



Pilot Case Studies of Climate Risk-coping Strategies of Small-scale Farmers in Cambodia

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Abstract Climate predictions for Cambodia are for increases in temperatures and rainfall with the likelihood of wetter monsoon seasons and less rainfall in the dry seasons. Developing countries such as Cambodia have few resources and capacity to adapt to climate change and are therefore considered to be the most vulnerable. Attention so far in Cambodia has focused on technical interventions and disaster relief rather than on planned adaptive responses. The aim of this study was to gain insights on how individual farm households cope with and adapt to climate variability and change. Here we present the results of pilot case studies to document climate risk-coping strategies currently employed by small-scale rice farmers in Cambodia. Community consultations and in-depth interviews with selected participants were conducted in the Communes of Trapeang Ruessei in Kampong Thom Province and Snam Krapeu in Kampong Speu Province in 2011. Data were collected by writing down notes to form the basis of the respondent's narrative. Two in-depth interviews were done in each Province. It was immediately obvious from the narratives that the households studied could not survive from on-farm income alone especially during droughts. Our pilot interviews indicated that off-farm income might be the predominant coping strategy in the rice-based farming system. There appears to be a need for researchers and policy makers to shift from an agricultural systems/commodity mind-set to a household livelihood mind-set with regard to the ability of households to cope with climate variability and climate change. A complete breakdown of household income sources is an essential baseline requirement before an assessment of climate change resilience in the rice-based system can be made. A baseline assessment of vulnerability at the household level should be considered an essential prerequisite for developing research priorities and designing interventions.

Keywords climate change, adaptation, risk, vulnerability, household, livelihood

INTRODUCTION

Climate predictions for Cambodia are for increases in temperatures and rainfall with the likelihood of wetter monsoon seasons and less rainfall in the dry seasons. Temperature is expected to rise by 0.7 to 2.7 °C by the 2060s and annual rainfall to increase with shorter-wetter rainy seasons and longer-drier dry seasons (Mac Sweeny et al., 2008). Anecdotal evidence suggests the frequency and intensity of floods, droughts and windstorms have increased in Cambodia since the year 2000 (NAPA, 2006).

Developing countries such as Cambodia have few resources and capacity to adapt to climate change and are therefore considered to be the most vulnerable (McCarthy et al., 2001). In response, The Cambodian National Adaptation Programme of Action to Climate Change (NAPA) was established in 2006 (NAPA, 2006). However, as with elsewhere in Southeast Asia, attention so far in Cambodia has focused on technical interventions and *ex post* disaster relief rather than on planned (*ex ante*) adaptive responses (Resurreccion et al., 2008).

Researchers are now beginning to give attention to climate change adaptation in Cambodia (Roth et al., 2009). However, the emphasis remains on exploring agricultural enterprise interventions without reference to the climatic risk-coping strategies that are currently being employed at the household level. This is consistent with the conventional narrow focus on exploring changes to the agricultural enterprise mix on-farm and excluding non-farm activities and income (Ellis, 2000). Sakurai (2009) posed that from the viewpoint of resilience, it is important to investigate how a farm household copes with shocks that negatively affect income. It was found that most of the households studied in Zambia used non-agricultural work as an *ex post* risk-coping strategy to respond to crop production shock in the previous cropping season.

OBJECTIVE

The aim of this study was to gain insights on how individual farm households cope with and adapt to climate variability and change and the basis for decision making at the household level.

METHODOLOGY

During 2011, a pilot project was conducted to evaluate options for improving adaptive capacity for climate variability and climate change in Cambodian rice-based systems. Community consultations were held in the Communes of Trapeang Ruessei in Kampong Thom Province and Snam Krapeu in Kampong Speu Province. The purpose of the consultations and in-depth interviews was to gain an insight into the current climate risk-coping strategies of small-scale farmers in Cambodia. Community consultations were held with 30-40 farmer participants at each Commune. The consultations were conducted according to guidance and monitoring by commune officials. On completion of the group consultations, in-depth interviews were conducted with volunteer participants. The methods were adapted from Roth (2008) and Ramamasy and Baas (2007).

The in-depth interviews were informal and included timeline analysis and narrative. The timeline analysis helped draw out a narrative from the respondent on the events leading to good times, successes, bad times and failures. Questions were structured to draw out information on the household's ability to cope with climatic events. The questions included: what was the reason for success; how did they cope/adapt; and reasons for not coping/adapting.

It was expected that this process could identify opportunities to improve coping/adaptive capacity. Some of the key driving forces could include health, climatic events, access to resources, assistance and new technology. Data were collected by writing down notes to form the basis of the respondent's narrative. Two in-depth interviews were done in each Province. A 0-100 scoring system was used for scaling time line events and for proportioning household income.

RESULTS AND DISCUSSION

Ms. Yam Pon, Kampong Thom Province: Ms. Yan Pon, 43, lives in Trapeang Krasang Commune, Kampong Thom Province. Her village, is a small distance from the Kampong Thom capital. There are six members of the household. Yam Pon's timeline is strongly affected by family tragedy with the death of her husband in 1996; her grandmother in 2001; a brother in 2004; and her youngest brother in 2010 (Fig. 1). Her life has been very difficult since her husband passed away as this made her the primary supporter for the household.

On the positive side, her 1995-2001 rice income enabled her to buy an extra 0.5 ha of land. From 2001-2008 her income increased after she got a job in Phnom Penh as a garment factory worker. She received USD 40-100 per month from the off-farm work. Her cousin is also working off-farm as a hotel cashier with a monthly income of USD 80.

By 2006, Yam Pon's income from work at the garment factory had raised the quality of life in the household. In 2009 her income from rice and livestock enabled her to buy a new motorbike. In 2010, the rice yield enabled her to buy another 0.5 hectare of land. Yam Pon has health problems

and when she gets sick she cannot work and her son and aunt need to work on her behalf.

Yam Pon's soil is sandy and poor in nutrients, she grows rice one time per year in the main wet season but growing rice can be affected by drought. The average rice yield is about 1 - 2 t/ha. She has two hectares of land and harvests around 3 tonnes of rice each year.

Yam Pon has access to finance at 1.5% per month. This is considered to be a very low interest rate for households with low income. The common interest rate within the region is about 3% per month. Her family income is derived from rice, other crop, livestock (four cattle), and on-farm and off-farm labour. She and her cousin migrate off-farm for work in times of drought. The average income for the family is around USD 40-70 per month.

In summary, when Yam Pon is faced with disasters such as drought or flood, she resorts to off-farm activities to gain income to support her family. Thus it is very hard for her to cope with the problems. To support her family, she would like to increase her rice yield and expand other sources of income.

Mr. So Chhoei, Kampong Thom Province: Mr. So Chhoei is 55 years old and a key farmer living in Serei Vong village, Trapain Russei Commune, Kampong Svay District, Kampong Thom Province. He has nine children with five already married and four remaining in his household. In 1995, after he stopped working as a soldier, his livelihood was difficult but not so serious (Fig. 1). He mainly relied on rice and a small income from livestock and vegetables. Growing rice is mainly for household consumption. If the rice yield is high, then the surplus can be sold; however, if the rice yield is low, the household needs to buy rice to make up the deficit.

In 2000, due to sickness in the whole household, their livelihood was very badly affected. They received a very low yield of rice because of insufficient labour to maintain the crop. To survive, he borrowed money from rich local people at high interest rates and sold some property. He also rented some land from a neighbour to grow vegetables for one season.

In 2005, Chhoei's livelihood improved because the health of the household improved. At that time, he had received some support that enabled him to earn some money from various agricultural activities such as vegetables, fish and fruit trees. However, his livelihood was not much better because he had two years of drought. His rice crops during that time completely failed. His family was dependent on homestead activities of vegetable, fish, fruit trees and livestock production.

In 2010, things were good and Chhoei's standard of living improved. He had learned and adopted some agricultural techniques which provided him with greater yield compared to his traditional practice. In conclusion, his life has not been easy and he has had to cope with many difficulties. When he is faced with drought, he is dependent on homestead activities and his income is reduced.

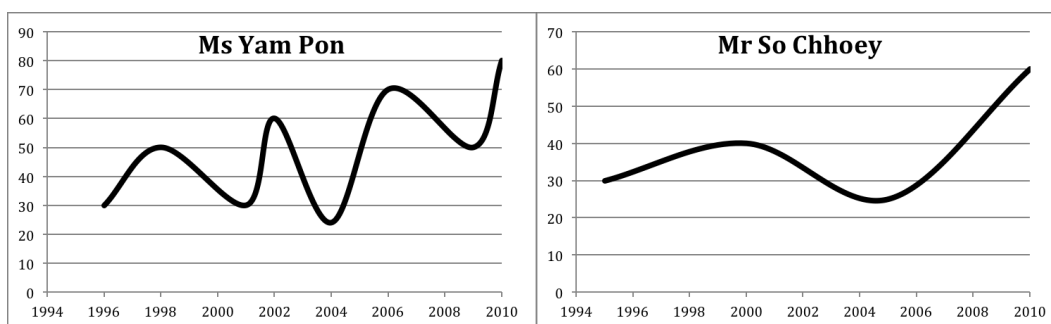


Fig. 1 Timelines for Ms. Yam Pon (left) and Mr. So Chhoei (right)

Ms. Keo Sokhom, Kampong Speu Province: Keo Sokhom is 50 years old, and a key farmer living in Snam Krapeu Commune, Kampong Speu Province. She has two daughters. In 1995 her livelihood was difficult but not so serious. It was mainly reliant on livestock (cattle), rice and vegetable.

In 1996, due her mother's sickness, her livelihood was difficult because she had to spend a lot of money on medical treatment and other expenditure for the household (Fig. 2). They received

very low yield from their rice because of insufficient labour to maintain the crop. To survive, she borrowed money at high interest rates.

In 1998, her livelihood was a bit better because the general household health had improved although her sister remained sick. At that time, she worked at needle craft which enabled her to earn some money. Her daughter also commenced migrant labour at a garment factory in Phnom Penh. Her husband is disabled but can take the cattle to grass fields off-farm. Her livelihood has been made difficult because of successive droughts and floods (1999-2004).

Droughts and floods resulted in almost complete failure of the rice crop and loss of productivity from livestock. During these times, her household was dependent on migrant labor and livestock and some on homestead activities of vegetable or fruit tree. Her land is less than 1 hectare which produces enough rice for family consumption but no surplus to sell.

In 2010, things were better and Sokhom's standard of living was improved. She had learned some new agricultural techniques that resulted in better yield compared to traditional practice.

In conclusion, Sokhom's life is not easy and she has to cope with many difficulties. When she has a problem with drought, she depends on off-farm income and homestead activities. The biggest challenges for her life are drought and flood.

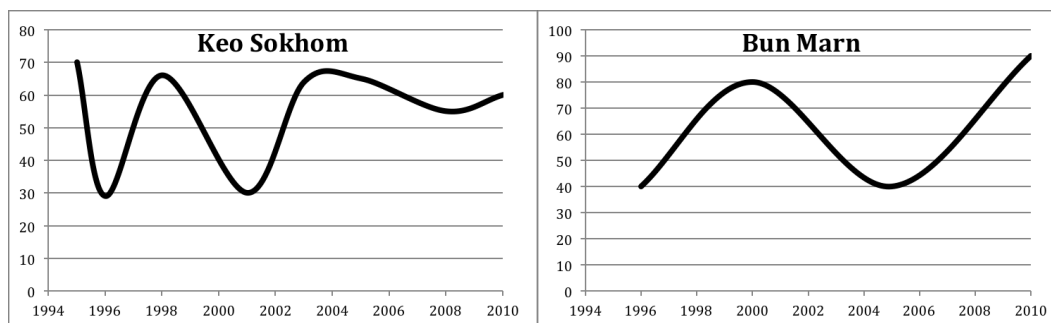


Fig. 2 Timelines for Ms. Keo Sokhom (left) and Mr. Bun Marn (right)

Mr. Bun Marn, Kampong Speu Province: Bun Marn is 42 and lives in Cham Bok Khae village, Toek La Ok Commune, Kong Pisey District, Kampong Speu Province. There are five members in the household, two daughters, one son, his wife and himself. He stopped studying after he was in grade 7 of the secondary school. His village is a long way from Kampong Speu capital and it takes around one hour to travel there.

Bun Marn's health is not good and when he falls ill, he cannot work, and this is a major problem because his whole family is dependent on him (Fig. 2). In addition, his medication costs around USD 40 per year with the total cost for family health care being about USD 75-100 per year.

The soil is a sandy loam poor in nutrients and he can grow only one rice crop per year in the main wet season. He would like to grow rice two times per year but there is not enough water. The average rice yield is about 1 - 2 tonnes per hectare. He has only 0.4 hectares of land and receives a rice yield of around 800 - 900 kg. Within the village, there is no irrigation infrastructure or water resources. But in some other villages within the commune, some channels have been dug by government projects. Marn has access to credit but with an interest rate of 3% per month which is considered excessive for people on low incomes.

Marn's family income is derived from rice, motor taxi, small store and making Khmer noodles. He doesn't do off-farm labour or migrate for work. He has one cow which has not yet produced a calf. In the past, he had several cows but sold all because he needed money for family medical expenses. The household has a small number of chickens. He does not keep pigs because it is hard to supply feed. The average income for the household is around USD 40 – 50 per month.

When Marn is faced with disasters such as drought or flood, he is forced to resort to off-farm activities to gain income to support the household. He has also had to mortgage his farm to get a loan during periods without income. To support his family, he has had to increase the time driving his moto-taxi and expand other sources of small income.

Discussion

Ellis (2000) contended that most rural families have multiple income sources including off-farm wage work in agriculture, non-agricultural wage work, trading and remittances from urban areas and from abroad. In sub-Saharan Africa, between 30 and 50 per cent of household income is derived from non-farm sources (Ellis, 2000).

A similar situation exists in Cambodia. A survey of households in Preah Nipean and Angk Popel Communes in Kampong Speu Province in 2011 showed that the average number of persons per household was 5.65 with 55 percent of households owning less than 0.5 ha of land, 35 percent having a non-farm business, 67 percent reliant on credit and 88 percent receiving remittances from migrant labour. Clearly these households do not have the capacity to survive on agricultural pursuits alone even during periods of favourable climatic conditions.

It was also immediately obvious from the narratives of respondents in our study that their households could not survive from on-farm income alone especially during droughts. We therefore introduced retrospectively, a question about the income sources that the household relied on. This yielded the dramatic results presented in Fig. 3. Three of the four farmers relied heavily on off-farm income during periods of climate stress and this ranged up to 93%.

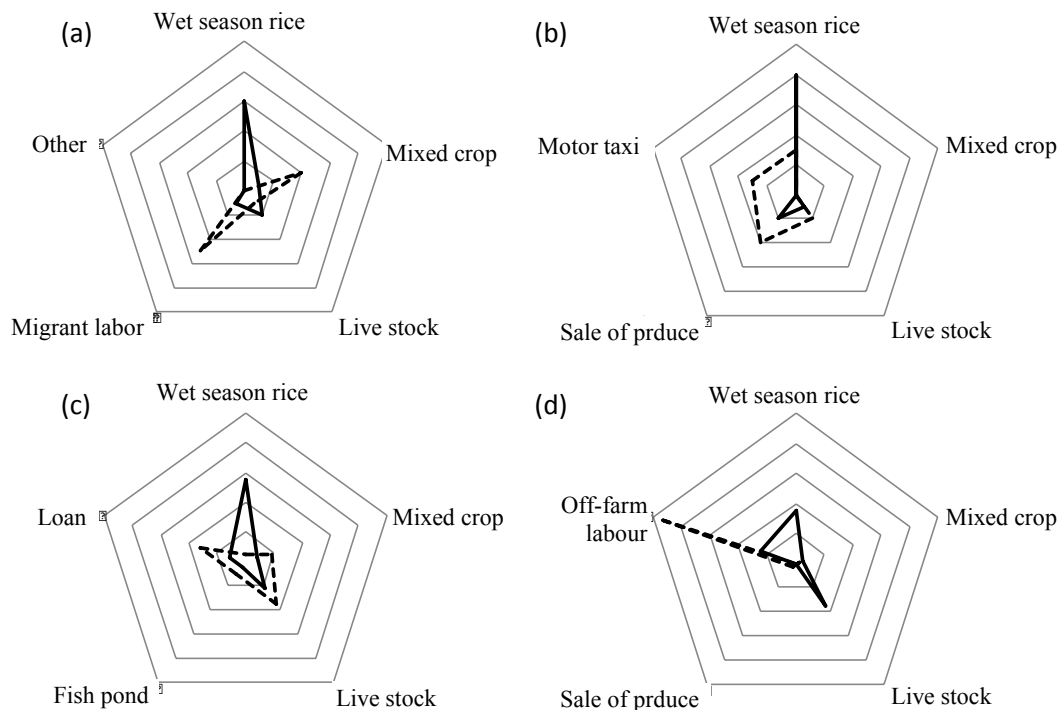


Fig. 3 Sources of household income in normal and drought years for Yam Pon (a), So Chhoei (b), Keo Sokhom (c) and Bun Marn (d). Normal year (solid line), drought year (dotted line).

CONCLUSION

In-depth farmer interviews revealed that coping strategies of households in “the rice-based farming system” did not always include rice or on-farm diversification options. Production from other crops, chickens, pigs and cattle suffer in the drought the same as the rice. There appears to be a need for researchers and policy makers to shift from an agricultural systems/commodity mind-set to a household livelihood mind-set with regard to the ability of households to cope with climate variability and climate change. In the in-depth interview pilot case studies, the rice-based system appeared to be systemically inadequate to cope with regular droughts.

It appears that natural disasters such as drought and poor health are causing significant livelihood problems for Cambodian rural households. To cope with the difficulties, some household members migrate for off-farm income, while others diversify their agricultural crops and livestock in order to secure their income. Based on this case study, access to micro-finance at reasonable interest rates would greatly assist rural households especially to reduce the impact of natural disasters and family sickness.

Access to better health care and health information is crucial. The households interviewed appeared to be having serious problems with their health and are spending significant amounts of money on medication. Construction of irrigation infrastructure where appropriate could help farmers in coping with drought.

The concept of a “rice-based system” in the Cambodian rainfed lowlands appears to be a dogmatic construct which seems to have been unquestioningly accepted by researchers and policy makers with the potential for application of inappropriate interventions. Although the majority of farmers in the Cambodian rainfed lowland grow rice, it is not possible to determine from national statistics the proportional contribution that rice makes to the household income.

A complete breakdown of household income sources is an essential baseline requirement before an assessment of climate change resilience in the “rice-based system” can be made. A baseline assessment of vulnerability at the household level should be considered an essential prerequisite for prioritizing research projects and designing interventions.

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