected, in villages where people are already leaving, households are significantly more likely to have a household member in Thailand. Village marginality, access to credit, and the presence of NGO projects are not independently associated with migrant departures in 2009.

These bivariate associations do not take into account that the relationships between migration and various environmental shocks or stressors may be the result of other factors, or may be the result of regionally specific differences. For example, perhaps households in more marginal areas or particular regions are most likely to migrate, and at the same time are most prone to environmental shocks. To better understand the associations between environmental factors and migration, the next section of this report presents results of logistic regression models of recent (2009) household migration to Thailand by various measures of environmental insecurity, controlling for infrastructure and access differences among villages.

Table 3. Village and Household Characteristics, by Migration Status (to Thailand, departure 2009)

	Non-migrant Household	Migrant Household	
Village level			
Drought 2008	11.09	33.72	***
Flood 2008	11.09	19.77	*
Poor rainfall 2008	15.14	47.67	***
Village depopulation	19.66	30.23	*
Village marginality			
Most marginal	23.85	23.25	
Highly marginal	24.24	30.23	
Moderately marginal	21.64	26.74	
Less marginal	17.48	11.63	
Least marginal	12.79	8.14	
Village has NGO agricultural program offering technical skills	36.51	30.23	

Distance (km) to nearest credit provider	8.00	6.88	
Household level			
Household crop loss	3.64	13.95	***
Number of observations (households)	11,721	86	

Source: CSES 2009.

Note: Statistical significance based on chi-square and *t*-tests comparing households with migrant departures in 2009 and those without.

† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6.4 Multivariate Models

Multivariate models enable us to consider whether the bivariate relationships shown in figures 1–3 are still evident when other possible explanatory factors are controlled for. Table 4 introduces two models, each of which explores how environmental factors are associated with migration, while controlling for key village and household characteristics. Both models include fixed effects for region, as well as survey month (not shown).

Model 1 suggests that drought, poor rainfall, and household crop loss all remain important in explaining 2009 migration to Thailand, net other factors. Households that have experienced crop loss are twice as likely to have a migrant member leave in the following year. Similarly, households in areas of drought in 2008 are more than three times as likely to have someone leave for Thailand in 2009. Poor rainfall is also still strongly associated with migration, with households in areas reporting poor rainfall in 2008 having 2.4 times higher odds of having a migrant household member leave the following year. In contrast, flood in 2008 has no significant association with migration, which suggests that much of the bivariate association between flood and migration is explained by village and household-level controls.

The data suggest that migration is more likely out of more marginal areas; however, none of the marginality quintiles are significantly associated with migration, net other factors. Village depopulation is marginally significant, suggesting migration is more likely out of areas with a history of depopulation. Households in areas with agriculture programs offering technical skills and where credit is more accessible are also more likely to have international migrants. The latter finding may be counterintuitive; however, this finding resonates with earlier work in Cambodia suggesting that formal credit access and use is associated with migration to Thailand (Bylander and Hamilton 2015; Bylander 2014a; Ovesen and Trankell 2014).

Table 4. Odds Ratios from Logistic Regressions of Household Migration Status (household member departs for Thailand, 2009) on Environmental Shocks

	Model 1			Model 2		
	Odds Ratio		(Standard error)	Odds Ratio		(Standard error)
Household level						
Household crop loss	2.02	*	(.70)	3.01	**	(1.2)
Crop loss × Drought				0.76		(.52)
Village level						
Drought 2008	3.46	***	(.90)	4.63	***	(1.2)
Flood 2008	1.35		(.40)			
Poor rainfall 2008	2.43	***	(.60)			
Village depopulation	1.54	†	(.38)	1.70	*	(.41)
Village marginality						
Most marginal	1.71		(.95)	1.35		(.72)
Highly marginal	1.32		(.68)	1.31		(.65)
Moderately marginal	1.17		(.59)	0.91		(.44)
Less marginal	0.56		(.30)	0.47		(.25)
Least marginal (reference category)						
Village has NGO agricultural program that offers technical skills	0.52	*	(.13)	0.59	*	(.15)
Distance (km) to credit provider	0.96	*	(.02)	0.97	*	(.02)
Pseudo R^2	.1677					.1546
Number of observations (households)	11,807			11,807		

Source: CSES 2009.

Note: Model also includes indicators for region and survey month, not shown.

† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Taken as a whole, Model 1 suggests the importance of reported environmental shocks and stress on later migration. Although this is a useful first step, recent research has highlighted that it is critical not only to understand how household shocks (for example, an individual household experiencing a substantial crop loss, which can occur both within and outside of areas of environmental stress) and area-level shocks (for example, flood, drought, poor rainfall) influence migration, but also how the interaction between household and area shocks may matter in influencing migration. For instance, even in communities where environmental shocks occur, these shocks affect households and their livelihoods unevenly (for example, households' crops on land with better soil quality may be less affected by poor rainfall).

A clearer understanding of how household and area-level effects interact to shape migration patterns helps clarify the mechanisms through which environmental factors shape migration decision making. For example, research in Bangladesh suggests that household and area environmental shocks affect migration in countervailing ways, where household shocks may undermine the potential for migration while area-level shocks encourage it (Gray and Mueller 2012). To understand this in practice, consider that migration

is often costly and may require significant resources. Thus, at the household level, a climate shock might mean that households are not able to finance migration, even if they desire to migrate. In contrast, area-level shocks might increase people's interest in migration, as they seek to invest in lower-risk or risk-diversifying activities. In an illustrative example of the countervailing ways that environmental factors influence decision making, Gray and Mueller (2012) find that in rural Bangladesh household-level shocks undermined the resources needed to enable migration, while households that experienced no direct shock but were in areas where shocks occurred were increasingly motivated to move. As a result, households not directly affected by crop failures but living within severely affected areas were most likely to move.

To consider household-area interactions, Model 2 focuses explicitly on drought, and explores the interactions between household and area-level shocks (crop loss \times drought). Results from Model 2 suggest that households experiencing crop loss (but not in a drought context) are more likely to migrate to Thailand, as are households located in a context of drought but not experiencing direct loss. Households experiencing loss in a drought-affected village are, however, less likely to have a household member depart for Thailand the following year, although the association is not statistically significant. This result suggests that although household crop loss may drive migration in general (for example, outside of drought-specific crop loss), in contexts of drought households that do not experience loss are driving the relationship between drought and migration. Similar to Gray and Mueller's (2012) findings, the CSES data suggest that households not experiencing direct crop loss but that are located in contexts of drought are most likely to experience migration the following year. This finding suggests that migration out of environmentally insecure areas is being undertaken in response to increased risk to local livelihoods, though not as a direct response to shocks.

6.5 Limitations and Areas for Further Research

At this point a few caveats and limitations are worth noting. First, although it is likely that a variety of household-level variables would also mediate migration decision making in contexts of environmental stress, this analysis does not include factors such as household wealth and assets or other measures of household adaptive capacity, a limitation primarily based on concerns with maintaining consistent time ordering.¹⁸ For instance, while we might expect that household wealth; alternative livelihoods; and household size, gender, age, and educational attainment (among others) would all play key roles in determining the extent to which migration is a response to environmental shocks, the nature of the CSES

18. The current analysis considers shocks (household crop loss, drought, flood) retrospectively reported in 2008, and migrations in 2009. Thus, the independent variable (shocks) occurs before the dependent variable (migration), maintaining a time ordering consistent with the search for causal relationships. If we were to include control variables that are measured in 2009 (for example, household assets or relative wealth), how to interpret any relationships would be unclear. For example, if our model suggested that wealthier households (measured in 2009) reporting shocks in 2008 were more likely to have migrant household members, it could be that (1) initially wealthier households were more likely to respond to shocks with migration, or (2) migrating households accrue wealth between the two periods and thus have more assets in 2009, or (3) some other relationship. Without controls measured at the time of shock, we have little ability to meaningfully interpret household variables that are likely to have changed as a result of both shocks and migration. Thus, our model only includes village-level controls, which are unlikely to have substantively changed during the period between harvest 2008 and data collection in 2009.

and lack of retrospective questions limits the variables that can be usefully included in the analysis.¹⁹ Similarly, the small number of migrants departing in 2009 in the sample limits the opportunity for a more complex analysis. Thus, it is important to stress that these models should be treated as preliminary evidence suggesting a need to build broader and more complex studies of the linkages between environmental stress and migration in the Cambodian context. More comprehensive longitudinal data, and more detailed information about community migration history, would greatly improve the understanding of these patterns and processes.²⁰

Second, these findings may be significantly affected by the particularities of 2009, when many Cambodian households were still coping with the impact of rising food and fuel prices during the previous year. Beyond food price spikes, recent empirical work also suggests that the food crisis resulted in increased indebtedness among rural households during this time (Pide 2013). Given that indebtedness has been documented as a driver of migration in Cambodia (Maltoni 2006; Bylander 2014a), it may be that the relationships between various shocks and migration are mediated by the degree to which households are indebted.²¹ The CSES offers limited ability to unpack these connections, but they are ripe areas for future research. Analyses using more recent data would also prove insightful.²² Migration has grown rapidly since 2009, becoming more entrenched in some communities, more possible in others, and in some cases attracting young people at much earlier ages (Hing, Lun, and Phann 2011; Bylander 2014a). At the same time, key drivers of both migration (indebtedness, development-induced displacement) and environmental stress (floods, drought, poor rainfall) have continued to affect rural areas. It is unclear whether 2009 data are suggestive of a regularity, an anomaly, or the tip of the iceberg.

Third, a word of caution is in order in interpreting the associations between poor rainfall and migration, and between drought and migration. Given that these are the perceptions of local officials, and not based on external reports or well-defined criteria, it is possible that the associations observed in the data reflect that officials located in areas of high out-migration are more pessimistic about their local environment or have a lower threshold for reporting poor rain, drought, and so on than those where migration is not prevalent. In other words, although results suggest that environmental stress has an impact on migration patterns, preexisting patterns of migration (that are not adequately captured and controlled for here)

19. Although these variables are not included in the household-level analysis, individual data from the CSES suggest that in 2009 slightly more than two-thirds (68 percent) of migrants currently reported as working in Thailand were men, while one-third were women. Ages ranged between 15 and 50 years old, with an average age of 27. More recent data from migrant-sending communities suggest similar trends (Hing, Lun, and Phann 2011). For more recent discussions of the gender, age, and socioeconomic make-up of Cambodians in Thailand, see Baker (2015); Bylander (2014b); and Hing, Lun, and Phann (2011).

20. Longitudinal analysis of the CSES would be one potential way to achieve this; however, a more complete understanding of migration-environment connections would likely require additional data collection because the CSES is limited in appropriate questions and information on timing.

21. See CARE (2012) for a discussion of the relationship between environmental shocks and indebtedness.

22. The 2009 CSES is unique in comparison with later years, which have significantly smaller sample sizes (approximately 3,600–3,840 each). Although certain kinds of analysis with data from more recent years would be possible, given that migration is a relatively rare event, the 2009 survey offers a far more useful data source for such questions.

could be shaping the likelihood that a local official would report drought or poor rainfall. Thus, a key area for future research would be to analyze the CSES's flood and drought reports in comparison with externally organized environmental reports to assess how perceived insecurity relates to empirical changes in rainfall or externally defined shocks. Research on the relationships between migration and the environment in other contexts has suggested that perceptions may be as, if not more, important than actual change in explaining migration decision making (Jonsson 2010).²³ Although this is a growing area of interest, the ways that environmental stress is subjectively experienced, and how subjective perceptions of insecurity play into migration decision making, are still poorly understood (Jonsson 2010). A useful next stage of this and future projects would be to analyze external indicators of environmental stress (for example, rainfall data) alongside perceptions of change to see how they are related, and how each relates to migration decision making.

Finally, and related to each of the points above, although these models are useful in illustrating broad and important links between certain kinds of environmental stressors and migration, they offer very little ability to understand what such migrations mean. Are migrations last-resort coping strategies to deal with indebtedness in the face of recurring droughts? Are they proactive strategies of risk diversification and investment? Or can they best be characterized as something entirely different? To answer such questions well would require qualitative research, or different kinds of questions than can be answered by data available in the CSES, but which present ripe areas for future research.

7. Conclusions

A key aim of this paper is to bring migration into conversations about climate change, rural livelihoods, and adaptation in the Cambodian context. Secondly, it seeks to draw attention to environment-migration connections in South-South migratory corridors.

A significant and growing number of Cambodians are seeking work in neighboring Thailand, yet to date there has been little discussion of the way that environmental insecurity may drive these movements. Similarly, in Cambodia there has been little discussion of the importance of incorporating international migration into policy discussions on adaptation to environmental change. The analysis suggests that there are significant associations between reported environmental insecurity and international migration, as

23. For example, in Nepal, Massey, Axinn, and Ghimire (2010) find that the likelihood of both short and longer distance migrations were significantly increased among those who perceived declining land productivity, and that this outcome was particularly true among more disadvantaged groups. Based on their data, Massey and colleagues suggest that the “deeper underlying causes of environmental migration are not only related to the severe environmental calamities, but also to a more gradual deterioration of conditions and to subjective perceptions about the degree of deterioration” (Massey, Axinn, and Ghimire 2010, 131; see also Henry, Schoumaker, and Beauchemin 2004). Massey's data also confirm that social and human capital are stronger predictors of migration than environmental factors, again arguing for the need to recognize that migration is multicausal and related to a variety of socioeconomic and demographic processes. Similar work in both Ghana and Senegal has argued for the importance of perceptions of environmental change in explaining migration, stressing that perceptions may not only be part of migration decision making but also that perceptions of change are inextricably linked with local economic and political power (Carr 2005; Bleibaum 2009).

well as between reported drought and international migration. This finding highlights the need for policy makers in Cambodia to recognize that migration appears to already be a means through which rural households respond to environmental stress. Given this result, there is a clear need to link discussions of migration policy to debates on climate change, poverty, and rural adaptation. In environmentally stressed areas where migration has already become an idealized or established livelihood strategy, policies aiming to build climate resilience will need to take migration preferences into account (Bylander 2013).

We are only beginning to understand the complex ways in which environmental change, environmental shocks and stress, and migration are connected, and more important, what such links mean. Unfortunately, the nature of the CSES data offers little ability to unpack the more complex linkages between sociodemographic, political, economic, cultural, and environmental factors, and how each shapes migration decision making. Recent research on the linkages between environmental stress and migration has quite rightly criticized studies assuming a simple causal relationship between shocks and migration (Jonsson 2010). With the recognition that this work could easily be misread to suggest that drought or poor rainfall are stand-alone causes of migration, the author stresses here that findings should be interpreted much more broadly. The data suggest that environmental factors are related to international migration, but the more complex relationships that mediate this relationship cannot be unpacked using available data. In addition, households may be responding to environmental stress through a variety of other strategies (both place based and mobile) that are not captured in the analysis.

Migration out of contexts of environmental change can be enabling or erosive (Warner and Afifi 2014). Research on the experiences of Cambodians in Thailand suggests the potential for both.²⁴ For example, migrant remittances have been critical in enabling rural Cambodians to move out and stay out of poverty (FitzGerald and Sovannarith 2007). Yet research on Cambodians in Thailand has also highlighted that most migrant workers have no legal status, and that they are vulnerable to a variety of exploitations. They often work in dangerous and low-paid work, and have few rights and protections offered by the Thai government (Human Rights Watch 2010). The vulnerability of migrant workers was particularly evident in the mass exodus of June 2014, when more than 220,000 Cambodians left Thailand during a two-week period in response to rumors of a crackdown on undocumented workers (MMN 2014). Similarly, during flooding in Thailand in 2011, migrants were particularly vulnerable, with many displaced or negatively affected by the floods (Koser 2014).²⁵ Legal migration programs regulated by the government of Cambodia have also been criticized for the high levels of exploitation and abuse common among migrants (Lee 2007).

24. Although no studies specifically interrogate the consequences of environmentally motivated migrations to Thailand, broader studies of the same pattern of migration are illustrative.

25. Notably, Thailand is also highly vulnerable to climate change, although it has significantly greater adaptive capacity than Cambodia (Yusuf and Francisco 2009).

If migrants are moving without documentation, if they lack rights and protections, and if their work is highly insecure, shifting the burden of climate resilience onto migrant workers is unlikely to lead to any greater sense of stability or reduction in vulnerability. At the same time, if households are already responding to climate stress through migration, it seems appropriate to consider how policies can support such movements to at least be more adaptive. There is a wealth of research on this topic from both policy makers and scholars suggesting best practices in supporting migration for development (for example, Hujo and Piper 2010). Indeed, the government of Cambodia already has a Labour Migration Policy (2010), which suggests strategies to promote and empower migrant workers and support migration as a development strategy. Key recommendations from this policy overlap nicely with suggestions from scholars considering how migration can contribute to adaptive capacity in environmentally stressed areas:

- Fewer restrictions on movement
- Reduced costs of legal migration
- Ensuring the protection of the rights of workers abroad
- Building strong regional and international response systems (Barnett and Webber 2010; Kartiki 2011).

Such shifts would not ensure that environmentally motivated migrations are adaptive responses, nor would they mediate the need for rural development and climate-resilience programs to ensure that dignified livelihood options exist in rural areas. However, policies that decrease the vulnerability of migrant workers, enable movement, and support the potential of remittances can offer important additions to climate change policies aimed at ensuring sustainable rural livelihoods, resilient ecosystems, and decent work. By bringing migration into climate-resilience discussions, policy makers can both strengthen existing adaptation strategies and leverage the livelihood strategies that households may already be using in response to environmental change.

References

- Baker, Simon. 2015. *Migration Experiences of Cambodian Workers Deported from Thailand in 2009, 2010 & 2012 Poipet, Cambodia*. Bangkok, Thailand: United Nations Action for Cooperation against Trafficking in Persons and United Nations Development Program.
- Barnett, Jon, and Michael Webber. 2010. "Accommodating Migration to Promote Adaptation to Climate Change." Policy Research Working Paper 5270, World Bank, Washington, DC.
- Black, Richard, W. Neil Adger, Nigel W. Arnell, Stefan Dercon, Andrew Geddes, and David Thomas. 2011. "The Effect of Environmental Change on Human Migration." *Global Environmental Change* 21 (Suppl 1): S3–S11.
- Bleibaum, F. 2009. "Senegal Case Study Report." In "EACH-FOR Environmental Change and Forced Migration Scenarios." Edited by Jill Jäger, Johannes Frühmann, Sigrid Grünberger, and Andreas Vag. Brussels: European Commission.
- Bylander, Maryann. 2013. "Depending on the Sky: Environmental Distress, Migration and Coping in Rural Cambodia." *International Migration* 53 (5): 135–47. doi: 10.1111/imig.12087.
- . 2014a. "Borrowing across Borders: Migration and Microcredit in Rural Cambodia." *Development and Change* 45 (2): 284–307. doi: 10.1111/dech.12080.
- . 2014b. "Contested Mobilities: Gendered Migration Pressures among Cambodian Youth." *Gender, Place and Culture A Journal of Feminist Geography* 22 (8): 24–40. doi:10.1080/0966369X.2014.939154.
- , and Erin Hamilton. 2015. "Loans and Leaving: Migration and the Expansion of Microcredit in Cambodia." *Population Research and Policy Review* 34 (5). doi: 10.1007/s11113-015-9367-8.
- Caouette, Therese, Rosalia Sciortino, Philip Guest, and Alan Feinstein. 2006. "Labor Migration in the Greater Mekong Sub-region." Working Paper 40773, World Bank, Washington, DC.
- CARE. 2012. "Drowning in Debt: The Impact of the 2011 Cambodia Floods on Household Debt." CARE, Phnom Penh.
- Carr, E. R. 2005. "Placing the Environment in Migration: Environment, Economy, and Power in Ghana's Central Region." *Environment and Planning* 37 (5): 925–46.
- Chan, Sophal. 2009. "Costs and Benefits of Cross-Country Labour Migration in the GMS: Cambodia Country Study." Working Paper 477, Cambodia Development Resource Institute, Phnom Penh.
- Deelen, Linda, and Pracha Vasuprasat. 2010. "Migrant Workers' Remittances from Thailand to Cambodia, Lao PDR and Myanmar: Synthesis Report on Survey Findings in Three Countries and Good Practices." ILO/Japan Project on Managing Cross-border Movement of Labour in Southeast Asia. ILO Regional Office for Asia and the Pacific, Bangkok.
- Eastham, Judy, Freddie Mpelasoka, Mohammed Mainuddin, Catherine Ticehurst, Peter Dyce, Geoff Hodgson, Riasat Ali, and Mac Kirby. 2008. *Mekong River Basin Water Resources Assessment: Impacts of Climate Change*. Canberra: CSIRO.
- Findley, Sally E. 1994. "Does Drought Increase Migration? A Study of Migration from Rural Mali during the 1983–1985 Drought." *International Migration Review* 28 (3): 539–53.

- FitzGerald, Ingrid, and So Sovannarith. 2007. *Moving Out of Poverty? Trends in Community Well-Being and Household Mobility in Nine Cambodian Villages*. Phnom Penh: Cambodia Development Resource Institute.
- Foresight: Migration and Global Environmental Change. 2011. *Final Project Report*. London: Government Office for Science.
- Gray, Clark L., and Valeria Mueller. 2012. "Natural Disasters and Population Mobility in Bangladesh." *Proceedings of the National Academy of Sciences of the United States of America* 109 (16): 6000–5.
- Heinonen, Ulla. 2006. "Environmental Impact on Migration in Cambodia: Water-Related Migration from the Tonle Sap Lake Region." *International Journal of Water Resources Development* 22 (3): 449–62.
- Henry, S., B. Schoumaker, and C. Beauchemin. 2004. "The Impact of Rainfall on the First Out Migration: A Multi-Level Event History Analysis in Burkina Faso." *Population and Environment* 25 (5): 423–60.
- Hing, Vuthy, Pide Lun, and Dalis Phann. 2011. "Irregular Migration from Cambodia: Characteristics, Challenges and Regulatory Approaches." Working Paper 58, Cambodia Development Research Institute, Phnom Penh.
- Hugo, Graeme, and Douglas K. Bardsley. 2014. "Migration and Environmental Change in Asia." In *People on the Move in a Changing Climate*, edited by Etienne Piguet and Frank Laczko, 21–48. Berlin: Springer Science and Business Media.
- Huguet, Jerrold W., and Sureeporn Punpuing. 2005. *International Migration in Thailand*. Bangkok: International Organization for Migration.
- Hujo, Katja, and Nicola Piper. 2007. "South-South Migration: Challenges for Development and Social Policy." *Development* 50: 19–25. doi:10.1057/palgrave.development.1100419.
- , eds. 2010. *South-South Migration: Implications for Social Policy and Development*. London: UNRISD and Palgrave Macmillan.
- Human Rights Watch. 2010. *From the Tiger to the Crocodile: Abuse of Migrant Workers in Thailand*. New York: Human Rights Watch.
- Hunter, Lori, and Raphael Nawrotzki. 2011. "Migration and the Environment." Institute of Behavioral Science Working Paper, University of Colorado Boulder, Boulder, CO.
- IDEM and Oxfam GB. 2008. "Drought Management Considerations for Climate Change Adaptation: Focus on the Mekong Region. Cambodia Report." Oxfam Cambodia and Graduate School of Global Environmental Studies of Kyoto University, Japan.
- ICEM (International Center for Environmental Management). 2013. "USAID Mekong ARCC Climate Change Impact and Adaptation: Summary." Prepared for The United States Agency for International Development by International Center for Environmental Management.
- Jampaklay, Aree, and Sirinan Kittisuksathit. 2009. "Migrant Workers' Remittances: Cambodia, Lao PDR and Myanmar." In *ILO/Japan Project on Managing Cross-border Movement of Labour in Southeast Asia Regional Office for Asia and the Pacific*, edited by International Labour Organization. Thailand: Institute for Population and Social Research, Mahidol University.
- Jónsson, Guvnor. 2010. "The Environmental Factor in Migration Dynamics: A Review of African Case Studies." IMI Working Paper 21, International Migration Institute, Oxford.

- Kartiki, Katha. 2011. "Climate Change and Migration: A Case Study from Rural Bangladesh." *Gender and Development* 19 (1): 23–38.
- KNOMAD. 2014. "Environmental Change and Migration: State of the Evidence." Global Knowledge Partnership on Migration and Development, World Bank, Washington, DC.
http://www.knomad.org/docs/environmental_change/Environmental%20Change%20and%20Migration%20Literature%20Review.pdf.
- Koser, Khalid. 2014. "Protecting Non-Citizens in Situations of Conflict, Violence and Disaster." In *Humanitarian Crises and Migration: Causes, Consequences and Responses*, edited by S. Martin, S. Weerasinghe, and A. Taylor, 267–86. London: Routledge.
- Lee, Chen Chen. 2007. "A Study into Exploitative Labour Brokerage Practices in Cambodia." Report for the Coordinated Mekong Ministerial Initiative against Human Trafficking (COMMIT) Project Proposal Concept 8.
- Maltoni, Bruno. 2006. *Review of Labor Migration Dynamics in Cambodia*. Phnom Penh: International Organization for Migration.
- . 2007. "Migration in Cambodia: Internal vs. External Flows." Paper presented at the 8th ARPMN Conference on Migration, Development and Poverty Reduction. Fuzhou, China, May 25–29.
- . 2010. *Analyzing the Impact of Remittances from Cambodian Migrant Workers in Thailand on Local Communities in Cambodia*. Phnom Penh: International Organization for Migration.
- Martin, Philip. 2007. *The Economic Contribution of Migrant Workers to Thailand: Towards Policy Development*. Bangkok: International Labor Office.
- Massey, Douglas, William Axinn, and Dirgha Ghimire. 2010. "Environmental Change and Out-Migration: Evidence from Nepal." *Population and Environment* 32 (2): 109–36.
- MMN (Mekong Migration Network). 2014. "The Precarious Status of Migrants in Thailand: Reflections on the Exodus of Cambodian Migrants and Lessons Learnt." Mekong Migration Network, Hong Kong SAR.
- MoE (Ministry of Environment). 2010. *GHG Inventory and Mitigation Study*. Phnom Penh: Ministry of Environment.
- , and BBC World Trust. 2011. *Understanding Public Perceptions of Climate Change in Cambodia*. Phnom Penh: Ministry of Environment, Climate Change Department.
- MoE and UNDP (Ministry of Environment and United Nations Development Programme). 2011. *Cambodia Human Development Report 2011. Building Resilience: The Future for Rural Livelihoods in the Face of Climate Change*. Phnom Penh: Ministry of Environment Cambodia and UNDP Cambodia.
- Morrissey, James. 2009. "Environmental Change and Forced Migration: A State of the Art Review." Background paper, Refugee Studies Center, Oxford.
- Nang, Phirun. 2013. "Climate Change Adaptation and Livelihoods in Inclusive Growth: A Review of Climate Change Impacts and Adaptive Capacity in Cambodia." CDRI Working Paper 82, Cambodia, Development Resource Institute, Phnom Penh.
- Ovesen, Jan, and Ing-Britt Trankell. 2014. "Symbiosis of Microcredit and Private Moneylending in Cambodia." *Asia Pacific Journal of Anthropology* 15 (2): 178–96.

- Parsons, Laurie. Forthcoming. "Under Pressure: Environmental Risk and Contemporary Resilience Strategies in Rural Cambodia." In *The Handbook of Contemporary Cambodia*, edited by Katherine Brickell and Simon Springer. London: Routledge.
- Pearson, E., S. Punpuing, A. Jampaklay, S. Kittisuksathit, and A. Prohmno. 2006. *Mekong Challenge – Underpaid, Overworked and Overlooked: The Realities of Young Migrant Workers in Thailand*. Mekong Sub-regional Project to Combat Trafficking in Children and Women. Bangkok: International Labour Office.
- Pholphirul, Piriya, and Pungpond Rukumnuaykit. 2009. "Economic Contribution of Migrant Workers to Thailand." *International Migration* 48 (5): 174–202.
- Pide, Lun. "The Role of Rural Credit during the Financial Crisis: Evidence from Nine Villages in Cambodia." CDRI Working Paper Series 79, Cambodia Development Research Institute, Phnom Penh.
- Portes, Alejandro. 2008. "Migration and Development: A Conceptual Review of the Evidence." In *Migration and Development: Perspectives from the South*, edited by Stephen Castles and Raul Delgado Wise. Geneva: International Organization for Migration.
- Sciortino, Rosalia, and Sureeporn Punpuing. 2009. *International Migration in Thailand*. Bangkok: International Organization for Migration.
- Tacoli, Cecilia. 2009. "Crisis or Adaptation? Migration and Climate Change in a Context of High Mobility." *Environment and Urbanization* 21 (2): 513–25.
- Tong, Kimsun, and Bopharath Sry. 2011. "Poverty and Environment Links: The Case of Rural Cambodia." Working Paper 64, Cambodia Development Research Institute, Phnom Penh.
- University of Adelaide, Flinders University, and University of Waikato. 2009. *Climate Change and Migration in Asia and the Pacific*. Mandaluyong City, Philippines: Asian Development Bank.
- Warner, Koko, and Tamer Afifi. 2014. "Where the Rain Falls: Evidence from 8 Countries on How Vulnerable Households Use Migration to Manage the Risk of Rainfall Variability and Food Insecurity." *Climate and Development* 6 (1): 1–17.
- Yusuf, Arief Anshory, and Herminia A. Francisco. 2009. *Climate Change: Vulnerability Mapping for Southeast Asia*. Singapore: Economy and Environment Program for Southeast Asia.

