



# Climate Change Training Needs Assessment for the Agricultural Sector



Prepared by:

Royal University of Agriculture  
Chea Sim University of Kamchaymear  
University of Queensland



Funded by:



# Climate Change Training Needs Assessment for the Agricultural Sector in Cambodia

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## **Acknowledgments**

This report would not have been produced without the valuable contribution of time and expertise of individuals during the field survey. The team would like to express their gratitude to all partners in this collaborative effort.

We would like to acknowledge the valuable support, comments and suggestions which were received from Mr. Kim Soben, Head of the Center for Agricultural and Environmental Studies, Ms Ly Kalyan, Project Manager of the BUILD-FARM-ADAPT Project, Mr. Sok Pheak, Project Assistant, Ms Suon Pagnassak and Ms Khiev Sokleap, volunteers in the project.

We would also like to thank the editors who made a valuable contribution to the final development of this document, including Dr. Heng Chan Thoeun, Deputy Director of the Climate Change Department; Dr. John Schiller, Technical Advisor from the University of Queensland; Mr. Michael Powell, Environmental Economist; Mr. Pin Vannaro, Vice-Rector of Chea Sim University of Kamchaymear; and Mr. Pin Tara, Dean of Faculty of Agronomy of Chea Sim University of Kamchaymear.

Finally, we would like to thank all PDA officials in the Provincial Departments of Agriculture, who collaborated with the project team and provided clear information relating to climate change issues in Cambodia.

This TNA report would also not have been possible without the support of the **EU, UNDP, DANIDA, and SIDA**, for the building of capacity of institutions to help farmers better adapt to climate change and climate variability in Cambodia. This report will be used to support a National Training Workshop on Climate Change in order to help build capacity of governmental officials in helping farmers.

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## Abbreviations

BUILD- FARM- ADAPT	Building capacity of institutions to Help Farmers Better Adapt to climate change and Variability in Cambodia
BS	Baseline Survey
CC	Climate Change
CCCA	Cambodia Climate Change Alliance
CCCA-TF	Cambodia Climate Change Alliance Trust Fund
CDMT	Commune Disaster Management Team
CSUK	Chea Sim University of Kamchaymear
GHG	Greenhouse Gas
IPM	Integrated Pest Management
MAFF	Ministry of Agriculture, Forestry and Fisheries
MoE	Ministry of Environment
NGOs	Non-Government Organizations
PDA	The Provincial Department of Agriculture
RUA	Royal University of Agriculture
SRI	System of Rice Intensification
TNA	Training Needs Assessment
UNFCCC	United Nations Framework Convention on Climate Change
UQ	University of Queensland

## **1. PROJECT BACKGROUND**

The Project ‘Building Capacity of Institutions to Help Farmers Better Adapt to Climate Change and Variability in Cambodia (BUILD-FARM-ADAPT) was funded by the Cambodia Climate Change Alliance Trust Fund (CCCA-TF). The project was implemented by the Royal University of Agriculture (RUA) in cooperation with Chea Sim University of Kamchaymear (CSUK), and the University of Queensland (UQ) of Australia. The project was implemented in the period October 2011 to December 2012. The key objectives of the project were: (i) To increase awareness of potential climate risks and related management options among PDA and other interested stakeholders, through training workshops and seminars; (ii) To develop educational outreach materials and demonstration trials to increase farmer awareness of the need for, and benefits of, appropriate strategies for adapting farming systems to climate variability and climate change; (iii) To determine trends in climate variability using weather data-sets with the cooperation of the Department of Meteorology; (iv) To establish benchmark information on the potential effects of climate change and climate variability on the agricultural sectors in Cambodia; and (v) To synthesize the lessons learned from the results of project, into farm-level adjustment guidelines and mainstreaming of adaptation strategies of agricultural extension planning, mainly at the level of the PDA. The project aimed to increase the capacity of government officials and relevant stakeholders to be able to assist farming communities to deal with current and future impacts of climate change and climate variability on agricultural production in Cambodia. The project also aimed to promote national and international collaboration between universities, social networks, and government stakeholders, to work together to increase smallholder farmers’ resilience in relation to the potential impacts of climate change and climate variability. The research component of the project was focused on the assessment of potential technologies for minimizing the impact of climate change and climate variability on agricultural production, and improving the access of smallholder farmer groups and farming communities to these improved technologies. An on-farm, farmer-participatory approach was used to assess the innovative technologies. The project also aimed to help define the direction of future research priorities for minimizing the potential impact of future climate change and climate variability, and the best methods for improving and building the capacity of government officials and other stakeholders. A national workshop was hosted at the Royal University of Agriculture (RUA) on 26-27 September 2012 on “Building Capacity of Institutions to Help Farmers Better Adapt to Climate Change and Variability in Cambodia”. This national workshop was aimed at helping to PDAs to improve their general knowledge of climate change and climate

variability issues and strategies, based on the evidence from on-farm trials and other research sources, and to help in the dissemination of information and technologies that have emanated from the project. This information is being documented in a way to ensure that it can be used by both government and non-government organizations in Cambodia, in accordance with the national agricultural development policies and guidelines.

## **2. TRAINING NEEDS ASSESSMENT**

A Training Needs Assessment (TNA) exists when there is a gap between the current levels knowledge and what is required of a person to perform a task competently. TNA is the method used for determining if a training need exists and if it does, to fill the gap. The expectation of knowledge, skills and abilities of officials at different levels is different, so the training needs at these different levels are also different. The objectives of conducting a needs assessment are several and include: (1) To validate the hypothetical judgment with actual training needs; (2) To ensure that the solution addresses the most needed subjects and effectively focuses appropriate resources, time and effort, towards targeted solutions; (3) To identify the gaps between the model situation and the actual situation. As the training and knowledge gaps are identified, they are evaluated to determine the manner in which the gaps can be bridged. Some situations will indicate training needs, some may need non-training solutions (e.g., financial support, institutional strengthening, providing the right tools, etc.). The results of training needs analysis aim highlight the subjects needed to effectively fulfill the knowledge and needs gaps, help in the preparation of training modules, and facilitate in the development of a climate-based change learning program.

## **3. BASELINE AND TRAINING NEEDS ASSESSMENT SURVEY**

### **3.1. Objectives**

In the period July to August, 2012, the teams in the BUILD-FARM-ADAPT Project completed missions to all Provincial Departments of Agriculture in Cambodia to carry out the training need assessment (TNA) survey. The main objectives of this baseline survey and training needs assessment were to collect baseline information and data from PDA officials and obtain a general overview of climate change activities, successful experiences and priority topics for addressing climate change issues in the future; also to identify the current institutional mechanisms and policy strategies for natural disaster prevention/preparedness in local areas based on the findings. In particular, the survey aimed to provide capacity building strategies to improve the knowledge of PDA officials.

### **3.2. Procedures and Methodologies**

To achieve the above objectives, the Baseline Survey (BS) and Training Needs Assessment (TNA) were conducted by using a questionnaire with key informant interviewees, based on procedure outlined below. Before developing the questionnaire for the TNA, project staff held meetings with the Heads of the Provincial Departments of Agriculture or the representatives. The objective of these meetings was to discuss their current approach to addressing climate change issues and improving agricultural production. After the discussions, a draft questionnaire of the TNA was developed and pre-tested in the provinces of Kompong Speu and Prey Veng. This pre-testing of the questionnaire with officials was carried out in order to address any points in the questionnaire that were perceived to be lacking in clarity. The formal interviews relating to training needs were conducted with PDA officials from the various offices within the Provincial Departments of Agriculture in 24 provinces and Phnom Penh. The data collected was then entered in Microsoft Excel for analysis, after which priority recommendations were made.

## **4. MAJOR FINDINGS**

### **4.1 Responsibilities of Provincial Departments of Agriculture (PDA)**

The Provincial Departments of Agricultures (PDAs) are the public bodies responsible for both implementing extension programs and the processing of work relevant to the Ministry of Agriculture, Forestry and Fisheries (MAFF). Provincial officials also play an essential role in addressing issues relating to food security in Cambodia, through the promotion of new relevant technologies. The interest of the Cambodian government in improving the agricultural sector is reflected in the expansion of irrigation schemes and other agricultural developments. The project for which support was provided through the Cambodian Climate Change Alliance Trust Fund (CCCA-TF) aimed to build the capacity of government officials' with respect to climate change, and to apply on-farm testing of climate change adaptation technology options in Cambodia. A primary focus of the project was also on the training of PDA officials. The BUILD-FARM-ADAPT Project has aimed to build on the existing structure within MAFF. It is noted that among the major roles of the PDA is the delivery of extension services and to work directly with farmers. Provincial and district level officials within collaborating PDAs, were expected to develop their knowledge and competence relating to farmer participatory approaches, and in relation to potential new agricultural technologies.

## **4.2 Constraints to implementing strategies identified by PDA officials**

After two decades of civil war, personnel within both the MAFF and PDA are relatively young professionals with limited technical experience. In addition, institutional capacity is weak. Due to these constraints, their ability to respond to issues such as the impact of climate change and related climate variability is weak. It is generally acknowledged that a lack of capacity is a major constraint to effective performance. This project aimed to help improve the knowledge and effectiveness of officials in relation to the potential impact on households of climate change and climate variability.

## **4.3 General Information and Perceptions of Climate Change (CC)**

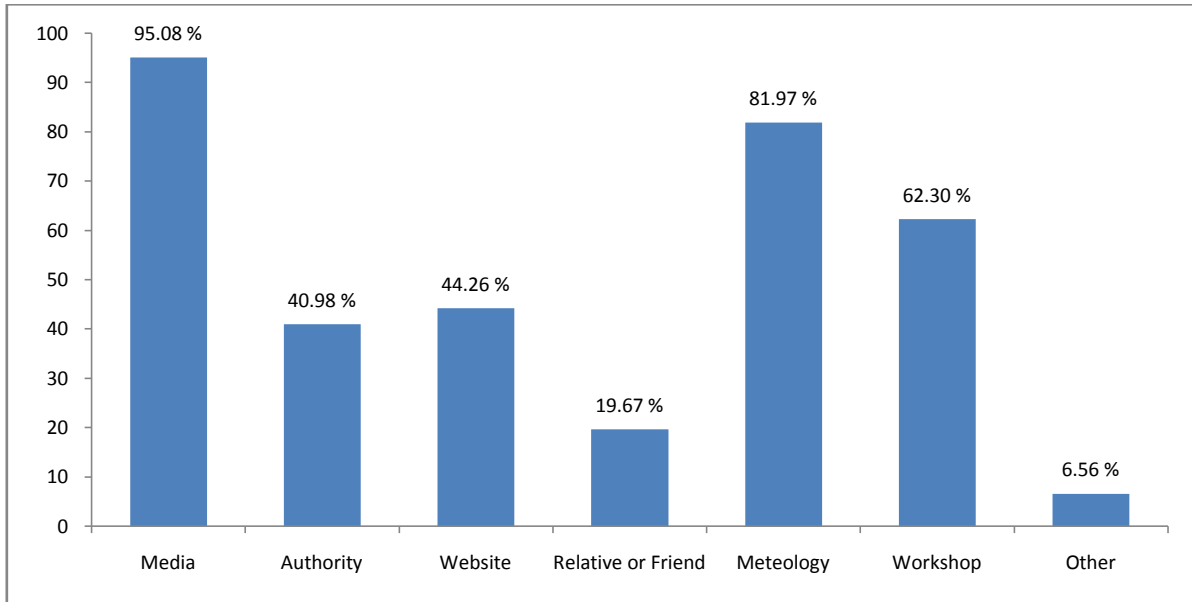
### **4.3.1 What is Climate Change?**

Scientific evidence now clearly indicates that climate change is a serious and urgent issue which needs to be addressed. Climate includes patterns of temperature, precipitation, humidity, wind and the nature of the seasons. Climate change is more than just a change in the weather. It refers to seasonal changes over a long period of time. The increase in CO<sub>2</sub> emissions into the earth's atmosphere may lead to a change in global climate conditions. A study conducted by the Cambodian Ministry of Environment showed that global warming will affect the Cambodian climate (MoE, 2001). The climate patterns play a fundamental role in shaping natural ecosystems, and the human economies and cultures that depend on them. Because so many systems are dependent upon climate, a change in climate can affect many related aspects of where and how people, plants and animals live. For example, a change in the timing of rains or temperatures can affect when plants bloom and set fruit, when insects hatch or when streams are their fullest. These issues can, in turn, affect historically synchronized pollination of crops, food availability for migrating birds, spawning of fish, water supplies for drinking and irrigation, forest health, and so on. Some short-term climate variation is normal, but longer-term trends reflect a changing climate. A year or two of extreme changes in temperature or other conditions does not mean that climate change trends have been "erased."

### **4.3.2 Information about Climate Change**

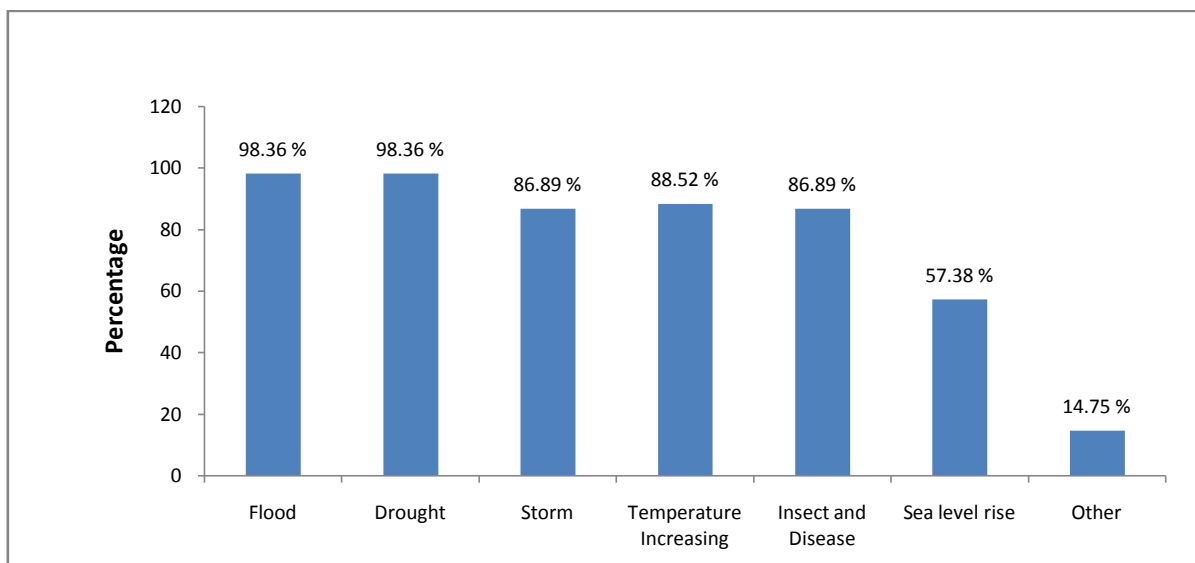
The majority of PDA officials reported agreement that climate change is taking place now. They also reported that, as a result of opportunities to participate in other national and international workshops, they understood the potential impact of climate change. They reported having obtained information about climate change from a range of different sources

(Figure 1). Around 95% of the PDA officials said that they obtained climate change information from the media (radio, TV, newspapers, magazines) Eighty one percent said they received information through announcements from the Department of Water Resources and Meteorology. A further 62% said they got information from participating in workshops. Around 44% said they obtained information from websites or the internet.



**Figure 1: Sources of information about Climate Change**

Around 98 percent of PDA officials reported floods and drought as the major events that they considered to be the result of climate change (Figure 2). They believed floods and droughts are now occurring almost annually in Cambodia. An additional concern of the provincial officials was the increase in temperature. Nearly 90 per cent of PDA officials believed that average temperatures had increased.



**Figure 2: Events considered reflecting Climate Change**

### 4.3.3 The Impact of Climate Change

Cambodia is regarded as being highly vulnerable to the impact of climate change. The country's agriculture, a major sector of the national economy, is dependent on natural rainfall and the annual flooding and recession of the Mekong River and the Tonle Sap Lake. Cambodian agriculture is therefore particularly sensitive to potential changes in local climate and monsoon regimes. Data from the past five years indicates that more than 70% of rice production losses in Cambodia were primarily due to flooding, while drought was responsible for about 20%. Human societies have generally adapted to the relatively stable climate that has been experienced since the last ice age, which ended several thousand years ago. A warming of temperatures as a result of climate change will bring about changes that can potentially the country's water supplies, agriculture, power and transportation systems, the natural environment, and our own health and safety.

According to the interviews with the officials from provincial departments of agriculture, there are several categories of natural disasters, including floods, droughts, storms and insect plagues. Nearly 97 per cent of PDA officials said that the greatest impact was on animal production (Figure 3), followed by impacts on human and animal health. Other potential effects were on reduced rice and crop production and on infrastructure and housing.

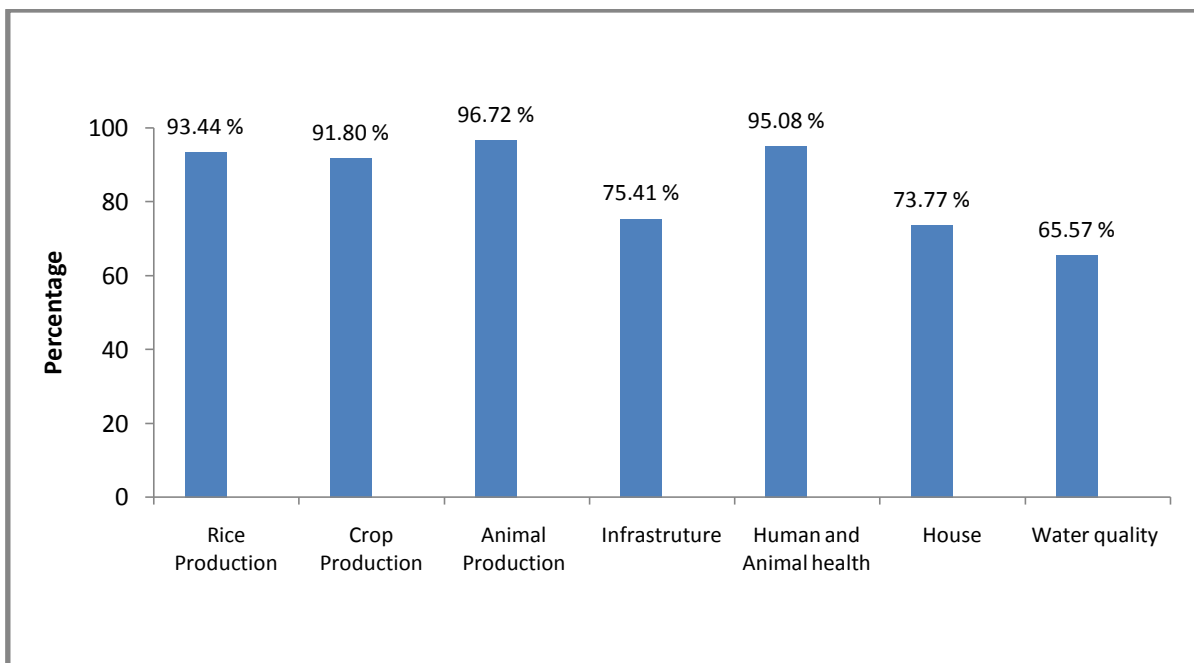


Figure 3: The perceived impacts of Climate Change

### 4.3.3.1 The impact of climate change on livestock

Raising livestock plays a very important role in supporting people’s livelihoods in Cambodia. However, climate change is perceived to cause many livestock production problems that may lead to a decline in household incomes. Officials at the PDA indicated that they believed that increasing problems with animal diseases were caused by climate change, and that this was the most serious of climate change related problem (Figure 4). The potential loss of animal food and habitats were also regarded with concern.

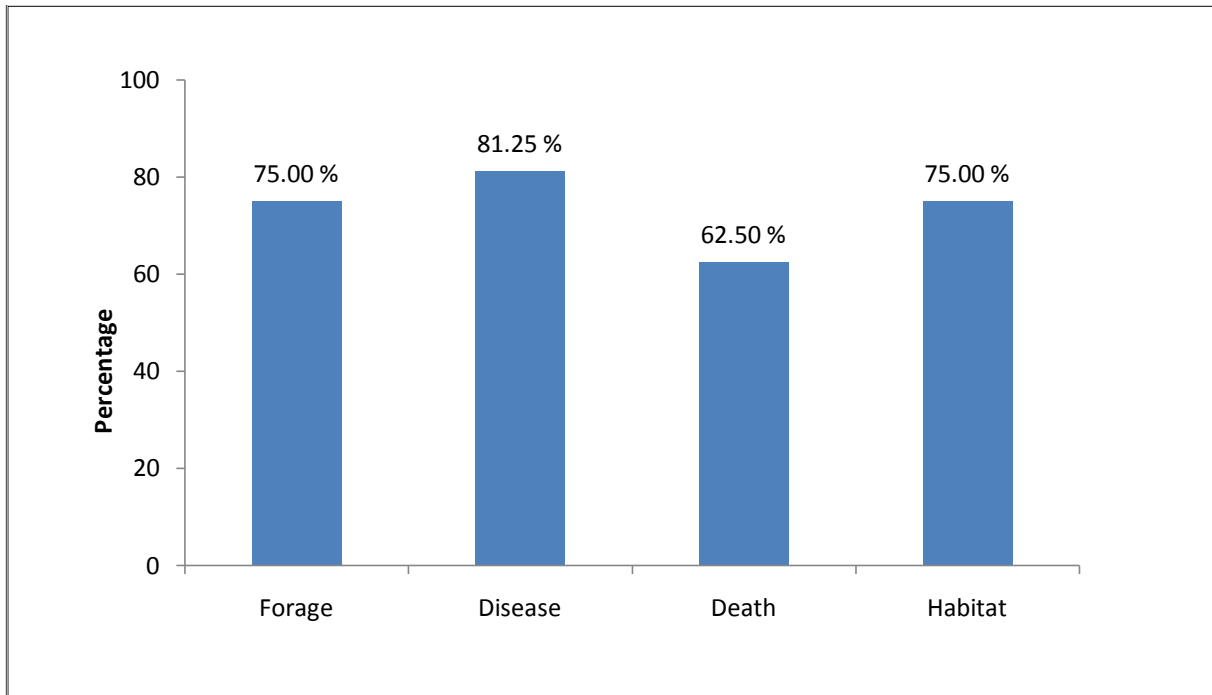


Figure 4: Perceptions of the impact of the Climate Change on livestock production

## 4.4 The experience of PDA officials in helping farmers adapt to Climate Change

### 4.4.1 Capacity Building

Sixty per cent of PDAs officials said that they had participated in training and workshops about how to address climate change related issues (Figure 5).

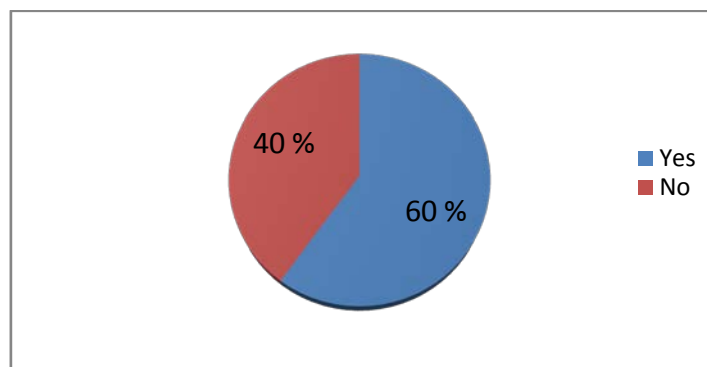


Figure 5: Number of PDA officials who have attended workshops on Climate Change



#### **4.4.2 Flooding**

To improve farmer's ability to deal with the problem of floods, PDA officials identified a range of strategies. The most important extension activity related to the use of crops (mainly rice) that are tolerant of flooding combined with improved cropping rotations, and appropriate techniques on how to apply fertilizer. In addition, they conducted other activities relating to preparations in advance of flooding. These included recommending people find higher ground for their animals, and preparation of food and water for livestock and their families. They also encouraged local people to listen to the radio and watch TV, so that they could receive updated information about disaster management in advance. PDA officials also mentioned that authorities should share information about flooding with district level people and officials.

#### **4.4.3 Droughts**

In an effort to enhance farmer's capacity to deal with drought, PDA officials reported that they have adopted a range of different techniques. They conducted training at the community level during droughts, and talked about drought-resistant varieties of rice, crop rotations, fertilizer application, and mulching techniques. Forage preparation for animals was also mentioned as a possible strategy for drought preparation, and they encouraged the farmers to focus on growing grass for feeding cows, and addressing insect and disease problems that might potentially damage their crops. They cooperated with stakeholders' institutions to build irrigation systems, such as canals, wells, ponds, and irrigation water points. In addition, they encouraged farmers to dig ponds to save water to grow crops, and raise animals.

#### **4.4.4 Storms**

Provincial officials reported that pre-storm advice to communities was important. They told local communities to listen to the radio or watch TV, for updates on changing weather, and to secure areas where they could remain safe from potential disasters. They also asked village chiefs and commune chiefs, and particularly the Commune Disaster Management Team (CDMT), to provide reports on any damage caused by storms, to senior officials in order to get help for affected people. They also suggested that communities should plant trees to provide wind breaks to help reduce the potential effects of storms.

#### 4.4.5 Insects and Diseases

All officials acknowledged the importance of strongly addressing issues relating to insect pests and diseases which might affect agricultural production. In order to reduce the potential damage from insects and diseases, the priority areas identified for technology development relate to appropriate management techniques, including soil preparation, application of an integrated pest management approach (IPM), and the use of natural pesticides.

#### 4.4.6 Extension Methodologies

Provincial officials use a variety of promotional methods (Figure 6). The most frequent method is to discuss with local people, relevant topics or information that they want to share. They also use a combination of oral and visual techniques that involved the use of microphones, pictures and the distribution of relevant documents. They also provided training courses to villagers on a range of issues including, System of Rice Intensification (SRI) and the technique of Integrated Pest Management (IPM). Other methods less frequently used included farmer field schools, distribution of advisory leaflets, and field trips for villagers.

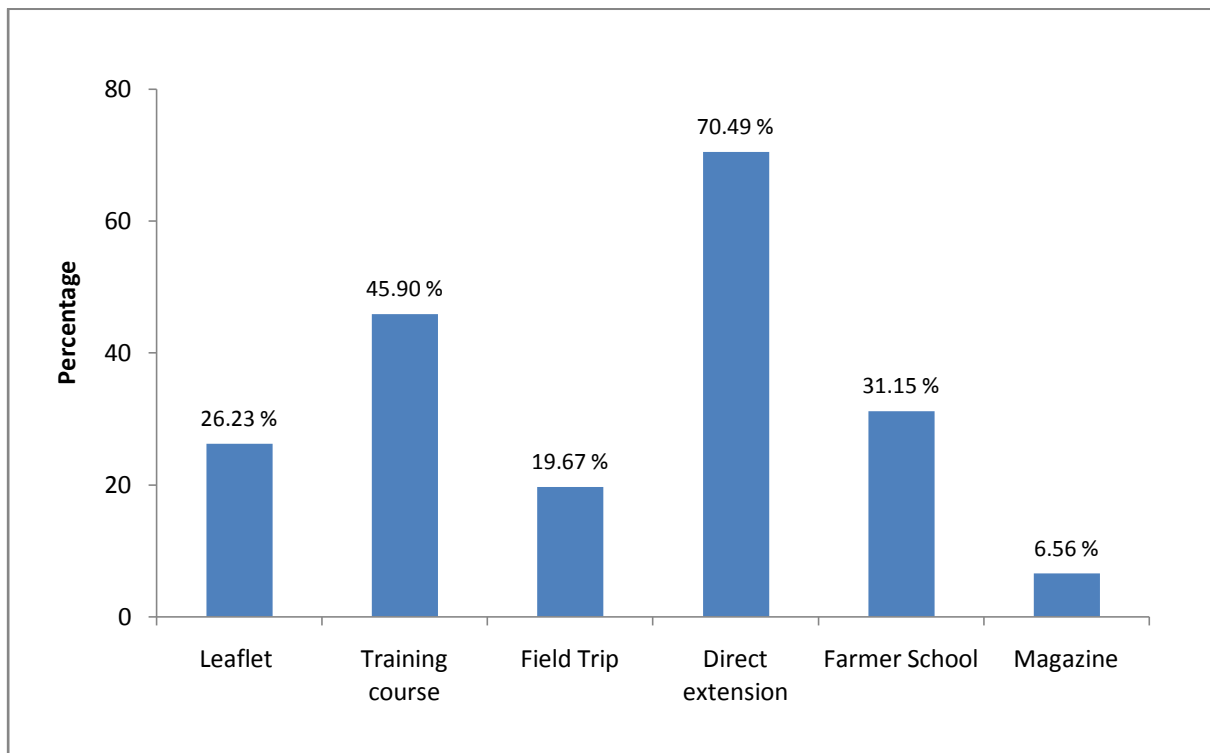


Figure 6: Dissemination Methodologies of PDA officials

#### 4.5 Strategies and Adaptation Planning of PDA for Minimizing Risk in the Agricultural Sector

There are a number of national and regional adaptation projects and programs currently being implemented in Cambodia. National projects are focused on capacity building, as well

as some policy formulation, awareness raising, knowledge sharing, and community based adaptation activities. The main strategies are related to the agricultural sector, water, risk reduction, and meteorology. Cambodia also participates in a number of regional projects. These regional projects are primarily focused on capacity building, vulnerability assessment, research, and policy formulation, within the areas of health, nature, water, risk reduction, and policy.

#### **4.5.1 Floods**

Provincial officials adopt a range of strategies to help rural Cambodians to deal with floods. The strategies include the introduction of flood resistant varieties, early maturing varieties (for flood avoidance), and preparation of animal forage. In addition, they highlighted the importance of early warning systems to help people prepare for potential flooding events. They also encouraged improved collaboration among stakeholders, increased sharing of information between different levels of government, and strengthening of disaster management committees. Finally, they also recommended that the commune investment plan include improved irrigation systems, which are very important to help reduce the potential impact of flooding.

#### **4.5.2 Droughts**

PDA officials reported that they have a range of strategies on how to address drought. The most important strategy was to introduce and promote a range of drought resistant crop varieties (including rice), and proper soil preparation. In addition, they encourage farmers to practice mulching of organic material to promote vegetable production and to practice the System of Rice Intensification (SRI). Officials also collaborated with stakeholders and relevant departments, in order to help farmers to minimize the effects of drought through infrastructure development. This infrastructure includes the construction of ponds, canals, wells, and irrigation systems.

#### **4.5.3 Storms**

Provincial department officials also address the challenge of storms and the damage they might cause. They encouraged villagers to listen to the radio or watch TV, to obtain updated information about possible storms in their area. They further suggested to villagers that they should prepare food and other needs, and identify a potentially safe location in advance of the storm, to reduce potential adverse effects of the storm. They also highlighted

the importance of the village chief’s responsibilities to report damage cause by storms, to senior officials and other stakeholders, to undertake the restoration of any damage.

#### 4.5.4 Insect Pests and Diseases

In relation to strategies for addressing insect pest and disease issues, PDA officials encourage farmers to focus on integrated pest management (IPM) and the use field demonstrations in target areas. During IPM training, they provide lessons related to identifying and managing insect pests and diseases, as well as training in the identification of the symptoms of damage by both insect pests and diseases. The PDA officials also provide training of the farmers on how to produce organic fertilizers and natural pesticides for use directly on farms, and explain to farmers the advantages of applying organic fertilizers and natural pesticides.

## 5. RECOMMENDATIONS FOR CAPACITY BUILDING OF INSTITUTIONS

### 5.1 Overview of Topics for Building the Capacity of Institutions

The results of the interviews with PDA officials revealed that they have had experience with NGO training in relation to a range of topics relating to climate change, including water resources, climate change and health, and a variety of climate change adaptation strategies. They are also interested in the area of renewable technologies e.g. solar, wind power, and hydro power, although they felt that transferring this technologies to rural communities would be difficult. (See Table 1)

**Table 1: The PDA official priority topics for training**

No	Subjects	Percentage
<b>General Information about Climate Change</b>		
1	The Impact of Climate Change on the Agricultural Sector	95
2	The causes of Climate Change	70
3	The Factors that cause Climate Change (Greenhouse Gases, Global Warming UNFCCC Kyoto Protocol)	51
4	The potential impact of Climate Change at the national, regional, and global levels	48
5	The Impact of Climate Change on Infrastructure and Health	33
6	The Impact of Climate Change on water resources	26
<b>Climate Change Adaptation</b>		
1	Variety Selection and Technologies for Cropping for Adaption to Climate Change	77

2	Preparing and Responding to Climate Change	62
3	Pest and Disease Management	57
4	Community-based Climate Change Adaptation	48
5	Climate Change Adaptation Strategies	34
6	Animal Feed Formulation Techniques before Flooding and Drought	31
<b>Climate Change Mitigation</b>		
1	Technology of Biogas Creation to Reduce Greenhouse Gas (GHG) Emissions	70
2	Biogas Technology to Reduce Greenhouse Gases (GHG)	66
3	Cropping Technology and Reforestation	64
4	Renewable Technologies (Solar, Wind Power, Hydro Power, etc.)	49
5	Technologies for Using Cookers	33
<b>Climate Modeling</b>		
1	Model to Evaluate Rainfall Transition	51
2	Analysis Program (Software: Crystal Ball, Magice Scengen, STERSBE, STERSBA etc.)	49

## 5.2 Priority Topics for Building the Capacity of Institutions

Strengthening the capacity of PDA officials has been one of the main objectives of the Build-Farm-Adapt Project. It is expected that PDA officials will be able to share their knowledge with rural communities, to increase their capacity to adapt to climate change. The results of the interviews with PDA officials revealed (Table 1) that the priority topic was ‘Potential Impact of Climate Change on the Agricultural Sector’ (95%), because it is regarded as very important for them in their role as extension workers. Another important topic (70%) was listed as ‘The Causes of Climate Change’.

Additional areas of interest included ‘Variety \Selection and Technology of Cropping to Climate Change Adaptation (77%), Preparing and Responding to Climate Change (62%) and Pest and Disease Management (57%). The results of the interview with PDA officials revealed that their capacity to apply adaptation strategies and climate change in the agricultural sector is still limited.

The use of technologies to reduce greenhouse gases (GHG) was a priority topic selected by 70 per cent of those interviewed. Biogas technology was the next priority subject for those interviewed. Provincial officials thought that biogas technology could reduce carbon dioxide

emissions to the atmosphere, and that they could generate electricity through the adoption of this technology. The last topic was cropping technology and reforestation (63%).

The officials acknowledged that they needed help in maintaining records of rainfall data. They recognized that this information would be important in helping them understand the rainfall patterns in the future. It could also be used in climate change modeling. Some provincial officials also said that they would like to improve their knowledge of computer software programs related to climate modeling.

**Table 2: Training recommendations for PDA officials**

No	Key training areas for PDA officials are as follows:
1.	The impact of Climate Change on the Agricultural Sector
2.	The impact of Climate Change in the Cambodia Context
3.	Choosing different seed varieties to adapt to Climate Change
4.	Preparing for and responding to Climate Change
5.	Biogas Technology to Reduce Greenhouse Gases

## Conclusions

The research output summarized in this report reveals the needs of PDA officials', as they attempt to address the effects of climate change. At the moment, most officials respond to a range of threats and disasters in rural Cambodia, but lack the capacity to address possible climate change effects in the long-term. The TNA shows that PDA officials have a variety of interests in this area. They are aware of it the potential impacts of climate change on agriculture and would like more information about how it will affect specific agricultural sectors. They want to focus on the identification of appropriate varieties of rice and other crops that are best adapted to changing conditions, to ensure farmers' livelihoods are minimally affected. Climate change mitigation was also recognized by the officials as having the potential to improve rural livelihoods, and they expressed an interest in biogas technologies for reducing the emission of greenhouse gases. Some of the PDA officials have attended training workshops to provide and share information about the various strategies they use in their work. They further indicated that this kind of forum is a valuable way to obtain additional knowledge, and ensure they are up-to-date with the latest ideas about how to address climate change related issues in Cambodia.



## APPENDIX 1: PICTORIAL RECORDS OF TRAINING NEEDS ASSESSMENT









## Appendix 2: Questionnaire for Training Needs Assessment (Head of PDA, Agronomy and Extension Office)

### 1. GENERAL INFORMATION

1.1. Interviewing date:.....

1.2. Respondent: .....Position.....

Tel: .....

E-mail:.....

Provincial Department of Agriculture:.....

1.3. Sex:     Male             Female

1.4. Age:     less than 25     26-35             36-45

46-55                     More than 55

1.5. Educational Background

Associate Degree         Bachelor Degree         Master Degree

Doctorate Degree        Other (specify)

.....

1.6. Working Duration:

0-5 years             6 - 10 years             11 - 15 years             16 - 20 years

More than 20

1.7. Total of Officials: .....            Female:.....

1.8. What is your responsibility?

.....  
.....  
.....  
.....  
.....

1.9. What are the problems you often meet during working implementation?

.....  
.....  
.....  
.....  
.....

1.10. Among those problems above, have you ever found the solutions?

Yes             No

1.11. If yes, what were your strategies to deal with these problems?

.....  
.....  
.....  
.....

1.12. How did you think about those strategies?

- Excellent     Good     Medium     Not Good     Not so Good

**2. GENERAL CONCEPT OF CLIMATE CHANGE**

2.1. Did you know about climate change?     Yes     No

2.2. If yes, what events do you assume as climate change?

- Flood  
 Drought  
 Windstorm  
 Temperature increase  
 Insects and diseases  
 Sea level rise  
 Other (specify) .....

2.3. How did you know about climate change?

- Mass Media (radio, TV, newspaper, and Magazine)  
 Authorities  
 Websites  
 Relations and friends  
 Meteorology Information  
 Training course and workshop  
 Other (specify) .....

2.4. What were the impacts of climate change?

- Rice production  
 Crop  
 Animal production  
 Infrastructure  
 Human and animal health  
 House

- Water quality
- Other (specify) .....

**3. THE EXPERIENCES OF CLIMATE CHANGE**

**Training**

3.1. Did you participate in training workshop on climate change?

- Yes (move to Q.3.2)
- No (Move to Q.3.3)

3.2. If yes, what topics did you participate?

.....  
.....  
.....

3.3. If no, what is the reason?

.....  
.....

3.4. What did you learn from the training?

.....  
.....  
.....

3.5. Did you disseminate the information to the communities?

- Yes (Move to Q.3.6)
- No (Move to Q.3.7)

3.6. What are the strategies to distribute the information to the communities?

- Leaflet
- Training
- Field trip
- Direct extension
- Farmer school
- Magazine
- Other (specify) .....

3.7. In your experiences, when having flood, drought, windstorm, and insects destroyed your crops, What technologies did you disseminate to farmer in order to adapt climate change?(focusing on agriculture sector)

A. Flood

.....  
.....  
.....

B. Drought

.....  
.....  
.....

C. Windstorm

.....  
.....

D. Diseases and Insects

.....  
.....  
.....

3.8. In case,climate change still go on, do you have any strategies mitigate the impact of climate change to minimum level?

A. Flood

.....  
.....  
.....

B. Drought

.....  
.....  
.....

C. Windstorm

.....  
.....  
.....

D. Diseases and Insects

.....  
.....  
.....

**4. THE CLIMATE CHANGE TRAINING IN THE FUTURE**

4.1. If there is any training course or workshop related to climate change, do you want to participate?       Yes    No

4.2. If yes, what subjects, additionally, do you want to know?

**General Information** (Please prioritize from 1 to 3)

- Factor that causes climate change (Greenhouse gas, global warming UNFCCC Kyoto Protocol)
- The impact of climate change on agriculture sector
- The impact that cause by climate change in Cambodia
- The impact of climate change on infrastructure and human health
- The impact of climate change on water resource
- The potential of Climate change impact on nation, region, and global level
- Other (specify) .....
- .....
- .....
- .....

**Adaptation Strategies** (Please proritize from 1-3)

- Crop varieties and planting technologies for climate change adaptation
- Pest and disease management
- Community-based climate change adaptation
- Preparation technology to deal with climate change
- Climate change adaptation method
- Animal food production technology
- other (specify)
- .....
- .....
- .....

**Climate Modeling** (choose only one)

- Model to evaluate the rain transition
- Software: (Cristable, Magic Zengen, STRESBE, STRESBA etc.)
- Other (specify) .....
- .....
- .....
- .....

**Mitigation** (Please prioirtize from 1-3)

- Bio-gas using technology

- Technology of economical gas-cooker using
- Forest restoration
- technology of producing bio-gas to reduce greenhouse effect
- Renewable energy technology (Solar, Wind Power, Hydro Power etc.)
- Other (specify) .....
- .....
- .....
- .....

**Extension** (choose the priority from 1-3)

- Extension strategies on climate change to the community
- The importance of using meteorological information
- Diseases protection strategies during drought
- Animal protection during the flood and drought
- Farmers education strategy on diseases protection
- Crop varieties extension
- Cropping technology
- Water management
- Integrated farming system
- Agro-forestry
- Aquaculture
- System of rice intensification (SRI)
- Forage crop planting technology and forage crop post harvesting
- Other (specify) .....
- .....
- .....
- .....

**Adaptation strategies** (Please prioritize from 1-3)

- Climate change adaptation strategies
- Strategies of climate change response
- Strategy planning for climate change adaptation
- Irrigation and water management strategies
- Other (specify) .....
- .....

.....  
.....  
4.3. What is your additional request in the training program?

.....  
.....  
.....  
.....  
.....

## Appendix 3: Questionnaire for Training Needs Assessment (Animal Production Office)

### 1. GENERAL INFORMATION

1.1. Interviewing date:.....

1.2. Respondent: .....Position.....

Tel: .....

E-mail:.....

Provincial Department of Agriculture:.....

1.3. Sex:     Male                     Female

1.4. Age:     less than 25     26-35                     36-45

46-55                     More than 55

1.5. Educational Background

Associate Degree             Bachelor Degree             Master Degree

Doctorate Degree             Other (specify)

.....

1.6. Working Duration:

0-5 years                     6 - 10 years                     11 - 15 years                     16 - 20 years

More than 20

1.7. Total of Officials: .....                    Female:.....

1.8. What is your responsibility?

.....  
.....  
.....  
.....  
.....

1.9. What are the problems you often meet during working implementation?

.....  
.....  
.....  
.....  
.....

1.10. Among those problems above, have you ever found the solutions?

Yes                     No



1.11. If yes, what were your strategies to deal with these problems?

.....  
.....  
.....  
.....

1.12. How did you think about those strategies?

- Excellent     Good     Medium     Not Good     Not so Good

**2. GENERAL CONCEPT OF CLIMATE CHANGE**

2.1. Did you know about climate change?     Yes     No

2.2. If yes, what events do you assume as climate change?

- Flood  
 Drought  
 Windstorm  
 Temperature increase  
 Insects and diseases  
 Sea level rise  
 Other (specify) .....

2.3. How did you know about climate change?

- Mass Media (radio, TV, newspaper, and Magazine)  
 Authorities  
 Websites  
 Relations and friends  
 Meteorology Information  
 Training course and workshop  
 Other (specify) .....

2.4. What were the impacts of climate change?

- Rice production  
 Crop  
 Animal production  
 Infrastructure  
 Human and animal health  
 House

- Water quality
- Other (specify) .....

2.5 What are the impacts of Climate Change on Veterinary sector?

- Feed sources
- Diseases
- Animal death
- Animal habitats
- Others (specify).....

**3. EXPERIENCE RELATION TO CLIMATE CHANGE**

**Training**

3.1 Did you participate in training workshop on climate change?

- Yes (move to Q.3.2)
- No (Move to Q.3.3)

3.2 If yes, what topics did you participate?

.....  
.....  
.....

3.3 If no, what is the reason?

.....  
.....

3.4 What did you learn from the training?

.....  
.....

3.5 Did you disseminate the information to the communities?

- Yes (Move to Q.3.6)
- No (Move to Q.3.7)

3.6 What are the strategies to distribute the information to the communities?

- Leaflet
- Training
- Field trip
- Direct extension
- Farmer school
- Magazine
- Other (specify) .....

3.7 Regarding to your experiences, when flood and drought happened what techniques did you use to extend the information to local community for Climate Change Adaption?

**A. Floods**

- *Animal raising technique*

- Prevention and animal feeding

.....  
.....

Vaccination

.....  
.....

Looking after

.....  
.....

Cage building

.....  
.....

Feed mixture technique

.....  
.....

Varieties Choosing technique

.....  
.....  
.....  
.....

- *Extension on forage crop (Forage crop variety)*

.....  
.....

**B. Drought**

- *Animal raising technique*

Prevention and animal feeding

.....  
.....

Vaccination

.....  
.....

Looking after

.....  
.....

Cage building  
.....  
.....

Feed mixture technique  
.....  
.....

Varieties Choosing technique  
.....  
.....  
.....

- *Extension on forage crop (Forage crop variety)*  
.....  
.....

3.8 In the case of the impact of climate change continues, what strategies and measures do you have to minimize the impact of climate change?

**A. Floods**

- *Animal raising technique*  
 Prevention and animal feeding  
.....  
.....

Vaccination  
.....  
.....

Looking after  
.....  
.....

Cage building  
.....  
.....

Feed mixture technique  
.....  
.....

Varieties Choosing technique

.....  
.....  
.....  
.....

- *Extension on forage crop (Forage crop variety)*

.....  
.....

**B. Drought**

- *Animal raising technique*

- Prevention and animal feeding

.....  
.....

- Vaccination

.....  
.....

- Looking after

.....  
.....

- Cage building

.....  
.....

- Feed mixture technique

.....  
.....

- Varieties Choosing technique

.....  
.....  
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.....

- *Extension on forage crop (Forage crop variety)*

.....  
.....

**4. TRAINING RELATING TO CLIMATE CHANGE IN THE FUTURE**

4.1 If there is any training course or workshop related to climate change, do you want to participate?  Yes  No

4.2 If yes, what subjects, additionally, do you want to know?

**General Information** (Please prioritize from 1 to 3)

- Factor that causes climate change (Greenhouse gas, global warming UNFCCC Kyoto Protocol)
- The impact of climate change on agriculture sector
- The impact that cause by climate change in Cambodia
- The impact of climate change on infrastructure and human health
- The impact of climate change on water resource
- The potential of Climate change impact on nation, region, and global level
- Other (specify) .....
- .....
- .....
- .....

**Adaptation Strategies** (Please proritize from 1-3)

- Crop varieties and planting technologies for climate change adaptation
- Pest and disease management
- Community-based climate change adaptation
- Preparation technology to deal with climate change
- Climate change adaptation method
- Animal food production technology
- other (specify) .....
- .....

**Climate Modeling** (choose only one)

- Model to evaluate the rain transition
- Software: (Crystal Ball, Magice Scengen, STERSBE, STERSBA etc.)
- Other (specify) .....
- .....
- .....
- .....

**Mitigation** (Please prioirtize from 1-3)

- Bio-gas using technology

- Technology of economical gas-cooker using
- Forest restoration
- technology of producing bio-gas to reduce greenhouse effect
- Renewable energy technology (Solar, Wind Power, Hydro Power etc.)
- Other (specify) .....
- .....
- .....
- .....

**Extension** (choose the priority from 1-3)

- Extension strategies on climate change to the community
- The importance of using meteorological information
- Diseases protection strategies during drought
- Animal protection during the flood and drought
- Farmers education strategy on diseases protection
- Crop varieties extension
- Cropping technology
- Water management
- Integrated farming system
- Agro-forestry
- Aquaculture
- System of rice intensification (SRI)
- Forage crop planting technology and forage crop post harvesting
- Other (specify) .....
- .....
- .....
- .....

**Adaptation strategies** (Please prioritize from 1-3)

- Climate change adaptation strategies
- Strategies of climate change response
- Strategy planning for climate change adaptation
- Irrigation and water management strategies
- Other (specify) .....
- .....

.....  
.....  
4.3 What is your additional request in the training program?

.....  
.....  
.....  
.....  
.....

Thanks!!!





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