



## PERCEPTION SURVEY ON

**"LEVEL OF KNOWLEDGE AND AWARENESS ON CLIMATE CHANGE AND ITS IMPACT ON AGRICULTURE AND WATER RESOURCES"**



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**Supported by: United Nation Development Programme (UNDP)**  
**REP: NO.: UNDP/RFP-015/10**

**2011**

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## **EXECUTIVE SUMMARY**

Save Cambodia's Wildlife (SCW) conducted a baseline study in Tuek Krahorm commune, Choam Khsant district, Preah Vihear province and in Bos Leave commune, Chitrborei district, Kratie province. In the field survey, there were 108 respondents (62 percent females) from 6 villages in Teuk Krahorm commune and 109 respondents (50.46 percent females) from 8 villages in Bos Leave commune were interviewed.

The purpose of the survey is to access the level of awareness and knowledge of local villagers on climate change and its impacts on agriculture and water resources management as well as adaptation practices in the target communes. In addition, provincial officers of NAPA Follow Up project and commune councilors were also accessed their knowledge on climate change awareness.

The key findings of the study are most respondents have observed changes in climate. However, they are not aware much of its causes and effects. Over 50 percent of respondents in Tuek Krahorm commune and approximately 30 percent of respondent in Bos Leave commune do not know at all about the various causes which contribute to climate change.

Approximately 50 percent of respondent in Teuk Krahorm commune and over 50 percent in Bos Leave commune are aware of deforestation as a cause of climate change, but they do not know much about various causes from different sectors which emit greenhouse gases into atmosphere. Approximately 50 percent of respondents in Teuk Krahorm commune and over 70 percent in Bos Leave commune know climate change affect their agricultural yields. Nearly 30 percent of respondents in Teuk Krahorm and over 30 percent in Bos Leave commune know that water resources have been affected by climate change.

Women in the target communes are the most vulnerable to the impacts of climate change such as droughts and floods. Normally, women have multiple roles in their families especially doing housework in particularly collecting water and taking part in agricultural activities. In dry season, women have to collect water from long distance and face with shortage and bad quality of water during flood season for domestic use in the families.

Respondents think that non-governmental organizations (NGOs) are responsible for helping their community to cope with climate change rather than commune councilors and the government. It means that people are relying more on NGOs, but they are less aware the usefulness of their participation in integrating their demands related to climate change issues to the commune investment plans.

The majority of respondents are farmers and they are planting paddy and other supplemental crops to support their daily livelihoods. Their crops especially paddy has been impacted by climate change, which is resulted in low yields, and increased insects. Farmers are not aware of how to select resilient crop varieties current weather conditions.

Almost all respondents are rearing animals including cattle and buffalo as their main power in agriculture as well as pigs, chicken, ducks and fish as part of their extra income generation. Animals have also been impacted by changes in temperature, which made them sick, reduced food stock, no shelters and died. People in Teuk Krahorm commune are rearing their animals with traditional ways rather than adaptive methods to climate change impacts.

Respondents in the target communes access to water for domestic use and agriculture from rivers, wells, pumping wells, digging ponds, natural ponds, streams and private distributor in Bos Leave commune. The majority of them are aware of climate change impacts on water resources such as water dried up and depleted.

Most of respondent in the target commune are aware of the impacts on the forest in their commune as it could make trees dried and possible fire. 89 percent of respondents in Teuk Krahorm and 70 percent of respondents in Bos Leave commune know that the forest can help in absorbing rain, reduce heat and protect them from wind storm.

Most respondents are able to fish in water sources in their commune. Some respondents are aware of the CC decreases fish stock by increasing water temperature, drying up water, contaminating water quality. It was noticed during the field study that illegal fishing are often taken place in the target communes. Not so many respondents realize the ways to maintain fish for their food through reducing illegal fishing and keeping water availability.

Over 35 percent of respondents in Teuk Krahorm commune and over 97 percent of respondents in Bos Leave commune received information mostly before climate hazards occur via radio, TV and village meeting with local authorities and local NGOs. Respondents have considered local authority and local NGOs as information agencies that can provide sufficient information related to climate change.

Although respondents have information receiving tools such as radios, televisions, VCD players and phones, most of them are still not able to access to climate change information for their commune. Radios, TVs and meetings in their villages are effective and trusted tools to get information on climate change. Respondents in the target communes like watching TV and listening to radio in particular news programme in the morning and night time. The Bayon TV and radio channel is accessible to local people.

Over 50 percent of respondents in the target communes never read any reading materials while approximately one third of them have low education. Therefore, reading materials with more pictures such as posters are more appropriate.

Provincial stakeholders still have limited understanding and knowledge on climate change in particular causes and effects, mitigation measure and adaptation practices in agriculture and water resources management. Moreover, they are not clear the difference between climate change and disasters, disaster management, monitoring and evaluation.

# INTRODUCTION

## 1.1 Project Overview

Save Cambodia's Wildlife (SCW) is a non-governmental organization working for natural resources protection in Cambodia, which is a premier national conservation non-governmental organization that works specifically on nature conservation and biodiversity preservation. Since its creation in 2000, SCW has been successful in a range of projects including the provision of technical support and increasing environmental awareness among the general public through teaching programs, publications, and environmental awareness campaigns. SCW has been continuing its effort to address environmental issues through knowledge and information dissemination to local communities and relevant stakeholders.

In late December 2010, SCW signed an agreement with the United Nation Development Program (UNDP) to implement a public awareness and Outreach for Climate Risk Reduction for 15 months. The outreach is being implemented by the Save Cambodia's Wildlife (SCW) and the results will contribute output 3 of a piloted project, 'Promoting Climate-Resilient Water Management and Agriculture Practices in Rural Cambodia' (NAPA Follow-up project). This project is implemented by the Project Support Unit, Ministry of Agriculture, Forestry and Fishery (MAFF) and collaborated with the Ministry of Environment (MoE), the Ministry of Water Resources and Meteorology (MoWRAM), and the Ministry of Women's Affairs (MoWA)..

## 1.2 Purpose of the study

At the beginning of the Public Awareness and Outreach for Climate Risk Reduction (PAOCRR), the project commences a baseline study in order to assess the level of knowledge and awareness of climate change and its impacts on agriculture and water resources management as well as the adaptation mechanisms being implemented in the target communes. The study also attempts to understand the knowledge, attitude and practice of people on the climate change impacts on agriculture and how the cope with climate change in particular agriculture and water resource management practices so far. In addition, the capacity of commune councilors and provincial officials from relevant departments are assessed for improvement.

Base on the result from the study, a detailed strategy and implementation plan of how the outreach project will be raised among the target groups in different target areas. The expected result from the outreach campaign is that 60 percent of the target households is aware of the impacts of climate change and adaptive measures.

## METHODOLOGY

### 2.1 Scope of the study

The survey covered 8 villages in Bos Leave commune, Chitr Borei district, Kratie province and 6 villages in Teuk Krahorm commune, Choam Ksant district, Preah Vihear province.

**Table 1: List of target villages for the survey**

No.	Village	Commune	District	Province
1.	Praek Ta Am	Bos Leave	Chitr Borei	Kratie
2.	Praek Ta Theung			
3.	Bos Leav Krom			
4.	Bos Leav Leu			
5.	Praek Kov			
6.	Lo Vear Tong			
7.	Preah Kanlorng			
8.	Ta Lus			
9.	Teuk Krahorm	Teuk Krahorm	Choam Ksant	Preah Vihear
10.	Au Ksant			
11.	SangkumThmey			
12.	Chat Taing			
13.	Tropaing Thom			
14.	Robonh			

### 2.2 Sampling

**Table 2: Sample Size in Bos Leave commune (Total 8 villages)**

Village Name	Sample Size by Gender					
	Female		Male		Total	
	#	%	#	%	#	%
Preak Ta Thueng	2	1.83	4	3.67	6	5.50
Ta Lus	8	7.34	9	8.26	17	15.60
Bos Leave Leu	7	6.42	9	8.26	16	14.68
Bos Leave Krom	5	4.59	6	5.50	11	10.09
Preak Ta Am	20	18.35	15	13.76	35	32.11
Preah Kanlong	2	1.83	5	4.59	7	6.42
Preak Kov	8	7.34	2	1.83	10	9.17
Lvea Tong	3	2.75	4	3.67	7	6.42
<b>Total</b>	<b>55</b>	<b>50.46</b>	<b>54</b>	<b>49.54</b>	<b>109</b>	<b>100</b>

Table 3: Sample Size in Teuk Krahorm commune (Total 6 villages)

Village	Gender of respondent				Total	
	Male		Female		#	%
	#	%	#	%		
Teuk Krahorm	8	7.4%	15	13.9%	<b>23</b>	<b>21.3%</b>
Chat Taing	6	5.6%	10	9.3%	<b>16</b>	<b>14.8%</b>
Sangkum Thmei	7	6.5%	12	11.1%	<b>19</b>	<b>17.6%</b>
Trapiang Thom	11	10.2%	18	16.7%	<b>29</b>	<b>26.9%</b>
Ou Khsant	8	7.4%	5	4.6%	<b>13</b>	<b>12.0%</b>
Robonh	1	0.9%	7	6.5%	<b>8</b>	<b>7.4%</b>
<b>Total</b>	<b>41</b>	<b>38.0%</b>	<b>67</b>	<b>62.0%</b>	<b>108</b>	<b>100.0%</b>

### 2.3 Data Collection

The survey team collected the data using face to face interviews with randomly selected respondents and determination of gender distribution in 8 villages of Bos Leave commune and 6 villages of Teuk Krahorm commune. Members of the survey team were received orientation on how to collect data using face to face interviews and together checked questionnaires for inconsistencies.

### Study instruments

The study used three types of structured and unstructured questionnaires. Structured questionnaires were used for interview with selected respondents and unstructured questionnaires used for focus group discussion and interview with key informants (commune councilors, district officers and provincial line departments).

A few tools of Participatory Rural Appraisal (PRA) such as resource mapping, seasonal calendar, VENN diagram were used to find more information from villagers related to the changes of climate and existing resources in the target communes as well as challenges of farmers in agriculture and water resource management.

### Data analysis and reporting

Quantitative data and qualitative data were triangulated to build up a fully rounded analysis. Microsoft Excel was used for data entry and storage before importing to the Statistical Packages for Social Science (SPSS) for generating quantitative data while qualitative data was thematically analyzed.

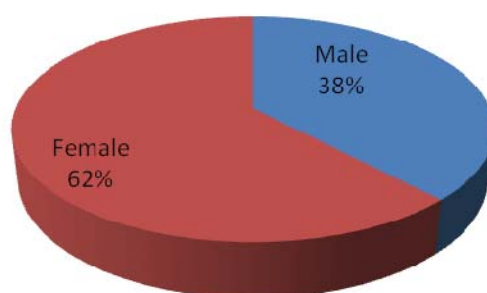
## Survey Findings in Teuk Krahorm commune, Choam Khsant District, Preah Vihear Province

### 3.1 Demographic Information

#### Gender

Based result from the baseline survey data, figure1 indicates that 62 percent of respondents are female and 38 percent male. Female respondents are much more than male respondents as observed that men of some families are soldiers at the border, and some were at paddy fields and forest during the interviews. Therefore, the percentage of female respondent is higher than male.

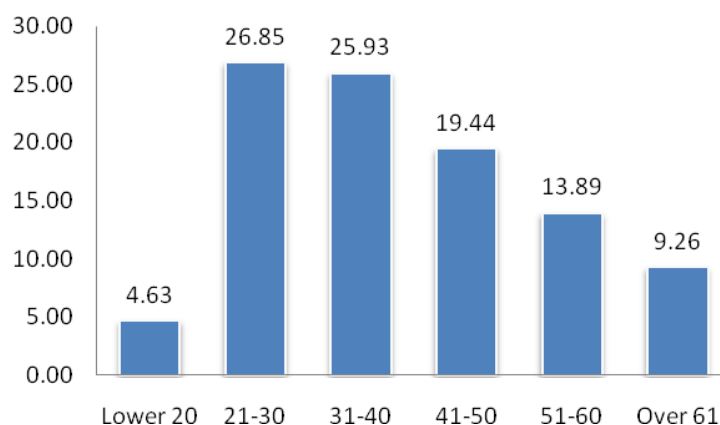
Figure 1: Gender of Respondent



#### Age

Figure 2 indicates age ranges of respondents, 4.63 percent lower than 20 years old, 26.85 percent between 21-30 years old, 25.93 percent between 31-40 years old and 19.44 percent between 41-50 years old, 13.89 percent between 51-60 years old and 9.26 percent over 60 years old.

Figure 2: Age ranges of respondents

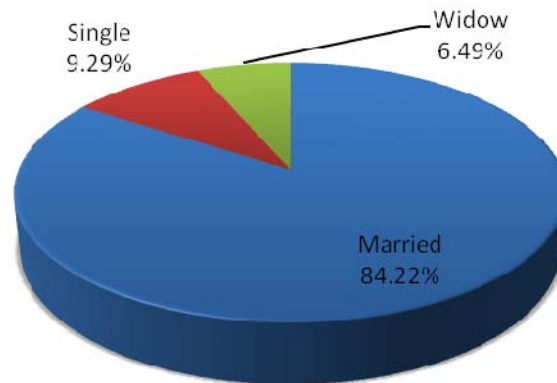




### Marital status

Figure 3 indicates that 84.22 percent of respondents is married, 9.29 percent single and 6.49 percent widow.

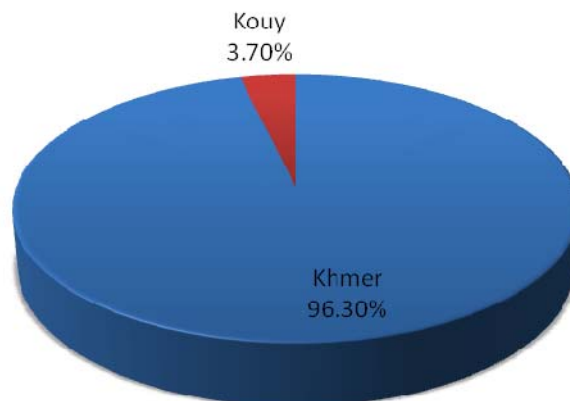
Figure 3: Marital status of respondents



### Ethnicity

According to data analysis, figure4 indicates that majority of respondents are Khmer and 3.70 percent are Kouy indigenous group who are living in Robonh village located about 40 kilometers from the center of Teuk Krahorm commune.

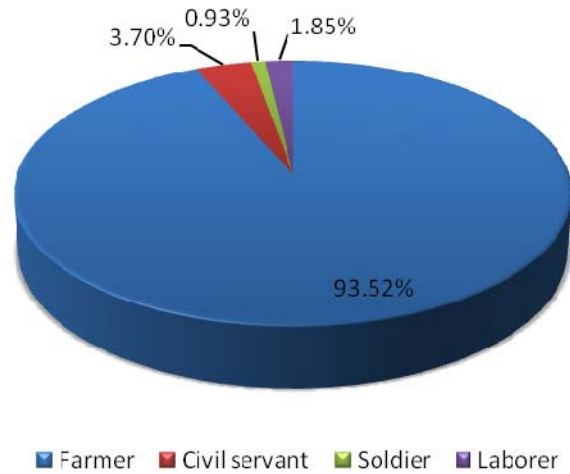
Figure 4: Ethnicity of respondent



### Main occupation

Figure 5 below indicates that 93.52 percent of respondents is famer, 3.70 percent civil servant, 1.85 percent laborer and 0.93 percent soldier.

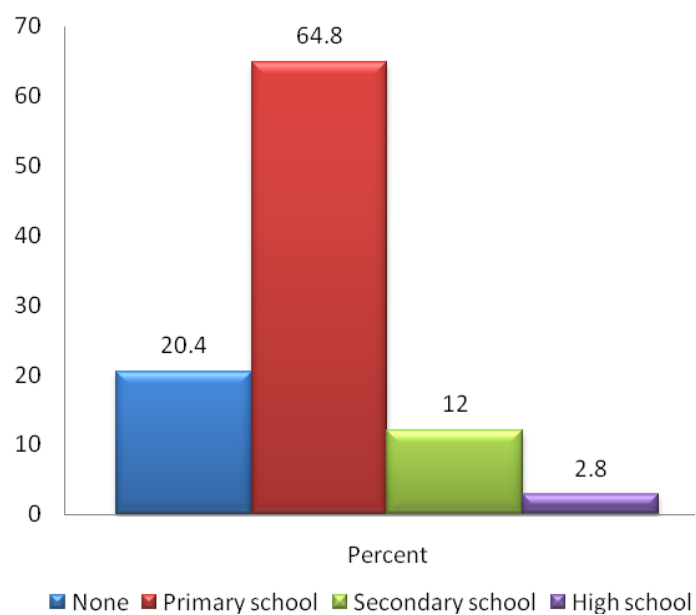
Figure 5: Main occupation of respondents



### Educational level

According to survey, figure 6 indicates the educational level of respondents that 64.8 percent is 'primary school', 12 percent is 'secondary school', 2.8 percent is 'high school', and 20.4 percent is 'don't go to school'.

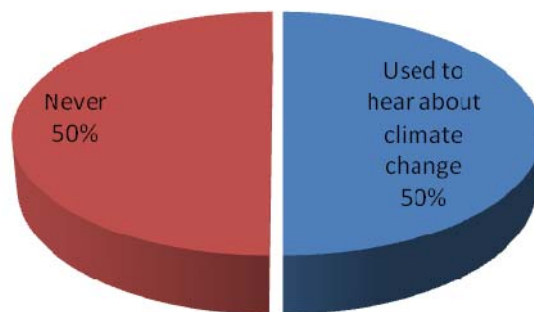
Figure 6: Educational Level of Respondents



### 3.2 Awareness and Knowledge of Villagers on Climate Change

Respondents were asked whether they have ever heard of “Climate Change. Data analysis indicates in figure 7 that 50 percent of respondents heard of climate change and 50 percent did not.

Figure 7: Have you ever heard about “Climate Change”?



According to, baseline data analysis 93 percent of respondents noticed the changes in climate in their area. They noticed that climate conditions in the community seem to be abnormal and changing from year to year. It became unpredictable. The rest of 7 percent never noticed because they had no interest in the changes of climate in their community.

Figure 8: Have you noticed changes in the climate?

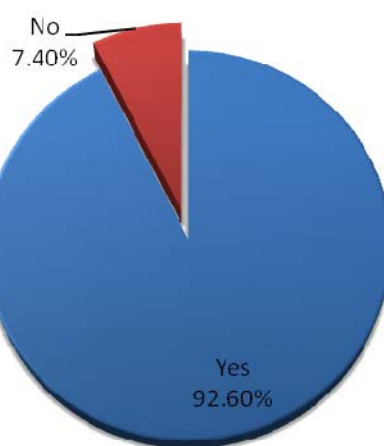
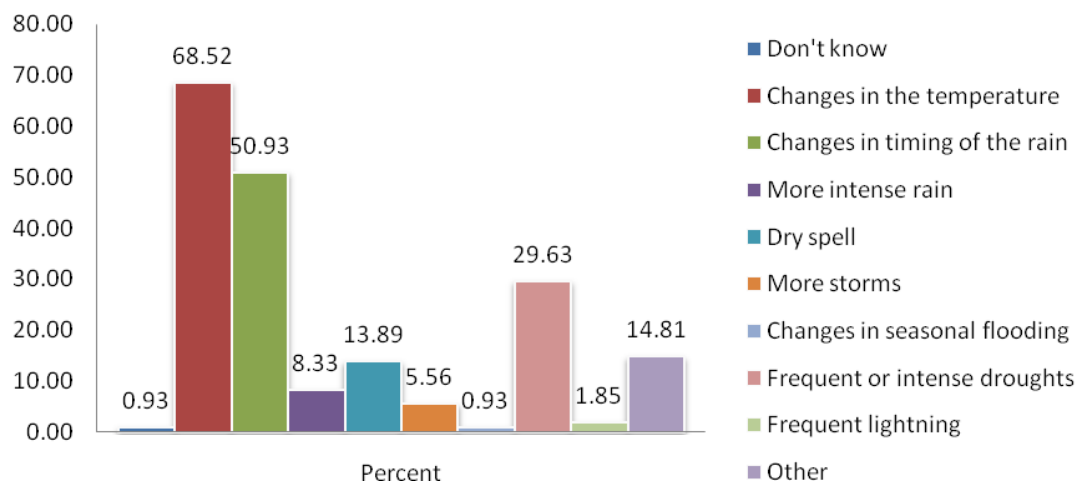


Figure 9 indicates that 68.52 percent of respondents realized the changes in the temperature. They have observed immediate changes such as it has been warmer during rainy seasons and colder in dry seasons. 50.93 percent of respondents realized the changes in timing of the rain especially between mid-June of 2000 and 2005, and between mid-July of 2006 and 2010.. 29.63 percent of respondents observed the changes in frequent or intense drought and 0.93 percent of respondents did not know how climate has changed.

Figure 9: How has the climate changed?



Knowledge of interviewees on causes of climate change is still limited. Figure 10 indicates that 50.93 percent of respondents did not know the causes of climate change while 40.74 percent of respondents raised deforestation. 9.26 percent said forest fire, 2.78 claimed pesticide and chemical fertilizer use in agricultural sector, 2.78 percent said emission from burning fossil fuel, 1.85 percent said modern electronic equipment use and 4.63 percent raised other causes.

Approximately one second of respondents said deforestation was the only cause. However, it is noticed that a small percentage of people, who used to attend climate change related events, could identified various causes of climate change.

Figure 10: What causes climate change?

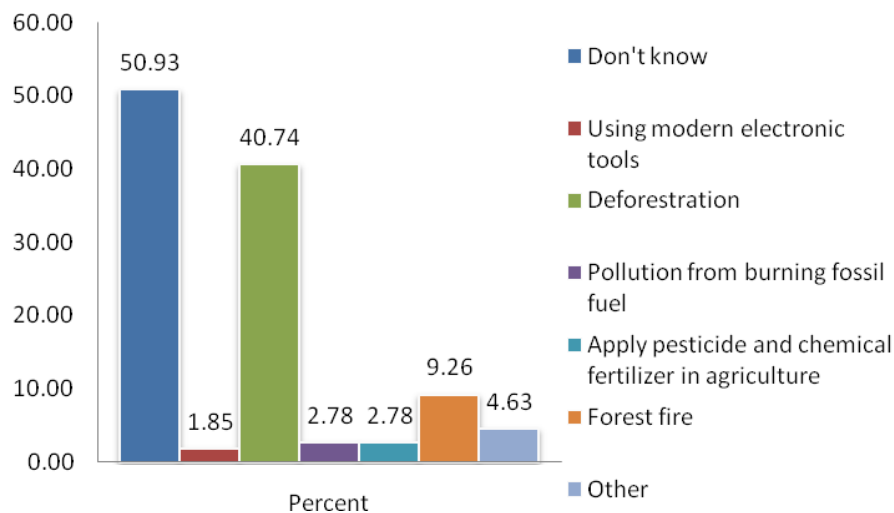


Figure 11 indicates that 73.15 percent of respondents realized the impacts of climate change on health such as malaria, dengue fever, diarrhea and cold in particular on children and elderly. Moreover, 46.30 percent of respondents focused on agricultural losses caused by climate disasters especially drought as most of them rely on rain for cultivation. 26.85 percent of them saw CC impacts depleting water supply, 10.19 percent said CC reduced income and 6.48 percent did not know.

Figure 11: How does climate change affect people?

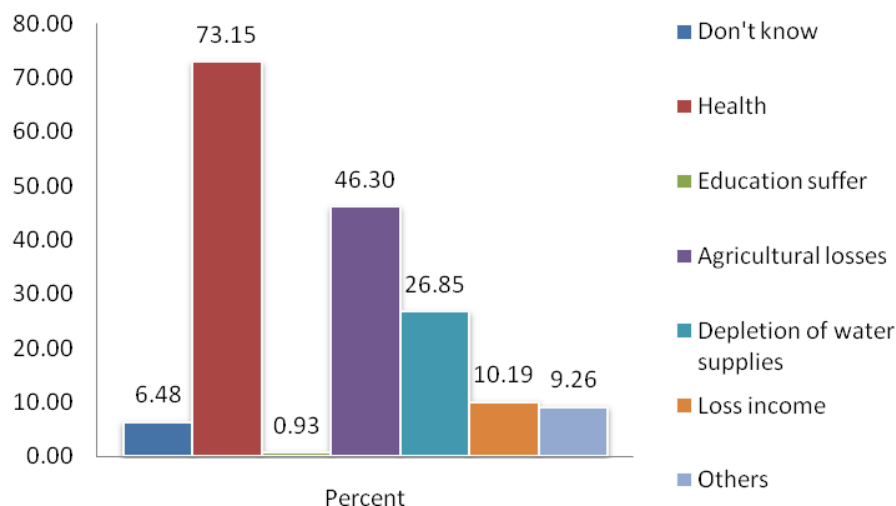


Figure 12 indicates that respondents said the most vulnerable people from climate change are the poor (42.59%), women (4.63%), children (37.96%), disabled people (4.63%) and elder (2.78%).

Respondents understood that the poor are the most vulnerable as they do not have ability and capacity such as knowledge, money, materials to cope with climate change impacts. Moreover, children are also the most impacted as they are more exposed to diseases such as cold, dengue fever and diarrhea.

Figure 12: Who is the most vulnerable as a result of climate change?

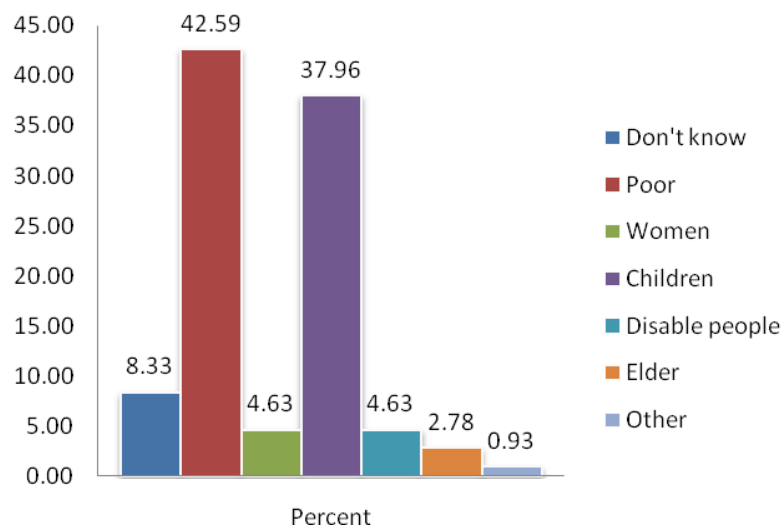


Figure 13 indicates that 55 percent of respondents considered women as the most impacted from CC impacts as they have more workloads in the family such as animal feedings, cooking, water collection, washing clothes, children, and crop plantations. However, 12 percent of respondents thought that men are the most suffered as they worked hard in the field in terms of agricultural activities. 25 percent thought both men and women were equally vulnerable as they are working together in agriculture activities for supporting livelihoods, and the rest 8 percent did not know.

Figure 13: Between women and men, who would you say suffers the most from climate change?

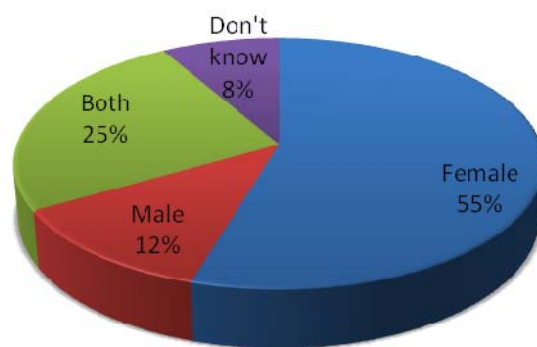
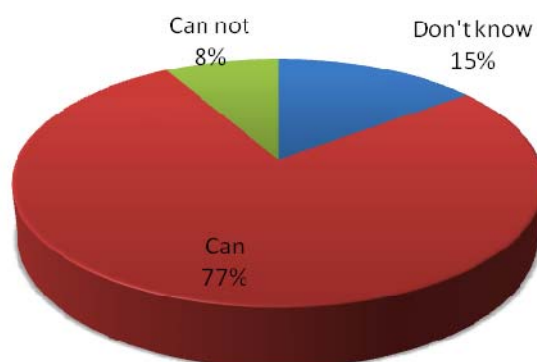


Figure 14 indicates that 77 percent of respondents thought they could cope with the changes of climate. 8 percent of them thought that they could not cope with the changes as they didn't have any ability or resources.

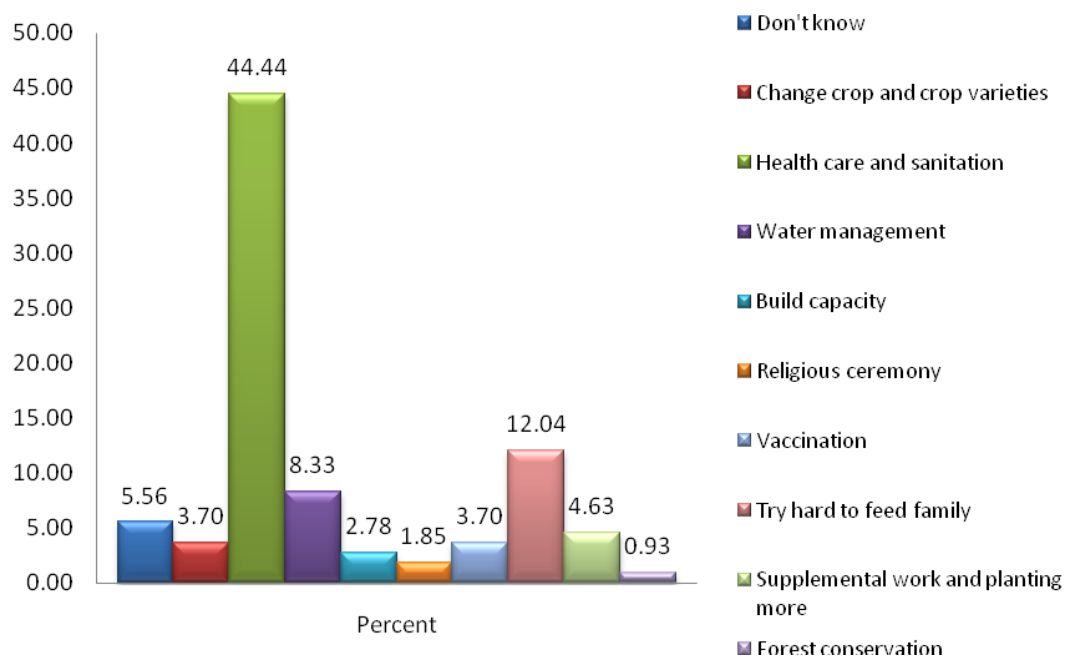
Figure 14: Is there anything can be done to cope with changes of climate?



Respondents were asked how people can adapt to climate change. Figure 15 indicates that 44.44 percent could take care of their health and improve sanitation using water filters and boiling water for drinking. 12.04 percent thought they would work harder to feed family using their own ability. 8.33 percent of thought that water management was very necessary for supporting their agricultural activities and daily use in family. There is a small percentage of respondents raised other ways to cope with climate change such as changing crop and crops varieties (3.70%), building self capacity (1.85%), vaccinating animal (3.70%), doing supplemental works or planting more crops (4.63%) and conserving forest (0.93%). It was found that 1.85 percent of respondents in Robonh village believed in spirit ceremony once drought occurred.

According to figure 15, respondents are not aware of the alternatives to cope with the impacts of climate change. However, they are aware of how to take care of their health by applying sanitation. Few respondents aware of how to apply tolerant crops to bad conditions of weather especially droughts, take care or cure animal, and how to manage water resources for domestic use and agriculture during droughts. Moreover, they have no appropriate options for adaptations.

Figure 15: How can people participate in actions of climate change adaptation?



### 3.3 Attitude toward climate change

Respondents were asked how changes in climate affect their lives. Figure 16 shows that 78.70 percent said CC impacted their health as some family members got sick more often.. 65.74 percent focused on the reduction on rice yield. Meanwhile, 41.67 percent stressed on water shortage for crops growing and domestic use, which causes crops damage, depletion and contamination of water. Finally, 3.70 percent of respondents did not know the impacts of climate change on their livelihood.



Figure 16: How do these changes affect your life?

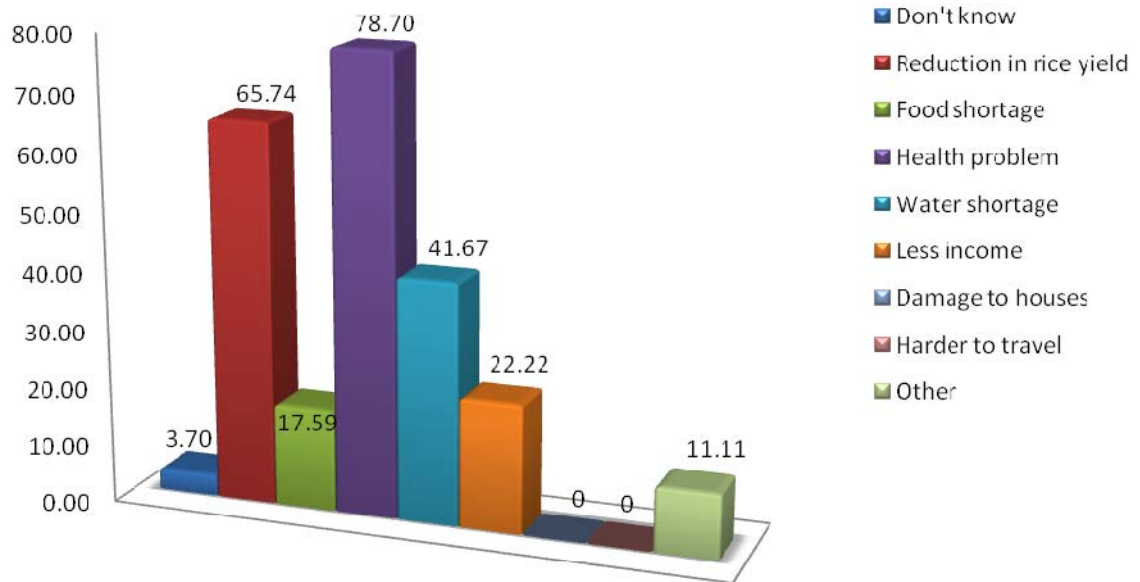
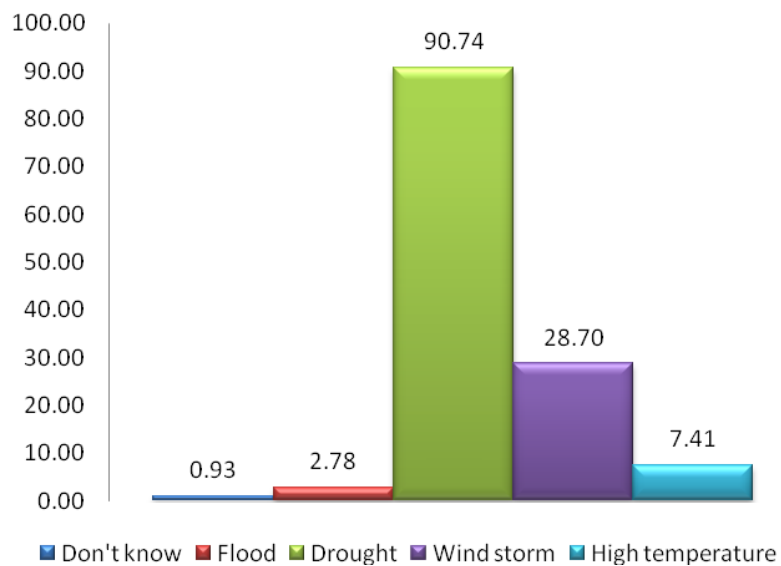


Figure 17 indicates the percentage of respondents who could identify climate hazards. 90.74 percent identified drought, 28.70 percent said wind storm, 7.41 percent raised high temperature, 2.78 percent said flood as noticed flood occurred in Robonh village once serious rain, and 0.93 percent did not know.

Figure 17: What kind of climate hazards have you faced so far?



Respondents were asked whether they ever participated in any activities dealing with climate hazards. Figure 18 indicates that 91 percent of respondents said never, and only 9 percent of them did by lending rice and helping as labor to their neighbors, providing transportations to health centre, and transferring information.

Figure 18: Have you ever participated in any activities for dealing with climate hazards?

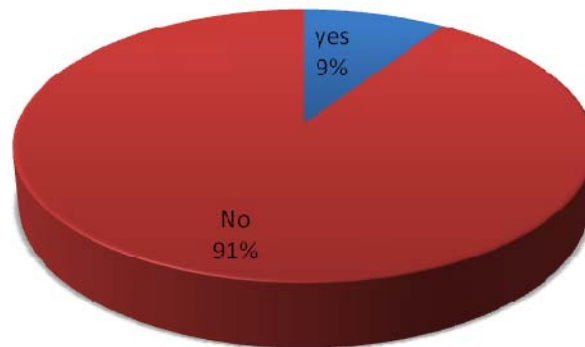


Figure 19 indicates that 93 percent of respondents face challenges in coping with the impacts of climate change such as food shortages, lack of medicine or health care, animal sick and dead, crops and rice varieties and water resources management. 6 percent of respondents did not realize the challenges they face during climate disaster and 1 percent of them respondents had no challenges as most of them had better livelihoods and ability to cope with the impacts of climate change.

Figure 19: Do villagers in your community face any challenges in coping with climate change?

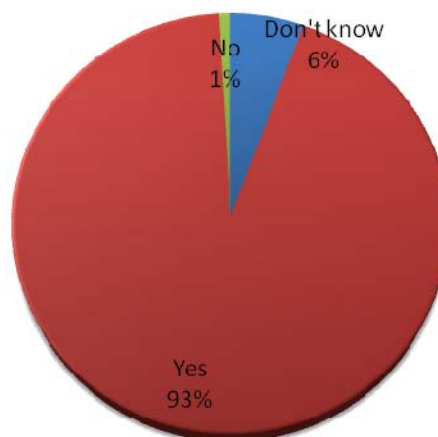
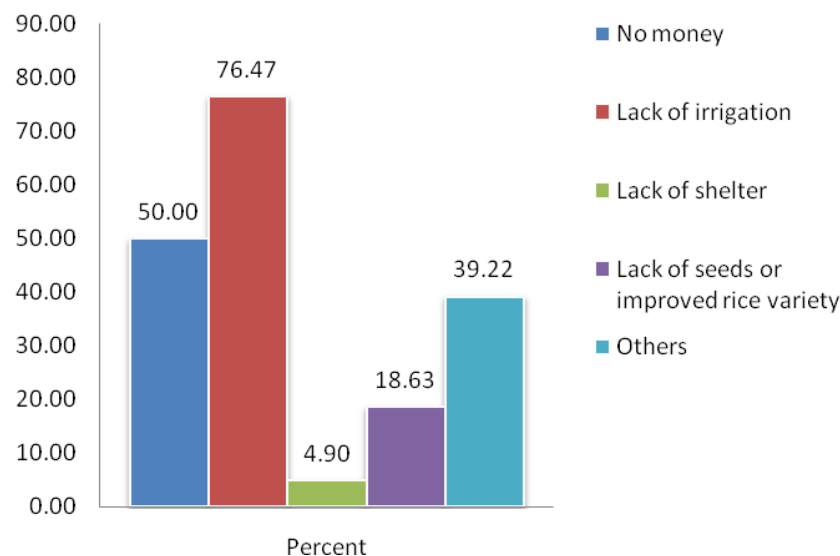


Figure 20 indicates the challenges of respondent facing. 76.47 percent of them raised lack of irrigation system, 50 percent said no money, 18.63 percent said lack of seeds or improved rice variety, 39.22 percent faced other challenges (food shortages, pumping machines and animal supports, agricultural activities) and 4.90 percent stressed on lack of shelter.

Figure 20: What are challenges facing in coping climate change?



In coping with droughts in local communes, 29.63 percent respondents in Teuk Krahorm commune did nothing and 12.96 percent did not know how to deal but waiting for rain fall. While, 8.33 percent of them could help themselves, 3.70 percent helped other villagers by disseminating water management and agricultural methods. 2.78 percent of them sought assistance from NGOs. Very small percentage of respondents (0.93%) realized various ways in coping with droughts such as spirit ceremony, irrigation system construction and restoration, concern raising to local authorities, water pumping and purification, and contributions of extra works for more income and food to neighbors.

As illustrated above, most respondents are not aware of how to cope with impacts of droughts. Though, they do not have enough ability and capacity to do so.

Figure 21: Respondents' contribution in coping drought

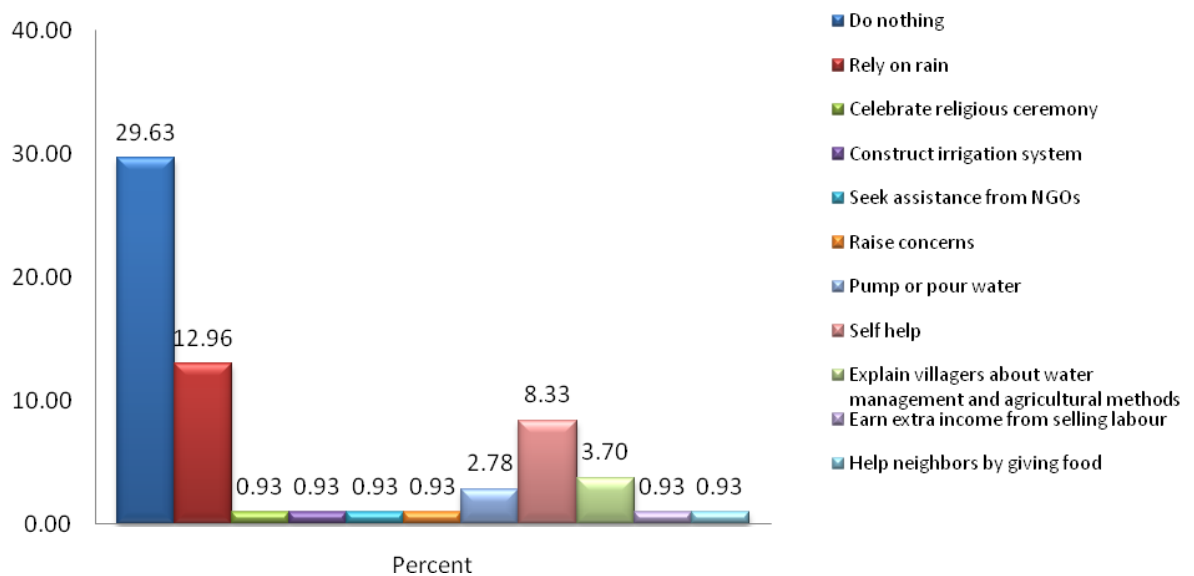
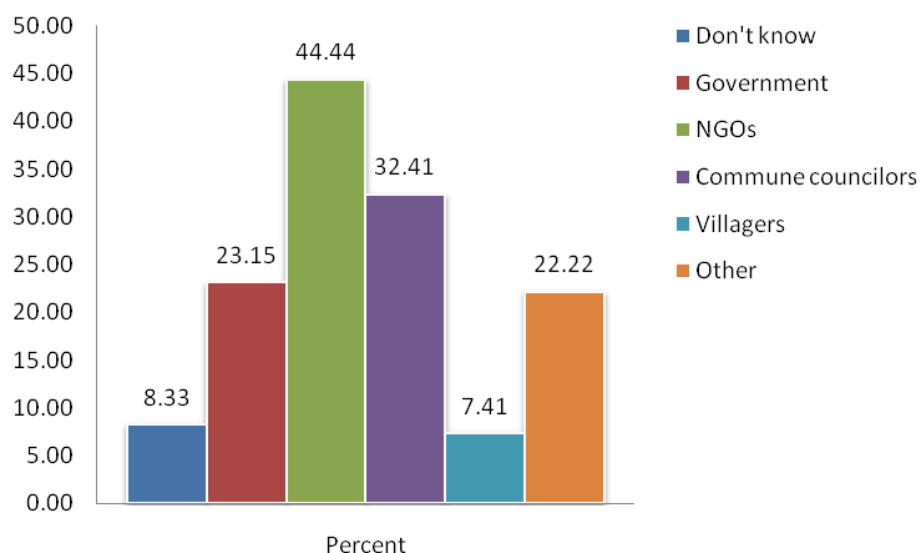


Figure 22 indicates the institutional participation in helping communities to cope with problems of climate change. There is 44.44 percent of NGOs, 32.41 percent of commune councils, 23.15 percent of government institutions, 7.41 percent of villagers and 22.22 percent of other stakeholders. Among all respondents, 8.33 percent of them did not know which institution helped their communities.

Figure 22: Who do you think should be responsible in helping your community cope with the problem of climate change?



### 3.4 Practices in Agricultural and Water

#### 3.4.1 Crops Plantation

Figure 23 indicates that 99.10 percent of respondents is planting crops mainly paddy and the other 0.90 percent is small scale sellers in the community.

Figure 23: Do you plant crops?

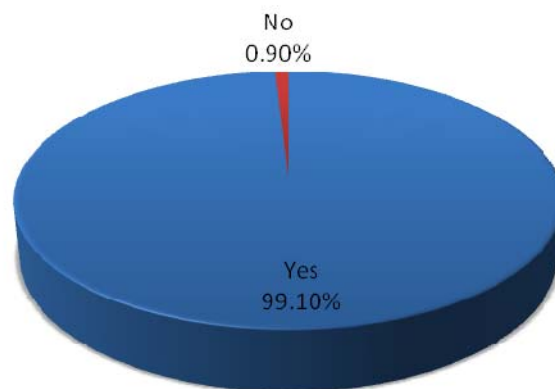
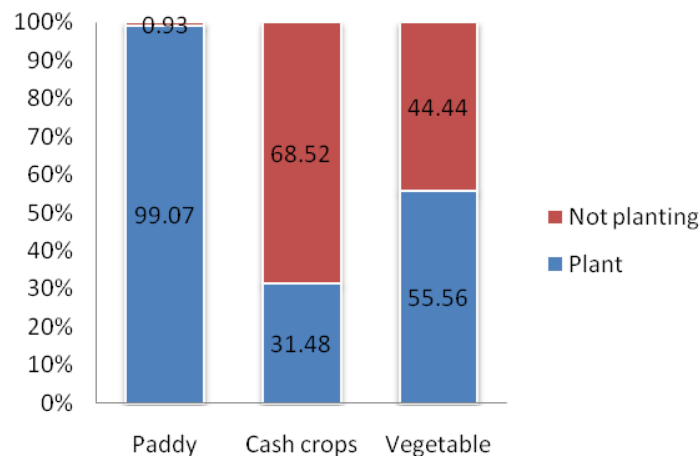


Figure 24 indicates types of main crops planted by respondents. In terms of paddy, it showed that 99.07 percent of respondents are growing paddy while 0.93 percent was not as they had other jobs such as laborers or sellers in the village. Moreover, 31.48 percent of them are growing cash crops such as corn, bean, and banana, etc. And the other 68.52 percent is not growing anything as they do not have land or it is located in the forest that has no enough water for cultivation.

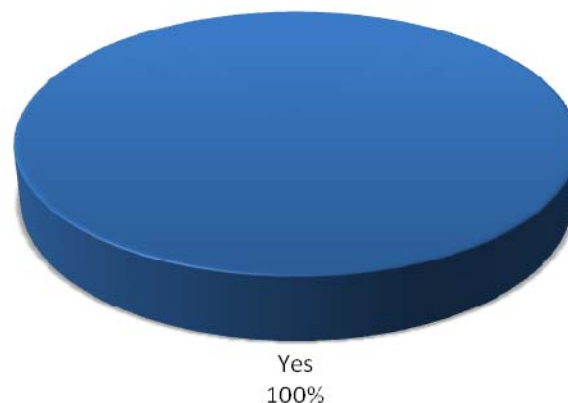
On the other hand, 55.56 percent of respondents is growing vegetables around their home such as cucumber, long-bean, Chinese cabbage, and morning glory for domestic supply and sell the rest to markets and neighbors. The other 44.44 percent did not grow any vegetables.

Figure 24: What kinds of crops are you planting?



Respondents were asked has climate change impacted their crops. Based on the figure 25, all respondents (100%) mentioned that their crops they are planting have been impacted by climate change.

Figure 25: Has climate change impacted on these crops?



Respondents were also asked how climate change impacts their crops. According to figure 26, 95.37 percent of respondents realized climate change brought less yields and 88.89 percent of them said it damaged crops as droughts depleted water resources. 19.44 percent of them mentioned that their crops were damaged due to increasing insects. Moreover, 16.67 percent said they had to replant twice if some families still remain rice seed. Some families who no rice seed, they have to borrow or buy rice seeds from neighbors.

A majority of respondents is aware of CC impacts on their crops such as less yield and crop damages as they have already experienced with droughts. However, they have limited knowledge and agricultural techniques to apply resilient crops in response to bad weather.

Figure 26: How does climate change impact your crops?

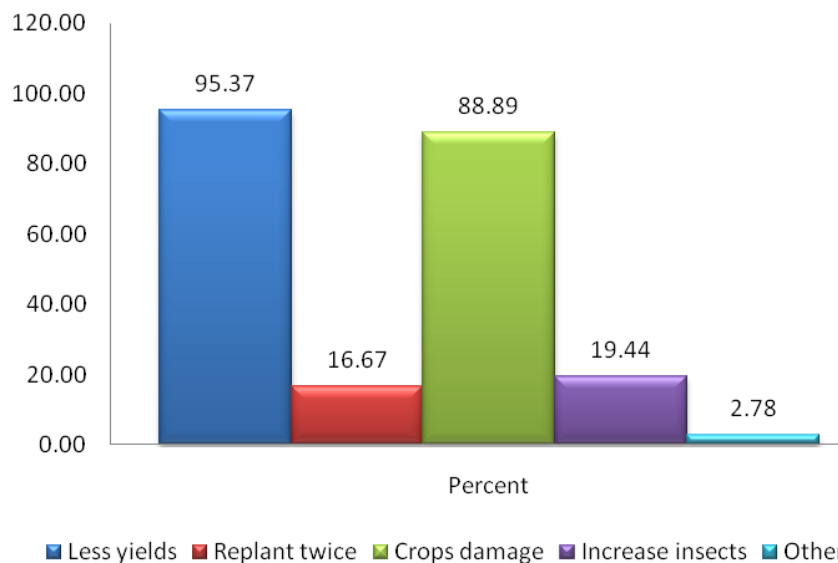
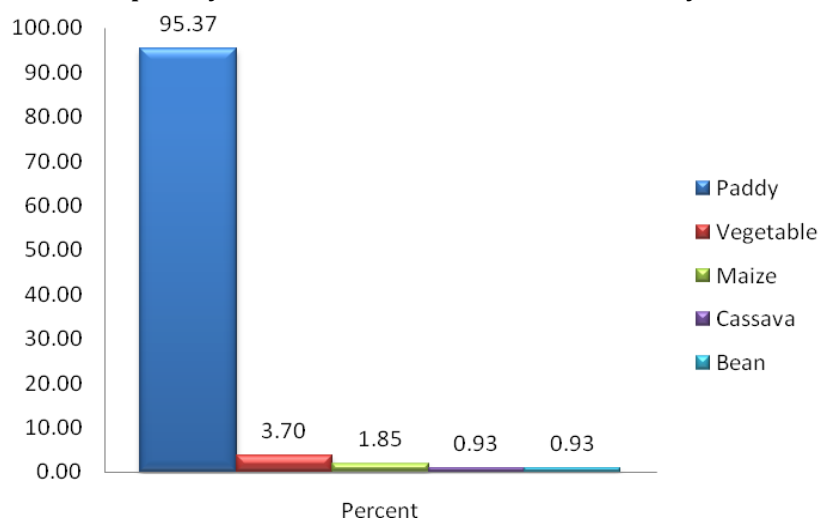


Figure 27 indicates that most respondents mentioned paddy is the most affected by climate change, 3.70 percent said vegetable, 1.85 percent mentioned maize, and the rest said cassava and bean.

A majority of respondents raised paddy is the most impacted crop as most farmers are planting it to support their daily lives. Moreover, it was observed that farmers still use their traditional seeds, which might not be the resilient types to the current weather conditions.

Figure 27: Which crops do you think have been most affected by climate change?



Respondents were asked whether they have switched crops due to climate change. Figure 28 indicates that 74 percent of them have never switched their current crops, while the other 26 percent did so.

The result showed that respondents, who have never switched crops mainly rice, lacked of awareness and knowledge on agricultural techniques and CC resilient seed selection. Therefore, they are planting only rice variety that is delicious and market-demanded. For farmers who used to switch crop varieties, it was observed that they have tried to increase yield and adapt to current weather conditions. However, some respondents switched crop varieties by rotating few varieties year by year with fear of getting low yields.

Figure 28: Have you switched crops because of climate change?

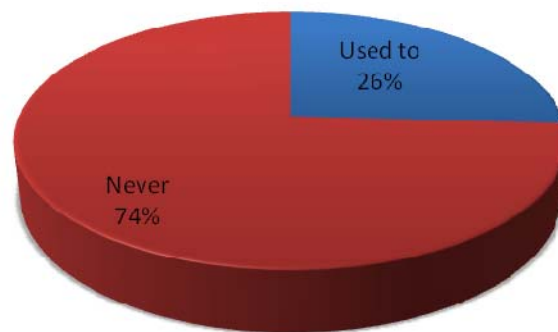


Figure 29 indicates types of rice varieties that respondents are planting such as Phkar Malis (81.48%), Neang Ke (73.15%), Phkar Romdoul (24.07%), sticky rice (21.30%), Neang Oam (8.33%) and other varieties.

Figure 29: Rice varieties are planted by villagers in Teuk Krahorm commune

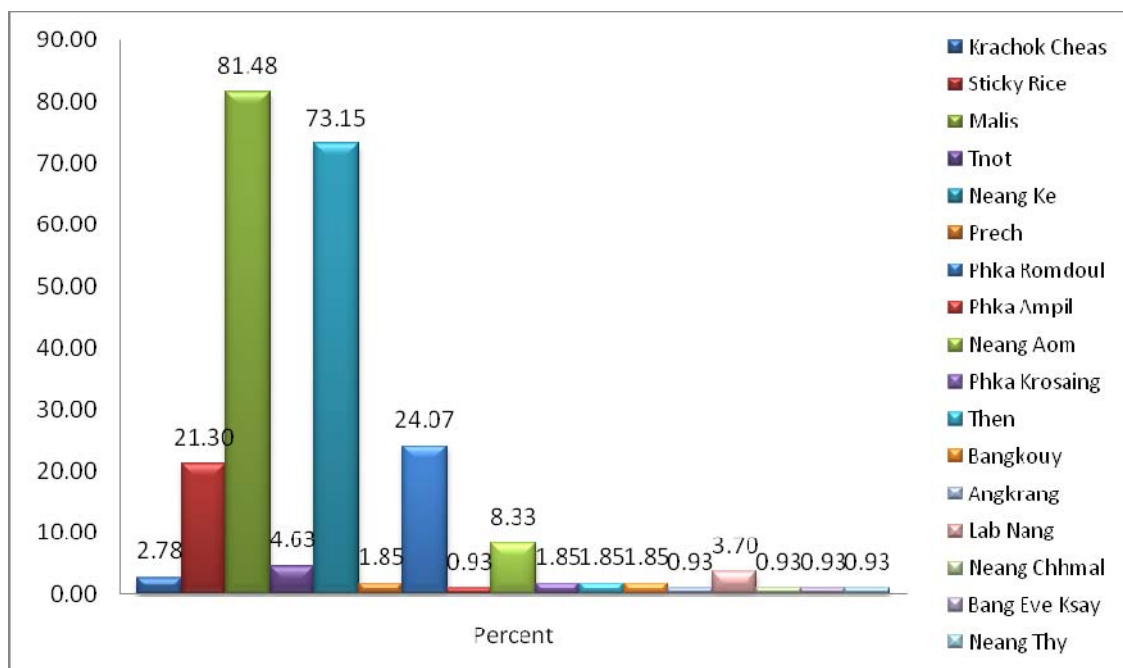




Figure 30 indicates different kinds of cash crops being planted by respondents such as banana (29.41%), mango (29.41%), coconut (14.71%), papaya (11.76%), corn (29.41%), cassava (17.65%), sugarcane (11.76%), cashew nut (14.71%), jackfruit (5.88) and others.

Figure 30: Cash crops planted by villagers in Tuek Krahorm commune

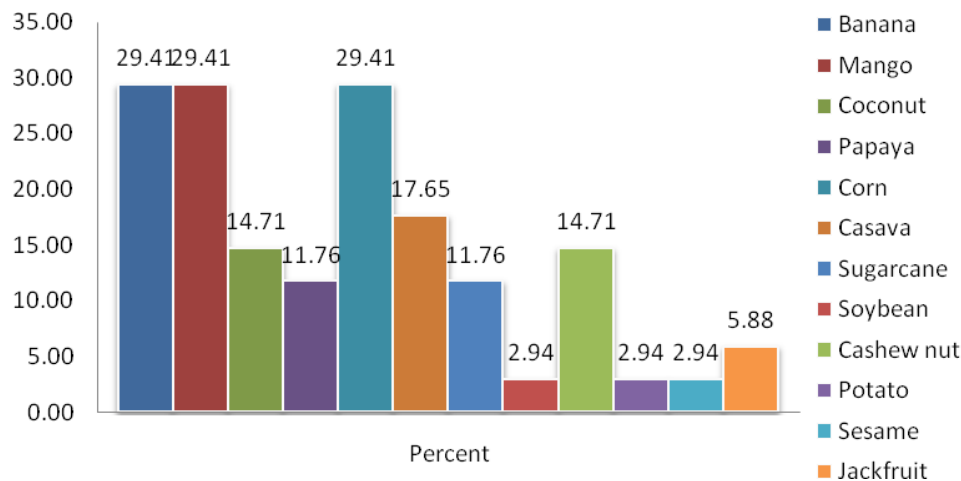


Figure 31 indicates that 21 percent of respondents participate in income generating activities to reduce climate risks in crops cultivation, for example they find other jobs in the village after harvesting seasons, collect non-timber forest products (NTFPs), and participate in village knowledge sharing meetings related to risk reduction. 79 percent of respondents did not participate or engage in any activities to reduce climate risks in crop cultivation.

Figure 31: Do you engage in other income generating activities to reduce the risk of climate change in crop cultivation?

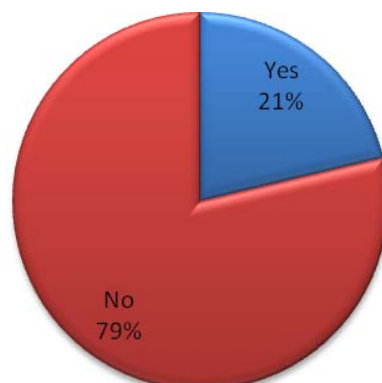


Figure 32 indicates that 90 percent of respondents acknowledged that women face more challenges in coping with climate change in agriculture. They mentioned that climate risks may affect women who involve in collecting and maintaining water,

and taking care of seed and paddy. However, 10 percent of respondents did not know what challenges women face. .

Most women are not only responsible for food and multi-house work in families, but also take part in agricultural activities. As observed during the field survey, women even get more burdens when their husbands work as soldiers and are obliged to base at the borders.

Figure 32: Do you think women face more challenges in coping with climate change in agriculture?



### 3.4.2 Animal Raising

Most of the respondents, 99 percent, raise animals. Only 1 percent of them did not.

Figure 33: Do you raise animal?

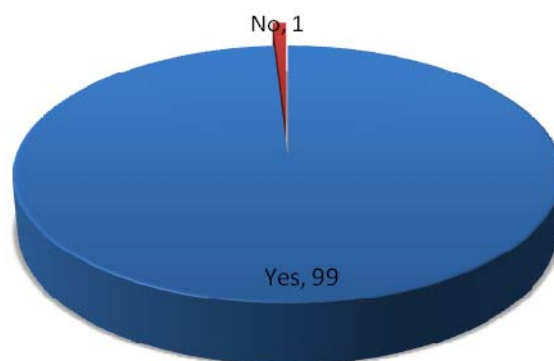
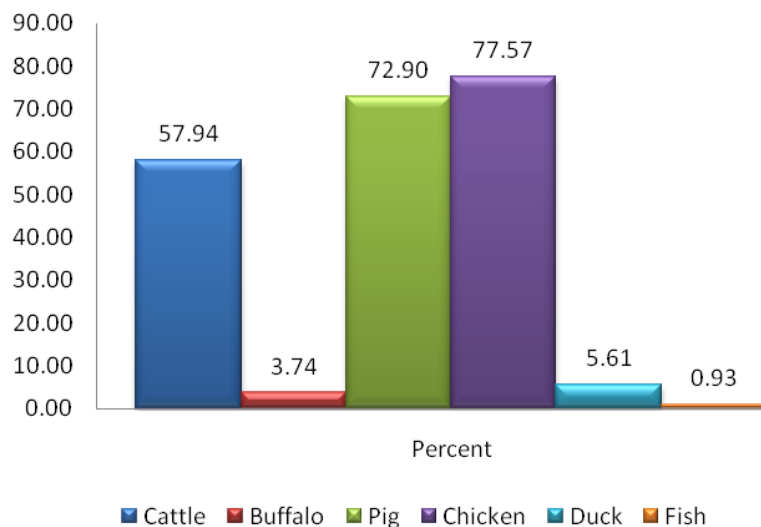


Figure 34 indicates that respondents in Teuk Krahorm commune are raising animals mainly chicken (77.57%), pig (72.90%), cattle (57.94%), duck (5.61%), buffalo (3.74%) and fish (0.93%).

Figure 34: What animal are you raising?



In Teuk Krohorm commune, 97 percent of respondents mentioned that their animals have been affected from climate change and only 3 percent of them said no.

Figure 35: Have these animals been affected by climate change?

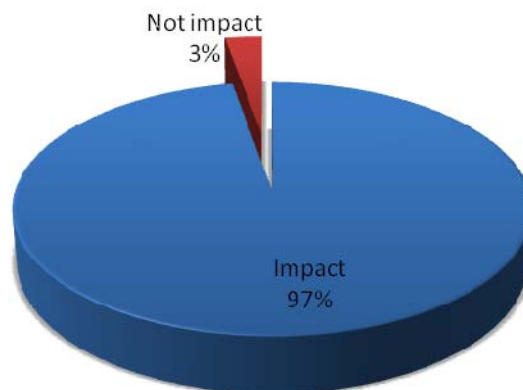
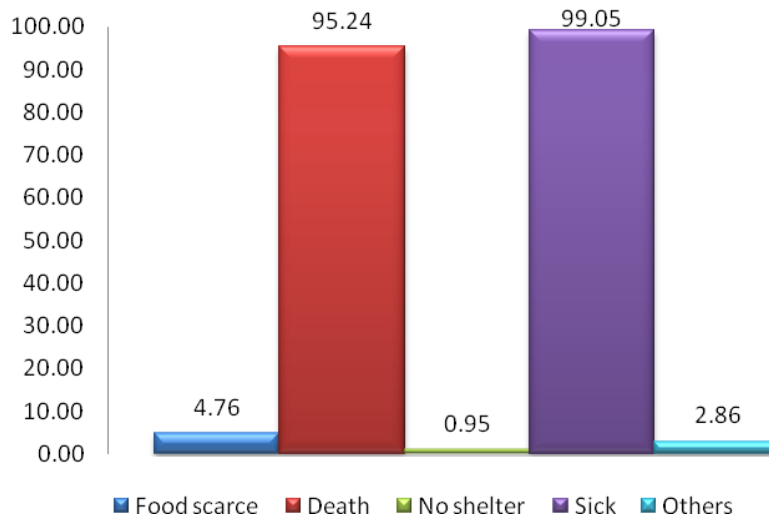


Figure 36 indicates CC impacts on animals such as making them sick 99.05 percent, 95.24 percent death, 4.77 percent lack of food, and 0.95 percent no shelter.

According to observation in Teuk Krahorm commune, animals are being raised using traditional habit without proper cages especially for cattle, pigs and chicken. Animals are freely releasing to feed themselves. Moreover, many households are not keeping straw for animal feeding during dried season. Once their animals get sick, they don't know how to cure them. However, they have applied their own

traditional ways such as watering animals when they have high temperature and offering traditional medicine such as tree barks to reduce the temperature.

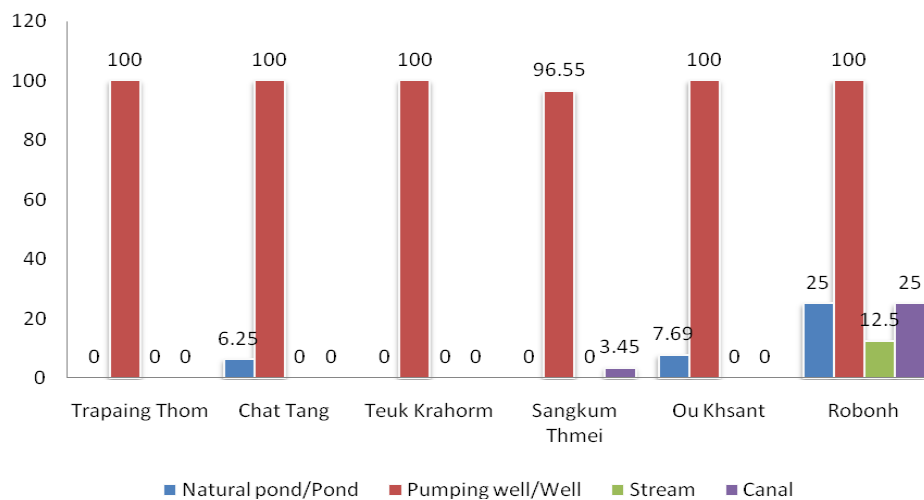
Figure 36: How has climate change affected these animals?



### 3.4.3 Water Resources

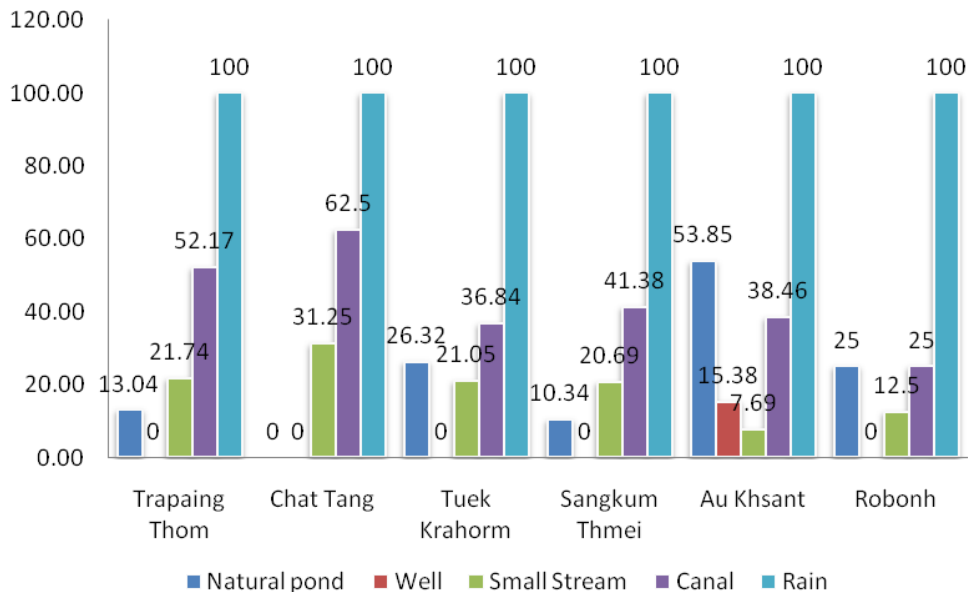
Figure 37 indicates that respondents in Teuk Krahorm commune get water from various sources such as natural ponds, digging pond, stream, canal and especially wells or pumping wells. In each village, respondents can access to water mainly from wells or pumping wells for daily consumption. Women in the villages are playing very important role in collecting water for domestic consumption and vegetable and crop watering around their households. Villagers normally face with water shortage between March and April. This issue makes women to collect water from longer distance sources.

Figure 37: What are the water sources in your village?



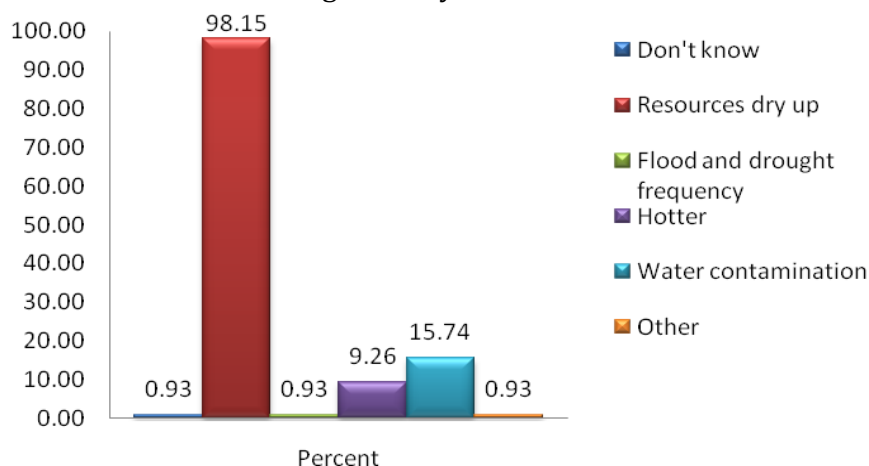
Actually, villagers in Tuek Krahorm commune possess paddy fields mostly in the forest which are not so closed to the villages. In addition, those lands are irrigated with water from natural ponds and stream. Figure 38 indicates that all respondents in each village mainly depend on rain water for growing paddy. Respondents are also relying on existing natural ponds, small stream and canals as supplementary for irrigating their paddy fields once there is no rain.

Figure 38: Where do you get water from for cultivation?



Respondents were asked how climate change affects water resources. Figure 39 indicates that 98.15 percent of respondents said water resources were dried up, 15.74 percent said water was contaminated, 9.26 percent claimed water becomes hotter, 0.93 percent said there were more frequent floods and droughts and 0.93 percent did not know.

Figure 39: How does climate change affect your water resources?



### 3.4.4 Forestry

Respondents were asked whether there is a forest in their commune. All respondents realized the forest existed in their area.

Figure 40: Does your community have forest?

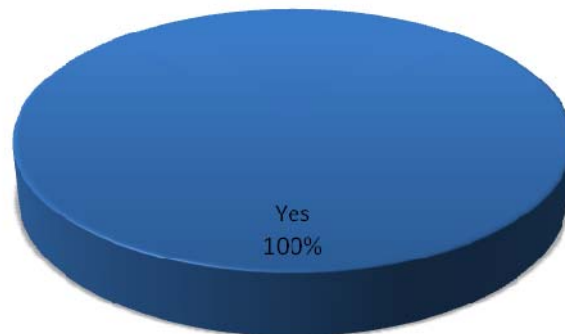


Figure 41 indicates that 93 percent of respondent acknowledged that forest in their area is affected by climate change due to high temperature. It could make the forest dried that could lead to fire. In addition, 6 percent of respondents thought that the forest is not affected by climate change. However, it is affected by illegal logging and logging for constructing houses for soldiers. Only 1 percent of respondents did not know.

Figure 41: Do you think these forests are also affected by climate change?

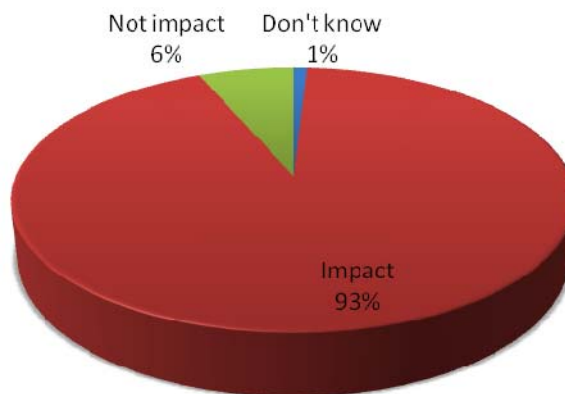


Figure 42 indicates that 89 percent of respondents realized the usefulness of forest in helping their community to cope with climate change. The majority of them are aware that forest could absorb rain and reduce heat. In contrast, 8 percent thought that it is not helping them and 3 percent did not know.

Figure 42: Do forests help your community in coping with climate change?



### 3.4.5 Fishery

As Illustrated in figure 43, 93.50 percent of respondents can find fish from lakes, reservoirs and stream in their commune and 6.50 percent cannot.

Figure 43: Do you have fish in the lakes, dams, river?

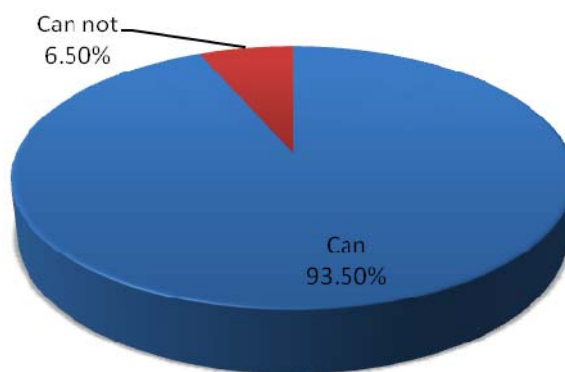
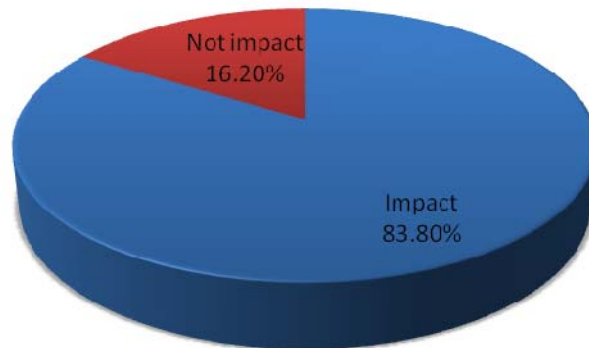


Figure 44 indicates that 83.80 percent of respondents said CC impacted fish stock such as fish decline as water depleted and contaminated resulted from higher temperature. Moreover, 16.20 percent of them thought that fisheries were not impacted by climate change. But they were affected by illegal fishing by local people.

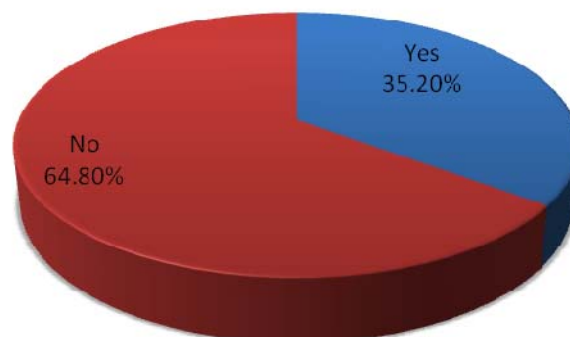
Figure 44: Do you think fisheries are affected by climate change?



### 3.5 Access to Climate Change Related Information

Figure 45 indicates that 35.20 percent of respondents received information on climate hazards and 64.80 percent did not.

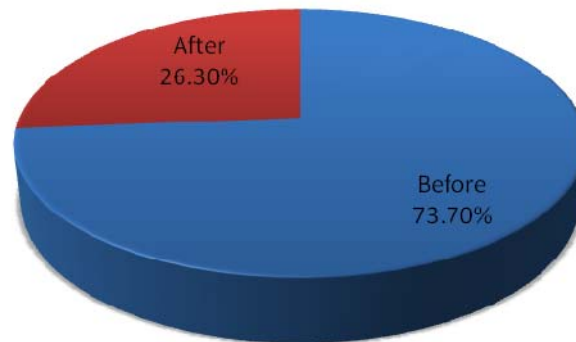
Figure 45: Do you used to receive any information before climate change hazards occur?



Respondent were asked when they received information related to climate. Figure 46 indicates that 73.70 percent received information before climate events occur from radio, mouth to mouth, meetings with village chief or commune councilors. This is useful for them to prepare materials, food, water, animals, children etc in advance. 26.30 percent of respondents received information after disaster, which is difficult for farmers to prepare cultivation and arrange other stuffs.

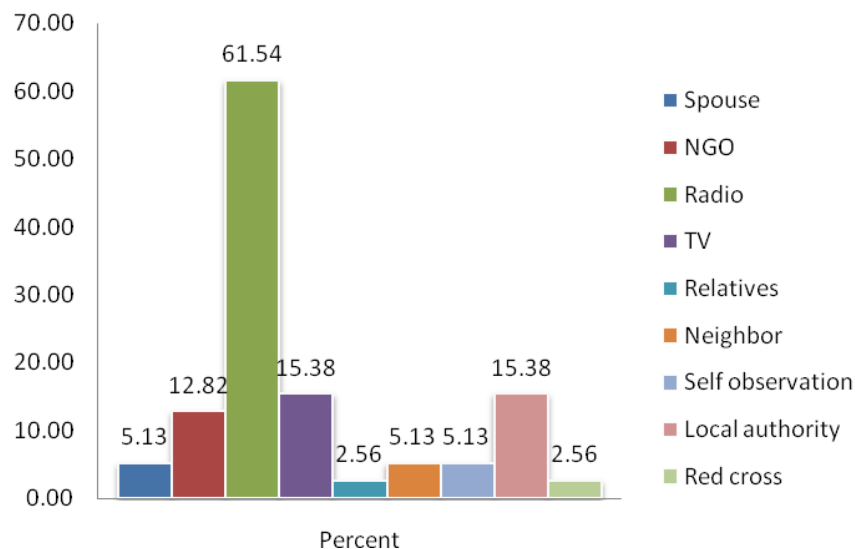


Figure 46: When did you receive this information?



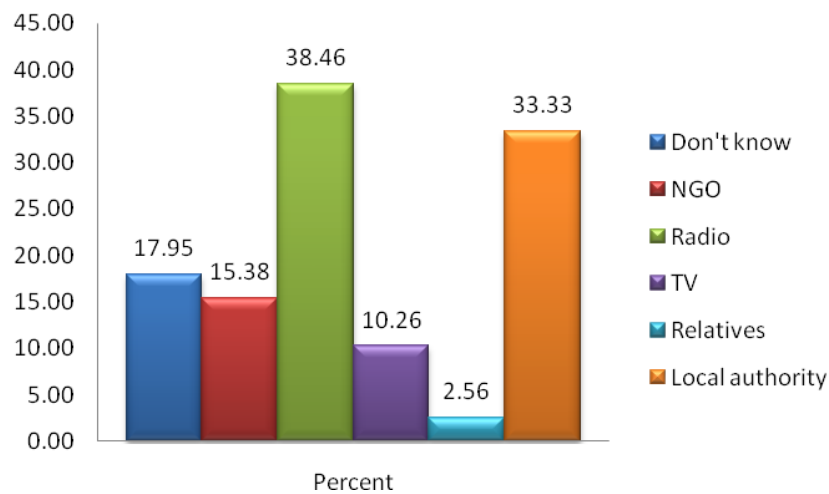
Regarding to information sources, 61.54 percent of respondents get information from radio, 15.38 percent from television, 15.38 percent from village meetings with local authority, 12.82 percent from NGOs, 5.13 percent from spouse, 5.13 percent from self observation, 5.13 percent from neighbors, 2.56 percent from relatives and 2.56 percent from the Cambodian Red Cross.

Figure 47: Who provide this information?



The information providers that respondents consider as the most trusted are 38.46 percent radio, 33.33 percent local authority, 15.38 percent NGOs, 10.26 percent television, 2.56 percent relatives and 17.95 percent did not know.

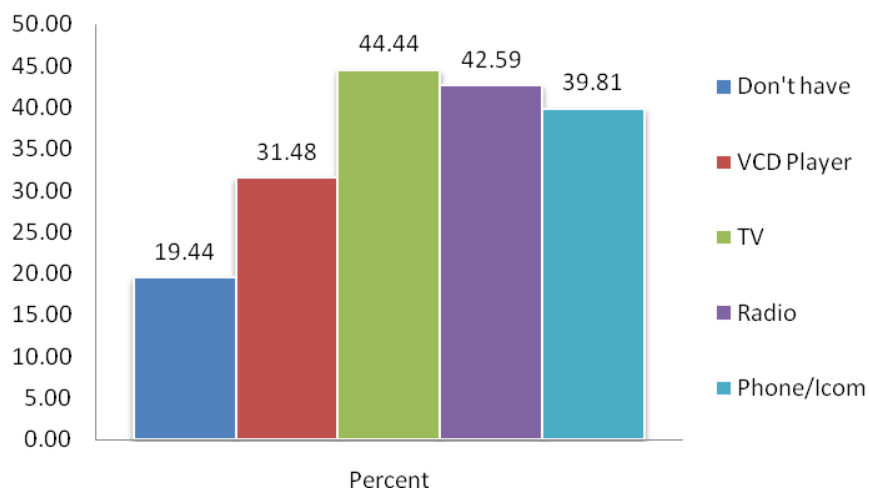
Figure 48: Who do you think should provide this information?



### 3.6 Mass Media Sources

Figure 49 indicates information receiving tools that respondents possess such as television (44.44%), radio (42.59%), phone (39.81%), VCD player (31.48%) and 19.44 percent do not have any information receiving tools.

Figure 49: Do you have information receiver tools?



Respondents were asked from which information sources they first heard of climate change. Figure 50 indicates that they first heard of climate change from radio (43.52 percent), television (14.81 percent), meetings (8.33 percent), and others (5.56 percent). 37.04 percent of respondents did not hear of climate change.

Figure 50: Where did you first hear about climate change?

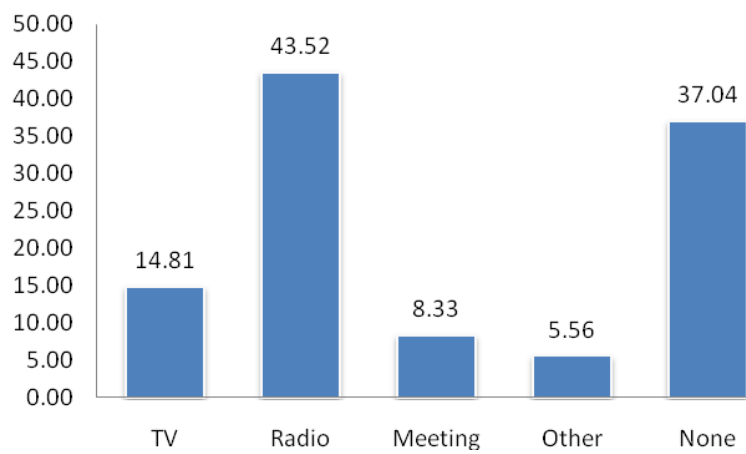
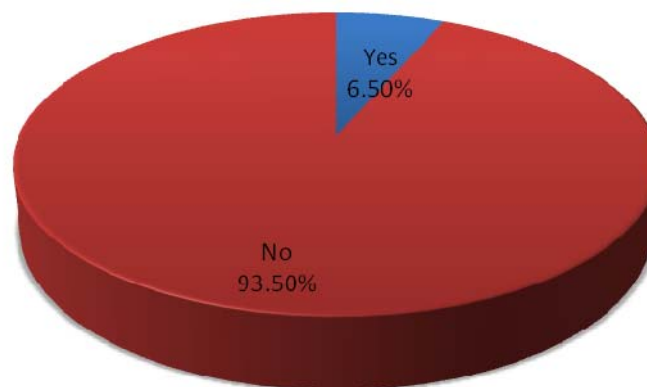


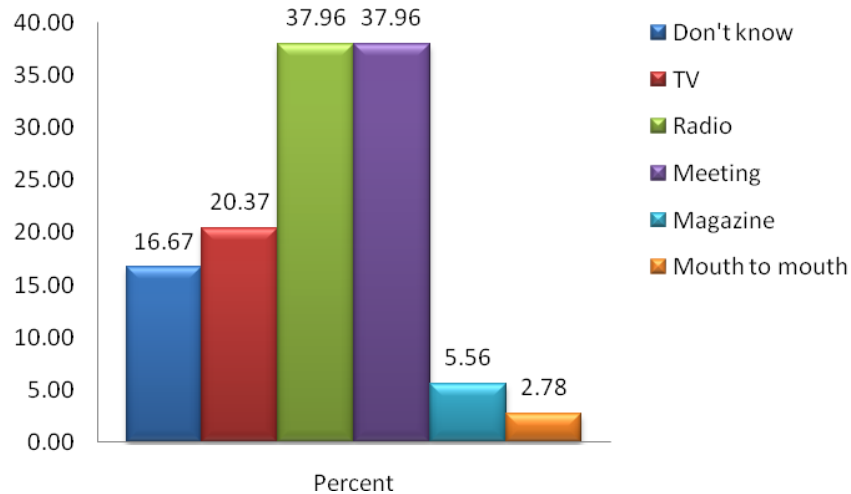
Figure 51 indicates that 93.50 percent of respondents are not able to access local information related to climate change. 6.50 percent of them are able to through village meetings with commune council, village chief or Red Cross's volunteers in villages.

Figure 51: Is information on climate change available to you?



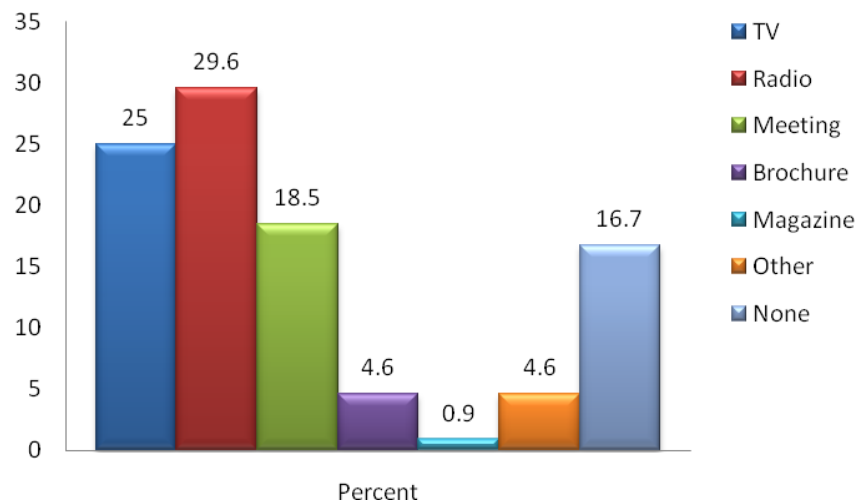
Villagers can get information mainly through meetings and radio (37.06 percent), 20.37 percent television, 5.56 percent magazine, 2.78 percent mouth to mouth and 16.67 percent do not know.

Figure 52: What are the sources of information that can most effectively reach people in your commune?



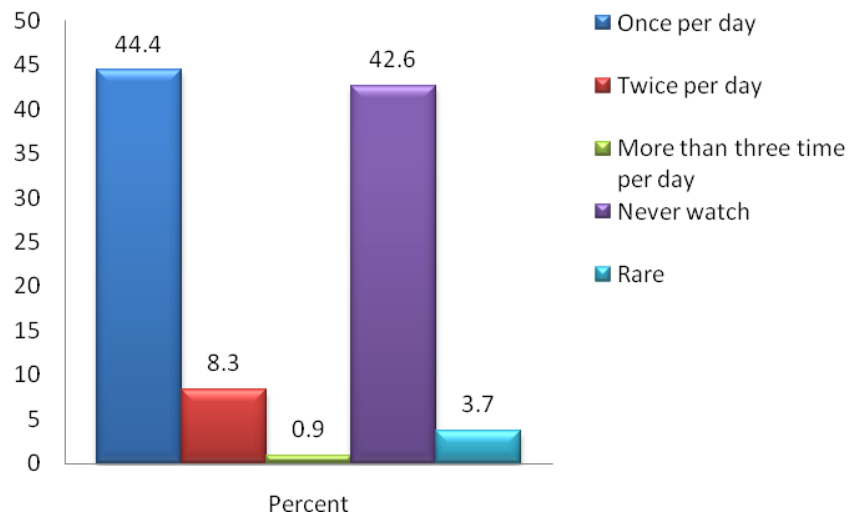
Respondents in Teuk Krohorm commune trust information from radio (29.60 percent), television (25 percent), meeting (18.5 percent), brochure (4.6 percent), magazine (0.9 percent), other sources 4.6 percent and 16.7 percent do not know.

Figure 53: What sources of information do you trust the most?



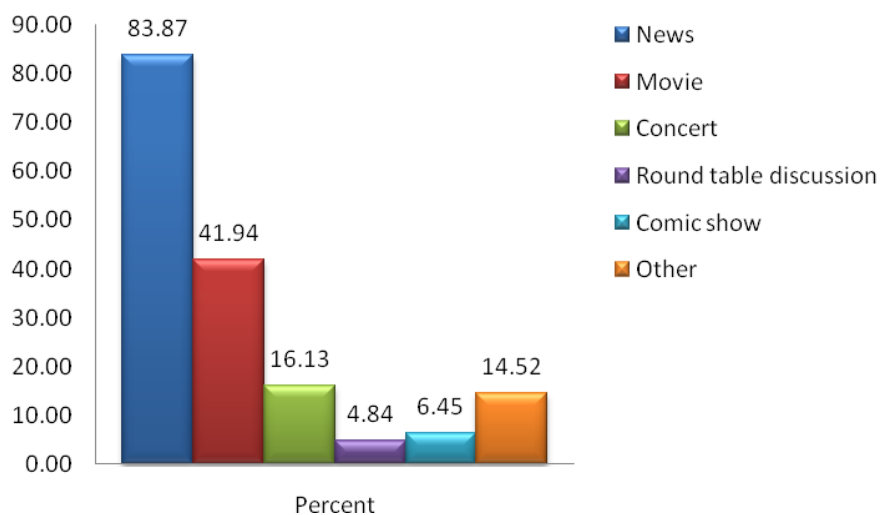
For television 44.44 percent of respondents watch once per day while 8.3 percent watch twice per day, 3.7 percent rarely and 0.9 percent watches more than three times per day. In contrast 42.60 percent never watch.

Figure 54: How often do you watch TV?



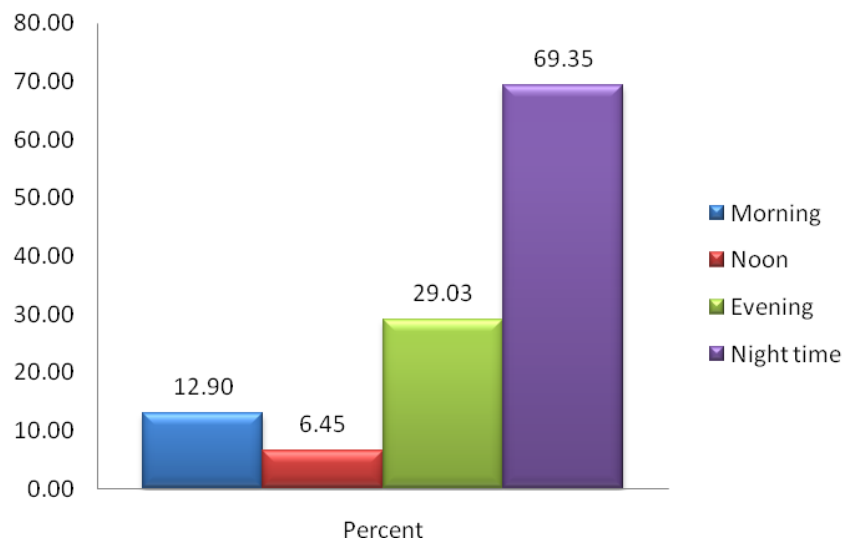
Focusing on the television programs, 83.87 percent of respondents like watching news, 41.94 percent movies, 16.13 percent concert, 6.45 percent comic shows, 4.84 percent round table discussions and 14.52 percent other programs.

Figure 55: What program do you like?



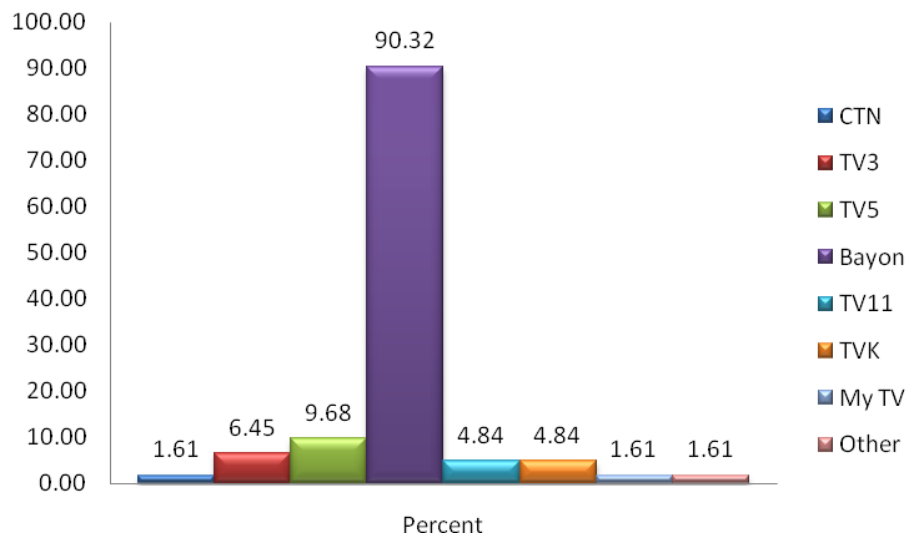
Time that most respondents watch television is night time (69.35 percent), evening (29.03 percent), morning (12.90 percent) and mid-day (6.45 percent).

Figure 56: What hours of the day do you usually watch?



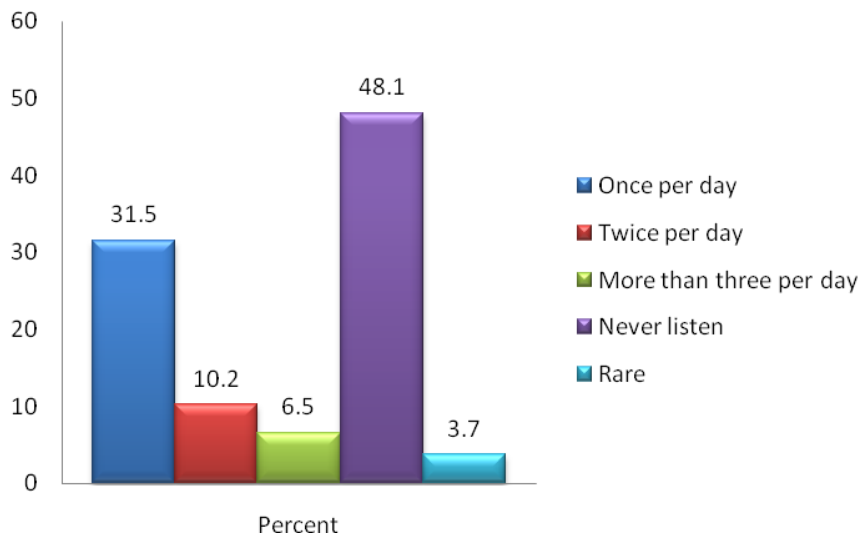
Television channels that respondents usually watch are Bayon TV 90.32 percent, TV5 9.68 percent and TV3 6.45 percent.

Figure 57: What channel do you usually watch?



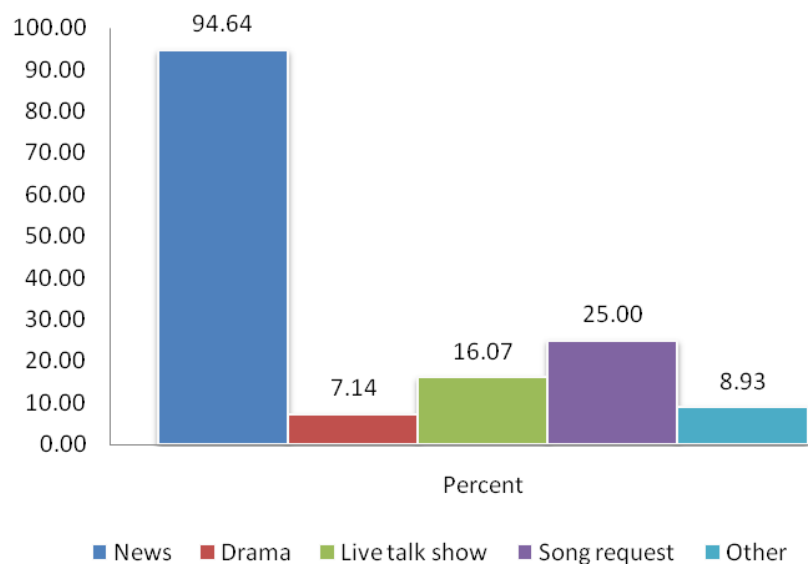
Related to radio stations, interviewees listened once per day 31.5 percent, twice per day 10.2 percent, more than three times per day, 3.7 percent rarely listen and 48.10 percent never listened.

Figure 58: How often do you listen to radio?



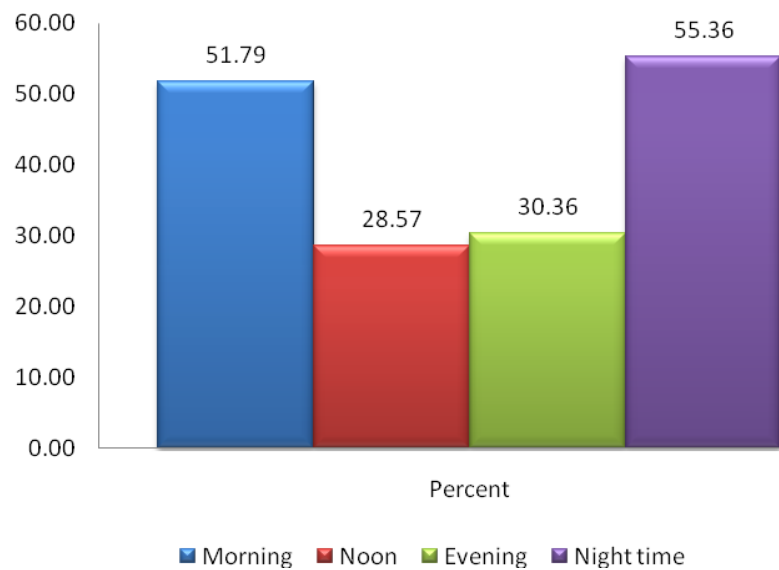
Radio programs that respondents like listening the most are news (94.64 percent), song requests (25 percent), talk shows (16.07 percent), drama (7.14 percent) and others (8.93 percent).

Figure 59: What kind of programme do you like to listen to?



Time people listen to radio is at night time (55.36 percent), morning (51.79 percent), evening (30.36 percent) and mid-day (28.57 percent).

Figure 60: What hours of the day do you usually listen?



For radio stations, respondents listen to Bayon (82.14 percent), Sra EM (41.07 percent), the National Radio and FM103 (are equally 17.86 percent).

Figure 61: What channels do you usually listen to?

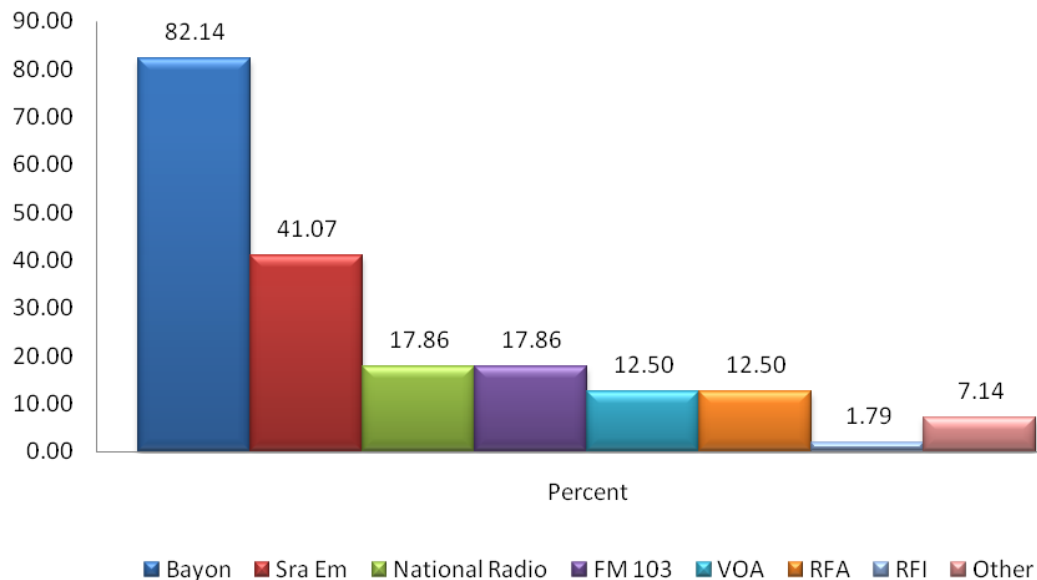
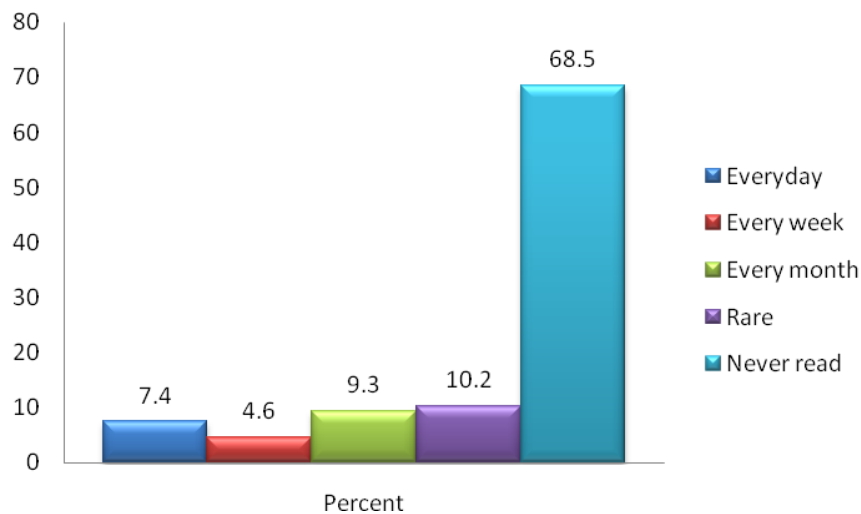


Figure 62 indicates that 68.5 percent of respondents never read any reading materials because they are illiterate. 10.2 percent of them rarely read, 9.3 percent read every month, 7.4 percent read every day and 4.60 percent read every week.

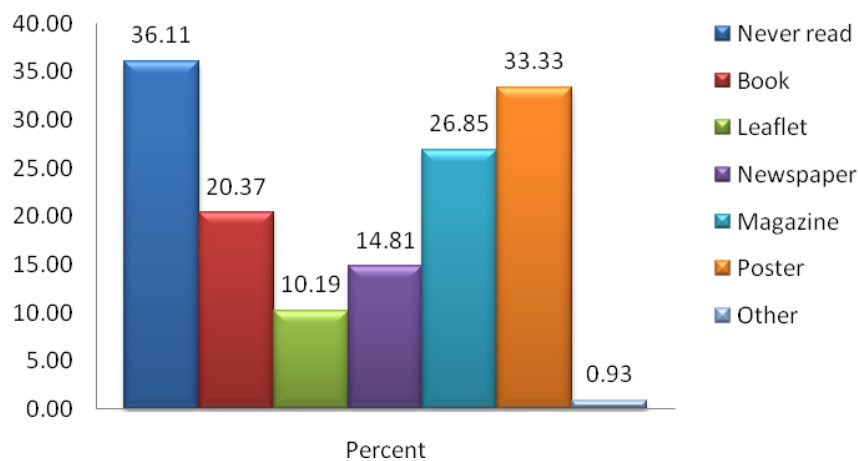


Figure 62: How often do you read newspaper/magazine/booklet?



The most reading materials that respondents like reading are posters (33.33 percent), magazines (26.85 percent), books (20.37 percent), newspapers (14.81 percent), leaflets (10.19 percent) and never read (36.11 percent).

Figure 63: What kinds of publication/reading materials do you read?



### 3.7 Awareness and knowledge on climate change of provincial stakeholders

Based on interviews with provincial stakeholders under the NAPA Follow Up project, it was found that most of them are aware of the trends of current climate including unexpected rain in dry season, drought, changes in the temperature, increased insects and diseases on human being and animals.

In terms of the causes of climate change, provincial officers are aware of the deforestation, burning fossil fuel, waste management and smoke pollution from factories as contributions to climate change. One among five does not know what causes climate change.

In agricultural sector, they realize that low rice yield, animal sick and death, crops damage are caused by lacking of water, and crops are destroyed by insects. Moreover, they are aware that climate change shortages water, and dries it up with higher temperature. This makes the situation worse upon the current poor irrigation system or water management for both domestic uses and agriculture. They added that the challenges in water sector make women more difficult to collect water from longer distance from their home.

Respondents realize that poor people especially women and children are very vulnerable to the impacts of climate change as women are responsible for multiple tasks in their family as well as taking part in water collection and agricultural activities (animal raising, home gardening and seed transplanting etc).

Among five of them, only one respondent thinks that climate change cannot be mitigated, but climate change impacts can be coped. However, they are aware of some ways to adapt in agriculture such as applying crops tolerated to flood and drought, using organic fertilizer and biogas. They could understand on the ways to manage water such as building new irrigation, maintaining or restoring existing irrigation in the commune, digging wells, ponds, canals and keeping water for domestic use.

Based on their understanding, provincial officers have built their knowledge and understanding through presentations in workshop and technical meeting organized by NAPA Follow Up project. In terms of awareness raising activities, provincial officers gathered documents related to climate change and pass on to villagers in the target commune. As their understanding still limited, they suggested more capacity building to understand deeply on the climate change and adaptation measures in particular in agriculture and water sectors. Awareness of local people, training manual (gender and climate change) and educational materials (using pictures) for local villagers were considered as critical needs for spreading out climate change knowledge effectively.

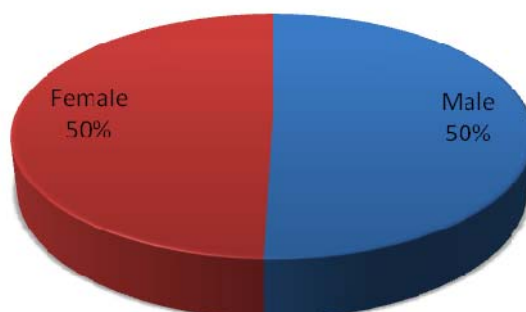
## Survey Findings in Bos Leave commune, Chitr Borei District, Kratie Province

### 4.1 Demographic Information in Bos Leave commune

#### Gender

According to the figure 65 below, there were comprising of 50 percent of respondents who were interviewed are females and 50 percent males. There is an excellent distribution of respondents by gender in Bos Leave commune which was identified by interviewers.

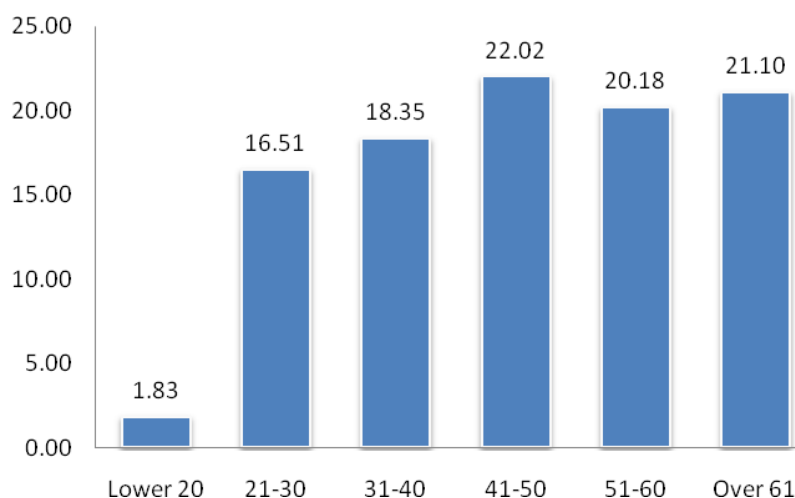
Figure 64: Gender of Respondents



#### Age

According to Figure 65, the majority of respondents are between 21 years and over 60 years of age. Based on the observation during the field survey, there are few villagers aged under 21 years. The survey team tried to identify villagers in this range to interview. However, they are busy at their plantations.

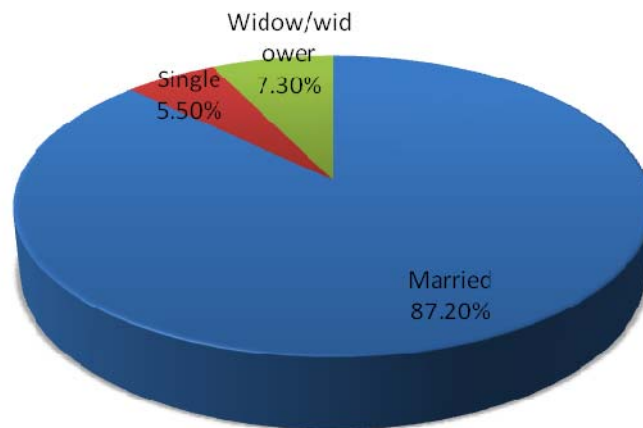
Figure 65: Age range of respondents



## Marital status

The Figure 66 below shows that 87.20 percent is married, 5.50 percent is single and 7.30 percent is widow.

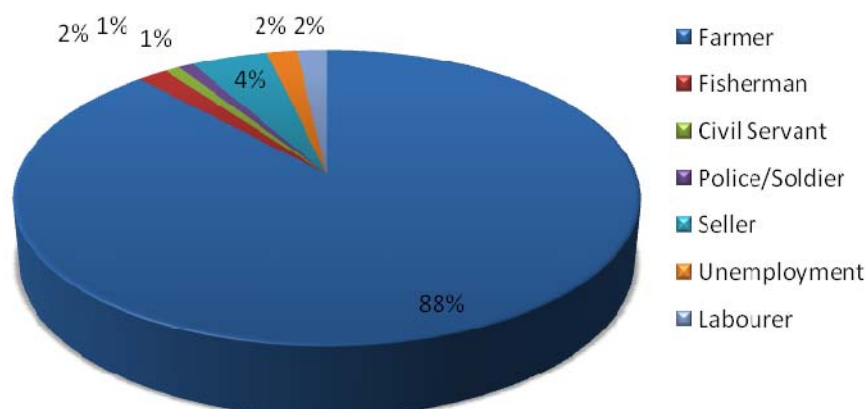
Figure 66: Marital status of respondents



## Main occupation

Based on the Figure 67, 88 percent of respondents is farmers, 4 percent (sellers), 2 percent (unemployed), 2 percent (labour workers), 2 percent (fishermen), 1 percent civil servant (teachers) and 1 percent (police).

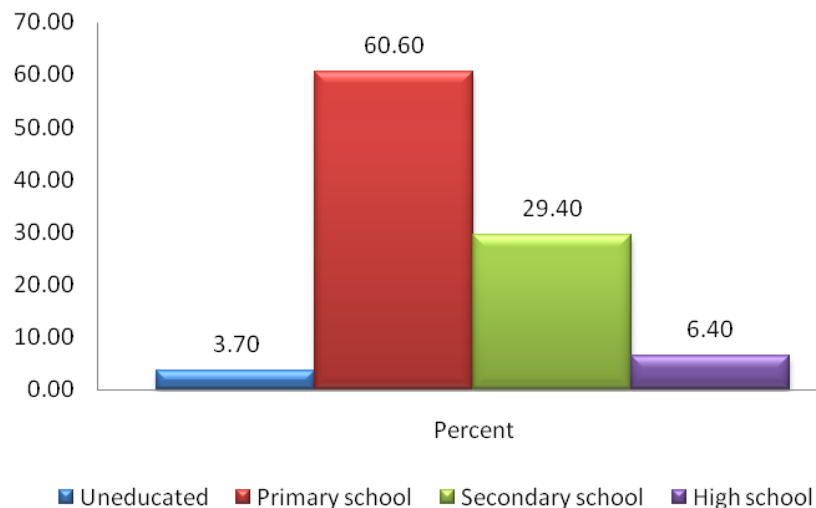
Figure 67: Main occupations of respondents



## Level of Education

The analysis result in figure 68 shows that 3.70 percent of respondents has no education, 60.60 percent (primary school), 29.40 percent (secondary school) and 6.40 percent (high school).

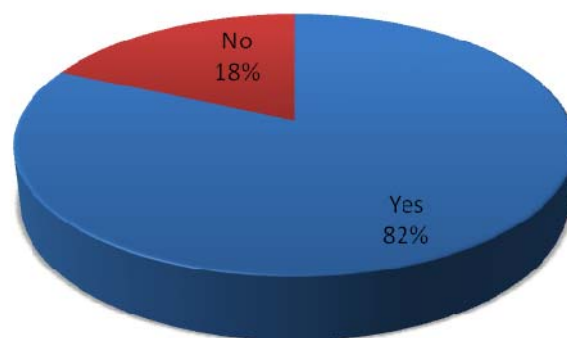
Figure 68: Educational level of respondents



## 4.1 Awareness and Knowledge of Villagers on Climate Change

Respondents were asked whether they have heard of “Climate Change”. Figure 69 shows that 82 percent of them used to hear it and 18 percent never heard of. It is observed that a majority of them heard of climate change as they experienced floods and droughts as they are living along the Mekong River. Furthermore, some respondents used to participate in climate change forum organized by NAPA Follow-Up project as well as getting news heard spread by media and Red Cross’s volunteers on disasters.

Figure 69: Have you ever heard about “Climate Change”?



Respondents were asked about their observations on the changes in climate during the survey in order to understand how they have been noticing. Figure 70 shows that 96 percent of them has noticed the changes and 4 percent has not.

Figure 70: Have you noticed changes in the climate?

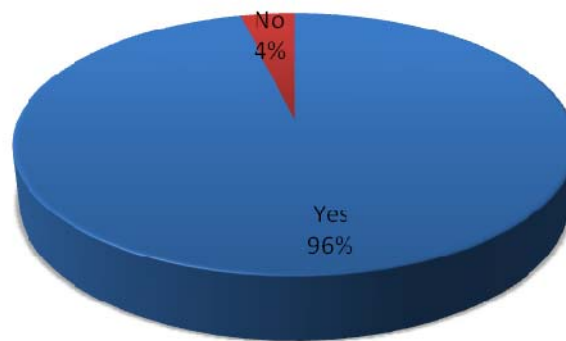


Figure 71 shows that 3.67 percent doesn't know how the climate has changed. 85.32 percent realized the changes in temperature, 63.30 percent noticed changes timing in the rain, 40.37 percent said more frequent or intense droughts, 33.03 percent said changes in seasonal flooding, 22.94 percent showed frequent lightning, 20.18 percent raised dry spell, 18.35 percent stated more intense rain, and 17.43 percent said more/longer flood.

According to Focus Group Discussion, village representatives have noticed some changes such as intense storm, weather gets colder and hotter immediately, natural ponds dried up, increased insects destroying paddy, animals get sick more frequently and seasonal flooding started earlier in April last year.

Figure 71: How has the climate changed?

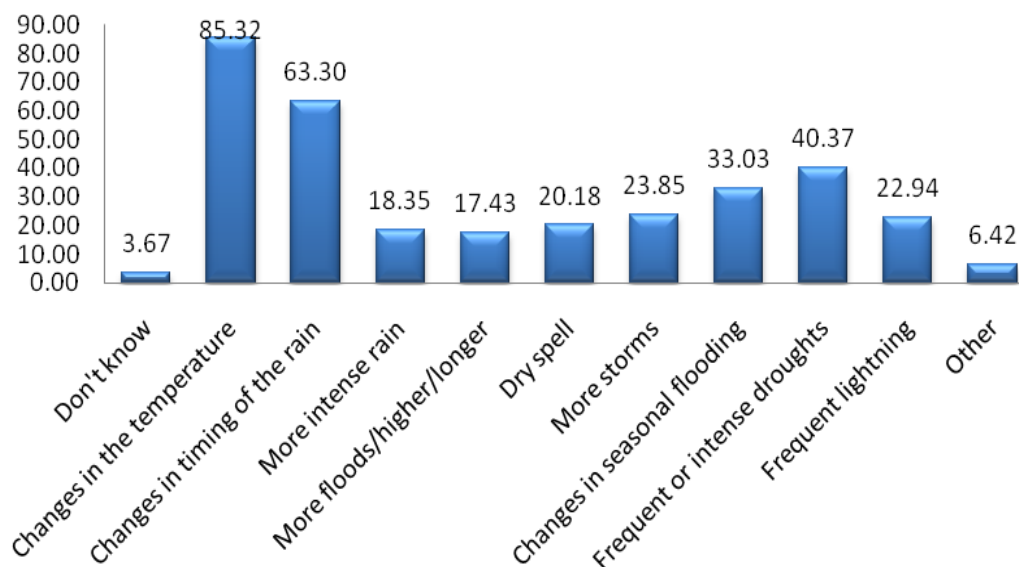


Figure 72 indicates that most respondents are more aware of the causes of deforestation (70.64 percent), pesticide and chemical fertilizer use in agriculture (14.68 percent) and pollution from burning fossil fuel (11.93 percent). They are also aware of other causes such as using modern electronic tools (11.01 percent), forest fire (9.17 percent) and emission from waste dump (6.42 percent), emission from farming (5.50 percent) and emission from factory (4.59 percent). Among all respondents, 22.94 percent doesn't know at all about the causes of climate change.

Village representatives who participated in focus group discussion expressed their understanding on some CC causes such as deforestation, upstream hydropower caused hydrological fluctuation of Mekong River, smoke from factory and reflection of glass from buildings that contribute to higher temperature. 23 percent of village representatives could understand various causes of climate change such as Green House Gases (GHGs), however they understood it wrongly by considering it as an effect from glasses of buildings, which later leads to higher temperature.

Figure 72: What causes climate change?

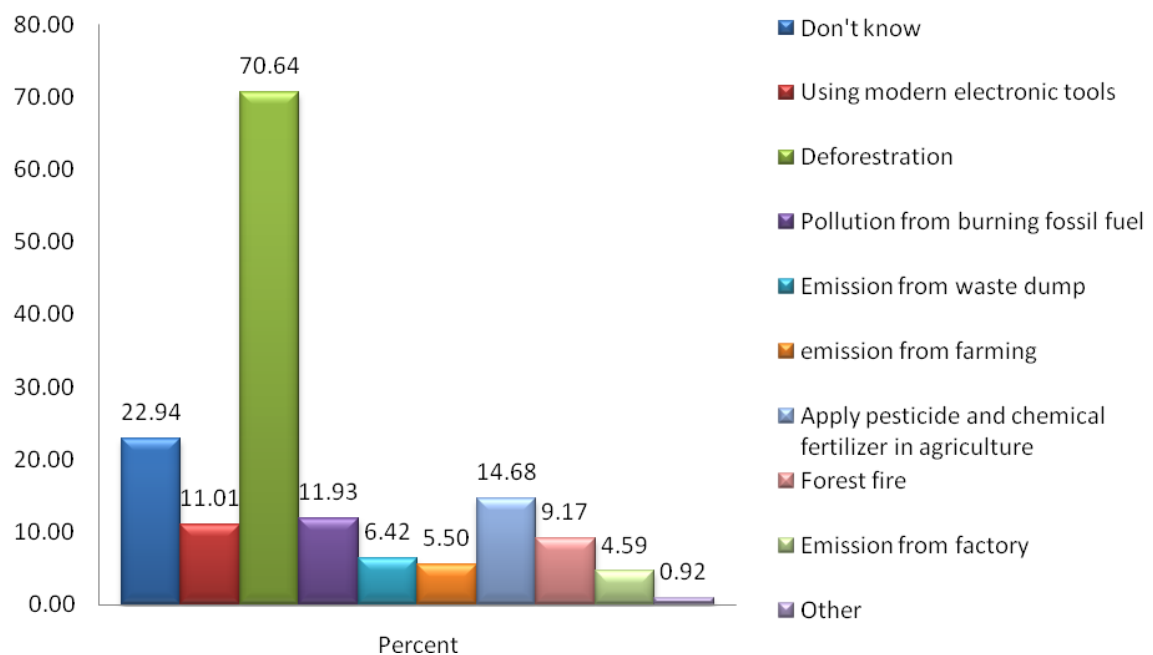
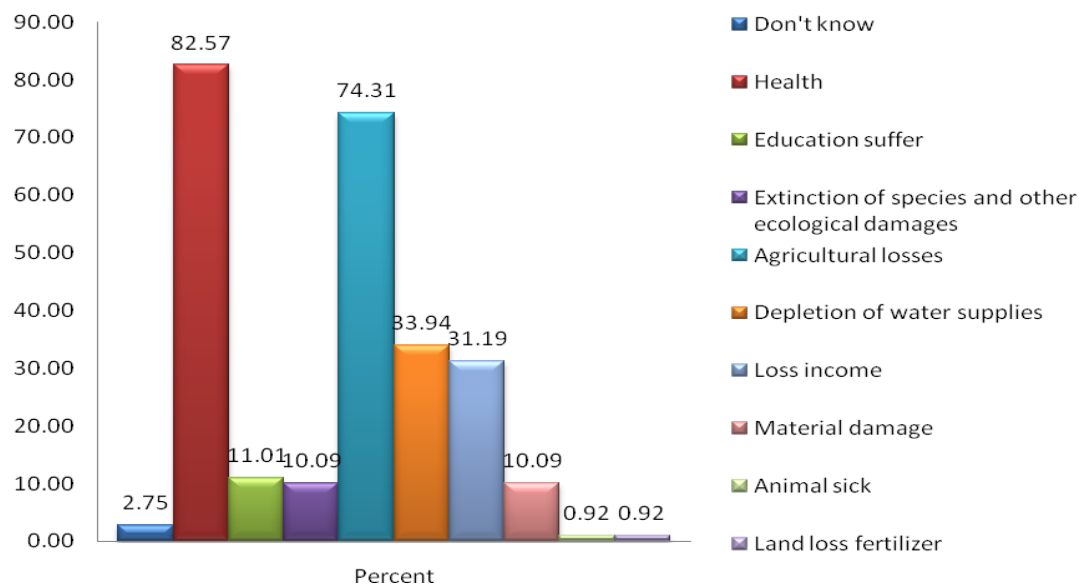


Figure 73 indicates that 2.75 percent of respondent does not realize the impacts caused by climate change. Villagers are aware only the impacts that they have experienced so far such as impact on health (82.57 percent) as many villagers especially children and elders have faced with health problem such as diarrhea due to depletion and contamination of water and high temperature. 74.31 percent of them is aware of loss of agriculture product. Respondents are not aware much on other impacts of climate change such as the depletion of water resources (33.94

percent), income loss (31.19 percent), education suffer (11.01 percent) especially children are difficult to access their school during flooding, material damages (10.09 percent), animal health and fertilizer loss (0.92 percent).

In the focus group discussion, farmers expressed their most concern of flooding on their paddy in rainy and flooding season, and drought in dry season. They also raised the increasing of animal diseases caused by high temperature, and human health such as diarrhea resulted from contaminated water and water shortage. Moreover, the depletion of water sources nearby the villages caused their crops and home garden faded.

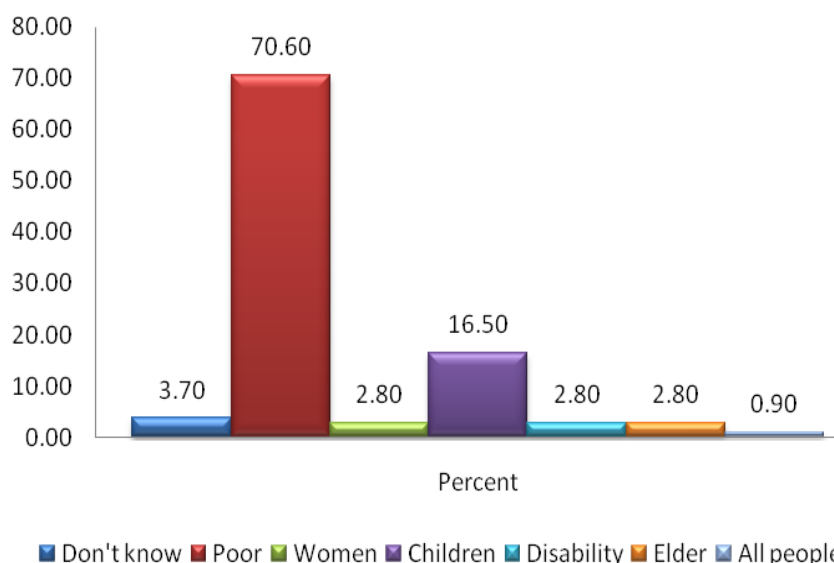
Figure 73: How does climate change affect people?



According to the figure 74, 3.70 percent of respondent does not know which group is the most vulnerable from impacts of climate change. 70.60 percent said the poor people are the most vulnerable.

Figure 74: Who is the most vulnerable as a result of climate change?





Respondents were asked between men and women who would suffer more from climate change. Figure 75 indicates that 69.70 percent of respondents said women are suffered more, 14.70 percent said men, 11.90 percent said both, and 3.70 percent did not.

Based on result from focus group discussions with female groups, women are most vulnerable comparing to men. This is because women have more physical weakness, more housework as well as their contributions in agricultural activities.

All most all men in male groups mentioned differently that men are the most vulnerable. Men work more in paddy fields and work harder than women. However, a man in a male group disagreed and thought women are the most vulnerable.

Figure 75: Between women and men, who would say suffers the most from climate change?

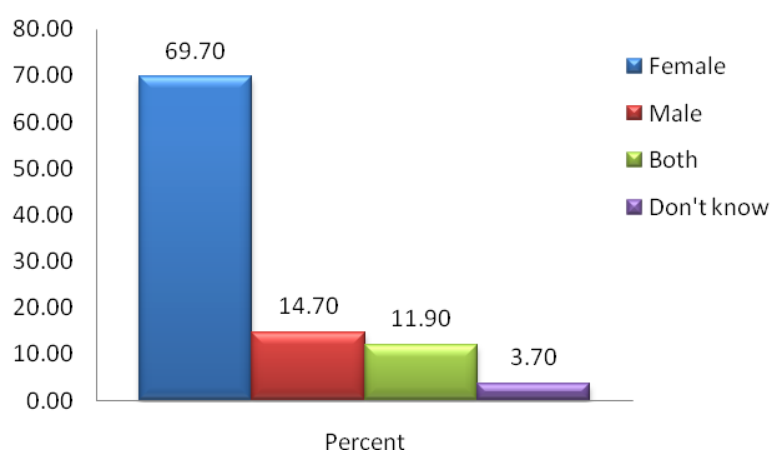
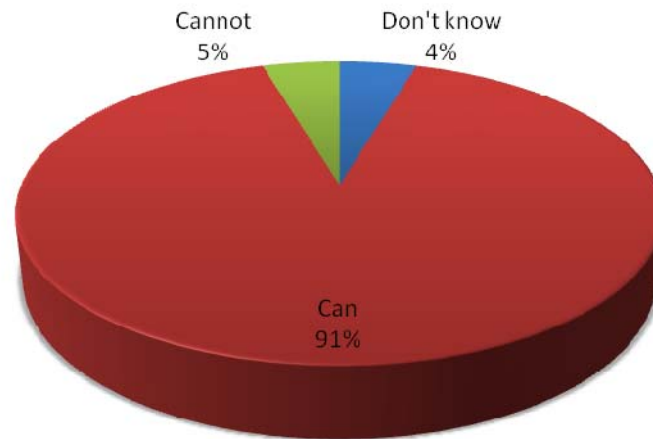


Figure 76 indicates that 91 percent of respondents answered that climate change impacts could be coped with, 5 percent said no, and 4 percent didn't know.

Figure 76: Is there anything can be done to cope with changes of climate?

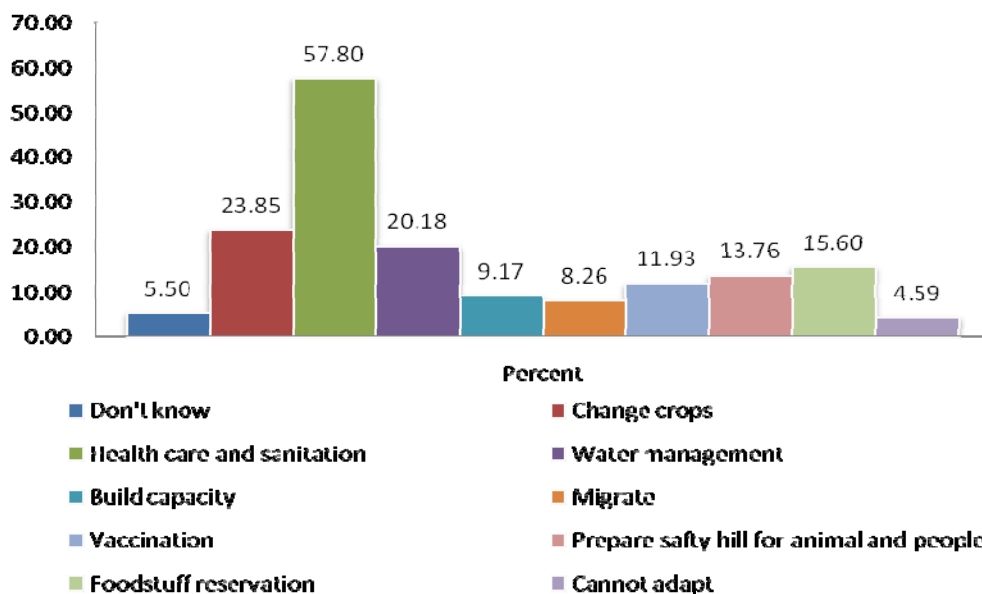


Respondents were asked how they can participate in climate change adaptation. Based on their understanding, 57.80 percent answered that they would participate in health care and water sanitation, 23.85 percent change or alternate crops, and 20.18 percent manage and restore water sources for domestic consumption and agriculture. They would also participate in other actions such as building own capacity (9.17 percent), preparing stuff for safety hills (13.76 percent), reserving foodstuff (15.60 percent), vaccinating animals (11.93 percent) and migrating to safety places (8.26 percent). Among all respondents, 5.50 percent said they didn't know, and 4.59 percent said they could not adapt to climate change.

As results from focus group discussions, farmers who are members of 'Farmer Field School' responded that they would select resilient rice seed to bad conditions of weather especially floods and droughts. In term of other crops, some farmers have switched from crops that need much water to those that require less. For example, broom corn is planted in Praek Kov and Preah Kanlorng village. They usually use pumping machines and long pipes to pump water from water sources nearby such as natural ponds, Praek Te, dike and river. Some families have to hire pumping machines (2000 Riels per hour and 1 hectare of paddy field take 7 hours) and buy water for domestic consumption (1500 – 2500 Riel per tank).

During dry season, farmers take care of their animals with frequent cleaning, traditional medicine, and vaccination to protect them from diseases. Farmers mentioned that although animals are taken care as mentioned above, their animal still die (by diseases). Before flooding season, they reserve animal food and boat to transport their animals to safety hills, which is about 8-12 kilometers from their homes.

Figure 77: How can people participate in actions of climate change adaptation?



#### 4.3 Attitude toward Climate Change

Respondents were asked how climate change affects their life. Most of them said that it affected rice yield (77.98 percent), health (69.72 percent), income (42.20 percent), water resources (34.86 percent), and food (30.28 percent). Not many respondents saw CC damaged houses (7.34 percent) and made travel harder (11.01 percent). 2.75 percent of respondents said they did not know.

Therefore, respondents are aware more of what associated with their daily lives such as reduction in rice yield as they lack of knowledge on agricultural techniques; health issues as it is caused by water quality and sanitation; less income as crops are damaged and animal die.

Figure 78: How do these changes affect your life?

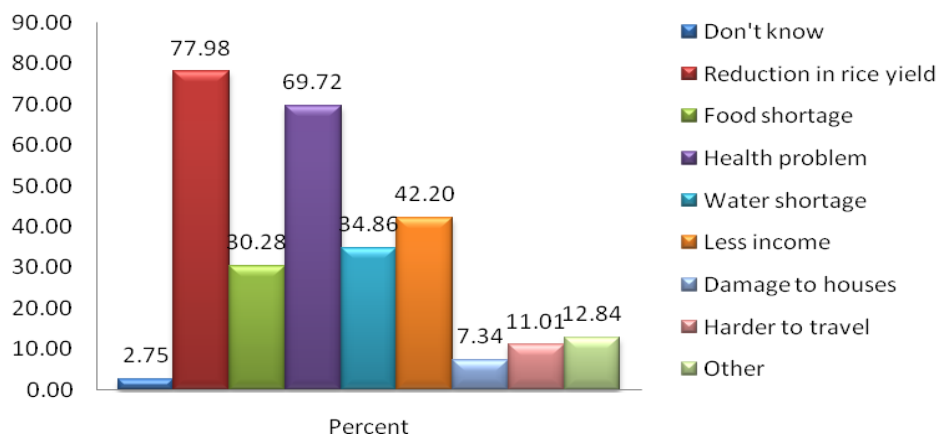
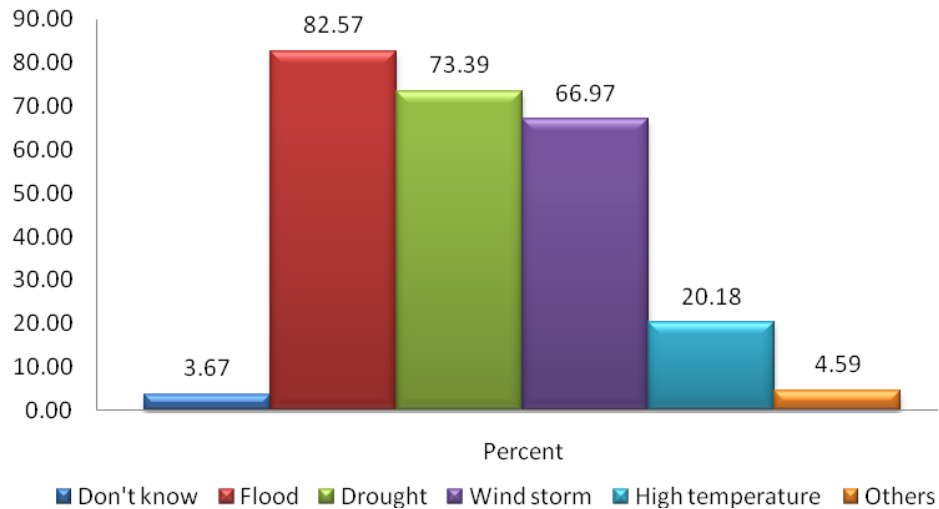


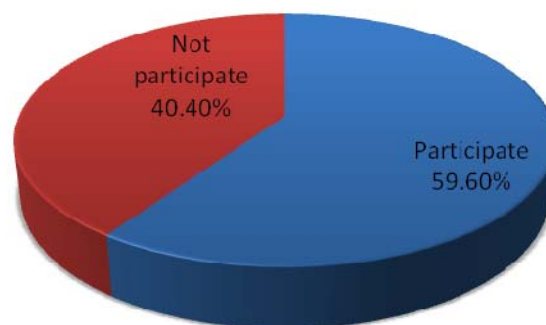
Figure 79 indicates that 82.57 percent of respondents is aware of flood, 73.39 percent (drought), 66.97 percent (wind storm) and 20.18 percent (high temperature) occurred in their commune. 3.67 percent of respondent did not know.

Figure 79: What kind of climate hazards have you faced so far?



Respondent were asked about their participations in dealing with climate hazards in their commune. 59.60 percent of them participated by helping other villagers through providing and lending boats to transport, materials and animals. 40.40 percent of respondent didn't participate in dealing with climate hazards due as they did not have boat, pumping machines, seeds and other materials. They could not even help themselves.

Figure 80: Have you ever participated in any activities for dealing with climate hazards?



Respondents were asked whether they have challenges in coping with climate change. Figure 81 shows that the majority of them (92.70 percent) face challenges in dealing with climate change, while other 1 percent does not. However, 6 percent of

respondents didn't know. Actually, some respondents have survived their family with challenges as usual. However, they do not think those are challenges.

Figure 81: Do villagers in your community face any challenges in coping with climate change?



The challenges that most respondents face in coping with climate change are lack of money (67.89 percent), lack of irrigation (48.62 percent), lack of boat (33.94 percent), lack of shelter (30.28 percent), lack of seeds or improved rice variety (26.61 percent), food shortage (19.27 percent), no medicine for curing (8.26 percent), lack of materials (1.83 percent) and other challenges (5.50 percent).

The main challenge is money to buy petroleum for their pumping machines or hired pumping machines for their paddy fields as needed, to buy fertilizer as well as other materials. Furthermore, they are also lacking of irrigation system for cultivation and also lacking improved rice seeds for higher yield. Some people in the commune do not have enough boats, materials and shelters as well as medicine during flooding season.

Figure 82: What are challenges facing in coping climate change?

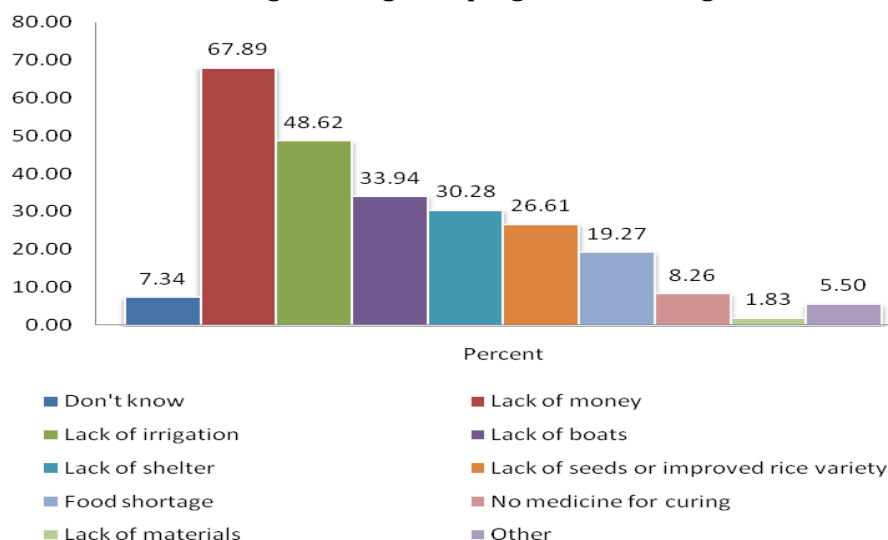
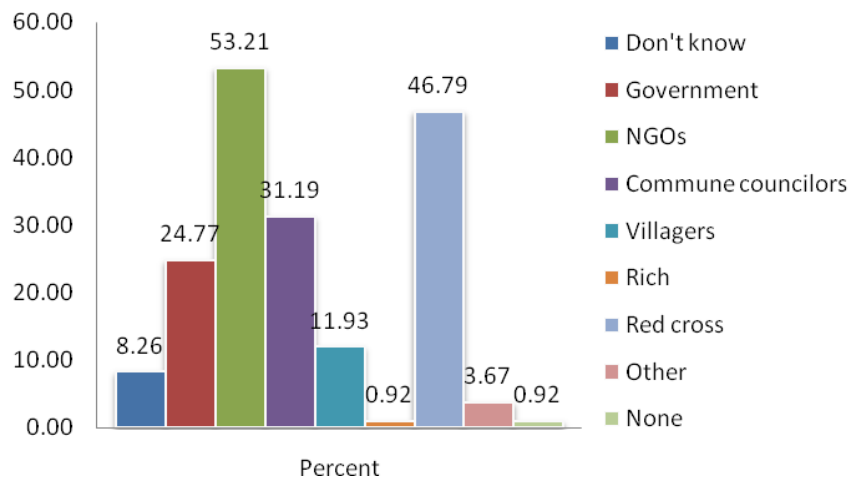


Figure 83 indicates that relevant bodies who are responsible for helping people in coping with problems of climate change are government (24.77 percent), non-governmental organizations (53.21 percent), commune councilors (31.19 percent), villagers (11.93 percent), rich people (0.92 percent), Red Cross (46.79 percent). Among all of respondents, 8.26 percent did not know.

Figure 83: Who do you think should be responsible in helping your community cope with the problem of climate change?



#### 4.4 Practices in Agriculture and Water

##### 4.4.1 Crops Plantation

Figure 84 indicates 90.80 percent of respondents is planting crops and 9.20 percent is not.

Figure 84: Do you plant crops?

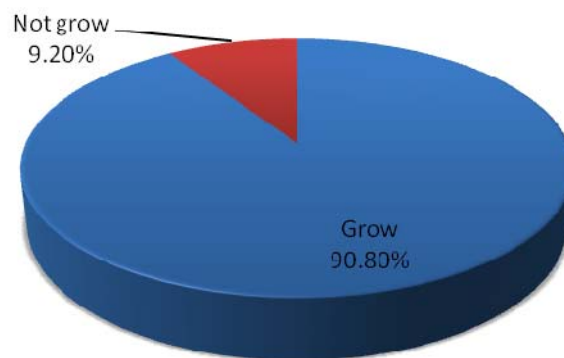


Figure 85 below indicates further that 86.24 percent of respondents is planting paddy, 59.63 percent is growing cash crops and 54.13 percent is doing vegetable.

Figure 85: What kinds of crops are you planting?

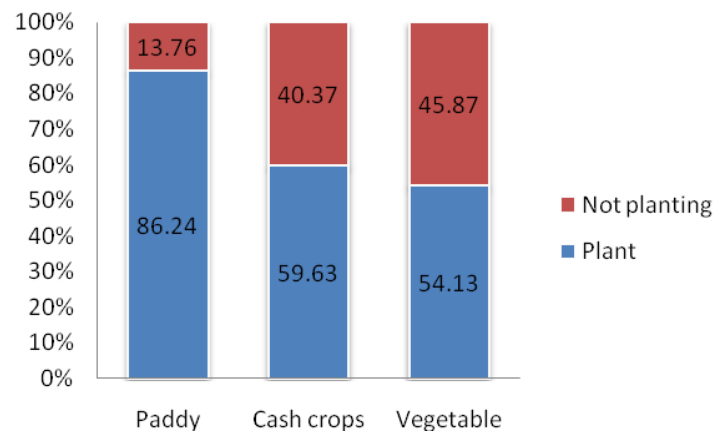


Figure 86 shows that various kinds of crops mainly paddy, cash crops and vegetable are being planted by farmers in each village as illustrated below.

Figure 86: Main crops in each village

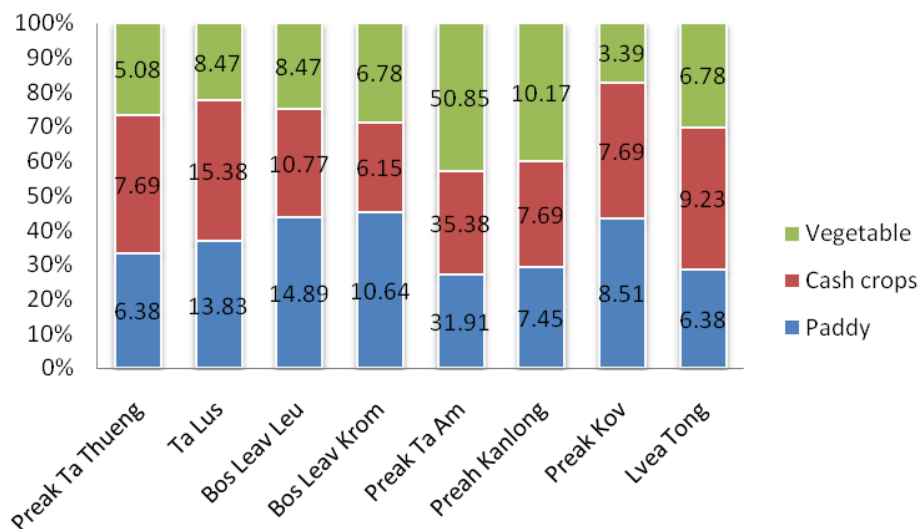
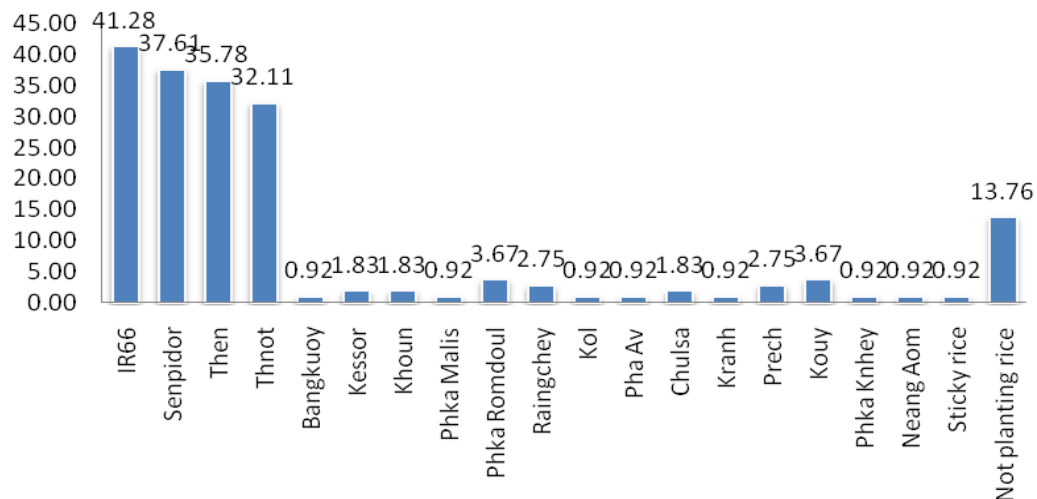


Figure 87 indicates that 13.76 percent does not plant paddy. Most rice varieties are being planted by farmers are IR66 (41.28 percent), Thnot (32.11 percent), Then (35.78 percent) and Senpidor (37.61 percent).

There is few rice varieties being planted by farmers such as Bangkuoy (0.92 percent), Kessor (1.83 percent), Khoun (1.83 percent), Phkar Malis (0.92 percent),

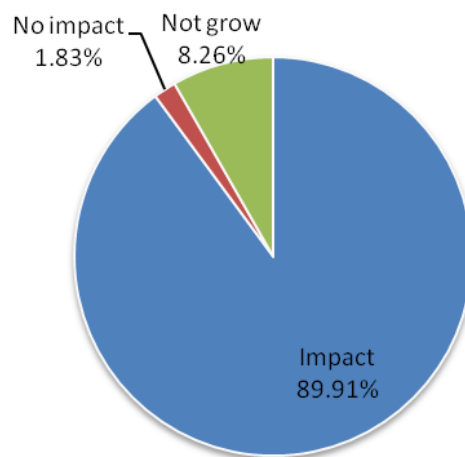
Phkar Romdoul (3.67 percent), Raingchey (2.75 percent), Kol (0.92 percent), Pha Av (0.92 percent), Chulsa (1.83 percent), Kranh (0.92 percent), Prech (2.75 percent), Kouy (3.67 percent), Phkar Knhey (0.92 percent), Neang Aom (0.92 percent) and Sticky rice (0.92 percent).

Figure 87: Rice varieties being planted in Bos Leave commune



Respondents were asked whether climate change impacts their crops. Figure 88 indicates 89.91 percent said yes, and 1.83 percent said no.

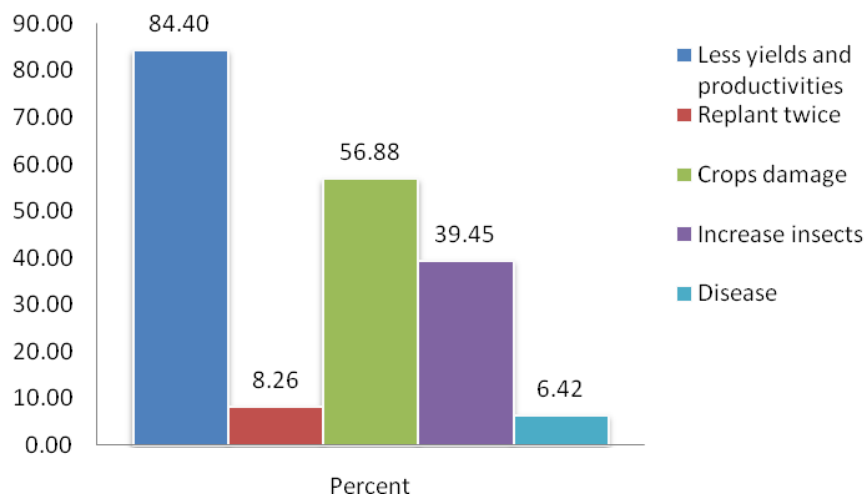
Figure 88: Has climate change impacted these crops?



The below figure shows that 84.40 percent of respondent said CC impacts caused less yields and productivities, 56.88 percent crop damages, 39.45 percent (increasing insect), 8.26 percent (replant twice) and 6.42 percent (crop diseases).

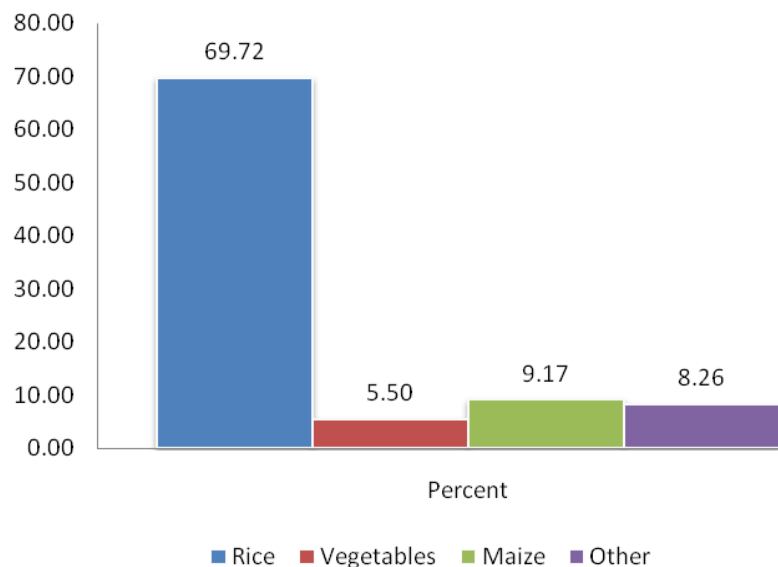


Figure 89: How does climate change impact your crops?



Respondents were asked which crops have been most affected by climate change. 69.72 percent of respondents mentioned rice paddy, 9.17 percent (maize) and 5.50 percent (vegetable). From the analysis of the survey, many farmers are not aware of how to select resilient crops.

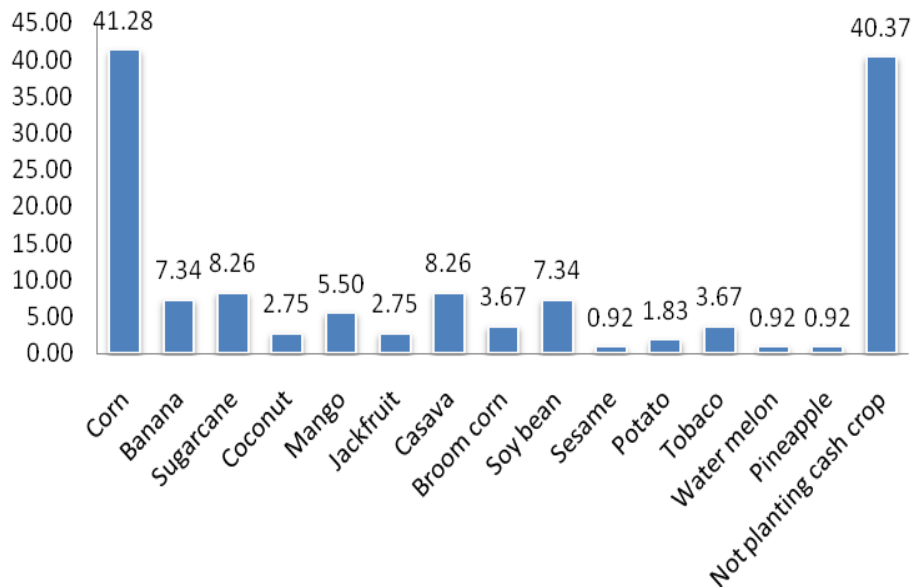
Figure 90: Which crops do you think have been most affected by climate change?



In Bos Leave commune, respondents are planting cash crops mainly corn (41.28%) and other supplementary cash crops such as banana (7.34%), sugarcane (8.26%), coconut (2.75%), mango (5.50%), jackfruit (2.75%), cassava (8.26%), broom corn (3.67%), soy bean (7.34%), sesame (0.92%), potato (1.83%), tobacco (3.67%),

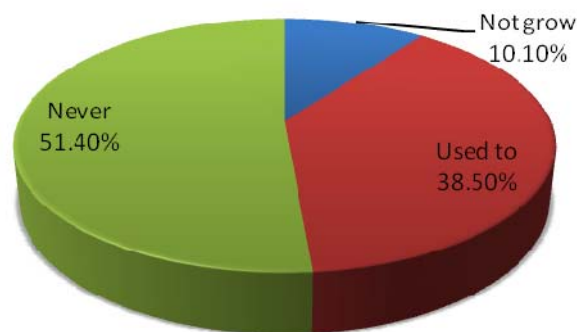
water melon (0.92%) and pineapple (0.93%) while 40.37 percent of respondents are planting cash crops.

Figure 91: Type of cash crops being planted in Bos Leav commune



Respondents were asked whether they used to switch or rotate crops due to changes of climate. Figure 91 indicates 38.50 percent of respondent used to switch or rotate planting crops and 51.40 percent never. In Bos Leave commune, farmers have concerned about low yields and crop damages due to climate disasters such floods and droughts in their commune. Some farmers are aware of usefulness of switching crop which is tolerated to bad condition of weather. However, some are not aware and haven't applied appropriate measures for resilient crops yet.

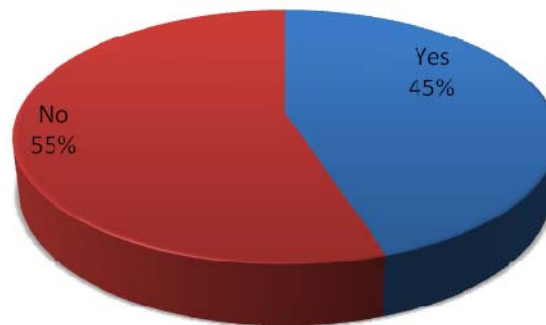
Figure 92: Have you switched crops because of climate change?



Respondents were asked whether they engage in income generating activities to reduce risk of climate change in crop cultivation. 45 percent of them join saving group, farmer field school in order to reduce risks of climate change that would be

harmful to their crops. However, 55 percent do not join in any activities as some families are very busy with their field work. Some families are interested in building their understanding on agricultural techniques, but they don't know which group to engage with

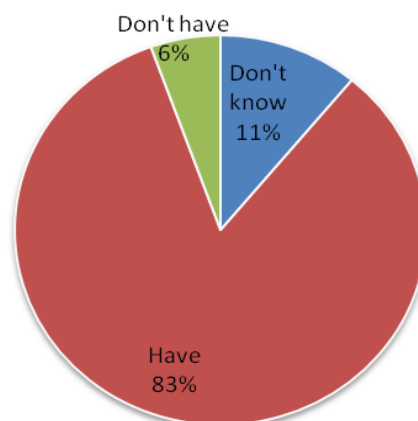
Figure 93: Do you engage in other income generating activities to reduce the risk of CC in crop cultivation?



Respondents were also asked whether women face more challenges in coping with climate change in agriculture. 83 percent said yes, 6 percent women said no and 11 percent didn't know.

As results from focus group discussions, male group considered women as physically weak, not so healthy, and are not able to make decisions by themselves. For women group, they thought women are facing some difficulties such as food shortage, weakness, debt and low price of rice at the market. Moreover, women are in debt due to the paddy loss or damage caused by climate hazards such as floods and droughts.

Figure 94: Do you think women face more challenges in coping with climate change in agriculture?



#### 4.4.2 Animal raising

Figure 95 and 96 indicates that 94.50 percent of respondents are raising animals such as cattle (71.56 percent), pigs (42.20 percent), chicken (65.14 percent) and duck (2.75 percent). 5.50 percent of them do not raise any animal.

Figure 95: Do you raise animal?

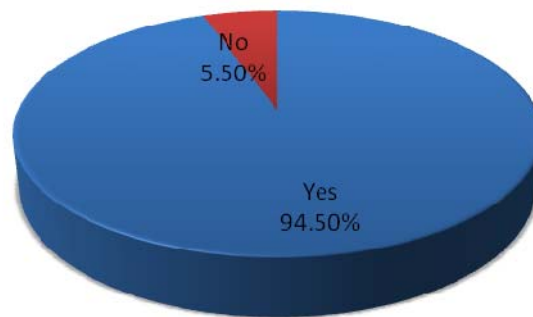
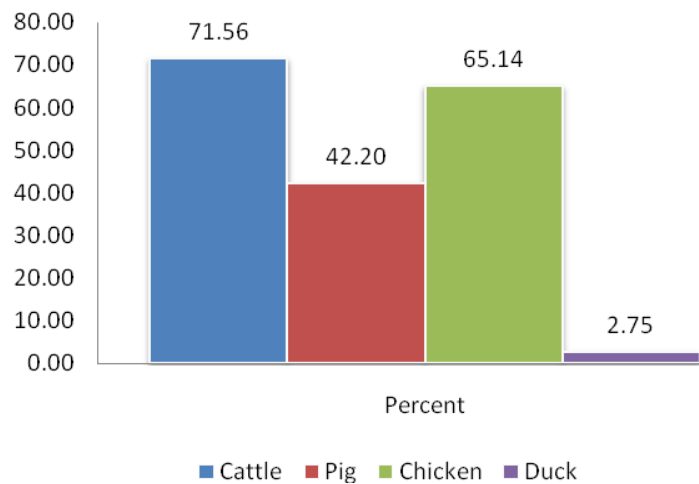
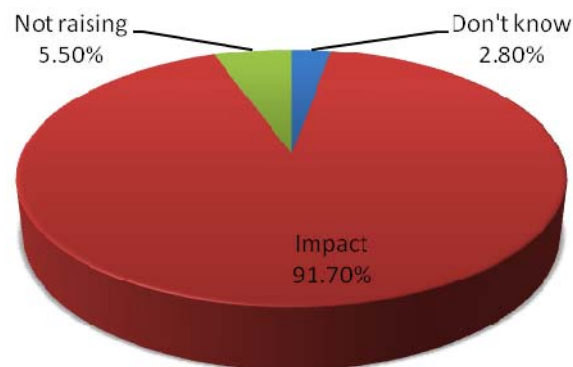


Figure 96: What animal are you raising?



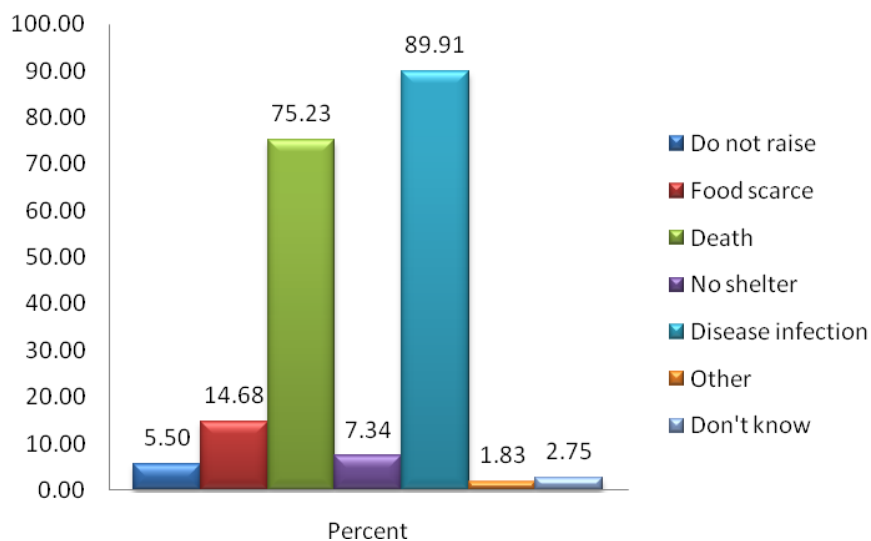
Respondents were asked whether their animals have been affected by climate change. 91.70 percent of respondents answered yes and 2.80 percent didn't know.

Figure 97: Have these animal been affected by climate change?



Respondents were asked further how climate change affects those animals. The impacts could be food scarcity (14.68 percent), death (75.23 percent), no shelter (7.34 percent), disease infection (89.91 percent) especially during flooding seasons and high temperature period. Among all respondents, 2.75 percent did not know.

Figure 98: How has climate change affects these animals?



#### 4.4.3 Water Resources

Figure 99 indicates that respondents in the commune access to water from various resources such as the Mekong River and Praek Teh as main water sources and ponds, natural ponds, wells, canals, lakes and water consumption.

Figure 99: What are the water sources in your village?

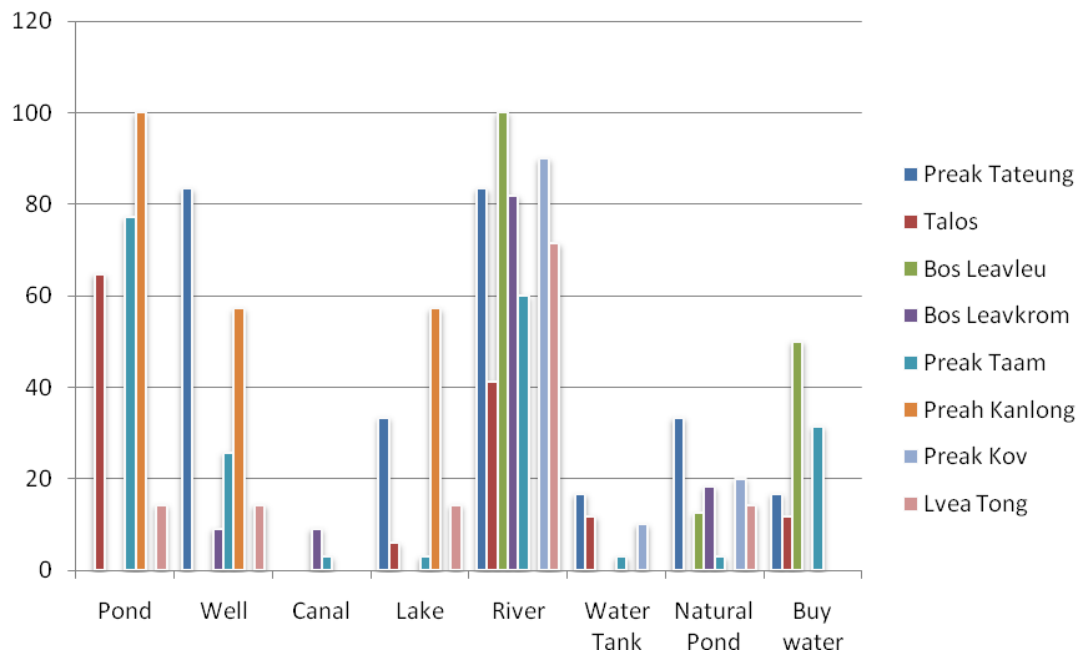
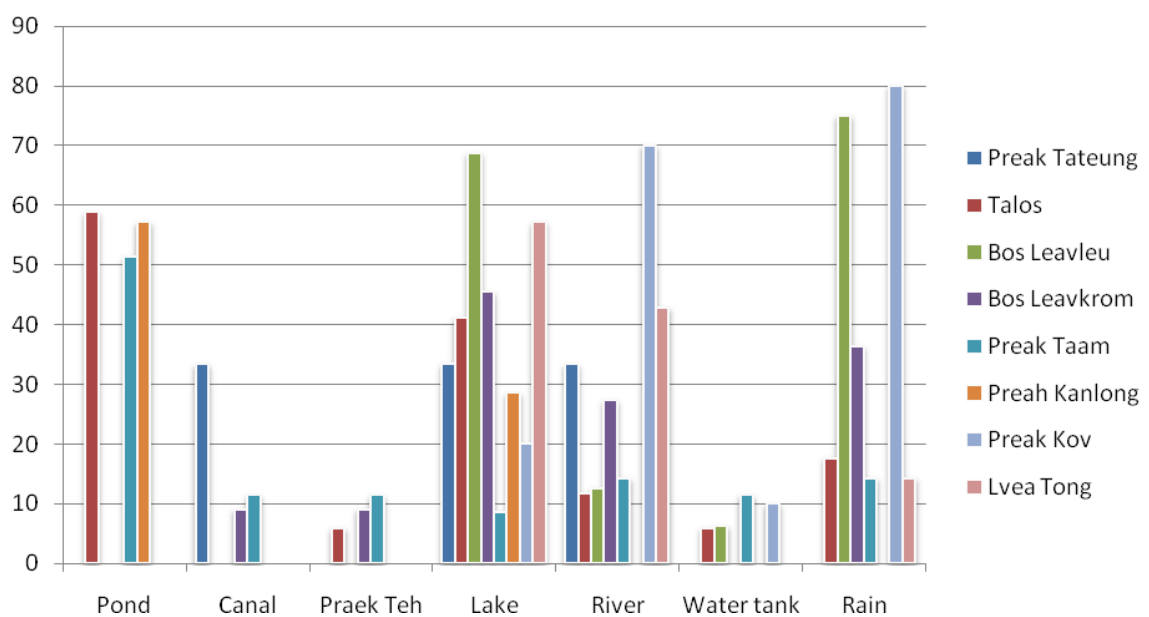


Figure 100 indicates that the majority of respondents in each village are relying on rain water, lakes, rivers and ponds for their cultivation. In addition, villagers who have plantation along and near Praek Teh are relying on water from it.

Figure 100: Where do you get water from for cultivation?

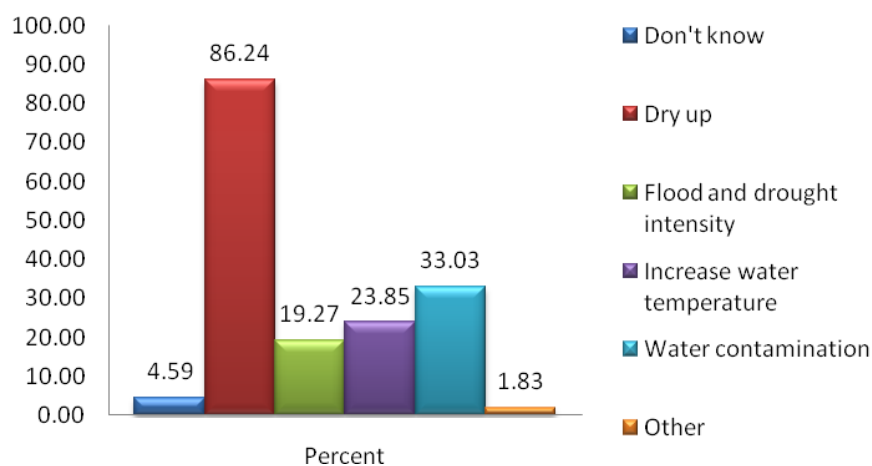


Respondents were asked how climate change affects their water resources. 4.59 percent said 'don't know', 86.24 percent said 'water dry up', 33.03 percent raised 'water contamination', 23.85 percent referred to the increase water temperature or hotter and 19.27 percent said flood and drought intensity.

As results from group discussions with village representatives, farmers can access to water resources differently according to their ability. They could water their paddy fields and farm if they own pumping machines or able to hire pumping machines with long distance pipes. Farmers who have no ability to hire pumping machines would face water shortages. Due to climate change impact, water level of Mekong River has fluctuated from 2006 to 2009, which less water flow to lakes, ponds and dams. Moreover, farmers are also facing with high price of oil for pumping machines and it is a major challenge for cultivation.

According to experiences with climate hazards (flood and drought), respondents are aware much of CC impacts on water resources especially water resources are dried up once Mekong river's fluctuation changed. It is also because of higher demand of water in agriculture, bad quality of water during flooding season and the increasing water temperature, which reduces fish stock.

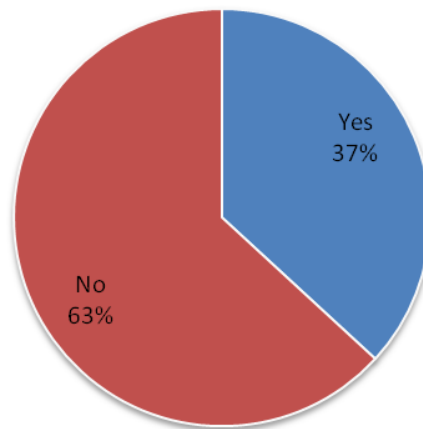
Figure 101: How does climate change affect your water resources?



#### 4.4.4 Forestry

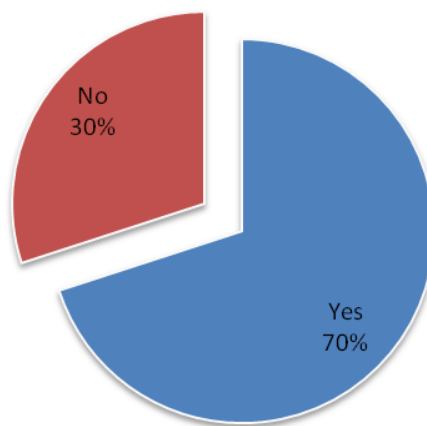
Figure 102 indicates that 63 percent of respondents said there is no forest in their community and 37 percent said yes. This question was also asked the commune chief in order to clarify, and he clearly mentioned that there is no forest in the commune, but some small trees on the hill, which has been cleared by some villagers for planting cassava.

Figure 102: Does your community have forests?



Respondents were asked whether forest help community in coping with climate change. 70 percent of respondents think that forest can help their community in coping with climate change and 30 percent say no. Respondents realize the usefulness of forest in helping their community in coping with climate change as a wall preventing storm, balancing temperature and absorbing rain for their cultivation.

Figure 103: Do forests help your community in coping with CC?

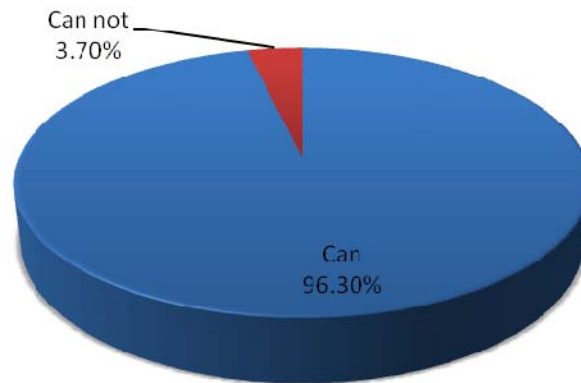


#### 4.4.5 Fishery

Respondents were asked if they could fish in the lakes, dams and rivers. 96.30 percent said yes, and 3.70 percent said no. According to the result from the village meeting, most villagers mentioned that they could catch fewer fish than a few years ago.

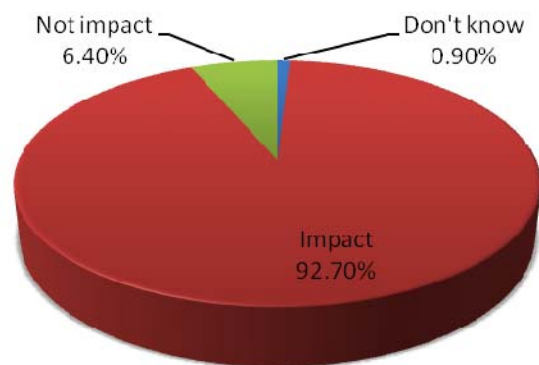


Figure 104: Can you do fishing in the lakes, dams and river?



Respondents were asked whether fisheries were affected by climate change. 92.70 percent said yes, 6.40 percent said no, and 0.90 percent did not know.

Figure 105: Do you think fisheries are affected by CC?



#### 4.5 Access to Climate Change related Information

Respondents were asked whether they used to receive any information before climate hazards occur. 97.20 percent said they received information in advance, and 2.80 percent said they never received any information.

Figure 106: Do you used to receive any information before climate hazards occur?

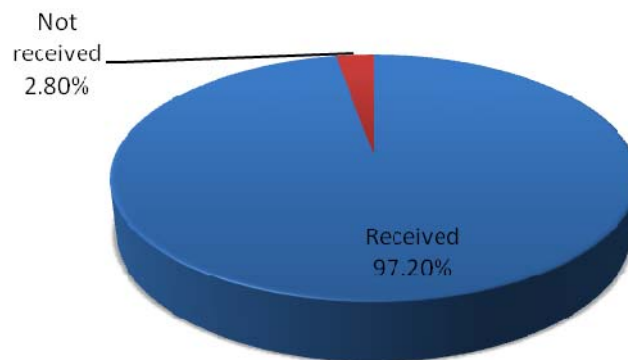


Figure 107 below indicates that 84.40 percent of respondents received information before disasters, 17.43 percent got it after, and 1.83 percent received it during disasters. Most respondents thought that information received before disasters would inform them to prepare foodstuff, animal feeds, and boats during flood seasons.

Figure 107: When did you receive this information?

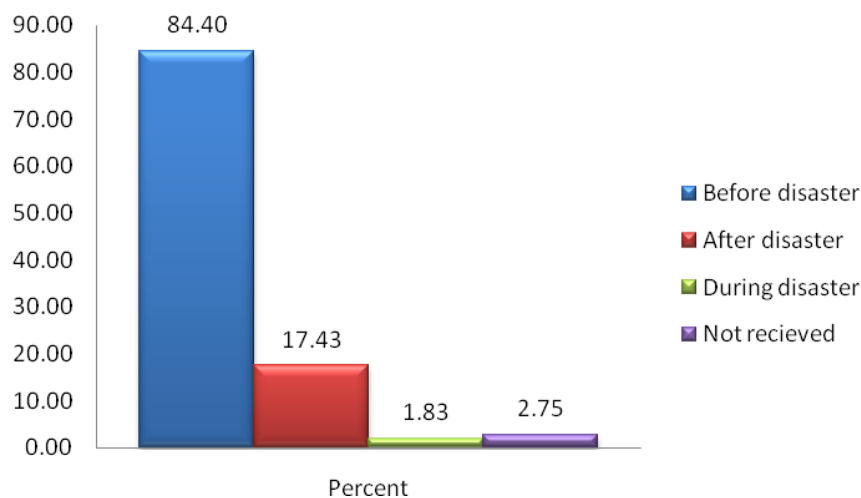
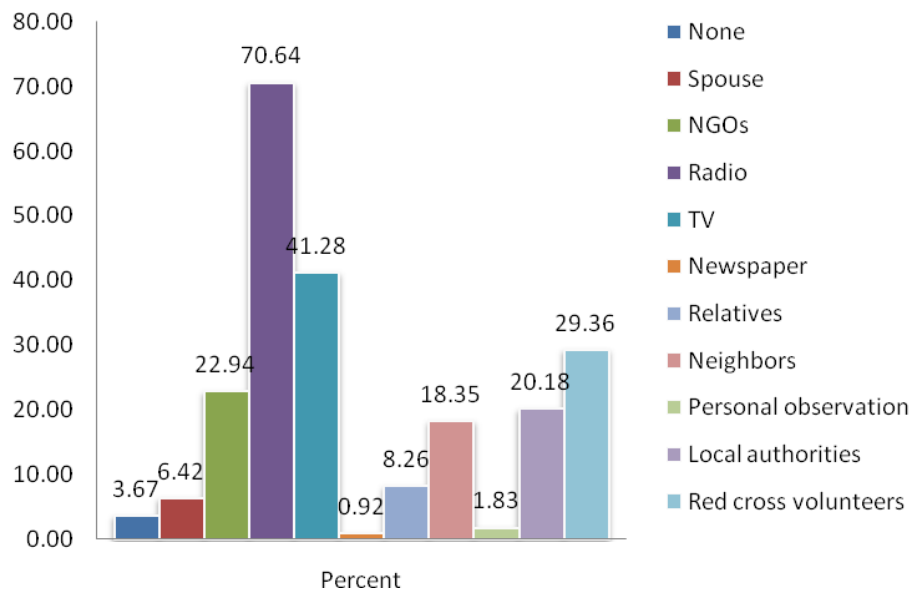


Figure 108 indicates that 70.64 percent of respondents received information about disaster from radio, 41.28 percent from TV, 29.36 percent from Red Cross volunteers, 22.94 percent from NGOs, 20.18 percent from local authorities, 18.35 percent from their neighbors and 8.26 percent from their relatives.

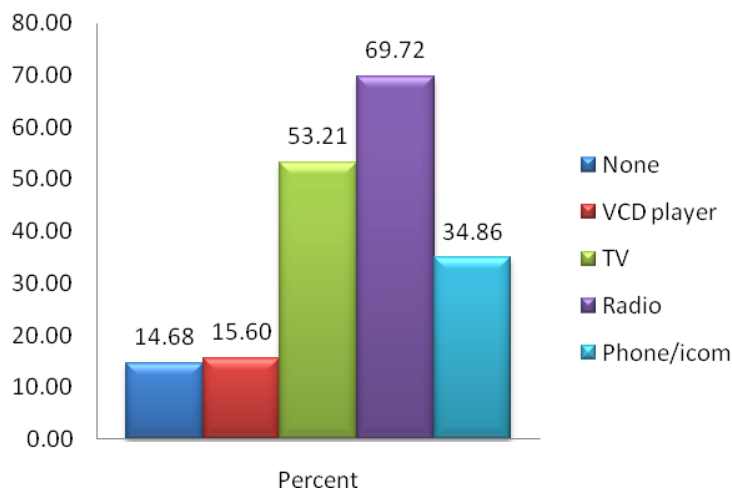
Figure 108: Who provide this information?



#### 4.6 Mass Media Sources

Figure 109 below indicates that 69.72 percent of respondents have radio, 53.21 percent (TV), 34.86 percent (phones), 15.60 percent (VCD players) and 14.68 percent don't have any information receiver tools.

Figure 109: Do you have information receiver?



Respondents were asked through which media they first heard of climate change. 64.22 percent heard from radio, 33.94 percent from TV, 20.18 percent from meetings and 4.59 percent from mouth to mouth.

Figure 110: Where did you first hear about climate change?

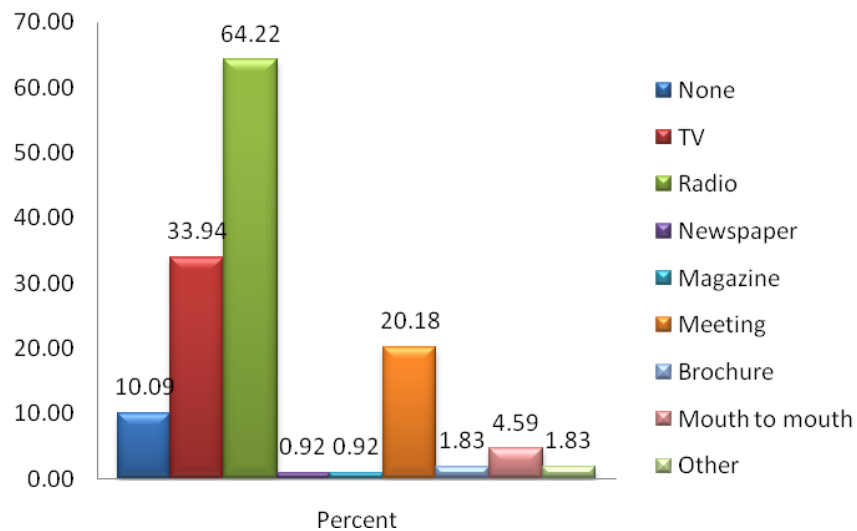
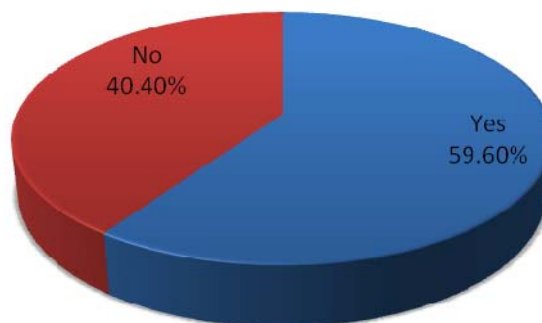


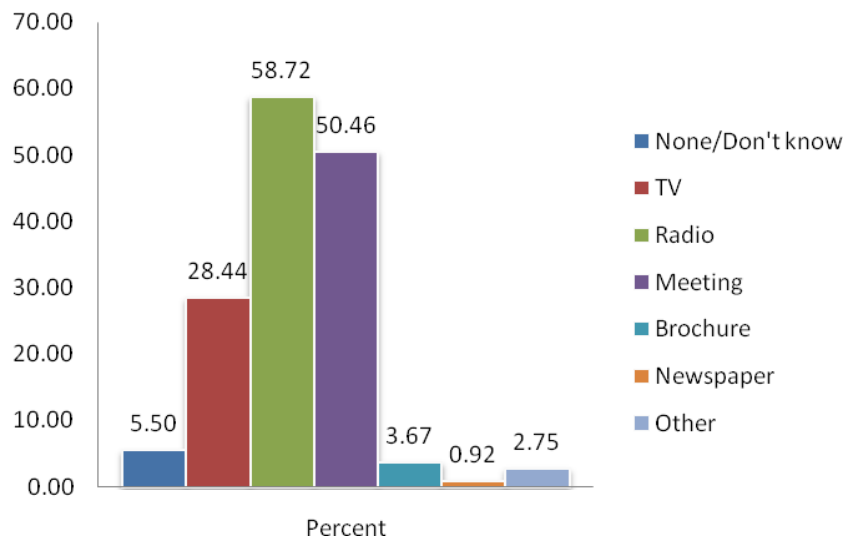
Figure 111 indicates that 59.60 percent of respondents said climate change information was available in their local village and 40.40 percent said no.

Figure 111: Is information on climate change available to you?



Respondents were asked about the effective and reachable information sources in the commune. The most effective information sources are radio (58.72%), meetings (50.46%) and TV (28.44%).

Figure 112: What are the sources of information that can most effectively reach people in your commune?



Respondents were asked about their trusted information sources. 65.14 percent of respondents trust radio, 27.52 percent said TV and 20.18 percent preferred meetings.

Figure 113: What sources of information do you trust the most?

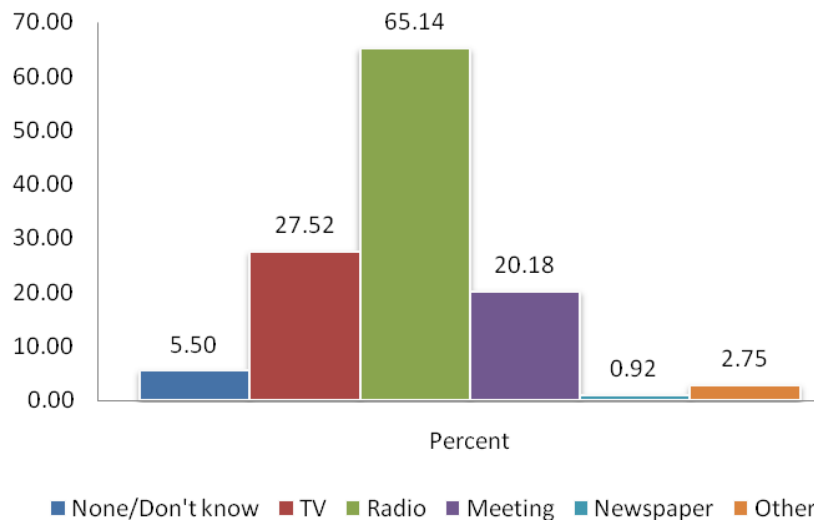
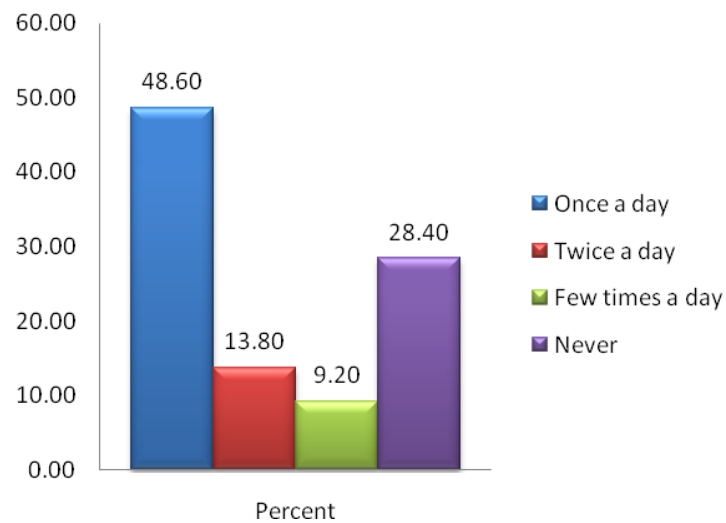


Figure 114 indicates that 48.60 percent of respondents watch TV once a day, 13.80 percent (twice a day), 9.20 percent (few times a day) and 28.40 percent (never watch).

Figure 114: How often do you watch TV?



Respondents were asked what TV programs they watch. 58.72 percent of respondents like watching news, 31.19 percent (movie), 10.09 percent (concert) and 10.09 percent (comic show).

Figure 115: What program do you like?

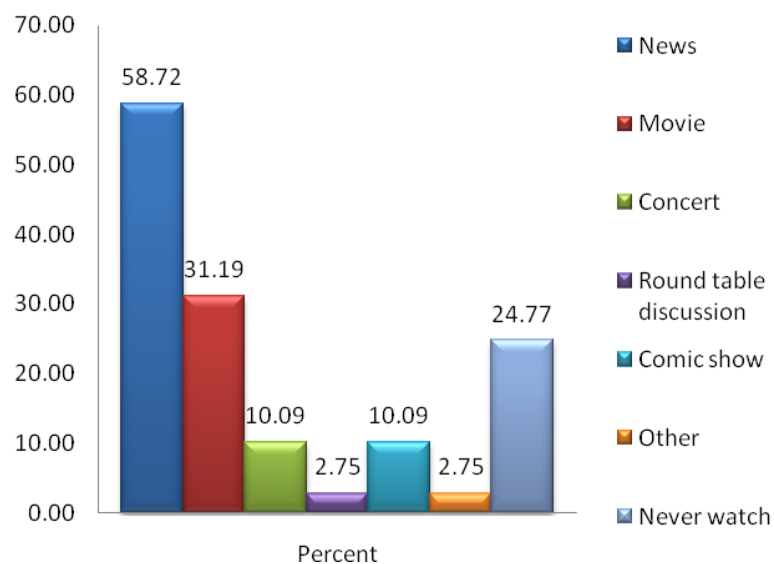
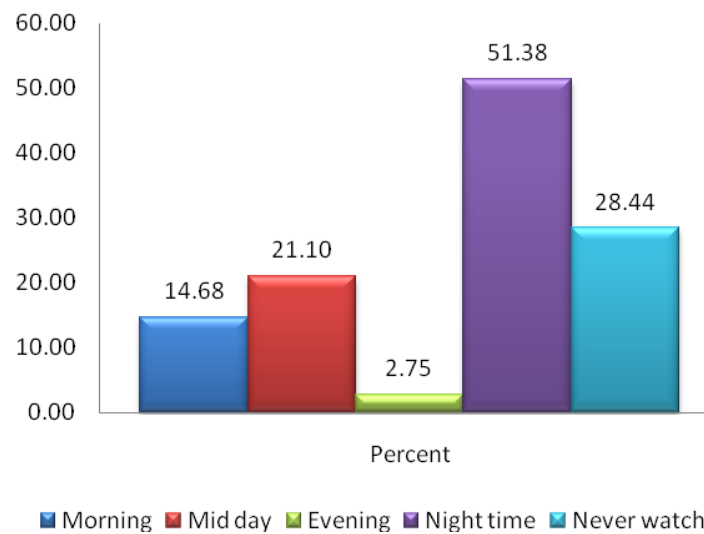


Figure 116 indicates that 51.38 percent of respondents usually watch TV at night time, 21.10 percent at mid day, 14.68 percent in the morning and 2.75 percent in the evening.

Figure 116: What hours of the day do you usually watch?



Respondents were asked what channels they usually watch. TV channels that they usually watch are CTN (12.84%), TV5 (31.19%), Bayon TV (50.46%), Apsara/TV11 (4.59%), TVK (4.59%) and MyTV (2.75%).

Figure 117: What channel do you usually watch?

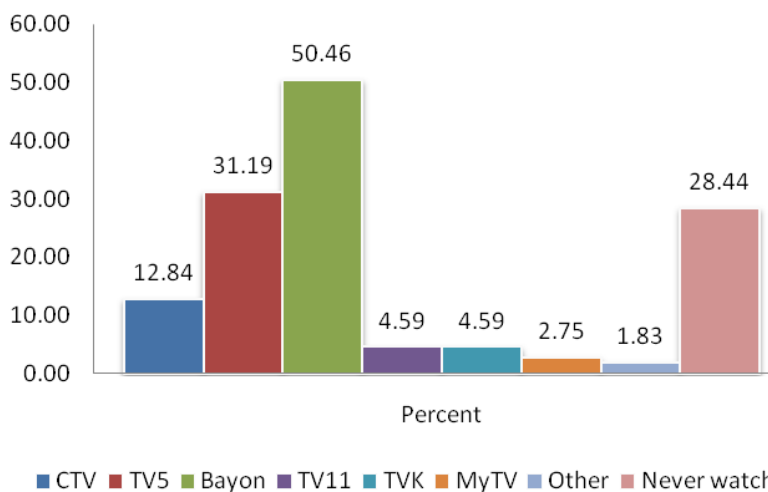
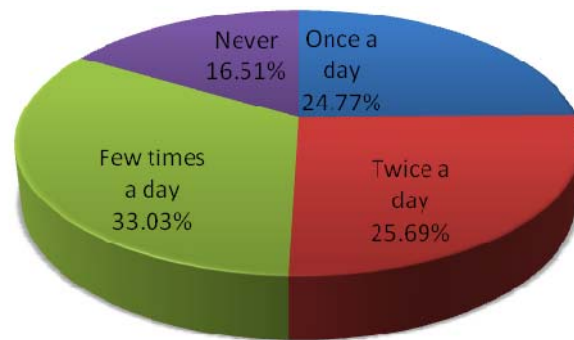


Figure 118 indicates that 24.77 percent of respondents listen to radio once a day, 25.69 percent twice a day, 33.03 few times a day and 16.51 percent never listen.

Figure 118: How often do you listen to radio?



Respondents were asked what programmes they listen to. 79.82 percent of respondents listen to news, 8.26 percent (drama), 12.84 percent (live talk shows), 8.26 percent (round table discussions) and 21.10 percent (song requests).

Figure 119: What kind of programme do you like to listen to?

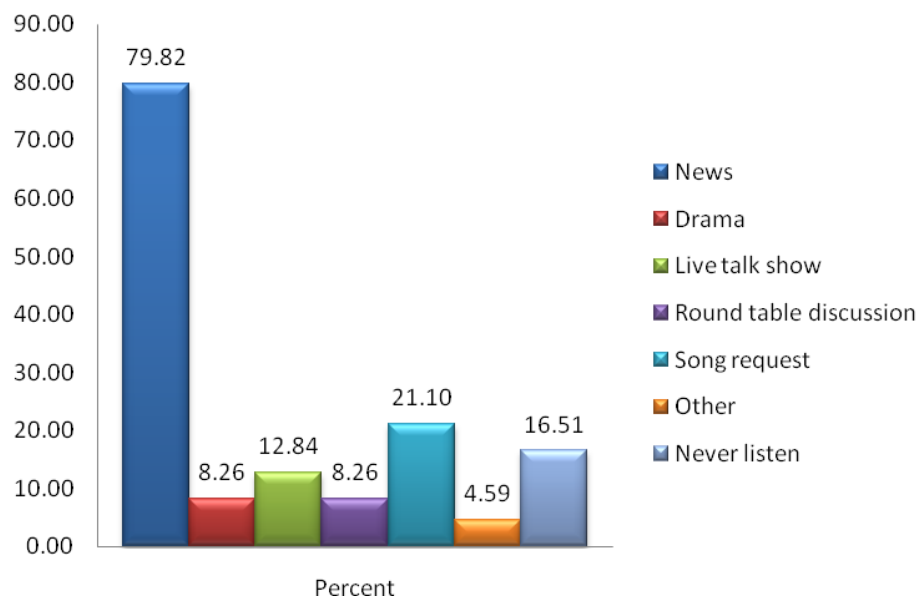
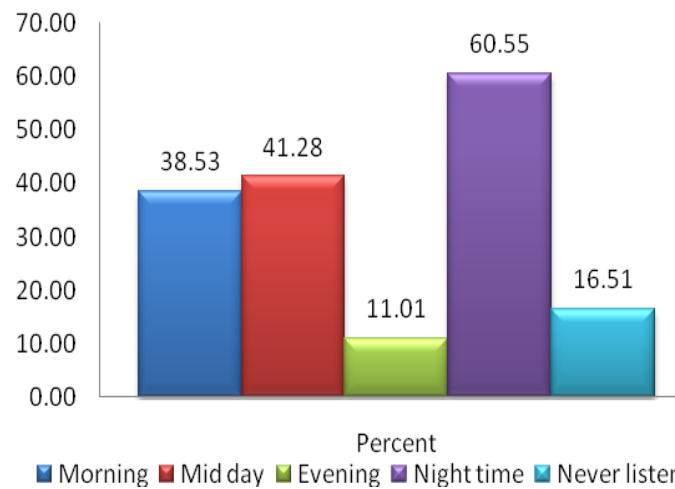


Figure 120 indicates that 60.55 percent of respondents usually listen to radio at night time, 41.28 percent in mid day, 38.53 percent in morning and 11.01 percent in the evening.

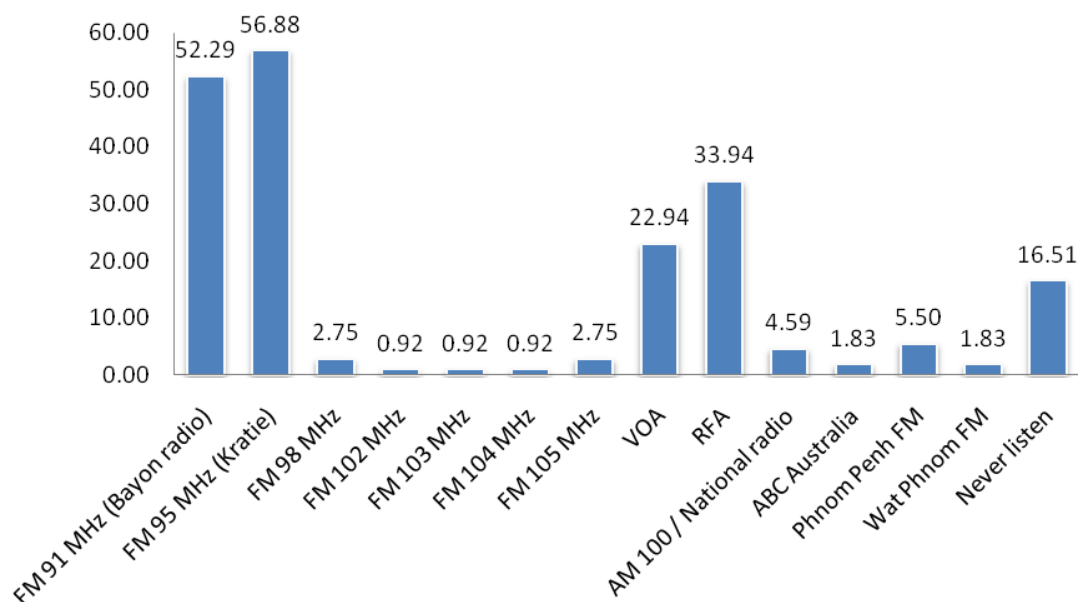


Figure 120: What hours of the day do you usually listen?



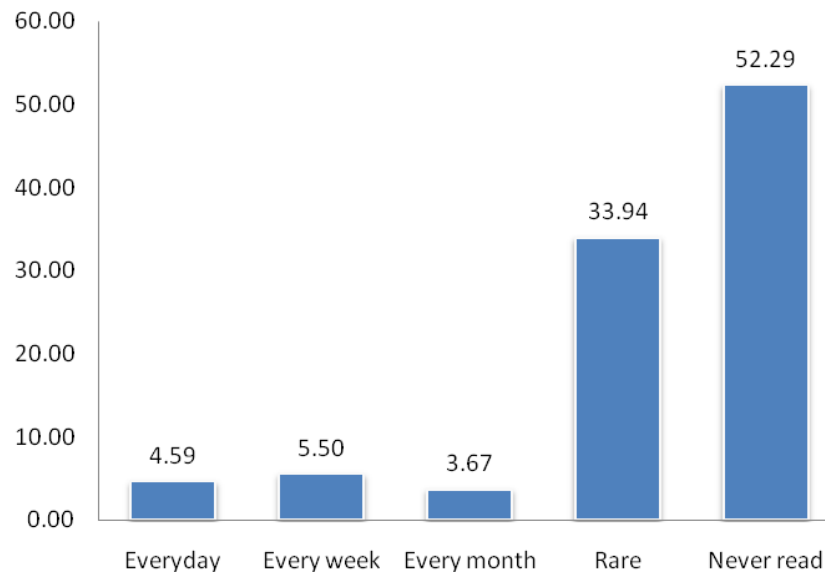
Radio stations that respondents usually listen to are FM91 MHz/Bayon (52.29%), FM95 MHz (56.88%), Radio Free Asia (33.94%) and Voice of America (22.94%).

Figure 121: What radio band do you usually listen to?



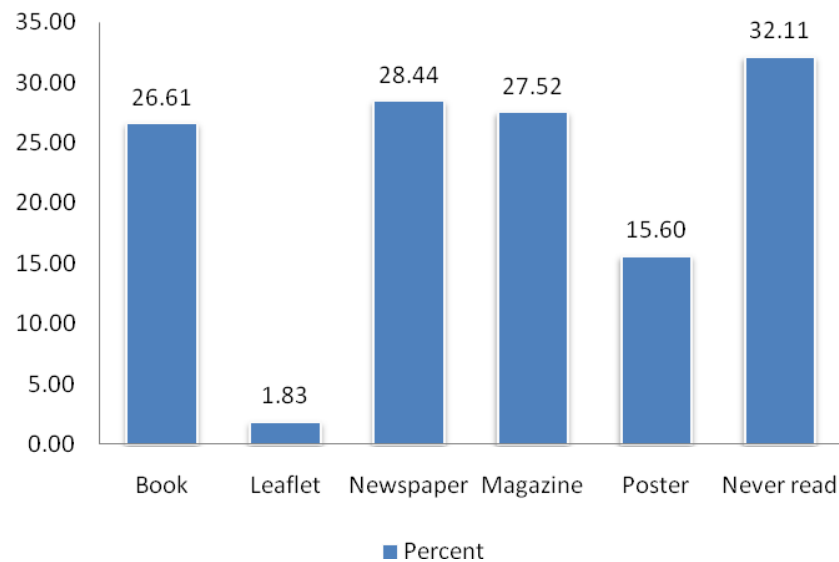
Regarding to reading materials, figure 122 indicates that 52.29 percent never read, 33.94 percent rarely read, 5.50 percent read every week, 4.59 percent read every day and 3.67 percent read every month.

Figure 122: How often do you read newspaper/magazine/booklet? How many times?



Respondents were asked what kinds of reading materials they read. 28.44 percent of respondents read newspapers, 27.52 percent (magazines), 26.61 percent (books), 15.60 percent (posters) and 1.83 percent (leaflets).

Figure 123: What kinds of publication/reading materials do you read?



#### **4.7 Awareness and Knowledge of Provincial Officer on Climate Change**

According to the results from interviews with relevant stakeholders in Kratie province, it is found that respondents could mention more information about the current climate trends such as changing in rain pattern, changing in Mekong River water level in recent years, changing in temperature, increased droughts and floods, intense rain, increased insects and increased diseases on human, animals and crops.

All respondents are pretty aware of the causes contributing to climate change such as deforestation, forest fire, emissions from burning fuel (machines, cars and factories), lacking of waste management, applying chemical fertilizer and emission from agricultural sectors. Linking with the causes, they also realize the impacts on human (lack of drinking water, health issues including water bone diseases and low incomes), agricultural sector (epidemic diseases on animals, low production or yield, crops damage due to water depletion and increased insects as well as climate disasters), and water sector (water resources dry up due to climate disaster and high demand of water in growing crops, bad water quality, damage of irrigation system or infrastructure).

Respondents could identify vulnerable groups including the poor especially women and children. They could understand that women have low knowledge, capacity and responsibilities in family tasks as well as agricultural activities. This limited women's access to social services and made them more vulnerable to climate change impacts.

Responding to climate change, they know that it can be mitigated through tree planting, using renewable energy, applying organic farming and taking part in environmental protection and conservation. They also realize the adaptive options in agriculture such as switching crops, saving water for growing vegetable, covering vegetable with net, providing agricultural techniques to farmers through demonstration, selecting resilient crops and vaccinating animals. They could express their understanding further on adaptation measure in water management such as digging ponds and canals, constructing irrigation system, raising awareness on saving water and establishing water-user communities.

Some respondents used to participate in a 2-day climate change training, and 2-day training on climate change and natural resource management. Some of them used to participate in trainings of trainer (ToT) organized by Live & Learn.

Regarding to their knowledge on climate change, provincial officers have limited or not clearly understanding on climate change versus disasters, adaptation measures, process of commune investment programme, monitoring and evaluation. Such capacity building should be included commune councilors and village chiefs as well.

## **CONCLUSIONS AND RECOMMENDATIONS**

### **Awareness and knowledge level on climate change**

The majority of respondents have low awareness and knowledge on climate change. There is a need to undertake public campaign in order to raise awareness and knowledge on the basic concept of climate change which is focused on causes, effects and alternatives of adaptation mechanism in particular agriculture and water management through diversified events such as climate change celebrations, village dissemination workshops on climate change with farmers' participations, commune and district councilors and relevant stakeholders in target districts. From the findings above, educational level of most respondents in Bos Leave and Teuk Krahorm commune are low. Therefore, Information, Education and Communication (IEC) materials such as posters, T-shirts, teaching materials, billboards and movies are necessary to develop for building awareness on the causes, effects and alternatives of adaptation to rural farmers in the target communes. There is a need to have balance of female and male participation in the public events as well as mainstreaming gender into IEC materials.

### **Knowledge on climate change adaptation**

Most respondents are highly aware of adaptation practices on health care and sanitation against climate change. However, approximately one forth of them realizes the adaptation practices in cropping, animal raising and water management. There is a need to develop proper messages for and pictures illustrating alternative adaptation practices using public events, IEC materials as well as teaching materials. Moreover, farmers should participate in demonstration courses related to agricultural practices including seed selection and purification, animal raising and participation in maintenance of irrigation system.

### **Level of participation in dealing with disaster**

Respondents in Bos Leave and Teuk Krahorm commune act differently to participate in dealing with climate hazards. Over one second of all respondents in Bos Leave commune participates in helping people in their commune to evacuate from floods through boats and providing rice seeds once they are damaged during flood or dry season. It is opposite from respondents in Teuk Krahorm commune that majority of them try hard as they can to feed their family rather than helping others. There is a need to design a concept of community-based participation in dealing with disaster such as fee contributions in maintenance irrigation as well as fair share of roles between men and women in family and agriculture and water collection.

### **Availability of climate change information**

Over one second of respondents in Bos Leave commune received information related to climate change, while only one tenth of them in Teuk Krahorm commune received the information. There is a need to widely spread out climate change information to villagers in the target communes and commune councils as well as

district councilors in the target districts through village meetings and media broadcasting especially radio and TV.

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