



*Strengthening local capacity
in the economic analysis
of environmental issues*

The Economy and Environment Program for Southeast Asia (EEPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 10 member countries (i.e., Cambodia, China, Indonesia, Lao PDR, Malaysia, Myanmar, Papua New Guinea, the Philippines, Thailand, and Vietnam.) It aims to strengthen local capacity for the economic analysis of environmental issues so that researchers can provide sound advice to policy makers.

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Climate-induced Vulnerability in Kampong Speu Province, Cambodia

Climate change has significantly reduced agricultural production affecting food security and livelihood sustainability of Cambodians. An EEPSEA and IDRC study by a team from the Royal University of Phnom Penh analyzed the social vulnerability to climate change of Cambodia's Kampong Speu province, one of the provinces most affected by natural disasters in the country.

Results indicate that drought was the most severe hazard from 1999 to 2011 in Kampong Speu because it occurred in both the lowland and upland areas. The agricultural sector was found to be the most sensitive because of the frequency of drought in the province. Majority of people in Kampong Speu are rice farmers who suffered negative climate-induced impacts on their livelihoods such as lower agricultural output, loss of agricultural labor due to increasing cases of migration, and damaged roads and irrigation systems. Results also show that women were more vulnerable to extreme climate hazards than men due to high workload, less opportunity for education, and higher susceptibility to health problems.



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Constructing and renovating canals, selling household assets, and migrating to other areas or countries to find work were some of the strategies used to deal with extreme climate hazards. In agriculture, shifting from six-month to three-month rice seed varieties was found to be an effective coping mechanism. It was also found that people in upland areas have a higher adaptive capacity and tend to migrate less than those from lowland areas because of additional income from non-timber forest products collection.

Kampong Speu Province

Kampong Speu province borders Kampong Chhnang and Pursat to the north, Phnom Penh to the east, Kampot and Takeo to the south, and Koh Kong to the west. Kampong Speu's weather is characterized by warm and humid temperature, with average temperature at about 27°C. The province covers 7,017 km². Its topography is variable, from a large area of lowland paddy fields in the east to lowland/upland mosaics and upland forested areas in the west.

Kampong Speu is subdivided into eight districts composed of 87 communes and 1,308 villages. Average population density is about 102/km². Agriculture (i.e., rice, sugar cane, palm sugar and mango) and its

related sub-sectors (e.g., garment factory) make up Kampong Speu's economy.

Kampong Speu is one of the provinces most affected by natural disasters in Cambodia. In particular, it suffers from flash floods in the rainy season and drought in the dry season. The disasters that the province faced have contributed to its becoming one of the poorest provinces in the country (PDMC, 2011; Oxfam, 2005).

Six out of eight districts in Kampong Speu were selected as study sites. The two districts to the west (i.e., Aoral and Phnum Sruoch) represent the upland areas. The four other districts (i.e., Chbar Mon, Samraong Tong, Baseth, Odongk) represent the lowland areas of the province.

The lowlands often experience seasonal flood due to the large amount of water flowing from the Aoral Mountains. Among the six districts selected in the study, four are located along the Stung Preak Thnaot River, which cuts across the province. These areas experience flash floods if heavy rains occur for more than seven days in the mountains. Two districts (i.e., Baseth and Odongk) are highly vulnerable to drought because of its far location from the river.

Methodology

The study analyzed the social vulnerability of Kampong Speu local communities to extreme climate disasters in terms of geographic location, ethnicity and sociocultural factors (i.e., social capital and demographic and political-economic variables). It identified the communities vulnerable to specified hazards; described vulnerable communities and social groups; and assessed social vulnerability in terms of underlying problems and their corresponding solutions.

The study employed both quantitative and qualitative research methods. A survey was used to analyze general information relating to both the number and impacts of hazards on the livelihood of villagers. Particular focus was given to the agricultural sector. Seven focus group discussions (FGDs) were conducted: four in the lowland districts and three in the upland districts. Sixteen key informant interviews were conducted with provincial leaders, district/municipal leaders, commune/village leaders, commune farmer association representatives, youth representatives, women leaders, mothers, child association representatives, and representatives from the religious sector and NGOs. The interviews captured their views



on vulnerability, adaptation, exposure and climate change. Twenty-four families were interviewed to get a detailed narrative about their experiences in relation to floods, drought and windstorms, eight of which were selected to provide more detailed information.

Climate-related hazards in Kampong Speu

Study results indicate that over the last 12 years (1999-2011), the province was exposed to three main climate-related hazards: droughts, floods and windstorms. Both upland and lowland areas faced drought and flooding more than windstorms; however, lowland areas were exposed to more droughts. Flooding was generally not a major concern for farmers in the province although it still affected upstream areas.

Drought has had the biggest impact on livelihood over this period and has occurred widely across the province. Floods mainly affected areas along the upstream part of the Stoeung Preak Thnout River, particularly the mountain districts of Aoral and Phnum Sruoch. Chbar Monn City and Samroung Thoung district, as well as those who live nearby and along the downstream part of the Stoeung Preak Thnout River, have not experienced flooding

since 2005 when the Tomnoup Rorlongchey Kartboun and the Tomnoup Rorlingchey Karkchoeung canals were constructed. The construction of these canals has also enabled greater water access for planting rice and vegetables all year round.

For the areas affected, overall flooding has caused a significant amount of damage, especially to infrastructure, agriculture, and the health sector. Windstorms have occurred in the upland areas but have had minimal impact on livelihood.

Vulnerable sectors

The agricultural sector is considered the most sensitive sector because of the frequency of drought in the province (i.e., one to three times per year over the last 12 years). Majority of people in Kampong Speu are rice farmers who suffered impacts on their livelihoods from natural hazards such as lower agricultural output, poor health of both humans and livestock, loss of agricultural labor due to increasing cases of migration, and damaged infrastructure (i.e., roads and irrigation systems).

Significant adverse impact manifests in lower family income, which led to inadequate access to education and health services. Many students

especially at the vulnerable areas have left school to provide support at home or to migrate with their parents and seek work outside their home village.

Children, people with disabilities, and the elderly were found to be the most vulnerable to climate-related hazards followed by orphans, families who suffer from gender violence, single parent households, and low income families. Results also show that women were more vulnerable than men due to the high degree of responsibility they typically held regarding family care and food provision; the lower opportunity for health education and skills training in rural areas; and, on the average, their higher susceptibility to health problems.

Despite this, women play an important and active role in mitigating and responding to natural hazards at the family level. Results from the depth interviews indicate that women work more than men, being responsible for housework while also doing some agricultural field work. Other women have looked for migrant work in other villages to support their family. Women are also responsible for emergency preparedness as well as house repair after disaster strikes.



Strategies in dealing with natural hazards

Constructing and renovating canals, selling household assets, and migrating to other areas or countries to find work as garment factory workers, house helpers and construction workers are some of the strategies used to deal with the impacts of climate-related hazards in Kampong Speu.

In agriculture, lowland farmers have taken to using three-month instead of six-month rice seed varieties as a strategy to deal with vulnerability. The fast-growing rice seed needs less time and water and produces high yields (i.e., 5-8 tons per hectare).

On the contrary, upland farmers were less willing to change their agricultural practices. Only small areas have changed from planting rice to planting taro, which provides more income. However, those from the uplands have a higher adaptive capacity and have less instances of migration than people in lowland areas because of the additional income they gain from harvesting non-timber forest products and from employment at agricultural industrial farms.

Some people in both rural and urban areas have also relied on herbal medicines and traditional ceremonies to mitigate the impacts of natural hazards. Many people are still dependent on local relations

(i.e., relatives and neighbors) to help them deal with hazard impacts.

Policy implications

The study recommends the renovation and construction of reservoirs and canals in areas where people live far away from water sources. Extension activities to provide farmers with information on fast-growing rice seed varieties or suitable crops that use less water and give high yield is also recommended.

Strengthening existing extension activities that provide climate change information to rural folk in both the lowland and upland areas in Kampong Speu is needed. Providing more support, especially in terms of food and health care, to vulnerable groups including women, children, people with disabilities and the elderly is also important, especially in preparing them for extreme climate-related hazards. Establishing an emergency food supply in each village and commune, which can be used to support the urgent needs of hazard victims, is also recommended.

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