CAMBODIA CLIMATE CHANGE ALLIANCE

FINAL REPORT OF WORK

Reservoir – rehabilitation of water gate, Prey Nob District

COASTAL ADAPTATION AND RESILIENCE PLANNING (CARP) COMPONENT
DHI WATER ENVIRONMENT HEALTH
AUGUST 2014

Project duration: November 2011 – May 2014
Total Approved Budget: US$ 2,200,000
Project partners: Ministry of Environment

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1. Summary

The contract for the Coastal Adaptation and Resilience Planning Component (CARP) under the Cambodia Climate Change Alliance was signed in Mid-November 2011 and the present final report of work covers the period from November 2011 to end of May 2014.

Coastal adaptation had been identified as an important component under the CCCA programme, which responds to the priorities identified in the Cambodia National Adaptation Programme of Action (NAPA). The "Coastal Adaptation and Resilience Planning (CARP) component" has built coastal zone adaptation capacity at national and provincial level and developed local coastal adaptation plans through a practical learning-by-doing - capacity building exercise involving all relevant central and de-central stakeholders. The coastal component has removed or alleviated key barriers to strengthening adaptive capacity and increased resilience in affected communities. The coastal component beneficiaries resided in three different levels, namely: national, sub-national and local. At the sites of the demonstration activities, the communities now have increased resilience to climate change impacts and improved livelihoods.

The overall objective of the Coastal Adaptation component has been to increase resilience of coastal communities and ecosystems to climate change through local adaptation planning, demonstrated targeted local interventions and provision of practical learning experience in adaptation planning to the National Climate Change Committee and Climate Change Department.

To contribute to this above overall objective, the following two outcomes were formulated:

1. Improved climate change knowledge integrated into land use and coastal development plans; and

2. Increased resilience of coastal communities and coastal ecosystem buffers to climate change and improved livelihoods.

Capacity Development and Integration of Climate Change in Commune Development Planning

A substantial capacity development has taken place during the implementation. The CCU in MoE is now working as a well-functioning unit for coordination of climate change adaptation between the National Committee for Coastal Development and Management to the provincial departments and commune councils.

At the provincial level departments have developed capacity by participating in Technical Working Groups with focused training sessions in climate change awareness, land use planning, vulnerability assessment, public participation, monitoring of indicators. This capacity has been further developed by using these capacities in actual work in the coastal area.

Substantial capacity development has also taken place in the coastal communes and communities where more than 2000 villagers have been trained in climate resilient integrated farming systems, veterinarian assistants, livestock production, production of rice varieties and development of fishery community for community based natural resources management. All

the capacity development at the commune and community level where further supported by tangible inputs such as livestock, fruit trees, investment in water harvesting and water resources infrastructure and establishment of funds and saving groups.

Besides including climate change awareness overall in the activities a separate comprehensive programme was also targeting climate change awareness in the 31 villages in the coastal area reaching out to around 3000 households.

The overall events and people involved through CARP activities are indicated in the table below.

Activity	Number of Events	Total participants	Number of women
Total	**821**	**10,838**	**>4,685**

Table 1. Summary of events or activities conducted in relation to CARP implementation

A major effort has been on integration climate change into commune development plans and this activity has included several training sessions and consultations with the Technical Working Groups and with the commune councils in the eight selected communes in Prey Nob and Mondul Seima districts. The outputs produced should provide a basis for the future CDP's and CIP's to include climate change considerations in the planning process. In combination with the report describing the process applied by CARP for mainstreaming climate change into sub-national planning, the CIP´s prepared for the demonstration activities in each commune, the template prepared for climate change screening, and the output report of the workshop together they all provide a tool for the communes and districts to include climate change in the sub-national planning process. The process used will be presented and discussed with NCDD-S working group through LDCF and activities under LDCF will apply similar approach and monitor that the target communes continue this and use the processes applied in future preparation of CDPs and CIPs.

In relation to outcome 2 six demonstration activities were identified and implemented. The results of the activities are shortly summarised below.

Activity 1: Farmer Training Programme in climate resilient integrated farming in 8 communes including demonstration on water conservation, water harvesting and small-scale irrigation

The results and outputs during January 2013 to March 2014 included the conduction of 31 Farmer Field Schools (FFS) on integrated farming systems and climate change to coastal condition. A total of 1,452 farmers including 716 women as direct beneficiaries, who participated in both FFSs (852 farmers including 393 women) and 20 on-farm demonstrations (600 farmers including 323 women) on farm production such as rice and vegetable productions, pig and chicken raising, and fish production during 2013. Also they have formed self-help groups or saving groups for follow up and use as models for replicating and upscale to other areas in coastal zones. A total of 858 farmers including 584 women benefits from operation of saving groups. A special facility has been established for 155 poor households who

have participated in the training so they receive support for rain water harvesting and investment in IFS production.

The Demonstration Activity Integrated Farming and Climate Change Adaptation in the Coastal Area is adopted as a model by the Provincial Department of Agriculture (PDA) of Preah Sihanouk and Koh Kong provinces and sub-national level agencies and local communities for use in increasing resilience of agriculture and food production and related livelihoods to short and long term effect of climate change. The model of Climate Resilient Integrated Farming has been adopted and integrated in Commune Development and Commune Investment Plans by commune councils and strongly supported by PDA. The model of Climate Resilient Integrated Farming has also been adopted and put in the Climate Change Action Plan for Agriculture, Forestry and Fisheries 2014-2018 for building up the resilience of farmers and farming communities in the coastal area to climate adaption in agriculture and livelihoods.

Activity 2: Community Fisheries project for Peam Krasaob, Koh Kong;

The main objective was to establish a Community Fisheries at Peam Krasaob; especially in terms of strengthening regulatory measures and their enforcement. This should improve general fishing developments and its regulatory measures, including improvement of fish stocks. This was likely to be required to adjust to climate change and increase long-term livelihood possibilities for the fishery communities at Peam Krasoab.

Peam Krasoab coastal area is one of the rich natural fisheries resources. To increase livelihood options in the area the local community requested assistance in establishing the Community Fisheries (CFi). The main purpose of having CFi in the fishing areas in Peam Krasoab commune is to co-manage the natural resources at the sea and coastal areas in order to manage, conserve and use the fisheries resources in a sustainable manner, which could contribute to address the issues of climate changes in a sufficient and effective way, complementary to each other and work together between CPA and CFi as a natural resources co-management approach by the local people. CARP funding have facilitated the formal establishment of the Community Fishery with all documents prepared, agreed and signed. A management plan has been prepared for the area which has been demarcated and also the conservation zone has been demarcated. Training has been provided in management of community fishery. All nine steps included in the establishment of the CFi have been done. Monitoring of activities inside the area is established and active. Fish catch monitoring has been established and continuously carried out. A crab bank has been established and stocked. Ten women have been trained improved processes for producing and packaging dried shrimps as a commercial product.

Activity 3: On Farm Field Trials for Seed Varieties, demonstration and training in seed selection in 8 communes

The objective of this activity was to develop and implement on-farm field trials for the promotion and increase availability of shorter term rice crops compared to farmer varieties, particularly for main wet season rice to enable harvest before onset of heavy flooding and sea water surges at the target communes in collaboration with PDAs.

The demonstration activity was implemented in 8 communes at the coastal provinces, 6 communes in Prey Nob district, Preah Sihanouk province, and 2 communes in Mondul Seima district, Koh Kong province. The purpose of this activity was to increase adoption by farmers of improved short duration rice variety in the target area, ensure food security and increase household income and as an adaptation measure to climate change.

The activities were implemented by Cambodian Agricultural Research and Development Institute (CARDI) in cooperation with provincial Department of Agriculture (PDA) and collaborative farmers. These activities were undertaken from February 2013 to March 2014 as follows: (i) on- farm rice field demonstration, (ii) growing mung bean after rice, (iii) farmer training course, and (iv) farmer field days.

The analyses of the results of the on-farm field trials of different rice varieties and showed that the tested varieties gave higher yields and especially gross income compared to current farmer practice as the varieties grown provide a higher price than the normal farmer variety. These varieties were: Phka rumdoul, Phka rumdeng and Phka Romeat for both Prey Nob and Peam Krasoap areas. Also the field trials with mung beans showed that a profit could be obtained by growing these in the dry season but dependent on water availability. Test with the rice varieties in saline soils showed a good tolerance for the above varieties indicated by CARDI and similar to varieties received from IRRI.

Activity 4: Livestock Revolving Stock Scheme in 8 communes

The farmer field school training programs have been completed successfully with ten sessions in each of the villages. Beneficiaries have participated in bi-weekly FFS on care, feeding and management of animals. The knowledge level was measured before and after the training. In the pre-test 18% got good scores, 36% passed the test and 46% failed and the post-test conducted at the end of the FFS sessions showed that 68% passed with good scores, 20% passed with medium scores and 12% failed the test.

A total of 300 beneficiaries (51.3% women) have received inputs such as animals and small amount of starter feed (20 kg). Among all beneficiaries, 57 beneficiaries got gilts, 234 beneficiaries received piglets, 3 beneficiaries received goats, 2 beneficiaries received laying ducks and 4 beneficiaries received chicken. In term of animal distribution, there were 1,170 piglets for fattening, 57 gilts for breeding, 400 chickens, 200 laying ducks and 9 goats distributed to beneficiaries.

A Gross Margin Analysis was carried out and it showed that including the labor cost, each beneficiary can make a net profit of US$245 per year keeping 5 fattening pigs per cycle and three cycles per year. Changing from traditional pig keeping (free range) using local breeds to the improved production system keeping them in pen, providing care and feed to crossbred pigs, minimize time per production cycle.

A total of 93,000 USD was provided for the fund. Around 9,700 USD has been lost due to livestock death. Until now 51,000 USD have been paid back and around 32,000 USD have been used for funding of 2nd and 3rd cycle. It is expected that around 83,000 USD will be available for

continued funding. The procedures and rules for funding have been strengthened and the continued funding will be supervised by CelAgrid and monitored through the LDCF activities.

Activity 5: Climate change awareness raising and training in climate change resilient irrigation

The climate change awareness training in the coastal area has been conducted both in relation to the present activity but also in relation to the demonstration activities. Training has been carried out during two rounds in 31 villages and the climate change awareness booklet has been distributed to the participants.

In each training session up to 30 persons participated. A total of approx. 2780 persons have participated in the training and of which approx. 50% were women. The evaluation shows that women is becoming more active and willing to learn to get knowledge on climate change and related issues.

Also a video documentary has been produced to be shown in the national TV. The video provide information on climate change adaptation and provide information regarding the demonstration activities conducted in the two target areas.

Three training sessions in Climate Resilient Irrigation have also been conducted including a study tour to Cantho in Vietnam. The training sessions has been aimed to involve members of the polder community and to assess the potential for renovating the water reservoirs in the Prey Nob area.

Activity 6: Adaptation measures integrated in Commune Development Plans in 8 communes and linked to commune investment plans.

Eleven projects have been finalized in the selected communes. The implemented projects mainly focus on the provision of water either through rehabilitation of wells/reservoirs or through establishment of rain water harvesting and renovation of water gates. All the projects have been included in the Commune Investment Plans and a specific description has been prepared for each of the projects. A total of approx. 650 households have benefitted from these investment either by getting access to drinking water during the dry season or by having access to water for crop production.

Sustainability Issues and Exit Strategy

Considering the short implementation period of 2.5 year of CARP the main concern is the sustainability of the activities implemented and their replication and expansion to other areas. It was a clear recommendation from the stakeholders that they would like to have the CCCA to continue the coastal activities if the CCCA Programme had a second phase. This would also be the better option as this would have provided an opportunity to follow-up and expand the conducted demonstration activities and thereby increased the likelihood for sustainability. In this context it should also be considered that the two other major climate change initiatives in

Cambodia that is the SPCR under ADB implementation and ASPIRE under IFAD implementation do not plan to have climate change activities in the coastal area.

Presently only the UNEP LDCF project will be working with climate change implementation in the coastal area and with very limited resources for on the ground implementation. Exit strategies have been developed for each of the demonstration activities for activities which could be carried out through LDCF to improve the sustainability situation.

The climate resilient integrated farming activities showed an 3-14 times increase in household income compare to baseline and this should by itself be a clear incentive for the farmers to replicate and continue these activities and also potentially more benefits should be possible to generate through these activities. It would also be expected that other farmers who have received training would be interested to adapt these methods after experiencing the results. The replication would depend on potential access to funds for initial investments and for the local departments of agriculture to provide support during implementation. It is expected that the established saving groups could provide start-up financing for interested farmers but this process could be accelerated if the key ministries could provide a funding source.

The tests of rice varieties showed generally a very significant potential for an income increase (around 4 times) and also a big demand for the aromatic rice varieties. There should be a clear potential for replication as the actual investment by the farmer would be relatively limited and thereby a clear potential long-term sustainability.

Through the livestock fund also a potential for long-term sustainability exist but the profit margin is smaller compared to the above activities and a very important factor would be that the mortality rate can be significantly reduced to make pig fattening profitable. Another factor that could help in this was if the farmers could sell the pigs together in bigger lots instead as the procedure used in the first cycle where the pigs were sold in small lots and through middlemen.

Observations and Lessons Learned

A technical note has been prepared on lessons learned from the demonstration activities implemented. This includes an overview of activities and provides additional details for some of the demonstrations implemented. In the report is provided a summary of observations and lessons learned.

Additionally a synthesis report was finalized in December 2013. This report also elaborate on the challenges and lessons learned under the identification and preparation of the demonstration and investment projects.

Documentation

All major documents and other deliveries of the project are being copied on DVD and/or memory sticks. All major documents have been submitted to CCCA Trust Fund Secretariat including regularly progress reports during the implementation period. Some of the deliveries were part of the contract deliveries whereas additional deliveries have been made for providing more comprehensive information regarding the implementation of CARP.

Financial Utilisation

The contract for the CARP Component was a fixed price contract and payments have been made in relation to linked outputs/progress reporting and payment schedule. The summarized spending of CARP shows that 97% of the funds have been spent for implementation.

2. Implementation Results

Coastal adaptation had been identified as an important component under the CCCA programme, which responds to the priorities identified in the Cambodia National Adaptation Programme of Action (NAPA). The present "Coastal Adaptation and Resilience Planning (CARP) component" has built coastal zone adaptation capacity at national and provincial level and developed local coastal adaptation plans through a practical learning-by-doing - capacity building exercise involving all relevant central and de-central stakeholders. The CCCA coastal component has also followed innovative approaches on Ecosystem Based Adaptation (EBA), now widely internationally accepted as one of the key approaches in the portfolios of adaptation actions. The coastal component also has removed or alleviated key barriers to strengthening adaptive capacity and increased resilience in affected communities. The coastal component beneficiaries reside in three different levels, namely: national, sub-national and local. At the sites of the demonstration activities, the communities now have increased resilience to climate change impacts and improved livelihoods.

The overall objective of the Coastal Adaptation component has been to increase resilience of coastal communities and ecosystems to climate change through local adaptation planning, demonstrated targeted local interventions and provision of practical learning experience in adaptation planning to the National Climate Change Committee and Climate Change Department.

To contribute to this above overall objective, the following two outcomes were formulated:

3. Improved climate change knowledge integrated into land use and coastal development plans; and
4. Increased resilience of coastal communities and coastal ecosystem buffers to climate change and improved livelihoods.

The below activities and studies have been undertaken to reach these outcomes and more details in relation to the indicators are provided in the following tables.

2.1 Steering Committee Meeting, Reviews and Joint Annual Seminars

In the project period four Steering Committees Meetings have been held from March 2012 to January 2014 at which the progress of work were presented and discussed. Similarly work plans and budgets for the project were approved at these meetings. The overall results of the CARP was presented at the 5th Steering Committee meeting on 18 August and the report adopted by the Committee.

A Review of the CARP was conducted in spring 2013 together with other grant projects under CCCA. This review expressed that clear results had been achieved by the component. Some recommendations were provided by the review team and actions were taken accordingly.

Two Joint Reviews have been conducted by the CCCA and UNEP of the two projects CARP and LDCF projects including field visits to assess progress on the ground. These reviews were conducted in July 2013 and in March 2014. Following the first review recommendation were provided and follow-up actions implemented by the management team.

A thorough Mid-Term Review was carried out for the sister project under LDCF in April 2014 and the conclusions also including CARP results stated that these projects had good ownership, good management and had achieved significant and valuable results during the implementation period up to now. It also emphasized that until now the visibility of CARP was much stronger than that of the LDCF. It also stated that it was important to continue the activities and also expand demonstrations to Kampot and Kep Provinces to maintain the momentum.

Under the CCCA a final very cursory review was conducted of CARP activities and with limited interaction with the team. The findings included a number of misunderstandings and have been commented by the management team of CARP.

Both reviews included recommendations regarding of the fund management and additional capacity building to strengthen this. In response to this the procedures have been strengthened and supervision and monitoring put in place.

During the implementation period two Joint Annual Seminars have been conducted by CARP and LDCF with participation of approx. 400 persons from national and sub-national level including involved communities. The last Joint Annual Seminar was held on 25-26 March 2014 and provided a good platform for presentation of the achievements reached so far by the CARP and LDCF projects. These achievements were also clearly acknowledged by the Minister of Environment, and from the opening remarks from UNDP and UNEP. Under the seminar a long list of relevant climate change adaptation actions were identified and a very clear conclusion was that the coastal activities should be expanded and replicated in other provinces. It was also strongly recommended by the participating stakeholders that the good results of CARP should be continued through the next phase of CCCA (See Annex 1).

A substantial capacity development has taken place during the implementation. The CCU in MoE is now working as a well-functioning unit for coordination of climate change adaptation between the National Committee for Coastal Development and Management to the provincial departments and commune councils in the coastal area. The sustainability of this capacity might be limited as most positions have been covered by project staff. However, these positions will continue under the LDCF activities and could generate permanent positions.

At the provincial level departments have developed capacity by participating in Technical Working Groups with focused training sessions for 38 provincial staff in climate change awareness, land use planning, vulnerability assessment, public participation, and monitoring of indicators. This capacity has been further developed by using these capacities in actual work in the coastal area. The National Committee for Coastal Development and Management have together with Ministry of Women Affairs and National Committee for Disaster Management become members of the Steering Committee and it is expected to provide a formal structure for reporting on climate change activities in the coastal area.

Substantial capacity development has also taken place in the coastal communes and communities where more than 2000 villagers have been trained in climate resilient integrated farming systems, veterinarian assistants, livestock production, production of rice varieties and development of fishery

community for community based natural resources management. All the capacity development at the commune and community level where further supported by tangible inputs such as livestock, fruit trees, investment in water harvesting and water resources infrastructure and establishment of funds and saving groups.

A comprehensive programme was also targeting climate change awareness in 31 villages in the coastal area reaching out to around 3000 households.

The overall events and people involved through CARP activities are indicated in the table below. For details please refer to information under the separate activities.

Activity	**Number of Events**	**Total participants**	**Number of women (total or %)**
Total	**821**	**10,838**	**>4,685**

Table 1. Summary of events or activities conducted in relation to CARP implementation

2.2 Integrating climate change into commune development plans

This activity has included several training sessions and consultations with the Technical Working Groups and with the commune councils in the eight selected communes in Prey Nob and Mondul Seima districts. See table below for more details on activities and events. A specific training manual for the area together with a general training manual have been prepared and used in training. Land use maps have been prepared based on 2012 data and distributed to all communes. A report have been finalised containing the outputs from the workshops on integrating climate change into commune development plans. This output should provide a basis for the future CDP's and CIP's to include climate change considerations in the planning process. In combination with the report describing the process applied by CARP for mainstreaming climate change into sub-national planning, the CIP´s prepared for the demonstration activities in each commune, the template prepared for climate change screening, and the output report of the workshop together they all provide a tool for the communes and districts to include climate change in the sub-national planning process. All documents produced are presented in Annex 2.

Activity	**Number of Events**	**Total participants**	**Number of women (total or %)**
Workshops	2	49	2
Field Visits	8	76	3
Surveys	6	38	1
Total	**16**	**163**	**6**

Table 2: Events or activities conducted in relation to climate change integration in commune development plans

2.3 Activity 1: Farmer Training Programme in climate change adaptation and integrated farming in 8 communes including demonstration on water conservation, water harvesting and small-scale irrigation

This section gives a summary of the activities conducted under the Climate Resilient Integrated Farming during January 2013 to March 2014. The approach was to implement the Climate Resilient Integrated Farming Training Programme for (a) agricultural extension staffs and (b) households/families in multi-scale climate change adaptation strategies and integrated farming (integration of crops, livestock, fish, water) in 31 villages covering the 8 target communes in Prey Nob District, Preah Sihanouk province and Mondul Seima district, Koh Kong province. The demonstration was aimed to improve household food security and income generation through strengthening and improving adaptive capacity and resilience of farming and local communities to climate change in the coastal area. The Demonstration Activity aimed to reach the following objectives:

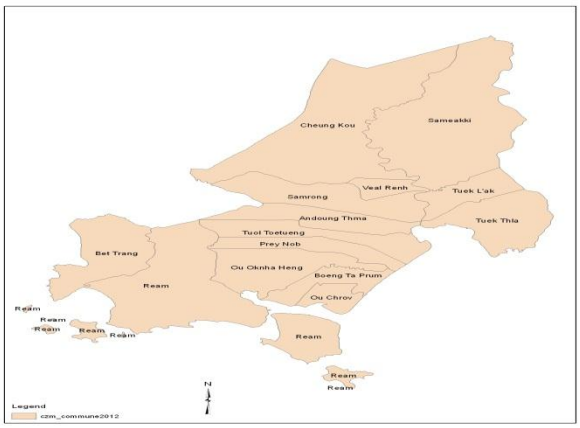
1. to assess the impact of climate change on local farming communities and livelihoods in target communes and to identify the options and measures for climate change adaptation and resilience in the coastal area.
2. to identity and develop training modules for field extension workers and farmers for strengthening adaptation and resilience capacity in coastal areas.
3. to strengthen and improve technical and extension methodology capacity and skills for field extension workers to carry out and facilitate integrated farming training and climate change adaptation and resilience with farmers and communities in the coastal area.
4. to improve and strengthen adaptation capacity and resilience to climate change by using climate resilient integrated farming approaches through farmer field schools and on-farm demonstrations, field days and exchange visits.

The 31 villages in the 8 target communes included the following villages in the two districts:

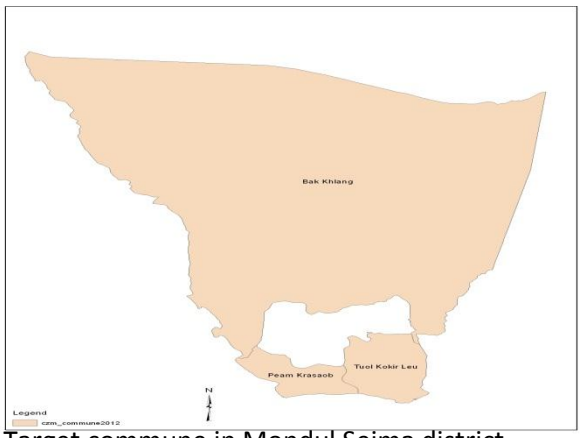
1. Total 25 villages in Prey Nob District, Preah Sihanouk province:
    - 4 villages in Teuk Thlar commune;
    - 4 village inTeuk Laak communes;
    - 3 villages in Samaki commue;
    - 4 villages in Toul Toteung commune.
    - 5 villages in Prey Nob commune and
    - 5 villages in O Okhna Heng commune.

2. Total 6 villages in Mondul Seima District, Koh Kong province:
    - 4 villages in Toul Kokir commune and
    - 2 village in Peam Krasoab communes.

Figure 1. Target communes in Prey Nob district and Mondul Seima District maps of IFS-CARP in 2013



Target commune in Prey Nob district



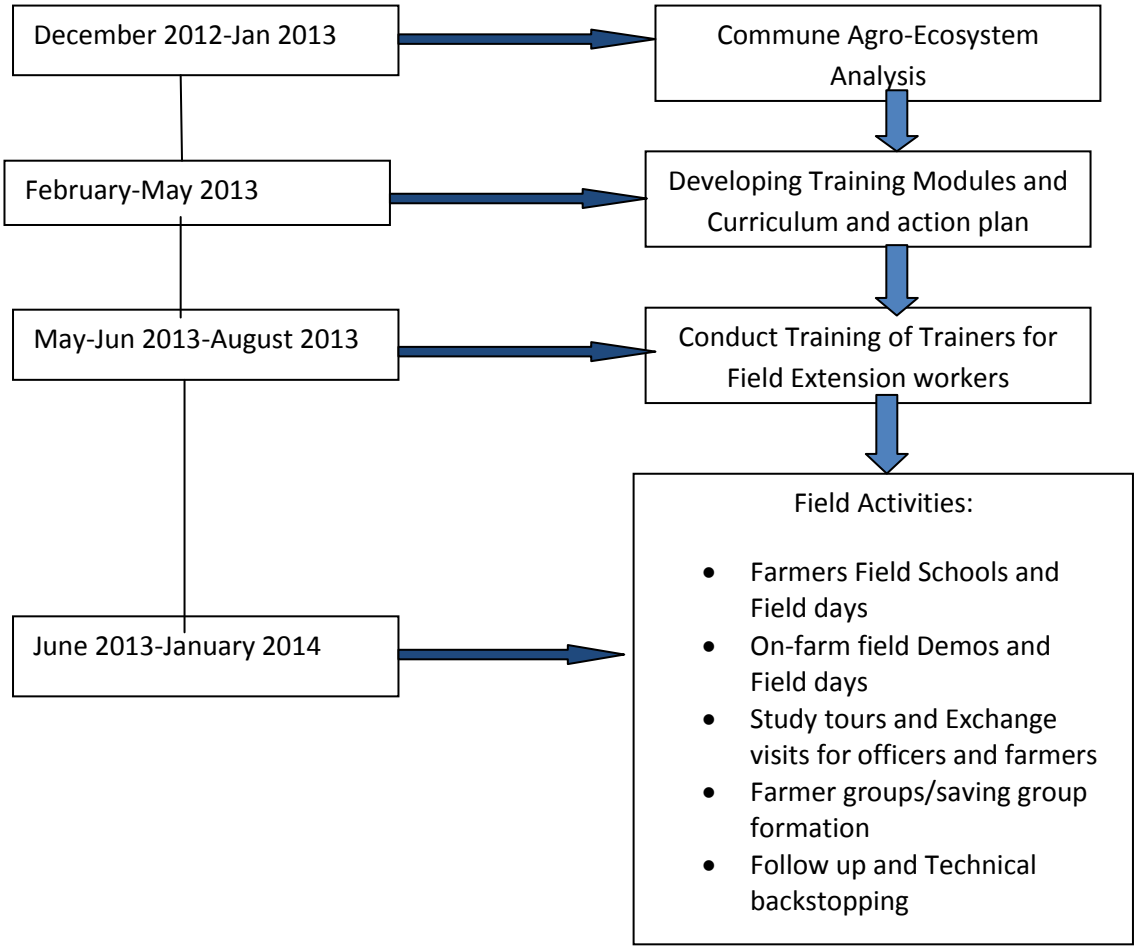
Target commune in Mondul Seima district

Implementation approaches and methodology

The activities were carried out using participatory training and extension approaches including the following:

1) Participatory Assessment and Planning by applying the Commune 's Agro-ecosystem Analysis (CAEA) to assess the current situation and trend, as well as the impacts of climate change on and risks for agriculture/farming and livelihoods and identify what are local solutions/adaptation and mitigation, and propose adaptation and mitigation strategies and action for improving farming/agricultural productivity and livelihoods and to identify some adaptation options and activities in target communes.
2) Development of the training module and curricular to coastal conditions for extension workers and farmers based on the results of CAEA results and stakeholder consultation workshops.
3) Participatory training approaches carried out with Training of Trainers for extension workers to improve skills and knowledge on Climate Change impacts and adaption on Agriculture and livelihoods, extension methodologies and agricultural technologies and practices (e.g. rice, vegetables, soil nutrient management, fruit trees, integrated farming systems.
4) The participatory extension approaches by conducting the Integrated Farmer Field Schools and on-farm field demonstration, field days and exchange visits.
5) Participatory monitoring and evaluation for follow up and technical backstopping during implementation of field activities e.g. IFFS, on-farm field demonstrations, field days, in field data and on-farm data collection and farm economic analysis in villages and communes.
6) Formulation of farmer groups/saving groups to ensure project sustainability and regular follow up and technical support by district extension officers and provincial departments of agriculture with technical backstopping by Department of Agricultural Extension.
7) Use farm Economic Analysis of Farm Demonstrations of FFS and On-farm Demonstrations by calculating farmer gross margin as a useful and practical tool for assessing the comparative yield and profitability of different farmer activities (e.g. rice, vegetables, chicken. pigs, fish farm production). The gross margin for enterprises is gross income minus variable costs (Gross margin=Gross income-Variable costs).

Figure 2. Approaches and Methodology of Demonstration Activity 1-CRIFS-CARP



Adaptation options and activities

Based on the CAEA the results indicated that to reduce the vulnerability of climate change and climate variability the following adaptation measures could be considered: improving crop production systems (e.g. rice, vegetables, cash crops and fruit trees), soil and nutrient management and conservation of agriculture, integrated farming systems, livestock production, water management, fishery and aquaculture and improved agro-forestry (table 3) .

Table 3. Proposed adaptation options and activities for training modules and curricular development for coastal conditions

Adaptation options/ activities	Agricultural practices	Impact on food production
1. Improved crop management		
Improved rice varieties	Use early and medium rice seeds: Sen Pidor, Chulsa, Pkhar Rumduol	High yield and good quality and high income
1.1. Improved rice production	• Best practices for rainfed lowland rice: Best management practices for rainfed lowland rice: husbandry/ cultural practices, crop management (water, nutrient, pest management and weed control), harvesting and postharvest technology. • System Rice Intensification is changing the management of plants, soil, water and nutrient.	Increased rice yield and farm incomes
1.2. Improved vegetables /cash crops production (Open field and Green house/home garden)	• Use good seeds and improved crop establishment (land and crop planting techniques), crop management (water, nutrients, pest and diseases controls), and post-harvest technologies.	Increased crop yield and farm incomes.
1.3. Improve fruit tree plantation	• Use good planting materials, and improved crop establishment (land preparation and planting techniques), plant management (water, nutrients, pest and diseases controls), and post-harvest technologies.	Increased diversified production and farm incomes.
1.4. Improved Soil and Nutrient Management	• Increasing efficiency of plant nutrient e.g. Nitrogen fertilizers, organic fertilizers, legumes and green manure, compost and animal manure, and proper management of organic soils. • Precision of fertilizer application based on crops and Site Specific Nutrient Management (SSNM) of IRRI practices, splits and timing.	High yield through increasing soil fertility and more efficient use of fertilizers (e.g. N).
1.5. Integrated farming system	• A complex diversification of household farming activities e.g., fish ponds, rice field, cash crops field , fruit trees, multi-purpose trees, livestock pen/ housing, compost pit and bio-digesters to ensure household food security and nutrition, and income. Apply farming system practices is advantageous to economic,	Increased diversified production and farm incomes. Increased water availability

Adaptation options/ activities	Agricultural practices	Impact on food production
	social, environment and soil/ land improvement. • Water harvesting for farming and domestic uses.	
1.6. Conservation of agriculture	• reduced/zero tillage for crops/plant cultivation. • Use of legumes and cash crops rotation (before and after rice crops) • Use crop rotation and crop cover, crop residue covers for upland crops and plantations.	High yield and value added incomes due to increased soil fertility, water holding capacity and through reduced soil erosion and nutrient leaching /losses and better rain management.
2. Improved domestic livestock production (chicken, pig)	• Selection and use of animal breeds, improving animal feeds/nutrition and improving veterinary and care services. The management of livestock residues such as manures and liquid residue also for recycle use for composting and biogas.	Increased animal productivity and bio safety, and increased nutrient cycling improved animal feed /fodder production
3. Improved fishery and aquaculture	• Promote fish ponds, mini-plastic pond and cage culture. • Formulation and strengthening fishery community to involve and manage mangrove forest, sea grass bed, crab banks, fishing ground, replanting mangroves and protect coastal soil erosion.	Increased fish productivity and farm incomes
4. Improved water management	• Construction/rehabilitation irrigation systems (e.g. polders, reservoir, canals and water harvesting pond) • Water conservation and rain water harvesting. • Improved on-farm water management and • Introducing participatory irrigation management and development (PIMD) - for O&M of irrigation systems.	Increased crop yields and crop intensity.
3. Agro-forestry systems	• Planting trees, shrub and fruit tree in integrated farming systems including improved fallows, growing multipurpose trees, boundary planting, farm woodlots, shelterbelt and windbreaks, fodder trees, live fences...etc.	Diversified production and increased farm incomes. Reduced wind and storm hit on house

Adaptation options/ activities	Agricultural practices	Impact on food production
	• Formulation and strengthening forestry community	and farm crops and animals.
4. Capacity building for extension officers and farmers	• Participatory training and extension methodologies e.g. communication and farmer field school's facilitation skills • Awareness of climate change and adaption measures and strategies to farmer to cope (for both extension officers and farmers) • Training on Integrated Farming/Farming Training Modules for field Extension workers and farmers.	Effective and efficiency of farmer access, adopted and use of agricultural technology. Increased adaptation capacity and resilience systems for field extension workers and farmers to climate change.

Training modules and curricular to coastal condition

A stakeholder workshop was held during 29-30 April 2013 to discuss and adopt the training modules and curricular to coastal conditions. The training module was developed based on the agro-ecosystem analysis for increasing adaptive capacity and system resilience of climate change in farming communities in the coastal zone. The training module and curricular was developed into two types including (i) for training of Trainers for extension workers and for (ii) farmer training including farmer field schools. The training modules and curricular was focused on critical element of systems' adaptation and resilience as identified by the CAEA results in each commune through reviewing of commune results and a two days' workshop with stakeholders for identifying options and coping activities for climate change adaptation.

The training modules for Training of Trainers included the following modules for the coastal area:

1. Training Module on Farmer Field School Manual for Facilitators including participatory training and extension methodologies and approaches and FFS.
2. Training Module on climate change adaptation and mitigation in Agriculture and Water.
3. Training Module on Rice Intensification Techniques (for irrigated and rain fed lowland rice).
4. Training Module on Vegetable production Techniques
5. Training Modules of fruit tree plantation and production
6. Training Module on Soil Fertility management (Soil and nutrient management).
7. Training Module on Household scale chicken production.
8. Training Module on Household Scale pig production.
9. Training Module on Household Scale aquaculture
10. Training Modules on Integrated farming systems Practices including the Conservation Agriculture and Agro-forestry systems).
11. Training module for agro-forestry systems.
12. Saving group training manuals and saving bookkeeping.

For training of the farmers the following modules including training material were prepared:

1. Improving best management practices for irrigated and rain fed lowland rice (including water saving techniques. e.g. Alternatives Wet and Dry (AWD) irrigation for rice).
2. Improving vegetable production including Drip irrigation and soil mulching.
3. Fish farming and aquaculture
4. Improving household chicken production.
5. Improving pig production.
6. Saving group development.

Training of Trainers (ToT) for field Extension workers in Coastal Zone

The Training of Trainers (ToT) on Climate Resilient Integrated Farming to coastal conditions for field Extension workers from Preah Sihanouk and Koh Kong province was conducted in two rounds. First training was conducted from 27 May to 8 June 2013 in Department of Agricultural Extension (DAE), MAFF and second round was conducted in August in Sihanoukville , Preak Sihanouk province. ToTs was attended by 30 participants including 3 women with 15 participants from Preah Sihanouk province, 12 participants from Koh Kong province and 3 participants from DAE.

After the training the 30 field extension workers have improved skills and knowledge, and capacity on the extension methodologies and approaches, Farmer Field School organization and management (e.g. Agro-Ecosystem Analysis Concepts, facilitation methods, lesson plan and diary record of FFS) and training modules on rice production, vegetable production, chicken raising, pig raising, household scale aquaculture and saving group development, fruit tree production techniques, soil and nutrient management and integrated farming systems and farm management and farm economic, M&E of FFS and field demonstrations of IFS, FFS and field Demo's IFS data collection and analysis and farm economic analysis. The participants are able to facilitate agricultural topics and M&E and data collection and analysis and farm economic analysis of FFS and field demonstrations.

Farmer Field School on Climate Resilient Integrated Farming

31 Farmer Field Schools (FFS) on the Climate Resilient Integrated Farming was conducted during June to December 2013 in 31 villages including 25 villages in Prey Nob district of Preah Sihanouk and 6 villages inKoh Kong province (table 4). The FFS conducted 16 sessions including an opening session in each village. Overall events under the FFS amounted to 496 training sessions for training of 852 farmers (representatives of 852 households) including 393 women who improved skills and knowledge in agricultural technologies on rice production techniques, vegetable production, small scale aquaculture (fish farming), household chicken production, pig production, farming systems including water conservation and rain water harvesting, and water saving techniques.

62 Households were selected as model farmers to conduct field demonstration on rice, vegetables, chicken, pig and fish pond cultures for field study and practices during farmer field school sessions. 62 models farmers including 7 women lead households were selected as the village extension worker in their villages after project completion.

31 Field days were conducted to evaluate FFS and to present the results and outcomes of farmer field schools and field demos for FFS to other farmers in the villages and communes with a total of 921 farmers participating including 435 women.

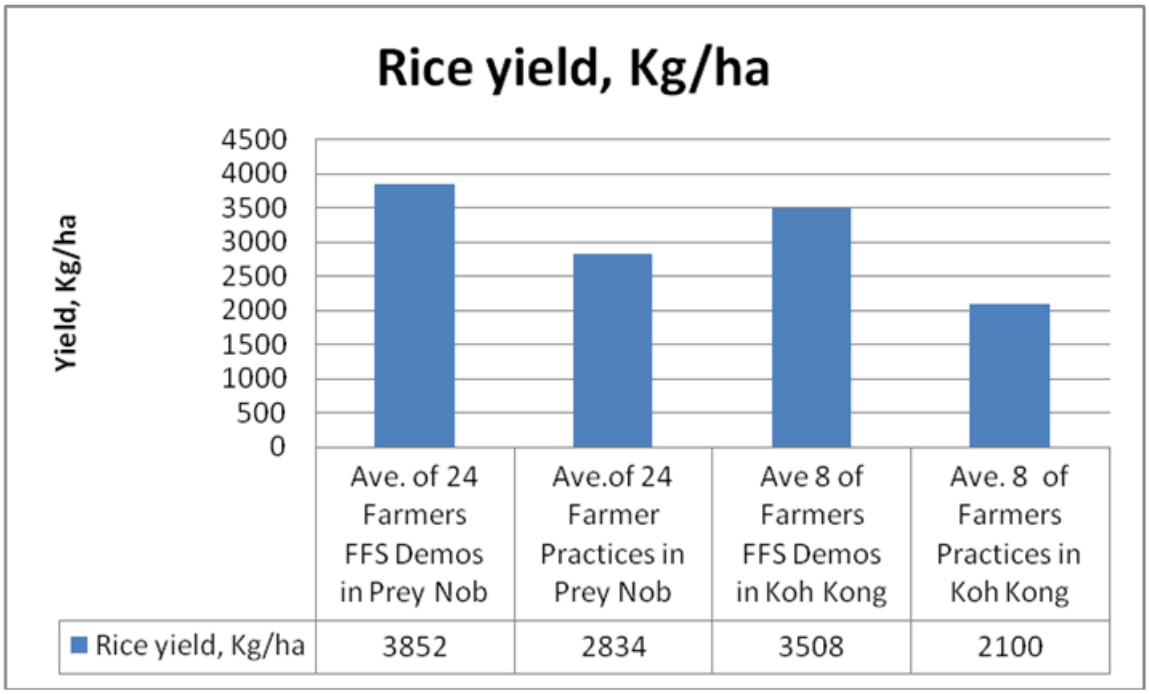
Table 4. Farmer Field Schools and field Demos for IFFS by village June-December 2013.

No	Commune	No. village	IFFS	Field Demos*	Farmer	Female
1	Tuek Thlar Commune, Prey Nop	4	4	8	117	76
2	Tuek Laak Commune, Prey Nop	4	4	8	103	59
3	Samaki Commune, Prey Nop	3	3	6	85	54
4	Tuol Toteung Commune, Prey Nop	4	4	8	115	52
5	Prey Nob Commune, Prey Nop	5	5	10	147	36
6	Ou Okha Heng Commune, Prey Nop	5	5	10	133	50
7	Toul Kokir commune, Mondul Seima	4	5	10	128	52
8	Peam Krasoab commune Mondul Seima	1	1	2	24	14
	Total	**30**	**31**	**62**	**852**	**393**

Note*: 62 field studies for FFS were conducted for farmer study and sharing of experience.

Establishment of baseline for the target areas through CAEA, developing of curricula, training of trainers amounted to a substantial part of the costs for development the activities and training series. Based on the training costs it is expected that continued training of other farmers in Farmer Field Schools will amount to approximately 50-100 USD per farmer trained. An investment of approximately 1,100 USD will be needed for establishment of all IFS activities on a farm according to the results from the present implementation.

Figure 3. Average rice yield of field demonstrations for FFS schools in Prey Nob district and Mondul Seima district in wet season 2013



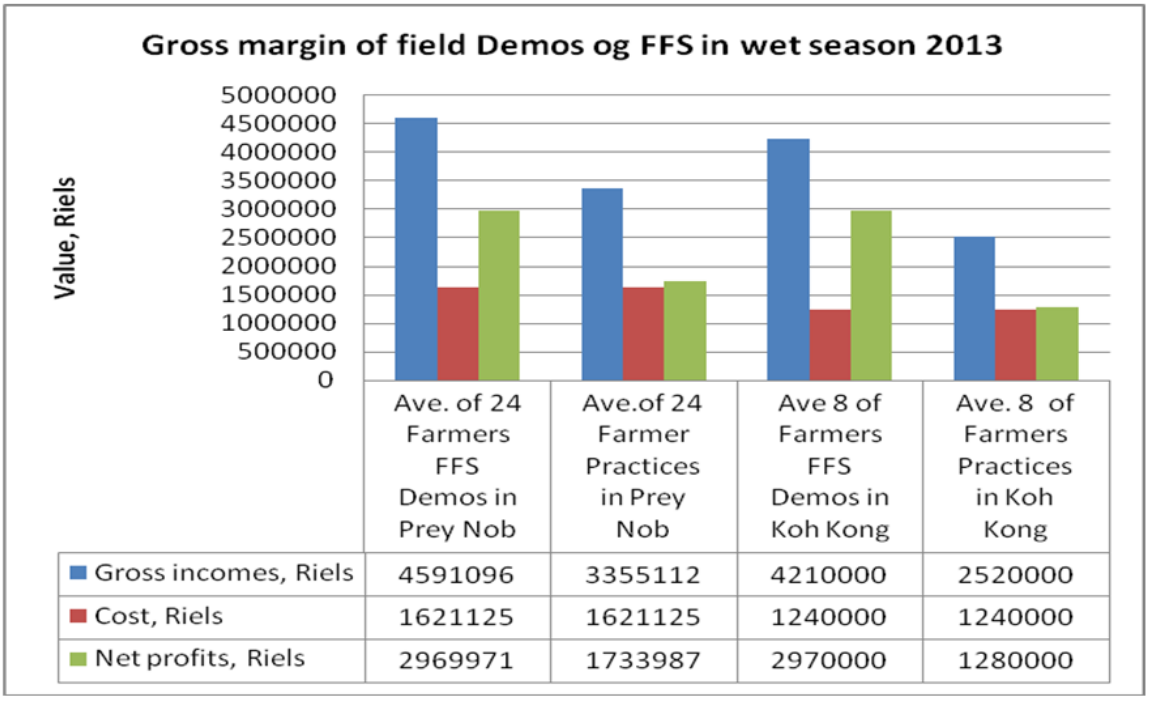
The results of field demonstration data and farm economic analysis of FFSs showed that average rice yield for the improved technologies was higher compared to farmer practices. Average rice yield of improved technologies was 3,852 Kg/ha compared with farmer practices of only 2,834 Kg/ha in Prey Nob district. Average rice yield using improved technologies was 3,508 Kg/ha compared with farmer practices of only 2,100 Kg/ha in Mondul Seima district, Koh Kong province (Figure 3).

Average net profit in Prey Nob district of using rice improved technology was 2,969,971 Riels or 724US$/ha higher than farmer practices of only 1,733,987 Riels or 423 US$/ha. Average net profit of the improved technology plot in Mondul Seima district is 2,970,000 Riels or 724US$/ha also higher than farmer practices plot of only 1,280,000 Riels or 312 US$/ha (Figure 4).

Table 5. Farmers participating in Farmer Field Days of FFS in Prey Nob and Mondul Seima in wet season 2013

No	Commune	No. of village	Field day	Farmers	Female
1	Tuek Thlar	4	4	120	42
2	Tuek Laak	4	4	119	78
3	Samaki	3	3	86	49
4	Toul Toteung	4	4	151	58
5	Prey Nob	5	5	128	40
6	Ou Okha Heng	5	5	137	79
7	Tuol Kokir	4	4	120	60
8	Peam Krasoab	2	2	60	29
	Total	**31**	**31**	**921**	**435**

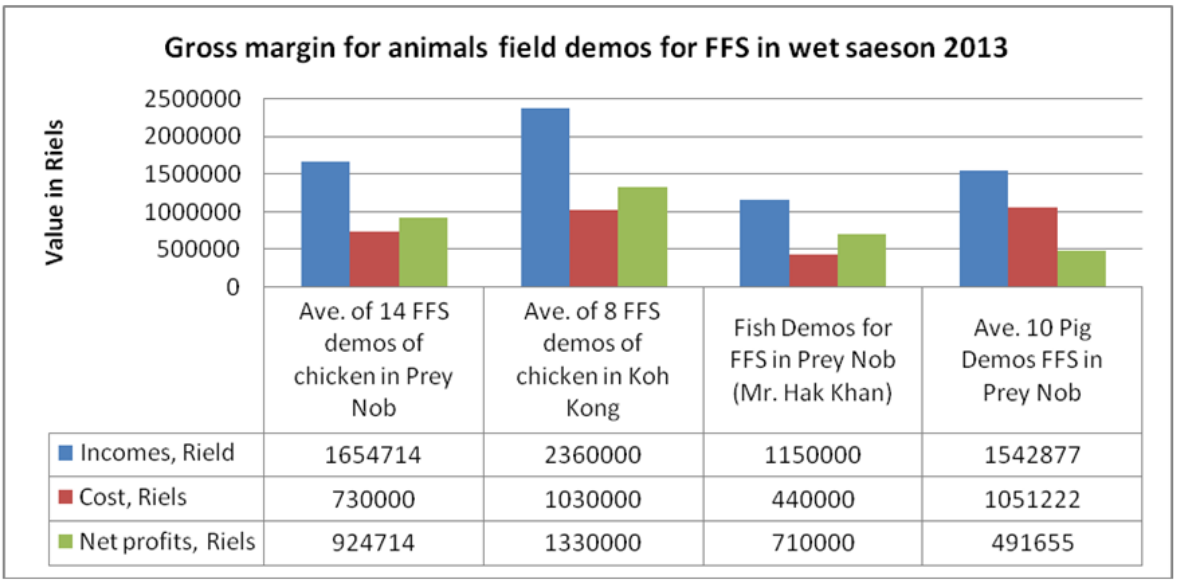
Figure 4 . Average profit of rice's field demonstration for FFS schools in Prey Nob district and Mondul Seima district in wet season 2013



Average net profit of animal raising in field demonstrations of FFS showed that chicken raising in Prey Nob district provided an average profit of 924,714 Riels or 226 US$ and in Modul Seima district it provided 1,330,000 Riels or 324 US$. Fish raising gave an average profit of about 710,000 Riels and fattening of piglets only 491,655 Riels.

Of the introduced livelihood options rice production using the Phkar Rumduol variety provided the highest profit and then followed by chicken raising, fish farming and finally pig raising (Figure 5).

Figure 5. Average profit of animal raising demonstrations for FFS (chicken, pig and fish) in Prey Nob district and Mondul Seima district in wet season 2013



	Ave. of 14 FFS demos of chicken in Prey Nob	Ave. of 8 FFS demos of chicken in Koh Kong	Fish Demos for FFS in Prey Nob (Mr. Hak Khan)	Ave. 10 Pig Demos FFS in Prey Nob
Incomes, Rield	1654714	2360000	1150000	1542877
Cost, Riels	730000	1030000	440000	1051222
Net profits, Riels	924714	1330000	710000	491655

On-farm Demonstrations on IFS and Water harvesting

20 On-farm Demonstrations were conducted in each target communes with 20 households as model farmers including 12 demonstrations conducted from Mid June to December 2013 in Prey Nob district and 8 demonstrations in Mondul Seima district. On-farm Demonstration included rice, vegetables, fruit trees, chicken, pigs raising and fish farming. A total of 600 farmers including 323 women attended the training sessions of on-farm demonstrations. (Table 6). 20 model farmers conducted pilot testing on-farm demonstrations of agricultural techniques and practices for climate change adaption in the coastal zones by introducing the five modules/or technical packages in farm production as an integrated farming approach that produced positive food production and nutrition as well as incomes. Besides 20 rain water harvesting facilities were constructed that contributed directly in climate change resilience of local farming communities.

Table 6. On-farm field Demonstrations on IFS and water harvesting by village in June-December 2013.

No	Commune	No. of village	No. on-farm demos	No. Household conducted on-farm	Farmer attend in Demos session	Female
1	Tuek Thlar	2	2	1	59	30
2	Tuek Laak	2	2	2	62	28
3	Samaki	2	2	2	58	36
4	Tuol Toteung	2	2	2	57	33
5	Prey Nob	2	2	2	64	28
6	Ou Okha Heng	2	2	2	60	35
7	Tuol Kokir	4	6	6	180	99
8	Peam Krasoab	2	2	2	60	34
	Total	**20**	**20**	**20**	**600**	**323**

On-farm Demonstration of IFS typically included the following:

- rice field in lowland part of farms
- home gardens for vegetables, fruit trees and annual and perennial crops for year-round food provision and products for market as well as for wind breaks;
- chicken and pig pens for animal raising for food, sale and organic fertilizers farming and fish;
- a pond stocked with fish (fish in farm approach) for food, nutrition and sale in markets and
- constructed water harvesting tanks and pond connecting to household for domestic use and to home gardening irrigation and watering of animals.

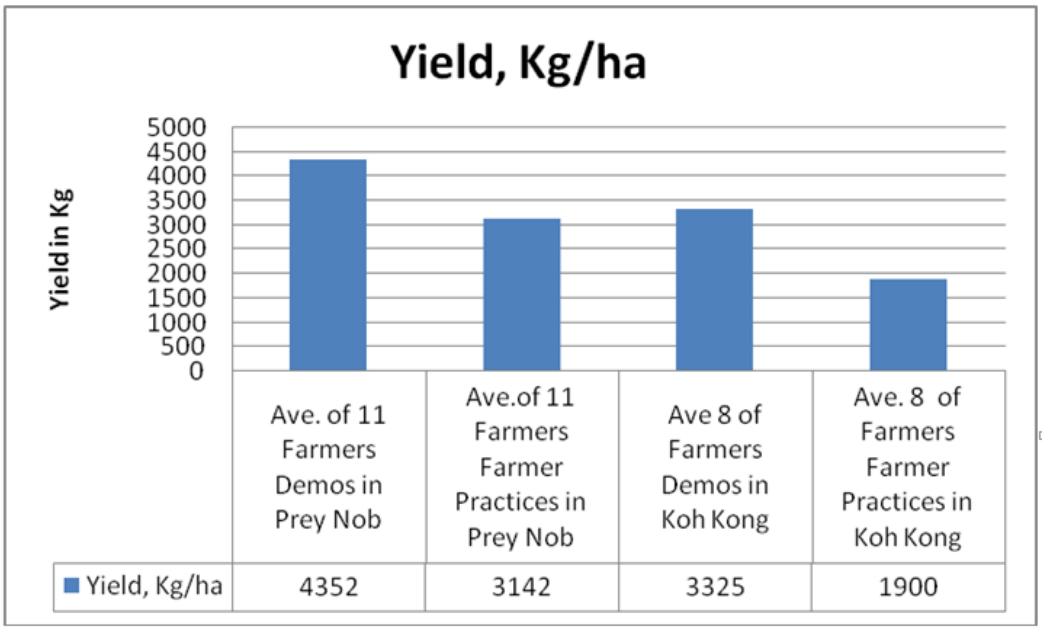
Eight Field days were conducted to evaluate FFS and to present the results and exchange and share experiences and technologies to other farmers and producers in the communes regarding farm business and production with a total of 733 farmer participants including 342 women (Table 7).

Table 7. Farmers participating in Farmer Field Days of on-farm demonstrations in Prey Nob and Mondul Seima in wet season 2013

No	Commune	Commune	Field day	Farmers	Female
1	Tuek Thlar	1	1	98	52
2	Tuek Laak	1	1	99	40
3	Samaki	1	1	102	63
4	Toul Toteung	1	1	97	40
5	Prey Nob	1	1	95	23
6	Ou Okha Heng	1	1	105	47
7	Toul Kokir	1	1	72	37
8	Peam Krasoab	1	1	65	40
	Total	**8**	**8**	**733**	**342**

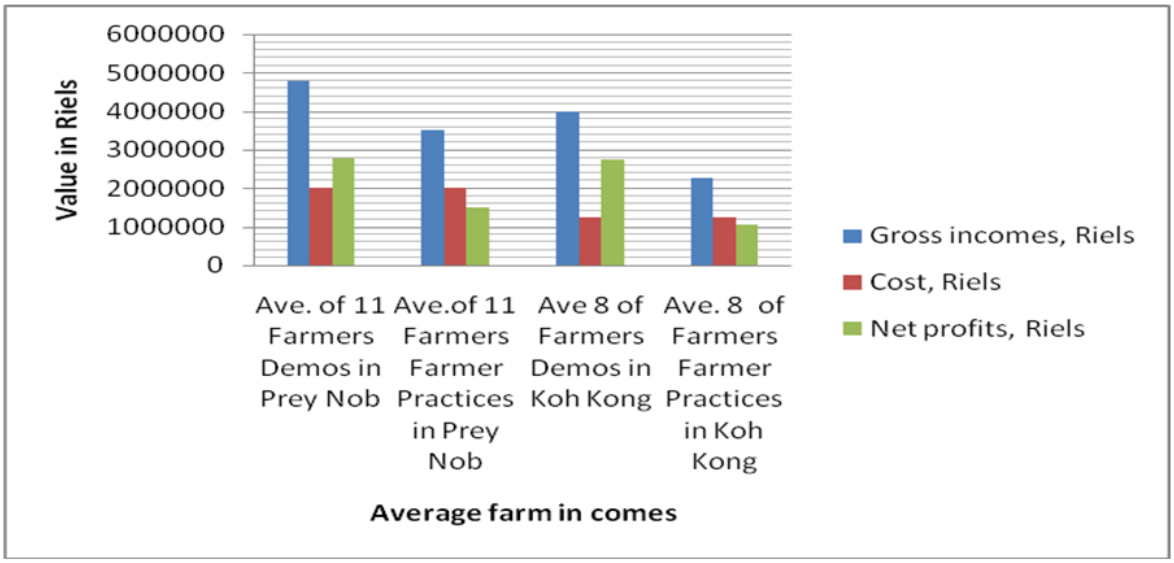
The results of field data and farm economic analyses of on-farm demonstrations showed that average rice yield for 24 trials using improved technologies are higher than traditional farmer practices. Average rice yield of improved technologies gave 4,352 Kg/ha compared with farmer practices of only 3,142 Kg/ha in Prey Nob district. Average rice yield of improved technologies was 3,325 Kg/ha compared with farmer practices of only 1,900 Kg/ha in Mondul Seima district (Figure 6).

Figure 6. Average rice yield of field demos for on-farm demonstrations in Prey Nob district and Mondul Seima district in wet season 2013



The average net profit in Prey Nob district using rice improved technology was 2,789,809 Riels or 680 US$/ha and higher than farmer practices of only 1,490,000 Riels or 363 US$/ha. Average net profit of improved technology in Mondul Seima was 2,750,000 Riels or 670 US$/ha also higher than farmer practices of only 1,040,000 Riels or 254 US$/ha (figure 7).

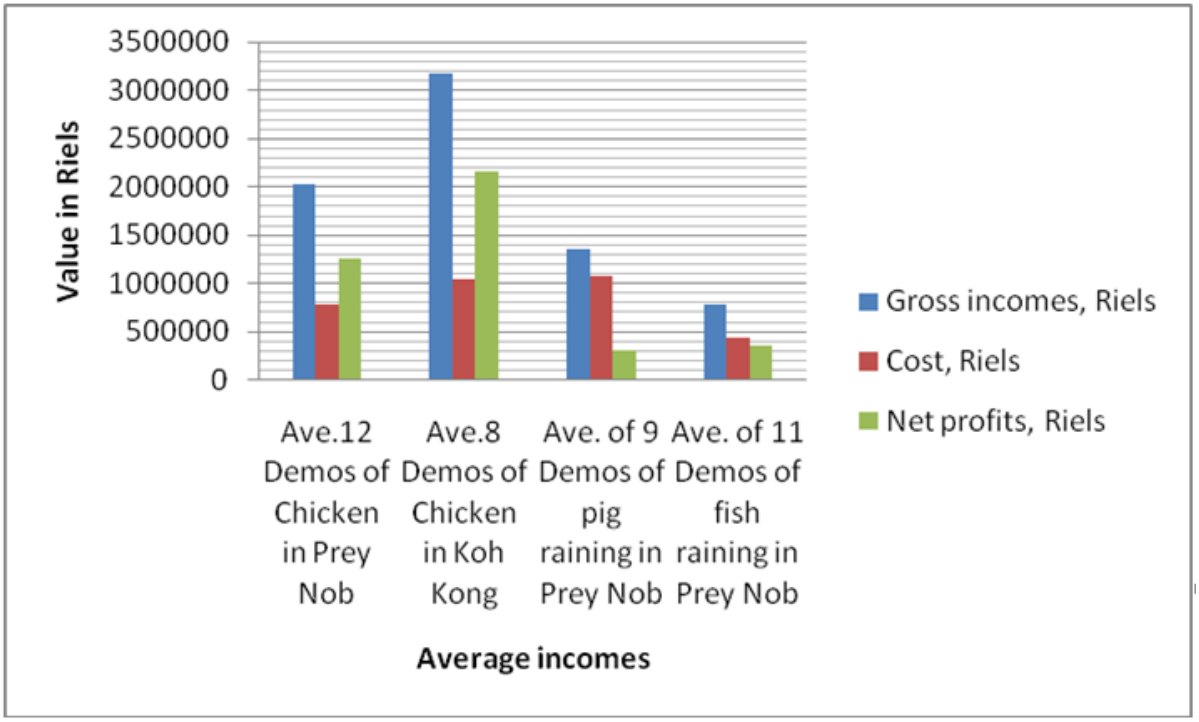
Figure 7. Average profit of rice's On-farm Demonstration in Prey Nob district and Mondul Seima district in wet season 2013



Average net profit of chicken raising in the on-farm field demonstration in Prey Nob district provided an average profit of 1,255,283 riels or 306 US$ and in Mondul Seima district 2,148,250 Riels or 524 US$ during a 4 months period. Average profit for fish raising was 343,454 Riels or 82 US$ and for pigs it was only 293,366 Riels or 71 US$ during a 4 months period (Figure 8).

The average profit of vegetable farming demonstration was 170,000 Riels per 200 m^2 or 8,500,000 Riels per ha during a 4 months period.

Figure 8. Average profit of livestock On-farm Demonstrations (chicken, pig and fish) in Prey Nob district and Mondul Seima district in wet season 2013



Based on gross margin of all farm activities the analysis of on-farm demonstrations (rice, vegetables, chickens, pigs and aquaculture) showed that (i) An average profit of 12 farmers income in Prey Nob district varied from 516,700 Riels to 4,341,600 Riels per season (6 months) (Figure 9) and (ii) an average profit of 8 on-farm demonstrations in Mondul Seima varied from 2,570,000 riels to 6,856,000 Riels per season (Figure 10).

Figure 9a . Gross margin On-farm Demonstrations in Prey Nob district in wet season 2013

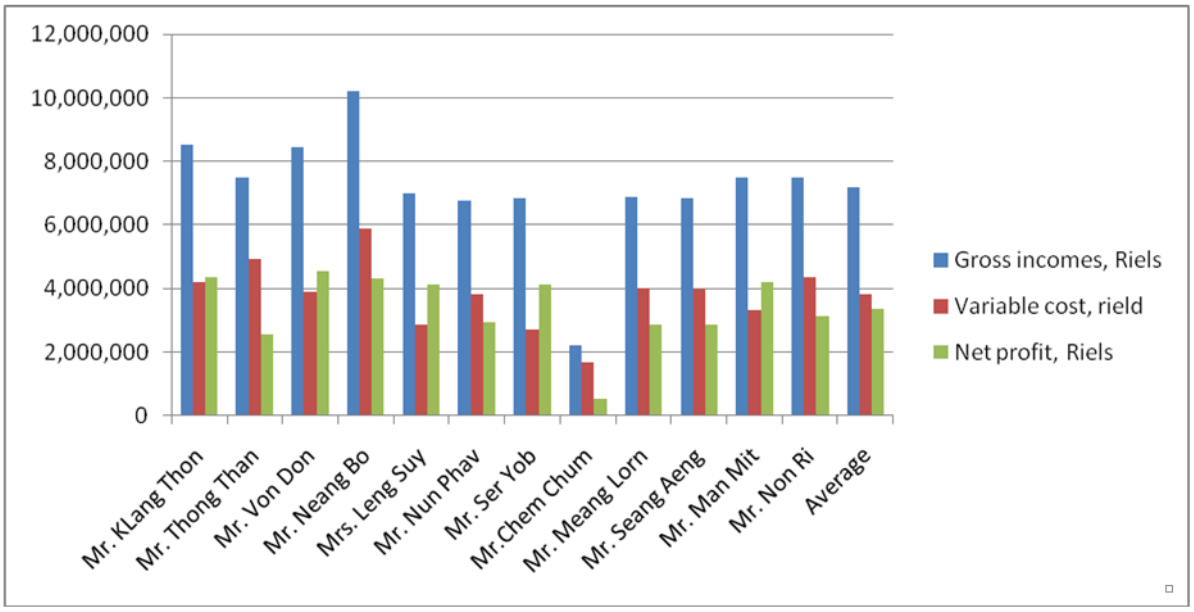
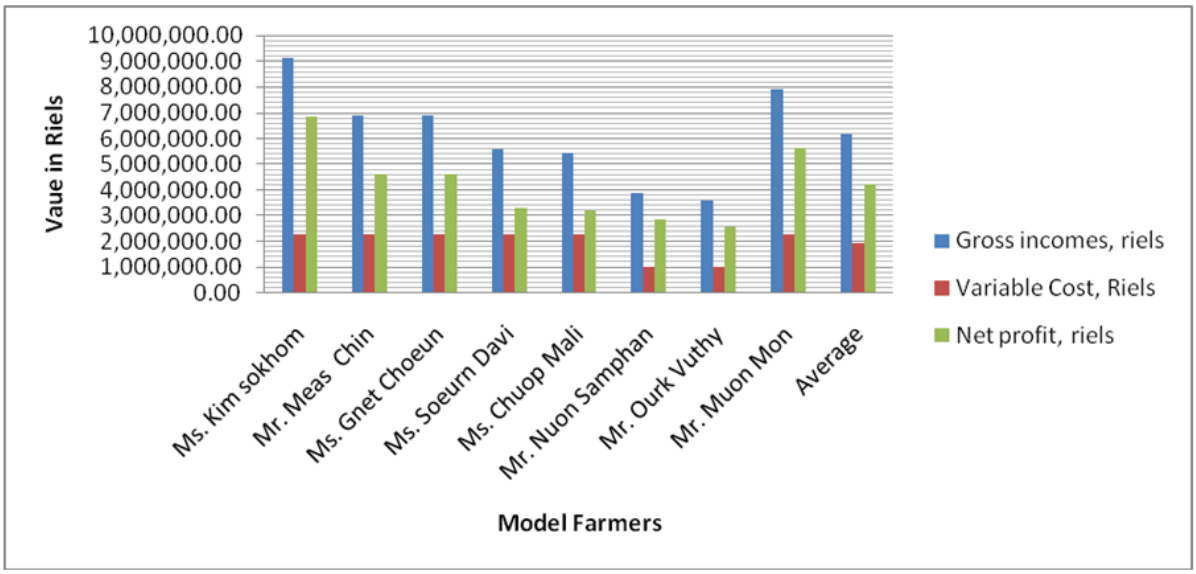


Figure 9a. Gross margin On-farm Demonstrations in Mondul Seima of Koh Kong province in wet season 2013



In the figures below the baseline income has been compared to the net profits after implementation of the proposed IFS activities in the two districts. It shows generally an increase in net income after IFS implementation of between 3 to 14 times. This shows clearly the significant increase in income that can be achieved in farmer income.

Figure 10a. Comparison of baseline farmer income (Riels) 2012 with farmer income after IFS implementation 2013 in Prey Nob

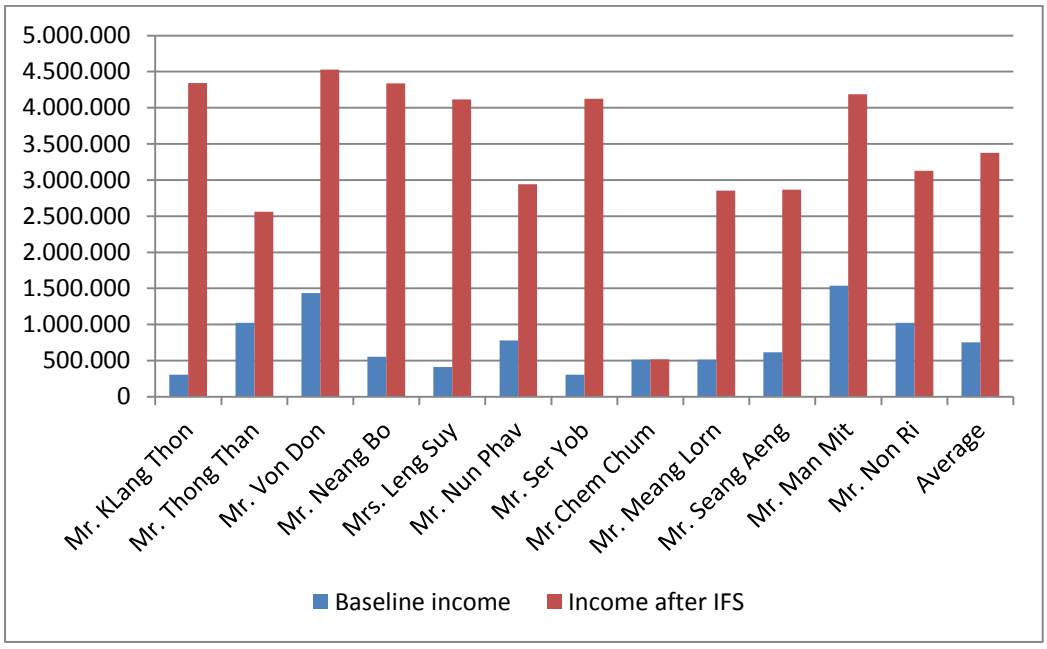
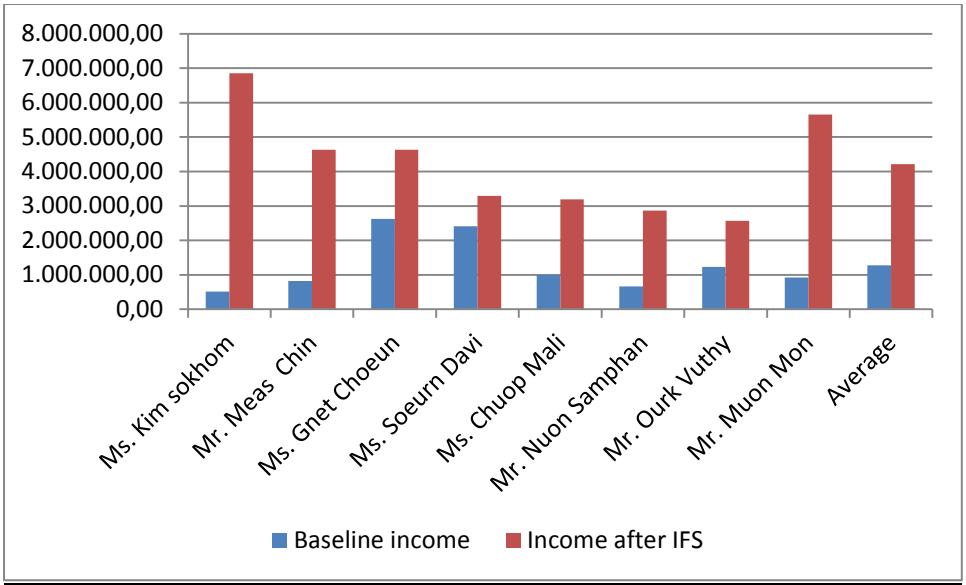


Figure 10b. Comparison of baseline farmer income (Riels) 2012 with farmer income after IFS implementation 2013 in Mondul Seima.



Saving group Development

31 saving groups were developed with a total of 743 farmers (representatives of 723 households) including 437 women in 31 villages (Table 3).

Table 8. Saving groups in Prey Nob and Mondul Seima in 2013

No	Commune	No. village	No. Saving group	Member saving group	Female
1	O Okha Heng Commune, Prey Nop	5	5	114	50
2	Prey Nob Commune, Prey Nop	5	5	114	61
3	Tuek Laak Commune, Prey Nop	4	4	117	80
4	Tuol Toteung Commune, Prey Nop	4	4	96	54
5	Samaki Commune, Prey Nop	3	3	85	50
6	Teuk Thlar Commune, Prey Nop	4	4	103	78
7	Tuol Kokir commune, Mondul Seima	4	4	70	37
8	Peam Krasoab commune Mondul Seima	2	2	42	26
	Total	**31**	**31**	**723**	**437**

Demonstration actions in relation to poor households

The building of Adaptive Capacity and Resilience (physical and economic resilience) for poor households have been aimed to improved household food security and nutrition, and income generation for the poor in the coastal zone. The activity has increased the adaptive capacity and physical and economic resilience systems by improving household food production (linking with the integrated farming activities of CARP), promoting micro-business and saving groups for the poor level 1 and poor level 2 in each village of the target communes. The objectives were to:

1. Improve household food production through promoting integrated farming (crops, domestic livestock and household scale aquaculture and use good quality inputs).
2. Improve access to water for the poor through development of community micro-projects for installing water harvesting facilities.
3. Improve access to credit and working capital for the poor through saving groups.

The activity selected a total of 155 poor households (5 poor households in each village of the target communes (31 villages) in Preah Sihanouk and Koh Kong Provinces from the 1452 farmers who attended Farmer Field Schools and on-farm demonstrations. The activity has undertaken the following activities:

- Supporting the poor households in each village for creating micro-business through village saving groups. The funds are operated and managed by saving groups as revolving funds in the village with supervision and follow up by district and provincial officers, and technical backstopping by Department of Agricultural Extension;
- Support the community micro-projects in the villages for construction local infrastructures that contributes (e.g water harvesting facilities) to increase the climate resilience of local poor farmer communities.
- Support saving groups in each village by increasing group working capital and group meetings in each village to setting saving group regulations and follow up on saving group bookkeeping, and
- Facilitation, support, follow up and technical backstopping by district agricultural offices and provincial departments of agriculture, and Department of Agricultural Extension (DAE) to ensure the sustainability and effective operation.

Meetings have been conducted at provincial, district and commune offices with the provincial department of agriculture, district agricultural offices and commune councils to introduce and discuss the project concepts, procedures, principles and implementation arrangement, and selecting poor households for increasing adaptive capacity and resilience to climate change. The meetings have appreciated the support for the poor and saving group establishment.

Bookkeeping for saving groups were also introduced and trained to districts and provincial officers for assisting saving groups in recording saving bookkeeping.

Meetings were conducted in each of the 31 villages to introduce the basic concepts and principles of self-help group/saving groups. The meetings also discussed the rules and norms including bookkeeping procedures with farmer groups and procedures and methodology for implementing the community micro-projects for support to the poor.

Each saving group has elected group leaders (group leader and deputy group leaders) and treasurers for managing and operating saving activities and bookkeeping of saving groups, and managing the revolving fund in the groups.

Saving groups also selected 5 poor households from each area to receive the first support and loan from the saving to do farm business and construct water harvesting facilities. Each poor household has received support and a loan of US$ 500 (equivalent of 2,050,000 Riels) half to be used for farm business and half for construction of water harvesting facilities.

Each saving group has received support from CARP of US$ 2,700 as group working capital and for construction of water harvesting facilities.

The result is 31 saving groups with a total of 858 farmers including 584 women who benefits from the operation of the saving groups and they have now achieved an own saving of 41,050,000 Riels (or about US$ 10,250). This saving amount has increased steadily from around 4000 US$ in December 2013 to 10,000 US$ in May. A total of 155 water harvesting facilities were constructed that contributed directly to increasing climate change resilience for the 155 households and local farming communities in the village for use in agricultural production and domestic use.

At least 175 poor households (total of 885 peoples) have benefited from 175 constructions of climate resilience infrastructures (water storage facilities) including 20 small household farmers (100 people) have benefitted from 20 pilot demonstrations climate resilience infrastructures (water storage facilities) and 155 poor households (total of 775 peoples) have received support for constructing water harvesting facilities.

Conclusion of results and outcome of Climate Resilient Integrated Farming

Based on activities including ToT, 31 Farmer Field Schools and 20 On-farm Demonstrations during 12 months, the following achievements were obtained:

- The FFS and on-farm demonstrations were established as a model of pilot adaptation activities that demonstrated effective measures by diversifying production of smallholder farmers to achieve a profitable and resilient farm business, and have been adopted to be applied in the whole coastal areas.
- Has provided an improved extension services for the coastal zone as 30 field extension workers from Preah Sihanouk and Koh Kong province have improved their capacity, knowledge and skills in awareness of climate change, climate change impact assessment and adaptation planning, extension methodology and facilitation skills and agricultural technologies and farm management practices, and farmer group/saving development.
- 12 training modules were identified and developed for climate resilient integrated farming in the coastal zone and 6 training modules including rice and vegetable production, chicken, pigs and fish farming and saving group development for improved farm business and farm production in the coastal area.
- Improved capacity and skills of farm business and farm production on climate resilient rice and vegetable productions, pig and chicken raising, and fish farming of a total 1,452 farmers including 716 women, who attended both sessions of 31 FFSs (852 farmers including 393 women). 62 farmers participated in field demonstration and 20 farmers in on-farm demonstrations of full IFS activities (600 farmers including 323 women) as direct

beneficiaries. A total of 1,714 farmers including 821 women also attended Farmer Field days of both FFS and On-farm Demonstration.

- At least 1,452 small household farmers have now improved knowledge on climate resilient farm operation and at least 175 small household farmers (885 people) have benefitted from climate resilient infrastructures (Water storage facilities).
- 31 saving groups were established and carried out the community micro-projects for assisting and support to poor smallholder farmers such as providing credit for saving members for improved and resilient farm businesses. A total of 723 farmers including 437 women have benefitted from operation of saving groups and at least 155 poor households (750 smallholder farmers) have benefitted from investment in climate resilient water harvesting facilities and a livelihood option activity.
- A total of 24 commune council members from 8 communes and 62 village chiefs and village development committees from 31 villages, and 180 farmer representatives from 8 communes have improved capacity and skills in climate impact assessment and identification and planning of adaptation and resilience farming and livelihood activities to climate change in their communes and villages through involvement with the Commune Agro-Ecosystems Analysis (CAEA), planning meetings and field activities under Demonstration Activity-Climate Resilient Integrated Farming Systems of CARP. The results of the Climate Resilient Integrated Farming Systems have been integrated in Commune Development and Commune Investment Plans.
- Recent reports (August 2014) from the target areas indicate that farmers involved in on-farm demonstrations (62 farmers) have expanded their activities by using improved rice procedures, vegetable production, pig and chicken raising using their own funds. Additional some farmers of the 155 households, who received support from CARP and water harvesting also use their own fund for up-scaling farm business particularly vegetable production, chicken and pig raising, and village shop selling.

The table below summarises number of events and people participating in the events for all activities under the demonstration activity on climate resilient integrated farming.

Follow up, monitoring and technical backstopping were regularly carried out by Department of Agricultural Extension to ensure the effective operation of field activities including farmer field schools, on-farm demonstrations and saving group establishment. Follow up and technical backstopping also facilitated and provided hands on training to provincial and district officers in Farmer Field School organization and management, FFS record book and data collection, topic facilitation in FFS sessions, on-farm demonstration field data collection and analysis and farm management data collection and analysis, farmer groups and saving establishment.

DAE considers to ensure the sustainability and effective operation after project finalization of CARP, by follow up and technical backstopping by district agricultural offices and provincial department of agriculture with supervision by Department of Agricultural Extension (DAE). The activities include:

- Support, follow up and providing technical backstopping to 31 saving groups in operation and management of saving groups, record bookkeeping of revolving fund in saving groups.
- Continue follow up and strengthen the resilience capacity of 1,452 farmers and farmer community for climate change adaptation in farm production and farm business through up-scaling and replicating the model of Integrated Farming and saving groups of CARP within target villages and other areas in coastal zones. An estimated cost of 50-100 USD for training per farmer in climate resilient integrated farming and for full scale investment in IFS activities an investment of around 1,100 USD is needed per household.

- Establish and form rice seed production group, and chicken, piglets and fish seed production group, as well as other farm business groups in target communes for rice seeds and farm inputs supply in local farming community through promoting rice seeds and other business pilot production by using Integrated Farming of CARP lessons learnt and model.
- Conduct case study of lessons learnt and success story of Climate Resilient Integrated Farming of CARP for up-scaling and replicating to other areas in Cambodia for building up and strengthening resilience capacity to climate change in agriculture production and livelihood improvement for farmers and local farming communities.

The Demonstration Activity Climate Resilient Integrated Farming in the Coastal Area has been adopted as a model by the Provincial Department of Agriculture (PDA) of Preah Sihanouk and Koh Kong provinces and sub-national level agencies and local communities for use in increasing resilience of agriculture and food production and related livelihoods to short and long term effects of climate change. The model of Climate Resilient Integrated Farming has also been adopted and integrated in Commune Development and Commune Investment Plans by commune councils and PDA. The model of Climate Resilient Integrated Farming has also been adopted and put in the Climate Change Action Plan for Agriculture, Forestry and Fisheries 2014-2018 for building up the resilience of farmers and farming communities in the coastal area to climate impacts in agriculture and livelihoods. As reported by the DAE the Climate Resilient Integrated Farming needs to be followed up and expanded to other areas in the coastal area.

Activity (Demo-Activity 1)	**Number of Events**	**Total participants**	**Number of women (total numbers)**
Workshops	2	106	14
Training (ToT for Field Extension)	2	30	3
Farmer Training (Farmer Field School on IFS)	310	852	393
Farmer Training by 20 on-farm Demos	20	600	368
Saving group meetings	31	858	584
Farmer Field Days	31	1714	821
Field Visits (study visit for Farmers and Officers)	1	37	4
Media	2	60	34
Commune Agro-Ecosystem Analysis -Surveys	8	738	313
Total	**407**	**4995**	**2534**

Table 9: Summary of events or activities conducted in relation to climate resilient integrated farming

2.4 Activity 2: Community Fisheries project for Peam Krasaob, Koh Kong;

This activity started beginning of May 2013 after final clarification between Fisheries Administration and Ministry of Environment regarding demarcation and management of fisheries inside the wild-life sanctuary and outside the sanctuary.

The main objective was to establish a Community Fisheries at Peam Krasaob; especially in terms of strengthening regulatory measures and their enforcement. This should improve general fishing developments and its regulatory measures, including improvement of fish stocks. This is likely to be required to adjust to climate change and increase long-term livelihood possibilities for the fishery communities at Peam Krasoab.

Peam Krasoab coastal area is one of the rich natural fisheries resources. There is a Community Protected Area (CPA) which has been established several years ago. The main purpose of this CPA is on protection of the coastal zone, which is not focused on the fishing related activities. Having seen the fishing conflicts and the necessity of fisheries management in the area which is next to and not covered by CPA, then local fishers have requested Fisheries Administration (FiA) to assist in establishing the Community Fisheries (CFi). The main purpose of having CFi in their fishing areas in Peam Krasoab commune is to co-manage the natural resources at the sea and coastal areas in order to well manage, conserve and use the fisheries resources in a sustainable manner, which could contribute to address the issues of climate changes in a sufficient and effective way, complementary to each other and work together between CPA and CFi as a natural resources co-management approach by the local people with the assistance of technical agencies and authorities for improvement of their livelihoods.

In response to this, the Ministry of Environment (MoE) and the Fisheries Administration of Ministry of Agriculture, Forestry and Fisheries (MAFF) through funding support from CARP of the Cambodia Climate Change Alliance (CCCA), implemented a Peam Krasaob Community Fisheries (PKCFi) project as a demonstration project. The main purpose was to strengthen fishing regulatory measures, their enforcement and fishing stock enhancement considering climate change adaptation in order to improve local peoples livelihoods and climate resilience. The aim was during a five years' period to increase income by 320$ for at least 20% of 277 target households'.

The main expected output during one year project was to establish and strengthen the Community Fisheries Peam Krasaob, under technical support and coordination from FiA central and FiA Koh Kong Cantonment.

The following summarizes the main activities that have been done during implementation:

Activity 1: Official registration and boundary demarcation of Peam Krasaob CFi

The facilitation of CFi establishment has been made through close collaboration with local authorities of Peam Krasaob commune through 9 steps shown in the figure below. Several local consultations and communications were made before the election of CFi committee in order to prepare all relevant materials and logistic arrangements.

Initial consultations were made with key villagers/fishers, local authorities and provincial key agencies to discuss the need and purpose of CFi establishment, with a total of 22 participants (5 women) at Peam Krasoab commune. There was reported on the general situation and issue on fisheries management in Peam Krasoab and it was agreed that there was a need to establish a Community Fisheries at Peam Krasoab. The main purpose of CFi establishment was identified, allowing local people and fishers to participate and take responsibilities in managing and protecting the fisheries resources in a sustainable way, stopping fishing conflicts and provide fish conservation in collaboration with Peam Krasaob Community Protected Area, so that they are complementing each other to provide benefits for the betterment of natural fisheries resources.

All nine steps indicated below have been completed including dissemination and registration of CFi members, preparation CFi by-law/regulation, CFi mapping, fishing area agreement and a Community Fishing Area Management Plan (CFiAMP), and CFi committee election. The committee was elected by 210 members (86 women). The official registration of Peam Krasaob CFi at MAFF has be finalized including the signing by the Minister.

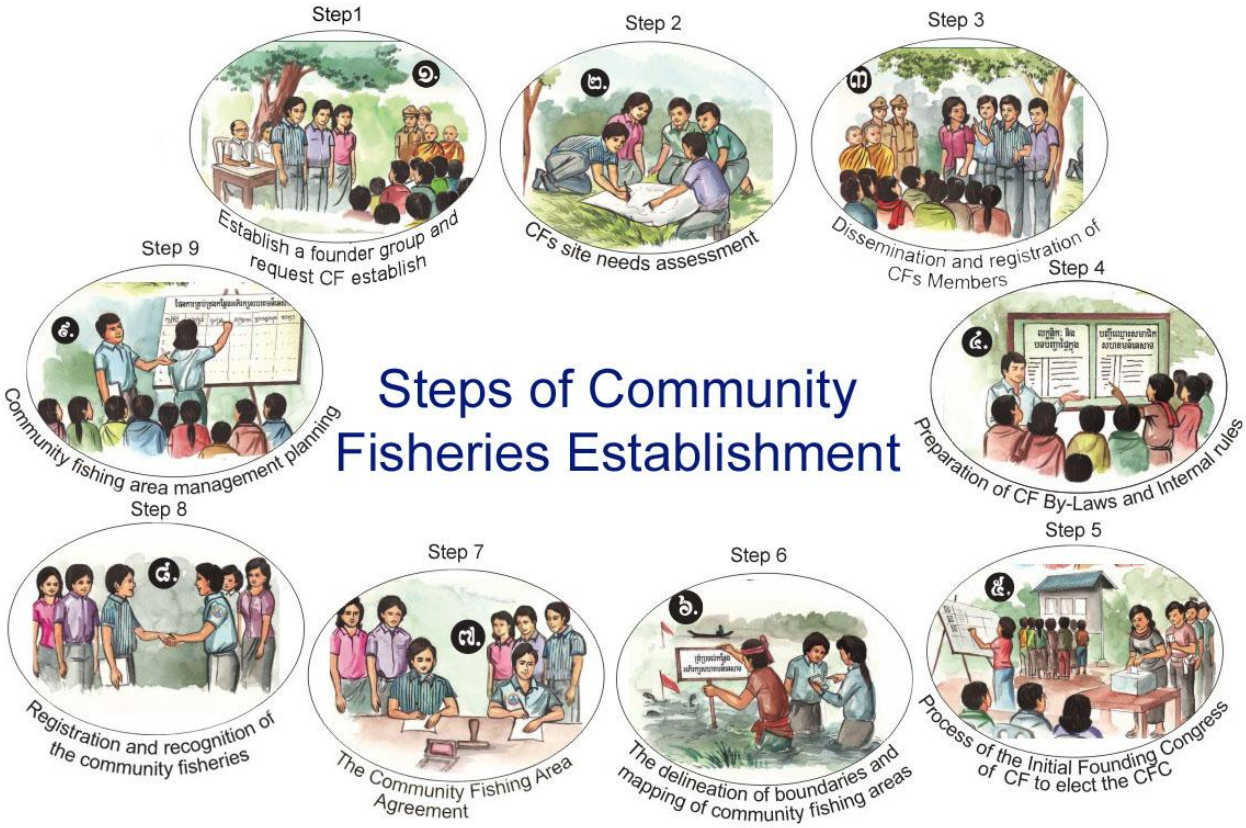


Figure 11: Process of a Community Fisheries Establishment

Picture 1: Peam Krasaob CFi Committee Election and Signed Agreement

Activity 2: Development and Implementation of the Community Fisheries Area Management Plan (CFiAMP)

The development of CFiAMP is the last process of CFi establishment normallystarted after CFi committee election. However, for CFi Peam Krasaob, it was decided by key CFi members and a founder group to be prepared and consulted before CFi committee's election, so that this CFiAMP could be signed and endorsed during the congress of CFi committee election. There were informal consultations made to prepare CFiAMP and finally the 8 main activities planned were agreed by CFi Committee and members as follows:

1. The uses of fishing gears, which require fishers to respect and follow CFi regulation.
2. Fishing boats and fish production statistics;
3. Identify and establish fish sanctuary zone, including regularly patrolling for not allowing in doing fishing activities in this zone;
4. Aquaculture development;
5. Crab bank establishment;
6. Capacity building for CFi committee and patrol groups;
7. Fish processing and marketing; and
8. Promote alternative livelihood activities.

Activity 3: Implementation of fish stock enhancement measures (including demarcation of fish sanctuary zone and CFi boundary) and livelihoods promotion

The conservation zone or a fish sanctuary zone has been identified and mapped together with the CFi area as a whole. The agreed location is in front of Prek Pei with a size of 10 ha, as this is a suitable site for fish brood-stock and fish habitats. Forty concrete poles have been posted around this fish

sanctuary zone, and 10 concrete poles and 10 coconut trees have been used to demarcate the CFi boundary. Two notice boards for CFi regulation were also put at locations where most people could see and read these at the CFi villages.

Picture 2: Activities in the Peam Krasoab CFi

Two main livelihoods have been requested and supported by the project in order to improve and promote the livelihoods for CFi members:

Improving the quality of marine fish processing through proper packaging of dried shrimps: a group of 10 women CFi shrimp processors have been formed. The introduction of good practices of shrimp processing and packaging has been made to these 10 women to understand and to produce better quality of dried shrimps. The result of this practice and on job-training, their dried shrimp processing's quality have improved with better drying and color together with better packaging using better quality plastic bag, that can keep the dried shrimp products for longer.

Picture 3: Good Quality Dried Shrimp with Proper Packaging by Women Group

Creation of crab bank to improve crab production: A group of 20 CFi members (10 women) have been established and also agreed on a saving group. The location of a crab bank cage has been agreed at Peam Krasaob Chas village. A cage has been built and will be put in water in the coming season from October and also the crab bank will start together with the functioning of the saving group as well. The main result of this crab bank activity has proved the high interest of CFi members, high participation, commitment and acting in the activities of natural fisheries resources conservation and management. This activity will be monitored through the LDCF activities.

Activity 4: Strengthening of fisheries monitoring, control and surveillance measures; including procurement of equipment

The following activities have been conducted:

- A speed boat and patrolling materials (Icom and life jackets) have been purchased and delivered to the CFi committee.
- Capacity building: a training course on fish catch monitoring, leadership and facilitation skills has been conducted with a total of 22 participants including 6 women (7 CFi committee members, 10 CFi patrollers and key CFi members).
- 10 members of two patrolling groups have been established together with commune policemen and local authorities for regularly patrolling of fish sanctuary zone and stopping illegal fishing activities. CFi patrolling activities have been well functioning due to that most of CFi patrol members are full time fishers and also engaged in fish catch monitoring.
- Catch monitoring activity has been carried out by 10 CFi fishers (1 woman) using a log book when they go fishing. The results of this catch monitoring is as follows:

  - In dry season, normally fishers use a type of gear, called swimming crab's gill net, which receives the average catch amount of:

    - Swimming crab around 5-7kg/day/fisher
    - Fish around 1-3kg/day/fish (mostly the species of *siganidae, dasytidae, serranidae, ephippidae and others)*

  - In wet season, normally fishers use a type of gear, called mud crab's gill net, which receive the average catch amount are:

    - Mud crab around 1-3kg/day/fisher
    - Fish around 0.5-3kg/day/fish (mostly the same species as above)

These data is useful in providing the basic data and information on catch, which will be used and is important for comparison and evaluation of the impact of CFi management on natural fisheries conservation and management to see whether fisheries production has been improved and sustained after a few years.

Activity 5: Project monitoring and closure workshop at CFi village to feedback on the project results

Project monitoring was done by the provincial FiA staff together with the chief of CFi Peam Krasaob. CFi monthly meeting is one of local monitoring tools, where CFi committee could report what have happened in their CFi area. Mostly CFi monthly meetings have been conducted with the CFi committee members together with Provincial FiA.

A closure workshop was conducted at Peam Krasaob commune to feedback on the project results and future plans. A total of 33 participated (12 women), who are CFi committee, key CFi members, representatives of women fish processing group and crab bank group, local authorities, 3 FiA management team, chief and staff of FiA cantonment Koh Kong and Provincial MoE chief.

It was discussed and reported on the feedback and **main achievements** of CFi Peam Krasaob, which were summarized as follows:

- The Peam Krasaob Community Fisheries has been established and officially recognized with 7 CFi committee members (1 woman) as a leader team for this CFi local governance.
- Required legal documents for CFi registration have been prepared, endorsed and signed. Those CFi legal documents such as CFi lay-law (including member list and CFi Committee structure), CFi regulation or internal rule and CFi area agreement (including CFi boundary demarcation map and fish sanctuary zone);
- CFi area management plan has been endorsed and implemented with necessary activities;
- Those necessary activities, in which 8 activities among 9 activities of CFiAMP have started implementing as follows:
    1. The uses of fishing gears, which require fishers to respect and follow CFi regulation: 2 notice boards have been posted for disseminating CFi regulation and also through CFi monthly meetings.

    2. Fishing boats and fish production statistics: has been piloted with fish catch monitoring.

    3. Identified and established fish sanctuary zone, including regularly patrolling for not allowing fishing activities in this zone: 10 ha of fish sanctuary zone established and demarcated.

    4. Crab bank establishment: has started.

    6. Capacity building for CFi committee and patrol groups: training on leadership and facilitation skills and catch monitoring has been conducted. However, the capacity of CFi committee is still poor and need more capacity building activities on both in-door and out-doors training and awareness creation.

7. Fish processing and marketing: one kind of marine fisheries processing is dried shrimp product has been introduced for improving quality through proper packaging. However, there are more marine fisheries processing proposed to be supported for better quality and marketing.

8. Promote alternative livelihood activities. The two above livelihood activities (crab band and dried shrimp processing) have been introduced and promoted with high interest and commitment of CFi members, especially by CFi women members.

Also reports were provided on **problems and proposed actions and supports** as follows:

- Peam Krasaob CFi is very young, it has just been established for about one year requiring more support both financial and technical for wider functioning.
- The capacity and knowledge of CFi committee members are limited on CFi management and development, so more capacity building activities including on-job training and study tour are required.
- The awareness raising among CFi members and related stakeholders in CFi villages on CFi management and CFi roles, are still lacking and is proposed to be supported in the near future.
- The implementation of CFiAMP has just been for a limited time, so it is proposed to be continued supported for at least three years so that CFiAMP could be monitored and evaluated for the effects and impacts of CFi management. Especially, it was requested for support the promotion and improving of existing and new suitable livelihoods to CFi members.
- Due to that Peam Krasaob CFi is just established, there has been limited opportunity regarding collaboration activities with the Peam Krasaob Community Protected Area. It was requested for longer support, so that these two local communities will have more work together for effective and sufficient fisheries resources management and could provide more lessons learnt and experiences to others.
- Also Peam Krasaob CFi has not started on networking with other CFis . There is a need to support such activities.
- Some of the CFi activities require generation of revenue and it could be considered to copy a fishery fee as used in other CFI's.

Activity	Number of Events	Total participants	Number of women (total or %)
Workshops (Closure workshop at CFi Peam Krasaob)	1	33	12
Training	2	44	12
National Meetings (only project team meeting)	2	26	7
Field Visits	12	132	39
Media	- 2 Posters (1. CFi committee election and 2. CFi Committee Capacity building) and - 2 notice boards (1 for CFi regulation and 1 for CFi map)		
Total	**17**	**235**	**70**

Table 10: Summary of events or activities conducted in relation to CFi establishment

2.5 Activity 3: On Farm Field Trials for Seed Varieties, demonstration and training in seed selection in 8 communes

The objective of this activity was to develop and implement on-farm field trials for the promotion and increase availability of shorter term rice crops compared to farmer varieties, particularly for main wet season rice to enable harvest before onset of heavy flooding and sea water surges at the target communes in collaboration with PDAs.

This section provides the results and outcomes of the on-farm field demonstration for paddy varieties, planting techniques of mung bean (mung bean variety called CARDI Chey) after harvesting of wet season rice, capacity building through training courses and farmer field days. The demonstration activity was implemented in 8 communes at the coastal provinces, 6 communes in Prey Nob district, Preah Sihanouk province, and 2 communes in Mondul Seima district, Koh Kong province. The purpose of this activity is to increase adoption by farmers of improved short duration rice variety in the target area, ensure food security and increase household income and as an adaptation measure to climate change.

The activities were implemented by Cambodian Agricultural Research and Development Institute (CARDI) in cooperation with provincial Department of Agriculture (PDA) in Prey Nob and in Mondul Seima with active participation from commune leaders and collaborative farmers in the target areas. These activities were undertaken from February 2013 to March 2014 as follows: (i) on- farm rice field

demonstration, (ii) growing mung bean after rice, (iii) farmer training course, and (iv) farmer field days.

On-farm field demonstrations on technology package for increased rice productivity

The field demonstration trials on technology package for increased rice productivity was carried out in rainy season with the specific objectives (i) to provide an appropriate technology for rice cultivation practices to farmers (ii) to provide training on rice crop management techniques (iii) to increase rice yield for sufficient home consumption as well as increase household income.

30 rice field demos (20 in Prey Nob district, and 10 in Mondul Seima district) were conducted. In Prey Nob, 11 field trials with Phka Rumduol (PRD) and 9 field trials with Phka Romeat (PRM). In Mondul Seima, 4 trials with PRD, 4 trials with PRM, and 2 trials with IR66 (Table 11) were made. Unfortunately, 3 trials in Prey Nob district were damaged by floods and GAS and 2 trials with IR 66 in Mondul Seima were damaged by salt water intrusion during the flowering stage.

All field trials were divided into 3 plots with each plot size of 10 m x 10 m. Each field trial consisted of (1) CARDI Technology package, (2) Improved CARDI variety + farmer practice, and (3) farmer variety + farmer practice.

Table 11. Number of field trials in Preah Sihanouk and Koh Kong

Province	**Commune**	**No of field demos**	**Variety used**		
			PRD	**PRM**	**IR66**
Preah Sihanouk	Tuek Thla	4	2	2	
	Tuek L'ak	3	2	1	
	Sameakki	4	2	2	
	Tuol Toteung	3	2	1	
	Prey Nob	3	1	2	
	O Okna Heng	3	2	1	
Total		**20**	**11**	**9**	
Koh Kong	Peam Krasaob	2			2
	Toul Kokir	8	4	4	
Total		**10**	**4**	**4**	**2**

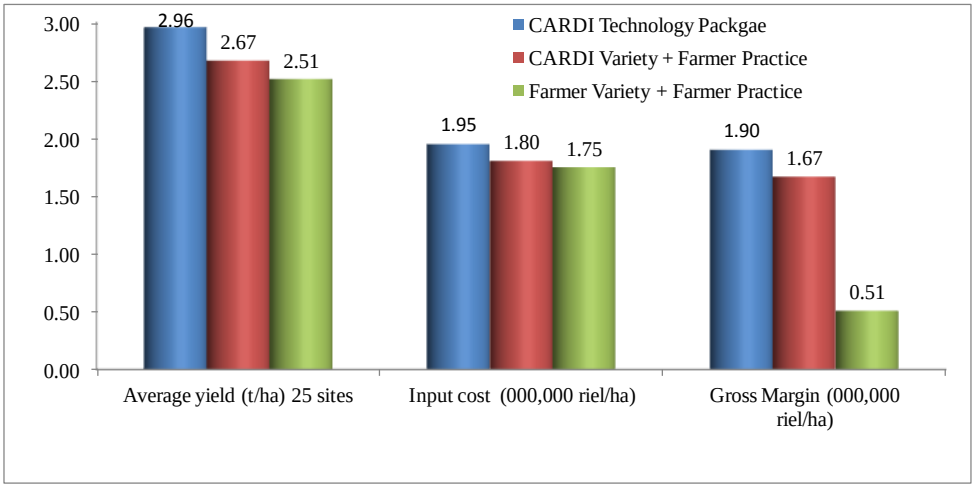
The results obtained from the 25 field trials conducted in the two districts showed that the introduced Phka Rumduol and Phka Romeat rice varieties grow very well in salt affected fields of rainfed lowland in Preah Sihanouk and Koh Kong . An average grain yield of both introduced varieties was 2.95 t ha^{-1} and about 0.5 t ha^{-1} higher than farmer varieties. Yield with introduced CARDI technology package was 18 % higher than farmer practice (Table 12).

Table 12. Grain yield (t/ha) of 25 field demos at Preah Sihanouk and Koh Kong provinces.

Variety	a). CARDI Package technology	b).CARDI variety+ farmer Practice	c).Farmer variety+ farmer practice	Yield increase a and b (%)	Yield increase b and c (%)
Phka Rumduol (13 sites)	3.21±0.6	2.90±05	2.76±0.3	16	5
Phka Romeat (12 sites)	2.68±0.6	2.42±09	2.3± 0.63	20	8
Mean (25 sites)	**2.95**	**2.66**	**2.50**	**18**	**6.5**

Economic analysis from the 25 sites of field demonstrations indicated that CARDI technology package plot obtained higher gross margin of 1.95 million t ha $^{-1}$, gross margin from CARDI variety with farmer practice was 1. 67 million riel ha $^{-1}$, and gross margin from farmer variety with farmer practice was only 0.51 million riel t ha $^{-1}$ (Figure 11). This difference is caused by the higher yield but most importantly by the higher market price for the two varieties tested.

Figure 11. Rice yield and gross margin of CARDI technology package and farmer practice



Picture1. Field demos for paddy variety conducted during wet season , 2013

Seed purification field demonstration

In Prey Nob, Preah Sihanouk province, 6 farmers in each of the target communes was selected to carry out seed purification using a simple seed purification practice for farmers developed by CARDI. The aim was to provide a seed purification technique to farmer so they could have a good quality of seeds for the next growing season.

The size of the seed purification field demonstrations depended on availability of farmer field area. Farmers could use their own local varieties and conventional practice. These varieties included Korl Phrav, Phka Rumduol, Leak San Loek, Haivin and Phka Malis .

Grain yield from six sites of seed purification demonstrations ranged from 1.87 to 2.81 t ha^{-1} with an average yield of 2.22 t ha^{-1} (Table 13).

Table 13. Grain yield of 6 seed purification field demos at Preah Sihanouk provinces.

No of field	Farmer name	Commune	Farmer Variety	Yield (t/ha)
1	Khon Nann	Tuek Lák	Korl Phrav	1.87
2	Ly Tong	O Oknha Heng	Phka Rumduol	1.95
3	Yin Yam	Prey Nob	Haivin	2.18
5	Chork Phal	Sameakki	Phka Malis	2.26
4	Kol Saphoun	Tuek Thla	Phka Rumduol	2.26
6	Sim Sareth	Tuol Toteung	Leak San Loek	2.81
	Mean			**2.22**

Planting techniques of mung bean after wet season rice

The field trials on planting technology of mung beans were conducted in the dry season after rice wet season was harvested. Trials were conducted from January to March 2014 at Prey Nob with the objective (i) to determine yield and growth of mung beans in rainfed lowland area after harvesting wet season rice (ii) to improve soil fertility through growing leguminous crops (iii) to improve livelihoods and increase household income.

15 mung bean trials were conducted in 4 villages in Prey Nob in collaboration with Prey Nob Agricultural District. All field trials were divided into 2 plots with each plot of 10 m x 10 m. The first plot received fertilizer application of 100 kg of 20-20-25+ TE, 100 kg of KCl and 5 tons of organic manure and second plot with no fertilizer inputs. Mung bean variety called CARDI Chey was introduced in these trials. It is a short duration variety which requires about 55-60 days after planting. During implementation of mung bean field trials in the dry season, 2014, 10 trial sites failed due to water shortage for irrigation (run out of water and a long dry period).

The results obtained from the 5 field trials showed that an average grain yield from fertilizer plot was 564 kg ha^{-1}, about 172 kg ha^{-1} (44%) higher than non-fertilizer field.

Economic analysis revealed that the gross margin from fertilizer field was 2.04 million riel ha^{-1} while the gross margin obtained from non- fertilizer inputs field was only 1.59 million riel ha^{-1} (Figure 12).

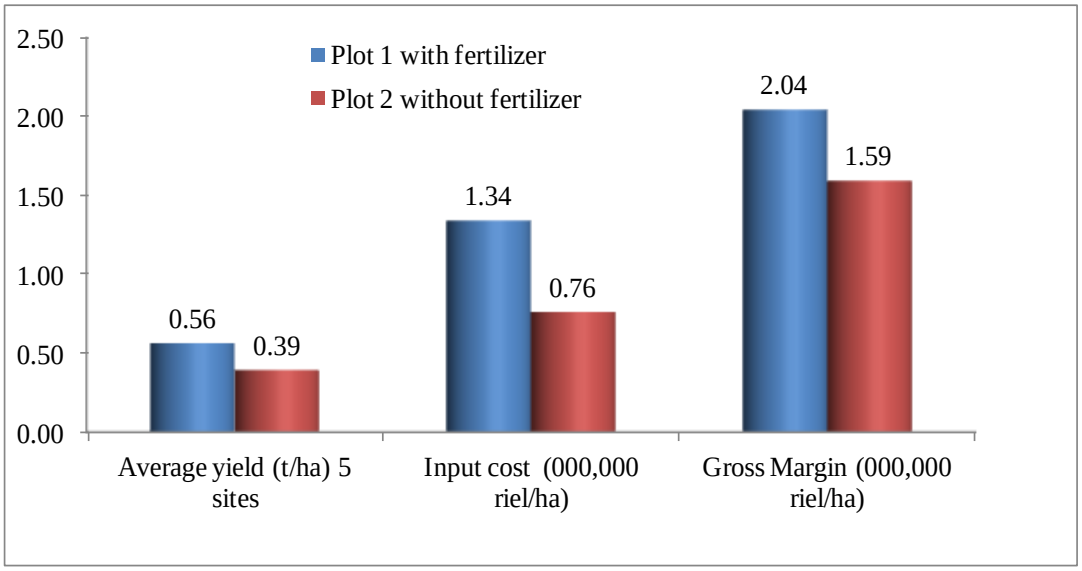


Figure 12. Grain yield of mung bean (t/ha) and gross margin (000,000 riel/ha)

Picture 2. Field demos of mungbean conducted during dry season , 2014 at Preah Sihanouk

Varietal screening experiment to soil salinity

A screening experiment regarding soil salinity was conducted in Mouy village, Peam Krasoab commune, Mondul Seima district. The objective of the experiment was to evaluate preliminary lines and varieties regarding resistance to soil salinity. 58 lines and varieties were selected for evaluation in order to compare with 2 check varieties from IRRI (IR 29 and Pokkali). Among the 58 varieties, there were 32 lines obtained from IRRI plus 2 checks, 9 early varieties from CARDI, 5 medium varieties with non-photoperiod sensitive from CARDI, 5 medium photoperiod sensitive from CARDI, and 5 farmers variety in the coastal area. The experiment consisted of 8 blocks with non-replication. Each block composed of 7 lines and 2 IRRI varieties as check. The preliminary results from the experiments indicated that the varieties released by CARDI as Phka Rumduol, Phka Romeat and Phka Rumdeng show a moderate tolerance to soil salinity compared to international variety (Pokkali & IR 29) and a local variety (Sar Kramom) collected from Sre Ambel, Koh Kong as indicated in table 14. The IR29 did not establish so no data can be provided. Sar Kramom provided a reasonable yield but the selling price is markedly lower compared to CARDI varieties. The experiment will also be conducted in the next growing season by CARDI.

Table 14. Grain yield of testing varieties conducted in coastal area

Variety	DTM (day)	GY (t/ha)	Variety	DTM (day)	GY (t/ha)
Pokkali	141	1.4	Phka Romeat	141	1.1
IRRI 66	137	0.4	Phka Chan Sen Sar	164	0.7
Chu'sa	105	0.7	Sar Kramom	141	1.6
Sen Pidao	137	0.7	SrovPrai	137	0.8
Phka Rumduol	141	1.1	Hay Vin	137	0.9
Phka Rumdeng	141	1.5	Neang Kok	137	1.3

DTM= day to maturity, GY= grain yield

Picture 3. Varietal screening experiment to soil salinity conducted at Koh Kong province

Training course

Apart from field trials CARDI also organized seven training courses on rice crop management, seed purification techniques, GAS and its measures. The course was coordinated by District Agriculture Office (DAO) in Prey Nob, PDA of Koh Kong and fully supported from 8 target commune leaders. This training course was conducted in 6 communes (Tuek Thla, Tuek L'ak in , Sameakki, Tuol Toteung, Prey Nob, and O Okna Heng), Prey Nob district and Toul Kokir commune in Mondul Seima district. A total of 172 participants attended including agricultural district staff, farmers as well as local authorities.

Picture 4. Training course organized at Preah Sihanouk and Koh Kong provinces

Farmer field day

Prior to the end of the wet season rice harvest in October 2013, CARDI held 3-farmer field days in both provinces. A field day was carried out in Tuol Kokir commune and two field days were conducted in Tuel Thla and Sameakki communes, Prey Nob with a total of 81 participants.

Picture 5. Farmer field day conducted at Preah Sihanouk and Koh Kong provinces

Distribution of CARDI document

At the time of course and farmer field days, CARDI distributed relevant documents to stakeholders including 405 copies of farmer notes about GAS, 255 copies of farmer notes about IR 66, Phka Rumduol, Phka Rumdeng, Phka Romeat , and Phka Chan Sen Sar, 20 books of technology package for increased rice productivity, and 16 books of rice agro-ecosystems in Cambodia, soil group classification for paddy field, characteristics of 10 main rice varieties, and methodology of rice seed purification and 26 banners of main soil profile of rice growing area in Cambodia, type of fertilizer, quantity and time of application.

Household survey

Two household surveys were conducted in both provinces with the objective to gather information from participating and non-participating farmers in relation to their farming practices, average monthly income in both dry (DS) and wet season (WS), source of income from rice, vegetable and other sources of income. The first survey was done July, 2013 at Koh Kong and second survey was done in August, 2013 at Preah Sihanouk. A total of 31 HHs were selected to interview, 23 HHs in Preah Sihanouk and 8 HHs in Koh Kong provinces.

The preliminary results of the survey from Preah Sihanouk province revealed that monthly average income in DS was 161$ and in WS income was 117 $ only. The percentage of income from fishery, agriculture and other sources was 13%, 37% and 50%, respectively. And also, the results from Koh Kong indicated that monthly average income for DS was 54 $ and 38 $ for WS. The percentage of income from rice was 54%, vegetable 19% and other income was 27%.

Constraints and conclusion

During the implementation some problems occurred particularly in Prey Nob such as rats, birds, iron toxicity, flash floods, insufficient water at time of crop growth and GAS. Three trials were damaged by GAS and floods. Ten field trials of mung beans failed because of water shortage for irrigation, a long dry period and not very active participation from cooperative farmers. Strong wind rainstorms usually occurs in the three communes (Tuek Thla, Tuek L'ak and Sameakki) in Prey Nob district during rainy season and caused a lower yield of rice and other crops but in 3 communes Tuol

Toteung, Prey Nop and O Okna Heng GAS and flooding are the main constraints for rice production in this area.

See water rising, drought, soil salinity, lack of land preparation tools, labor shortage, lack of fresh water are major problems facing farmers in Peam Krasaop commune, Koh Kong province. Two field trials in Peam Krasaob using introduced variety of IR 66 did not produce any grain due to spikelet sterility caused by salt water intrusion during the flowering stage, therefore this variety is not suitable to saline conditions. For Koh Kong province, the officers did not have much experience in facilitation and leading farmers in field trials implementation. The shortage of freshwater has been partly alleviated as a major reservoir has been rehabilitated under LDCF. The CARDI varieties showed good yield also in saline environment. CARDI will continue tests for own funds in Koh Kong and thereby could provide more experience to PDA staff in facilitation.

In conclusion the field trial results provided successful and fruitful outcomes showing effective ways for assisting farmers to achieve more profitable incomes and farmers would be able to adopt and apply the techniques in the coastal area.

The Technology package for increased rice productivity gave higher yield than farmer practice. Similarly the gross margin from of technology pacjkage also provided higher income compared with farmer variety. The price of both varieties (PRD & PRM) is 1.3 times higher than farmer‘s variety. Mung bean field demos from 5 sites also indicated that plot with fertilizer gave higher yield and more income than plot with no fertilizer inputs.

172 farmers received training course on rice crop management from the project to improve their skills and knowledge and 81 farmers attended farmer field day.

Both introduced varieties Phka Rumduol and Phka Romeat grow well and performed well in rain fed lowland areas as well as in coastal area at Preah Sihanouk and Koh Kong provinces.

Activity (Demo-Activity 3)	**Number of Events**	**Total participants**	**Number of women (total numbers)**
Workshops	7	59	-
Training	7	172	49
Farmer Field Days	3	81	49
Surveys	3	38	8
Field Visits	11	288	-
Total	**31**	**638**	**>106**

Table 15: Summary of events or activities conducted in relation to rice varieties field trials

2.6 Activity 4: Livestock Revolving Stock Scheme in 8 communes

The farmer field school training programs have been completed successfully with ten sessions in each of the villages. Beneficiaries have participated in bi-weekly FFS on care, feeding and management of animals. The knowledge level was measured before and after the training. In the pre-test 18% got good scores, 36% passed the test and 46% failed and the post-test conducted at the end of the FFS sessions showed that 68% passed with good scores, 20% passed with medium scores and 12% failed the test. Moreover, all beneficiaries have received manuals on "care, feeding and management of pigs" and "good practice of chicken keeping and AI awareness". The number of attendants participating in the bi-weekly sessions of the FFSs is shown in Figure 13. The participation of farmers in the bi-weekly sessions of the FFS was not regular because some farmers needed to work to earn their living including rice cultivation and off farm activities. The participation of female beneficiaries to the 10 FFS sessions was higher than men as females are mostly in charge of the pig production including feeding and care.

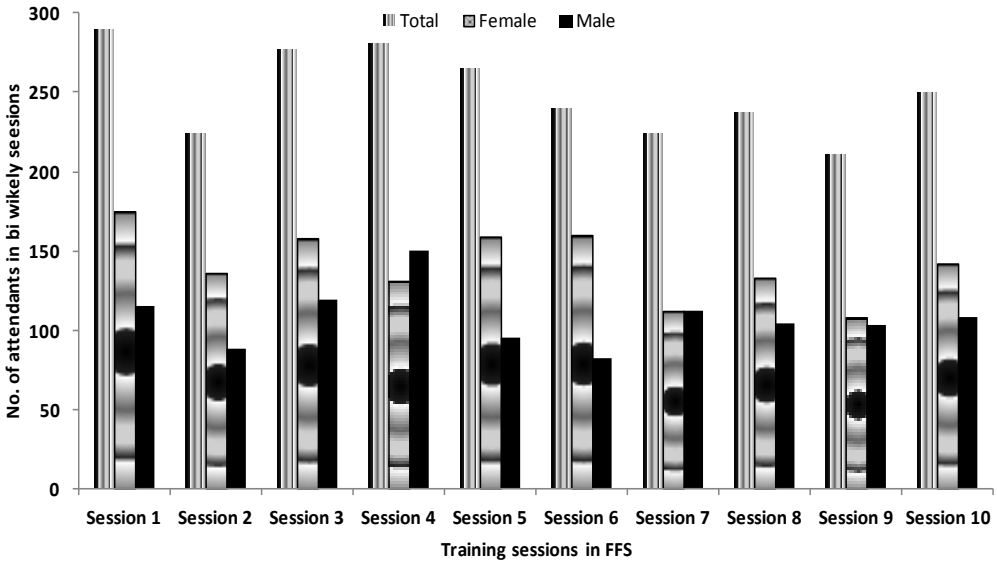


Figure 13. Number of attendants in bi-weekly sessions of FFSs

A total of 300 beneficiaries (51.3% women) have received inputs such as animals and small amount of starter feed (20 kg). Among all beneficiaries, 57 beneficiaries got gilts, 234 beneficiaries received piglets, 3 beneficiaries received goats, 2 beneficiaries received laying ducks and 4 beneficiaries received chicken. According to the large amount of piglets, the distributions were conducted in several rounds. In term of animal distribution, there were 1,170 piglets for fattening, 57 gilts for breeding, 400 chickens, 200 laying ducks and 9 goats distributed to beneficiaries both in Prey Nob, Preah Shihanuk province and Mondul Seima in Koh Kong province.

A training needs assessment for VAHW, PMC members and beneficiaries was conducted. The training was successfully organized for 40 elected/selected PMC members from Prey Nob in Preah Shihanouk and Mondul Siema in Koh Kong provinces to build their capacity on organizing and managing the project at the target villages in a sustainable manner. As planned a total of 30 new and existing VAHWs were trained during three periods of one week each. The themes of the training

were dealing with 3 types of animals including cattle/buffaloes, poultry and pigs while the topics for each species were linked with animal health and production such as management, care and disease control. They were trained by the contracted experts from the Department of Animal Health and Production (DAHP) and they were awarded certificates of recognition by the DAHP. At the end of the three periods of the training they were given a veterinary tool kits by the Minister of Environment during his official visit to Prey Nob. The members of PMC consists of five persons that is VAHW, representatives of the LIG, project implementer, the village chief and a commune council member.

The loan of US$93,070.00 was provided to 300 beneficiaries in 16 villages of 7 communes in the two target districts in Koh Kong and Preah Sihanouk provinces. So far 188 beneficiaries (62.7% of which 33.3% are females) have sold the pigs and returned US$49,517.00 to the project and this money is ready for redistribution for the second cycle. PMC members benefit from 3% interest rate as incentive for their work.

Eight sows have delivered offspring with a total of 50 piglets (3 sows had number of litter size less than 4 piglets and the other five sows had a litter size of more than 8 piglets). Piglets are also growing well beside some problems to their health. Forty four sows and 4 does are pregnant and expected to deliver offspring in the next quarter.

From the start of the animal distribution till now, 129 piglets from both districts in Prey Nob and Mondul Siema have been reported dead by diseases and 5 gilts died. Sixty laying ducks also died due to outbreak of diseases in the village. About 10% (US$9,664) of the loan was lost due to the death of animals (it is indicated in contract – that when animal becomes sick, the beneficiary has to report immediately to VAHW and PMC members for action otherwise the beneficiary has to pay for the animal that dies).

A survey was conducted to collect information in regard to the fattening of pigs from 18 beneficiaries who have already sold their pigs. A Gross Margin Analysis was carried out and it showed that including the labor cost, each beneficiary can make a net profit of US$245 per year keeping 5 fattening per cycle and three cycles per year. Changing from traditional pig keeping (free range) using local breeds to the improved production system keeping them in pen, providing care and feed to crossbred pigs, minimize time per production cycle and the farmers take over the responsibility in providing care and feed.

Issues encountered

Under the implementation several issues were identified:

- At the beginning of the project implementation several beneficiaries in most communes were concerned about the number of animals they would receive because they were concerned about the cost of feed during the fattening period. **As solution the team explained that during the training the project will introduce topics related to the use of local feed ingredients.**

- The short period of the project and large number of piglets that need to be purchased was a challenge. Few suppliers in Cambodia are in the position to provide large numbers of piglets as they plan is to produce enough piglets for their contract farmers. **Three**

commercial pig companies and one supplier were contracted to supply enough piglets for the project beneficiaries but it took several months to finish the delivery.

- Some beneficiaries are interested in local chicken especially Muslim beneficiaries in Prey Nob. The project team was trying to convince them to change to 3 blood chickens but they were hesitant to try while the suppliers of 3 blood chickens want to sell day-old chicks and feed. **The solution was to allow beneficiaries to look for local chickens themselves in nearby villages then the project providesd them loan to get 100 chickens.**

- Although animals were purchased from companies that have strict disease control, still diseases caused problems. A total of 129 piglets and 5 gilts were infected and most of them died and those who recovered grew slowly. Sixty laying ducks also died. **Veterinarians from one of the companies that supplied pigs were asked for assistance and technical advice was provided but most of the sick animals died.**

- Some beneficiaries have been less willing to return fund to project although they have already sold their animals. **Additional discussions have clarified that they have continued with second and third cycle and they now will return loans.**

A total of 93,000 USD was provided for the fund. Around 9,700 USD has been lost due to livestock death. Until now 51,000 have been paid back and around 32,000 USD have been used for funding of 2nd and 3rd cycle. It is expected that around 80,000 will be available for continued funding. The procedures and rules for funding have been strengthened and the continued funding will be supervised by CelAgrid and monitored through the LDCF activities.

Monitoring and follow up on progress of project activities in the target villages by a project field staff. The project field staff will work closely with PMC members and local authorities for the collection of the remaining loan and prepare plan for the redistribution of loan for the next cycles and monitor this.

Activity	**Number of Events**	**Total participants**	**Number of women (total or %)**
Training of VAHWs, PMC and beneficiaries	164	370	43.2%
Field Visits	15	370	43.2%
Surveys	4	108	30%
Total	**183**	**478**	**43.2%**

Table 16: Summary of events or activities conducted in relation to livestock revolving fund

2.7 Activity 5: Climate change awareness raising and training in climate change resilient irrigation

The climate change awareness training in the coastal area has been conducted both in relation to the present activity but also in relation to the demonstration activities. Training has been carried out

during two rounds in 31 villages and the climate change awareness booklet has been distributed to the participants.

The implementation of the climate change awareness program was coordinated by Department of Environmental Education, MoE. The field training was being conducted by two teams of two persons from: two officers from Department of Environment, one person from Department of Agriculture, Forestry and Fisheries and one from Department of Water Resources and Meteorology.

In each training session up to 30 persons participated. A total of approx. 2780 persons have participated in the training and of which approx. 50% were women. The evaluation shows that women is becoming more active and willing to learn to get knowledge on climate change and related issues.

Also a video documentary has been produced to be shown in the national TV. The video provide information on climate change adaptation and provide information regarding the demonstration activities conducted in the two target areas.

A study tour was arranged to Cantho University in Vietnam and also including a site visit to Soc Trang Province to see how farmers cope with saline intrusion and climate change impacts in Vietnam. The study tour provided a learning experience for the provincial authorities and commune councils and they learned a lot from the experience gained in Vietnam regarding climate change. All participants confirmed that the study tour provided very valuable experience to be used in relation to their work.

Examples from coping strategies in Vietnam which would be relevant for Cambodia was structural adaptation measures such as dykes; regulators, and sluice gates. Non-structural adaptation includes diversification of income sources; crop calendar optimization; improved farming systems and technologies (water efficiencies, salt-tolerant varieties); early warnings for floods and saline intrusion; weather forecasting; communication and data sharing (nationally and regionally); and awareness-building.

Three training sessions in Climate Resilient Irrigation have also been conducted following the first training session conducted in early January with focus on the Prey Nob polder area. The training sessions has been aimed to involve members of the polder community and to assess the potential for renovating the water reservoirs in the Prey Nob area.

Activity	Number of Events	Total participants	Number of women (total or %)
Workshops	3	60	12
Training of Trainers	3	10	4
Training of communities	93	2780	Approx. 50%
Mangrove training CC awareness	1	500	Approx. 50%
National meetings	3	500	Approx. 50%
Intl Meetings (study tour Vietnam)	1	33	3
Field Visits	62	310	-
Media (video – national TV) Youth debate programme	1 1	- 136	- 54
Total	**167**	**4329**	**1964**

Table 17: Summary of events or activities conducted in relation climate change awareness raising

2.8 Activity 6: Adaptation measures integrated in Commune Development Plans in 8 communes and linked to commune investment plans.

During 2013 a long list of small scale investment projects was prepared in cooperation with the commune councils and communities for the eight communes. Of these some were shortlisted for additional studies and continued discussions with the commune councils. Finally, eleven small scale investment projects in the target areas have been finalized and in some communes the benefits of these investments have already been felt by the local communities. The small scale projects have been included in the Commune Investment Plans and presented as part of the District Integration Workshops. The projects were selected based on the below criteria:

- Climate Change resilience related
- Within budget (or provision for part of costs within budget)
- Stated Commune priority based on meetings
- Benefits large numbers of families
- Ease of maintenance/operation
- No significant adverse environmental/social impacts

The list below present an overview of the activities supported.

Table 18. List of Small Scale Investment Projects in Target Communes

Commune Name	Investment Name	Village Name	Beneficiaries, household	Cooperation Partners
Ou Oknha Heng	Renovation of Lake and Water Control Structure	O Tapng Village	50	Commune Council
Prey Nop	Expansion of rainwater harvesting tank	Bek Krang primary school	25	Commune Council
Tuol Totoeng	Rainwater Harvest Tank	Chumpou Khmao school	50	Commune Council
Tuol Totoeng	Restoration of pagoda pond		100	Commune Council
Tuk Thla	Renovation of a combination of four wells	Prek Toal village	50	Commune Council
Tuk Laak	Rain water harvesting Tank	O Keo School	25	Commune Council
Tuk Laak	Rainwater Harvest Tank	Kampong Smach Touch	25	Commune Council
Tuol Kokir	Rainwater Harvest Tank	Koh Chak	50	Commune Council
Peam Krasoab	Renovation of Existing Well and Water Storage Tank	Commune office	50	Commune Council
Peam Krasoab	Rain water harvesting tank	Commune office	50	Commune Council
Toul Totoeng	Renovation of Water Gate	Several villages	150	Commune Council

OUTCOME: *Increased resilience of coastal communities and ecosystems to climate change through adaptation planning, demonstrated targeted local interventions and provision of practical learning experience in adaptation planning to the NCCC/CCD*

Outcome Indicators	*Baseline (11/2011)*	*Target (05/2014)*	*Current status (06/2014)*
● 1. Number of coastal plans considering CC risk approved	1. No climate change adaptation plans exist for the coastal zone	1. At least 2 coastal plans include consideration of climate change impacts by the end of the project✓	Eight Commune Investment Plans include climate change actions to increase community resilience to climate change. The plans have been presented and included in District Integration Workshops following the normal sub-national planning procedures. Guideline for integrating climate change in commune development plans has been prepared and used in training of technical working groups and commune councils. An output report has been prepared through on-the-job work.
● 2. Number of the government staff trained on climate change on technical adaptation themes	2. Very limited capacity available at national and provincial departments in relation to climate change	2 At least 50% of the technical staff in the key ministry departments and institutions trained of the coastal component ✓	Training of Trainers of provincial staff included a total of 75 persons. From Preah Sihanouk Province 41 persons were trained and 31 from Koh Kong Province. Three staff from DAE was also included in the training. The staff trained was from provincial departments of Environment, Agriculture, Forestry and Fishery, Land Management, Water Resources and Meteorology. Training also

			included district staff and commune clerks.
• 3. % of targeted population in coastal communities aware of climate change risks and appropriate adaptation measures	3. No or very limited awareness in coastal communities on CC risk	3. At least 30 % of demonstration coastal communities well aware of climate change risks by the end of the coastal component ✓	Extensive training has been conducted on climate awareness in the target areas. Overall 10,850 persons have participated in training events or 30% of the total population in the target areas. If considering households it would be likely that members of the majority of households have participated in training under the project. .
• 4. Perceived change in livelihood of vulnerable coastal communities due to component interventions.	4. No interventions in the targeted areas so no change in livelihoods	4. At least 30% of targeted households show increased livelihood as a result of alternative livelihood activities ✓	Totally 567 households (32%) out of approx. 1790 households targeted by livelihood activities received direct support and increased their livelihood. All households receiving integrated farming support (237 households), livestock (305), and rice varieties (30) showed increased livelihood due to the conducted activities. The income for these farmers/community members increased significantly in both areas resulting in approx. a four times increase in income for integrated farming, new rice varieties would provide almost 4 times more net profit, and pig fattening would for 3 cycles per year provide a doubling of income excluding labour as shown in the previous sections. The impacts of fishery

			community require more time and will be evaluated as part of the LDCF activities. The M&E framework for measuring impact on the household livelihood is finalized. And will be used in the continued monitoring.
• 5. % of mangrove forests in target areas restored and in good health.	5. No rehabilitation interventions are taking place recently in the targeted areas.	5. At least 60% of the destroyed mangrove forests are restored in the targeted areas and show good health conditions by the end of the coastal component. ✓	As mangrove re-planting was a specific demonstration under the LDCF the actual mangrove replanting has been funded by LDCF. A total of 60 ha have been replanted and with a survival rate of 70% meeting the target. CARP provided land use maps including distribution of mangroves and which have been used in the selection of the 60 ha for mangrove replanting. The main support from CARP has been directed towards awareness raising of the role of mangroves in coastal protection and as an ecosystem based approach to adaptation
• 6. Capacity developed for identification of climate change impacts and adaptation measures in key provincial departments	6. Limited or no capacity on climate change impacts and adaptation in provincial departments	6. Provincial interdepartmental units capacitated to implement climate change measures✓	The Technical working groups have been trained to establish capacity in the provinces to provide technical assistance in relation to climate change to districts and commune councils. In Preah Sihanouk Province 25 persons have been trained and in Koh Kong Province 18 persons have been trained. The trained persons have capacity for identifying, ranking and

			shortlisting proposed actions in relation to climate change. Their direct involvement in the work has significantly strengthened their capacity and ownership.
The work carried has led to the foreseen outcome and associated indicators. For most indicators higher numbers have been achieved.			
■ delivery *exceeds* plan	☐ delivery *in line with* plan	☐ delivery *below* plan	

OUTPUT 1: **Improved climate change knowledge integrated into land use and coastal development plans**			
Output Indicators	*Baseline (11/2011)*	*Target (05/2014r)*	*Current status (06/2014)*
• 1. Number of plans, norms to take into account loses from CC and integrate climate change adaptation measures	1. Local and national development plans do not include climate change factors	1. At least one plan for each component targeted area is developed to integrate CC risk ✓	Eight Commune Investment Plans have been prepared including actions identified to increase and build resilience inside the target communes in response to climate change impacts. The Climate Change Guideline for Commune Development Planning has been used in training sessions with the target groups to build capacity for the future continued integration of climate change measures into the Commune Development Plans. Additionally the manual has been revised for application in other provinces. A report has been prepared demonstrating efforts in the communes to identify climate change measures in commune development planning.
• 2. Coastal land use planning guide incl. climate change used in local planning	2. Presently commune plans not consider climate change impacts	2. Commune plans developed considering climate change impacts in other vulnerable areas along the coast ✓	The identified climate change actions have been included directly in the Commune Investment Plans for the eight communes. The CIP's were presented at the DIW's in November/December 2013 and was prepared in the format for sub-national planning documents.
• 3. Understanding and awareness of climate change in local government system	3. Presently climate change impacts are not considered by local government and understanding is very low	3. In targeted communities local government well aware and reacting in relation to climate change ✓	Training programmes have been conducted for Technical working groups and commune council chiefs including commune clerks in all 8 targeted communes. Through these continued sessions with commune councils and provincial working groups understanding of climate change impacts and coping

			strategies have been established.
Goals and outcomes have been achieved. Plans have been developed for the targeted eight communes and tools developed for assessing future commune development projects sensitivity to climate change impacts. The plans have been developed in the sub-national CIP format and presented by the commune councils at the District Integration Workshops.			
■ delivery *exceeds* plan	☐ delivery *in line with* plan	☐ delivery *below* plan	

OUTPUT 2: **Increased resilience of coastal communities and coastal ecosystem buffers to climate change and improved livelihoods**			
Output Indicators	*Baseline (11/2011)*	*Target (05/2014)*	*Current status (06/2014)*
● 1. % of households in the coastal communities with access to coastal agricultural practices adapted to CC.	1. No households in the coastal component target areas currently uses climate change resilient livelihood methods	1. At least 30% of targeted households participate in innovative sustainable and climate resilient coastal livelihood activities ✓	The selected activities for livelihood activities involve approx. 1950 persons in climate resilient livelihood activities and it is expected that the significant beneficial impact of the proposed activities should make it very attractive for these households to adopt the proposed methodologies. 31 Farmer Field Schools have been finalised and included approximately 1452 households besides this 307 households are involved in livestock activities. 202 households are involved in the Community Fishery Activity. Of the directly targeted households of 769 more than 75% are active and participate in the livelihood activities.
● 2. Number of people (male/female) from targeted coastal communities trained on coastal agriculture practices adapted to CC	2. Communities not aware of climate change impacts and adaptation practices.	2. At least 30% of people (male/female) living in the targeted areas are aware of climate change and climate resilient agriculture practices✓	Extensive training has been conducted on climate awareness and climate resilient agriculture in the target areas. Overall 10,850 persons have participated in training events or 30% of the total population in the target areas. If considering households it would be likely that members of the majority of households have participated in training under the project.
● 3. Perceived reduction of loss in agricultural production in targeted area	3. No interventions in the targeted areas so no	3. At least 30 % of households show reduction of	The members participating in the climate resilient IFS training, the livestock activities

	reduction in loss	agricultural production loss✓	and rice varieties all increased their income significantly from agricultural activities. These households amounted to 32% of the targeted households.
• 4. Ha of mangrove rehabilitated in target area	4. No recent replanting of mangrove in target areas	4.At least 60% of mangrove rehabilitated in identified target areas✓	As mangrove re-planting was a specific demonstration under the LDCF the actual mangrove replanting has been funded by LDCF. A total of 60 ha have been replanted and with a survival rate of 70% meeting the target. CARP provided land use maps including distribution of mangroves and which have been used in the selection of the 60 ha for mangrove replanting. The main support from CARP has been directed towards awareness raising of the role of mangroves in coastal protection and as an ecosystem based approach to adaptation.
• 5. % increase of the length of ecosystem-based protected coastline in target areas.	5. The baseline will be established during the inception	5.At least 20% increase in ecosystem-based coastal protection ✓	As mentioned above mangrove re-planting was a specific demonstration under the LDCF the actual mangrove replanting has been funded by LDCF. CARP provided maps of mangrove distribution for calculation of eco-system based protection. CARP also provided awareness on role of mangrove in coastal protection. The LDCF-funded mangrove planting activities increased the ecosystem based protection for 33% of the target coastline.
• 6. % of coastal communities' households in mangrove areas with improved livelihood due to access to	6. Limited livelihood options for communities in	6. At least 20% of households in mangrove areas	Through the implemented activities 28% of the total households adopted the

alternative livelihood options.	mangrove areas	adopt alternative livelihood options and have increased livelihood ✓	livelihood options. 50 household in IFS, 30 household CFi activities, 24 livestock activities, and 10 household rice varieties.
7. Number of people (female/male numbers) from targeted mangrove areas trained on climate change and alternative livelihoods	7. Extremely limited awareness and information on alternative livelihood	7. At least 40% of people (male/women) living in targeted communities are aware of climate change and alternative livelihood and show increased resilience through capacity established ✓	Overall 45% of total population from mangrove areas of 2520 persons have been trained in climate change and alternative livelihood. Total persons trained was 1123 and 557 were women (49.6%).
8. % of women participating in training on climate change and alternative livelihoods	8. Baseline to be established during inception.	8. At least 30% of participants in community training courses are women ✓	Based on data from climate resilient IFS 791 out of 1452 participants are females amounting to 54% of all participants. Also in the saving groups women amounted to 68%.
9. % of female led household participating in training activities	9. Baseline to be established during inception	9. At least 20% of female participants represents female led households✓	The women participants in the training sessions amounted to 54% of all participants. Based on the registered data 21% of female participants represented female led households
10. Number of demonstration locations implemented in the coastal area	10. Presently no adaptation measures have been carried out in the coastal area	10. A minimum of two to four demonstration sites identified and adaptation measures implemented. Two sites has been pre-identified but some additional sensitive sites might be included if funds are available. ✓	Two sites have been identified for demonstration activities and these sites include eight communes. In each commune up to six demonstration projects have been implemented and integrated into the Commune Investment Plans
11. Capacity developed for identification of climate change impacts and	11. Limited or no capacity on climate change impacts and	11. Interdepartmental units capacitated to	The Technical working groups have been trained to establish capacity in the provinces to

adaptation measures in key provincial departments	adaptation in provincial departments	implement climate change measures ✓	provide technical assistance in relation to climate change to districts and commune councils. In Preah Sihanouk Province 25 persons have been trained and in Koh Kong Province 18 persons have been trained. The trained persons have capacity for identifying, ranking and shortlisting proposed actions in relation to climate change. Their direct involvement in the work has significantly strengthened their capacity and ownership.
12. Reporting structure established for climate change impacts in coastal area	12. No reporting structure regarding climate change exists	12. Reporting structure established to NCCC and other relevant committees on climate change impacts in coastal area and measures implemented. ✓ 12a The results of at least one demonstration site is considered by the NCCC for potential replication in other areas of the country ✓	A network structure have been described where sub-national structures in the coastal area should report through CCU to the National Committee for Coastal Management and Development and NCCC. Also a proposal for mainstreaming CC into the overall sub-national planning has been prepared. The results of the demonstration activities have been recommended for replication in other areas both by stakeholders as recorded from the annual seminar or directly as activities included in CC Action Plans by key ministries. An example is the Climate Change Action Plan for Agriculture, Forestry and Fisheries 2014-2018.
Goals and outcomes have been produced as foreseen for this outcome. .			
☐ delivery *exceeds* plan	■ delivery *in line with* plan	☐ delivery *below* plan	

3. Sustainability Issues and Exit Strategy

Considering the short implementation period of 2.5 year of CARP the main concern is the sustainability of the activities implemented and their replication and expansion to other areas. As expressed at several meetings and latest at the annual seminar (summary attached, Annex 1) it was a clear recommendation from the stakeholders that they would like to have the CCCA to continue the coastal activities if the CCCA Programme had a second phase. This would also be the better option as this would have provided an opportunity to follow-up and expand the conducted demonstration activities and thereby increased the likelihood for sustainability. In this context it should also be considered that the two other major climate change initiatives in Cambodia that is the SPCR under ADB implementation and ASPIRE under IFAD implementation do not plan to have climate change activities in the coastal area. This leaves at present only the UNEP LDCF project for climate change implementation in the coastal area and with very limited resources for on the ground implementation as the CARP under CCCA was the main implementing factor on the ground level.

In the situation that the UNEP LDCF project should be carrying out activities in support of sustainability of CARP the following future activities and exit strategies have been developed for the separate demonstration activities under CARP. The full details have been provided in Annex 3.

1. Climate Resilient Integrated Farming Training Programme

The Demonstration Activity Climate Resilient Integrated Farming in the Coastal Area has been adopted as a model by the Provincial Department of Agriculture (PDA) of Preah Sihanouk and Koh Kong provinces and sub-national level agencies and local communities for use in increasing resilience of agriculture and food production and related livelihoods to short and long term effects of climate change. The model of Climate Resilient Integrated Farming has also been adopted and integrated in Commune Development and Commune Investment Plans by commune councils and PDAs. The model of Climate Resilient Integrated Farming has also been adopted and put in the Climate Change Action Plan for Agriculture, Forestry and Fisheries 2014-2018 for building up the resilience of farmers and farming communities in the coastal area to climate adaption in agriculture and livelihoods. As reported by the DAE the Climate Resilient Integrated Farming needs to be followed up and expanded to other areas in the coastal area and originally with a strong expectation that this would be supported by a new phase of CCCA.

DAE considers ensuring the sustainability and effective operation after project finalization of CARP through the provincial departments and with supervision by DAE.

The LDCF project has some resources for supporting livelihood activities and to ensure the most cost effective use of these resources the activities started through CARP will be continued through direct support. In doing this LDCF will also be in a position for monitoring the continued activities and thereby also be able to improve the likelihood of the sustainability of this demonstration activity.

It is considered that sustainability of this activity should be relatively good as farmers can see a clear improvement of their livelihood conditions. Considering replicability the conditions should also be relatively good as previous described the cost of farmer training will be between 50-100 USD per farmer. To implement full IFS practices an investment of approx. 1000 USD are needed but it is

expected that some farmers seeing the overall benefits could have the possibility to implement it stepwise to generate funds for full establishment. Also recent data show that farmers involved now have started to use their own fund for expanding their farm activities using the methods learned under the training,

2. Community Fisheries project at Peam Krasaob Commune

It is considered to provide limited support to activities such as the crab bank and dried shrimp production through the LDCF livelihood resources and in cooperation with FiA. Under the LDCF project monitoring of the activities will be conducted and a final evaluation will be conducted by end of 2015.

3. Promotion and increased availability of shorter duration seeds for crops

It is expected that through LDCF to support some of the farmers who participated in the field demonstrations in carrying out full scale implementation of the methodology and varieties used in the field tests. The number of participants however will be limited due to the full scale implementation will be done with a loss compensation scheme to the farmers if the production not goes as expected.

Under the LDCF monitoring of the activities will be conducted and an assessment of numbers of farmers switching to the proposed rice varieties will be conducted by end of 2015.

It is considered that the loss compensation scheme to be provided through the LDCF could be a factor for expanding this change and make it more sustainable. The strategy will be to support a few pilot farmers and hopefully other farmers will follow if they see that such production is successful.

4. Promotion of increased livestock keeping at the selected communes

It is expected that the started revolving funds will be continued during the coming period so that the PMC and LIG's will be responsible for the fund cycling according to the stipulated procedures and conditions. The overall process will be supervised by CellAgrid and MAFF and reported to CCU..

If LDCF have additional livelihood funds these might be provided as direct additions to the established funds.

Under the LDCF the activities under this demonstration will be monitored and a final assessment will be prepared by end of 2015.

Sustainability of this activity should be relatively good although it has just finalized one to three cycles but the income generated for the participating households have resulted in a clear interest of the households to participate in this revolving fund. As mentioned previously 93,000 USD was provided for the fund. Until now 51,000 have been paid back and around 32,000 USD have been used for funding of 2nd and 3rd cycle. It is expected that around 83,000 will be available for continued

funding. The procedures and rules for funding have been strengthened and the continued funding will be supervised by CelAgrid and monitored through the LDCF activities.

5. Climate change awareness raising and training on climate change resistant irrigation in the target communes

Staff is trained in providing training in climate change awareness and training material has been prepared. However, specific funds are not available through LDCF to include more communes in the target districts or include other provinces. It has been considered to provide flip-chart material for schools and thereby reach a wider part of the population in the coastal area.

Under the LDCF a concept paper will be prepared for potential development of the Prey Nob area and renovating the reservoirs as present water shortage is a major constraint for increasing agricultural productivity in this area. The aim of the concept note would be to initiate a discussion with potential donors to support such activities.

LDCF will as part of the final evaluation make an assessment of increase in climate change awareness in the target areas using a similar approach as in the coping strategy study.

6. Adaptation measures integrated in Commune Development Plans in 8 communes

Some of these activities will be continued under the LDCF as there is a limited budget for providing water harvesting systems in the target areas. These demonstrations will be carried out following similar procedures as under CARP and inclusion in the communes CIP's. As LDCF will use similar procedures we will engage actively with NCDD-S working group on CC mainstreaming guidelines to provide experience from the CARP implementation.

The maintenance and operation of these small scale climate change investments will be monitored under the LDCF activities.

The overall sustainability of these investments is expected to be good as all reflects a strong need and request from the communities benefitting as water shortage is a major issue in the dry season in these areas.

4. **Observations and Lessons Learned**

A technical note has been prepared on lessons learned from the demonstration activities implemented and this has been included as Annex 4 in the present report. This includes an overview of activities and provides additional details for some of the demonstrations implemented. In the following a summary of observations and lessons learned is provided.

From the present conducted activities under CARP the following overall challenges and lessons could be brought forward.

- Human skills and institutional capacity development should have high priorities, both at the province, district and commune levels, including training of trainers, and provision of CCA guidelines as the present capacity in relation to climate change is very low.
- Awareness-building and improved understanding is needed at all sub-national levels of administration, as well as within the private sector, and among women and vulnerable groups.
- Women have been identified as particularly vulnerable; but also as a viable entry point for climate change mainstreaming, due to their role within households and families.
- The following sectors could be characterized as particularly vulnerable in all the selected areas: Water supply in dry season, roads, including rural roads; agriculture and irrigation, exposed to floods and drought; and storm water drainage of roads and in urban areas. Flood preparedness and mitigation were other urgent matters.
- Funds are inadequate (for operation and maintenance, basic development needs, and climate proofing) at all levels, and particularly so at the district and commune levels.
- The extensive training indicated that the willingness to attend training sessions is limited for people who are running their own business.

Additionally a synthesis report was finalized in December 2013. This report elaborate on the challenges and lessons learned under the identification and preparation of the demonstration and investment projects.

The followings are the main lessons learnt and recommendations made from implementation of the demonstration activities.

The following observations were made upon completion of the climate resilient integrated farming activity:

- Climate resilient integrated farming offers additional opportunities for livelihoods and income generation. It can spread the uneven seasonal workload for traditional rain fed rice cultivation and can also, to some extent, spread the risks involved (drought, pests etc). Reliable access to water is a prerequisite.
- The implementation period (of one cultivation period) was too short for a convincing documentation of the benefits produced.
- A scope remains for consolidation of the skills of the extension workers. The capacity at district level is limited, and a realistic level of efforts is warranted.

- Water harvesting was highly beneficial and opened new opportunities for the households. A scope remains for fine-tuning of modalities and operation.

- The savings groups were auspicious, providing micro-finance for household-level initiatives and some extent of risk coverage; but a scope remains for consolidation of (hitherto unfamiliar) management and accounting modalities. Some extent of technical backstopping is required. The activities of the savings groups may be expanded to seed production and input supplies.

- There is a clear scope for replication and scaling up of the achievements.

From the establishment of Community Fishery and diversification of livelihood options the following lessons were identified:

- The establishment of Peam Krasaob Community Fisheries was successful and recognized with active participation of local people and willingness. This was probably due to the need of this CFi and local agreement by relevant stakeholders and agencies. It was learnt that technical support was very important to be flexible to the real situation for establishing of a Community Fisheries. It is a good lesson learnt that all CFi documents such as CFi by-law, regulations, agreement and CFiAMP were signed and launched at the same time during CFi congress of the CFi committee election.

- CFi committee members are interested, satisfied and proud of the result of the transparent election with good cooperation, active participation of CFi members.

- It is noted there are some members of CPA are also CFi committee members and some CFi members are CPA committee members. This could benefit closer collaboration among these two local groups for the betterment of natural fisheries resources management and development in a sustainable way. This approach could maybe also be copied in other areas.

- Work together between Peam Krasaob CFi and CPA created a stronger capacity for addressing climate change issues and for managing the natural resources and environment in an effective and sustainable way. However, it needs a longer period to provide support and evaluate the effectiveness of such local nature resources co-management.

- After receiving training courses, Peam Krasaob CFi committee members have better knowledge and understanding on the value and main roles as team leaders for facilitating managing the whole CFi area, conflicts resolutions and sustainable fisheries resource management. However, the capacity of CFi committee members is still limited, so it should be continued supported, including study tours to older and experienced CFis.

- Supporting and improving the existing and alternative livelihoods is another important and necessary strategy for building and improving CFi committee capacity and creating members awareness on the value to be members of Peam Krasaob CFi and participate in natural fisheries resources management. Especially, it provides incentive for active participation and stopping illegal activities in an effective way.

- The uses of fishing gears have been identified and started practicing by zoning. But there is a need for longer period to effectively practices. This important activity will be affected in stopping illegal fishing activities and conflicts. Especially, it is a contribution of strong and good nature resources management and easier of CFi functioning.

- The activity of fish catch monitoring by CFi members, who are full-time fishers provide the basic data and information on catch data and fisheries production, which will be used and be important for comparison and evaluation of the impact of CFi management on natural fisheries conservation and management to see whether fisheries production has been improved and sustained after a few years.

There were various lessons learned from the CARDI rice variety implementation as indicated below:

- The introduced varieties for field trials such as Phka Rumduol and Phka Romeat showed that these were suitable to grow in the target areas and also accepted by farmers, as they intend to use these varieties in the next growing season.

- Through organization of farmer's field day in both provinces, the farmers revealed that both improved varieties gave significant improved yield and higher additional income compared with farmer's own varieties that have been introduced and grown in the region in the past. Similarly, the price of introduced variety (1350 riel/ kg) also provided higher farm gate price of about 500 riel /kg compared to farmer variety (only 800 riel/kg). Therefore, the use of CARDI varieties not only increase yield and income by farmers, but also enable to assists farmers and traders to serve the best quality rice for tourists as well.

- Results obtained from farm household interviews in Prey Nob and Toul Korki communes of target provinces indicated that in Prey Nob, a number of farmers used to grow early maturity variety such as IR 66 starting transplanting from late April or early May if supplementary water from canals and ponds are available, and harvest by late August. Unfortunately, birds and rats cause serious damage to farmer's crops. In order, to solve these issues, a plastic barrier systems (TBS) with rat traps would be encouraged to farmers to apply and birds net or birds crow can be used more effectively in controlling birds. On the other hand, harvesting time of early variety starts in the middle of rainy season, so this makes it more difficult to dry rice grain and store the seeds. It is suggested that if many farmers would grow early rice variety in large areas, the problems could be reduced. In Peam Krosaob commune thfarmers also grew an early variety previously but faced similar problems as in Prey Nob. Also the yield was not high due to soil salinity, flooding by sea water several times during crop cycle.

- Based on the field observations, farmers in Koh Kong grew diversified crop (various types of vegetable) as home garden around their houses and in paddy field, corn, mung bean have been planted after rice is harvested. But in Prey Nop, water melon, corn, cucumber, pumpkin, peanut, eggplant, and long bean were grown after harvesting wet season rice. Hopefully, several type of leguminous crops as mung bean, peanut, cow bean would be introduced in that areas using CARDI package technology for increased crop productivity

aiming to improve soil fertility through growing legumes in paddy fields and generate extra income to support the families.

- The promotion and extension of ten rice varieties which is officially encouraged/ recognized for use by the Cambodian government has already been introduced in the coastal area, particularly Phka Rumduol and Phka Romeat. In terms of improved price and reasonably high yield, rainfed lowland rice growers are interested in growing these varieties and it is expected that this will spread extensively in the immediate future.

The livestock activities provided the following observations and lessons learned:

- Demand for pig meat continues to increase due the short supply in Cambodia. Pigs is good business for the people in the coastal areas due to its short cycle to return the investment although the risk is still concerned with the outbreak of diseases and the poor veterinary services in the rural areas.

- To make the model sustainable, an agreeable interest rate can be applied. As discussed with beneficiaries, 3-6% interest rate per annum is acceptable by beneficiaries. The money generated from interest rate can be used to give incentive to PMC members and to buy notebook and basic office materials. Under the current implementation, beneficiaries agree to pay 3 percent interest rate per year to the committee.

- Few suppliers of piglets are found in Cambodia, therefore to get large number of piglets to supply to beneficiaries in shorter period is really great challenge. It is important to allow more time from the selection of beneficiaries, building animal shed to the actual distribution of animals.

- Training of beneficiaries using Farmer Field School methodologies are appropriate to bring beneficiaries together not only to learn techniques on animal health and production from training facilitators but it is an excellent opportunity for beneficiaries to discuss problems and share good practices with each other and this also allows field staff to monitor the progress of the activities. But time for their participation in the FFS still need to be flexible.

- Although potential farmers were selected to be the beneficiaries of the project still need great effort to change farmers' attitude from traditional livestock rearing to a more commercial one.

- Although the project team has announced the regulation of this project to all beneficiaries and the contract was made with all beneficiaries, it is still a big challenge to collect the return loan. Great effort needs to build up with those communities to create a new way of development.

In relation to climate change awareness raising the followings lessons was learned:

- The activity is well suited for immediate replication, preferably with some streamlining of the courseware, reflecting the experience gained during the pilot implementation, a bit of coaching of the trainers, and education of additional trainers.

- Furthermore, the awareness-building can be extended to schools with a minimum of adaptation, expectedly with a visible impact.

- The impression remains that the need of continued training and awareness-building is open-ended, that costs are moderate, and that benefits are highly attractive.

In relation to commune planning and small scale investment the following observations and lessons were done:

- A clear need was confirmed of climate change awareness within the commune councils, along with improved understanding of challenges and management options. Apart from contributing directly to commune-level climate change adaptation, the commune planning can feed into (and interact positively with) the district and province level planning.

- The pilot investments were very well received by the benefitting households.

- Reliable water availability was a priority, and the related benefits to households and cultivation were significant. There are other climate-related investment needs at the commune level, however, such as for example flood protection and climate proofing of infrastructure.

- Land use planning was demonstrated as a powerful tool for climate change adaptation, also at the commune level. The use of maps is in an early stage of consolidation. 1 Access to contemporary (satellite-based) land use and elevation maps and GIS analysis, was new to the communes and can be highly helpful in their development planning.

- There is a clear scope for replication beyond the target communes. This may involve training off additional trainers; skill consolidation and a bit of coaching/backstopping, and fine-tuning of curriculum and courseware.

1 Not only at the commune level, but at the district and province level as well

5. Documentation

All major documents and other deliveries of the project are being copied on DVD and/or memory sticks. All major documents have been submitted to CCCA Trust Fund Secretariat including regularly progress reports during the implementation period. The submissions are indicated below:

	Document	**Date**
1	Assessment of Coping Strategies in the Coastal Zone of Cambodia	June 2012
2	Implementation capacity of demonstration activities	October 2012,
3	Vulnerability of existing agricultural practices	July 2012
4	Support to CC education, awareness-building and FWUC strengthening	December 2012
5	Assessment of Community Vulnerability and Risks from Climate Change in the Coastal Zone of Cambodia	October 2012,
6	Analysis of Costs & Benefits of modifying Agricultural Practices for Climate Change at the Coast	November 2012,
7	Detailed Implementation Plan for Demonstration Activities at the Coast	March 2013
8	Climate-Resilient Irrigation - Guidance Paper	March 2013,
9	Monitoring and Evaluation Framework for Demonstration Activities	October 2013,
10	Training Materials for Scaling-up Climate Change Adaptation and Modified Procedures	December 2013
11	Effective Mechanisms for Climate Change Mainstreaming in Sub-National Planning	January 2014,
12	Guidelines for Integrating Climate Change Considerations into Commune Development Planning - Target Areas	January 2014
13	Guidelines for Integrating Climate Change Considerations into Commune Development Planning - Overall	January 2014
14	Mainstreaming of Climate Change into the Sub-National Development Planning in Cambodia	December 2013
15	Outputs from Training Programme on Integrating Climate Change Considerations into Commune Development Planning	April 2014

	Document	Date
16	Lessons learnt from pilot and demonstration activities	June 2014

The deliveries 1-12 were part of the contract deliveries whereas deliveries 13-16 have been made additional for providing more comprehensive information regarding the implementation of CARP. The full list of documents and training materials can be found in Annex 2. Also in Annex 5 is provided a full list of equipment procured under CARP.

6. **Financial Utilisation**

The contract for the CARP Component was a fixed price contract and payments were made in relation to the below linked outputs and payment schedule. The summarized spending of CARP is shown in the table following below.

MILESTONE	PAYMENT STATUS
1st payment 20% of the total contracting amount will be disbursed upon signing of contract	Payment received
2nd payment 10% of the total contracting amount will be disbursed upon submission and acceptance of the 2012 Implementation Plan and the 1st Progress Report	Payment received
3rd payment 20% of the total contracting amount will be disbursed upon submission and acceptance of the completion of below outputs and the 3rd Progress Report: 1. *Assessment of implementation capacity of demonstration activities* 2. *Assessment of current coping strategies in target communities in relation to flooding, drought and extreme events* 3. *Vulnerability and risk assessment of community livelihoods in target districts* 4. *A review analysis of the vulnerability of existing agricultural practices to the impacts of climate variability and climate change*	Payment received
4th payment10% of the total contracting amount will be disbursed upon submission and acceptance of the completion of below outputs: 1. *Analysis of economic and social costs and benefits of options for modified agricultural practices* 2. *Assessment of training needs and implementation of training in FWUCs with regards to climate risk management; involving local authorities*	Payment received
5th payment 5% of the total contracting amount will be disbursed upon submission and acceptance of the completion of below outputs and the 5th Progress Report: 1. *Development of a detailed implementation plan for community adaptation demonstrations*	Payment received
6th payment15% of the total contracting amount will be disbursed upon submission and acceptance of the completion of below outputs and the 6th Progress Report: 1. *Development of guidance for climate-resilient irrigation design*	Payment received
7th payment10% of the total contracting amount will be disbursed upon submission and acceptance of the completion of below outputs and the 8th Progress Report: 1. *Development of land use planning guide by integrating climate change consideration for coastal area* 2. *Climate change considerations integrated into the Commune Development Plans in targeted areas* 3. *Development of training materials for scaling-up and adoption of modified procedures* 4. *Establishment of a monitoring and evaluation format for assessing benefits of demonstration activities*	Payment received
8th payment10 % of the total contracting amount will be disbursed upon submission and acceptance of the Final Report of work	Payment requested

2011	2012	2013	2014

Overall 2,140,578 US $ have been spent or 97% of the total budget on implementation of the project activities.

Description	Total in USD	Percentage of Total	Spent	Remaining	Percentage remaining
International Personnel	270.470,00	12%	281.142,68	(10.672,68)	-4
International Consultant	270.200,00	12%	292.078,00	(21.878,00)	-8
National Consultant	112.000,00	5%	117.076,00	(5.076,00)	-5
Contractual Services Individual	136.000,00	6%	129.200,00	6.800,00	5
Travel and Workshops	215.000,00	10%	195.205,59	19.794,41	9
Miscellaneous Expenses	61.330,00	3%	62.299,88	(969,88)	-2
Equipment and Furniture	154.000,00	7%	135.321,57	18.678,43	12
Communication and Audio Visual Equipment	27.000,00	1%	17.596,00	9.404,00	35
Supplies	100.000,00	5%	75.252,28	24.747,72	25
Demonstration Interventions	789.000,00	36%	788.197,00	803,00	0
Information Technology Equipment	35.000,00	2%	23.883,40	11.116,60	32
Audit	30.000,00	1%	23.326,00	6.674,00	22
Total	**2.200.000,00**	**100%**	**2.140.578,40**	**59.421,60**	**3**

ANNEXES

Annex 1. Findings and Conclusions from the Annual Seminar on Climate Change Adaptation in the Coastal

Annex 2. Documents and deliveries under CARP

Annex 3. CARP Demonstration Activities – Status, Future Plans and Sustainability/Exit Strategy

Annex 4. Lessons learnt from pilot and demonstration activities

Annex 5. List of equipment procured

Annex 1. Findings and Conclusions from the Annual Seminar on Climate Change Adaptation in the Coastal Area

Summary of Findings and Conclusions of the 2nd National Seminar on Climate Change Adaptation within the Coastal Zone of Cambodia

25-26 March 2014

We have identified the major challenges to climate change adaptation/mitigation efforts as being:

- Fast economic development
- Insufficient / lack of unified land use planning
- Adverse effects on (the potential of) eco-tourism as a result of fast economic development and poor planning
- Lack of financial resources but also a challenge to prioritise how to spend the available resources
- Weak capacity in relation to climate change
- Insufficient coordination between key stakeholders
- Protection of biodiversity
- Striking a (right) balance between conservation and economic development
- A large proportion of households in the coastal zone lack access to clean water and other basic services
- Climate change awareness is still limited among coastal communities

We have identified the major opportunities as being:

- The Royal Government of Cambodia and The Ministry of Environment is committed to improve adaptation, enhance livelihoods and develop the agricultural sector in the coastal zone as exemplified by Samdech Hun Sen's speech at the Climate Change Forum
- H.E. Dr. Say Samal reiterated this commitment in his speech yesterday and added that replication of CARP models and activities should be a priority together with increased coordination among stakeholders, unified land use planning and exploring options for private sector funding of environmental activities
- There has been significant progress in CARP so far, early outcomes have been achieved and valuable lessons learned have been generated – it is a flagship project that should be upscaled and replicated by CCCA
- It is time to strengthen the coordinating role of the Provincial Working Groups in assisting communes and districts in integrating CC activities into their development plans
- Donors have expressed a commitment to provide more funding for capacity development and addressing policy and institutional gaps but important that national stakeholders, e.g. CCMD, MoE, MLMUPC and MoT, improve their coordination and land use planning

- A circular on CZ management has been developed which could be used as a platform for more effective land use planning alongside a yet-to-be-drafted law on CZ development
- A host of pilot activities have been conducted in CARP's target areas and many of them have proved cost-effective which constitute another argument for their replication
- The application of dynamic models on tide assessment has given us more knowledge of the different impacts of storms in different areas which will make it easier to allocate the scarce resources for adaptation
- The conducted pilot activities have illustrated that management options can have multiple benefits at the same time – this should be further exploited by garnering the experience and expertise of the different members of the Provincial Working Groups
- A continued strong focus on livelihoods improvements will make it easier to implement adaptation activities since local communities can see tangible results of their participation
- There are many challenges in improving local livelihoods but also opportunities for many "quick wins": Irrigation, pest management, rehabilitation of dykes, strengthening of polders, water storage tanks, introduction of CARDI rice varieties, improving liquid and solid waste collection, promotion of livestock farming etc.
- Scope for increasing the documentation – we need more success stories (not least relevant in connection with fund raising)
- This national seminar has not only demonstrated the progress of our efforts but has also given us an opportunity to reflect on policy and institutional gaps that needs to be filled in order to move forward especially to set up a coordinating body at provincial level for mainstreaming climate change into sub-national plans.

1) **The Seminar Chairs' Summary**

a) **Recognised** that **adaptation, climate resilience, and mitigation** are emerging and increasingly becoming critical key elements of overall coastal and marine development and management.

b) **Acknowledged that** in realising adaptation, **promising progress has been demonstrated by coastal national and sub-national government** in terms of building capacity for climate change resilience management and planning, strengthening policy and science, and demonstrating targeted local interventions to increase ecosystem resilience, and these **efforts need to be spread and scaled up with greater urgency** by all key stakeholders. However, there are many difficulties in moving coastal adaptation and resilience from the analysis stage, onto the planning stage and the implementation stage. However the experience from the coastal area and especially the lessons learned from the target areas shows that this can be done and have full support from the local stakeholders and the cooperation partners

c) **Reaffirmed** that the active participation of relevant stakeholders must be fostered to formulate effective policies and practices for Cambodia climate change vision.

d) Recommended National Committee for Management and Development of Cambodian Coastal Area and development partners to consider the following actions:

i. **On broad policies and legal frameworks:**

- **Improve policies and regulations** in order to facilitate the **amendments of existing policies and guidelines for the coastal areas; integration climate change in land management and urban planning, or sector climate changes strategic plan in land management and urban planning**;
- Develop **coastal climate change guidelines**, which encourage the development of **local climate change adaptation action plans for realising green, low-carbon, climate resilient, equitable, sustainable and knowledge-based society** based on **scientific findings**, as well as the **integration of climate change into commune development and investment plans**;
- **'Governance'** should be considered **under Framework Plan for Managing Coastal and Marine Environment**, as a **cross-cutting action area of cooperation,** given that coastal and marine environmental issues transcend administrative boundaries and call for institutional coordination. Therefore, not only internal coordination within ministries, but also with sub-national governments is important.

ii. On **practical projects and actions under development partner collaboration on climate change adaptation:**

- **Climate change adaptation initiatives and donors need to focus on financially-feasible project development and connect them to finance mechanisms**. Climate funds, private sector investment, national budgets and innovative financing, all need to be employed as sources of capital.
- Governments, donors, NGOs, Civil Society and academia should try **to devise methods and ensure lesson learnt from adaptation implementation projects are effectively fed into national and sub-national policies and plans**. Effective approaches; such as **training activities, knowledge sharing events and demonstrating local interventions** through the modality of **building partnerships and cooperation;** are needed to facilitate the up-scaling of pilot measures to other provinces especially Kep and Kampot. **Networks and communities of**

practitioners need to multiply these relationships to encourage and 'spread' and 'scale' of best practice adoption.

- **Strongly emphasised** that the demonstration activities in the coastal area supported in the coastal area by **CCCA should be expanded and replicated in** other coastal areas **under the next phase of CCCA under preparation.**

e) **Requested** the Coastal Coordination Unit of Ministry of Environment (Secretariat of National Committee for Management and Development of Cambodian Coastal Area) to communicate to and report the Summary of the 2nd National Seminar on Climate Change Adaptation within the Coastal Zone of Cambodia and consult relevant stakeholders on possible ways forward at the following upcoming meetings:

i. Joint Review Programme Meeting of CARP and LDCF to be held on 31st March 2014 in Phnom Penh;
ii. 9th Meeting of Programme Support Board on Cambodia Climate Change Alliance (CCCA) to be held on 8 April 2014 in Phnom Penh;
iii. 1st Meeting of the National Committee for Management and Development of Cambodian Coastal Area to be held in April 2014 in Phnom Penh;
iv. 5th Meeting of Project Steering Committee to be held in July 2014 in Phnom Penh;
v. Other relevant major meetings and seminars pertaining to Climate Change Adaptation, including those under regional and bilateral processes such as IUCN, PEMSEA, USAID, UNDP, UNEP, EU, SIDA, China, Korea, and Japan.

Annex 2. Documents and deliveries under CARP

Document	Date	English	Khmer	Web Page	Distribution
Technical					
Assessment of Coping Strategies in the Coastal Zone of Cambodia	June 2012	Yes	Yes	Yes	PSC, CCU, TWG, CCCA
Implementation capacity of demonstration activities	October 2012,	Yes	No	Yes	PSC, CCU, TWG, CCCA
Vulnerability of existing agricultural practices	July 2012	Yes	No	Yes	PSC, CCU, TWG, CCCA
Support to CC education, awareness-building and FWUC strengthening	December 2012	Yes	No	No	PSC, CCU, TWG, CCCA
Assessment of Community Vulnerability and Risks from Climate Change in the Coastal Zone of Cambodia	October 2012,	Yes	Yes	Yes	PSC, CCU, TWG, CCCA
Analysis of Costs & Benefits of modifying Agricultural Practices for Climate Change at the Coast	November 2012,	Yes	Yes	Yes	PSC, CCU, TWG, CCCA
Detailed Implementation Plan for Demonstration Activities at the Coast	March 2013	Yes	No	Yes	PSC, CCU, TWG, CCCA
Climate-Resilient Irrigation - Guidance Paper	March 2013,	Yes	Yes	Yes	PSC, CCU, TWG, CCCA, Polder User Committee
Monitoring and Evaluation Framework for Demonstration Activities	October 2013,	Yes	No	Yes	PSC, CCU, TWG, CCCA
Training Materials for Scaling-up Climate Change Adaptation and Modified Procedures	December 2013	Yes	No	Yes	PSC, CCU, TWG, CCCA
Effective Mechanisms for Climate Change Mainstreaming in Sub-National Planning	January 2014,	Yes	Yes	Yes	PSC, CCU, TWG, CCCA, commune

Document	Date	English	Khmer	Web Page	Distribution
					councils
Guidelines for Integrating Climate Change Considerations into Commune Development Planning - Target Areas	January 2014	Yes	Yes	Yes	PSC, CCU, TWG, CCCA commune councils
Guidelines for Integrating Climate Change Considerations into Commune Development Planning - Overall	January 2014	Yes	No	Yes	PSC, CCU, TWG, CCCA
Mainstreaming of Climate Change into the Sub-National Development Planning in Cambodia	December 2013, Final, Eng	Yes	Yes	Yes	PSC, CCU, TWG, CCCA commune councils
Outputs from Training Programme on Integrating Climate Change Considerations into Commune Development Planning	April 2014	Yes	No	Yes	PSC, CCU, TWG, CCCA
Training Materials/Books					
Climate Change Awareness Training Booklet	April 2013	No	Yes	Yes	PSC, CCU, TWG, CCCA, trainers, commune councils , communities
Climate Change Awareness Flip Chart	April 2013	No	Yes	Yes	PSC, CCU, TWG, CCCA, trainers, commune councils, schools
Training Manual – Climate Change Awareness	April 2013	Yes	Yes	Yes	PSC, CCU, TWG, CCCA, trainers
Climate Resilient Integrated Farming -Chicken husbandry at the family level	March 2013	No	Yes	No	Trainers, farmers
Climate Resilient Integrated	March	No	Yes	No	Trainers,

Document	Date	English	Khmer	Web Page	Distribution
Farming - Pig husbandry at the family level	2013				farmers
Climate Resilient Integrated Farming - Sustainable fisheries	March 2013	No	Yes	No	Trainers, farmers
Climate Resilient Integrated Farming - Introduction to the System of Rice Intensification (SRI)	March 2013	No	Yes	No	Trainers, farmers
Climate Resilient Integrated Farming - Vegetable cultivation	March 2013	No	Yes	No	Trainers, farmers
Climate Resilient Integrated Farming - Fruit tree cultivation	March 2013	No	Yes	No	Trainers, farmers
Climate Resilient Integrated Farming - Rice cultivation	March 2013	No	Yes	No	Trainers, farmers
Climate Resilient Integrated Farming - Soil fertility management	March 2013	No	Yes	No	Trainers, farmers
Climate Resilient Integrated Farming - Post-harvest technology	March 2013	No	Yes	No	Trainers, farmers
Livestock - Improving chicken raising in rural areas to control bird flu	March 2013	No	Yes	No	Trainers, farmers
Livestock - Technique for raising chicken, pigs and cattle by smallholders	March 2013	No	Yes	No	Trainers, farmers
Livestock - Technique for raising pigs by smallholders	March 2013	No	Yes	No	Trainers, farmers
Livestock - Technique for raising cattle by smallholders	March 2013	No	Yes	No	Trainers, farmers
Livestock - Care and feed of pregnant and lactating sows and piglets 1-35 days	March 2013	No	Yes	No	Trainers, farmers

Document	Date	English	Khmer	Web Page	Distribution
Climate-Resilient Irrigation - Guidance Paper	March 2013,	Yes	Yes	Yes	PSC, CCU, TWG, CCCA, Polder User Committee
Guidelines for Integrating Climate Change Considerations into Commune Development Planning - Target Areas	January 2014	Yes	Yes	Yes	PSC, CCU, TWG, CCCA commune councils
Management					
1st Quarterly Progress Report November – December 2011	January 2012	Yes	No	Yes	PSC, CCU, TWG, CCCA
2nd Quarterly Progress Report January – March 2012	April 2012	Yes	No	Yes	PSC, CCU, TWG, CCCA
3rd Quarterly Progress Report April – June 2012	July 2012	Yes	No	Yes	PSC, CCU, TWG, CCCA
4th Quarterly Progress Report July– September 2012	October 2012	Yes	No	Yes	PSC, CCU, TWG, CCCA
5th Quarterly Progress Report October– December 2012	January 2013	Yes	No	Yes	PSC, CCU, TWG, CCCA
6th Quarterly Progress Report January– March 2013	April 2013	Yes	No	Yes	PSC, CCU, TWG, CCCA
7th Quarterly Progress Report April– June 2013	July 2013	Yes	No	Yes	PSC, CCU, TWG, CCCA
8th Quarterly Progress Report July- September2013	October 2013	Yes	No	Yes	PSC, CCU, TWG, CCCA
9th Quarterly Progress Report October– December 2013	January 2014	Yes	No	Yes	PSC, CCU, TWG, CCCA
10th Quarterly Progress Report January– March 2014	April 2014	Yes	No	Yes	PSC, CCU, TWG, CCCA
Final Work Report May 2014	June 2014	Yes	No	Yes	PSC, CCU, TWG, CCCA

Annex 3. CARP Demonstration Activities – Status, Future Plans and Sustainability/Exit Strategy

CARP Demonstration Activities – Status, Future Plans and Sustainability/Exit Strategy

Demonstration Activity	Status	Plans for future	Sustainability/Exit Strategy
1. Climate Resilient Integrated Farming Training Programme for (a) agricultural extension staff and (b) households/families in multi-scale climate change adaptation strategies and integrated farming (integration of crops, livestock, fish, and water) at 8 target communes[2]. This is preceded by agro ecological analysis as an integral part and includes demonstration in on-farm water management measures. A special activity includes support to poor households for implementing rainwater harvesting and a livelihood support activity. The demonstration activity has been implemented in cooperation with Department of Agricultural Extension, MAFF.	The outputs included the finalization of 31 Farmer Field Schools (FFS) on Climate Resilient Integrated Farming Systems to coastal conditions. A total of 1,452 farmers including 716 women have been direct beneficiaries, participating in both FFSs (852 farmers including 393 women) and 20 on-farm demonstrations (600 farmers including 323 women) on farm production such as rice and vegetable productions, pig and chicken raising, and fish production during 2013. Also they have formed self-help groups or saving groups for follow up and use as models for replicating and up-scaling to other areas in the coastal zone. A total of 858 farmers including 584 women benefits from operation of saving groups. A special facility has been established for 155 poor households who have participated in the training so they receive support for rain water harvesting and investment in IFS production. Calculations have indicated that farmers adapting Climate Resilient Integrated Farming can generate an average net income of 875-1050 USD during the wet season which is a significant improvement compared to their income using traditional practices. The building of Adaptive Capacity and Resilience (Physical and economic resilience) for poor households has been aimed to improved household food security and nutrition, and income generation for the poor in the coastal zone. The activity will increase the adaptive capacity and physical and economic resilience systems through improving household food production (linking with the integrated farming activities), promoting micro-business and saving groups for the poor level 1 and poor level 2 in each village of the target communes. The activity selected a total of 155 poor households (5 poor households in each village of the target communes (31 villages) in Preah Sihanouk and Koh Kong Provinces from the 1452 farmers who attended Farmer Field Schools and on-farm demonstration. Bookkeeping for saving groups have also been introduced and trained to districts and provincial officers for assisting saving groups in recording savings and proper bookkeeping. Meetings were conducted in each of the 31 villages to introduce basic concepts and principles of self-help group/saving groups. The meetings also discussed the rules and norms including bookkeeping procedures with farmer groups and procedures and methodology for implementing the community micro-project for support to the poor. Each saving group has elected group leaders (group leader and deputy group leaders) and treasurers for managing and operating saving activities and bookkeeping of saving groups, and managing the revolving fund in the groups. The result is 31 saving groups with a total of 858 farmers including 584 women who benefits from the operation of the saving groups and they have now achieved an own saving of 16,656,000 Riels (or about US$ 4,060). A total of 175 water harvesting facilities were constructed that contributes directly to increasing climate change resilience for the 155 poor households and 20 local farming communities in the villages for use in agricultural production and domestic use. At least 175 poor households (total of 885 peoples) directly benefits from these constructions of climate resilience infrastructures (Water storage facilities)	The Demonstration Activity Integrated Farming and Climate Change Adaptation in the Coastal Area has been adopted as a model by the Provincial Department of Agriculture (PDA) of Preah Sihanouk and Koh Kong provinces and sub-national level agencies and local communities for use in increasing resilience of agriculture and food production and related livelihoods to short and long term effects of climate change. The model of Climate Resilient Integrated Farming has also been adopted and integrated in Commune Development and Commune Investment Plans by commune councils and PDA. The model of Climate Resilient Integrated Farming has also been adopted and put in the Climate Change Action Plan for Agriculture, Forestry and Fisheries 2014-2018 for building up the resilience of farmers and farming communities in the coastal area to climate adaption in agriculture and livelihoods. As reported by the DAE the Climate Resilient Integrated Farming needs to be followed up and expanded to other areas in the coastal area and originally with a strong expectation that this would be supported by coming phase of CCCA.	DAE considers ensuring the sustainability and effective operation after project finalization of CARP through the provincial departments and with supervision by DAE. The LDCF project has some resources for supporting livelihood activities and to ensure the most cost effective use of these resources the activities started through CARP will be continued through direct support. In doing this LDCF will also be in a position for monitoring the continued activities and thereby also be able to improve the likelihood of the sustainability of this demonstration activity. It is considered that sustainability of this activity should be relatively good as farmers can see a clear improvement of their livelihood conditions.

[2] The communes are: Tuek Thla, Tuek L'ak, Sameakki, Prey Nob, Toul Toteng, O Oknha Heng Communes, Prey Nob District, Sihanoukville Province. Peam Krasaob and Tuol Kokir Communes, Mondul Seima District , Koh Kong Province

Demonstration Activity	Status	Plans for future	Sustainability/Exit Strategy
2. Community Fisheries project at Peam Krasaob Commune; especially in terms of strengthening regulatory measures and their enforcement. The relation of community fisheries to climate change adaptation is that general fishing developments and its regulatory measures are likely to be required to adjust the livelihood of fishing communities. The demonstration activity has been implemented in cooperation with the Fisheries Administration, MAFF.	This activity started after final clarification between Fisheries Administration and Ministry of Environment regarding demarcation and management of fisheries inside the wild-life sanctuary and outside the sanctuary. The main objective was to establish a Community Fisheries at Peam Krasaob for the benefits of the 277 households; especially in terms of strengthening regulatory measures and their enforcement. This was done to improve general fishing developments and its regulatory measures, including improvement of fishing stocks. This is likely to be required to adjust to climate change and increase long-term livelihood possibilities for the fishery communities at Peam Krasoab. All legal CFi documents (by-law, internal rule, list of members and committee, agreement, and map) have been completed, signed and endorsed by all relevant stakeholders (CFi chief, village chief, commune chief, district mayor, FiA Cantonment chief, Provincial Governor and FiA General Director). These legal documents have been sent and are in the process of being officially registered at MAFF. The Community area management plan (CFiAMP) has been completed, signed and endorsed. Implementation of fish stock enhancement measures such as demarcation of a conservation zone has been done, strengthening of fisheries monitoring, control and surveillance measures; and procurement of equipment: Training needs for CFi committee members for CFi capacity have been completed and training provided in 1. facilitation skills and leadership and 2. Catch monitoring. Fish catch monitoring has been carried out by 10 CFi fishers (who are CFi committee members and patrolling members) from October 2013 up to now, CFi monthly meetings have been held by CFi committee members and patrolling group. Improving the quality of marine fish processing through proper packaging has been conducted. A group of 10 CFi shrimp processors (all women) has been established. The design of shrimp packaging has been discussed and the process for printing and the shrimp packaging with CFi Peam Krasoab name has been finalized. A crab bank has been created to improve crab production in Peam Krasoab. A group of 20 CFi members (50% women) have been established; location of a crab bank (crab bank station) has been done; a cage for the crab bank has been prepared, and capital input for crab bank savings has been agreed and will be functioning from April. The 10 fishers are doing their daily catch monitoring report regularly; CFi patrolling activities have been well functioning due to that most of CFi patrol members are full time fishers and also engaged in fish catch monitoring.	It is considered to provide limited support to these activities through the LDCF livelihood resources.	Under the LDCF monitoring of the activities will be conducted and a final evaluation will be conducted by end of 2015.
3. Promotion and increased availability of shorter duration seeds for crops; particularly for wet-season paddy possibly enabling harvest before onset of heavy flooding and sea water surges at target communes. Such varieties will need to be tested (at no cost to farmers) in specific localities, where they are likely to be effective. The demonstration activity has been implemented in cooperation with Cambodia	As part of this activity 30 rice field demonstration have been carried out (20 in Prey Nob district, and 10 in Mondul Seima district). In Prey Nob, 11 demonstrations were with PRD and 9 demonstrations with PRM. Apart from the field demonstrations 6 seed purification demonstrations were also carried out in Prey Nob District. In Mondul Seima 4 demonstrations with PRD, 4 with PRM, and 2 with IR66 were made. Three demonstrations in Prey Nob district were damaged by floods and Golden Apple Snail (GAS) and 2 demonstrations of IR 66 at Mondul Seima were damaged by salt water intrusion during the flowering stage. The data are under analysis and a final report will be provided by CARDI shortly. The preliminary results indicate that the farmers using short-term varieties and fertilizer have approx. almost 3 times higher gross margin compared to farmers using their own variety and no fertilizer.	It is expected that through LDCF support some of the farmers who participated in the field demonstrations will be assisted in carrying out full scale implementation of the methodology and varieties used in the field test. The number of participants however will be limited due to the full scale implementation will be done with a	Under the LDCF monitoring of the activities will be conducted and an assessment of numbers of farmers switching to the proposed rice varieties will be conducted by end of 2015. It is considered that the loss compensation scheme to be provided through the LDCF will be a

Demonstration Activity	Status	Plans for future	Sustainability/Exit Strategy
Agricultural Research and Development Institute, MAFF.	The field trials with Mung beans are just being finalized and the results and analysis will be included in the CARDI final report.	loss compensation scheme to the farmers if the production not goes as expected.	factor for expanding this change and make it more sustainable.
4. Promotion of increased livestock keeping at the selected communes - by using a revolving scheme for improved breeds – as tested successfully in Cambodia, Laos and elsewhere. This is in response to increased flooding problems as livestock are moveable. The demonstration activity has been implemented in cooperation with the Center for Livestock and Agriculture Development (CelAgrid) in collaboration with the Project Management Unit, Ministry of Agriculture, Forestry and Fisheries.	A total of 300 beneficiaries/families have received animals of which 57 beneficiaries received gilts, 234 beneficiaries received piglets (5 piglets per family for fattening), 3 beneficiaries received goats (3 goats per family), 4 beneficiaries received chicken (100 chicken per family) and 2 beneficiaries each received a herd of 100 laying ducks. The farmer field school training programs have been completed successfully. Beneficiaries participated in bi-weekly FFS on care, feeding and management of animals. The knowledge level was measured as in the pre-test. In the pretest 18% got good scores, 36% passed the test and 46% failed and the post-test conducted at the end of the FFS sessions showed that 68% passed with good scores, 20% passed with medium scores and 12% failed the test. All beneficiaries have received manuals on “care, feeding and management of pigs” and “good practice of chicken keeping and AI awareness”. Almost all families who raise fattening pigs have sold their pigs and returned the revolving fund to CelAgrid which is at present deposited in an account at ACLEDA. Meetings have also been organized with PMC members to make sure that i) the revolving fund must be returned to the project, ii) to remind and provide technical knowledge to PMC members and to LIG members so when selling their animals they are not cheated by middlemen. A total of 155 beneficiaries from both provinces have sold their animals and they have also returned the funds to the project (142 beneficiaries in Prey Nub and 13 beneficiaries in Koh Kong). Most of these beneficiaries have raised fattening piglets and only two families have raised chicken. Among the 57 families who received gilts, 8 of them have delivered offspring of a total of 50 piglets. Three sows have litter size of less than 4 piglets and the other five sows have more than 8 piglets. Forty four sows are pregnant and expected to deliver their offspring soon. Among the provided gilts, 5 gilts died by diseases or were bitten by scorpions. The revolving fund looks promising as a high number of participants want to continue and a number of new households want to be included in the programme. The final report of this activity is under finalization and the contractual format for release of funds have also been clarified and strengthened for the second cycle to make procedures more clear for all participants.	It is expected that the started revolving funds will be continued during the coming period so that the PMC and LIG’s will be responsible for the fund cycling according to the stipulated procedures and conditions. The overall process will be supervised by CellAgrid and MAFF. If LDCF have additional livelihood funds these might be provided as direct additions to the established funds.	Under the LDCF the activities under this demonstration will be monitored and a final assessment will be prepared by end of 2015. Sustainability of this activity should be relatively good although it has just finalized one cycle but the income generated for the participating households have resulted in a clear interest of the households to participate in this revolving fund.
5. Climate change awareness raising and training on climate change resistant irrigation in the target communes. A comprehensive training and awareness activity in relation to climate change impacts has been implemented applying experience from previous work in Cambodia. The training will be done in all 8 selected communes. The demonstration activity has been implemented in cooperation with Department of Environmental Education, Save Cambodia’s Wildlife, and the established provincial working groups, who will be responsible for the implementation in the communes.	The climate change awareness training has been conducted in 31 villages and the climate change awareness booklet has been distributed to all the participants and to be shared with other household members. The field training has been conducted by two teams from: two officers from Department of Environment, one person from Department of Agriculture, Forestry and Fisheries and one from Department of Water Resources and Meteorology. In each training session up to 30 persons participate. A total of approx. 2850 persons have participated in the training and of which approx. 50% were women. The evaluation shows that women is becoming more active and willing to learn to get knowledge on climate change and related issues. A video documentary has also been produced to be shown in the national TV. The video provides information on climate change adaptation and also provide information regarding the demonstration activities conducted in the two target areas.	Staff is trained in providing training in climate change awareness and training material has been prepared. However, specific funds are not available through LDCF to include more communes in the target districts or include other provinces. Under the LDCF a concept paper will be prepared for potential development of the Prey Nob area and renovating the reservoirs as present water shortage is a major constraint for increasing agricultural productivity in this area. The aim of the concept note would be to	LDCF will as part of the final evaluation make an assessment of increase in climate change awareness in the target areas using a similar approach as in the coping strategy study.

<table>
<tr><th>Demonstration Activity</th><th>Status</th><th>Plans for future</th><th>Sustainability/Exit Strategy</th></tr>
<tr><td></td><td>A study tour has been conducted to Cantho University in Vietnam and this also included site visits in Soc Trang Province to see how farmers cope with saline intrusion and climate change impacts in Vietnam. It is hoped that the study tour will provide learning experience for the provincial authorities and commune councils so that they can learn from the experience gained in Vietnam regarding climate change.

Several training sessions in Climate Resilient Irrigation have been conducted with focus on the Prey Nob polder area. The training sessions have been aimed to involve members of the polder community and to assess the potential for renovating the water reservoirs in the Prey Nob area.</td><td>initiate a discussion with potential donors to support such activities.</td><td></td></tr>
<tr><td>6. Adaptation measures integrated in Commune Development Plans in 8 communes. Concrete demonstration actions has been done in each of the target communes based on the planned activities in the 2013 commune investment plans and implementing actions that will make the communes more resilient to climate change impacts. The demonstration action has been conducted in cooperation with the commune councils, districts and the provincial working groups.</td><td>The identified climate change actions have been included in the CIP’s for each of the eight communes. Overall the outputs produced provide a basis for the future CDP’s and CIP’s to include climate change considerations in the planning process. In combination with the report describing the process applied by CARP for mainstreaming climate change into sub-national planning, the CIP´s prepared for the demonstration activities in each commune, the template prepared for climate change screening, and the output report of the workshop together they all provide a tool for the communes and districts to include climate change in the sub-national planning process.
A table with the small scale climate change investment is presented below:
<table>
<tr><td>Ou Oknha Heng</td><td>Renovation of Lake and Water Control Structure</td><td>O Tapng Village</td><td>50</td><td>Commune Council</td></tr>
<tr><td>Prey Nop</td><td>Expansion of rainwater harvesting tank</td><td>Bek Krang primary school</td><td>25</td><td>Commune Council</td></tr>
<tr><td>Tuol Totoeng</td><td>Rainwater Harvest Tank</td><td>Chumpou Khmao school</td><td>50</td><td>Commune Council</td></tr>
<tr><td>Tuol Totoeng</td><td>Restoration of pagoda pond</td><td></td><td>100</td><td>Commune Council</td></tr>
<tr><td>Toul Totoeng</td><td>Renovation of Water Gate</td><td>Several villages</td><td>150</td><td>Commune Council</td></tr>
<tr><td>Tuk Thla</td><td>Renovation of a combination of four wells</td><td>Prek Toal village</td><td>50</td><td>Commune Council</td></tr>
<tr><td>Tuk Laak</td><td>Rain water harvesting Tank</td><td>O Keo School</td><td>25</td><td>Commune Council</td></tr>
<tr><td>Tuk Laak</td><td>Rainwater Harvest Tank</td><td>Kampong Smach Touch</td><td>25</td><td>Commune Council</td></tr>
<tr><td>Tuol Kokir</td><td>Rainwater Harvest Tank</td><td>Koh Chak</td><td>50</td><td>Commune Council</td></tr>
<tr><td>Peam Krasoab</td><td>Renovation of Existing Well and Water Storage Tank</td><td>Commune office</td><td>50</td><td>Commune Council</td></tr>
<tr><td>Peam Krasoab</td><td>Rain water harvesting tank</td><td>Commune office</td><td>50</td><td>Commune Council</td></tr>
</table></td><td>Some of these activities will be continued under the LDCF as there is a limited budget for providing water harvesting systems in the target areas. These demonstrations will be carried out following similar procedures as under CARP and inclusion in the communes CIP’s.</td><td>The maintenance and operation of these small scale climate change investments will be monitored under the LDCF activities.

The overall sustainability of these investments is expected to be good as all reflects a strong need and request from the communities benefitting as water shortage is a major issue in the dry season in these areas.</td></tr>
</table>

Annex 4. Lessons learnt from pilot and demonstration activities

(See separate attachment)

Annex 5. List of equipment procured

Project title: Coastal Adaptation and Resilience Planning
Period :

ASSET AND INVENTORY REGISTER
As at 31-Dec-2012

Asset Identity No.	Description/Specification (include serial/model no.s & country of origin)	Purchase date	Ref. PV No.	Budget Line	Quantity	Unit Price	Amount US$	Location & User
CARP-CCCA-Air Con 1	Panasonic Air-Conditioner S10MKH Serial No: 2433277379, Made in Thailand	21-Jan-12		E1-07	1	$ 481,75	$ 481,75	CCU
CARP-CCCA-Air Con 2	Panasonic Air-Conditioner S13MKH Serial No: 2433603902, Made in Thailand	21-Jan-12		E1-07	1	$ 536,75	$ 536,75	CCU
CARP-CCCA-Digital Camera 1	Sony Digital Camera TX10 16.2 Megapixel, Memory Card Toshiba 8GB, Bag, and LCD protector Made in Japan	21-Jan-12		E1-01	1	$ 347,00	$ 347,00	CCU
CARP-CCCA-Water Dispenser 1	Standard Hot-Cool Water Dispenser Made in Thailand	21-Jan-12		E1-07	1	$ 275,00	$ 275,00	CCU
CARP-CCCA-Filing Cabinet 1	Leeco Filing Cabinet 014ML (4 drawers) Made in Thailand	29-Jan-12		E1-07	1	$ 165,00	$ 165,00	CCU: Sok Seyla
CARP-CCCA-Sliding Cabinet 1	Standard Sliding Cabinet SG72-18 Made in Thailand	29-Jan-12		E1-07	1	$ 142,00	$ 142,00	CCU: Sok Seyla
CARP-CCCA-Office Chair 1	Office Chair with wheels KI01A Black Made in Korea	29-Jan-12		E1-07	1	$ 62,00		CCU
CARP-CCCA-Office Chair 2	Office Chair with wheels KI01A Black Made in Korea	29-Jan-12		E1-07	1	$ 62,00	$ 62,00	CCU
CARP-CCCA-Office Chair 3	Office Chair with wheels KI01A Black Made in Korea	29-Jan-12		E1-07	1	$ 62,00	$ 62,00	CCU
CARP-CCCA-Office Chair 4	Office Chair with wheels KI01A Black Made in Korea	29-Jan-12		E1-07	1	$ 62,00	$ 62,00	CCU
CARP-CCCA-Office Chair 5	Office Chair with wheels KI01A Black Made in Korea	29-Jan-12		E1-07	1	$ 62,00	$ 62,00	CCU
CARP-CCCA-Office Chair 6	Office Chair with wheels KI01A Black Made in Korea	29-Jan-12		E1-07	1	$ 62,00	$ 62,00	CCU
CARP-CCCA-Office Chair 7	Office Chair with wheels KI01A Black Made in Korea	29-Jan-12		E1-07	1	$ 62,00	$ 62,00	CCU
CARP-CCCA-Office Chair 8	Office Leather Chair F9158 Made in Taiwan	29-Jan-12		E1-07	1	$ 245,00	$ 245,00	CCU: Dr. Neath
CARP-CCCA-Laptop 1	Sony VAIO VPC-EG1DGX/B Core i5 2410M 2.30GHz/4GB/500GB/14" Serial No.: S013000005 Made in China	02-Feb-12		E1-11	1	$ 1.060,00	$ 1.060,00	CCU: Sok Seyla
CARP-CCCA-Laptop 2	Sony VAIO VPC-EG1DGX/B Core i5 2410M 2.30GHz/4GB/500GB/14"	02-Feb-12		E1-11	1	$ 1.060,00	$ 1.060,00	CCU: Sreng Sophal

	Serial No.: S013000021Z Made in China							
CARP-CCCA-Laptop 3	Sony VAIO VPC-EG1DGX/B Core i5 2410M 2.30GHz/4GB/500GB/14" Serial No.: S013000055 Made in China	02-Feb-12		E1-11	1	$ 1.060,00	$ 1.060,00	CCU: Meas Rithy
CARP-CCCA-PC Monitor 1	Dell Monitor LCD 18.5" Dell E1912H LED Widescreen Flat Panel Serial No.: CN04H19R728721C5H6YM Made in China	02-Feb-12		E1-11	1	$ 105,00	$ 105,00	CCU: Ith Kessna
CARP-CCCA-PC Monitor 2	Dell Monitor LCD 18.5" Dell E1912H LED Widescreen Flat Panel Serial No.: CN04H19R728721C5HFVM Made in China	02-Feb-12		E1-11	1	$ 105,00	$ 105,00	CCU: Sreng Sophal
CARP-CCCA-CPU 1	Dell Inspiron 620MT i3-2120/4GB/500GB-Reader-DVDRW/Win7Pro Serial No.: 41FW92S Made in China	02-Feb-12		E1-11	1	$ 625,00	$ 625,00	CCU: Ith Kessna
CARP-CCCA-CPU 2	Dell Inspiron 620MT i3-2120/4GB/500GB-Reader-DVDRW/Win7Pro Serial No.: 51FW92S Made in China	02-Feb-12		E1-11	1	$ 625,00	$ 625,00	CCU: Sreng Sophal
CARP-CCCA-External Hard Drive 1	Trancend 750GB Serial No.: 476407-0343 Made in Taiwan	02-Feb-12		E1-11	1	$ 140,00	$ 140,00	CCU: Sreng Sophal
CARP-CCCA-Sliding Cabinet 2	Standard Sliding Cabinet SG72-18 Made in Thailand	16-Feb-12		E1-07	1	$ 142,00	$ 142,00	CCU: Dr. Neath
CARP-CCCA-Sliding Cabinet 3	Standard Sliding Cabinet SG72-18 Made in Thailand	16-Feb-12		E1-07	1	$ 142,00	$ 142,00	CCU: Sreng Sophal
CARP-CCCA-Printer 1	Ricoh SP 3400 SF Serial No.: S6819600199 Made in China	24-Feb-12		E1-12	1	$ 560,00	$ 560,00	CCU
CARP-CCCA-Printer 2	HP Officejet k7000 Color Serial No.: MY15K11113 Made in Malaysia	24-Feb-12		E1-12	1	$ 250,00	$ 250,00	CCU
CARP-CCCA-Wireless Router 1	Wireless Router TP-Link TL-WR940N Serial No.: Made in	17-Mar-12		E1-13	1	$ 120,00	$ 120,00	CCU
CARP-CCCA-Telephone System 1	Telephone System Panasonic KX-TES824 Serial No.: TES824BXV4-1B Made in Vietnam	17-Mar-12		E1-08	1	$ 230,00	$ 230,00	CCU
CARP-CCCA-Deskphone 1	Panasonic KX-T7730 Serial No.: T7730XV4-1A Made in Vietnam	17-Mar-12		E1-08	1	$ 70,00	$ 70,00	CCU
CARP-CCCA-Refrigerator 1	Panasonic BT223LHTH	06-Apr-12		E1-07	1	$	$	CCU

	Serial No.: Made in Thailand					315,00	315,00	
CARP-CCCA-Voice Recorder 1	Voice Recorder Sony ICD-PX720 Made in China	21-Apr-12		E1-08	1	$ 69,00	$ 69,00	CCU
CARP-CCCA-LCD Projector 1	Sony EX 120 Serial No.: S015019915G Made in China	22-Jun-12		E1-10	1	$ 770,00	$ 770,00	CCU
CARP-CCCA-Projector Screen 1	Projector screen 1.8m Made in China	22-Jun-12		E1-10	1	$ 105,00	$ 105,00	CCU
CARP-CCCA-Digital Camera 2	Canon EOS 600D with Kit 18-55 Serial No.: 143056024131 Made in Japan	23-Jun-12		E1-01	1	$ 934,00	$ 934,00	CCU
CARP-CCCA-Car 1	Nissan Patrol Engine No.: TD4222513 Chassis No.: JN1TCSY61Z0583623 Made in Japan	06-Aug-12		E1-05	1	$ 29.821,15	$ 29.821,15	CCU
CARP-CCCA-GPS 1	Garmin eTrex 20 Serial No.: 2DU138410 Made in	07-Sep-12		E1-02	1	$ 360,00	$ 360,00	CCU
CARP-CCCA-GPS 2	Garmin Montana 600 Serial No.: 2JN008378 Made in	07-Sep-12		E1-02	1	$ 755,00	$ 755,00	CCU
CARP-CCCA-Car 2	Toyota Land Cruiser Engine No.: 1GRA528835 Chassis No.: JTMJU03J004061239 Made in Japan	06-Nov-12		E1-05	1	$ 44.327,64	$ 44.327,64	CCU
CARP-CCCA-Deskphone 2	Panasonic KX-TS500 Serial No.: 2HCLK615220 Made in Malaysia	29-Dec-12		E1-08	1	$ 25,00	$ 25,00	CCU
CARP-CCCA-Laptop 4	Sony VAIO S13116FG Core i5 3210M 2.50GHz/4GB/640GB/13.3" Serial No.: Made in Malaysia	31-Jan-13		E1-11	1	$ 1.140,00	$ 1.140,00	CCU: Chho Somony
CARP-CCCA-Laptop 5	Sony VAIO S13116FG Core i5 3210M 2.50GHz/4GB/640GB/13.3" Serial No.: Made in Malaysia	31-Jan-13		E1-11	1	$ 1.140,00	$ 1.140,00	CCU: Kampot
CARP-CCCA-Laptop 6	Sony VAIO SVE1412DPXB Core i5 3210M 2.50GHz/4GB/500GB/14" Serial No.: C10FREYR Made in China	18-Feb-13		E1-11	1	$ 1.080,00	$ 1.080,00	CCU: Koh Kong
CARP-CCCA-Laptop 7	Sony VAIO SVE1412DPXB Core i5 3210M 2.50GHz/4GB/500GB/14" Serial No.: C10FNAMG	18-Feb-13		E1-11	1	$ 1.080,00	$ 1.080,00	CCU: Sihanoukville

	Made in China							
CARP-CCCA-Laptop 8	Sony VAIO SVE1412DPXB Core i5 3210M 2.50GHz/4GB/500GB/14" Serial No.: C10FREYD Made in China	18-Feb-13		E1-11	1	$ 1.080,00	$ 1.080,00	Kep
CARP-CCCA-LCD Projector 2	Sony DX 100 Serial No.: S01-7021039 Made in China	18-Feb-13		E1-10	1	$ 625,00	$ 625,00	KK
CARP-CCCA-LCD Projector 3	Sony DX 100 Serial No.: S01-7014300 Made in China	18-Feb-13		E1-10	1	$ 625,00	$ 625,00	SHV
CARP-CCCA-Printer 3	HP1536DNF Serial No.: CNF8F1C69X Made in China	18-Feb-13		E1-12	1	$ 430,00	$ 430,00	KK
CARP-CCCA-Printer 4	HP1536DNF Serial No.: CND9D7VBRT Made in China	18-Feb-13		E1-12	1	$ 430,00	$ 430,00	SHV
CARP-CCCA-Digital Camera 3	Nikon P510 Serial No.: 71056041 Made in China	19-Feb-13		E1-01	1	$ 492,00	$ 492,00	KK
CARP-CCCA-Digital Camera 4	Nikon P510 Serial No.: 71056569 Made in China	19-Feb-13		E1-01	1	$ 492,00	$ 492,00	SHV
CARP-CCCA-Motorbike 1	Honda Dream 125cc Engine no. ND125ME-8821457 Made in Thailand	20-feb-13		E1-06	1	$ 2.135,00	$ 2.135,00	CCU:KK
CARP-CCCA-Motorbike 2	Honda Dream 125cc Engine no. ND125ME-8799504 Made in Thailand	21-mar-13		E1-06	1	$ 2.125,00	$ 2.125,00	CCU:KAMPOT
CARP-CCCA-Motorbike 3	Honda Dream 125cc Engine no. ND125ME-8799475 Made in Thailand	21-mar-13		E1-06	1	$ 2.125,00	$ 2.125,00	CCU:KEP
CARP-CCCA-Sliding Cabinet-4	Wooden sliding Cabinet No serial Made in Thailand	01-Apr-13		E1-11	1	$ 190,00	$ 190,00	CCU-KK
CARP-CCCA-Meeting table-1-(1-5)	Wooden Meeting table No serial Made in Cambodia	01-Apr-13		E1-07	5	$ 180,00	$ 900,00	CCU-KK
CARP-CCCA-Meeting chair-1-(1-30)	Wooden Meeting Chair No serial Made in Cambodia	01-Apr-13		E1-07	30	$ 45,00	$ 1.350,00	CCU-KK
CARP-CCCA-Office-Chair-9	Scroll Meeting Chair No serial Made in China	23-May-13		E1-07	1	$ 60,00	$ 60,00	CCU-SHV
CARP-CCCA-Fan-1-(1-4)	Hatari Fan	25-May-13		E1-07	4	$	$	CCU-KK

	No serial Made in Thailand					65,00	260,00	
CARP-CCCA-Fan-2-(1-6)	Hatari Fan No serial Made in Thailand	25-May-13		E1-07	6	$ 60,00	$ 300,00	CCU-SHV
CARP-CCCA-Motorbike 4	Honda Dream 125cc Engine no. ND125ME-8820424 Made in Thailand	27-mar-13		E1-06	1	$ 2.120,00	$ 2.120,00	CCU: SHV
CARP-CCCA-Water pump machine-1	Water Pump machine No serial Made in China	30-May-13		E1-07	1	$ 93,00	$ 93,00	CCU-SHV
CARP-CCCA-Meeting-Table-2-(1-4)	Wooden Meeting Table No serial Made in Cambodia	30-May-13		E1-07	4	$ 200,00	$ 800,00	CCU-SHV
CARP-CCCA-Meeting-Chair-2-(1-30)	Wooden Meeting Chair No serial Made in Cambodia	30-May-13		E1-07	30	$ 45,00	$ 1.350,00	CCU-SHV
CARP-CCCA-Projector-Screen3	Projector screen 1.8m No serial Made in China	08-Jun-13		E1-10	1	$ 95,00	$ 95,00	CCU-SHV
CARP-CCCA-Projector-Screen2	No serial Made in China	08-Jun-13		E1-10	1	$ 95,00	$ 95,00	CCU-KK
CARP-CCCA-Sliding Cabinet-5	Sliding Cabinet No serial Made in Thailand	21-Jun-13		E1-07	1	$ 161,00	$ 161,00	CCU-SHV
CARP-CCCA-Office-Table-1	Office Table No serial Made in Thailand	21-Jun-13		E1-07	1	$ 165,00	$ 161,00	CCU-SHV
CARP-CCCA-Video Camera1	Sony NX70P Serial No.: 512642 Made in	25-jun-13		E1-01	1	$ 3.498,00	$ 3.498,00	CCU
CARP-CCCA-Table for LCD Satanding	Wooden Table for LCD No serial Made in Cambodia	01-Jul-13		E1-07	1	$ 35,00	$ 35,00	CCU-KK
CARP-CCCA-Wooden table-1	Wooden table for printer standing No serial Made in Cambodia	11-Oct-13		E1-07	1	$ 55,00	$ 55,00	CCU
CARP-CCCA- External Hard Disk 2 and EST SMART SECURITY 6	Sony External Hard Disk Serial No.:Sony 1Tb USB3.0 Made in Malaysia	11-okt-13		E1-11	1	$ 126,00	$ 126,00	CCU
CARP-CCCA-Laptop 9	MacBook Pro, Apple USB Drive, and JCPAL MacGuard Ultra-thin MacBook Protective Serial No.: SC02KX7JTFFRP Made in Japan	23-okt-13		E1-11	1	$ 1.933,00	$ 1.933,00	CCU: Dr. Vann Monyneath

CARP-CCCA-Sheeder1	Sunwood Paper sheeder Serial No.:SD 9157 Made in China	12-Dec-13		E1-07	1	$ 130,00	$ 130,00	CCU
CARP-CCCA-Office table-2	Wooden table No serial Made in Thailand	12-Dec-13		E1-07	1	$ 105,00	$ 105,00	CCU
CARP-CCCA-Meeting table-3	Wooden meeting table Serial No.:A240 Made in China	12-Dec-13		E1-07	1	$ 745,00	$ 745,00	CCU
CARP-CCCA-Wooden Chair(1-8)	Wooden meeting chair No serial Made in Cambodia	12-Dec-13		E1-07	8	$ 80,00	$ 640,00	CCU
CARP-CCCA-External Hard Disk -3	Transend External Hard Disk Transend 1Tb-USB3.0 Made in China	02-Jan-14		E1-11	1	$ 98,00	$ 98,00	CCU
CARP-CCCA-Bag1	Krusell Gala Laptop Slim Bag Krusell Gaia Slim Laptop Case - 15,6 Made for Xperia	14-Jan-14		E1-11	1	$ 45,00	$ 45,00	CCU: Dr. Vann Monyneath
CARP-CCCA Refractometer	Salinity Refractometer	Jan-14		E1-04	1	$ 77,63	$ 77,63	CCU
CARP-CCCA Refractometer	Salinity Refractometer	Jan-14		E1-04	1	$ 71,25	$ 71,25	CCU
CARP-CCCA-External Hard Disk -4	Transend External Hard Disk Transend 25 A3 1Tb USB3.0 Made in China	07-Feb-14		E1-11	1	$ 98,00	$ 98,00	CCU
CARP-CCCA-wooden table-2	Wooden Table No serial Made in Cambodia	16-Feb-14		E1-07	1	$ 75,00	$ 75,00	CCU
CARP-CCCA-LED Smart TV	SonyLED Smart TV Sony :Serial No.:2724416 Made in Malaysia	17-Feb-14		E1-01	1	$ 579,00	$ 579,00	CCU: Dr. Vann Monyneath
CARP-CCCA-HP Laser Printer 5	HP LaserJet Pro 400 Printer M401dn Serial No.: VNH6800196 Made in China	28-Apr-14		E1-12	1	$ 434,50	$ 434,50	CCU
CARP-CCCA-Adapter1	Apple Mini Display Port to VGA Adapter No serial Made in Japan	19-May-14		E1-11	1	$ 45,00	$ 45,00	CCU