

# CLIMATE CHANGE ADAPTATION IN POST-DISASTER RECOVERY - POLICY BRIEF 2

## CLIMATE CHANGE ADAPTATION: INSIDE THE FLOOD-PRONE COMMUNITIES IN KRATIE PROVINCE, CAMBODIA

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Drawing on a household survey conducted by a team of researchers and students from the Royal University of Phnom Penh (RUPP) in four communes of Preak Prasop District, Kratie Province, Cambodia, in August 2017, this policy brief highlights the decisive role household-based livelihood strategies play in determining the nature and degree of climate change adaptation at the community and district level.

### KEY MESSAGES

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- ◆ Cambodia's vulnerability to climate change is driven by both environmental and socioeconomic factors. Exposure to natural hazards alongside poverty, inequality and a high dependence on natural resources aggravate the impacts of climate change on Cambodian households.
- ◆ This study demonstrates the key role of household assets – physical, human, social, natural and financial – in determining decision-making processes, shaping households' perceptions of risks and driving adaptive strategies.
- ◆ This provides valuable insights into how elements such as education, social networks, support systems and access to knowledge play a pivotal role in shaping the capacity of households to perceive, respond and adapt to environmental risks.
- ◆ Results from these findings highlight the value of community engagement to actively and accurately inform policy making. It also demonstrates the use of knowledge dissemination at the household level as an adaptive tool.
- ◆ To address these vulnerabilities, a combination of participatory approaches, local knowledge and policy development is proposed to increase adaptive capacity within communities and reduce the vulnerabilities faced by individual households.

## WHAT IS AT STAKE?

As the effects of climate change become increasingly apparent, Cambodia's vulnerability to these real and potential threats cannot be overlooked. Ranked as one of the most vulnerable countries in the world to climate change, Cambodia's reliance on precipitation patterns and agriculture alongside its limited infrastructure and mitigation methods present it with few means of moderating the impacts of these changes. It is argued that a society's vulnerability, rather than the hazard itself, is the cause of disasters. Cambodia's experience of hazards is inherently linked to this concept. Economic prosperity within Cambodia is situated in rural areas, with agriculture playing a critical role in food security, livelihood and economic development. From 1996 to 2017 flooding in Kratie province adversely affected 558,984 people, damaging 1,715 houses and 164,896.50 ha of crops. With the impacts of climate change increasing disproportionately to the development of adaptation and mitigation programs in Cambodia, concerns for the future are undeniable. In response to these real and perceived threats, the Government of Cambodia has introduced a National Adaptation Program of Action, through which the most active climate change adaptation projects have focused on water, agriculture and disaster risk management.

### Box 1: A brief review of disaster risks in Kratie

Kratie province is closely connected with the Mekong River and Sesan River ecosystems with the livelihoods of communities in Kratie highly dependent on these fluctuating ecosystems. The communities surveyed reside in primarily lowland areas that are marked by cross-cutting water streams, water basins and natural lakes and ponds. Consequently, severe flooding is the primary climatic hazard in Kratie, occurring the most frequently and sustaining the highest levels of damage and costs. This vulnerability is magnified by poor infrastructure, lack of access to irrigation systems and a high dependence on agriculture, with 91% of the total population in Tamao Commune considered to be permanent farmers. The impacts of these extreme flood events touch all corners of a community, from livelihood and food security to shelter, education and economic development.

More recently the Climate Change Strategic Plan for 2014-2023 was introduced. The mission of this plan is to establish "a national framework for engaging...stakeholders in a participatory process" and "capitalize on... local knowledge..." with regards to climate change responses. This study thus has policy implications for this Strategic Plan focusing on local knowledge and adaptation strategies against natural hazards.



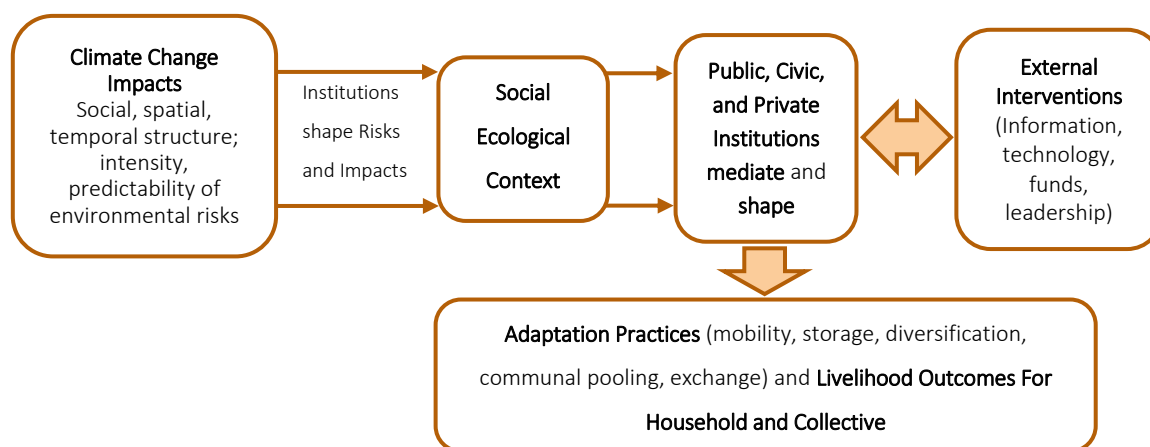
**Photos 1 and 2.** Common local flooding adaptation measures: extending the stilts of houses (left); building hills for animal evacuation (right)

## SUSTAINABLE LIVELIHOODS IN HOUSEHOLD ADAPTIVE CAPACITIES

For this study, structured interviews were conducted with 165 households in 11 villages in four communes (Chroy Banteay, Preak Prasop, Tamao, and Koh Tasuy) in Preak Prasop district. The study adopted Agrawal and Perrin’s adaptation, institutions, and livelihoods framework (Figure 1). The role of sustainable livelihoods in adaptive capacities explores the ability of households to develop stronger adaptive capabilities through the diversification of asset




portfolios and increased opportunities for livelihood diversification. Through the livelihoods framework this study conducted an in depth look at how varying means of livelihoods influenced households to adopt or disregard certain defense mechanisms and adaptive strategies. This report presents the adaptive capacities of households through the following livelihood asset components; physical, human, social, natural and financial assets.

Figure 1: Adaptation, Institutions, and Livelihoods Framework, developed by Arun Agrawal and Nicolas Perrin



## SUSTAINABLE LIVELIHOODS IN KRATIE PROVINCE

The susceptibility of households in Kratie is influenced by their access to, or ownership of, various livelihood assets as described below:

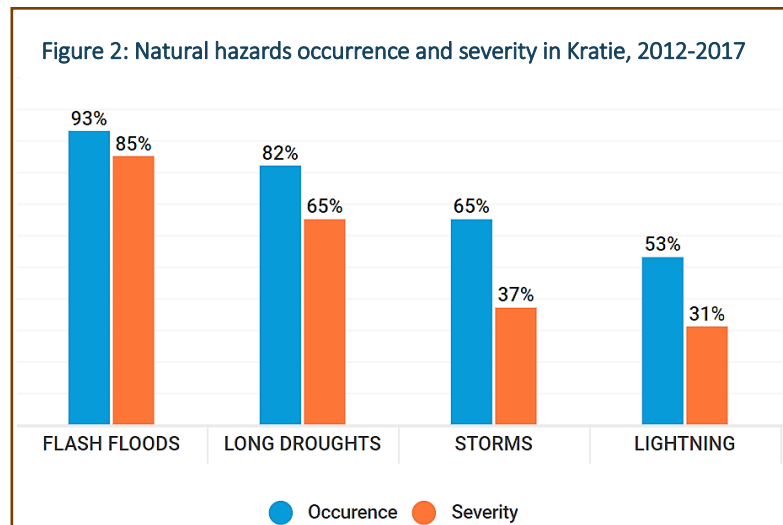
Component	Description
	The majority of the households surveyed live in wooden-stilt houses, with only five percent of the households residing in two-to-four-story structures. Poultry, motorbikes, cropland and mobile phones were found to be the dominant physical assets of value with only half the households possessing boats.
	The average household size was found to be five members and three in four people surveyed were found to have very low formal education (ranging from no formal education up to primary education). Only one percent of those surveyed held a university degree.
	Social assets comprise the development and distribution of community knowledge, educational opportunities, gender equity, and family income. In Kratie, 92% of villagers surveyed had social assets in the form of support provided by relatives within their own village. A further 63% recognized such support structures in neighboring villages. Interestingly, only 15% identified social support structures outside of Cambodia.

## Hazard Exposure

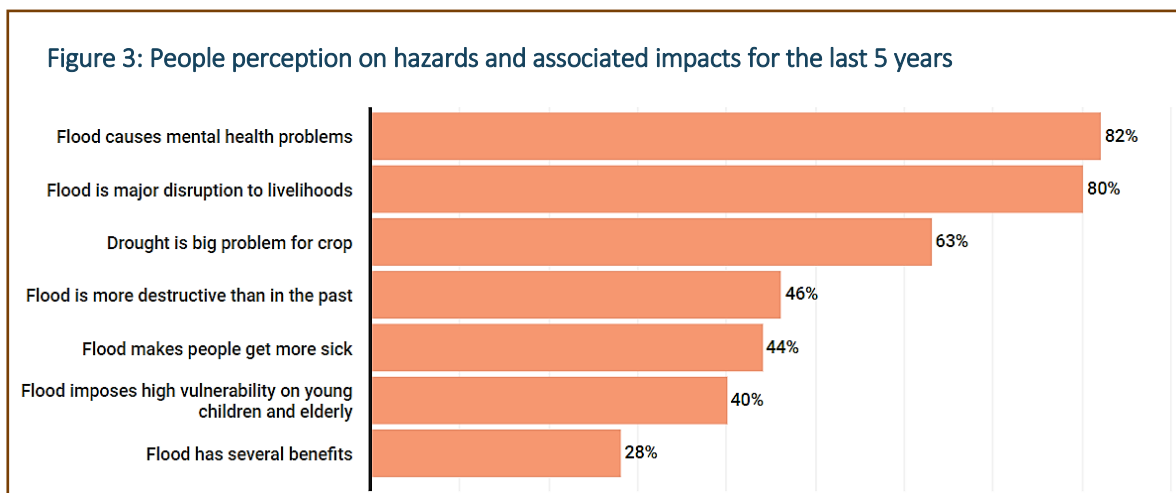
Floods, droughts, storms, and lightning are the major hazards in Kratie province. As shown in Figure 2, respondents reported that floods constituted the most frequent and severe disruption to people’s livelihoods. Droughts were characterized as the second most severe hazard in terms of both occurrence and severity, followed by storms and lightning.

This demonstrates the high degree of risk awareness among

the district’s communities. Villagers were both aware of the risks of natural hazards and the perceived effects of these hazards, as demonstrated in Figure 3. They confirmed that floods and drought played significant roles in putting communities’ livelihoods at risk, with



the risk factors ranging from crop reduction to mental health problems. It is interesting to note that 28% of villagers surveyed recognized the potential benefits of flooding, specifically in terms of pest eradication and the replenishment of soil fertility.



## Risks and Impacts

Floods and drought caused the most losses and damages to crops and animals, consequently impacting household livelihoods to the greatest extent. Nearly 70% of participants experienced crop damages by flooding and many acknowledged detrimental collateral effects. Floods were perceived to bring about indirect multiplying effects, such as the Thai Red Snail,

and widespread diseases. However, there is little to no knowledge surrounding these collateral effects leaving communities vulnerable to largely unfamiliar impacts.

Households in different locations perceive the frequency and intensity of the hazards and their impacts in distinct ways. The intensity of

droughts was deemed lowest in Koh Tasuy commune, a small island which experiences seasonal inundation, and highest in Preak Prasop commune, which is situated in an elevated area with reduced access to water supplies. People's perceptions on hazards and associated impacts also varied depending on the household's livelihood assets. Households with higher levels of

livelihood diversification assessed the impacts of hazards on a greater scale, identifying more frequent impacts of flooding and droughts on stock and household assets. This can be attributed to the fact that households with more diverse asset portfolios, such as owning cattle, generators and tractors, claim assets of higher value, thus assessing a greater risk of loss and damage.

## THE INFLUENCE OF RISK AWARENESS AND PERCEPTION IN SHAPING COMMUNITY ADAPTATION AND RESPONSE STRATEGIES

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Households employed different adaptation strategies in response to the hazards encountered. The application of these strategies and extent to which households effectively maintained the processes directly corresponded to their means of livelihood. Those with superior livelihoods - measured through assets, activities securing certain living standards, activities providing alternative income means and other factors to facilitate access to assets - were able to better anticipate, cope with, resist and recover from the impacts of a natural hazard. Four primary classes of adaptation within the 165 households surveyed were established: storage, diversification mobility, and communal pooling. The extent to which these adaptation strategies were successfully applied depended on the type of hazard experienced and the degree of livelihood capacity, materials and social assets.

The impact of floods was perceived by all households to be significantly higher than that of droughts or storms. Consequently, more extensive adaptation practices were exercised by all households in anticipation of and response to flooding hazards. In response to flooding, storage was deemed the most popular adaptation strategy beyond which mobility, diversification and communal pooling

were all measured to have relatively equal worth. The extent to which strategies were implemented varied extensively between households with poorer households exercising a significantly lower approach to adaptation methods than medium and better-off households. Better-off households prioritized the storage of higher value assets, such as livestock and crops, as well as demonstrating a stronger diversification, communal pooling and mobility capacity. This stresses the role of

**“ Households with a larger and more diverse asset base were able to better anticipate, cope with, resist and recover from the impacts of a natural hazard. ”**

sustainable livelihoods in determining adaptive capacities. Households with more diverse assets and a stronger ability to access and utilize these assets demonstrated robust defense mechanisms and superior adaptive capabilities to avoid and reduce risks. Households with limited ownership and access to assets, in the physical, social, natural and financial forms, demonstrated lower coping capacity. Lack of access to resources aggravated their vulnerability and increased their reliance on traditional coping mechanisms.

In comparison to flood response, a significantly smaller proportion of households employed drought adaptation practices. The adaptation strategies instigated by households varied considerably among livelihood groups, with better-off households applying drought

adaptation strategies to a greater extent than poor households. Droughts are a relatively new phenomena in Cambodia, consequently those dependent on traditional coping mechanisms

have a significantly weaker response than those with superior access to shared knowledge, information and social networks

## TRADITIONAL KNOWLEDGE

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Traditional knowledge bears considerable weight in decision-making in the villages surveyed. Traditional knowledge was found to generate effective adaptation measures in many of the communities studied, primarily in the form of flood awareness knowledge and mitigation measures. Bamboo fences are used as flood mitigation, houses are raised to reduce exposure and higher shelves are built in houses as preparedness measures. Bigger houses are built for stocking products and assets and households often equip their boat as a form of flood preparation. Animals of value, such as cattle and poultry are evacuated to higher and safer areas, often along pre-established evacuation routes and into customary areas.

However, alterations in natural ecosystems and the reshaping of water systems are decreasing the relevance of traditional coping mechanisms and preventing communities from utilizing all resources at hand. For example, in Kandal Koh villagers do not extract water from the river for planting corn because it is not their custom to

do so, detrimentally impacting their agricultural livelihoods.

This high dependence on traditional knowledge highlights a lack of knowledge sharing and information management within and between communities. Social learning and information acquisition were found to rely on personal prediction and individual sharing. The survey found a lack of willingness to participate in collective actions, a lack of common interests and a high level of interest in self-preservation. This highlights the absence of a local focal point and the poor functioning of community leadership.

Future mitigation and adaptation measures may involve knowledge management systems, through which information is channeled in a valuable and reliable way and made available to all individuals. The introduction of early warning systems localized at grassroots levels, also have the potential to increasing community participation, power distribution and knowledge.



**Photos 3 and 4:** Traditional knowledge: planting bamboo fences as flood mitigation (left); stroking lemongrass leaves as flood prediction (right)

## Box 2: The underlying problems behind the floods in Tamao Commune

Along with the disastrous impact floods have brought to Tamao Commune, there have been several significant issues that challenge the community's disaster coping mechanisms. The dissemination and reliability of information-related to disaster prediction remains a major concern. Common traditional flood forecasting techniques, for example, stroking lemongrass leaves, observing the water's patterns and using the signals interpreted from animal behavior, have become unreliable as climate change and modern processes (such as dam constructions) change the natural integrity of ecosystems. Emerging modern systems from the Ministry of Water Resources and Meteorology also diminish the weight of traditional flood forecasting techniques. Nonetheless, a wide information gap still exists between the 'failed' authority and the passive public. Noticeably, the low level of public political participation and poor functioning of community leadership in Tamao Commune has added to the already fragile social capital between local authority and villagers.



91% of the Tamao population are farmers

## POLICY IMPLICATIONS

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- ◆ The development of Knowledge Management Systems, through which information is channeled in a valuable and reliable way and made available to all individuals.
- ◆ The introduction of Early Warning Systems, localized at grassroots level, to increase community participation, access to knowledge and the introduction and distribution of external knowledge.
- ◆ Poverty alleviation and income diversification to reduce the vulnerabilities of individual households and increase their adaptive capacity.
- ◆ A focus on pro-poor adaptation strategies to enhance the capacity of the most vulnerable households. This may involve a more nuanced examination of the risk and impact perceptions of vulnerable households.
- ◆ The development of disaster-specific and location-sensitive adaptation practices. Taking into account the pre-existing tradition knowledge and adaptive processes and drawing on the effective engagement of local communities in planning and implementing interventions.

## SOURCE

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This policy brief has been prepared by Sophie Offner and Viseth Vathanak Som, The University of Auckland, New Zealand, and is based on the following material:

Ngin, C., Chhinh, N., Neef, A., & Chhom, C. (2018). *Adaptation Strategies in Post-Disaster Recovery Processes: Flood-Affected Communities in Kratie Province, Cambodia*. APN Project Research Report.

Edited by Professor Andreas Neef, The University of Auckland, New Zealand



**About this publication:** This policy brief has been developed for the APN project “Climate Change Adaptation in Post-Disaster Recovery Processes: Flood-Affected Communities in Cambodia and Fiji” (CAF2017-RR01-CMY-Neef) under APN’s Climate Adaptation Framework. For full details of this project, including news and events, project activities, publications and presentations, please visit the project website at <http://www.climatechangeplus.net>.

March 2019