Kingdom of Cambodia

Nation Religion King

TA-8179 CAM MAINSTREAMING CLIMATE RESILIENCE INTO DEVELOPMENT PLANNING – PACAKGE A (45283-001)

Advanced Vulnerability Assessment and Adaptation Planning Training: Baseline Assessment for Climate Resilient Feasibility Studies in Agriculture and Water Management

Date of training: August 16-18, 2016
Date of this record: August 27, 2016
Location: Prey Veng Province, Cambodia



Prepared for: Asian Development Bank
Prepared by: Climate Change Department, NCSD
Technical supported by: ICEM

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SUMMARY

The three-day "Advanced Vulnerability Assessment and Adaptation Planning Training: Baseline Assessment for Climate Resilient Feasibility Studies in Agriculture and Water Management" workshop took place in Prey Veng on 16-18 August 2016. The workshop was organized under TA 8179-CAM: Mainstreaming Climate Resilience into Development Planning, which is being executed by Cambodia's Ministry of Environment with assistance from International Centre for Environmental Management (ICEM).

Among other objectives, the TA seeks to strengthen the capacity of government officials to assess current and future vulnerabilities for selected investment projects (Activity 1.9), and to conduct feasibility studies for at least six pilot adaptation projects (Activity 2.2). The workshop was second in a series of three field-level capacity-building workshops located at the pilot project sites. The aim of this workshop was to build capacity at local and national levels to conduct feasibility studies which incorporate climate-resilient and adaptation technologies into the project design, with focus on baseline data collection and assessment for feasibility studies for agriculture and water management projects.

The specific objectives of the workshop were:

1) To outline the feasibility study planning process for designing projects which incorporate climate change adaptations in agriculture and water management;
2) To provide guidance on the feasibility study design, future planning and implementation process for the development of climate-resilient agriculture and water management projects in Prey Veng Province;
3) To present concepts for the climate-resilient agriculture and water sector adaptation development projects in the Prey Veng Province (Delta ecozone) and in other provinces and ecozones of Cambodia (Kampong Thom, Pursat and Battambang);
4) To build capacity at national and local levels to undertake baseline data collection and assessments for feasibility studies for adaptation projects in agriculture and water management, in order to inform future project planning and investment processes; and
5) To conduct a field exercise on baseline data collection and assessment to enable participants to gain hands-on experience in procedures and methodologies required to develop and design climate-resilient agriculture and water management projects, with the emphasis on undertaking: (a) a quality vulnerability assessment; and (b) identifying the necessary adaptation measures that will need to be introduced.

The workshop consisted of two days of presentations and desk exercises, and a one-day field visit to a site of a proposed project 'Climate-Resilient Water Management for Agriculture Production'. It was attended by national, provincial and district officials from MOE, MAFF, MOWRAM, MPWT, MRD and other concerned ministries, who act as focal points for agriculture and water planning investment proposals

According to the feedback from participants, the workshop presentations about the agricultural and water profiles of the Prey Veng province, about the baseline data collection and assessment required for the climate vulnerability assessment and adaptation planning, and about the proposed projects in Prey Veng and Kampong Thom provinces were informative and useful. The field visit to the proposed project site was successful in 1) validating the project concept through the discussions with the three local communes, 2) clarifying the key vulnerabilities of the agricultural systems and farmers in the province, and 3) commencing the development of a baseline for the vulnerability

assessment. The participants' feedback on the proposed projects and the data collected during the field visit will be used to revise the project concept notes, and to draft of the design and monitoring frameworks (DMF) for both projects.

The logistics of workshop participants visiting all three communes were difficult. For the upcoming workshop in Kampong Chhnang province in September 2016, it is recommended that three groups visit three separate communities for a full day and spend focused time with them using some of the vulnerability assessment tools (hazard maps, historic time lines of events, seasonal calendars of their activities at risk, as well as gender differentiation tools). The workshop should also have fewer participants (not more than 30 participants from the national ministries and three provinces, plus the TA team) to further reduce the logistical burden.

1 INTRODUCTION

1.1 PROJECT OVERVIEW

The Ministry of Environment (MOE) is the executing agency of TA 8179-CAM: Mainstreaming Climate Resilience into Development Planning. The Technical Assistance (TA) is aimed at enhanced resilience to climate change in Cambodia through strengthening institutional and technical capacity of the government to mainstream climate resilience into development planning, as well as improving coordination among various sectoral line ministries, sub-national agencies, non-government organizations (NGOs) and the private sector.

The TA has four outputs: (i) SPCR coordination, technical support and capacity to mainstream climate resilience into development planning strengthened; (ii) detailed feasibility studies for selected National Adaptation Program of Action (NAPA) projects conducted; (iii) civil society support mechanism established and capacity of NGOs and civil society organisations (CSOs) to mainstream adaptation and disaster risk reduction (DRR) into their operations strengthened; and (iv) climate change adaptation knowledge products developed and disseminated. ICEM - International Centre for Environmental Management was contracted in February 2015 to support MOE for Package 1 of this TA, covering outputs (i), (ii) and (iv).

Activity 1.9 of the TA seeks to "Strengthen capacity to assess current and future vulnerabilities for selected investment projects". This activity focuses on building capacity with the risk screening tools and methods identified and tested in Activity 1.8 ("Review, test, and apply risk screening tools"). Specifically, this activity consists of a series of capacity-building workshops at target project sites that will be timed to coincide with the vulnerability assessment and adaptation planning (VA&AP) and project development exercises to be undertaken as part of Activity 1.6 ("Develop sector-specific case analysis on climate resilience") and Activity 2.2 ("Conduct at least 6 feasibility studies for Adaptation Project (AP) priority projects in 3 sectors, particularly unfunded ones related to the SPCR investments").

The aim of the advanced VA&AP training was to build capacity at local and national levels to conduct feasibility studies which incorporate climate-resilient and adaptation technologies into the project design. These actions form an integral part of TA's Output (ii), namely the conducting of six feasibility studies for selected climate-resilient projects. This training entailed organization of three field-level capacity-building workshops located at the pilot project sites, and provided instruction materials for the development of the feasibility studies for submission to MOE, collaborating ministries and ADB.

The first three-day workshop in this series involved the Adaptation Working Group members and provincial counterparts, and provided an introduction to the VA&AP methodology. It was held in Battambang in November 2015 and included field exercises and testing of the VA&AP tools. This second training workshop (Baseline Assessment for Climate Resilient Feasibility Studies in Agriculture and Water Resource) has focused in greater detail on baseline data collection and assessment for feasibility studies for projects in agriculture and water management, with an emphasis on climate adaptation projects.

In order to be eligible for climate funds, a project proposal needs to show: (1) that a quality vulnerability assessment has been done; (2) adaptation measures that will be introduced; and (3) the comparative costs and benefits of introducing these measures have been assessed. This workshop is another step in addressing the first two aspects, by focusing on baseline data gathering requirements for comprehensive VA&AP. This VA&AP will then be the focus of further workshops and field activities linked to feasibility studies of six proposed adaptation projects. The third eligibility criteria – cost-benefit analysis – will be the subject of another training workshop to be conducted by the MRCDP economist at a later date.

The capacity-building efforts has involved national, provincial and district officials from MOE, MAFF, MOWRAM, MPWT, MRD and other concerned ministries, who act as focal points for agriculture and water planning investment proposals. These officials have been trained in the methods of baseline data collection for climate vulnerability assessment.

The focus of the baseline data collection exercise is to enable a detailed assessment to be made of the vulnerabilities of the farming and livelihoods systems in a particular location/ecozone, and consequently determine which adaptation measures will need to be introduced. The major risks to these systems in the Delta ecozone and Prey Veng Province are identified as vulnerabilities to floods, droughts and extreme weather events (namely wind storms). Data is therefore required on agriculture (current status and future trends) and climate (seasons, climate change and vulnerability, extremes, climate threat analysis – past and projected, climate change profiles for the location, and adaptation options – both traditional and introduced). These data are supplemented with information on water availability and management (current situation, challenges and opportunities in dealing with past extreme events as regards to water availability). Furthermore, information is also required on the socio-economic and cultural contexts as impacted by climate change of the province and target project area.

The baseline data to be collected include all the standard requirements for a feasibility study, including basic information on the natural resource base, agriculture and livelihood systems, irrigation and water management, socio-economic status, value chain and agribusiness, and institutional support.

This three-day training workshop in Prey Veng Province took place on 16-18 August 2016, with a focus on the agriculture and water resources sectors. In preparation, the TA team also visited Prey Veng to work with the provincial officials and identify the sites to be visited during the field trip.

The training workshop was presided over by HE Prof Dr Sabo Ojano, Secretary of State and Program Coordinator of SPCR, Ministry of Environment; HE Mok Theary, Deputy Governor of Prey Veng Province; and HE Pon Saroeun, Undersecretary of State and Deputy Program Coordinator of SPCR, Ministry of Environment.

1.2 WORKSHOP PURPOSE

The objectives for this training workshop included:

- To outline the feasibility study planning process for designing projects which incorporate climate change adaptations in agriculture and water management;
- To provide guidance on the feasibility study design, future planning and implementation process for the development of climate-resilient agriculture and water management projects in Prey Veng Province;
- To present concepts for the climate-resilient agriculture and water sector adaptation development projects in the Prey Veng Province (Delta ecozone) and in other provinces and ecozones of Cambodia (Kampong Thom, Pursat and Battambang);
- To build capacity at national and local levels to undertake baseline data collection and assessments for feasibility studies for adaptation projects in agriculture and water management, in order to inform future project planning and investment processes; and
- To conduct a field exercise on baseline data collection and assessment to enable participants to gain hands-on experience in procedures and methodologies required to develop and design climate-resilient agriculture and water management projects, with the emphasis on undertaking: (a) a quality vulnerability assessment; and (b) identifying the necessary adaptation measures that will need to be introduced.

2 SUMMARIES OF TECHNICAL PRESENTATIONS

The slide presentations are available in Appendix 4.

2.1 SESSION 1: OPENING AND INTRODUCTION

As indicated above, the training workshop was presided over by HE Prof Dr Sabo Ojano, Secretary of State and Program Coordinator of SPCR, Ministry of Environment; and HE Mok Theary, Deputy Governor of Prey Veng Province.

HE Mok Theary made the welcome remark about the training workshop and expressed warm welcome of VIP persons from Ministry of Environment, and all participants from line ministries, and relevant departments of Prey Veng province. He thanked the MOE for considering and choosing Prey Veng as training site noting that MOE has always supported Prey Veng province for care of environment and conservation, especially wastewater and solid waste management in the town. He emphasised the importance of the training workshop that helps gather relevant information on climate change for preparing the Royal Government of Cambodia's strategic policy on response to climate change, and developing scientific knowledge on climate change including adaptation measures and resilient practices that can tackle with the local issues on climate change. HE Mok Theary continued to report the previous activities related to climate change resilience that Prey Veng provincial government has thus far carried out. This includes constructing river bank protection facility, growing vegetation on river bank and road in the city for recreation and tourist attraction, restoring the drainage sewer systems for collecting storm water and wastewater.

HE Prof. Dr. Sabo Ojano made the opening remark of the training workshop. He first stated the objectives of the training and the history of SPCR program aiming at building capacity and developing guideline, procedure and design standard related to climate resilience to line government agencies and relevant stakeholders in Cambodia. Cambodia is one of the nine pilot countries in the world that have been selected to implement the SPCR program. In this regard, the Royal Government of Cambodia (RGC) under the leadership of Samdach Prime Minister Hun Sen has adopted the Cambodia Climate Change Strategic Plan (2013-2030) which laid strong foundation for Cambodia to take firm action on climate change issues. From this long term strategy, RGC has made substantial consideration for mainstreaming climate change resilience into development planning and implementation. This includes development and rehabilitation of road and rural infrastructure, restoring water storage reservoir, improving canalization for efficient irrigation for agriculture of rice commercialization, flood protection and building dyke to protect salt water intrusion, and increased capacity and technicality for conservation of natural resources as well as biodiversity. In order to achieve the long term vision and strategies, all concerned stakeholders of SPCR program should join hands together, not only at national level, but also sub-national government, to plan and implement climate change resilience actions into integrated sectors, above all water resource, agriculture and infrastructure erection. Finally, HE Sabo reiterated that this training workshop would surely give practical skill and knowledge on vulnerability assessment and adaptation planning with regard to feasibility study baseline assessment to all participants from government and nongovernment organizations, although it is the second training event supported under the TA8179 project. There will be series of training workshops on advance VA&AP to be organized in the short future in accordance to specific sectors like urban and rural infrastructure.

Following the completion of opening speech, Dr. Peter-John Meynell, the team leader of TA8179, briefed the objective of the workshop and program arrangement. The major objective of training workshop is to test the methodology of feasibility study's baseline assessment tool and build capacity of relevant government agencies with regard to vulnerability assessment and adaptation planning. The training agenda was divided into three days: the first day covered general issues about methodology, project concept note for Prey Veng, status and challenges for agriculture and water

resource sectors with reference to flood, drought and wind storm and temperature; the second day was field visits to three communes: Kansom Ak, Rung Damrei, and Ba Borng; and the last day was on group report back of field work, presentation of concept notes for water resource in Battambang and Pursat, and agriculture development in Kampong Thom.

Dr. Lay Chanthy delivered a presentation on feasibility study methodology and process, and what the donors and funds required for the adaptation projects. The TA8179 will conduct six feasibility study projects, and in the end through comprehensive assessment and analysis based on results of feasibility studies, at least two project proposals will be formulated and submitted to Green Climate Fund.

Dr. Seak Sophat, Deputy Team Leader of TA8179 delivered a presentation of briefing of six feasibility study projects that will be carried out in different provinces. These are:

1. Rehabilitation and development of Damnak Cheukrom irrigation system, phase II in Purast' Bakan district, and Battambang's Rukhakiri and Moung Russey district with preliminary estimated budget of about 25 mil USD over 5 years.
2. Climate resilient commercial horticulture development project (CRCHDP) in Kampong Thom province with an estimated total cost of 30 mil USD over 5 years.
3. Climate-Resilient Water Management For Agriculture Production Project in Prey Veng province with estimated total cost of 25 mil USD over 5 years.
4. Enhance Resilience of Rural Infrastructure and Community Livelihoods in Kampong Leng District in Kampong Chhnang province with an estimated cost of 28.30 mil USD over 3 years.
5. Climate Resilience of Rural Road and Small-scale Irrigation Reservoir Improvement Project in Western Region of Tboung Khmum Province with an estimated total cost of 40 mil USD.
6. Rehabilitation of Irrigation and Drainage System of Kampong Seima Project in Battambang Municipality with an estimated cost of about 50 mil USD over 5 years.

2.2 SESSION 2: PREY VENG AGRICULTURE SECTOR AND ADAPTATION PROJECT CONCEPT

2.2.1 Climate Resilient Water Management for Agriculture Production Project (CRWMAPP)

This presentation was delivered by Mr. Stoang Kea, from MAFF, a summary of which is as follows. To address climate change issues in the Delta ecozone which is characterised by a shortage of water in the dry season, flooding in the wet season and low agricultural productivity, the proper management of water is of paramount importance. Climate resilient water management for agriculture and livelihoods is key to the future of agriculture and improving adaption to climate in this part of Cambodia. This is the strategy to address climate change which is taking place in Prey Veng Province situated in the Delta ecozone, while also continuing to improve the agricultural productivity (mainly of the cropping systems), rural livelihoods and food security.

The overarching goals of agriculture and water resource management in the Delta of Cambodia and this project are: to improve food availability and livelihoods; increase food access and income through improved water and crop management; improve resilience to climate change; strengthen the capacity of the public and private sectors and civil society to address food security and improved rural incomes.

The project will produce the following three outcomes: (1) climate resilient water and crop management for agriculture and livelihoods developed suitable for small farmers and scaled out to other regions for improving agriculture; (2) access to financial services for agriculture improved for farmers in the project areas; and (3) markets for farmers developed and organized.

The project has 4 main components:

1. Organize farmers to engage in climate resilient water management and agricultural production
2. Capacity building for farmers and strengthening their capacity in water management and the agricultural sector through improved training and capacity building for farmers
3. Promote the provision of technical services and improved technology delivery for crop and water management
4. Promote improved financial services and market access

The target beneficiaries for this project are the rural poor farmers on the irrigated areas of 3 districts in Prey Veng province, more especially those with small land holdings. It will focus on assisting both male and female farmers through group actions and the provision of technical and financial support.

In developing this Concept Note for the CRWMAPP it is important that careful attention is made to the design of the project components as regards – choice of crops and cultivation methods, appropriate crop and water management technologies – which should address the changing climatic conditions, and provide protection measures against extremes. Overall future climate conditions are likely to have limitations on the project performance and location, and care needs to be taken in the design of project, from choice of crops, preparation of land and soils, provision of water during the dry season, protection against intense rainfall and flooding, and provision of appropriate water management systems for both surface and groundwater.

Location: The provinces along the Mekong River more especially the Delta ecozone where the water resource-rich provinces are located and where Prey Veng province is appropriate for agriculture and water resource development.

The keywords for this project are as follows: Crops, Land and water management, Micro-irrigation, Groundwater, Climate resilience, Marketing, Rural finance, Water User Groups. The project concept will address the following sub-sectors: Crops, Land Management, Water Management, Agribusiness

Comments on the concept had previously been made by MAFF and during the workshop include the following:

1. MAFF recommends that the project should produce the tangible output. The project should develop the small irrigation infrastructure supporting the farmers in the area of the farmer cooperative, and utilize the scarcity of water resource supporting high value crops. This model should be piloted with the farmer cooperatives.
2. The adaptation technologies presented in the Toolkit (such as sprinkler, drip irrigation system, solar pumping system, biogas, etc.) should be applied and used effectively for this five-year project.
3. MAFF recommends that the other agricultural components such as livestock and aquaculture should be taken into consideration for income source diversification. In project concept, only rice crop has been mentioned for income source diversification. This is considered not to be sufficient and effective for this large-scale investment project.
4. MAFF recommends that the existing farmer cooperative should be used. If the area (project area) doesn't have the existing farmer cooperative, then new farmer cooperative can be formulated and established. The farmer cooperative initiative is in line with Ministry's direction and policy.
5. Contract farmers should be considered in the project design. The contracted fund or contracted farmer is very important to promote the private sector or investor to invest in agricultural

production. The project has not mentioned the inclusion of a contract fund, an important missing point.

6. MAFF recommends that the new project should be thinking of other areas [location/province] outside Prey Veng province, where getting a high economic rate of returns might be more feasible. The project location is very important for MAFF project development. Many development partners or NGOs are already working in the Prey Veng area, and seem not to want to shift to other areas.
7. MAFF recommend that the project should explain about the crop variety seed safety and security. Seed management is a good adaptation measure in crop production. One of MAFF's major concern is about variety seed management – a point that the present project concept has not mentioned.

Outcome of the training workshop will contribute further to the design of this project, the findings of which will be incorporated in the second draft of the concept note to be prepared by the end of September 2016.

2.2.2 Agriculture sector in Prey Veng Province – status and trends as impacted by climate change, with the emphasis on floods, drought and other extreme weather events (storms)

This was presented by Mr. Chum Chandara Deputy Director of Prey Veng PDOA. For the full presentation refer to Appendix 4.

General situation: Prey Veng province locates in lowland and floodplain of Mekong where the area is highly potential for rice production (dry and wet season rice) compared others province of the Kingdom of Cambodia. However, the rice production farmers have faced several problems in cropping are such;

- Low rice production, leads to food shortage
- Having encountered the natural disaster every year are such; drought, flood- flooded by river and flooded by dog and cat rainy
- Insects and diseases are such; 1-insect destroys the rice and other crops, 2-worm, 3-diseases, 4-rat, and 5-unfertile soil
- Farmers used to practice the traditional technique which is not adapting to intensive agricultural production technique (rice production is 2.991kg/ha)
- Total population is 1,203,570 people (619,427females) and 273,593families. Population density is 246 people per km^2

Statistics of agricultural land of Prey Veng province in 2016 are as follows: (a) Total agricultural land: 337,000 ha (60% of total provincial land which is 488,300 ha); (b) Wet-rice (paddy rice) land area: 250,000 ha; (c) Dry-rice land area: 75,000 ha; and (d) Supplementary crop land area: 12,000 ha.

The current status of livestock production in 2016 are: cattle ؛ 2,487,163 head, pigs 269,481 head, chicken 1,197,886 head, and ducks 2,556,954 head.

Impacts of Climate Change: Impacts of climate change on agriculture in the past are:

- Delays of raining causes to delaying of cropping period
- Low of rainfall quantity effects on crop growth
- Flood, heat, changing of climate causes to damage of agricultural production (rice, vegetable, and livestock husbandry)
- Outbreak of pest and insect makes crops damage

- Outbreak of disease on plants and crops, and livestock often

The impact of drought & flood on agricultural production-recording from 2009-2015 is presented in the Table below.

Description	2009	2010	2011	2012	2013	2014	2015
Rice cultivated land area (ha)	333,446	351,497	361,272	358,922	372,095	364,776	360,315
Land area impact by flood (ha)	2,377	-	70,965	-	55,840	30,496	-
Destroyed by flood (ha)	1,396	-	47,268	-	14,125	5,199	-
Impact by drought (ha)	6,067	4,141	-	9,283	-	8,022	39,328
Destroy by drought (ha)	1,009	-	-	3,243	-	532	-

Effective Intervention Actions in Agricultural Sector in responds to Climate Change: Past actions prepared by Province in readiness for intervening with climate change are

1. Prepared provincial department's action plan: preparation intervention and resolution after risk taken place (rehabilitation)
2. Training and extension on:
    - Cropping: seed saving, seed purification of crops and suitable crop varieties (short-term rice variety, vegetable seed) and provision of agricultural technology
    - Livestock husbandry: preparation of rice straw, crop seed for livestock feed, processing of livestock feed, making shelf or security shelter for livestock, and searching for hill area to move the livestock in during the flood period.
3. Preparation of tools and materials such as; engine boat, gasoline, medicine for livestock, feed, and other tools for intervention

Key activities by PDOA with community to address climate change are for agriculture: (a) extension to promote the farmer doing the less water requirement crops; (b) extension to promote the multi-benefit farming or integrated farming; (c) promote fish culture in plastic pond or rice field; (d) measures to protect rice cropping, e.g., IPM for Cereal Leaf Beetle; and (e) experimental study to search for short-term rice variety which can be grown any season and resilience to climate change.

For livestock production: (a) promote livestock feeding crops and cake for cattle; (b) livestock feeding garden (grass); (c) storage of rice straw; and (d) training on livestock husbandry techniques. Interventions on the veterinary aspects include: (a) strengthening the capacity of Village Veterinary Agents; (b) vaccination to prevent the disease transmission; (c) prepared the drug for treatment: antibiotic and vitamin for livestock health improvement; and (d) biosafety measures.

Intervention measure in response to an emergency: Planning of key activities through assigned roles and responsibility, observing the effected situation, and finally estimate the total impact, assessing of damage, and report to Provincial Municipality, Ministry of Agriculture, Forestry and Fisheries (MAFF) and relevant institutions. Prepare safety hill site for livestock and supply livestock feed during the flood periods.

Rehabilitation action plan: There are two aspects to this plan: (1) **p**roduction of rice and vegetables; by (a) intervening to produce the rice seedling and distribute rice or others crop seed to effected farmers, and (b) having had sufficient water source for irrigating when having encountered prolonged drought; and (2) resolution for livestock health.

Suggestions

- Continues strengthening the capacity of relevant stakeholder staff at provincial and district level on the principle or technology of climate adaptation and resilience
- Organizes the events to disseminate to local stakeholders which is the key to success in mainstreaming of knowledge and promotion of popular participation in climate change adaptation
- Should set up target area for implementing of the mainstreaming climate change resilience project in provinces where vulnerable to natural disaster like as Prey Veng province.

Second presentation by Mr Mean Samorn-Deputy Director of Provincial Planning Department, Prey Veng Province who presented some very useful statistics on impacts of natural disasters – storms, flood and drought – refer to presentation in Appendix 4. Keys points from the presentation are as follows:

1. Provincial data profile has been computerized, and called as “commune database” and shorten as (CDB). The profile documentation is to use for developing the sub-national development plan and PIP (program investment plan),
2. These data of this document is collected from the village and commune/sangkat statistic books which have been recorded yearly, and reserved at commune/sangkat hall and village head or village representative who is a member of Planning and Budgeting Committee (PBC).
3. Before data processing, the village and commune database are cross-checked by commune clerk and deputy chief of commune/sangkat, and approval and endorsed by commune/sangkat leader who assures that statistic data is correct and true.
4. Detailed definition of each statistic data is made and reading in a guideline for village data collection for doing the commune/sangkat development plan.
5. Commune/Sangkat council needs to use this data profile to monitor and cross-check with the annual progress, and reporting on the progress after the council’s mandate end.
6. It is very useful during preparing of the development plan and investment project in investment plan. The planning working group needs to use this data profile as source of primary and key information for discussion and search for issues taken place in town and district at their own province.
7. There are no leading questions attached with the tables in this profile. Thus it should be checked and considered all data in those tables at which they are all having a meaningful and specific knowledge. Understanding of the meanings of data or figure in the tables is directly or indirectly made.
8. When using this data profile for preparing of development plan and investment program, the planning working group needs to have a paper on scoring of each provincial sector (which was also made from the commune/sangkat database) for helping for clarification and be easy to make a decision.
9. All steps of planning process for preparing the development plan and investment plan need all necessary and available information which reflects a real and specific situation of the province. Therefore, planning working group needs to have this information and data profile

together available with during every meeting. This data profile needs to be kept and make it available when we need.

2.3 SESSION 3: *SOCIO-ECONOMIC AND ENVIRONMENTAL PROFILE OF THE PROVINCE AND INTRODUCTION TO FIELD EXERCISE*

2.3.1 Socio-economic and cultural contexts as impacted by climate change of the Prey Veng Province – including traditional responses to extreme events (flood, drought, and storms)

Prey Veng province is located in floodplain of Mekong data region and it borders Kampong Cham to the northwest, Tboung Khmum to the northeast, Kandal to the west, and Svay Rieng to the east and Vietnam to the south. It is crossed by two major rivers of the country, namely the Mekong and Tonle Bassac. The total land area of the province is 4,883 km², which equals 2.7% of the total land area of Cambodia (181,035 km²). This consists of 445.18 km² or 9.12% of human settlements, 3,100 km² or 63.49% of agricultural land use, 194.61 km² or 3.99% of forested area, 1,082.86 km² or 22.18% of public land, infrastructure and water bodies. The remaining 60.35 km² or 1.24% is unused area.

The total population is 947,357 persons or 7.07% of the total population of 13,388,910 persons in Cambodia. About 825,818 persons or 80.54% are farmers, 140,685 person or 13.72% are fishermen, 44,561 persons or 4,35% are traders, 14,267 persons or 1.39% are government's officers. The average population density 194.0 person per km².

Prey Veng Province boasts of silt deposited in each flood, this makes the region conducive to agriculture and fishing. Unfortunately, the famers are still facing with many problems to increase the agricultural productions such as:

- Rice production is low,
- Natural disaster always threaten almost every year as flood, drought, wind storm,
- In addition to other disasters, insects destroy the productions of rice and vegetable, worms, disease, mouse, dried out of fertilizer,
- The famers still use the traditional farming practices that are apart from adaptation technology.

Data of agricultural and unoccupied land in Prey Veng-2016 in (Ha)

No.	Land type	Year 2016	Percentage	Remarks
1	Wet season rice land	250,000	51.20%	
2	Dry season rice land	75,000	15.36%	
3	Other plant land	12,000	2.46%	
4	Unoccupied land	151,300	30.99%	
5	Total land	488,300	100.00%	

Photos of agricultural and unoccupied land in Prey Veng-2016

Wet season rice land

Dry season rice land

Other plant land

Unoccupied land

Data of socio-economic and environmental profile of the Prey Veng Province

Impact by natural disaster in Prey Veng (2013-2015) by Provincial Department of Planning

- **Storm impact**

No.	Description	Year 2013	Year 2014	Year 2015	Remarks
1	No. of family impact majority by storm	238	73	106	
2	No. of people impact majority by storm	960	314	403	
3	No. of people died by majority storm	6	2	3	

- **Flood impact**

No.	Description	Year 2013	Year 2014	Year 2015	Remarks
1	No. of family impact majority by flood	4,590	2,976	514	
2	No. of people impact majority by flood	17,950	11,980	2,290	
3	No. of people died by majority flood	45	35	34	
4	Rice field damage by flood (Ha)	18,701	6,766	948	
5	Rice field damage by flood (%)	8.20	3.00	0.40	
6	Road length was damaged by flood (Km)	123,73 Km	54,59 Km	4,88 Km	
7	Bridge & Box culvert were damaged by flood (No.)	859	5	2	

- **Drought impact**

No.	Description	Year 2013	Year 2014	Year 2015	Remarks
1	No. of family impact majority by drought	1,374	2,596	7,018	
2	Rice field was damaged by drought (Ha)	16	259	7,062	
3	Rice field was damaged by pest insect (Ha)	1,096	2,931	169	

- **Lightning impact**

No.	Description	Year 2013	Year 2014	Year 2015	Remarks
1	No. of people impacted by lightning	14	11	22	

2.3.2 Water availability and management (surface and groundwater; water resource infrastructure) in Prey Veng Province

Prey Veng province is located in Mekong delta which is good for agricultural production. The area adjacent to river system receives flood every year and the province is highly prone to drought as well. In this regard, the province can be described as having too much water in wet season, and having too little water in dry season. The management of water resource is under the authority of MOWRAM, in which Provincial Department of Water Resource and Meteorology has direct responsibility on the water resources.

Annual average level flood is 7.5 m (as recorded from Prek Tatam Station), and intensity of flood has increased remarkably as recorded in 1991, 1996, 2000, 2001, and 2013. While, drought extreme event was recorded in 2015 for Prey Veng province and it is the most suffering drought ever in the recorded history.

Water resource in Prey Veng is divided into surface and underground water. For surface water resource, the province has Mekong river with a total length of 57 km flowing through Peam Ror and Peam Chhor districts. Small river (like Tonle Touch) is 230 km long flowing through Sithor Kandal, Pea Raing, Porveang, Peam Chhor, Preah Sdach, Ba Phnom, and Kampong Trabek districts, and a river along border of Vietnam with length of 51 km. In addition, there are other rivers and natural lakes, which are major sources for irrigating during wet and dry season rice cultivation. While for ground water source, the province consists of some 14,466 wells which are used for irrigation and domestic water supplies.

Below are summaries of water infrastructure in Prey Veng province:

- 139 reservoirs with dykes of the total length of 251,237 meters
- 112 canals with total length of 867,160 meters
- 15 pumping stations
- 58 Water gates
- 26 Spill ways
- 91 Water barrages
- 227 Water distribution buildings
- 259 crossing buildings
- 348 water sewer buildings

There are 23 water farmer user communities through out the province. However, these FWUCs are early stage of organization. In fact, they operate under the framework sub-decree on FWUC creation and management. They manage and use water according to specific situation in their community such as usage of user fee collected from community members and contribute to maintain irrigation

system after harvesting. As experienced from Prey Veng irrigation practices, the success of water use and management is relied on small scale private operators. They charge user fee from farmers who cultivate dry season rice. The fee rate is based on mutual agreement between farmer and pumping operator. This practice is mostly found in Kampong Trapaek, Preh Sdach, and Peam Chho districts. There are some important points to improve community water management:

- Participation from beneficiary of farmer groups
- Encouragement with a strong support from relevant local authorities supporting any kinds of management activities implemented by FWUC
- Participation from relevant agencies- working on water resource sector
- Building complete irrigation system (Complete system)
- Ensuring water supply is enough with both seasons

So far, the Prey Veng PDOWRAM has carried out the annual and 3 years planning focus on rehabilitating water reservoir, main and subsidiary canals, existing natural lakes which are suffering from higher sedimentation, and Strengthening rights of Farmer Water Use Community to maintain irrigation system and prevent any kind of illegal land encroachment, especially on public and state land.

Although, Prey Veng province has plenty of water resources, there are several challenges for sustainable water resource management. These may included:

- All irrigation systems are needed to maintain every years, financial resource allocated for province for this rehabilitation is relatively limited.
- Geographical location and land condition for farmland are high if compared with river and it needs pumping machines to get water into rice field.
- Building or rehabilitating of dyke faces some constrains due to the increasing the level of sedimentation into canal and lake, including illegal clearing flooded forest.
- Limited participation from local farmers to maintain all existing dyke.

In response to increasing climate change impacts, the PDOWRAM has proposed several intervention projects for Water Resource Management. These are Rehabilitation of 7 existing dykes and repairing all existing canals, building additional dyke as needed, and construction of pumping stations for irrigation, domestic water supply as well as environment.

2.3.3 Introduction to field exercise on baseline data collection and assessment required for the climate vulnerability assessment and adaptation planning

The presentation which introduced the workshop participants to the field exercise on baseline data collection and assessment required for the climate vulnerability assessment and adaptation planning was made by Dr Sophat. This outlined the methodology and the field collection template to be utilised by the trainees. For more information on this refer to the presentation in Appendix 4. The main focus was to collect information on the general aspects of agriculture in Prey Veng Province and more particularly the three main climate risks – flood, drought and wind storms.

2.3.4 Community based Vulnerability Assessment Tool

To enable participants in discussing and collecting data/information from community, four participatory tools that would be necessarily served in vulnerability assessment, determining adaption option and adaptation, planning have been introduced in the training. These tools include: (i) hazard mapping, (ii) historical analysis of hazard, (iii) seasonal calendar of cropping and hazard occurred, and (iv) impact analysis and determining of adaptation options. Each tool was explained the process of how to use this tool at field for data collect/information from community.

Hazard map: hazard mapping is a process of mapping hazard information within a study area of varying scale, coverage, and detail. This hazard map is developed to identify the potential

location/area in project area that need to provide interventions of responses/adaption measures to address specific climate threats in the area.

Historical analysis of hazard: The analysis of historical information to determine levels of risk based on past experiences of hazard occurred. The information of extreme climate events to collect is time-series information/data within past 10-30years up to present time. By doing historical analysis of occurred hazards, the trends of hazards to be occurred can be foreseen. This together with information of climate change projection provides solid information to conclude for how often and how serious the climate hazards would occur in future in project area.

Seasonal calendar of cropping and disaster: cropping calendar and climate threat calendar is a process to identify month of crop planting and months of climate hazard occurred with 12 months of year. By completing this tool, we know which months that villagers practiced their respective crops and which months that hazard usually occurred and deteriorate their crops. Thus, recommendations, proposing adaption measures in terms of shifting cropping season or changing crops to adapt existing climate change can be made effectively.

Impact analysis and determining of adaptation option: Impact analysis is a practice of identifying and evaluating the negative and positive consequences of disasters on natural and human systems and nature. The impact analysis of previous occurred hazards can lead to determining adaption options/adaptation measures to cope the impacts of climate hazards to be occurred in future.

2.4 SESSIONS 4: DATA REQUIREMENTS FOR THE FEASIBILITY STUDY BASELINE ASSESSMENT – FIELD EXERCISE (SOPHAT AND IAN)

Field trip – three groups (flood, drought and storm) are provided with the SPCR Baseline Assessment: Field Survey Template – and during the program they consulted with (i) local farmers and farmer groups, (ii) district government representatives, (iii) with other service providers and stakeholders (NGOs, private & others), and (iv) discuss amongst themselves in completing the Template. Survey locations in three Prey Veng districts: Peam Ro, Ba Phnom, and Kampong Trabek districts, which had differing constraints to agriculture production as impacted by climate change.

2.5 SESSIONS 5: DATA REQUIREMENTS FOR THE FEASIBILITY STUDY BASELINE ASSESSMENT – GROUP WORK

After the field exercise the three groups reviewed and consolidated their findings as presented in the Templates and made presentations in plenary highlighting the main issues, constraints and opportunities for the development of a properly focused agriculture and water management project in Prey Veng. Reference should be made to Section 3 of this report for summaries of the field work and group discussions.

2.6 SESSION 6: OTHER PROJECT CONCEPTS AND THEIR DATA REQUIREMENTS

2.6.1 Detailed presentation of the Kampong Thom agriculture project concept – Climate Resilient Horticulture Development Project (CRHDP)

This presentation was delivered by Mr. Bun Leang Hak, from MAFF, a summary of which is as follows. The province of Kampong Thom is located in the Tonle Sap ecozone which relies on the seasonal rains to facilitate the production of food crops mainly the staple rice which is predominantly grown under irrigated conditions. Kampong Thom has been affected by climate change. The flood and drought have contributed to the low productivity of agriculture and thus, farmers have only been able to grow rice and only one crop a year. There is an urgent need to enhance crop productivity with particular emphasis on introducing second cropping and diversifying the cropping systems away from rice towards more drought tolerant and profitable horticulture crops.

The overarching goals of horticulture commercialization and this project are: to improve food availability through the commercialisation of agriculture particularly the horticulture sub-sector; increase food access through rural income diversification focusing specifically on horticultural value chain development more particularly vegetable production; improve resilience to climate change; strengthen the capacity of the public and private sectors and civil society to address food security, commercialisation of horticulture and climate change.

The outcomes of the project are focusing both on non-physical and physical interventions, which include the following. Organizing communities and selecting the commercial horticulture farmers. Capacity building and on-farm training for commercial horticulture farmers on horticulture techniques and practices to increase productivity. Establishing demo-horticulture sites that farmers could see and learn. Providing the supporting systems for farmers so that farmers could support when they need it during the implementation. Improve horticulture productivities among farmers for household consumption and market business. Organizing markets for horticulture farmers to sell their produces. Processing and value added activities organized for farmers for them to compete in the market. Producer groups strengthen horticulture market access – linking horticulture producer groups with district and provincial level vegetable buyers. Community-based savings groups increase access to credit. Public Private Alliance partnerships with agribusinesses, Private Bank, NGOs and donors. Partnership with private bank in order to gain access to credits necessary for commercial horticulture. Through co-investments, farmer could access technologies and equipment, and participated in training designed to increase productivity, improve overall product quality, lower operating and farming costs, and strengthen technical knowledge.

The project has five main components: (1) Capacity Building – for farmers, public, private, and civil society to address food security and climate change; (2) Enhance Agriculture Input and Production Systems – commercial horticulture farmers increase productivity; (3) Strengthen Postharvest Systems – producer groups strengthen horticulture market access and post-harvest operations; (4) Access to Credit – for commercial horticulture farmer and private sector entities involved in the value chain; and (5) Public Private Partnerships – facilitate and formalize sustainable linkages between producer groups and private sector entities. Consideration also to be given to the inclusion of a component for improvement of rural road access. A Project Management component will also be required.

The target beneficiaries for this project are the rural poor farmers, more especially those with small land holdings. It will focus on assisting both male and female farmers.

In developing this Concept Note for the CRCHDP it is important that careful attention is made to the design of the project components (e.g., choice of crops and cultivation methods, appropriate storage and processing technologies) and should address the changed climatic conditions, and provide protection measures against extremes. Overall future climate conditions are likely to have limitations on the project performance and location, and care needs to be taken in the project design, from choice of crops, preparation of land and soils, provision of water during the dry season, protection against intense rainfall and flooding, provision of appropriate storage and processing facilities, and the condition and security of access roads.

Location: The provinces along the Mekong River and Tonle Sap given the water resource-rich provinces. Kampong Thom province is appropriate for horticulture development.

The keywords for this project are as follows: Horticulture, Market access, Value chains, Crops, Land and water management, Climate resilience. The project concept will address the following sub-sectors: Crops and Land Management, Rural Transport, Storage and Processing, Agribusiness

Comments on the concept had previously been made by MAFF and during the workshop include the following:

1. MAFF recommends that the domestic seed should be considered for horticulture project. Critically, currently imported vegetables influence the local market, hence the need for import substitution of a wide range of both rainy and dry season vegetable. A horticulture project is considered by MAFF as a good topic for consideration.
2. MAFF recommend the project should consider being located in a new area as compared Kampong Thom. Two provinces, Kandal and Siam Reap are good locations for promoting the vegetable production. These areas can link to the Urban Agriculture concept. MAFF think that if Kampong Thom is firmly considered for the first phase of the project, then Kandal and Siam Reap should be provinces where the project could be expanded at a later date. Promoting the vegetable production in Kandal province is not only increasing the climate crop resilience but also it helps to increase the food nutrition.
3. MAFF want to supply to the vegetable markets in the large urban areas of Phnom Penh and Siam Reap towns where demand is high and where most produce comes from Vietnam and Thailand respectively. The aim would be to supply the organic vegetable to tourist and big consumer base in these two urban centres.
4. Horticulture is hot issue and urgent need for Cambodian people. The project has not mentioned some points and we recommend that project should consider and add some points related to:
    - GAP (good agriculture practice), food safety and trade marks for farmer group. The project should consider about the labelling of farmer's product
    - Off-season cropping technique. Innovative cropping technology for vegetable crops should be promoted as it can improve the income and adapt to climate change. Non-flooded areas are suitable for off-season cropping (i.e., mango).
    - Agricultural product promotion should be actively considered. The farmer or community's agriculture product should be widely promoted via the national exhibitions/events.
    - The cooling technique and transportation parts of the value chain should be taken into consideration of the new project. Storage and transportation technology is very important for maintain the quality of agricultural produce especially vegetables.
    - The finance service should be expanded to support infrastructure and agricultural tools, and other aspects of the vegetable production value chain.
    - Biogas technology should be included in the project design.
    - The saving group should be clearly defined by the project and more information is required on what is such as saving group entails that the project concept is focusing on?

2.6.2 Detailed presentation of the water management project concept in Battambang – Rehabilitation and Development of the Damnak Cheukrom Irrigation System Phase II

This presentation was delivered by Mr. Bak Bunna, official from MOWRAM. Because the project proposed is an extension of current GMS Flood and Drought Risk Mitigation and Management project, there is little comment from the workshop participants. The following are summaries of comments:

- The project should study carefully the water sources and dimension of proposed main canal to as whether there is sufficient water to serve the canal, especially during dry season, to irrigate the farmland in Rukhakir and Moung Russey districts. It is because that the Pursat river is almost dead in dry season.
- Experiences from the current GMS project should be built into the extension project, so that all challenges and opportunity will be comprehensively addressed.
- For components of agriculture production should be linked to existing network and development partners like HARVEST projects, FAO, etc.

3 SUMMARIES OF FIELD WORK AND GROUP DISCUSSION

3.1 FIELD WORK BASELINE FOR FLOOD

The results of the field work baseline for flood risks for three communes in Prey Veng are presented in the completed Templates in Appendix 3. Comprehensive responses were made to the nine questions related to the agriculture sector in Prey Veng which provides some useful background information for the further development of the project concept. The following Table highlights some of the main findings in relation to flood prone areas their vulnerabilities and adaptation options.

Question	Comments
What have been the past challenges the province and agriculture and water sectors has faced as regards to flooding?	• Crop damage (paddy rice, crop diversification) • Flooded houses, grasses, animal, flood and river flood • Boeung Bram canal to release water during flood • Chen canal (2013 is the embankment for flood) • Challenge for transport (boats need to be dragged)
What are the current traditional and improved adaptation technologies that are being used by farmers to combat flooding?	• Most of crops are paddy rice • Vegetable has been grown less • Traditional agriculture techniques (use animal to drag) • Currently farmers use modern equipment for agriculture productivity • Use chemical fertilizer and pesticides • Farmers currently grow grasses for animal feed to support family and sell some to others (from 10 to 40 families)
What other measures are needed to combat flooding that is not currently being used?	• paddy rice and vegetable seeds preparedness when water receded • that area has spillway and delay water intrusion and water recede • community does not have measures for flood
What do you consider to be the criteria that relate to the exposure of system to flooding (e.g., duration, location, intensity, volume or flow, frequency, etc.)?	• farmers face many challenges for agriculture productivity (DRR—flood and drought) • when flooded, people and animals were evacuated to safety areas
Can you list what you see as the criteria which related to the sensitivity of the system as affected by flooding	• many people migrated to Thailand, Korea, and other provinces within Cambodia • community use pumping wells for domestic use and rice field (the depth of well is from 30 to 40 meters) • there is no water user community
How does flooding impact on the overall productivity in the province/ location (score according to: low, medium, high, very high)?	Impacts on agriculture products within flood prone villages
What do you consider to be the adaptive capacity to deal with flooding (e.g., technical & institutional factors, social factors, natural systems, etc.)?	Change timeline and types of crop

	What are the potential adaptation technologies to deal with floods?	N/A

Suggestions as to project design for Prey Veng based on the field survey of the three communes is presented in summary in the Table below.

	Question	Comments
a.	Constraints and opportunities to be taken into account in designing the project?	**Challenges:** • when integrated into district level, there is no partners support to rehabilitate canal • there is only PADEE support for one kilo meter-canal • lack of cooperation within community **Opportunity:** • suggest government to support project, canals and lakes • suggest to have technical agriculture skill trainings
b.	Recommendations for project design – identify the major outputs and activities required for a project which addresses both climate resilience and irrigated agriculture in the Delta ecozone?	• integrate these challenges into development planning and commune investment programme • suggest NGOs and government to approve on this project • need participatory contribution from development partners • should have 50% contribution from community for maintenance • local community raise awareness to beneficiaries for sustainable maintenance
c.	Recommend the priority locations for project activities?	• Kansom Ak is the priority village as its canal is shallow • Titakoeuy, Toul, Snaykhney and Pongpos villages • Chouk Chey village since there are many people (244 families) depends on agriculture productivity and women also grow vegetable and animal husbandry
d.	Who should benefit from the project?	• women, children, elders, disable people are benefit from this project as clean water will be available for domestic use and agriculture productivity to improve family income and being healthy
e.	What further information is required for the design of a climate resilient project and suggest where this information can be found?	• 85 families out of 365 families will benefit from this canal • secondary canal is the means to bring water from main canal for rice fields, and domestic use especially widows and elders who are lacking of labour.

3.2 FIELD WORK BASELINE FOR DROUGHT

Below are summaries of field exercise results in term of drought from three communes with three different districts in. Detailed results of each commune are presented in Appendix 3.

	Question	Comments
a.	Past challenges the province and agriculture and water sectors has faced as regards to drought?	- Need to rehabilitate and reparse the irrigation system, - Need to support from skilled department, - At school area, need to provide water supply,
b.	What are the current traditional and improved adaptation technologies that are being used by farmers to combat drought?	- Tradition: need manpower, - Technology: need fuel, electricity, mechanic,

	Question	Comments
c.	What other measures are needed to combat drought?	- Suggest to construct secondary canal, - Suggest to rehabilitate existing irrigation system,
d.	What do you consider to be the criteria that relate to the **exposure** of system to drought (e.g., duration, location, intensity, volume or flow, frequency, etc.)?	- Plan the tree - Rehabilitate reservoir - Construct irrigation system
e.	Can you list what you see as the criteria which related to the **sensitivity** of the system as affected by drought, for example:	- Prepare in advance to protect the drought, - Mitigate the drought situation, - Prepare/select the seed after drought,
f.	How does drought **impact** on the overall productivity in the province/ location (score according to: low, medium, high, very high)?	- Organise strategy to reduce the temperature by plantation of tree, - Keep the good seed that adapt the climate change,
g.	What do you consider to be the **adaptive capacity** to deal with drought (e.g., technical & institutional factors, social factors, natural systems, etc.)?	- Provide the good seed that adapt the climate change with high productivity, - Provide the training the new technology to the affected famers,
h.	What are the potential **adaptation technologies** to deal with drought?	- Need to participate from community, - Need to support from institutional skilled department

These are some suggestions of proposed adaptation projects to combat droughts.

	Question	Conclusion
a.	Constraints and opportunities to be taken into account in designing the project?	- Data gathering or data information, - Priority the project proposals.
b.	Recommendations for project design – identify the major outputs and activities required for a project which addresses both climate resilience and irrigated agriculture in the Delta ecozone?	- Require the human resource, - Require the budget allocated,
c.	Recommend the priority locations for project activities?	- According to Programme of 5 year moving ahead of Commune/Sangkat
d.	Who should benefit from the project?	- Need to participate with all parties, - Will be increased the living standard at remote areas, -Reduce immigration
e.	What further information is required for the design of a climate resilient project and suggest where this information can be found?	- Need to keep & record all necessary data information such as high flood water level, number of people are affected by natural disaster,

3.3 FIELD WORK BASELINE FOR WIND STORM AND TEMPERATURE

Below are summaries of field exercise results in term of wind storm and temperature from three communes with three different districts in. Detailed results of each commune are presented in Appendix 4.

	Questions	Comments
a.	What are the natural resources in the project area and in the surrounding watershed (upstream and downstream)?	There are various natural water sources for each commune for irrigating agriculture land, farming and providing various natural resources for livelihood of local people.
b.	What biodiversity do they contain in relation to economic cropping and farming systems (e.g., traditional varieties rice, etc.)?	Natural surface water serves very important role in farming and livelihood of local people.
c.	What is their importance of these traditional species/crops and how are they used as regards to food security and livelihoods?	Traditional rice seeds are abandoning shortly due to their long term crop period, climate change, low yield, and market factors.
d.	What are the major threats to these traditional resources in the area?	Shortage of irrigating water, changing season, storm occurrence, and markets are the major issues of local people.
e.	What is the status and availability of climate and natural resource information that is relevant to Prey Veng province?	People received climate information from national level through TV and radio. Local provision of climate information is limited. People getting information through information way such as through own observation.

These are some suggestions of proposed adaptation projects to tackle again wind storm and temperature.

	Questions	Comments
a.	Constraints and opportunities to be taken into account in designing the project?	• Lack of information • Existing mechanisms are weak • Lack of skill and technology • Lack of investment capital • Lack of infrastructure
b.	Recommendations for project design – identify the major outputs and activities required for a project which addresses both climate resilience and irrigated agriculture in the Delta ecozone?	• Plant more trees • Increase education and information dissemination • Increase preparedness • Strengthening capacity • Mainstream climate change budget at sub-national
c.	Recommend the priority locations for project activities?	All areas in commune
d.	Who should benefit from the project?	All people in commune
e.	What further information is required for the design of a climate resilient project and suggest where this information can be found?	Additional information from commune can be obtained from local authority, commune database, development plan, …report of disaster of commune.

4 TRAINING WORKSHOP EVALUATION

Nineteen participants filled in the workshop evaluation sheet among the total participation. They came from MAFF, MoWA, MPWT, MRD, ICEM, MoE, MoWRAM, NCDD, MoP, and from provincial line departments like Prey Veng, Kampong Thom, Pursat, and Battambang provinces. Following are statement on how participants understand the workshop beneficial to their work.

Participants are happy to learn data collection method for disaster and risk. It was a great topic for stakeholders for considering on climate change data collection for their work place. Similar way, participants learned about data collection in target area for project development. Participants gained knowledge on climate change impact on public work and infrastructure, bridge, and climate change adaptation method. They reported that the workshop would help them increase knowledge on climate change and adaptation at our work place in their province.

Among the participants who are filling the workshop evaluation sheet, 21% reported that the workshop was excellence, 53% was good, while only 26% reported neutral.

Specifically, participants reported that the knowledge gains through the workshop will benefit to their organization as follows: they will use the knowledge on climate change and adaptation for their workplace, includes climate change data collection tool for their workplace, understand the need of community on climate change adaptation, evaluation process, learning about climate change adaptation indicator identification. Anyways, participants, said that the workshop almost discussion on issues but does not discuss on solution of climate change and adaptation, the workshop's topic and its purpose was not specific, discussion was not clear, and should be more specific. Anyways, the workshop is still useful for stakeholders.

5 CONCLUSIONS AND NEXT STEPS

5.1 WORKSHOP FINDINGS AND RECOMMENDATIONS

According to the feedback from participants, the workshop presentations about the agricultural and water profiles of the Prey Veng province, about the baseline data collection and assessment required for the climate vulnerability assessment and adaptation planning, and about the proposed projects in Prey Veng and Kampong Thom provinces were informative and useful. The field visit to the proposed project site was successful in 1) validating the project concept through the discussions with the three local communes, 2) clarifying the key vulnerabilities of the agricultural systems and farmers in the province, and 3) commencing the development of a baseline for the vulnerability assessment. The participants' feedback on the proposed projects and the data collected during the field visit will be used to revise the project concept notes, and to draft of the design and monitoring frameworks (DMF) for both projects.

For the upcoming workshop in Kampong Chhnang province in September 2016 which will focus on infrastructure projects, it is recommended that a similar format is kept for the first day (outlining background information on the province, describing the proposed projects, outlining the feasibility study methodology, etc.). These sessions can be streamlined with less repetition, and make use of the relevant data from the provincial MPWT and MRD offices, the local NCDM, and the climate projections for Kampong Chhnang.

The logistics of workshop participants visiting all three communes were difficult. For the upcoming workshop in Kampong Chhnang province in September 2016, it is recommended that three groups visit three separate communities for a full day and spend focused time with them using some of the vulnerability assessment tools (hazard maps, historic time lines of events, seasonal calendars of their activities at risk, as well as gender differentiation tools). The workshop should also have fewer participants (not more than 30 participants from the national ministries and three provinces, plus the TA team) to further reduce the logistical burden.

5.2 IMMEDIATE AND LONGER TERM NEXT STEPS FOR THE DEVELOPMENT OF THE CONCEPTS FOR PREY VENG AND KAMPONG THOM

1. After completion of the Prey Veng training workshop, incorporate the findings of that workshop and these MAFF comments to further refine the project concepts for Prey Veng and Kampong Thom. These second drafts are to be completed by the end of September 2016 for submission to MAFF for further comment.
2. Prepare with MAFF AWG and technical staff the first draft of the project Design and Monitoring Frameworks (DMF) for both projects. These DMF would outline the various activities to be undertaken, their means of verification, and sources of verification (indicators). It will be essential in these frameworks to identify the key risks and assumptions, especially as regards to the climate change aspects (vulnerabilities, risks, impacts and adaptation measures).
3. From the DMF the project design as the basis on which to move forward towards the development of the feasibility study, and where key criteria to be included in the baseline data collection for the project are identified. The completion of the DMF and the baseline data collection survey design are to be completed by end of October 2016.

5.3 NEXT ACTIONS FOR ADAPTATION PROJECT FOR WATER RESOURCE IN PURSAT AND BATTAMBANG PROVINCES

4. Combine the comments from Roundtable meeting with MOWRAM officials and training workshop in Prey Veng, and set up the workplan to further consult and finalize the comments and integrate in the concept note for feasibility study.

5. Draft the methodology to carry out the feasibility by following the processes previously drafted in April 2016, and submit to MOWRAM AWG members for final comments
6. Set up workplan for field data collection to Pursat and Battambang

6 PHOTOS

Opening speech for the training on VA and AP under SPCR by H.E. Prof. Dr. Sabo Ojano on 16 Agu 2016

Speech by H.E. Mok Theary, Deputy Governor of Prey Veng Province on 16 Aug 2016

Dr. Seak Sophat, SPCR Deputy Team Leader presents the objectives of the training workshop

NAPA Specialist explains more about data collection process

Participant's reaction during the meeting

Participant's reaction during the meeting

Participant's reaction during the meeting

General view of the training workshop

Participants pose for a group photo

Day 2. Field Visit: Baseline Data Collection

Storm and Weather group visit to Kansom Ak commune, Kampong Trabek district, Prey Veng province.

Storm and Weather Group visit to Kansom Ak commune, Kampong Trabek district, Prey Veng province.

Water Resource Group visit to Kansom Ak commune, Kampong Trabek district, Prey Veng province.

Water Resource Group visit Kansom Ak commune, Kampong Trabek district, Prey Veng province.

Agriculture Group visit to Kansom Ak commune , Kampong Trabek district, Prey Veng province.

Agriculture Group visit to Kansom Ak commune , Kampong Trabek district, Prey Veng province.

Water Resource and Storm and Weather visit to Rung Damrei commune, Kampong Baphnom district, Prey Veng province.

Water Resource and Storm and Weather visit to Rung Damrei commune, Kampong Baphnom district, Prey Veng province.

Water Resource and Storm and Weather visit to Rung Damrei commune, Kampong Baphnom district, Prey Veng province.

Agriculture Group visit to Rung Damrei commune, Kampong Baphnom district, Prey Veng province.

Agriculture Group visit to Rung Damrei commune, Kampong Baphnom district, Prey Veng province.

Group photo taken in Rung Damrei commune, Kampong Baphnom district, Prey Veng province.

Overview of the visit to Baboang commune, Peam Ro district, Prey Veng province.

Meeting with commune chief of Baboang commune, Peam Ro district, Prey Veng province.

Water Resource and Agriculture Group visit to Baboang commune, Peam Ro district, Prey Veng province.

Water Resource and Agriculture Group visit to Baboang commune, Peam Ro district, Prey Veng province.

Water Resource and Agriculture Group visit to Baboang commune, Peam Ro district, Prey Veng province.

Authorities and local people attend the visit to Baboang commune, Peam Ro district, Prey Veng province.

Storm and Weather Group visit to Baboang commune, Peam Ro district, Prey Veng province.

Storm and Weather Group visit to Baboang commune, Peam Ro district, Prey Veng province.

Group photo taken in to Baboang commune, Peam Ro district, Prey Veng province.

Day 3. Data Analysis and findings

Deputy Team Leader takes an introduction to data analysis and group discussion

Participants form groups and discuss about the data collected

Participants form groups and discuss about the data collected

Group representative present their findings

Group representative present their findings

Group representative present their findings


Certificates provided at the end of training


Certificates provided at the end of training


Certificates provided at the end of training


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Certificates provided at the end of training

APPENDIX 1. AGENDA

ADVANCED VULNERABILITY ASSESSMENT AND ADAPTATION PLANNING TRAINING: (1) BASELINE ASSESSMENT FOR CLIMATE RESILIENT FEASIBILITY STUDIES IN AGRICULTURE AND WATER MANAGEMENT

PREY VENG, 16 – 18 AUGUST 2016

Day/Session	Presentation/training activity	Presenter/facilitator
Day 0 – 15 August 2016 [Monday]		
	Travel Phnom Penh to Prey Veng	
Day 1 – 16 August 2016 [Tuesday]		
Session 1: Opening and introduction – the overall project and feasibility studies		
7:40 - 8:00	Registration	PMU Staff
8:00 - 8:25	Welcome Speech (TW/MCRDP/DOC1)	Provincial Governor
8:25 - 8:40	Opening Speech (TW/MCRDP/DOC2)	HE Prof Dr Sabo Ojano, Secretary of State, MOE, and SPCR Program Coordinator
8:40 - 9:00	Introduction to the training (TW/MCRDP/DOC3)	Dr Peter-John Meynell
9:00 - 9:20	The structure and approach to feasibility studies and what the donors and funds require (TW/MCRDP/DOC4A-B)	Dr Lay Chanthy
9:20 - 9:40	An overview of the six project concepts under consideration by SPCR/MCRDP and collaborating ministries (TW/MCRDP/DOC5)	Dr Seak Sophat
Session 2: Prey Veng agriculture sector and adaptation project concept		
9:40 - 10:10	Detailed presentation of the Prey Veng agriculture project concept – Climate Resilient Water Management for Agriculture Production Project (CRWMAPP) (TW/MCRDP/DOC6)	MAFF AWG member (assisted by Dr Mak Sithirith and Dr Ian Hancock)
10:10 – 10:30	Coffee break	
10:30 - 11:15	Agriculture sector in Prey Veng Province – status and trends as impacted by climate change, with the emphasis on floods, drought and other extreme weather events (storms) (TW/MCRDP/DOC7)	Prey Veng Provincial Agriculture Department representative
Session 3: Socio-economic and environmental profile of the province and Introduction to field exercise		
11:15 - 12:00	Socio-economic and cultural contexts as impacted by climate change of the Prey Veng Province – including traditional responses to extreme events (flood, drought, and storms) (TW/MCRDP/DOC8)	Prey Veng Provincial Planning Department representative

Day/Session	Presentation/training activity	Presenter/facilitator
12:00 – 13:30	Lunch break	
13:30 – 14:00	Water availability and management (surface and groundwater; water resource infrastructure) in Prey Veng Province – current situation, challenges and opportunities in dealing with extreme events (flood, drought, and storms) (TW/MCRDP/DOC9)	Prey Veng Provincial Water Resource and Meteorology Department representative
14:00 - 14:30	Projected climate change in Prey Veng and the watershed – implications for development (TW/MCRDP/DOC10)	Dr Peter-John Meynell
14:30 – 15:00	Plenary discussion	Facilitated by Dr Peter-John Meynell/Dr Seak Sophat
15:00 – 15:20	Coffee break	
15:20 - 16:30	Introduction to field exercise on baseline data collection and assessment required for the climate vulnerability assessment and adaptation planning. Participants divided into three groups (focus on the following climate threats: flood, drought and storms). (TW/MCRDP/DOC11)	Dr Seak Sophat Dr Ian Hancock
16:30 - 16:50	Community based Vulnerability Assessment Tool (TW/MCRDP/DOC12)	Dr. Lay Chanthy
	Welcome dinner	
Day 2 – 17 August 2016 [Wednesday]		
Sessions 4: Data requirements for the feasibility study baseline assessment – field exercise		
08:00 – 17:00	Field trip – three groups (flood, drought and storm) are provided with the SPCR Baseline Assessment: Field Survey Template – and during the program they will consult with (i) local farmers and farmer groups, (ii) district government representatives, (iii) with other service providers and stakeholders (NGOs, private & others), and (iv) discuss amongst themselves in completing the Template. Survey locations in three Prey Veng districts: Pream Ro, Ba Phnom, and Kampong Trabek districts	Dr Ian Hancock Dr Seak Sophat Dr Peter-John Meynell Dr. Lay Chanthy Mr. Thai Vathara (Support from MAFF and MOWRAM AWG's)
Day 3 - 18 August 2016 [Thursday]		
Sessions 5: Data requirements for the feasibility study baseline assessment – group work		
8:00 - 10:00	Group work to complete the baseline assessment template	Facilitators – MRCDP team and MOWRAM/MAFF AWG members

Day/Session	Presentation/training activity	Presenter/facilitator
10:00 – 10:20	Coffee break	
10:20 -12:30	Three groups report back – plenary session (approx. 45 minutes each group allowing time for presentation and discussion)	Dr Mak Sithirith Dr Ian Hancock Dr Seak Sophat Dr Peter-John Meynell Dr. Lay Chanthy Mr. Thai Vathara
12:30 -13:30	Lunch break	
Session 6: Other project concepts and their data requirements		
13:30 – 14:00	Detailed presentation of the Kampong Thom agriculture project concept – Climate Resilient Horticulture Development Project (CRHDP) (TW/MCRDP/DOC13)	Mr. Sok Chea, MAFF AWG member (Assisted by Dr Mak Sithirith and Dr Ian Hancock)
14:00 – 14:30	Detailed presentation of the water management project concept in Battambang – Rehabilitation and Development of the Damnak Cheukrom Irrigation System Phase II (TW/MCRDP/DOC14)	Mr. Bak Bunna, MOWRAM AWG member (Assisted by Dr Seak Sophat and Dr Peter-John Meynell)
14:30 – 15: 15	Group discussion (divided in two groups according to two concept notes above) - What have they learned from above exercises on data requirements for climate resilient project design?	Facilitators – MRCDP team and MOWRAM/MAFF AWG members
15:15 -15:35	Coffee break	
15:35 – 16:05	Group presentation and discussion	Facilitators – MOWRAM/ MAFF AWG members
16:05 - 16:30	Workshop summary and next steps	Dr Ian Hancock Dr Peter-John Meynell
16:30 -17:00	Workshop close	MOE representative
	Travel Prey Veng to Phnom Penh	

APPENDIX 2. PARTICIPANT LIST

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APPENDIX 3. KEY BASELINE OF CLIMATE EVENTS (FLOOD, DROUGHT AND WIND STORM) FOR TARGETED COMMUNES OF SITE VISITS

1.1 BASELINE ASSESSMENT FOR GROUP 1: FLOOD

Location:	Kansom Ak, Rong Dam Rey and Ba Borng Communes
Date:	17 August 2016
Group name:	Flood
Group member name:	1. Dr. Seak Sophat (ICEM) 2. Dr. Soth Kimkolmony (NCDM) 3. Mr. Chum Dara (PDA) 4. Mr. Stoung Kea (MAFF) 5. Mr. Siav leangheng (DoE) 6. Mr. Long Phon (PDA) 7. Mr. Heak Pring (MRD) 8. Mrs. Kim Sokuntheary (PDWT) 9. Mr. Choub Sarun (DoE) 10. Mr. Cheang Rady (DoE) 11. Mr. Hong Kimsan (MoWRAM) 12. Mr. Heng Sovanna (MoE) 13. Ms. Chhorn Ratha (MoWA) 14. Mr. Sim Vimut (PDoRD)

Section 1: General information on Prey Veng Province agriculture systems

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune
Agriculture sector in Prey Veng – status and trends				
a.	What are the current farming systems in the area?	• rice transplanting, crop diversity, animal husbandry for family • depend on rainfall • canals or sometime open-wells	• rice transplanting, crop diversity, animal husbandry for family • depend on rainfall • canals or sometime open-wells	• rice transplanting (short term-rice in dry season and receding rice) • ducks, buffaloes, fish husbandry and fishing • Canals or sometime open-wells
b.	What crops do they grow and what cropping patterns do they use?	• modern techniques (seed selection, using fertilizer and	• modern techniques (seed selection, using fertilizer and modern	• fruit cultivation • ducks, buffalos, fish husbandry and

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune
		modern equipment) • traditional techniques (follow ancestors, use more seeds, fertilizers and no chemical pesticide) • melons, water melons, sugar canes, morning glories,	equipment) • traditional techniques (follow ancestors, use more seeds, fertilizers and no chemical pesticide) • melons, water melons, sugar canes, morning glories,	fishing • modern techniques (seed selection, using fertilizer and modern equipment) • traditional techniques (follow ancestors, use more seeds, fertilizers and no chemical pesticide) • melons, water melons, morning glories
c.	How important are other farming activities such as livestock, fisheries and forestry?	• increase family income • reduce family expense • improve family livelihood • reduce migration	• support family livelihood • improve family income • improve health and environment	• support and reduce other family expense
d.	What are the main challenges relating to productivity?	• animal is sick • cheap price to sell agriculture products • cheap price to sell pigs but its feed is expensive • loss fishes in the pond when flood • lack of safety area for animal • grasses, straw when flooded • decrease fishing yield	• decrease fishing yield • animal is sick • chemical waste • lack of safety areas • crop damaged when flooded • lack of vegetable in rainy season • unfertilized soil	• vegetable damaged by insects so farmers use more chemical pesticide and fertilizer • animal is sick • shallow canal and pollution (due to many ducks raising) • lack of safety areas • postpone crop cultivation when flooded
e.	What is the status and quality of the agriculture extension service – is it serving the farmers well - how to improve?	• seeds and fertilizer are sold by private companies • awareness raising and capacity building by NGOs/CBOs • rice transplanting 95% and vegetable cultivation 5% (% of farmer family) Improvement: • encourage private sector to cooperate with provincial	• government encourages to integrate agriculture diversification • NGOs promotes agriculture technical skills • expense is higher than income	• support by NGOs and others for effective agriculture productivity • provincial department of agriculture introduced farmers on agriculture techniques

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune
		department • provide technical skills		
f.	What is the present status of the markets for agriculture produce?	• sell agriculture products at village/commune markets • farmers disappointed on agriculture productivity (spend much capital and earn less income) • high migration	• Agriculture products sold at plantations/farms but the price was determined by commissioners	• Agriculture products sold at plantations/farms but the price was determined by commissioners
g.	How easy is it for farmers to get rural finance and what needs to be done to improve the situation?	Challenges: • micro credit, rice bank, and it is difficult to get loan (land title and guarantee needed) Easiness: • self-help groups (PADEE)	Challenges: • micro credit, rice bank, and it is difficult to get loan (land certificate and guarantee needed) Easiness: • self-help groups (PADEE)	Challenges: • micro credit, rice bank, and it is difficult to get loan (land certificate and guarantee needed) • high interest rate (no require land certificate and maximum 2- million Riel loan) • borrow money from rice commissioners but must sell paddy rice to them Easiness: • self-help groups (PADEE)

Section 2: Flood prone areas – vulnerabilities and adaptation options

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune
a.	What have been the past challenges the province and agriculture and water sectors has faced as regards to flooding?	• crop damage (paddy rice, crop diversification) • flooded houses, grasses, animal, flood and river flood • BOEUNG BRAM canal to release water during flood • CHEN canal (2013 is the embankment for flood) • challenge for transport (boats need to be dragged)	• crop damage (paddy rice, crop diversification) • flooded houses, grasses, animals, flood and river flood • BOEUNG BRAM canal to release water during flood • CHEN canal (2013 is the embankment for flood) • challenge for transport (boats need to be dragged) • breakout diseases, snakes • lack of clean water for domestic use	• paddy rice, vegetable, and fruit were damaged, • evacuated people, and animal to safety areas • natural forest to release flood and store water for dry season which is not enough • water from BOEUNG SNER can be used in dry season (but not enough) • breakout diseases, snakes (diarrhoea and dengue fever) • lack of clean water for domestic use
b.	What are the current traditional and improved adaptation technologies that are being used by farmers to combat flooding?	• most of crops are paddy rice • vegetable has been grown less • traditional agriculture techniques (use animal to drag) • currently farmers use modern equipment for agriculture productivity • use chemical fertilizer and insects pesticide • farmers currently grow grasses for animal feed to support family and sell some to others (from 10 to 40 families)	• most of crops are paddy rice • vegetable has been grown less • traditional agriculture techniques (use animal to drag) • currently farmers use modern equipment for agriculture productivity • use chemical fertilizer and insects pesticide	• farmers in the communes do not transplanted long term rice in rainy season • farmers transplanted short term rice in dry season (from December onward for 2 to 3 times per year) • since previous long time practices, farmers in this commune use animal to drag (cows and buffaloes) • currently farmers use modern equipment for agriculture productivity and chemical pesticide and fertilizer.
c.	What other measures are needed to combat flooding that are not currently being used?	• paddy rice and vegetable seeds preparedness when water receded • that area has spillway and delay water intrusion and water recede • community does not have	• paddy rice and vegetable seeds preparedness when water receded • that area has spillway and delay water intrusion and water recede • community does not have measures for flood	• paddy rice and vegetable seeds preparedness when water receded • that area has spillway and delay water intrusion and water recede • community does not have measures for flood

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune
		measures for flood		
d.	What do you consider to be the criteria that relate to the exposure of system to flooding (e.g., duration, location, intensity, volume or flow, frequency, etc.)?	• farmers face many challenges for agriculture productivity (DRR—flood and drought) • when flooded, people and animals were evacuated to safety areas	• farmers face many challenges for agriculture productivity (DRR—flood and drought) • when flooded, people and animals were evacuated to safety areas	• farmers do not work for agriculture productivity in rainy season • farmers work for agriculture productivity in dry season (from December onward for 2-3 times/ year) • when flooded, people and animals were evacuated to safety areas
e.	Can you list what you see as the criteria which related to the sensitivity of the system as affected by flooding, for example: • Agriculture and livelihoods (land tenure, markets and value chains, rural finance, etc.) • Water management & infrastructure (water management – WUG, groundwater, level of maintenance, protective systems, specific sites, design etc.) • Natural systems (in location and watershed)	• many people migrated to Thailand, Korea, and other provinces within Cambodia • community use pumping wells for domestic use and rice field (the depth of well is from 30 to 40 meters) • there is no water user community	• many people migrated to Thailand, Korea, and other provinces within Cambodia • community use pumping wells for domestic use and rice field (the depth of well is from 17 to 60 meters) • there is no water user community so they individually manage. Suggestion: • Ministry of Agriculture, Forestry and Fisheries to provide technical skills and capital such as explanation how to standardize use chemical fertilizer and how to keep all packages of chemical fertilizer properly	• many people migrated to Thailand, Korea, and other provinces within Cambodia • There is water user community within the commune. It is cheap price but it cannot supply enough Suggestion: • national level of each sector to think about additional irrigation canals
f.	How does flooding impact on the overall productivity in the province/ location (score according to: low, medium, high, very high)?	• impacts on agriculture products within CROACH and KANSOM AK villages.	• impacts on 8 villages out of 12 villages such as houses, crop and animal	• impacts all when flooded
g.	What do you consider to be the adaptive capacity to deal with flooding (e.g., technical & institutional factors, social factors, natural systems, etc.)?	• change timeline and types of crop	• crop calendar change (flood seasons and build cells for crop cultivation during flood)	• change seeds and types of crop for short time

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune
h.	What are the potential adaptation technologies to deal with floods?	N/A	N/A	N/A

Section 3: Project design proposal for Prey Veng Province

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune
f.	Constraints and opportunities to be taken into account in designing the project?	Challenges: • when integrated into district level, there is no partners support to rehabilitate canal • there is only PADEE support one kilo meter-canal • lack of cooperation with community Opportunity: • suggest government to support project, canals and lakes • suggest to have technical agriculture skill trainings	• There are many priority projects but are not very supported for implementation • lack of cooperation from community for contribution Opportunity: • continue to raise actual needs as the priority	Challenges: • There are many priority projects but are not very supported for implementation Opportunity: • continue to raise in the priority table from 2.1 to 2.2
g.	Recommendations for project design – identify the major outputs and activities required for a project which addresses both climate resilience and irrigated agriculture in the Delta ecozone?	• integrate these challenges into development planning and commune investment programme • suggest NGOs and government to approve on this project	• continue to raise actual needs as the priority to be integrated into development planning and commune investment programme • suggest NGOs and government to support	• need participatory contribution from development partners • should have 50% contribution from community for maintenance • local community raise awareness to beneficiaries for sustainable maintenance
h.	Recommend the priority locations for project activities?	• KANSOM AK is the priority village as its canal is shallow	• TITAKOEUY, TOUL, SNAYKHNEY and PONGPOS villages	• CHOUK CHEY village since there are many people (244 families) depends on agriculture productivity and women also grow vegetable and animal husbandry

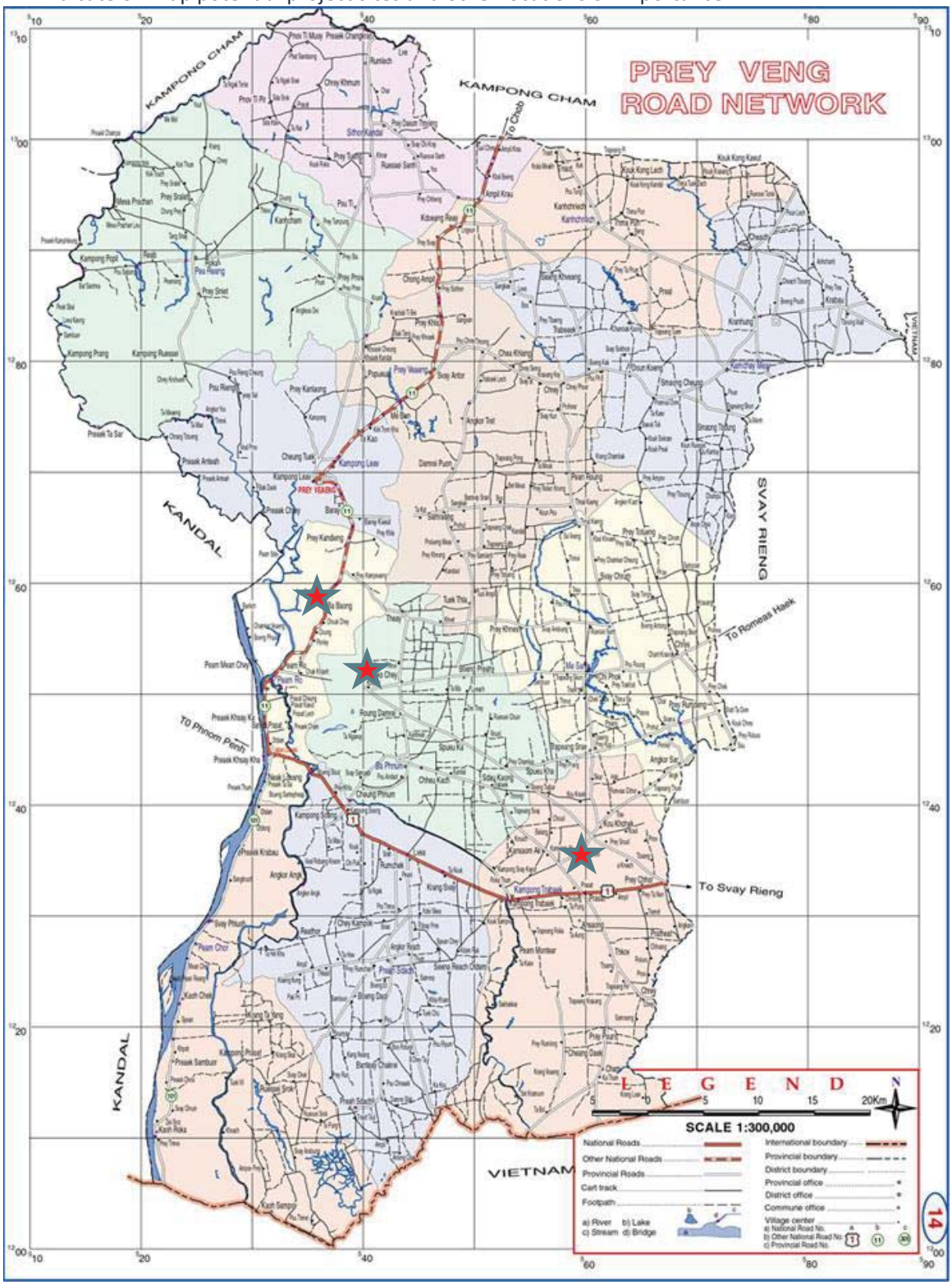
	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune
i.	Who should benefit from the project?	• women, children, elders, disable people are benefit from this project as clean water will be available for domestic use and agriculture productivity to improve family income and being healthy • affordable to send children to school	• women, children, elders, disable people are benefit from this project as clean water will be available for domestic use and agriculture productivity to improve family income and being healthy	• community is the beneficiary of this project particularly it improves the situation and helps vulnerable women, elders and widows, children.
j.	What further information is required for the design of a climate resilient project and suggest where this information can be found?	• 85 families out of 365 families will benefit from this canal • secondary canal is the mean to bring water from main canal for rice fields, and domestic use especially widows and elders who are lacking of labour.	• need more information about these 3 vulnerable villages (TITAKOEUY, TOUL, SNAYKHNEY and PONGPOS)	• need to select priority projects which responds to the community's need within the village • need to understand the needs of men and women

Section 4: Other comments

Other comments
No

Section 5: Project location

- Indicate on map potential project sites and other locations of importance



1.2 BASELINE ASSESSMENT FOR GROUP 2: DROUGHT

Location:	1- Phum Kroch, Khum Konsom Ork, Srok Kampong Trabek (Easting 553718 & Northing 1236325 by UTM, Datum WGS 84, Zone 48P) 2- Phum Prey Pgneam, Khum Rong Domrey, Srok Baphnom (Easting 543122 & Northing 1248661 by UTM, Datum WGS 84, Zone 48P) 3- Phum Chokchey, Khum Babong, Srok Peam Ro (Easting 536225 & Northing 1258054 by UTM, Datum WGS 84, Zone 48P)
Date:	17 August 2016
Group name:	Group-B (Drought)
Group member name:	*A- Investigative member name:* 1- Mr. Thai Vathara (ICEM/Phnom Penh) 2- Mr. Men Vannak (PDA/Pursat) 3- Mr. Chea Mo (PDWT/PVG) 4- Mr. Mean Samorn (PDOP/PVG) 5- Mr. Kuong Kea (PDRD/KTM) 6- Mr. Men Moniroth (PDRD/PVG) 7- Mr. Kong Chanthan (NCDM/Phnom Penh) *B- Participant member name:* 1- Phum Kroch, Khum Konsom Ork : 7 people 2- Phum Prey Pgneam, Khum Rong Domrey: 8 people 3- Phum Chok Chey, Khum Ba Bong: 8 People

Section 1: General information on Prey Veng Province on water resources and socio-economic status

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune	Conclusion
Water resources sector in Prey Veng – status and trends					
a.	Outline the water availability and management situation – current situation, challenges and opportunities?	• Hand-pump • Digging pond • 3 Natural pond (Prolay Chine)	• Hand-pump • Digging pond • River Ksach Sar	• Hand-pump • Beung Sne • Tonle Touch	• Using for agriculture crops but not enough, • Small period of drought on wet season, • Long period of drought
b.	Groundwater use is important in the province especially during the dry season – how can its use be improved?	• Rehabilitate canal • Rehabilitate pond • Construct canal and pond	• Rehabilitate canal • Rehabilitate pond • Construct canal and pond	• Rehabilitate canal • Rehabilitate pond • Construct canal and pond	• Manage canal network • Create the water user group (WUG) • Use drain-gutter (RCC) instead of Digging canal

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune	Conclusion
c.	What needs to be done to improve the functions of the farmer Water User Groups to better manage water management and agriculture production?	• Need to support from local authority • Improve the function of WUG	• Need to support from local authority • Improve the function of WUG	• Need to support from local authority • Improve the function of WUG	• Need to participate from villagers • Need to support from local authority • Training how to manage and use water
d.	How important is micro-irrigation (DRIP) – for which crops and locations, and what are its constraints?	• Save the water quantity while sprinkle, • Save the time and labours, • Suitable for: Cucumber, Species of gourd, Bitter melon, • Expensive and require technology,	• Save the water quantity while sprinkle • Save the time and labours, • Suitable for: Cucumber, Species of gourd, Bitter melon, • Expensive and require technology,	• Save the water quantity while sprinkle • Save the time and labours, • Suitable for: Cucumber, Species of gourd, Bitter melon, • Expensive and require technology	• Sped a lot of money, • Require technology, • Need to be patient, • Not interested at enough water areas,
Socio-economic profile					
a.	What are the on-farm and off-farm income generating activities for the farming households?	• On-farm: plan rice 2-3 times/year, with modern rice seed 3-5t/ha, and seasonal rice seed 2t/ha • Off-farm: feed animals, plan vegetable, fish pond by family, immigration	• On-farm: plan rice 2times/year, with rice seed IR-502 & IR66 with period 3 months get production 3-4t/ha, and more production at low terrain, • Off-farm: fish pond by family, immigration, saving money with micro-finance (30 million riel)	• On-farm: re-seeding rice 1time/year with production 4-6t/ha, dry season rice 2times/year with production 4-6t/ha, • Off-farm: feed animals, plant vegetable, drinking water enterprise, small scale business, immigration,	• Production depend on natural disaster as flood or drought, • If rehabilitate irrigation net work with enough water recourse, respectively the production will increase quantity
b.	Are there any cooperatives established among the communities in the commune, if so what is their status?	• Agriculture group, • Saving money group	• Saving money group • Water using group	• Self-help group • Agriculture group, • Saving money group, • Fishing group	• If there are, the status of community will be suitable,
c.	What is the land tenure situation and is it a constraint?	• Land was registered by LMAP, • Land for agriculture about	• Conflict between WUG at upstream and down stream	• There are no problem	• It is good, the land was registered already by LMAP, except Ba Bong commune.

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune	Conclusion
		20ha			
d.	What role do women play in the agriculture sector?	• Participate to make any decision in the family and community, • Encourage the scope of works, • Participate as skilled and unskilled labours,	• Participate to make any decision in the family and community, • Encourage the scope of works, • Participate as skilled and unskilled labours,	• Women 58% participate to increase the income by plantation around the house, • Participate to make any decision in the family and community,	• Encourage the women • Training and support women, • Distribute the income by equality and accountability

Section 2: Drought prone areas – vulnerabilities and adaptation options

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune	Conclusion
i.	Past challenges the province and agriculture and water sectors has faced as regards to drought?	• Some part of irrigation system was not rehabilitated or repaired due to budget,	• Some part of irrigation system was not rehabilitated or repaired due to budget,	• Some part of irrigation system was not rehabilitated or repaired due to budget, • Increasing of misfortune insects at the rice field	• Need to rehabilitate and reparse the irrigation system • Need to support from skilled department, • At school area, need to provide water supply,
j.	What are the current traditional and improved adaptation technologies that are being used by farmers to combat drought?	• Tradition: using scoop, waterwheel, watercan, • Technology: using motor pump, motor with air compressor,	• Tradition: using scoop, waterwheel, watercan, • Technology: using motor pump, motor with air compressor,	• Tradition: using scoop, waterwheel, watercan, • Technology: using motor pump, motor with air compressor,	• Tradition: need manpower, • Technology: need fuel, electricity, mechanic
k.	What other measures are needed to combat drought?	• Construct reservoir to stock water • Rehabilitate existing irrigation system, • Construct/renovate pond to stock water, • Plan the tree	• Construct reservoir to stock water • Rehabilitate existing irrigation system	• Construct reservoir to stock water • Rehabilitate existing irrigation system	• Suggest to construct secondary canal, • Suggest to rehabilitate existing irrigation system
l.	What do you consider to be the criteria that relate to the exposure of system to drought (e.g., duration, location, intensity,	• Rice field at Upstream is high elevation, • The duration of dry appear on the rainy season,	• Rice field at Upstream is high elevation, • The duration of dry appear on the rainy	• Rice field at Upstream is high elevation, • The duration of dry appear on the rainy	• Plan the tree • Rehabilitate reservoir • - Construct irrigation system

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune	Conclusion
	volume or flow, frequency, etc.)?	• Long period of drought, • Increasing the temperature,	season, • Long period of drought, • Increasing the temperature,	season, • Long period of drought, • Increasing the temperature, • Year 1995-2015 is extremely affected to the people who are living along NR-11	
m.	Can you list what you see as the criteria which related to the sensitivity of the system as affected by drought, for example: • Agriculture and livelihoods (land tenure, markets and value chains, rural finance, etc.) • Water management & infrastructure (water management – WUG, groundwater, level of maintenance, protective systems, specific sites, design etc.) • Natural systems (in location and watershed)	• Agriculture: low production, animal disease, number of mouse, insects, • Society: inflation, low income, immigration, frustrated, violence, jobless, banditry, fire, • Health: epidemic disease, children's disease, • Water resource: lacking water, poor quality of water, • Infrastructure: dusty, wilted grass and tree at the side slope, • Business/Enterprise: low production, • Education: lack of children go to school, school close the door	• Agriculture: low production, animal disease, number of mouse, insects, • Society: inflation, low income, immigration, frustrated, violence, jobless, banditry, fire, • Health: epidemic disease, children's disease, • Water resource: lacking water, poor quality of water, • Infrastructure: dusty, wilted grass and tree at the side slope, • Business/Enterprise: low production, • Education: lack of children go to school, school close the door	• Agriculture: low production, animal disease, number of mouse, insects, • Society: inflation, low income, immigration, frustrated, violence, jobless, banditry, fire, • Health: epidemic disease, children's disease, • Water resource: lacking water, poor quality of water, • Infrastructure: dusty, wilted grass and tree at the side slope, • Business/Enterprise: low production, • Education: lack of children go to school, school close the door	• Prepare in advance to protect the drought, • Mitiate the drought situation, • Prepare/select the seed after drought

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune	Conclusion
n.	How does drought impact on the overall productivity in the province/ location (score according to: low, medium, high, very high)?	• Very high	• Very high	• High	• Organise strategy to reduce the temperature by plantation of tree, • Keep the good seed that adapt the climate change
o.	What do you consider to be the adaptive capacity to deal with drought (e.g., technical & institutional factors, social factors, natural systems, etc.)?	• Change or select the rice seed to adapt the environmental situation, • Keep the water on reservoir or pond • Prepare the preventive medicines, medication to kill insects, issue the new technology to adapt the climate change,	• Change or select the rice seed to adapt the environmental situation, • Keep the water on reservoir or pond • Prepare the preventive medicines, medication to kill insects, issue the new technology to adapt the climate change,	• Change or select the rice seed to adapt the environmental situation, • Keep the water on reservoir or pond • Prepare the preventive medicines, medication to kill insects, issue the new technology to adapt the climate change,	• Provide the good seed that adapt the climate change with high productivity, • Provide the training the new technology to the affected famers,
p.	What are the potential adaptation technologies to deal with drought?	• Rehabilitate the irrigation system, • Tree plantation, • Issue the advance information to famers about drought,	• Rehabilitate the irrigation system, • Tree plantation, • Issue the advance information to famers about drought,	• Rehabilitate the irrigation system, • Select the rice seed with short period of plantation, • Prepare in advance of chemical pesticide	• Need to participate from community, • Need to support from institutional skilled department

Section 3: Project design proposal for Prey Veng Province

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune	Conclusion
k.	Constraints and opportunities to be taken into account in designing the project?	• Geographical areas, • Participate from community and local authority, • Need to support from institutional skilled department	• Geographical areas, • Participate from community and local authority, • Need to support from institutional skilled department	• Geographical areas, • Participate from community and local authority, • Need to support from institutional skilled department	• Data gathering or data information, • Priority the project proposals

	Question	Kansom Ak Commune	Rung Dam Rei Commune	Ba Borng Commune	Conclusion
l.	Recommendations for project design – identify the major outputs and activities required for a project which addresses both climate resilience and irrigated agriculture in the Delta ecozone?	• Participation of community and local authority, • Definite the priority of each • Find out the availability of local materials resource, • Communicate and find the budget from other agencies,	• Participation of community and local authority, • Supporting from institutional skilled department, • Find out the availability water resource, • Communicate and find the budget from other agencies,	• Participation of community and local authority, • Definite the priority of each sub-projects, • Find out the availability of local materials resource, • Communicate and find the budget from other agencies,	• Require the human resource, • Require the budget allocated
m.	Recommend the priority locations for project activities?	• Rehabilitation of existing irrigation system, • Construction of new pond, • Construct the new main canal from Kampong Trabek to Phum Kroch about 2-3Km	• Construct the main canal with proper water gate from Sne Resovior about 10Km to Phum Pgneam, • Form the WUG to use the water successfully and sustainably,	• Construct the main canal from Prek Punley about 2Km, • Construct the main canal from Spean Romlech about 4Km, can be used about 1,500ha,	• According to Programe of 5 year moving ahead of Commune/Sangkat
n.	Who should benefit from the project?	• Young children, old human, women are especially vulnerable, • Community and local authority	• Young children, old human, women are especially vulnerable, • Disability people and retired people	• Young children, old human, women are especially vulnerable, • Ethnic minority, especially Muslim people	• Need to participate with all parties, • Will be increased the living standard at remote areas, • Reduce immigration
o.	What further information is required for the design of a climate resilient project and suggest where this information can be found?	• Data information from community and local authority, • Data from Phum/Khum • Data records from institutional skilled department,	• Data information from community and local authority, • Data from Phum/Khum • Data records from institutional skilled department,	• Data information from community and local authority, • Data from Phum/Khum • Data records from institutional skilled department,	• Need to keep & record all necessary data information such as high flood water level, number of people are affected by natural disaster,

Section 4: Other comments

Other comments
The group B (Drought) have investigated the baseline data collection and assessment methodology in three villages (Phum Kroch, Phum Pgneam, Phum Chokchey) as mentioned above, we have found other comments which is related to drought situation as bellow: • There are problems face to the climate change because of long period of drought, • Insufficient water to use on the dry season. Therefore, need to rehabilitate and construct the irrigation system such as main and secondary canal, • Issue to training of technical agriculture to the famers that will adapt to the climate change, • Issue in advance information or early warning of all natural disaster to the famers, • Prepare in advance while unpredictable events appear, • "Drought" is a major disaster among others such as Flood, Storm, Lightning, etc.

1.3 BASELINE ASSESSMENT FOR GROUP 3: WIND STORM AND TEMPERATURE

Visited communes	Kansom Ork Commune, Kampong Travek District, Prey Vent Province Reorng Damrey commune, Ba Phnom District, Prey Vent Province Ba Borng commune, Peam Ror District, Prey Vent Province
Date	17 August 2016
Name of group members	1. Mr. Nuth Samphy, MRD – group leader 2. Mr. Chhao Buntheourn Environmental Department of Kampong Thom province 3. Mr. Ros Rithy, Water resource department of Prey Veng province 4. Mr. Nin Sinat Department of Rural Department of Pursat province 5. Mr. Kheng Sambat, Ministry of planning 6. Mr. Bun Leang Hak Ministry of Agriculture 7. Mr. Bak Bunna Ministry of water resource 8. Dr. Lay Chanthy, ICEM/MOE 9. Ms. Keo Srey Mouy, Ministy of Environment

Part I: General environmental information on Prey Veng Province

	Questions	Kansom Ak Commune, Kampong Travek District	Rung Damrei commune, Ba Phnom District	Ba Borng commune, Peam Ror District	Intergrated results
a.	What are the natural resources in the project area and in the surrounding watershed (upstream and downstream)? • Rivers and streams • Lakes and wetlands • Forests and natural grasslands	• Tieab Siam Lake(but shallow) • Kravean lake (but shallow) • Natural stream of 10km • Safe high land area of 7ha for using during flood. There is a big new constructed irrigation canal for commune.	• There are six high land areas in commune • Ksach Sor lake (big) • Flooded forest in lake • Fishing lot • Natural ponds (reservoirs)	• Ta Phrom and Ta Poang streams • Beoueng Sne and Ksach Sor lakes • Flooded forest • Ancient pond • Fishing lot • Safe high land	There are various natural water sources for each commune for irrigating in agriculture land, farming and providing various natural resources for livelihood of local people.
b.	What biodiversity do they contain in relation to economic cropping and farming systems (e.g., traditional varieties rice, etc.)?	• Rice crop (1 to 3 times per year depending on availability of water) • Fruit trees and vegetable	• Rice crop (1 to 3 times per year depending on availability of water) • Fruit trees and vegetable • Natural fish	• Rice crop (1 to 3 times per year depending on availability of water) • Fruit trees and vegetable • Natural fish	Natural surface water serve very important role in farming and livelihood of local people.

	Questions	Kansom Ak Commune, Kampong Travek District	Rung Damrei commune, Ba Phnom District	Ba Borng commune, Peam Ror District	Intergrated results
c.	What is their importance of these traditional species/crops and how are they used as regards to food security and livelihoods?	• Traditional rice seed: Krasang Teab, Banla Phdao, Tongchhouk, and Neang Nou rice seed. • These traditional seeds are shorter and shorter due to their long period crop, low yield, and don't adapt well to climate change.	• Traditional rice seed: Bonla Phdao, Tong Chhouk, Neang Nou, Beikratom, Koun Srov, and Neang Ory • These traditional seeds are shorter and shorter due to their long period crop, low yield, and don't adapt well to climate change.	• Traditional rice seed: Neang Ory, Neang Nou, Chulsa • Now these traditional seeds are absence • This commune grow only dry rice season such as IR and 504 •	• Traditional rice seeds are missing shortly due to their long crop period, climate change, low yield, and market factors.
d.	What are the major threats to these traditional resources in the area?	• Shortage of water in dry season • Climate change: change season • Strong wind (storm) make rice trunk fall down (no productive) • Dramatically drop in yield	• Shortage of water in dry season • Climate change: change season • Strong wind (storm) make rice trunk fall down (no productive) • Low yield • Market factors	• Shortage of water in dry season • Climate change: change season • Strong wind (storm) make rice trunk fall down (no productive) • Low yield •	Shortage of irrigating water, changing season, storm occurrence, and markets are the major issues of local people.
e.	What is the status and availability of climate and natural resource information that is relevant to Prey Veng province?	• Climate change information, climate events information usually received through TV and radio announced by MOWRAM. Local people also recognize climate threat to be occurred through local knowledge/local recognition.	• Climate change information, climate events information usually received through TV and radio announced by MOWRAM. Local people also recognize climate threat to be occurred through local knowledge/local recognition.	• Climate change information, climate events information usually received through TV and radio announced by MOWRAM. Local people also recognize climate threat to be occurred through local knowledge/local recognition. • People use private observation through Facebook.	People received climate information from national level through TV and radio. Local provision of climate information is limited. People getting information through information way such as through own observation.

Section 2: Wind storm and temperature prone areas – vulnerabilities and adaptation options

	Questions	Kansom Ork Commune, Kampong Travek District	Reorng Damrey commune, Ba Phnom District	Ba Borng commune, Peam Ror District	Intergrated results
a.	Past challenges the province and agriculture and water sectors has faced as regards to wind storms/temperature?	• Damage crop (make rice trunk fall down-no productive) • Damage houses (45 houses) • Loss life of people(1 people died, and 10 injure. • Hot/increase temperature cause people and animal sick	• Damage crop (make rice trunk fall down-no productive) • Damage house but not serious • Hot/increase temperature cause people and animal sick • Some ground wells are dried by hot temperature • Storm is not a serious natural event in commune	• Damage crop (make rice trunk fall down-no productive) • Damage house but not serious • Hot/increase temperature cause people and animal sick • Storm is not a serious natural event in commune	The impacts of storm and hot temperature on agricultural sector is getting worse.
b.	What are the current traditional and improved adaptation technologies that are being used by farmers to combat wind storms/temperature?	• Plant trees, bamboo tree. • Building safe cottage (thatch cottage) for escape from storm. • Run, stay in bathroom or toilet during storm come. • Dig pond to keep water during hot season. • Change crop from long period crop to shorter	• Plant trees and bamboo tree. • Run and stay in bathroom or toilet during storm. • Dig pond to keep water during hot season. • Change crop from long period crop to shorter	• Plant trees and bamboo tree. • Run and stay in bathroom or toilet during storm. • Dig pond to keep water during hot season. • Change crop from long period crop to shorter	Some local adaptations have been practicing by villagers. However these practices are still at household level and initiated by individual household.
c.	What other measures are needed to combat wind storms/temperature?	• To establish early warning system • Plant more trees to protect storm • Build a strong safe building that people can use during storms	• To establish early warning system • Plant more trees • Build strong safe building that people can use during storms • Reserve first aid and emergency equipment for rescue	• To establish early warning system • Plant more • Build a strong safe building that people can use during storms	

	Questions	Kansom Ork Commune, Kampong Travek District	Reorng Damrey commune, Ba Phnom District	Ba Borng commune, Peam Ror District	Intergrated results
d.	What do you consider to be the criteria that relate to the exposure of system to wind storms/temperature (e.g., duration, location, intensity, frequency, etc.)?	• Increasing of temperature • Surface water sources dried up fast • Crops do not grow up well • Number of damage houses by storm increased • Impact on people is more getting more worse • Intensity of storm is stronger and stronger			
e.	Can you list what you see as the criteria which related to the sensitivity of the system as affected by wind storms/ temperature, for example: • Agriculture and livelihoods (land tenure, markets and value chains, rural finance, etc.) • Water management & infrastructure (water management – WUG, groundwater, level of maintenance, protective systems specific sites, etc.) Natural systems (in location and watershed)	• Small house and weak structure • Does not have trees surrounding • Lack of drainage to release flood storm water from rice field • Some of existing crops is sensitive to climate change			
f.	How do wind storms impact on the overall productivity in the province/ location (score according to: low, medium, high, very high)?	• Impact of storm is strong • Impact of hot temperature is strong	• Impact of storm is medium • Impact of hot temperature is strong	• Impact of storm is medium • Impact of hot temperature is strong	
g.	What do you consider to be the adaptive capacity to deal with wind storms (e.g., technical & institutional factors, social factors, natural systems, etc.)?	• Rehabilitate canals • Plant trees • Change crop from long season crop to shorter period • Establish mechanism of early warning system • Educate, training, and disseminate adaptation responses to climate change			

	Questions	Kansom Ork Commune, Kampong Travek District	Reorng Damrey commune, Ba Phnom District	Ba Borng commune, Peam Ror District	Intergrated results
h.	What are the potential adaptation technologies to deal with wind storm/temperature?	• Establish mechanism to provide information and early warning system • Clean up the environment. Solid waste and plastic wastes may cause serious negative impact on environment and soil quality. • It can be recommended by Involved institutions for adaptation technologies.			

Section 3: Project design proposal for Prey Veng Province

	Questions	Kansom Ork Commune, Kampong Travek District	Reorng Damrey commune, Ba Phnom District	Ba Borng commune, Peam Ror District	Intergrated results
a.	Constraints and opportunities to be taken into account in designing the project?	• Lack of information • Existing mechanisms are weak • Lack of skill and technology • Lack of investment capital • Lack of infrastructure			
b.	Recommendations for project design – identify the major outputs and activities required for a project which addresses both climate resilience and irrigated agriculture in the Delta ecozone?	• Plant more trees • Increase education and information dissemination • Increase preparedness • Strengthening capacity • Mainstream climate change budget at sub-national			
c.	Recommend the priority locations for project activities?	All areas in commune			
d.	Who should benefit from the project?	All people in commune			
e.	What further information is required for the design of a climate resilient project and suggest where this information can be found?	Additional information from commune can be obtained from local authority, commune database, development plan, …report of disaster of commune.			

Section 4: Other comments

Other comments		
	• Increase use of biogas – mitigate air pollution emission • Availability of health centre nearby house is good • Provide baby tree of planting	

Reflection on organization of field visit and group discussion:

1. Questionnaire: Some questions are difficult to understand difficult to ask the right question

2. Timeframe ⁝ this is big work, it is not proportional to allocate timeframe

3. Organization of group discussion: group of facilitators, number women is small, lack of member from commune councils, group of people met were not right people to answers this respective storm group.

APPENDIX 4. PARTICIPANTS' FEEDBACK AND TA TEAM'S RESPONSES

On 1 September 2016, ADB forwarded feedback from workshop's participants to the TA8179 team. The feedback and ICEM's responses are provided in a table below.

Participants' comment	ICEM's response
1. Informal feedback from government participants on the value of Prey Veng visit, and Utility of such visits in their daily work	
1.1. Participants noted that it is useful to have a training that links with field practices. Some of the participants have previously been or currently involved in this kind of work, while others are not. Some participants mentioned that they will participate in field work if the invitation is given to them specifying what is expected of them in the field visit.	All participants attended the field exercise. The introduction to the exercise (delivered on the first day) provided the participants with guidance on objectives, expectations, methodology, locations and targeted participants of the field exercise.
1.2. Participants feel that they learned something from the training and field practice. However, they are not confident to carry out the tasks alone without support from the consulting team.	The objective of the workshop was to introduce the baseline data collection and assessment for vulnerability assessment, as part of feasibility studies. Following the training, each TA sector specialist will prepare methodology for feasibility studies in collaboration with relevant SPCR ministries. This will give the participants additional guidance on how to carry out the tasks.
1.3. Given their roles in the departments, they are busy in the office with routine work and don't have enough time to stay longer in the field to do data collection. Some participants do not see direct relevance of the field visit to their work.	The participants invited to this workshop were technical staff and AWG members who were officially assigned to SPCR. Among those invited, only one AWG from MOWRAM is a high-ranking official, who rarely attends TA8179 workshops.
2. Experiences and lessons learned from similar field visits organized by other development partners	
2.1. IFAD-supported projects (RULIP, PADEE and ASPIRE); UNDP-supported projects (CCCA, NAPA FU, SNC Scale-Up, SGP/CCBAP) and USAID-supported HARVEST project also conducted several field visits to familiarize the government staff on baseline collection, vulnerability assessment, etc. The HARVEST project recruited a firm to work directly with farmers, and the government staff were taken to meet the farmers once in a while.	Your update on related activities held by other donors is appreciated. Our work seeks to complement these activities, as it is unlikely that all of relevant government officials in SPCR ministries attended the workshops that you have mentioned.
2.2. For some systematic studies, IFAD and UNDP hired firms to carry out the jobs such as the conducting baseline, mid-term and end-line surveys, the project impact assessment and Agriculture and Water Data collection, etc. For IFAD, UNDP and UNCDF, in addition to training provided at national level or in the provinces, cross learning visits to other countries such as to Thailand, Vietnam, Laos, Philippines, Indonesia, Japan, etc. have been also organized. This kind of approach is a bit costly, but it	Cross-learning visits to other countries for government officials is something that the TA team has not considered. We will give this idea some thought.

Participants' comment	ICEM's response
provides the best fora for interacting, seeing and learning from the others.	
2.3. Our training workshop focuses on capacity building in project formulation. It may be useful to check ADAPT-ASIA's approach.	Thank you - we will check these materials for relevance.
3. Relative effectiveness of other approaches and options to get the same result of effective understanding of vulnerability and adaptation assessment	
3.1. Some participants suggested to conduct TOT for selected ministries and training manuals with potential VA tools should be developed and introduced. Doing so, could reduce the training cost organized by the experts.	As mentioned above, following the training, each TA sector specialist will prepare methodology for feasibility studies in collaboration with relevant SPCR ministries. This will give the participants additional guidance on how to carry out the tasks.
3.2. An effective approach to understand the vulnerability and adaptation capacity of local communities is through local NGOs who are operating in the community as they live and learn from the local people. The other option is to send the TA team with few national and provincial staff to go to the communes to do the assessment. This is much cheaper and more effective.	The TA team, assisted by selected national and provincial staff, will visit project sites as part of vulnerability assessments for feasibility studies. The sector specialists will further develop the methodology for data collection, and small group of AWG and sector TA member will conduct the field work.
4. Observation notes from the training workshop 16-18 August	
4.1. There were 42 people (including training facilitators) participated in the training workshop.	Noted with thanks.
4.2. The training was not able to introduce risk screening tools for the 6 project concept notes which initially was the intention.	The training focused on baseline assessment of feasibility studies; we did not intend to apply the risk screening tool. The tool was already applied to evaluate the six concept notes in April 2016.
4.3. In general, the design of the training is good. The training introduced the outlines and contents of the project feasibility study report that needs detail information, the training discussed how CC related information are collected for the project design. The training was able to introduce four participatory tools such as trend analysis, hazard mapping, seasonal calendar and problem/solutions matrix...to enable participants to test them in the fields. However, these were not used, instead the trainees were advised to use questionnaires.	This is not correct. The questionnaire was used as guidance for participants to carry out the baseline assessment, and these tools supported the field exercise.
4.4. Facilitators of the focus group discussion sometime don't understand the questionnaires, they found some translation problems,	Yes, this was due to a poor translation of the questionnaire by the outgoing agriculture specialist. However, other TA team members provided assistance during the field exercise to simplify the Khmer terms.
4.5. The flow of questionnaires and similar questions need to be reviewed and revised. It needs to be pre-tested among trainees before using them with the local communities.	The comments are appreciated. The workshop was designed to test our methodology for feasibility studies, and the questionnaires will be revised according to the feedback.
4.6. Participants preferred a conversation/dialogue style instead of asking so many questions.	Yes, we will encourage our TA team to apply a more "facilitating" style in future workshops.

Participants' comment	ICEM's response
4.7. Participants felt that time for discussion should be limited to 1.5-2 hours, as spending too much time with villagers will discourage their participation and affect the quality of the assessment results.	Yes, we will reduce time for discussion with villagers for the next workshop.
4.8. The facilitators should properly manage the time, time management is critical, it is observed that FGD spent longer time for general questions.	This is largely dependent upon the topics of our interest for discussion, and location.
4.9. Participatory tools are perceived to be time consuming, the facilitators decided to facilitate FGD using the questionnaires. Some participants felt that that participatory tools would better empower community and encourage people participation.	The questionnaire was used in combination with general discussions in order to speed up the process.
4.10. It was suggested that more coaching and opportunity should be given to the provincial staff to undertake the assessment in their respective provinces.	As mentioned above, selected provincial staff will have the opportunity time to join the TA team during the feasibility study field work.
4.11. NCDDS colleagues suggested that we should consider the existing VRA methodology and tools that are being used by NCDDS, UNDP projects, CCCA and NGOs, rather than bringing new approaches.	There are dozens of VRA methodologies being used in Cambodia by different groups. We prefer to take the AWG through a relative simple set of steps and tools that is common to all/most methods, as there is little use in confusing everyone with many different approaches at this still early stage. We can expand out later (if needed) by showing the approach of other organisations, but this is best done on a foundation of knowledge and confidence on the basics.

APPENDIX 5. WORKSHOP PRESENTATIONS

Strategic Program for Climate Resilience

Mainstreaming Climate Resilience into Development Planning (TA 8179)

(September 2013-April 2019)

Baseline Assessment for Climate Resilient Feasibility Studies in Agriculture and Water Management

Introduction to the training

Name of Presenter: Peter-John Meynell
Position of Presenter: Team Leader, Water and Climate Change Specialist
Organization / Ministry: ICEM
Date: 16 August 2016

Code: SW/MCRDP/DOC

Key features about this SPCR TA

- Capacity building in climate change vulnerability and adaptation processes in water sector, agriculture sector, roads and urban infrastructure
- Preparation of 6 feasibility studies for adaptation projects in 5 ministries
- Leading to 2 project proposals to Green Climate Fund
- **This training contributes to all of these features**

Training objectives

- Using the feasibility studies for agriculture and water resources as examples to start developing baseline information
- Use the process for developing vulnerability and adaptation planning in the context of the agriculture and water sector project in Prey Veng
- Build capacity at local and national levels to undertake baseline assessments and data collection for adaptation project design
- Provide hands-on experience in the field for assessing local vulnerabilities to climate threats

At the end of the training you should:

- Be familiar with the climate change issues that agriculture and water sector projects will have to address,
- Be able to identify the information that will be needed to carry out detailed vulnerability assessments, and how to source this information,
- Be aware of how this step fits into the overall climate change adaptation project feasibility study and design.

What does a good climate adaptation project need?

- These are **not** the usual development projects
- In order to be successfully funded, they need to show:
  1. Detailed vulnerability assessments of the people, infrastructure and resources that the project is aimed at assisting
  2. Potential vulnerability of the proposed components of the project – how can they be made more climate resilient
  3. Appropriate adaptation measures that address these vulnerabilities
  4. Cost-benefit comparisons with a more conventional project without adaptation built into it.
- In this workshop we will be working towards 1 and 2
- We will begin to get ideas for 3
- We will leave 4 for later.

Day 1 morning - Opening

Day 1 – 16 August 2016 [Tuesday]		
Session 1: Opening and introduction – the overall project and feasibility studies		
7:40 - 8:00	Registration	PMU Staff
8:00 - 8:25	Welcome Speech	Provincial Governor
8:25 - 8:40	Opening Speech	HE Prof Dr Sabo Ojano, Secretary of State, MOE, and SPCR Program Coordinator
8:40 - 9:00	Introduction to the training	Dr Peter-John Meynell
9:00 - 9:20	The structure and approach to feasibility studies – what the donors and funds require	Dr Lay Chanthy
9:20 - 9:40	An overview of the six project concepts under consideration by SPCR/MCRDP and collaborating ministries	Dr Seak Sophat

The Prey Veng Context

Session 2: Prey Veng agriculture sector and adaptation project concept		
9:40 - 10:10	Detailed presentation of the Prey Veng agriculture project concept – Climate Resilient Water Management for Agriculture Production Project (CRWMAPP)	MAFF AWG member (assisted by Dr Mak Sithirith and Dr Ian Hancock)
10:10 – 10:30	Coffee break	
10:30 - 11:15	Agriculture sector in Prey Veng Province – status and trends as impacted by climate change, with the emphasis on floods, drought and other extreme weather events (storms)	Prey Veng Provincial Agriculture Department representative
Session 3: Socio-economic and environmental profile of the province		
11:15 - 12:00	Socio-economic and cultural contexts as impacted by climate change of the Prey Veng Province – including traditional responses to extreme events (flood, drought, and storms)	Prey Veng Provincial Planning Department representative/ Prey Veng Provincial Agriculture Department representative

The Prey Veng context and exposure to climate threats

13:30 – 14:00	Water availability and management (surface and groundwater; water resource infrastructure) in Prey Veng Province – current situation, challenges and opportunities in dealing with extreme events (flood, drought, and storms)	Prey Veng Provincial Water Resource and Meteorology Department representative
14:00 - 14:30	Projected climate change in Prey Veng and the watershed – implications for development	Dr Peter-John Meynell
14:30 – 15:00	Plenary discussion	Facilitated by Dr Peter-John Meynell/Dr Seak Sophat
15:00 – 15:20	Coffee break	
15:20 - 16:30	Introduction to field exercise on baseline data collection and assessment required for the climate vulnerability assessment and adaptation planning. Participants divided into three groups (focus on the following climate threats: flood, drought and storms).	Dr Mak Sithirith Dr Ian Hancock
	Welcome dinner	

Day 2 – Field trip – talking to farmers

Day 2 – 17 August 2016 [Wednesday]		
Sessions 4: Data requirements for the feasibility study baseline assessment – field exercise		
08:00 – 17:00	Field trip – three groups (flood, drought and storm) are provided with the SPCR Baseline Assessment: Field Survey Template – and during the program they will consult with (i) local farmers and farmer groups, (ii) district government representatives, (iii) with other service providers and stakeholders (NGOs, private & others), and (iv) discuss amongst themselves in completing the Template. Survey locations in three Prey Veng districts: Pream Ro, Ba Phnom, and Kampong Trabek districts	Dr Mak Sithirith Dr Ian Hancock Dr Seak Sophat Dr Peter-John Meynell (Support from MAFF and MOWRAM AWG's)

Day 3 – Group discussions

Sessions 5: Data requirements for the feasibility study baseline assessment – group work		
8:00 - 10:00	Group work to complete the baseline assessment template	Facilitators – MRCDP team and MOWRAM/MAFF AWG members
10:00 – 10:20	Coffee break	
10:20 -12:30	Three groups report back – plenary session (approx. 45 minutes each group allowing time for presentation and discussion)	Dr Mak Sithirith Dr Ian Hancock Dr Seak Sophat Dr Peter-John Meynell
12:30 -13:30	Lunch break	

Considering information needs for 2 other project concepts

Session 6: Other project concepts and their data requirements		
13:30 – 14:00	Detailed presentation of the Kampong Thom agriculture project concept – Climate Resilient Horticulture Development Project (CRHDP)	Mr. Sok Chea, MAFF AWG member (Assisted by Dr Mak Sithirith and Dr Ian Hancock)
14:00 – 14:30	Detailed presentation of the water management project concept in Battambang – Rehabilitation and Development of the Damnak Cheukrom Irrigation System Phase II	Mr. Bak Bunna, MOWRAM AWG member (Assisted by Dr Seak Sophat and Dr Peter-John Meynell)
14:30 – 15: 15	Group discussion (divided in two groups according to two concept notes above) - What have they learned from above exercises on data requirements for climate resilient project design?	Facilitators – MRCDP team and MOWRAM/MAFF AWG members
15:15 -15:35	Coffee break	
15:35 – 16:05	Group presentation and discussion	Facilitators – MOWRAM/ MAFF AWG members
16:05 - 16:30	Workshop summary and next steps	Dr Ian Hancock Dr Peter-John Meynell
16:30 -17:00	Workshop close	MOE representative

Strategic Program for Climate Resilience

Mainstreaming Climate Resilience into Development Planning (TA 8179)

(September 2013-April 2019)

Advanced VA&AP Training Workshop (1) Baseline Data Collection

PROJECT CONCEPT NOTE – PREY VENG

Name of Presenter: Mak Sithirith and Ian Hancock
Position of Presenter: Agriculture and Climate Change Specialists
Organization / Ministry: ICEM
Date: 16 August 2016

Code: SW/MCRDP/DOC

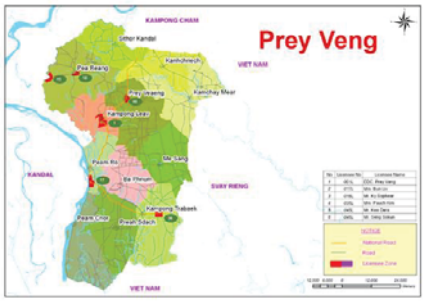
Project Title: Climate Resilient Water Management for Agriculture Production Project (CRWMAPP)

Name of sector: Agriculture and Water Resources	
Executing Agency	MAFF
Implementing Partners	MAFF, MoWRAM, Provincial Government, Service providers (FAO, SNV, NGOs and private sector, etc.)
Project Duration/ Period	5 years/2018-2022
Location	Prey Veng Province, Cambodia Delta ecozone
AWG members and TA 8179 team member	MAFF Team: 1. Ms. Meas Sotheavy, 2. Mr. Chea Sakhorn 3. Mr. Am Phirum 4. Mr. Stong Kia 5. Mr. Leang Bunhak 6. Mr. Sok Chea TA 8179: 1. Dr. Mak Sithirith 2. Dr. Ian Hancock

Project Title: Climate Resilient Water Management for Agriculture Production Project (CRWMAPP)

Keywords	Crops, Land and water management, Micro-irrigation, Groundwater, Climate resilience, Adaptation, Marketing, Rural finance, Water User Groups
Sub-sectors	Crops, Land Management, Water Management, Agribusiness

Project location



Project background - introduction

- To address climate change issues in the Delta ecozone which is characterised by a shortage of water in the dry season, flooding in the wet season and low agricultural productivity – proper management of water is of paramount importance.
- Climate resilient water management for agriculture and livelihoods is key to the future of agriculture and improving adaption to climate in this part of Cambodia.
- This is strategy to address climate change which is taking place in Prey Veng Province in the Delta ecozone, while also continuing to improve the agricultural productivity (mainly of the cropping systems), rural livelihoods and food security.
- Climate smart agriculture adaptation techniques also to be used.
- Project design is based on the lessons learnt by the IFAD Project for Agriculture Development and Economic Empowerment (PADEE) which is ongoing and located in the Delta region of Cambodia.

Project background – problems being addressed

- Prey Veng Province is one of many provinces in Cambodia that experiences heavy floods in the wet seasons, followed by severe drought in the dry season, all made worse by climate change.
- As an agrarian province, these climate extremes and variations in water level have made agriculture for many farmers, vulnerable and more erratic, and where crop productivity especially the staple rice is low; affecting the livelihoods of farmers and their incomes.
- The excessive water in the **wet season** has caused serious flooding, damaging crops and rice field infrastructure, resulting in low yield and crop failure.
- In the **dry season** the reverse is true, where drought and little available water have impacted on the farmers in the province who are unable to grow a second crop, leading to many farmers migrating for other employment possibilities.
- Irrigation schemes are characterised by lack of proper on-farm water management systems and ineffective water user groups.
- If situation continues in the future, it will have a detrimental effect on the livelihoods for farming communities living in the Delta ecozone

Project background – problems being addressed (continued)

- As farming is uncertain and yields of crops especially rice is low
- Farming cannot now support the typical households of five members,
  - many household members migrate for other employment particularly young and active
  - leaving behind the very young and old members of community
  - placing agriculture livelihoods at risk.
- Effect of climate change has been to change farming practices among farmers, from rice transplanting to broadcasting the seed, a practice which many farmers are unfamiliar with – hence farmers need to learn how to adapt to new practices.
- Lack of labour due to out-migration, many farmers change the farming practice from the use of long term rice varieties to short term rice varieties, where the lack of knowledge of these new practices is a hindrance. Also famers are now changing from one long term crop a year to two short duration crops where they need more water particularly in the dry season, hence better water/crop management becomes important.
- Many farmers digging wells to access groundwater to solve problem of water shortages, especially for dry season cropping. Improved strategies to address water shortages by individual farming households is one way of addressing the water shortage, but there is a lack of a cohesive approach to address the water shortage collectively among these households.
- Current water management approach to manage the excessive water in the wet season and droughts in dry season not been effective as based on large-scale irrigation development approaches/top-down government management

Project background - significance

- This project is significant for Prey Veng, given its vulnerability to floods and drought which is being exacerbated by climate change.
- The project contributes to addressing these issues through promoting water management which could reduce these impacts, and build agriculture resilient climate change through these innovative adaptation technologies focusing on improved crop and water management.
- Overall, it contributes to the current efforts of Royal Government of Cambodia (RGC) in improving agricultural productivity as stated in the Rectangular Strategies Phase 4.
- Project will work with MAFF as stage agency at the national level and collaborate with the Provincial Department of Agriculture and Provincial Department of Water Resources to boost agriculture production through improving water management for agriculture.
- Improved water management is key to increase the agricultural productivity for farmers in Prey Veng and address the increasing problem of climate change, an issue which is paramount in RGC's policies for environmental management and climate resilience.

Project background - beneficiaries

- This project will work with smallholder farmers in 3 selected districts in Prey Veng Province, namely: Baphnom, Peam Ro, and Kampong Trabek.
- These farmers have been working using water management for many years, and the project will reinforce the current traditional practices of water management and provide new inputs to improve water use that benefit agriculture sector and farmers.
- Women will be benefiting from this project as they play central role in agriculture, more especially rice cultivation. Through improved water management for crop production, women will have more time for other activities including other income generating activities and the cultivation of vegetable crops which will contribute to an improved diet for the household.

Project description

- **Project goal:** The goals of agriculture and water resource management in the Delta ecozone of Cambodia and project are: to improve food availability and livelihoods, through improved water and crop management, in order to improve resilience to climate change, while strengthen the overall capacity of the public and private sectors and civil society to address food security and improved rural incomes.
- **Outcomes:**
  1. Climate resilient water and crop management for agriculture and livelihoods developed suitable for small farmers and scaled up to other regions for improving agriculture
  2. Access to financial services for agriculture improved for farmers in the project areas
  3. Market for farmers developed and organized

Project description (continued)

- **Objectives:** The 4 objectives are:
  1. Increasing agricultural productivity and diversified sources of income for poor farmers in rural areas in Prey Veng province.
  2. Improved water management and water supply to farmers.
  3. Promote the provision of financial services.
  4. Promote the provision of technical services and marketing.
- **Outputs:** The project has 4 main components:
  1. Organize farmers to engage in climate resilient water management and agricultural production
  2. Capacity building for farmers and strengthening their capacity in water management and the agricultural sector through improved training and capacity building for farmers
  3. Promote the provision of technical services and improved technology delivery for crop and water management
  4. Promote improved financial services and market access
- A Design and Monitoring Framework (DMF) needs to be prepared highlighting in more detail indicators and sources of information for M&E.

Project description (continued)

- **Risks and assumptions:**
  - a) **Access to technology** - access to the appropriate technology for these farmers engaged in improved irrigated agriculture will be important, coupled with training in application, also adaptation technologies water use and diversified cropping systems
  - b) **Prices (particularly food and energy)** - the price of electricity, e.g. for pumping, storage and processing is very high in Cambodia, and may contribute to increasing impact, if electricity shortages or prices limit use
  - c) **Land ownership issues** - landownership and tenure can be a significant issue for farmers and the investments they are prepared to make, especially if tenure is insecure;
  - d) **Migration** – where out-migration is key concern in the project area where many youths migrate to urban areas for employment, leaving agricultural sector, this has led to the shortage of labour in rural communities, where mainly old people and children are left behind in the communities
  - e) **Input supply and markets** – high cost for agricultural production constrains farmers to produce for markets, with unfair influx of agricultural products from neighbouring countries contributing to low competitiveness of agricultural products by Cambodian farmers, with net effect of farming become a key concern in the future, & many farmers give up farming
  - f) **Climate change** – continued deterioration of climate in Delta especially worsening floods and increasing droughts need appropriate climate resilient adaptations to be put in place to try to stabilise the situation

Methodology

- **Approach:**
  - Project will involve number of agencies including MAFF (lead agency), MOWRAM, Provincial Government, other donor agencies, NGOs and private sector entities.
  - The project will be coordinated by the Project Steering Committee, with representatives from different ministries.
  - Project to provide support to farming community through:
    - Crop management and improved cropping systems
    - Improved water management, both surface and groundwater
    - Market development
    - Public Private Partnerships

Methodology (continued)

- **Activities:** Range of adaptation technologies sourced from the MCRDP Agriculture Technology Resource Toolkit (ICEM, 2016) will be implemented in carefully planned and synchronized process so that the **synergies and benefits** of these interventions are maximized.
- **Range of activities** to be included in the project:
  1. **Farmer group formation:** with proper budget management, improving financial planning and forming farmers into Water User Groups (WUG).
     a) Aspects include establishing farmers revolving fund systems, organizing farmer groups consisting of around 50 farm households and selection of 7 members as a WUG Committee to monitor and manage the group.
  2. **Technical training for farmers**: for agriculture, water management, savings, and marketing of agricultural products. The alternative crops with the drought tolerant crops (e.g., watermelon as a possibility). The watermelon growers, farming, Livestock and fish raisers, Watermelon growers and rice farmers, and project provides funds to support farmers after training.
  3. **Alternative agricultural and crop production systems:** including, alternative crops, diversification and changes to cropping during the two main growing seasons. Other systems such as animal and poultry raising.
  4. **Introduction of improved integrated water management and delivery systems:** including: drip Irrigation, groundwater dugs and tube wells, and storage tanks and sumps for storing water for pumped groundwater.
  5. **Facilitate agricultural markets:** organize and set up market for farmers, and improved value chain will be included especially for newly introduced alternative crops.
  6. **Build partnerships:** done with the private sector and cooperation with other organizations for service delivery, input supply, post-harvest operations and marketing.

Methodology (continued)

- **Feasibility:** At this stage without careful analysis of the various actions and cost implications of the various interventions required, hence difficult at this stage to determine the feasibility of the proposed project – further work is required to fine tune the project design.
- **Adaptation to climate change:** The project will introduce project beneficiaries and stakeholders to the following:
  a) Seasonal variation and crop diversity that could grow in different seasons in the different context of water availability.
  b) Introducing climate resilient water management practices and technique that is practical and low cost for small farmer such as drip irrigation, pond management etc.
  c) Farming techniques and practices that suitable to local farming conditions that will ameliorate the impact of climate change while improving livelihoods.

Budget and timeline

- Total cost
  - Outline budget estimate USD 25 million
- Timeline
  - 5-year project period 2018-2022
  - Inception phase – 18 months
  - Main implementation phase – 36 months

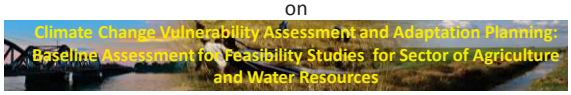
Data needs for feasibility study

- Project design requirements
  - Design and monitoring framework
  - Risks and assumptions
- Farming and livelihood systems
  - Cropping and farming systems
  - Value chains and private sector development
- Irrigation and water management
  - Surface and groundwater
  - Crop water management
  - Community based water management
- Socio-economic information
  - Social and gender
  - Land tenure
  - Financial and economic
- Institutional structures
  - Government
  - Private sector
- Agro-ecology and environmental
  - Natural resource base (agroecology, climate, soils, etc.)
  - Vulnerability assessment
  - Improved and traditional adaptation (adaptation planning)

Thank you

Strategic Program for Climate Resilience (SPCR)
Technical Assistance 8179: Mainstreaming Climate Resilience into Development Planning (MCRDP)

Training-Workshop
on



Approaches for Feasibility Study of Adaptation Project

Presenter's Name: Lay Chanthy
Position: National Adaptation Specialist
Ministry/Institution: ICEM
Date: 16th August 2016

Feasibility Studies

- SPCR TA8179, package 1's output 2: Detail feasibility studies of adaptation projects
- The ultimate product of output 2 is to develop at least 2 climate adaptation project proposals and submit to global climate fund for funding
- The target funding source is Green Climate Fund (GCF)

Process of feasibility studies

Process	Status
Project identification and periodization	Done
Preparation for feasibility studies	In progress
Conducting field feasibility studies	Sep 16
Preparation of reports of feasibility studies	Jul 17
Preparation of proposals	Mar 18
Submission of proposals to global climate fund	Apr 18

Prioritized adaptation projects

Key Ministry	Potential Projects for conducting feasibility studies	Province
MRD	1. Climate Resilience of Rural Road and Small-scale Irrigation Reservoir Improvement Project in Western Region of Tboung Khmum Province	Tboung Khmum
MOWRAM	2. Climate resilient irrigation development: expansion of Damnak Chheukrom canal system for flood and drought management and improving local livelihoods	Battambang
MAFF	3. Climate resilient water management for agriculture and livelihoods project (CRWMALP) 4. Climate resilient commercial horticulture development project (CRCHDP)	Prey Veng Kampong Thom
MPWT	5. Enhance Resilience of Rural Infrastructure and Community Livelihoods in Kampong Leng District, Kampong Chhnang Province	Kampong Chhnang
MOE	6. Urban Climate Resilience and Adaptation through improvement of Kampong Seima Canal System and its components-Battambang Province	Battambang

Approaches for conducting feasibility study

Baseline assessment

- ❖ Conducting more detail desk review
- ❖ Conducting field baseline assessment
  1. Climate change profiles
  2. Climate threat analysis (past and future projected)
  3. Socio-economic baseline assessment
  4. Environmental baseline assessment

Approaches for conducting feasibility study

Vulnerability assessment and adaptation planning

- Identify project elements and major climate threats
- Conduct baseline data collection
- Assess impact of threats, adaptive capacity, and vulnerability
- Identify adaptation options (adaptation measures,.)
- Identify adaptation planning

Approaches for conducting feasibility study

Social and environment analysis

- Land availabilities
- Land issues and their impact
- Social and cultural context analysis
- Community engagement analysis
- Initial social impact assessment
- Initial environmental impact assessment

Approaches for conducting feasibility study

Drafting design infrastructure for construction

- Drafting infrastructure design for construction
- Identify adaptation measures and technologies need and integrate them in design
- Identifying and evaluating for construction materials (local materials)

Approaches for conducting feasibility study

Capacity assessment

- Community knowledge and skills of communities and key stakeholders
- Existing mechanisms respond to climate change and disaster (disaster management committee, water user group, maintenance group, ..)
- Assessing skills and human resources
- Draw conclusion for the need of capacity building

Approaches for conducting feasibility study

Conducting the economic cost benefit analysis of the project

- Cost analysis of project
- Benefit analysis of project
- Rate of return of project
- Identify different cost scenarios of alternative adaptation measures
- Estimate project cost

Feasibility study report

- Context and location of project
- Background and description of project
- Description of past climate extremes
- Socio-economic and cultural context
- Vulnerability assessment and adaptation planning
- Preliminary infrastructure designs
- Identify and evaluate construction materials and sources
- Community engagement
- Sustainability of proposed interventions
- Description of anticipated social and environmental impacts
- Financial and Economic Analysis
- Staffing and capacity building requirements
- Monitoring and evaluation recommendations.
- Conclusions and Recommendations

Feasibility study onward

Process onward
Preparation for feasibility studies
Conducting field feasibility studies
Preparation of reports of feasibility studies
Preparation of proposals
Submission of proposals to global climate fund

Strategic Program for Climate Resilience (SPCR)
Technical Assistance 8179: Mainstreaming Climate Resilience into Development Planning (MCRDP)

Training-Workshop
on

Climate Change Vulnerability Assessment and Adaptation Planning: Baseline Assessment for Feasibility Studies for Sector of Agriculture and Water Resources

Fund requirements

Presenter's Name: Lay Chanthy
Position: National Adaptation Specialist
Ministry/Institution: ICEM/MOE
Date: 16-18th August 2016

Requirements of funding

- Expected source of funding: Green Climate Fund
- Feasibility study adaptation projects of SPCR is so fit to this fun
- Funding offer through a very competitive scheme
- For getting funding, project has to meet the requirement of fund.

TA-8179 MCRDP

Requirement of funding

- Project is not just being a conventional development project (intervention to meet the need of present)
- It is a clear climate proof, climate adaptation/resilient project
- It is a climate change responded project with long term development vision under climate change context at present and future.

TA-8179 MCRDP

Requirement of funding

A clear climate change responded project:

- It is located in area of high vulnerable to climate threats
- It is responded to high climate vulnerability in area
- It is directly addressed/responded climate change issues in area in target sectors and possible other sectors
- It is clearly shown climate adaptation and resilient measures or technologies.

TA-8179 MCRDP

Requirements of funding

No.	Criteria
1.	**Increase resilience and enhance livelihoods of the most vulnerable people and communities**
1.1	Quality of live benefits for vulnerable groups
1.2	Enhancement of climate resilience of vulnerable groups
1.3	Involves local communities in design, construction and management of adaptation measures
2.	**Increase resilience of infrastructure and the built environment to climate change threats**
2.1	Effective response to climate change threat in infrastructure design and maintenance
2.2	Opportunity for integrated approaches with other sectors
3.	**Improve resilience of ecosystems and sustainability of ecosystem services**
3.1	Adaptation measures rehabilitate and enhance ecosystems
3.2	Project uses green/bioengineering and ecosystems based adaptation measures

TA-8179 MCRDP

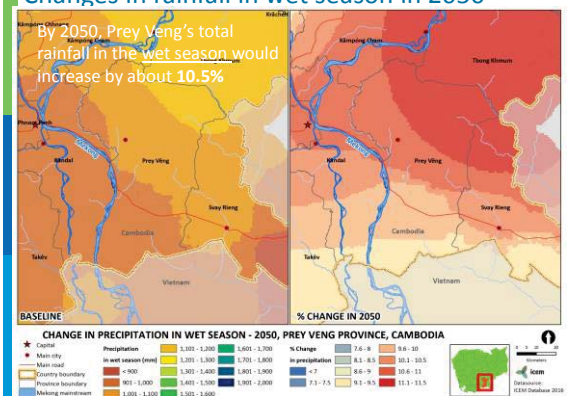
Thank You

Projected changes to average rainfall & average maximum temperatures in 2050

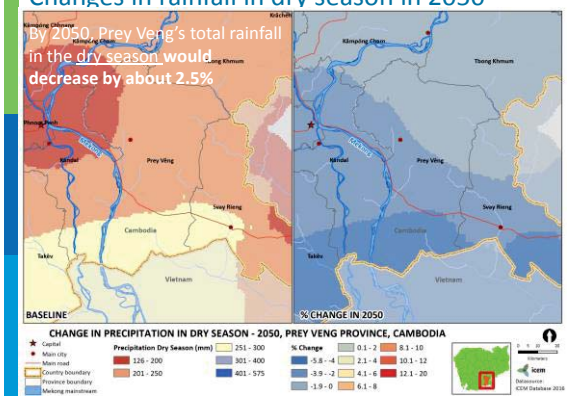
Climate change parameter	Baseline	With C.C.	Change
Average annual rainfall	1261 mm	1365 mm	+8.2%
Total rainfall in wet season	1037 mm	1147 mm	+10.5 %
Total rainfall in dry season (Mar- Aug)	224 mm	218 mm	-2.5 %
Ave daily max temp (annual)	31.2 °C	33.7 °C	+2.5 °C
Ave max temp in wet season	30.8 °C	33.5 °C	+2.7 °C
Ave max temp in dry season	31.7 °C	33.9 °C	+2.2 °C

TA-8179 MCRDP

Changes in rainfall in wet season in 2050



Changes in rainfall in dry season in 2050



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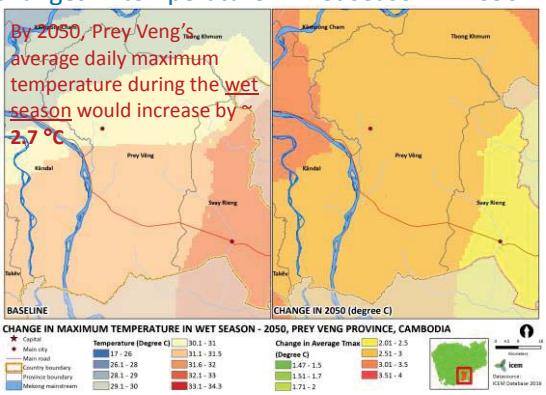
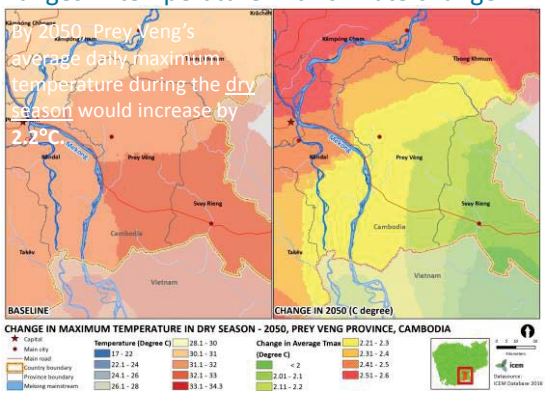
Changes in temperature in wet season in 2050

By 2050, Prey Veng's average daily maximum temperature during the wet season would increase by ~ 2.7 °C



Changes in temperature with climate change

By 2050, Prey Veng's average daily maximum temperature during the dry season would increase by 2.2°C



Summary of expected climate changes in 2050

- Prey Veng is likely to be:
  - Significantly hotter and wetter in the wet season
  - Significantly hotter and slightly **dryer** in the dry season

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Potential impacts of expected climate changes in 2050

Significantly hotter and wetter in the wet season

- Increased severity of pluvial flooding (where flooding already occurs)
- Potentially new areas of pluvial flooding
- Increased flows of the Mekong River
- Floods would be deeper and longer
- Heat-related stresses
  - increase pace of infrastructure degradation
  - crop failure and livestock losses
  - potential health problems

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Potential impacts of expected climate changes in 2050

Significantly hotter and slightly dryer in the dry season

- Heat-related stress – infrastructure, agriculture, health
- Higher evaporation, lower rainfall – increased incidence and duration of drought
- Water stress for agriculture & domestic use

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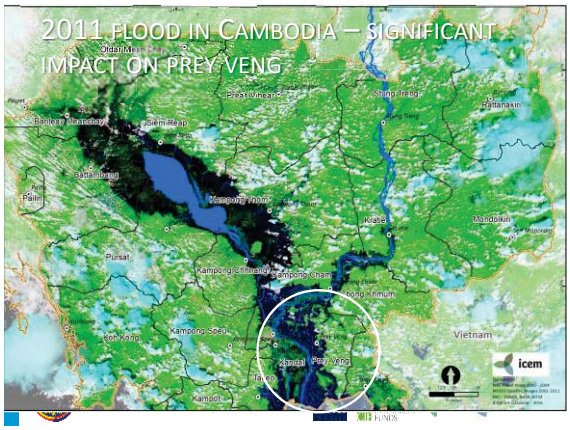
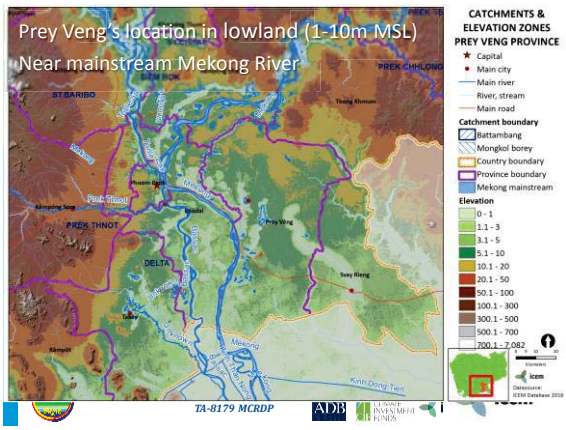
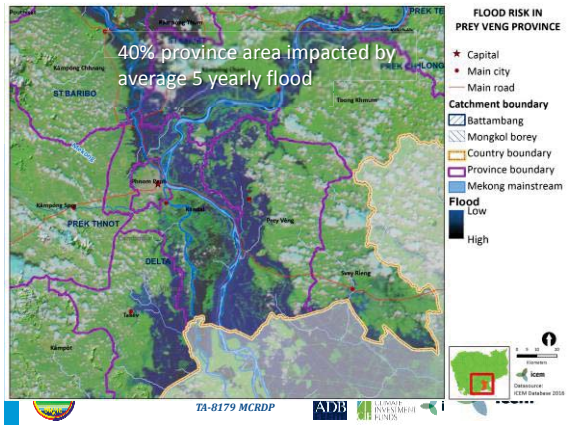
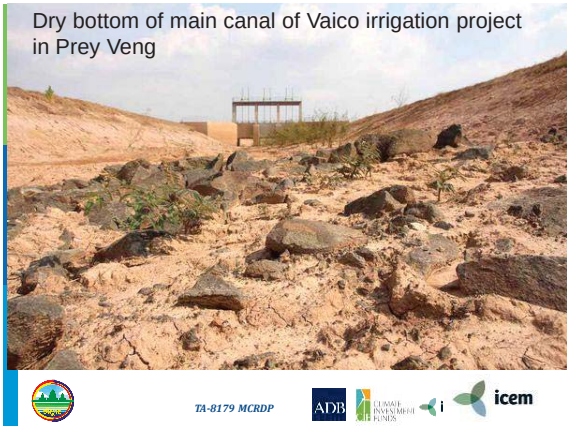
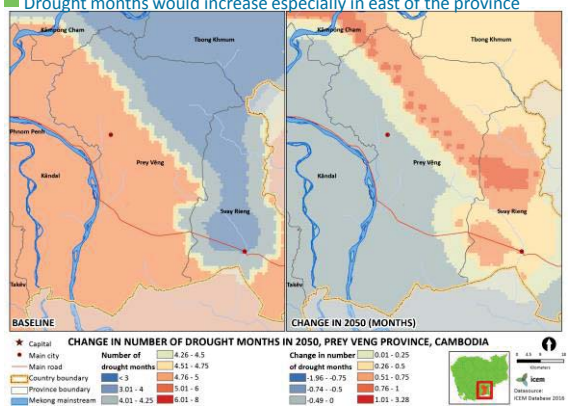








Drought months would increase especially in east of the province



Strategic Program for Climate Resilience

Mainstreaming Climate Resilience into Development Planning (TA 8179)

(September 2013-April 2019)

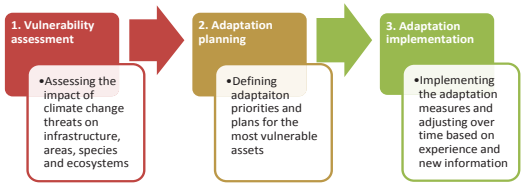
Baseline Assessment for Climate Resilient Feasibility Studies in Agriculture and Water Management

Vulnerability and adaptation planning processes

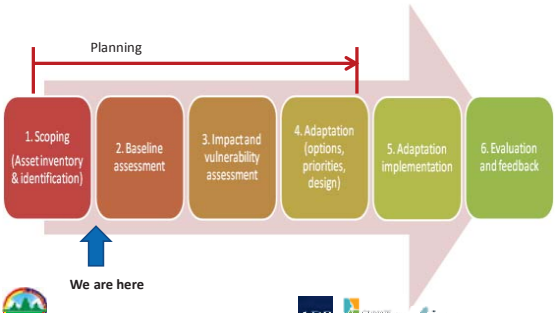
Name of Presenter: Peter-John Meynell
Position of Presenter: Team Leader, Water and Climate Change Specialist
Organization / Ministry: ICEM
Date: 16 August 2016

Code: SW/MCRDP/DOC

Vulnerability assessment and adaptation process



Typical climate change vulnerability assessment and adaptation steps



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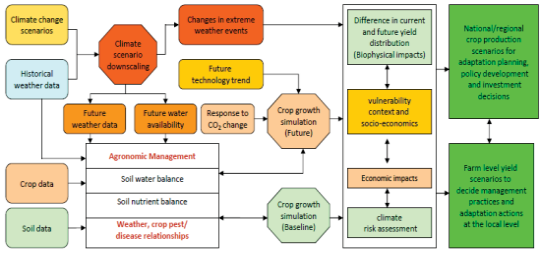
Data and information flow in a generic climate change impact assessment framework



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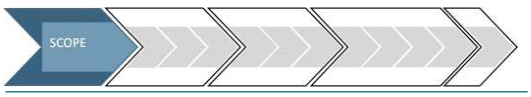

Scoping of:

1. Specific farming and livelihood system (e.g., irrigated farming, subsistence farming, mixed integrated farming systems, etc.)
2. Geographic area covered (e.g., entire catchment, entire province/district or specific site/village)
3. Linked natural and social system components and assets (e.g., agricultural fields, market, agribusinesses, road network, school, houses)

- Scoping is needed at key points in the assessment and planning process
- Scoping is part of priority setting in situations of scarce resources
- Need criteria to guide the scoping decisions

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Criteria for scoping

To identify target agriculture livelihoods and water resource assets:

- Existing or planned projects which will need to be climate proofed
- Non-infrastructure based actions focusing on improving the farming systems (e.g., crop diversification, mixed farming, improved water management, agribusiness and value chain, etc.)
- Infrastructure of strategic importance to the farming communities (e.g., road links to market, markets/storage facilities, major flood protection canal, groundwater systems)
- Poor quality or damaged infrastructure which needs to be replaced or repaired (e.g., repeatedly damaged by floods)

To identify target geographic area:

- Area exposed to past extreme events and projected climate change threat
- Area where communities are committed to participate in adaptation management, monitoring and repair
- Area with potential as an accessible and representative demonstration for replication.

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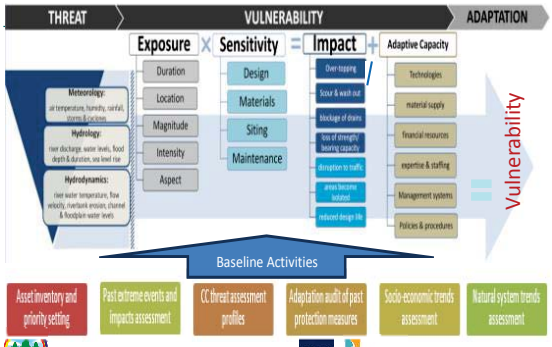
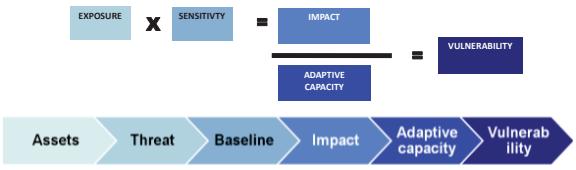
Agriculture and water management - sites selected in scoping phase

- Baseline assessment of:
  - Status and condition of irrigation infrastructure assets
  - Key issues and trends in natural, social, economic and built systems in the area.
  - Past extreme events and impacts
  - Past "adaptation" to extreme events (adaptation audit)
- Projected climate and hydrological threats
- Mapping results using GIS (may require topographical survey)

Vulnerability assessment steps



Vulnerability assessment steps



Exposure Criteria

- Duration (e.g. hours or days of flooding, length of drought period)
- Location (e.g. distance from flood)
- Intensity (e.g. strength of rainfall, speed of flood)
- Volume or Flow (e.g. size of event)
- Frequency

Sensitivity criteria

- **Agriculture and livelihood systems**
  - ❑ Land tenure
  - ❑ Markets and value chains
  - ❑ Rural finance
- **Water management & infrastructure**
  - ❑ Water management
  - ❑ Groundwater availability
  - ❑ Levels of maintenance
  - ❑ Protective systems (e.g. river walls, dykes)
  - ❑ Specific site
  - ❑ Design

Sensitivity Criteria

- Natural systems (in location and watershed)
  - Condition and trends
  - Capacity for regeneration
  - Degree of ecosystem connectivity
  - Tolerance of drought conditions
  - Biological response to climate changes

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Determining *Impact*

Sensitivity of system to climate threat	Exposure of system to climate threat: Very Low	Low	Medium	High	Very High
Very High	Medium	Medium	High	Very High	Very High
High	Low	Medium	Medium	High	Very High
Medium	Low	Medium	Medium	High	Very High
Low	Low	Low	Medium	Medium	High
Very Low	Very Low	Low	Low	Medium	High

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Defining *Adaptive Capacity*

Determinants of adaptive capacity include for example:

- Infrastructure
  - Availability of material resources (construction and maintenance)
  - The range of available adaptation technologies
  - Availability and distribution of financial resources
  - Government and contractor skills and knowledge
  - Management and response systems
  - Political commitment
- Social Factors
  - Community commitment
  - Social networks
  - Knowledge and skills
- Natural Systems
  - Watershed condition and characteristics (ability to recover)

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Determining *Vulnerability*

Adaptive Capacity	Impact: Very Low (Inconvenience (days))	Low (Short disruption to system function (weeks))	Medium (Medium term disruption to system function (months))	High (Long term damage to system property or function (years))	Very High (Loss of life, livelihood or system integrity)
Very Low (Very limited institutional capacity and no access to technical or financial resources)	Medium	Medium	High	Very High	Very High
Low (Limited institutional capacity and limited access to technical and financial resources)	Low	Medium	Medium	High	Very High
Medium (Growing institutional capacity and access to technical or financial resources)	Low	Medium	Medium	High	Very High
High (Sound institutional capacity and good access to technical and financial resources)	Low	Low	Medium	Medium	High
Very High (Exceptional institutional capacity and abundant access to technical and financial resources)	Very Low	Low	Low	Medium	High

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Strategic Program for Climate Resilience

Mainstreaming Climate Resilience into Development Planning (TA 8179)

(September 2013-April 2019)

Advanced VA&AP Training: (1) Baseline Assessment for Climate Resilient Feasibility Studies in Agriculture and Water Management

DATA COLLECTION FIELD EXERCISE

Name of Presenter: Mak Sithirith and Ian Hancock
Position of Presenter: Agriculture and Climate Change Specialists
Organization / Ministry: ICEM
Date: 16 August 2016

Code: SW/MCRDP/DOC

Presentation outline

1. Provide an overview of general data and information requirements for feasibility studies focusing on climate resilience and adaptation
2. Provide workshop participants details of the field baseline data collection and assessment exercise

Requirements for Feasibility Study

- Structure and table of contents for a feasibility study which focuses on project for climate resilient agriculture and water resource development
- Data to be collected must comprehensively address all the requirements including detailed information on climate and environment, and socio-economic aspects
- The need to take into account the requirements of donors who will be providing funds for the project (GEF, ADB, etc.)

TA 8179 Feasibility Study Design Template

1. Project Context and Rationale
   - i. Need for the Project
     - a. Existing situation, i.e. location, socio-economic conditions
     - b. Key development issues to be addressed
     - c. Related development initiatives
     - d. Government priorities and strategies
     - e. Project rationale (alignment with INDC/NAPA/NAP/LDCF priorities)
   - ii. NAPA Adaptation Priorities and Selection Criteria
2. Project Design and Description
   - i. Climate Risk, Vulnerability and Adaptation Assessment
     - a. Climatic and Hydrological Trends
     - b. Floods and Extreme Weather Events
     - c. Climate Screening
     - d. Vulnerability Assessment
     - e. Impact Assessment
     - f. Adaptation Assessment
   - ii. Project impact and outcome
   - iii. Outputs and activities
3. Cost Estimates
   - i. Capital costs (i.e. civil works, equipment, survey, design, bidding and construction supervision, and contingencies)
   - ii. Recurrent
   - iii. Climate change (include cost without climate change measures)
4. Implementation Arrangements
   - i. Responsibilities of executing and implementing agencies
   - ii. Implementation schedule
5. Governance
   - i. Procurement
   - ii. Financial management risk assessment of executing and implementing agencies
6. Economic and Financial Analysis
   - i. Economic Analysis
   - ii. Financial Analysis
7. Safeguards
   - i. Poverty and social dimensions
   - ii. Initial Environmental Examination
     - a. Anticipated environmental impacts and mitigation measures
     - b. Consultation, information disclosure, and grievance redress mechanism
8. Risk Assessment and Mitigation Measures
9. Monitoring and Reporting framework
10. Conclusion and Next Steps

- i. Climate Risk, Vulnerability and Adaptation Assessment
  - a. Climatic and Hydrological Trends
  - b. Floods and Extreme Weather Events
  - c. Climate Screening
  - d. Vulnerability Assessment
  - e. Impact Assessment
  - f. Adaptation Assessment

Prey Veng Project

- **Project title:** Climate Resilient Water Management for Agriculture Production Project (CRWMAPP)
- **Project objective:** to improve food availability and livelihoods; increase food access and income through improved water and crop management; improve resilience to climate change; strengthen the capacity of the public and private sectors and civil society to address food security and improved rural incomes.
- **Project key words:** crops, land management, water management, groundwater, micro-irrigation, climate resilience, adaptation, marketing, rural finance, value chains, water user groups, agriculture extension, agriculture research

Baseline data needs – types of data

- **Natural resource base** – soils, climate (seasons, climate change and vulnerability, extremes, climate threat analysis – past and projected, climate change profiles for the location, adaptation options, etc.), ecology, ecozone, etc.
- **Agriculture and livelihood systems** – crops, livestock, fisheries, off-farm incomes, etc.
- **Irrigation and water management** – surface and groundwater, alternative delivery systems – drip/sprinkler, water management (system and on-farm), constraints
- **Value chains and agribusiness** – input supply, production, post-harvest production, processing, marketing – of major commodities
- **Socio-economic status in general** – gender, land tenure, poverty levels, migration, etc., farm incomes (CBA), farmer groups, rural finance
- **Institutional support mechanisms** – government, civil society, and private

Data and information requirement

- **Observation, monitoring and prediction of climatic variables**
  - Climate database (observed)
  - Climate change projections (scenarios)
  - Modelling and prediction of the climate system
  - Key issues are low resolution, downscaling & uncertainties
- **Crop and soil data requirement:**
  - Crop models, crop coefficients, soil data and management data
  - Spatial and temporal variability in crop, soil and management data contributes to uncertainty in assessments
  - Historical hazards, loss and damage
- **Socio-economic data and information for adaptation**
  - Livelihood systems and livelihood assets
  - Local perception of risks
  - Current exposure to hazards
  - Current risks and vulnerabilities
  - Indigenous knowledge of adaptation practices and strategies

Methods for data collection and analysis

- **Secondary data and information** – variable sources, reference documents and reports, government statistics, internet searches, information from Ministry and Provincial departments (planning, agriculture, water, etc.)
- **Primary data collection** – informal and formal surveys, focus group discussions, surveys and questionnaires, selection of sample frame (poverty status, land holding size, landless etc.)
- **Sample size and level of accuracy required** – location, national, provincial, district, commune, village and household
- **Resource requirements** – manpower, budget, logistics, management and responsibility, etc.; requirements for survey team – leader, economist, enumerators etc.
- **Workplan and timeline for data collection**
- **Data quality control** – important to check that responses and data collected is accurate and consistent

Analysis and reporting of baseline data

- Simple qualitative and quantitative analysis
- Detailed and complex analysis – Excel, SPSS, etc.
- Reporting – will form part of the main report and associated annexes for the feasibility study – including sections on climate change and environment, social and gender, etc.

Objective of field exercise

- Review three aspects of climate hazards:
  - Floods
  - Drought
  - Wind storms and temperature
- Collection of information and data in sufficient detail to satisfy needs for full feasibility study
- Provide a simplified example of the data collection methods – group participants are provided with the baseline assessment data requirements sheet
- Provide preliminary information in which to further detail the design of the project

Baseline data collection field exercise modalities

- **Objectives of exercise:** to inform on the project design (e.g., Prey Veng agriculture project) and comment on the issues and constraints associated with collection of various types of baseline data
- **Simplified approach:** using a simple questionnaire template which will focus mainly on qualitative responses at this stage in project design using focus group discussions
- **Working in groups:** three groups use the same questionnaire template and report separately on their findings for the following climate change/environmental threats:
  - Group A - Floods
  - Group B - Drought
  - Group C - Wind storms and temperature

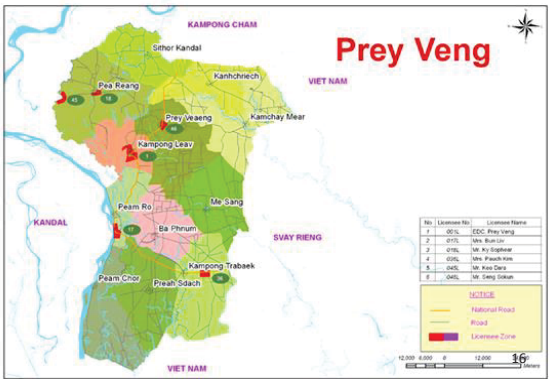
Baseline data collection field exercise modalities (continued)

- **Survey template:** baseline data collection tasks to include the different aspects/areas of the following:
  - Section 1 – General information (Group A – agriculture system; Group B – water resources & socio-economic; Group C – environment)
  - Section 2 – Vulnerabilities and adaptation options – for the three threats
  - Section 3 – Project design proposal
  - Section 4 – Other comments
  - Section 5 – Map of Commune locations
- **Commune summary sheets:** provides basic information on the three communes to be visited
  - Kansom Ak Commune
  - Rong Damrei Commune
  - Baboang Commune
- **Site/Commune comparison:** important to be able to compare the findings from the three locations

Baseline data collection field exercise modalities (continued)

- **Stakeholders to meet and interview:** (i) consult with local farmers, (ii) consult with provincial government reps (agriculture, planning, water, & others), (iii) consult with other service providers (projects (e.g., PADEE), NGO's, private & others)
- **Timetable:**
  - Depart Prey Veng – 08:00
  - Kansom Ak Commune survey – 09:00 to 10:30
  - Rong Damrei Commune – 11:00 to 12:30
  - Lunch – 12:30 to 14:00
  - Baboang Commune – 14:30 to 16:00
  - Return Prey Veng – 17:00
- **Follow-up:** Next day (Thursday 18 August morning)
  - Group session to go through results survey & prepare presentation
  - Plenary presentation – presentation of baseline results of basic information; (b) each groups presents its vulnerability and adaptation findings & proposals for project design

Project location



Strategic Program for Climate Resilience

Mainstreaming Climate Resilience into Development Planning (TA 8179)

(September 2013-April 2019)

Advanced VA&AP Training Workshop (1) Baseline Data Collection

PROJECT CONCEPT NOTE – PREY VENG

Name of Presenter: Mak Sithirith and Ian Hancock
Position of Presenter: Agriculture and Climate Change Specialists
Organization / Ministry: ICEM
Date: 16 August 2016

Code: SW/MCRDP/DOC

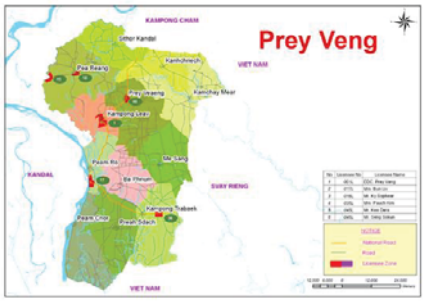
Project Title: Climate Resilient Water Management for Agriculture Production Project (CRWMAPP)

Name of sector: Agriculture and Water Resources	
Executing Agency	MAFF
Implementing Partners	MAFF, MoWRAM, Provincial Government, Service providers (FAO, SNV, NGOs and private sector, etc.)
Project Duration/ Period	5 years/2018-2022
Location	Prey Veng Province, Cambodia Delta ecozone
AWG members and TA 8179 team member	MAFF Team: 1. Ms. Meas Sotheavy, 2. Mr. Chea Sakhorn 3. Mr. Am Phirum 4. Mr. Stong Kia 5. Mr. Leang Bunhak 6. Mr. Sok Chea TA 8179: 1. Dr. Mak Sithirith 2. Dr. Ian Hancock

Project Title: Climate Resilient Water Management for Agriculture Production Project (CRWMAPP)

Keywords	Crops, Land and water management, Micro-irrigation, Groundwater, Climate resilience, Adaptation, Marketing, Rural finance, Water User Groups
Sub-sectors	Crops, Land Management, Water Management, Agribusiness

Project location



Project background - introduction

- To address climate change issues in the Delta ecozone which is characterised by a shortage of water in the dry season, flooding in the wet season and low agricultural productivity – proper management of water is of paramount importance.
- Climate resilient water management for agriculture and livelihoods is key to the future of agriculture and improving adaption to climate in this part of Cambodia.
- This is strategy to address climate change which is taking place in Prey Veng Province in the Delta ecozone, while also continuing to improve the agricultural productivity (mainly of the cropping systems), rural livelihoods and food security.
- Climate smart agriculture adaptation techniques also to be used.
- Project design is based on the lessons learnt by the IFAD Project for Agriculture Development and Economic Empowerment (PADEE) which is ongoing and located in the Delta region of Cambodia.

Project background – problems being addressed

- Prey Veng Province is one of many provinces in Cambodia that experiences heavy floods in the wet seasons, followed by severe drought in the dry season, all made worse by climate change.
- As an agrarian province, these climate extremes and variations in water level have made agriculture for many farmers, vulnerable and more erratic, and where crop productivity especially the staple rice is low; affecting the livelihoods of farmers and their incomes.
- The excessive water in the **wet season** has caused serious flooding, damaging crops and rice field infrastructure, resulting in low yield and crop failure.
- In the **dry season** the reverse is true, where drought and little available water have impacted on the farmers in the province who are unable to grow a second crop, leading to many farmers migrating for other employment possibilities.
- Irrigation schemes are characterised by lack of proper on-farm water management systems and ineffective water user groups.
- If situation continues in the future, it will have a detrimental effect on the livelihoods for farming communities living in the Delta ecozone

Project background – problems being addressed (continued)

- As farming is uncertain and yields of crops especially rice is low
- Farming cannot now support the typical households of five members,
  - many household members migrate for other employment particularly young and active
  - leaving behind the very young and old members of community
  - placing agriculture livelihoods at risk.
- Effect of climate change has been to change farming practices among farmers, from rice transplanting to broadcasting the seed, a practice which many farmers are unfamiliar with – hence farmers need to learn how to adapt to new practices.
- Lack of labour due to out-migration, many farmers change the farming practice from the use of long term rice varieties to short term rice varieties, where the lack of knowledge of these new practices is a hindrance. Also famers are now changing from one long term crop a year to two short duration crops where they need more water particularly in the dry season, hence better water/crop management becomes important.
- Many farmers digging wells to access groundwater to solve problem of water shortages, especially for dry season cropping. Improved strategies to address water shortages by individual farming households is one way of addressing the water shortage, but there is a lack of a cohesive approach to address the water shortage collectively among these households.
- Current water management approach to manage the excessive water in the wet season and droughts in dry season not been effective as based on large-scale irrigation development approaches/top-down government management

Project background - significance

- This project is significant for Prey Veng, given its vulnerability to floods and drought which is being exacerbated by climate change.
- The project contributes to addressing these issues through promoting water management which could reduce these impacts, and build agriculture resilient climate change through these innovative adaptation technologies focusing on improved crop and water management.
- Overall, it contributes to the current efforts of Royal Government of Cambodia (RGC) in improving agricultural productivity as stated in the Rectangular Strategies Phase 4.
- Project will work with MAFF as stage agency at the national level and collaborate with the Provincial Department of Agriculture and Provincial Department of Water Resources to boost agriculture production through improving water management for agriculture.
- Improved water management is key to increase the agricultural productivity for farmers in Prey Veng and address the increasing problem of climate change, an issue which is paramount in RGC's policies for environmental management and climate resilience.

Project background - beneficiaries

- This project will work with smallholder farmers in 3 selected districts in Prey Veng Province, namely: Baphnom, Peam Ro, and Kampong Trabek.
- These farmers have been working using water management for many years, and the project will reinforce the current traditional practices of water management and provide new inputs to improve water use that benefit agriculture sector and farmers.
- Women will be benefiting from this project as they play central role in agriculture, more especially rice cultivation. Through improved water management for crop production, women will have more time for other activities including other income generating activities and the cultivation of vegetable crops which will contribute to an improved diet for the household.

Project description

- **Project goal:** The goals of agriculture and water resource management in the Delta ecozone of Cambodia and project are: to improve food availability and livelihoods, through improved water and crop management, in order to improve resilience to climate change, while strengthen the overall capacity of the public and private sectors and civil society to address food security and improved rural incomes.
- **Outcomes:**
  1. Climate resilient water and crop management for agriculture and livelihoods developed suitable for small farmers and scaled up to other regions for improving agriculture
  2. Access to financial services for agriculture improved for farmers in the project areas
  3. Market for farmers developed and organized

Project description (continued)

- **Objectives:** The 4 objectives are:
  1. Increasing agricultural productivity and diversified sources of income for poor farmers in rural areas in Prey Veng province.
  2. Improved water management and water supply to farmers.
  3. Promote the provision of financial services.
  4. Promote the provision of technical services and marketing.
- **Outputs:** The project has 4 main components:
  1. Organize farmers to engage in climate resilient water management and agricultural production
  2. Capacity building for farmers and strengthening their capacity in water management and the agricultural sector through improved training and capacity building for farmers
  3. Promote the provision of technical services and improved technology delivery for crop and water management
  4. Promote improved financial services and market access
- A Design and Monitoring Framework (DMF) needs to be prepared highlighting in more detail indicators and sources of information for M&E.

Project description (continued)

- **Risks and assumptions:**
  - a) **Access to technology** - access to the appropriate technology for these farmers engaged in improved irrigated agriculture will be important, coupled with training in application, also adaptation technologies water use and diversified cropping systems
  - b) **Prices (particularly food and energy)** - the price of electricity, e.g. for pumping, storage and processing is very high in Cambodia, and may contribute to increasing impact, if electricity shortages or prices limit use
  - c) **Land ownership issues** - landownership and tenure can be a significant issue for farmers and the investments they are prepared to make, especially if tenure is insecure;
  - d) **Migration** – where out-migration is key concern in the project area where many youths migrate to urban areas for employment, leaving agricultural sector, this has led to the shortage of labour in rural communities, where mainly old people and children are left behind in the communities
  - e) **Input supply and markets** – high cost for agricultural production constrains farmers to produce for markets, with unfair influx of agricultural products from neighbouring countries contributing to low competitiveness of agricultural products by Cambodian farmers, with net effect of farming become a key concern in the future, & many farmers give up farming
  - f) **Climate change** – continued deterioration of climate in Delta especially worsening floods and increasing droughts need appropriate climate resilient adaptations to be put in place to try to stabilise the situation

Methodology

- **Approach:**
  - Project will involve number of agencies including MAFF (lead agency), MOWRAM, Provincial Government, other donor agencies, NGOs and private sector entities.
  - The project will be coordinated by the Project Steering Committee, with representatives from different ministries.
  - Project to provide support to farming community through:
    - Crop management and improved cropping systems
    - Improved water management, both surface and groundwater
    - Market development
    - Public Private Partnerships

Methodology (continued)

- **Activities:** Range of adaptation technologies sourced from the MCRDP Agriculture Technology Resource Toolkit (ICEM, 2016) will be implemented in carefully planned and synchronized process so that the **synergies and benefits** of these interventions are maximized.
- **Range of activities** to be included in the project:
  1. **Farmer group formation:** with proper budget management, improving financial planning and forming farmers into Water User Groups (WUG).
     a) Aspects include establishing farmers revolving fund systems, organizing farmer groups consisting of around 50 farm households and selection of 7 members as a WUG Committee to monitor and manage the group.
  2. **Technical training for farmers**: for agriculture, water management, savings, and marketing of agricultural products. The alternative crops with the drought tolerant crops (e.g., watermelon as a possibility). The watermelon growers, farming, Livestock and fish raisers, Watermelon growers and rice farmers, and project provides funds to support farmers after training.
  3. **Alternative agricultural and crop production systems:** including, alternative crops, diversification and changes to cropping during the two main growing seasons. Other systems such as animal and poultry raising.
  4. **Introduction of improved integrated water management and delivery systems:** including: drip Irrigation, groundwater dugs and tube wells, and storage tanks and sumps for storing water for pumped groundwater.
  5. **Facilitate agricultural markets:** organize and set up market for farmers, and improved value chain will be included especially for newly introduced alternative crops.
  6. **Build partnerships:** done with the private sector and cooperation with other organizations for service delivery, input supply, post-harvest operations and marketing.

Methodology (continued)

- **Feasibility:** At this stage without careful analysis of the various actions and cost implications of the various interventions required, hence difficult at this stage to determine the feasibility of the proposed project – further work is required to fine tune the project design.
- **Adaptation to climate change:** The project will introduce project beneficiaries and stakeholders to the following:
  a) Seasonal variation and crop diversity that could grow in different seasons in the different context of water availability.
  b) Introducing climate resilient water management practices and technique that is practical and low cost for small farmer such as drip irrigation, pond management etc.
  c) Farming techniques and practices that suitable to local farming conditions that will ameliorate the impact of climate change while improving livelihoods.

Budget and timeline

- Total cost
  - Outline budget estimate USD 25 million
- Timeline
  - 5-year project period 2018-2022
  - Inception phase – 18 months
  - Main implementation phase – 36 months

Data needs for feasibility study

- Project design requirements
  - Design and monitoring framework
  - Risks and assumptions
- Farming and livelihood systems
  - Cropping and farming systems
  - Value chains and private sector development
- Irrigation and water management
  - Surface and groundwater
  - Crop water management
  - Community based water management
- Socio-economic information
  - Social and gender
  - Land tenure
  - Financial and economic
- Institutional structures
  - Government
  - Private sector
- Agro-ecology and environmental
  - Natural resource base (agroecology, climate, soils, etc.)
  - Vulnerability assessment
  - Improved and traditional adaptation (adaptation planning)

Thank you

Strategic Program for Climate Resilience

Mainstreaming Climate Resilience into Development Planning (TA 8179)

(September 2013-April 2019)

Advanced VA&AP Training Workshop (1) Baseline Data Collection

PROJECT CONCEPT NOTE – KAMPONG THOM

Name of Presenter: Mak Sithirith and Ian Hancock
Position of Presenter: Agriculture and Climate Change Specialists
Organization / Ministry: ICEM
Date: 18 August 2016

Code: SW/MCRDP/DOC

Project Title: Climate Resilient Commercial Horticulture Development Project (CRCHDP)

Name of sector: Agriculture	
Executing Agency	MAFF
Implementing Partners	MAFF, MOWRAM, MoI, Service providers (SNV, IDE, FAO etc.)
Project Duration/ Period	5 years/2018-2022
Location	Kampong Thom Province, Cambodia Tonle Sap ecozone
AWG members and TA 8179 team member	MAFF Team: 1. Ms. Meas Sotheavy, 2. Mr. Am Phirum 3. Mr. Stong Kia 4. Mr. Leang Bunhak 5. Mr. Sok Chea TA 8179: 1. Dr. Mak Sithirith Dr. Ian Hancock

Project Title: Climate Resilient Commercial Horticulture Development Project (CRCHDP)

Keywords	Horticulture, Market access, Value chains, Crops, Land and water management, Climate resilience
Sub-sectors	Crops and Land Management, Rural Transport, Storage and Processing, Agribusiness

Project location

Project background - introduction

- Kampong Thom province is appropriate for horticulture development, given potential of province for horticulture, its proximity to Phnom Penh and Siem Reap, and past experiences of USAID HARVEST project in the province.
- Province is facing climate change more especially the increasing incidence of drought in the dry season and thus, farming practices using less water are needed.
- Project is designed to contribute to improving horticulture for sale, partly to improve the productivity of vegetables on small landholding, diversify the crops and improve food security of rural households.
- Project aims at linking horticulture producers to credit and markets.
- Importantly the project is to work with farmer to diversify crops and vegetables throughout the year based on water availability as a means to adapt to climate change and secure livelihoods.

Project background – problems being addressed

- Kampong Thom province is located in the Tonle Sap ecozone which relies on the seasonal rains to facilitate the production of food crops mainly the staple rice which is predominantly grown under irrigated conditions.
- Province has been affected by climate change.
  - The flood and drought have contributed to the low productivity of agriculture and thus, farmers have only been able to grow rice and only one crop a year. The flash floods in the rainy season have submerged large areas of agricultural lands throughout the province and damaged crops.
  - In contrast in the dry season, there is little water remaining or available for second cropping.

Project background – problems being addressed (continued)

- Trend of climate change further increases the concerns of about the impacts the climate change on agriculture.
- Shortage of water has made farmers unable to grow crops in the dry season, growing only one crop a year.
- Lack of technical skills in agriculture leaves farmers able only growing to grow rice.
- To increase the yield, farmers often use high chemical inputs on small plots of lands, negatively affecting the environment.
- Increase in population has put pressure on the traditional farming systems based on small land holdings.
  - Low productivity of farmland and low crop yields have not be able to produce enough food for household consumption, consequently food shortages have occurred almost every year.
- Situation is further exacerbated by low product prices (even for rice) and poor physical access to markets and inefficient market systems, also farmers are not properly organized to obtain good prices for their products.
- A project is needed to address issues of low household income from agriculture, poor access and poorly managed market systems, while trying to diversify the cropping systems to improve livelihoods and address the major constraint of climate change through introduction of suitable adaptation technologies and improved value chain development.

Project background - significance

- Project significant for Kampong Thom, given its vulnerability to floods and drought which is being exacerbated by climate change.
- Project contributes to addressing these issues through promoting climate smart agriculture and horticulture development which could reduce these impacts, and build agriculture resilient climate change through these innovative adaptation technologies focusing on improved crop and water management.
- Overall, it contributes to the current efforts of Royal Government of Cambodia (RGC) in improving agricultural productivity as stated in the Rectangular Strategies Phase 4 and other RGC policies.
- Project will work with MAFF as agency at the national level and collaborate with the Provincial Department of Agriculture and other Provincial departments to boost agriculture production through improving water management for agriculture.
- Project will also work with the private sector for value chain development and marketing

Project background - beneficiaries

- Target beneficiaries for project are the rural poor farmers, more especially those with small land holdings. It will focus on assisting both male and female farmers.
- The Project will work with and target farmers who have the following criteria:
  - Have more than 1,300 m2 (0.13ha) of land available for horticulture
  - Have interest and skills in horticulture production for cash sale
  - Have financial capacity to produce and sell vegetables to markets
  - Are willing to take financial credit if needed to enhance and improve horticulture production system on their holdings
  - Are willing to work with private sector and NGOs to promote commercial horticulture.

Project description

- **Project goal:** Through horticulture commercialization the aim is to improve food availability and increase food access through rural income diversification, while at the same time strengthening the capacity of the public and private sector/civil society to address food security and livelihoods, and improving resilience to climate change.
- **Outcomes:**
  1. Organized communities and commercial horticulture farmer groups through provision of supporting systems for farmers during the implementation.
  2. Capacity building and on-farm training/demonstrations for commercial horticulture farmers on horticulture techniques and practices to increase productivity, enhanced household food security, and agribusiness techniques
  3. Organizing markets for horticulture farmers to sell their produce at competitive prices through better value chain development.
  4. Community-based savings groups formed to improve access to credit – partnership with private banks in order to gain access to credit necessary for commercial horticulture
  5. Public Private Partnerships with agribusiness entities enabling farmers greater access to technologies, training and equipment, in order to increase productivity, improve product quality, lower operating and farming costs, and strengthen technical knowledge.

Project description (continued)

- **Objectives:**
  1. Growing vegetables using climate smart adaptation technologies for household consumption and commercial business expanded and improved among farmers through economic activities to increase their capacity and generate income while ensuring resilience to climate change.
  2. Development and enhance markets for horticulture products of farmers organized with good access and fair treatment for farmers.
  3. Improved access to micro-finance for small farmers established that enable horticulture producers to enhance the producing capacity for markets.
- **Outputs:**

  The project has 5 main components:
  1. Capacity Building – for farmers, public, private, and civil society to address food security and climate change.
  2. Enhance Agriculture Input and Production Systems – commercial horticulture farmers increase productivity
  3. Strengthen Postharvest Systems – producer groups strengthen horticulture market access and post-harvest operations
  4. Access to Credit – for commercial horticulture farmer and private sector entities involved in the value chain
  5. Public Private Partnerships – facilitate and formalize sustainable linkages between producer groups and private sector entities

Project description (continued)

- **Risks and assumptions:**
  - **Access to technology** - access to the appropriate technology for these farmers engaged in commercial horticulture will be important, coupled with training in application, also technology for storage and processing of vegetables
  - **Prices (particularly food and energy)** - the price of electricity, e.g. for pumping, storage and processing is very high in Cambodia, and may contribute to increasing impact, if electricity shortages or prices limit use
  - **Land ownership issues** - Landownership and tenure can be a significant issue for farmers and the investments they are prepared to make, especially if tenure is insecure.
  - **Crops and land management** - Project will be introducing new crops and techniques into a historical situation where climate threats pose a relatively moderate risk. The action of the project will address these risks.

Project description (continued)

- **Risks and assumptions:**
  - **Capacity building and training** - Capacity building of the staff of MAFF and provincial Agricultural departments, will enable protection measures against climate change threats, and provision of advice to farmers.
  - **Agricultural extension and research** - Agriculture extension should include measures to protect crops against climate threats, especially floods and droughts and storms Research will facilitate the choice of crops and varieties that are appropriate, and required growing conditions Research will also be helpful for improving post harvest storage and processing.
  - **Data gathering, monitoring, and information management systems** - Data about markets, prices for vegetables etc., will assist in ensuring appropriate harvest times and reduce storage times, and improve profitability for farmers. Non-Physical project actions overall - Overall these measures, will increase climate resilience of the project if they have a complementary focus on the climate threats and potential impacts.
  - **Storage and processing** - Choice of locations for storage and processing facilities to avoid areas liable to flood, and choice of appropriate technologies for storage and processing will reduce the impacts of increased temperatures on postharvest product deterioration.

Methodology

- **Approach:**
- The Project will involve number of agencies including MAFF, MOWRAM, MoI, Private sectors and NGOs. The MAFF will be the Executing Agency and will take responsibility for overall project management, coordination and reporting while agencies and line departments of MAFF will undertake the majority of technical work at national level. Provincial Department of Agriculture (PDA) responsible for actual implementation working with other provincial government departments.
- Approach to Project will address following:
  - **Crops and Land Management:** Planting alternative crops that use less water. The use of water saving crops and farming technique and water management, such as digging wells, ponds, drip irrigation systems. Build the capacity of farmers to adapt to climate change. Activities include: Capacity building for farmers, public, private, and civil society to address food security and climate change.
  - **Storage and Processing, Value Chain Development and Marketing:** Strengthen Postharvest Systems Producer groups to strengthen horticulture market access. Organizing markets for horticulture farmers to sell their produces. Processing and value added activities organized for farmers for them to compete in the market. Producer groups strengthen horticulture market access—linking horticulture producer groups with district and provincial level vegetable buyers.
  - **Rural Finance and Public Private Partnerships:** To provide access to credit for commercial horticulture farmers and private sector entities and develop viable Public Private Partnerships to facilitate improved marketing and horticulture product pricing.

Methodology (continued)

- **Activities:**
- A range of adaptation technologies sourced from the MCRDP Agriculture Technology Resource Toolkit (ICEM, 2016) will be implemented in a carefully planned and synchronized process so that the synergies and benefits of these interventions are maximized.
- Range of activities to be included in the project are:
  1. Organizing communities and selecting the commercial horticulture farmers
  2. Capacity building and on-farm training for commercial horticulture farmers on horticulture techniques and practices to increase productivity.
  3. Setting the demo-horticulture sites that farmers could see and learn
  4. Providing the supporting systems for farmers so that farmers could support when they need it during implementation.
  5. Improve horticulture productivities among farmers for household consumption and market business.
  6. Organizing markets for horticulture farmers to sell their produces.
  7. Processing and value added activities organized for farmers for them to compete in the market.
  8. Producer groups strengthen horticulture market access - linking horticulture producer groups with district and provincial level vegetable buyers.
  9. Community-based savings groups increase access to credit.
  10. Public Private Partnerships with agribusinesses, private banks, NGOs and donors.
  11. Partnership with private bank in order to gain access to credit necessary for commercial horticulture.
  12. Through co-investments, farmer could access technologies and equipment, and participated in training designed to increase productivity, improve overall product quality, lower operating and farming costs, and strengthen technical knowledge

Methodology (continued)

- **Feasibility:** At this stage without careful analysis of the various actions required and the cost implications of the various interventions, it is difficult at this stage to determine the feasibility of the proposed project – further work is required to fine tune the project design.
- **Adaptation to climate change:** A brief assessment of how project is going to achieve the goal of climate resilient development for the non-physical and physical project interventions are:
  1. **Crops and Land Management:** The potential impact of climate and geophysical hazards on the project's investments in crops and land management is based on hazard exposure ratings for the project location and the understanding of the project's sensitivity. The potential impact is rated on two different aspects of crops and land management. These aspects are key for agriculture and sustained productivity, and present diverse entry points for increasing the resilience of the project design. An integrated 'landscape approach' that improves soil and water conservation, promotes adapted cultivars, and sustains ecosystem services should be highly considered when enhancing resilience in agriculture systems.
  2. **Storage and Processing:** The potential impact of climate and geophysical hazards on the project's investments regarding the storage and processing of agriculture products is normally rated based on exposure ratings for the location, and an understanding of the historical and future sensitivity of the project to these risks. Impairment of storage and processing facilities due to extreme precipitation and flooding, for example, could be devastating for an entire harvest and undermine food security or the timely provision of supplies. Improved design of existing and planned storage and processing infrastructure (e.g. elevated silos, drying fans, etc.) is important to ensure enhanced productivity and the resilience of the project.

Budget and timeline

- Total cost
  - Outline budget estimate USD 25-30 million
- Timeline
  - 5-year project period 2018-2022
  - Inception phase – 18 months
  - Main implementation phase – 36 months

Data needs for feasibility study

- Project design requirements
  - Design and monitoring framework
  - Risks and assumptions
- Farming and livelihood systems
  - Cropping and farming systems
  - Value chains and private sector development
- Irrigation and water management
  - Surface and groundwater
  - Crop water management
  - Community based water management
- Socio-economic information
  - Social and gender
  - Land tenure
  - Financial and economic
- Institutional structures
  - Government
  - Private sector
- Agro-ecology and environmental
  - Natural resource base (agroecology, climate, soils, etc.)
  - Vulnerability assessment
  - Improved and traditional adaptation (adaptation planning)

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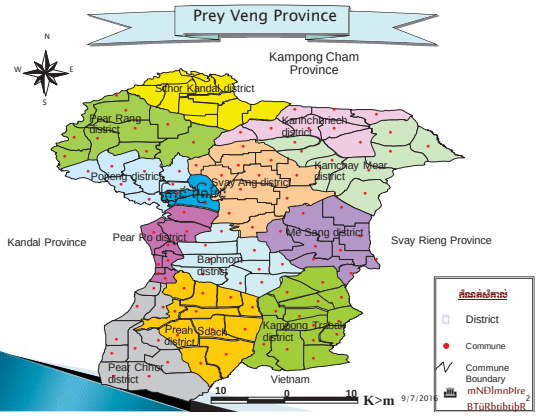


Note

1. Provincial data profile has been computerized, and called as “commune database” and shorten as (CDB). The profile documentation is to use for developing the sub-national development plan and PIP (program investment plan),
2. These data of this document is collected from the village and commune/sangkat statistic books which have been recorded yearly, and reserved at commune/sangkat hall and village head or village representative who is a member of Planning and Budgeting Committee (PBC).
3. Before data processing, the village and commune database are cross-checked by commune clerk and deputy chief of commune/sangkat, and approval and endorsed by commune/sangkat leader who assures that statistic data is correct and true.
4. Detailed definition of each statistic data is made and reading in a guideline for village data collection for doing the commune/sangkat development plan.
5. Commune/Sangkat council needs to use this data profile to monitor and cross-check with the annual progress, and reporting on the progress after the council’s mandate end.

6. It is very useful during preparing of the development plan and investment project in investment plan. The planning working group needs to use this data profile as source of primary and key information for discussion and search for issues taken place in town and district at their own province.
7. There are no leading questions attached with the tables in this profile. Thus it should be checked and considered all data in those tables at which they are all having a meaningful and specific knowledge. Understanding of the meanings of data or figure in the tables is directly or indirectly made.
8. When using this data profile for preparing of development plan and investment program, the planning working group needs to have a paper on scoring of each provincial sector (which was also made from the commune/sangkat database) for helping for clarification and be easy to make a decision.
9. All steps of planning process for preparing the development plan and investment plan need all necessary and available information which reflects a real and specific situation of the province. Therefore, planning working group needs to have this information and data profile together available with during the every meeting. This data profile needs to be kept and make it available when we need.

information profile on Economic and Social, 2016

7. Environment

7.1. Impact of natural disaster

7.1.1 Impact of storm

Description	2013	2014	2015
No. of Households have severely effected by storm	238	73	106
No. of people have severely effected by storm	960	314	403
No. of people killed by storm	6	2	3
Percentage of household effected by storm within 1000HHs	0.9	0.3	0.4
Percentage of people killed by storm within 100,000 persons	0.5	0.2	0.2
No. of people killed by lightning	14	11	22

Figure 7.1: Percentage of household effected by storm within 1000HHs

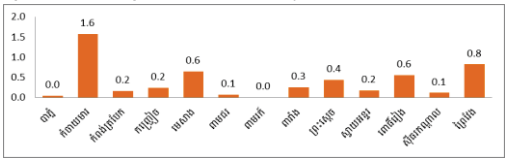
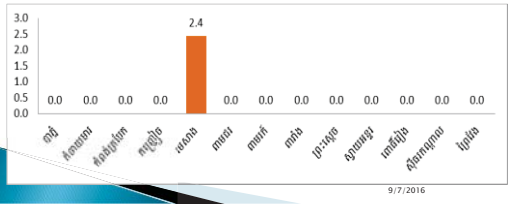


Figure 7.2: Percentage of people killed by storm within 100,000 persons



7.1.2. Impact of flood

Description	2013	2014	2015
No. of Households have severely effected by flood	4,590	2,976	514
No. of people have severely effected by flood	17,950	11,980	2,290
No. of people killed by flood	45	35	34
Percentage of household effected by flood within 1000HHs	17.4	11.0	1.9
Percentage of people killed by flood within 100,000 persons	3.8	2.9	2.8
Total agricultural area effected by flood (ha)	18,701	6,766	948
% of agricultural land area effected by flood	8.2	3.0	0.4

Figure 7.3: Percentage of household effected by flood within 1000HHs

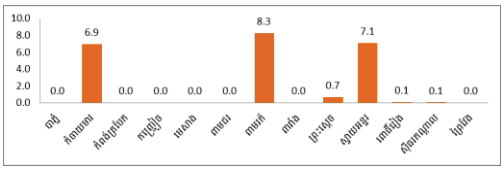


Figure 7.4: Percentage of people killed by flood within 100,000 persons

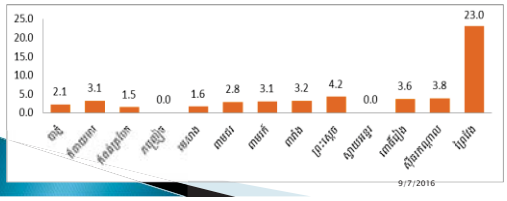
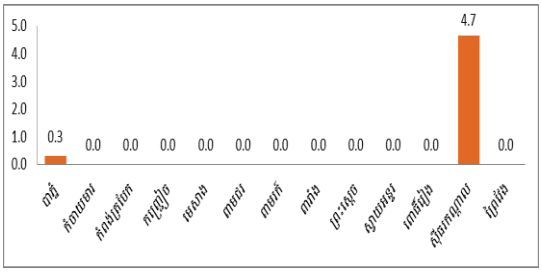


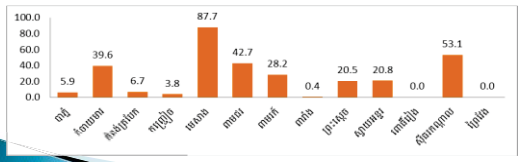
Figure 7.5: percentage of agricultural land area effected by flood



7.1.3. Impact of drought

Description	2013	2014	2015
No. of Households have severely effected by drought	1,374	2,596	7,018
Percentage of household effected severely by flood within 1000HHs	5.2	9.6	25.7

Figure 7.6: Percentage of household effected severely by flood within 1000HHs



7.2. Lost/damage caused by natural disaster

Description	2013	2014	2015
Length of road damage caused by flood (m)	123,724.0	54,585.0	4,873.0
No. of bridges damage caused by flood	859	5	2
Total rice field area effected by drought (ha)	16	259	7,062
Total rice field area effected by pest/insect (ha)	1,096	2,931	169

7.3. Utilization of organic fertilizer and pesticide

Description	2013	2014	2015
% of household used chemical pesticide for killing insect and grass	60.59	63.96	67.77
% of household used organic pesticide for killing insect and grass	3.9	3.4	3.2
% of household used chemical fertilizer	81.60	81.51	80.85
% of household used organic fertilizer	5.1	4.2	3.6

Figure 7.7: % of household used organic pesticide for killing insect and grass

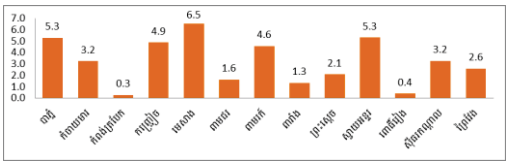
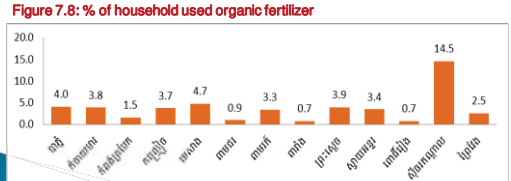


Figure 7.8: % of household used organic fertilizer



7.4. Number of households involved in environment

Description	2013	2014	2015
No. of households lives in conservation area	3	2	1
% of households live in conservation area	0.0	0.0	0.0
No. of households get the service for household's solid waste collection	2,729	3,240	3,176
% of household get the service for household's solid waste collection	1.0	1.2	1.2
No. of household effected by environment pollution	2,458	1,414	1,117
% of household effected by environment pollution	0.9	0.5	0.4

Figure 7.9: % of households live in conservation area

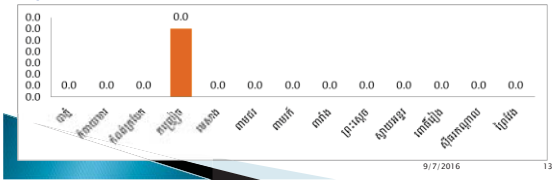


Figure 7.10: % of household get the service for household's solid waste collection

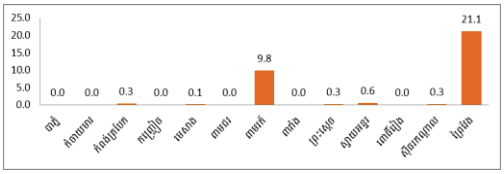
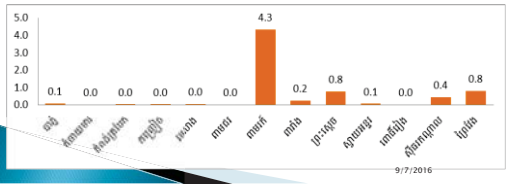


Figure 7.11: % of household effected by environment pollution



Target districts

	Type of statistic data (Village data)	Province	BaPhnom	Kampong Trabak	Pear Ro
Risk and climate change					
1	No. of HHs effected severely by storm	106	1	5	0
2	No. of people effected severely by storm	403	4	17	0
3	No. of HHs effected severely by flood	514	0	0	124
4	No. of people effected severely by flood	2,290	0	0	425
5	No. of HHs effected severely by drought	7,018	132	204	423
6	No. of people effected severely by drought	25,798	464	895	1,838
7	No. of HHs effected severely by fire	25	1	2	1
8	No. of people effected severely by fire	94	3	8	5
9	No. of household lives in conservation area	1	0	0	0
10	No. of people lives in conservation area	7	0	0	0
11	No. of households get the service for household's solid waste collection	3,176	0	100	1,475
12	No. of household effected by environment pollution	1,117	16	7	647

	Type of statistic data (Village data)	Province	BaPhnom	Kampong Trabak	Pear Ro
1	Total agricultural area effected by flood (ha)	1,182	63	0	0
2	Total rice field area effected by flood (ha)	948	63	0	0
3	Total supplementary crop land area effected by flood (ha)	234	0	0	0
4	Length of road damage caused by flood (m)	4,873	4,600	0	0
5	No. of bridges damage caused by flood	2	1	0	1
6	Total rice field area effected by drought (ha)	7,062	29	1,100	150
7	Total rice field area effected by pest/insect (ha)	169	0	0	0
8	No. of fire cases (house fire, market fire)	6	1	1	0
9	No. of safety hill	241	21	27	10
10	Total reforestation land (ha)	10.5	2.5	0	0

	Type of statistic data (Village data)	Province	BaPhnom	Kampong Trabak	Pear Ro
1	Total death caused by flood (age under 18 year old)	23	1	1	2
2	Total death caused by flood (age over 18 year old)	11	1	1	0
3	No. of female death caused by flood (age under 18 year old)	8	1	0	1
4	No. of female death caused by flood (age over18 year old)	2	0	1	0
5	Total death caused by storm (age under 18 year old)	1	0	0	0
6	Total death caused by storm (age over18 year old)	2	0	0	0
7	No. of female death caused by storm (age under 18 year old)	0	0	0	0
8	No. of female death caused by storm (age over 18 year old)	2	0	0	0
9	Total death caused by lightning (age under 18 year old)	9	0	1	0
10	Total death caused by lightning (age over18 year old)	13	1	2	0
11	No. of female death caused by lightning (age under 18 year old)	1	0	0	0
12	No. of female death caused by lightning (age over 18 year old)	4	0	0	0

Prey Veng Provincial Department of Agriculture

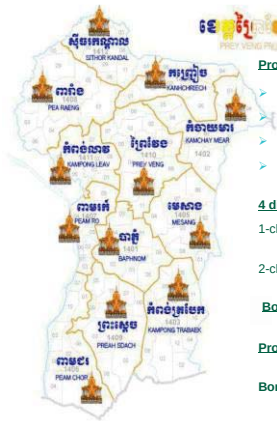
Climate Change Adaptation Planning in Agricultural Sector

Presented by Mr. Chum Chandara-Deputy Director of Prey Veng-PDOA
Phone: 011-567-798 Email: chum_dara@yahoo.com

General situation

Prey Veng province locates in lowland and floodplain of Mekong where the area is highly potential for rice production (dry and wet season rice) compared others province of the Kingdom of Cambodia. However, the rice production farmers have faced several problems in cropping are such;

- Low rice production, leads to food shortage
- Having encountered the natural disaster every year are such; drought, flood-flooded by river and flooded by dog and cat rainy
- Insects and diseases are such; 1-insect destroys the rice and other crops, 2-worm, 3-diseases, 4-rat, and 5-unfertile soil
- Farmers used to practice the traditional technique which is not adapting to intensive agricultural production technique (rice production is 2.991kg/ha)
- Total population is 1,203,570 people (619,427females) and 273,593families. Population density is 246 people per km^2.



Geographic area of Prey Veng province

Province boundary:

- Close to Kandal province to the West
- Close to Svey Rieng province to the East
- Close to Vietnam to the South
- Close to Kampong Cham and Thbong Khmum provinces to the North

4 districts close to Vietnam country:

1-close to the Vietnam to the East is Kamchay Mear district

2-close to the Vietnam to the South are Piem Chhor, Kampong Trabeak and Preah Sdach districts

Border line between Vietnam and 4 districts of Prey Veng province is 82,671 m in length.

Province administration: consists of 13 districts-krong, 116 communes, and 1,137 villages.

Border port gate: 6 port gates (3 regional port gates and 3 international port gates)

Statistics of agricultural land of Prey Veng province in 2016

- Total agricultural land: 337,000 ha (60% of total provincial land which is 488,300 ha)
- Wet-rice (paddy rice) land area: 250,000ha
- Dry-rice land area: 75,000 ha
- Supplementary crop land area: 12,000 ha

Status of Agricultural Production

Achievement of agricultural production in 2015:

- **Wet-season rice:** cultivated on 268,315 ha of agricultural land area, and harvested of 802,442 tones of rice.
- **Dry-season rice:** cultivated on 95,909 ha of agricultural land area, and harvested of 462,443 tones of rice.
- **Food balance:** rice production is 837,018 tones surplus from the consumption. It is equal to 535,691 tones of husked rice.
- **Supplementary crops:** are such corn, bean, potato, benne and vegetable. Cultivated land area is 7,156 ha and harvested production is 4,624ha.

Status of Livestock Production

Achievement of livestock production in 2016:

- Cattle : 2,487,163 heads
- Pig : 269,481heads
- Chicken : 1,197,886 heads
- Duck : 2,556,954 heads

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Impacts of Climate Change

Impacts of climate change on agriculture in the past:

- Delays of raining causes to delaying of cropping period
- Low of rainfall quantity effects on crop growth
- Flood, heat, changing of climate causes to damage of agricultural production (rice, vegetable, and livestock husbandry)
- Outbreak of pest and insect makes crops damage
- Outbreak of disease on plants and crops, and livestock often

Impact of drought & flood on agricultural production-recording from 2009-2016 (under recording)

Description	2009	2010	2011	2012	2013	2014	2015	2016
Rice cultivated land area (Ha)	333,446	351,497	361,272	358,922	372,095	364,776	360,315	
Land area impact by flood (Ha)	2,377	0	70,965	0	55,840	30,496	0	
Destroy by flood (Ha)	1,396	0	47,268	0	14,125	5,199	0	
Impact by drought (Ha)	6,067	4,141	0	9,283	0	8,022	39,328	
Destroy by drought(Ha)	1,009	0	0	3,243	0	532	0	

Effective Intervention Actions in Agricultural Sector responds to Climate Change

Past actions prepared to be ready for intervention with climate change

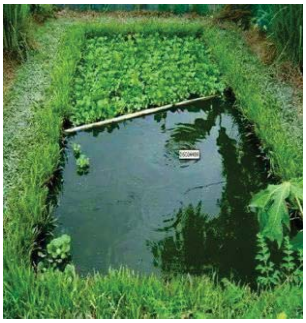
1. Prepared provincial department's action plan: preparation intervention and resolution after risk taken place (rehabilitation)
2. Training and extension on:
   - Cropping: seed saving, seed purification of crops and suitable crop varieties (short-term rice variety, vegetable seed) and provision of agricultural technology
   - Livestock husbandry: preparation of rice straw, crop seed for livestock feed, processing of livestock feed, making shelf or security shelter for livestock, and searching for hill area to move the livestock in during the flood period.
3. Preparation of tools and materials such as; engine boat, gasoline, medicine for livestock, feed, and other tools for intervention

Key activities with community

Extension to promote the farmer doing the less water requirement crops

Extension to promote the multi-benefit farming or integrated farming

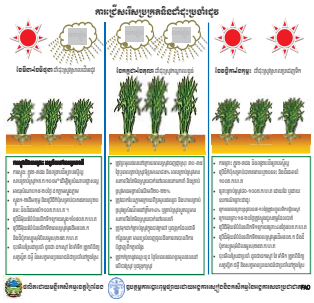
Promote fish culture in plastic pond or rice field



Mixed measure to protect rice cropping


Experimental study to search for short-term rice variety which can be grown any season and resilience to climate




Livestock production

1. Production

- Promote livestock feeding crops and cake for cow
- Livestock feeding garden (grass)
- Storage of rice straw
- Training on livestock husbandry technique



2. Veterinary:

- Strengthening the capacity of Village veterinary agents
- Vaccination to prevent the disease transmission
- Prepared the drug for treatment: Antibiotic and Vitamin for livestock health improvement
- Biosafety measure



Intervention measure responds to the emergency

Planning of key activities

1. Assigned the role and responsibility
2. Observed the effected situation
3. Estimate the total impact, assessing of damage, and report to Provincial Municipality, Ministry of Agriculture, Forestry and Fisheries (MAFF) and relevant institutions.

Prepare safety hill site for livestock and supply livestock feed during the flood period

Rehabilitation action plan

Production of rice and vegetables

1-interven to produce the rice seedling and distribute rice or others crop seed to effected farmers

2-Having had sufficient water source for irrigating when having encountered drought prolong

Resolution for livestock health

Suggestions

- Continues strengthening the capacity of relevant stakeholder staff at provincial and district level on the principle or technology of climate adaptation and resilience
- Organizes the events to disseminate to local stakeholders which is the key to success in mainstreaming of knowledge and promotion of popular participation in climate change adaptation
- Should set up target area for implementing of the mainstreaming climate change resilience project in provinces where vulnerable to natural disaster like as Prey Veng province.

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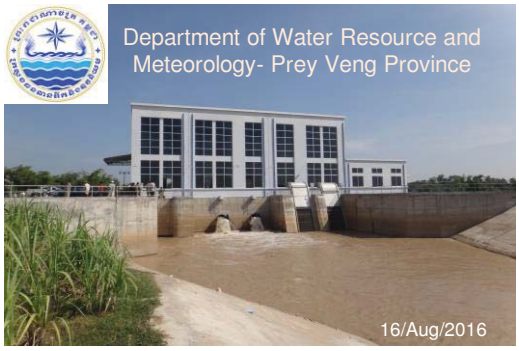


Table of Contents

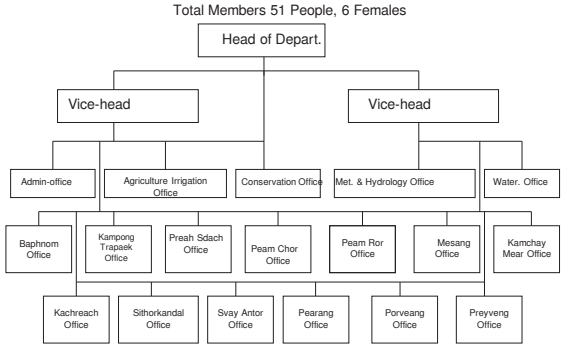
1. Introduction of Prey Veng Provincial Department of Water Resource and Meteorology

1.1 Background

The Department of Water Resources and Meteorology was changed from hydraulic office under the Department of Agriculture in 1999 to the Department of Water Resource and Meteorology. Hydraulic office became Department of Water Resources and Meteorology from the decree No. 662 by the creation of Ministry of Water Resources and Meteorology of RGC, and divided into 5 offices at the provincial, district/municipality through out the country.

1.2 Organization Chart of Department of Water Resource and Meteorology

Total Members 51 People, 6 Females



1.3 Roles of the Department of Water Resources and Meteorology

- Administration and official governance
- Formulate statistical database management and development plan
- Sum up and writing performance report and other activities of the department to the ministry
- Real estate inventory management, materials and inventory
- Research and monitor natural phenomena that occurs in its territorial jurisdiction and report to the Ministry
- Compile meteorological data, hydrology, water resources, and water sources
- Administers the operation and maintenance of all existing irrigation system, water system, pumping station, and large and medium pump categories according to the ministry mandate
- Educate and instruct farmer water user group to monitor their daily implementation activity
- Monitoring and undertaken intervention to prevent natural disasters such as flood and drought
- Study design and build a compact construction

1.4 The achievement from 2004 to 2015

Rehabilitation of irrigation system (75 projects) which including:

1. The total canal length of 524, 774 meters

2. The total length of 97, 697 meters dikes

3. The total constructions are 1,171

4. The number of irrigation wells are 14,466 wells

This amount is specified in the table details

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2. Water Resources: Surface water and Groundwater

Water Resources Map

2.1 Surface water: Irrigation Schemes .pdf

2.2 Groundwater: Monitoring Well-2015.pdf

2.3 water resources availability

Beside Mekong flooding, rain, groundwater

Mekong river lengths of 57 km flows along Prey Veng province through Peam Ror and Peam Chor districts. Small river (Tonle Toch) length 230 km flows through Sithor Kandal, Pea Raing, Porveang, Peam Chor, Preah Sdach, Ba Phnom, and Kampong Trabek district, and a river along border length 51 km. In addition, there are other rivers and natural lakes which are major sources for irrigating during wet and dry season rice. River in Prey Veng Pro..pdf

3. Water Resource Infrastructures

- 139 reserviors length 251,237 meters
- 112 canals length 867,160 meters
- 15 pumping stations
- 58 Water gates
- 26 construction teaching
- 91 intercepted construction
- 227 construction of water
- 259 crossing construction
- 348 water sewage construction
- Inventery -2015.xlsx

4. Successful water farmer user group

- There are 23 water farmer user groups through out the province up to now, and some to them managed and used water according to specific situation in their community such as mobilizing cash for water usage and contributed to maintain irrigation system after harvesting. FWUC PV 2015.doc
- The success of water use and management is relied on private sector. This includes pumping through fees from farmer in which this case occurred in the region that plan dry season rice. Farmers and water suppliers agreed on a set price in which this implementation seem majority occurred in Kampong Trapaek, Preh Sdach, and Peam Cho districts.

5. What should be done to improve community water management?

- Participation from beneficiary farmer groups
- Encouragement with a strong support from relevant local authorities supporting any kinds of management activities implementing by community water user group.
- Participation from relevant agencies- working on water resource sector.
- Building complete irrigation system (Complete system)
- Ensuring water supply is enough with both seasons.

10

Participation from Beneficiary User Group

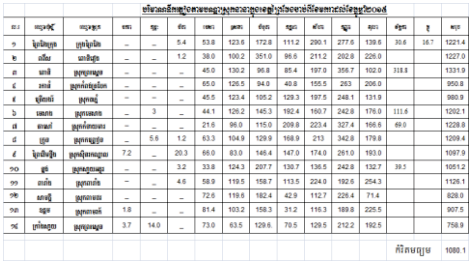
6. Water Resource Development Planning with Responding to Climate Change

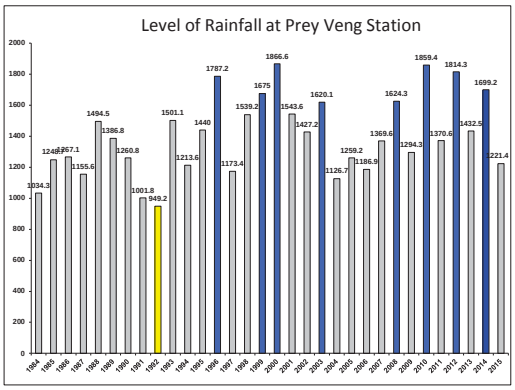
- Yearly planning and 3 years planning focus on rehabilitating water reservoir canal lack for sustainable use of water resource Plan 2015-1017.xlsx
- Rehabilitating all main canal
- Rehabilitating existing natural lakes which are suffering from higher sedimentation, and cubing any kinds of illegal forest clearance.
- Strengthening rights of Community Water User Group in order to maintain irrigation system and preventing any kind of illegal land encroachment, especially on public lack- under state control.

7. Source of Information and Water Resource Information

7.1 Rainfall

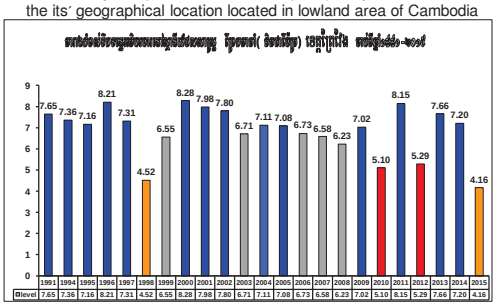
Average of rainfall 1,390mm/y. Below table is the average of rainfall in 2015.





7. Source of Information and Water Resource Information

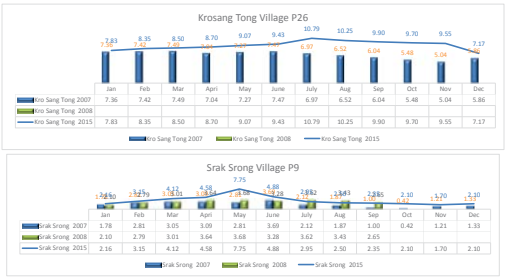
7.2 Flood: Prey Veng Province is suffering frequently flooded because the its´ geographical location located in lowland area of Cambodia



7. Source of Information and Water Resource Information (Cont´d)

7.3 Ground Water

7.4 Total number of tubewell in the whole province, is 14,466 wells



8. Challenges: Flood, Drought and Rapid Storm

8.1 Flood: Average of emergency level 7,5 m (Prek Tatam Station); and years of declaring 1991, 1996, 2000, 2001, and 2013.

8.2: Drought: In 2015, the most suffering drought ever in the recorded due to the low level of rain drop and decreasing of Mekong water level. Therefore, in every dykes in Prey Veng are suffering from drought (lack of water supplied).

MOWRAM is taken a strong action supporting against this natural phenomenal by providing pumping machine and helping local farmer to pump water directly from the Mekong River to 6,000 ha of dry rice fields.

9. Challenges and Opportunities in Water Resources Management in Prey Veng Province

9.1 Challenges

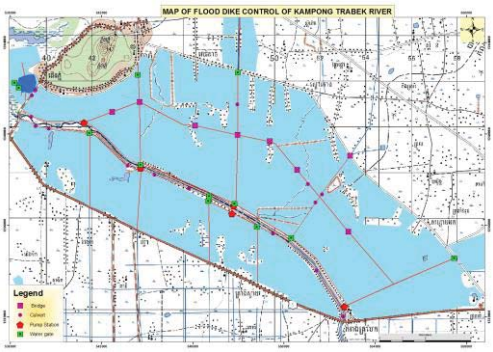
- Due to the geographical location of Prey Veng Province is located in the lowland area of Cambodia, its' yearly flooded by the increasing water level of the Mekong River; and caused strongly damages to majority of irrigation system (dyke). Based on this condition, all irrigation systems are needed to maintain every years. However, provincial level for this rehabilitation is limited.
- However, land condition in this province is not easy to build a direct dyke from River to rice field, it needs pumping machine for helping.
- Building or rehabilitating of dyke is facing some constrains due to the increasing the level of sedimentation into canal and lake, including illegal clearing flooded forest.
- One of the reason of the difficulty of building or rehabilitating dyke is limited participation from local farmer to maintain all existing dyke.

9.2 Opportunities

- Beside existing dyke, government of Cambodia is planning to build large scales dyke (irrigation system) direct from the river for watering all rice field in both seasons, as the following:
  - Delta project at Kampong Trobek (finished and using)
  - Vaikor project phase1 (processing)
  - Vaikor project phase2 (will be started in 2017)

  Otherwise, if the price of electricity decrease, local farmer will has a good room to pump water to their rice field by reducing the cost of total expense, and generating higher net profit.

River Delta Project at Kampong Trobek



Vaikor Project Phase1 and 2

Vaiko Project.pdf

Pictures of Vaikor Project Phase1

10. Proposing Solutions in Water Resource Management due to Climate Change

- Department has proposed a proposal to Ministry to rehabilite 7 existing dykes system and repairing all existing canals; and building additional dyke as needed. ព្រៃកសុំស្ពារ.pdf
- Has submitted proposal to ADB, CAVAC for funding support as following activities:

- Rehabilitation existing canal dyke, and constructing pumping stations. This project will be started in the following year.