



The Study on Flood's Impact on Rice Production in Sandek Commune Bathay District Kampong Cham

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Abstract Flood is regarded as the most serious natural disaster that affected the economy of Cambodia. As the consequence, flooding has caused the loss of many lives, and has addressed impacts on social welfare and damaged the public and household properties. Livestock and crops were also destroyed. It has caused not only on the economic impact, but also on social and environmental problems of the nation. Seeing this serious problem which is an obstacle for the development of Cambodia, this study have been conducted with three main objectives are (1) to identify the extent of flood's impact on rice yields of farmers, (2) to assess the economic impact of rice production, and (3) to explore the farmer's adaptation capacity on rice pattern to the flood. To achieve those objectives, structured questionnaires were used with 96 who participated in the interview. The Study showed that the major flooding event in the last twenty years, worst flood in history in study site was the flood in 2011. Indeed, all respondents have evaluated there 2000, 2001, 2002 and 2011. Flood causes the most negative impact to their rice and mixed crops productions. The flood of 2011 has badly affected to economic value of farmer's rice production, which total average yield 3.862 tones/ha were lost. Rice crop is the main source of farmer's living, so this is the serious problem to their livelihoods. Low education of farmers was seen as the cause of low adaptation to flood. Most illiterate people (98%) were worst affected among the others in the study site. Recently, around a half of respondents grow dry season rice instead. Migration after that the flood in 2011 has become the popular way to generate more income. Conclusion, flood in 2011 is the worst impact on rice production in the study area. Further adaptation strategy is strongly needed for local people.

Keywords impact, flood, rice production, adaptation

INTRODUCTION

Natural disasters are key factor in rural people becoming poor and destitute in Cambodia and in the persistence of poverty (MoE and UNDP, 2011). The main natural disaster in Cambodia is flood (CRC, 2003a, 2003b). As the consequences, flooding had caused the loss of many lives, impact of social welfare and damaged the public and household's properties. Livestock and crops were also destroyed. Moreover, flooding not only caused of economic impact, but also to social and environmental problems of the nation. Flooding have caused loss of lives, affected social welfare and damaged public and household's properties, livestock and crop. Moreover, flooding make people suffer, afraid and migration. According to (NCDM and MoP, 2008) showed that from 1997 flooding increase and happen almost every years. (NCDM and MoP, 2008) also add that major flooding events affecting a significant population occur in 1961, 1966, 1978, 1984, 1991, 1996, 2000, 2001, and 2002. Although the flood in 2011 damaged rice paddy 267,184 hectares, other crops 17, 264 hectares and 250 people were killed (NCDM, 2012). Agriculture is the source for rural livelihoods, and for Cambodia are relying in rice production (RGC, 2010 and MoE, 2002). But, Cambodia agriculture is extremely affected by climate change. The flood's impact on rice production was cause of food security problems and around 18% of total Cambodia people had

food insecurity almost every year (NGO ESCRMC, 2002). By the ways, flood's impact on rice production is the obstacles and difficulty to achieved the government strategy in order to increase rice yield and rice export 1 million tones in 2015 (ACIAR, 2009). Moreover, it is the obstacle in poverty alleviation program and in achieving the millennium development goals.

METHODOLOGY

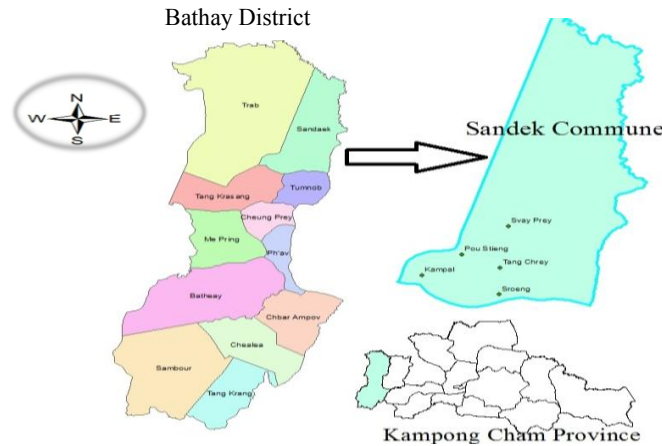


Fig. 1 Bathay district

Household level study was conducted in tree villages: Savay Prey village, Po Stiang village, and Tang Grey village, Sandek Commune, Bathay District, Kampong Cham Province. Major occupations for the people live in the commune who the rice growers. Mapping, seasonal calendar, time line and semi structure interviewer were used in qualitative methodology. There were 96 farmers who participated in the interview for quantitative approach. All data from quantitative were entry into SPSS program for this analysis.

RESULTS AND DISCUSSION

Households' survey and group discussion showed the events flood at the study area in 2000, 2001, 2002 and 2011. The worst floods in the study area's history occurred in 2011. This result is not different from data of (NCDM, 2012) which reveals that in some areas, the flood in 2011 was less severe than the flood in 2000. However, the other areas were worse than the flood in 2000. Table 1 shows 77% of the total respondents (n=96) caused impact and another 21% caused the medium impact. The rest, around 2% got less impact. For the flood in 2000 in the study area 69% got the worst impact. 23% got medium impact and another 6% got less impact. Only 2% of the total of the respondents is normal. Remarkably, the event flood in 2002, only 1% of the total respondents got the worst and medium impact. 11% was less impact and another around 13% normal. Meanwhile, around 17% of the household survey was less impact and around 24% was less potential. The rest, around 33% was the best potential from flood in 2002. Therefore, the event flood in 2001 around of the total of the respondents (n=96) at the study area around 8% got the worst impact by flood. The household's survey shows 24% was less impact and another around 17% normal. Meanwhile, around 7% of the total respondents is less potential and another around 11% mediums potential. The rest, around 33% is the best in the flood in 2001. Flood in 2011 had caused the loss of many lives, impact of social welfare and damaged the public and household's properties. Livestock and crops were also destroyed.

Agriculture is the foundation of farmers' livelihoods in study site, and rice paddy is the core cropping of respondents. It is the most important occupation for their living standard. But flood in 2011 damaged the public and household's properties and damaged on the livestock especially rice production. The survey result showed the rice paddy around 95% of the total respondents (n=96) got the worst impact by flood in 2011. They got nothing of rainy season rice yield because the

farmers grew raining rice at the same time during the flood period and flood in 2011 submerged before harvest 3.1% got medium impact. Most of the respondents got a little of raining rice yield and another 1% got less impact, they lost a little of their rainy season rice yield. The rest, no one in the respondents did not have an impact by flood in 2011 (Table 2). And Flood's Impact on plant around houses was 83.3% of the respondents got the worst impact. 9.4 % got medium impact and 7.3% of them got less impact by flood in 2011. Livestock rearing is a key part of rural livelihood, providing a mean for saving, source of income and food. But, Looking into the flood's impact on livestock of the respondents around 35.4% got the worst impacted by flood in 2011. Moreover, around 43.8% got medium impact and another 7.3% got less impact. Only 3.1% of the total households did not get impact. So, flood in 2011 really affected to their livelihood and saving. Remarkably, only 7.3% of houses of respondents the worst and medium impact. 58.3% got less impacted. The rest, approximately 27.1% was not affected by flood in 2011. During and after flood, the diseases always happen on human and animal. Most of local people have recognized the increasing cases of family's health problems and insect.

Table 1 Flood situation in the last 20 years in the study area

	2011	2000	2002	2001
Worst impact (%)	77	69	1	8
Medium impact (%)	21	23	1	-
Less impact (%)	2	6	11	24
Normal (%)	-	2	13	17
Less potential (%)	-	-	17	7
Medium potential (%)	-	-	24	11
The best potential (%)	-	-	33	33

Source: Households' survey, 2012

Table 2 Flood's impact on livelihood

Level of Impact	Worst (%)	Medium (%)	Less (%)	No Impact (%)
Rice	95.8	3.1	1.0	-
Plant near house	83.3	9.4	7.3	-
Livestock	35.4	43.8	17.7	3.1
Houses	7.3	7.3	58.3	27.1

Source: Households' survey, 2012

The economic impact of rice production

The survey showed that the people in the study site were farmers who grow rice paddy. this result is similar to the commune data book 2011 shows majority occupation of all of people lives in the commune are farmers which growing rice paddy. But, flood in 2011 almost damaged their rice production in the study site. And the total average yield only 0.119 tone/ hector .It was not enough even to home consumption. So, this was the serious problem to their livelihoods. Flood's impact on rice production was the obstacles and difficulty to achieved government strategy (ACIAR, 2009). Therefore, the survey result showed the economic value of rice production 3.682 tones/hectare was loss by flood in 2011. So, it really the obstacles to Achieved government strategy in order to increase rice yield and rice import 1 million ton in 2015.

Local knowledge to flood information

The Information of the water's level is vital for people especially farmers who live in the vulnerable area. Household's survey showed 98% of the total respondents (n=96) do not know the water's level beneficial for cropping matures at Chorlar Sas station. Remarkably, only 2% of the total respondents know the water level matures at Chorlar Sas station that beneficial for cropping. According to households' survey and household's group discussion shows the study area's history events flood in 2000, 2001, 2002 and 2011. Therefore, farmer used to get negative impact by flood.

In contrast, almost respondents in the study area did not make attention to water's level or flood information. It is the serious problems for people who lived in the vulnerable area. We also can say that, do not make attention on water's level or flood information is also another cause of badly impact by flood. In contrast, if they make attention on flood information they can reduce the level of worst impact by flood and they can prepare before flood. So, they have capacity to recover their farm after flood. Flood it is the serious problems and serious concern.

Level impacts of literacy respondents

Survey result showed that 98% of the total literacy respondents in the study place (n=96) was worst impacted by flood in 2011. Looking to the medium impact of the literacy respondents is only 2%. Due to the result shows among literacy respondents all of them were impacted by flood in 2011. The education has play main role in adaptation capacity to flood. Low education may the cause of low adaptation. By the ways, low adaptation is another cause of got worst impacted by flood.

The farmer's adaptation capacity on rice pattern to the flood

Generally, rice farming in the study site takes 7 months which started from June to December. By the ways, flood in 2011 submerged rice paddies about 3 months which started from middle September to middle December (Table 3). Group discussion and the result of interview 96 households showed farmers growing raining rice paddy at the same time during the flood period and flood in 2011 submerged before harvest. Therefore, almost the raining rice paddy of the farmers at the study area was damaged by flood in 2011. The average raining rice yield of the total respondents (n=96) in the year 2011 is only 0.118 tones/hectares. The green color showed the cycle of rice production and yellow color was the period of flooding and the red color was the worst flood. According to the timetable of crop calendar of rice production and flood duration, we can conclude that, the farmer's adaptation capacity on rice pattern to the flood before 2011 is low.

Table 3 Flood duration and rice production cycle

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Set	Oct	Nov	Dec
Rice												
Flood												

Source: Households' survey, 2012

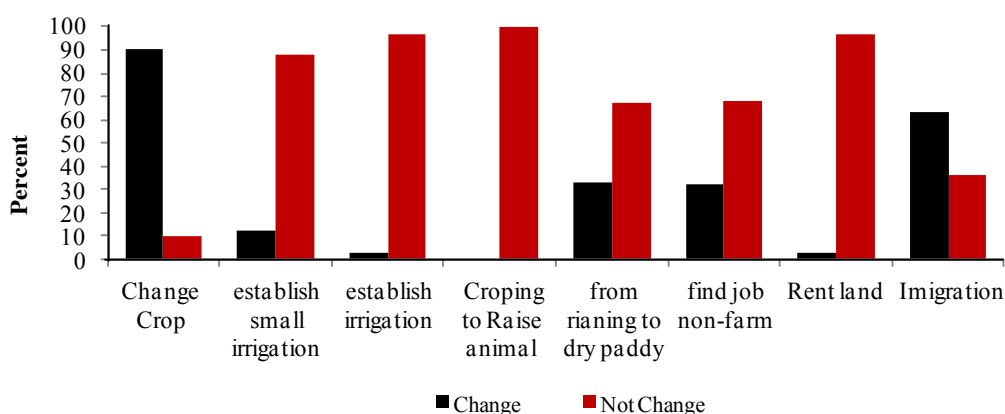


Fig. 2 Farmers' adaptation to flood

Survey result showed that 90% of total interview households has change crop. They changed many kind of rice while only 10% has not. 12% of the total respondents (n=96) was established small irrigations. They build ponds and wells near their farm. According to household's interviews only 3% is establish irrigation. It does not mean that local farmers build new irrigations they all together just rebuilds and clean some irrigation that too old and can not content the water.

Therefore, around 3% has changed rent their land to another. Most of the people do not like this way. However, they still grow rice event they do not know does the flood can damage their rice yield or not. They are farmers so they have no choice and they really want to grow rice two or three times per year, but lack of irrigation. Moreover, around 30% is change from raining to dry paddy and another round 60 % has migrated. Remarkably, there is no respondent change cropping to raise animal (Fig. 2). Agriculture is the foundation of rural livelihoods and rice production is the majority crop for rural people. Flood in 2011 is the worst impact on rice production in the place study is also another cause of blocked the development of Cambodia. Further adaptation strategy is strongly needed for local people.

CONCLUSION

Flooding had caused the loss of many lives, impact of social welfare and damaged the public and household's properties. Livestock and crops were also destroyed. Moreover, flooding not only caused of economic impact, but also to social and environmental problems of the nation. The major flooding event at the last twenty years worst flood in history in particularly study site was the flood 2011. Indeed, all respondents had evaluated there 2000, 2001, 2002 and 2011. The flood was the most negative impact on the rice and mixed crops productions. Particularly, the flood of 2011 had bad impact to economic value of farmer's rice production, which consisted of total average yield 3.862 tones/ha were lost. Rice crop was the main source of farmer's consumption, so this was a serious problem on their livelihoods. Around a half of respondents grow dry rice season instead. Migration to another place becomes the popular way to generate more income. Low adaptation of the farmers is another cause of worst impact especially on rice production. Therefore, the extent of flood's impact on rice yields of farmers is the main consequence. In conclusion, flood in 2011 is the worst impact on rice production in the place study. Moreover, it is the obstacles in poverty alleviation program and in achieving the millennium development goals. Further adaptation strategy is strongly needed for local people.

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