Cardno
Shaping the Future

CAVAC Six Monthly Report
January–June 2014

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

ANNEXES

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AIF	Agribusiness Innovation Fund
AQIP	Agricultural Quality Improvement Project
ATSA	Agriculture Technology Services Association
AWP	Annual Work Plan
BANTIC	Banteay Thleay Irrigation Community
BEE	Business Enabling Environment
BHH	Bayon Heritage Holding Group Co., Ltd
CARDI	Cambodian Agricultural Research and Development Institute
CAVAC	Cambodia Agricultural Value Chain Program
CDRI	Cambodia Development Resource Institute
CMAC	Cambodian Mine Action Centre
DAE	Department of Agricultural Extension
DCED	Donor Committee for Enterprise Development
DFAT	Department of Foreign Affairs and Trade
EWSI	East-West Seed International Limited
EIA	Environmental Impact Assessment
EMS	Environmental Management System
EMP	Environmental Management Plan
EU	European Union
FCRMA	Federation of Cambodian Rice Miller Associations
FGD	Focus Group Discussion
FLD	Farmer Livelihood Development
FWUC	Farmer Water User Community
FWUG	Farmer Water User Group
GDA	General Directorate of Agriculture
GIZ	Deutsche Gesellschaftfür Internationale Zusammenarbeit
GPS	Global Positioning System
HARVEST	Helping Address Rural Vulnerabilities and Ecosystem Stability
HPC	Heng PichChhay
IEA	Initial Environmental Assessment
IFDC	International Fertiliser Development Centre
IPM	Integrated Pest Management
IRL	Indochina Research Limited
ISC	Irrigation Service Centre
ISF	Irrigation Service Fee
KAP	Knowledge, Attitude and Practice
MAFF	Ministry of Agriculture, Forestry and Fisheries
M&E	Monitoring and Evaluation
M4P	Making Markets Work for the Poor
MODE	Minority Organisation for Development of Economy
MSG	Maly San Group Co., Ltd

MTR	Mid-Term Review
NGO	Non-Governmental Organisation
NSC	National Steering Committee
O&M	Ownership &Management
PDA	Provincial Department of Agriculture
PDD	Project Design Document
PDWRAM	Provincial Department of Water Resources and Meteorology
PLOVIC	Plov Touk Irrigation Community
PWS	Private Water Seller
QAI	Quality At Implementation
QBIT	Queensland Biological Information Technology Group
RGC	Royal Government of Cambodia
SC	Secondary Canal
SIF	Supplementary Investment Fund
SPC	Saigon Plant Protection Joint Stock Company
SPM	Srov Pouch Meas, Co., Ltd.
TAF	The Asia Foundation
TNA	Training Needs Assessment
TOT	Training of Trainers
UQ	University of Queensland
US	United States
UXO	Unexploded Ordnance
VVOB	Flemish Association for Development Cooperation and Technical Assistance

1 INTRODUCTION

The last six months within CAVAC can best be described as ‘hard work’, ‘clear focus’ and ‘successful’ with all major goals being achieved.

The first six months of 2014 have been the most intensive months for CAVAC’s irrigation engineers since the beginning of the Program. CAVAC has finished most of the major construction activities – allowing for minor adjustments and a proper defects liability period as well as initial support to the Farmer Water User Communities (FWUCs) in 2015. The schedule is on track and all schemes will be technically complete in July 2015.

The Agribusiness and Information Systems component is in a slightly different situation with new partnerships expected to be signed until the end of 2014 and support to companies continuing until the last months of CAVAC. The team is focused on a few markets with the highest potential for outreach and impact thereby maximising value for money. Key highlights include:

- Production and testing of a new tool to assist with diseases and pest diagnosis. This tool will be offered to a number of companies who are committed to incorporating it into their business.
- Work in the vegetable sector has led to tangible and promising early results. With the start of a new ‘one-stop-service-shop’ agreement, CAVAC is supporting a modern farmer support initiative with high potential for outreach and impact.
- Improved support to lead farmers (model farmers) has taken shape through an improved training to rain fed farmers and a roadshow that highlights potential innovations to farmers that rely on irrigation.

CAVAC further scaled down support to sectors where success is less likely to be achieved in the remaining months of the Program. This includes activities related to rice export, and information and communications technology. CAVAC’s patience in supporting commercial agricultural television programs continues and it is expected that this will be rewarded in the coming months.

Support to the Royal Government of Cambodia (RGC)’s agricultural priorities through financial assistance is progressing well. With field visits to Australia and China, the CAVAC program was also instrumental in developing future models of regional collaboration and development support in the water sector.

More broadly, the main trends of the previous years have continued in the rice based cultivation in Cambodia. Prices of paddy remain lower than the peak a couple of years ago and opportunities for labour has led to some farmers to temporarily migrating to Thailand – further limiting available agricultural labour in Cambodia. A new trend gaining traction, especially in irrigated areas, is that farmers are shifting one or more crops cycles to other crops such as sugarcane and maize.

With 18 months to go, CAVAC has finalised a draft work plan until the end of the Program. The detailed work plan has allowed for an update on the potential outreach and increased volume of production. These updated figures are only projections based on many assumptions and uncertainties.

With its present knowledge and based on its present work plan for the next 18 months, CAVAC projects that the total attributable outreach may have reached 264,000 households by 2017. The increased production is expected to be in the order of 250,000 tons of paddy per annum.

2 OUTREACH AND IMPACT PROJECTIONS

In January 2012, CAVAC conducted an extensive exercise to produce credible projections of the potential impact of CAVAC. The 2012 projections were based on the potential impact in each of the markets and on the status of the partnerships. The data was validated by the Mid Term Review team.

Now, two and a half years later, the Program has updated these projections. Over time, the Program has made major adjustments to its portfolio with some markets performing better than expected, while others less likely to achieve their potential. With 18 months to go, CAVAC has a clear plan of activities for the remainder of the Program. The final new irrigation activities were initiated earlier this year and the last agribusiness agreements are likely to be signed in the coming months.

This clarity in partnerships and activities allows for more accurate projections of outreach and impact, however there are still many uncertainties. The projections should be read with this in mind. The uncertainties in irrigation are mainly related to economic factors that reduce the attractiveness for farmers to farm in the dry, recession and early wet seasons, such as the low price for paddy and the high cost or unavailability of labour. Within the agribusiness portfolio, the main uncertainties relate to those activities that still need to take place over the next 18 months and actual impact. Interventions for example with the agricultural television program, pesticides companies or the one stop service of UNI-MART will influence the final numbers but most of the farmer engagement for these activities still needs to happen. CAVAC has conducted initial impact assessments to estimate yield increases, however more solid assessments will only take place after the next wet and dry seasons.

2.1 Market development and impact

The impact of market development programs is quite different from that of programs that support poor farmers directly. Programs like CAVAC aim to give the smallholder farmers access to better goods and services by assisting sustainable providers to improve the goods and services they deliver. This is called ‘systemic change’. The benefit of this approach, compared to a direct approach, is that smallholder farmers will have access to a wider variety of services now and in the future. The approach can potentially have a much higher outreach and is likely to better address farmers’ needs. Market forces not only have the potential to make the access sustainable, but also the potential to expand over time. Other companies may follow the example of the supported companies and farmers are likely to influence other farmers. This is called crowding-in and copying.

Rather than only supporting the ‘static’ or continued delivery of the same services, market development programs also aim to support activities in a more ‘dynamic’ nature where the content of the service is adjusted to new knowledge and changing situations. Taking a market systems approach, CAVAC also aims to achieve change in markets that lead to more dynamic change; however it will be very difficult to capture more than some anecdotal evidence for this. It would take years after a program is complete to really capture the impact of the continuation of services, and the crowding-in, copying and adjustment of these services. Waiting for five or 10 years to show the impact is not really feasible, therefore CAVAC has made the following operational choices in assessing impact:

- results measurement will only consider impact up until two years after the end of the Program (see DCED Standard for Results Measurement);

- crowding in will be ignored as this will have little impact within two years of program completion;
- copying behaviour may be included to some extent, but it will not be included in the projections; and
- future improvements in services will be ignored in projections.

2.2 Assumptions and impacts that are not yet measured

Assessing the impact of market development programs has been a major challenge for the development community. Measuring the outreach of potentially a few hundred thousand farmers whose identity is unknown and who themselves often do not realise that improvements are caused by CAVAC poses dilemmas. By applying results chains and following best practice, CAVAC will be able to give a credible and transparent estimate of the level of impact. The system is kept manageable by using assumptions where and when possible. Some of the assumptions have been validated; others still need to be confirmed over the next 18 months.

CAVAC will report not only on the outreach but also on the total increase in production volume. The production volume can then be used to calculate the increase in income and value for money. Over the next year and a half, CAVAC will estimate how much Program supported activities have increased yields. CAVAC has been preparing for this and will have a better set of data by the end of 2014. In some markets it will be very hard to measure credible figures through surveys in which case it will use literature data or refrain from reporting. An example of this is the case with media activities.

2.3 Measuring outreach

CAVAC's definition of outreach is the number of households that change farming practices because of the activities CAVAC undertook. The definition assumes that a change in practice will lead to a change in yield, even when the change is very small.

It is important to recognise that the outreach figure is lower than the total number of farming households that have access to improved services. Although access is not calculated in CAVAC's system, it could easily be above half a million households by the end of the Program.

In many interventions CAVAC calculates reach and outreach by studying how many farmers are affected on average per retailer and multiplying this number by the number of retailers affected. These ratios will be further validated over the next year.

When calculating the total impact on production and income, CAVAC may use a lower outreach figure to correct for those farming households where the impact was very small.

Table 1 below gives an overview of the projected outreach numbers developed by our intervention teams. From these figures, **CAVAC projects that two years after the Program, CAVAC supported activities will have changed practices and income of at least 264,000 farming households.**

The number is calculated with the following assumptions:

- The outreach from the Provincial Department of Agriculture (PDA) contracts has not and will not be verified, and is therefore disregarded.

- The outreach from the media activities will be kept separate as its nature is still very unknown.
- Some farmers will be reached by more than one activity. To correct for this the Program has disregarded the outreach for irrigation as this is where most of the potential double counting may occur.
- Double counting may also come from the work with fertiliser and pesticides retailers. CAVAC applies a simple mathematical calculation assuming 1.2 million rice farming households across Cambodia and a random distribution of both fertiliser and pesticide across these households. Through this calculation we can assume that double counting would add up to approximately 13,000 farming households and hence total projected outreach figures have been adjusted to account for this.
- These figures are based on assumptions that have not yet been fully validated or activities that have not been fully evaluated or in some case even started. The Program therefore uses a 'safety factor' of 25%.

Table 1 Projected outreach numbers

Intervention area	Outreach direct	Comments
Model farmers	**41,159**	
Wet season model farmer training – first version	20,023	
Wet season model farmer training – updated	9,967	
Dry season model farmer training	-	A survey did not show clear impact. Actual impact disregarded
Dry season road shows	11,169	These are the farmers who try new things.
Seeds – wet and dry seasons		Outreach of better seeds is low and continuation is uncertain. There is impact on adoption of new varieties but too hard to attribute.
Fertiliser	**168,720**	
Heng Pich Chhay I	121	
Heng Pich Chhay II	14,795	
Ye Tak I	4,257	
Ye Tak II	74,540	
Bayon Heritage	43,776	
Maly San	1,103	
Papaya	794	
Anachak	23,971	
Lay Seng	5,363	
Pesticides	**92,917**	
Nokor Thom I	5,798	
Nokor Thom II	1,473	
Nokor Thom III	13,267	
An Giang	36,787	
Joint pesticide retailer training with the PDAs	5,837	Not yet determined if this figure will be used for impact calculations
SPK	1,296	
Diagnostic tool (Minimum four companies)	28,460	

Intervention area	Outreach direct	Comments
Export	**4,929**	
Baitang, extension	4,000	Seed related data (1968 in June 2014) disregarded as uncertain
Federation of Cambodian Rice Miller Associations	929	
Vegetables	**57,205**	
Pacific Seeds	587	
East West Seed International	4,538	
UNI-MART	52,080	
Media (not included in total figures)		
MyTV	100,000-300,000	CAVAC will only establish reach and outreach.
Irrigation (not included in total figures)		
All schemes	20,000	Present estimate 20,640. This number is still conservative and will be updated. With a better paddy price or less labour constraints the total command area and households affected can significantly increase
PDA activities (not included in total figures)	50,189	These are non-verified reach data from the PDAs assuming that reach in 2014 is the same as that in 2013 and reach in 2015 is half of that in 2013.

2.4 Increased volume of production

2.4.1 Irrigation

CAVAC has engaged with the Provincial Departments of Water Resources and Meteorology (PDWRAMs) to produce better landholding surveys. The landholding surveys can be seen as an update of the initial design data.

The data shows that the present CAVAC supported schemes could, under current conditions, increase the production by more than 200,000 tons of paddy per year. Currently, production is over 60,000 tons. Many schemes are not yet (fully) operational and in most schemes it will take a few years for broader adoption. Paddy prices, availability of labour and the attractiveness of new crops will also influence the final numbers in 2017.

CAVAC is comfortable projecting that in 2017 the schemes will produce an additional 150,000 tons of paddy per year. If the price for paddy increases, this could easily reach numbers higher than 200,000 tons. Water availability in most canals allows for an even wider command area but farmers will only irrigate further from the main canals if it is economically profitable.

2.4.2 Agribusiness and Information Systems

Estimating the potential impact from agribusiness activities on the total increase in the volume of production is much more complicated. CAVAC has developed tools (Knowledge, Attitude and Practice indicators) which allow for estimating yield increases per farmer. It is however too early to conduct effective surveys for the updated model farmer training and fertiliser related activities. The first of these surveys is expected to be conducted towards the end of this year. The potential impact of CAVAC's support related to better use of pesticides will be a more difficult challenge. For these projections,

CAVAC relies on literature, observations and other indirect sources. For this projection it used the following data:

Table 2 Agribusiness and Information Systems – Production Volume Increase Projections

	Outreach (volume)	Average Yield – Paddy ton / ha	Average Area per HH ha	Estimated yield increase%	Total volume Increase – Paddy ton	Comments
Model farmer						
Wet season model farmers	10,832	3	3	10	9,749	Not separated in Table 1 outreach figures. 10% yeild increase based on small case studies
Wet season farmers	29,990	2.5	1.5	8	8,997	
Road show						
Dry season model farmers	4,477	5.3	3	7	4,983	Not included in Table 1 outreach figure
Dry season farmers	6,701	5.3	3	5	5,327	Lower than Table 1 figure, only using expected significant yeild increase
Fertiliser						
Wet and dry season	168,720	2.5	1.5	8	50,616	Assumed increase in production volume is similar for wet and dry season.
Pesticides						
Wet season	37,167	2.5	1.5	5	6,969	Assumed 40% of total outreach is wet season, 60% dry season. 5% yield increase, broad estimate only.
Dry season	55,750	5.3	3	5	44,321	
TOTAL					**130,962**	

With these assumptions and a safety factor of 75% ***it is estimated that the total increase in production may be of the magnitude of 100,000 tons of paddy by 2017.***

The total increase of production, attributable to CAVAC, is therefore projected at 250,000 tons of paddy per year in 2017 consisting of production increases on 150,000 tons of paddy per year from irrigation work and 100,000 tons of paddy per year from agribusiness support.

The above figures do not include activities in the vegetable sector or television programming and the accompanying market information systems. Whilst it is very likely that there will be a positive impact from the activities in the vegetable sector, given current information, CAVAC will not be able to construct credible estimations. Support to a large television program and the accompanying market information systems could also have a very large impact, however the nature of broadcasting with a large variety of subjects makes it practically impossible to measure the impact on yields and volume in an attributable way. This impact will therefore not be quantified.

3 SUMMARY OF PROGRESS AGAINST OBJECTIVES

3.1 Agribusiness and Information Systems

An 18-month work plan has been developed for the three units reflecting priority areas until the end of the Program. It is clear from these work plans that the next 18 months will continue at pace with several new interventions planned for all units. The Input Unit is expecting between four and seven new interventions in the pesticide market based on the introduction of the pest and disease diagnostic tool. The focus on new activities in the Information Unit will also be on introducing the diagnostic tool into a call centre and potentially a telecom company.

3.1.1 Input Unit

CAVAC's work within the **fertiliser market** has continued to grow in breadth and depth. Two new agreements with *Anachak* and *Lay Seng* (which has the second-largest sales volume in Cambodia) have been signed increasing potential outreach significantly. Traditionally the fertiliser market in Cambodia is divided between companies in the eastern part (supplying fertiliser imported from Vietnam) and those in the west (supplying fertiliser imported from Thailand). *Lay Seng* is CAVAC's first fertiliser partner that is supplied from Thailand and significant benefits can be derived from enhancing it's, at best, very limited information systems. CAVAC's partnership with the Company will also allow the Program to reach thousands of paddy producing farmers in the western part of Cambodia. *Anachak* is a new partner that sees its competitive advantage in making its fertiliser recommendations soil type specific and creating an in-house capacity to keep recommendations up to date.

Including the two new partners, CAVAC is currently actively working with six partners in the fertiliser market, improving their information services. The focus of support activities to date includes retailer training and field demonstrations. From one period to the next, CAVAC has noticed that its partners, such as *Heng Pich Chhay* and *Papaya*, have continued to deliver better quality retailer training and / or field demonstrations. While current information services have improved in quality, CAVAC's agreement with *Anachak* on the development of site specific fertiliser recommendations could be opening a new door or taking current information services to the next level as the experiments to develop fertiliser recommendations may be functioning like a Research and Development Unit within the Company. Recently, a contract with *Heng Pich Chhay* has also been amended to include a similar focus to *Anachak's* – to increase the company's ability to do simple and relevant research on fertiliser recommendations.

Progress in the **pesticide market** in this reporting period has been substantial. A major focus has been the development of the pest and disease diagnostic tool which will be distributed to pesticide companies and call centres to assist farmers in optimising the use of inputs and to ensure continual updates of the tool to keep pace with the changing context. It is expected that the tool will be completed in July / August 2014. The tool will be available in three configurations. The first is a server version which can be accessed from various computers in an office at the same time; the second is a stand-alone version; and finally a version for handheld android devices enabling field staff to use the tool in situ. CAVAC has had enquiries from various companies and it is expected that the partnerships will be established with four to seven companies in the deployment of the tool.

The diagnostic tool

The tool is based on the International Rice Research Institute research and has been developed by a consortium consisting of the University of Queensland, IR International Rice Research Institute RI and the Cambodian Agriculture (CamAg) Consulting.

The diagnostic tool consists of two parts: diagnostic questions and fact sheets.

The first is a list of diagnostic questions helping to identify pests and diseases. The questions have been tested with farmers in the field to make them appropriate for the local context. This part of the tool will remain static as the appearance of a disease do not vary dramatically and the questions remain appropriate.

Once a diagnosis has been reached, a fact sheet(s) will be displayed with a description of the pest / disease, its ecology and the management practices needed to prevent and cure the pest / disease.

As an aid to an operator, a picture will be displayed to exemplify the symptoms of a pest / disease.

This modular approach means that the tool is flexible and can be used in various ways. The first type of intervention will be with pesticide companies and it will function as a support system to their staff in the field. The fact sheets can be printed and used as brochures to leave with retailers, farmers or other stakeholders.

While potentially the diagnostic tool could be introduced with call centers to answer queries from farmers on diseases, the fact sheets could also be used in an Interactive Voice Response (IVR) system that could respond to the question 'what to use once a farmer has come to a diagnosis'.

The first company to deploy the pest and disease diagnostic tool will be *Nokor Thom* as it has been involved in testing the tool during the development process. The Company is planning to install the tool in several Android tablets for its staff to use when they meet with retailers and farmers in the field as well as having the tool installed at its head office to function as a helpdesk. *Nokor Thom's* deployment of the tool is part of its new agreement with CAVAC signed during this reporting period, the agreement also contains the company's technical capacity building, retailer training and development of an internal quality assurance system among other things.

An Giang's agreement with CAVAC was also signed in the beginning of this reporting period to improve the company's retailer training. By the end of June 2014, *An Giang* has delivered six training sessions. In July 2014, CAVAC and the Company will assess the training conducted and adjust where necessary and possible. It is foreseen that the factsheets from the pest and disease diagnostic tool could be used as resource materials for retailer training branded with the appropriate company logo.

Progress has also been made with the Pest Management Manual led by the General Department of Agriculture (GDA) and the joint pesticide retailer refresher training activities between CAVAC and the PDAs in the three target provinces. The manual developed by the GDA is in the process of being endorsed by Ministry of Agriculture Forestry and Fisheries (MAFF). This manual has been used as a major guideline in developing materials for the pesticide retailer refresher training. The content of the training and materials has been approved by the PDAs and the PDA teams are co-implementers of the training. The training has been scheduled to start in July 2014 and has received enthusiastic responses.

3.1.2 Information Unit

CAVAC works to develop and promote improved and more accessible information channels for Cambodian farmers. CAVAC works with partners on a number of fronts to: increase awareness of the benefits of providing quality programing to the sizable rural population; increase access for farmers to private and public market players; and provide reliable information to farmers which will assist them to assess how best to increase their productivity.

CAVAC works with multiple companies working within the **media** sector including *Delight Cambodia*, *Indochina Research Limited* (IRL) and *Feedback Research*. Within the past six months, the partnership with *Delight* to produce a local television program aimed at a rural audience has significantly progressed. Delight has succeeded in attracting commercial sponsorship for 27 episodes of an agricultural / rural drama titled *Dey Bamnas Thmey* (Newly Ploughed Soil), and has received some additional funding from CAVAC. Delight has signed a contract with MyTV to broadcast the drama three times per week. Delight is currently producing more episodes of the drama to get ready for the airing scheduled to start in late August 2014.

The agreements with the two research companies, *IRL* and *Feedback Research*, contracted in 2013, are proceeding as planned. *IRL* has been selling its first wave of research which was completed in late 2013. This research is expected to help sponsors identify market reach within the rural population and provide the data required to stimulate competition within the media sector to attract the large rural audience. The research has subsequently been sold to seven buyers and has added information to other research activities and reports of *IRL.* Currently, *IRL* is conducting the second wave of research field work, which will be completed in mid-July 2014. *Feedback Research* has also launched the first report of its rural TV viewership research and is currently working on the preparation of the second wave and creative marketing using social media for completed research.

A potential intervention on the local radio is being researched, aiming to improve the quality and consistency of agricultural programming to radio listeners. The focus is on ensuring that both advertisers and radio stations see a need to maintain the quality of their programming. A design workshop was conducted in April 2014 and some potential partners were identified and further discussions are being held.

There will be a new series of **linking events** in October / November 2014. An event organiser has been recruited to organise linking events in Takeo, Kampot and Kampong Thom. It is foreseen that each linking event will have two separate days: one day specifically for model farmers and another one for stakeholders in general.

As previously reported CAVAC has redesigned the **model farmer training** to create different programs based on the needs of wet and dry season farmers. The wet season training is currently being implemented. The new content has been reviewed by the PDAs and MAFF. New training materials have been produced and are disseminated during the training. The content is delivered based on local farming priorities making it more relevant to the local constraints and therefore farmers are more engaged. A significant effort has been made establishing a feedback system allowing for continuous quality control to ensure that the content and methodology of the training remain relevant to the local context of farmers.

The dry season model farmer training has been replaced with a roadshow, where the most innovative farmers are given a platform to discuss their solutions to the most pressing needs of local dry season farmers. The presenting farmers have been selected through a rigorous selection process and have been coached in presenting to large audiences. Roadshow topics are matched to local constraints to ensure relevance to farmers' needs. Within the past six months, 14 roadshows have been conducted. In the next dry season this may increase as CAVAC is considering recruiting additional trainers to increase the implementation of roadshows. A final decision will only be made once an assessment on the potential impact of these roadshows is complete.

To keep the content relevant for the next season new innovation stories are continuously being identified by the CAVAC training teams. Topics such as rat control and (the lack of) labour are universal and have not seen many farmer-driven innovations. To stimulate farmers to innovate in these topical areas CAVAC has introduced the challenge fund for farmers where CAVAC shares in the costs of farmers' testing new ideas on these topics. Currently CAVAC has seven challenge fund farmers working on rat control and labour saving ideas. If successful these will be presented in the next dry season's roadshows.

3.1.3 Vegetables and Rice Export Unit

The Vegetables and Rice Export Unit has been making progress but more in the vegetable sector than in the **rice export**. Current interventions with *Baitang* and the *Federation of Cambodian Rice Miller Associations* in the rice export market are progressing more slowly than expected. A number of *Baitang's* staff members who had received capacity building from CAVAC have resigned. A new team has been formed and support from CAVAC has been requested. Federation of Cambodian Rice Miller Associations had planned trade visits to Europe and the United States; these delegations have been delayed due to the Cambodian Rice Federation election. In addition, CAVAC's new intervention with the *Golden Daun Keo* has not materialised due to several changes in the company's management. Currently CAVAC is looking for new partners in rice export. Potentially staff from the Rice Export Unit will be added to the Input Unit to assist with the heavy workload if a new rice export partner is not found.

Within the **vegetable** market, CAVAC continues to work with *East West Seed International* and *Pacific Seeds.* The major highlight within the past six months was the launch of *Pacific Seeds'* UNI-MART. *Pacific Seeds* (originally an Australian seed company) seeks to provide a complete solution to farmers and through the UNI-MART it intends not only to sell seeds but also to provide solutions to all production-related issues faced by farmers. CAVAC's contribution is primarily in the training of UNI-MART staff. Much of this will be done through exchange visits between personnel from UNI-MARTs in India and Cambodia. Finally, as part of the agreement there will be a joint impact measurement to understand the potential of this very new business model in Cambodia.

Additionally, CAVAC's current intervention with *East West* (vegetable demonstration plots and training for vegetable seed retailers and vegetable collectors) has been progressing as planned. The Company and CAVAC have also been working together to prepare for a second phase of collaboration.

Table 3 below provides a list of CAVAC's partners across the Agribusiness and Information Systems component.

Table 3 List of companies / partners CAVAC has been working with as at 30 June 2014

Company / Partner	Market / Support System	Status (Within this reporting period)
Srov Pouch Meas, Co. Ltd. (Mr. Iv Vanna)	Rice seed	Completed
Mr. Sokunthea (Medium Seed Producer)	Rice seed	Inactive
Four Rice Seed Production Associations (Champei, Kvek Meanrith, Boeung Nimul and Po Samroang)	Rice seed	Active
Small seed producers	Rice seed	Completed
Nokor Thom	Pesticide	Active
SPK	Pesticide	Inactive
An Giang	Pesticide	Active
Pesticide retailer traing with PDAs	Pesticide	Active
Heng Pich Chhay	Fertiliser	Active
Ye Tak	Fertiliser	Active
Bayon Heritage	Fertiliser	Completed
Capcity building for Fertliser Company Trainers (12 companies commited so far: Ye Tak Group, Papaya, Hoang Long, My Agro Business, Heng Pich Chhay, Phkay Pram, Doung Chhive Agricultural Development, Ung Suy Kimly, Anachak Fertliser Company, CARIS, and Davanphumi)	Fertiliser	Completed
Papaya	Fertiliser	Active
Malysan Group	Fertiliser	Active
Anachak	Fertiliser	Active
Lay Seng	Fertiliser	Active
Baitong Kampuchea, Plc.	Rice export	Active
Federation of Cambodian Rice Miller Associations	Rice export	Active
Golden Daun Keo	Rice export	Cancelled
East West Seed International	Vegetable	Active
Pacific Seeds	Vegetable	Active
Vegetable seed retailers	Vegetable	Active
Delight Cambodia	Media	Active
Indochina Research Limited	Media	Active
Feedback Research	Media	Active
Asia Master	Media (wider market)	Inactive
Website development for the Cambodian Agricultural Research and Development Institute	Media (wider market)	Active
Helpdesks with the three PDAs	Media (wider market)	Completed

3.1.4 Working with the GDA and PDAs

During the reporting period, CAVAC has continued to support the PDAs and GDA in the implementation of their priorities under the Annual Work Plan. As reflected in the Annual Work Plan, the PDAs' priorities have been adjusted to be more aligned with MAFF's plan and the RGC's development goals and objectives. Those adjustments include cutting out farmer field schools, more capacity building support for agricultural cooperatives and linking cooperatives to rice millers, rice exporters and input companies. By the end of June 2014, 16 contracts supporting the 2014 priorities have been signed (Table 4). After delays in implementation due to the national election in 2013 and the transition of the government, the GDA in this reporting period started replanning and implementing

a number of activities within its agreement on the Rice Value Chain Improvement Project. This agreement has been extended to March 2015, and it covers eight major activities in the area of rice production ranging from field experiments to creating a national dialogue on RGC's policies, seed law and regulations. The activities implemented so far include rice seed production, field experiments, printing books on insects, and approximately 20 workshops and forums are planned to be conducted between June and September 2014.

Further support to MAFF has been provided through working with the GDA to develop a Rice Pest Management Manual. Significant progress has been made and the Manual is expected to be finalised in August 2014. In the past six months CAVAC has also supported two printing proposals from the Department of Agricultural Extension of the GDA: one on vegetable production techniques and another one on Pailin longan planting techniques.

In addition, in cooperation with the United States Agency for International Development, CAVAC is supporting the GDA in developing an agricultural extension policy and guideline in Cambodia. This includes supporting a regional study tour for 11 people from the GDA, Royal University of Agriculture and the Cambodian Agricultural Research and Development Institute to Thailand and Vietnam to understand the two countries' experiences and practices in agricultural extension.

Table 4 List of contracts signed with the three PDAs based on their priority areas in 2014

Signed Contracts	Provincial Department of Agriculture (PDA)
Rice demonstrations	Takeo PDA
Agricultural cooperative establishment	Takeo PDA
Laser land leveling	Takeo PDA
Rice seed production training and demonstrations	Takeo PDA
Farmers' meetings	Takeo PDA
PDA staff capacity building – study tour to Vietnam	Takeo PDA
Rice demonstrations	Kampot PDA
Rice seed demonstrations	Kampot PDA
Agricultural cooperative establishment	Kampot PDA
Laser land leveling	Kampot PDA
PDA staff capacity building – study tour to Vietnam	Kampot PDA
Rice demonstrations	Kampong Thom PDA
Laser land leveling	Kampong Thom PDA
Rice seed production training and demonstrations	Kampong Thom PDA
Rice seed production demonstrations	Kampong Thom PDA
Training on maintaining and repairing agricultural machinery	Kampong Thom PDA

3.2 Research

In 2013, CAVAC established two research funds, the Pesticide Management Action Research Fund and the Gender and Agricultural Development Research Fund, to provide support to researchers to develop action research on topics of interest for the Program.

The **Pesticide Management Action Research Fund** aims to encourage studies which considering practical solutions for farmers on how to manage pests more effectively. In June 2013 four proposals

were awarded under this fund. Final papers were submitted to CAVAC in December 2013 / January 2014, and a seminar was conducted on 17 January 2014 to disseminate research findings to relevant stakeholders. This seminar created further dialogue on operationalising the research conducted and determining interest and possible topics for further examination. The topics of the research and some of the findings are listed as follows:

1. **Effects of organic and inorganic fertiliser on insect pests prevalent in rice:** This was carried out by the Kampong Cham National School of Agriculture. The results showed that the rice plants in a plot with an increased nitrogen rate grew faster but the population of insect pests also increased causing increased crop damage, which resulted in lower yield than rice plants in a plot with a combination of an optimal nitrogen rate and cow manure.
2. **Farmers' technologies on vegetable pest control:** This was implemented by the International Institute of Rural Reconstruction. The result from this research proved that proper land preparation, proper use of fertiliser and proper application of pesticide (not excessive) helped farmers improve their crop yield of mustard green (leafy vegetable). The result also confirmed that in addition to a basal application of organic fertiliser, the application of nitrogen at the top dressing stage helped crops to perform even better.
3. **Examining the negative impacts and financial barriers in pest management among farmers and retailers:** This was implemented by the Human Development and Research Centre. The result showed that at both the retailer or farmer level, the awareness of the negative impact of pesticide on health or environment was not sufficient. There were no proper preventive or curative measures provided to them. There were cases of incorrect pesticide use, such as using it to commit suicide and discarding empty bottles or sachets of pesticide in the field and water streams, etc. In regard to financial barrier, farmers said it was not a big deal if compared to their expense on fertiliser. During the seminar, the audience commented that the sample size was very small, so it could not represent the general situation in Cambodia.
4. **Pest damage simulation: the effects of flag leaf damage on rice yield of different rice varieties:** This was implemented by the Cambodian Agricultural Research and Development Institute. After testing on a number of different rice varieties, the research found that there were differences between varieties in responding to damage of flag leaves. For Phkar Romeat (an improved traditional variety) and Chulsa (a breeding line from International Rice Research Institute) their yields did not significantly decrease when the damage of flag leaves reached 50% but did if damage exceeded 75%. For other varieties such as Phkar Romduol, Phkar Romeat, IR66 and Sen Pidoa yields decreased significantly when the damage of flag leaves reached 50%.

In March 2014, a second round of research funding was announced focusing on more specific topics: rat management and labour saving technologies. So far, two proposals on rat management and one proposal on labour saving have been received. The three projects are expected to start in July if the panel approves funding.

Details on the Gender and Agricultural Development Research Fund are included in **Section 4 GENDER EQUALITY.**

3.3 Irrigation

Over the last six months, CAVAC's Irrigation and Water Resource Management team has managed a significant workload. More than 10 contracts were signed in December 2013 for new schemes as well as improvements to existing schemes for implementation in 2014. Some of these contracts were already completed and most will be completed in July / August 2014. Seven other schemes started in 2013 were also completed during this reporting period. The team working on the Operation and Maintenance (O&M) continued support to the Provincial Departments of Water Resources and Meteorology (PDWRAMs) in establishing the Farmer Water User Communities (FWUCs) at new schemes, provided follow-up support to the existing FWUCs and started training in operation and management of pumping schemes. A research project looking at innovative ways CAVAC can support the O&M sector through involvement of the private sector was also completed. The team conducted a new round of Supplementary Investment Fund activities, providing support to local communities to dredge the remaining sections of a large canal in Takeo province serving as the main canal for several CAVAC schemes.

3.3.1 Survey, design and construction

All surveys and designs for the 2014 schemes, both new schemes and improvement works, were completed by the end of 2013. Construction on all schemes was started in January 2014. This was necessary to complete most construction within the dry season of 2014. The remaining project duration is needed to complete the training of established FWUCs in operating and maintaining their schemes. With construction of most schemes completed in June / July 2014, a period of 1.5 years should be sufficient to complete these activities in collaboration with the PDWRAMs and external service providers.

It is generally accepted in Cambodia that farmers are willing to pay for fees to operate and maintain their schemes, provided that they receive water in sufficient quantities at the time requested. Each FWUC is only able to operate and maintain a scheme if the scheme is well designed and able to serve all farmers sufficiently and equitably. This requires well designed schemes able to divert water at the field levels of all benefiting farmers within the command area. To design, construct and further develop complete schemes, the inputs of all stakeholders (PDWRAMs, farmers, local authorities, private water sellers, external service providers and CAVAC) are essential. This process is challenging, takes time and is not always successful for various reasons. CAVAC has gained much experience in this process and built up good relations in all the three provinces. CAVAC's irrigation staff function as initiators, facilitators, problem solvers and quality monitors during the implementation of this process.

The initial approach of CAVAC was to select schemes in areas with a high potential for increased crop production and involvement of private water sellers in scheme development at the secondary / tertiary level. This has worked well at some schemes but not all. Hence, more investments from CAVAC were required to complete the schemes and serve all farmers. At some schemes, a sharing of scheme improvements was made between CAVAC and private water sellers. The following paragraphs describe the construction activities on existing as well as new schemes during this reporting period.

3.3.2 2011 and 2012 scheme improvements

CAVAC and the PDWRAMs continued improvements to the schemes that were completed in 2011 and 2012. Improvements at *Tumnub Lork* in Takeo were needed to better manage the water in the canal. The improvements, included installation of additional gates and improving eroded embankments, have resulted in increased interest by private water sellers to invest in this scheme. At *Prey Rumdeng* in Takeo some outlet structures needed to be re-designed to better serve private water sellers using different pumping equipment as originally foreseen. These improvement works are currently on-going and will be completed in July 2014.

At *O'Kak* in Kampot canal lining was provided to avoid continuous collapse of sandy soil embankments. At *Sbov Andeth* in Kampot, two lined secondary canals were constructed to allow private water sellers to install their pumping equipment and provide services at a lower cost acceptable to farmers. The same is also being done at *Thnoat Chong Srang* in Kampot province. By the end of this reporting period, improvement works at *O'Kak* and *Sbov Andeth* were completed. Those at *Thnoat Chong Srang* will be completed in July.

In Kampong Thom two schemes constructed in 2011 needed major improvements as the initial conceptual design was incorrect. At *Angko* scheme farmers had to pump twice to irrigate their fields, resulting in very low profit margins. A pump station is being built to allow farmers to irrigate by gravity and the main canal is being lined to further increase efficiency and lower costs. The originally constructed canal is now functioning as a drain. At the *Thnoat Chhum* scheme, some new structures are being built and the existing structures and main canal are being improved to better serve farmers within the command area. It is expected that these major improvements will be completed in August 2014.

3.3.3 2013 scheme completion and improvements

The seven schemes started in 2013 were all completed during this reporting period. *Rokar Chhouk* is the only scheme in Takeo that was started in 2013. The construction of this scheme was postponed due to floods in July last year . By June this year the scheme was completed and ready for use by farmers.

The three schemes in Kampot that started in 2013 (*Chamlong Chrey, Reservoir 77* and *Hay Saun*) were also completed during this reporting period. The *Chamlong Chrey* scheme is a pumping scheme and pumps will be commissioned in July – farmers will start irrigating for a supplementary wet season rice crop immediately after that. The main structures of the *Reservoir 77* scheme were completed in early 2014 and scheme improvements through construction of two lined canals were completed by May 2014. The lined canals were necessary to avoid seepage from canals passing through sandy soils. The *Hay Saun* scheme was completed in early 2014 and is serving most farmers during this year's wet season rice crop. The low lift (*Hay Saun* is cut at three meters below the field level) allows farmers to pump water to their fields by using their own light pumping equipment. Hence no further improvements are needed at this scheme next year.

Two of the schemes in Kampong Thom started in 2013 *6 January Secondary Canal (SC) 2 and* 3, were completed and commissioned in April 2014. *6 January SC1* was another scheme that began in late 2013 that was also completed at the end of this reporting period. This scheme is an off-take of the

6 January Main Canal constructed by the RGC some years ago. A gated spillway structure and a gate structure to connect two reservoirs feeding the *6 January* canal were also constructed.

3.3.4 2014 schemes

For 2014 four new schemes were started in January 2014 and that included CAVAC's biggest scheme – *Wat Thmey* in Takeo. This scheme combines an old Khmer Rouge era scheme with an area that was served mostly by flood water and groundwater. In the seasonally flooded parts of the command area farmers can grow a double rice crops, and in the areas served by depleting groundwater levels farmers can grow three crops annually. It comprises a large pump station (2,300 litres / second) for which the pumping equipment was designed by an external consultant. The scheme was started by Tan Kim Eng Construction Company in January. However, the Company's performance did not conform to the contract and thus the contract was cancelled. Another contract was signed with Taing Cheng Oing Construction Company that could only start work well into February, resulting in significant challenge to finish such a big contract before the seasonal floods in August. By end of this reporting period, work was on schedule and expected to be completed by the end of August.

In Kampot, two new schemes were started in January. Both are extensions of existing schemes. The *Hay Saun Extension 1* scheme is extended from the *Hay Saun* scheme completed earlier this year. The extension is served by a pumping station installed at the tail end of the *Hay Saun* scheme which is a run off the river scheme from which farmers pump on an individual basis as the canal is cut at three meters below the field level (low lift). The pumping option was chosen as farmers were not willing to contribute land for the extended construction of *Hay Saun* which could result in substantial land losses. The alternative was to construct lined canals allowing farmers to irrigate by gravity and requiring very limited land losses. Farmers, however, failed to agree on a communal management of the pump house for this type of scheme. The *Hay Saun Extension 2* scheme was originally planned for a similar approach as that of the *Hay Saun Extension 1* but farmers later opted for a cut canal that was extended from a canal constructed by CAVAC in 2011 (*Sbov Andeth*) allowing farmers to pump directly from the canal. Both schemes will be completed by July 2014.

In Kampong Thom only one new scheme was selected for construction in 2014 as most other schemes were requiring major improvements. Available human as well as financial resources did not allow for more schemes to be undertaken this year. The selected scheme was *Boeung Leas* where water is pumped from the Stung Sen River. This scheme is currently on-going. After the construction of the pump station is complete, pumps will be installed. This scheme is expected to be completed in August 2014.

3.3.5 Supplementary Investment Fund

Grants were provided to three FWUCs (*Banteay Thleay Irrigation Community [BANTIC], Plov Touk Irrigation Community and Kampong Krasang Irrigation Community*) through the Supplementary Investment Fund grant scheme. The grants provided support to dredge three separate sections of one main canal for increased access to irrigation. This work was a continuation of the Supplementary Investment Fund work carried out last year and is expected to be completed in July 2014. During the implementation of these grant agreements the three FWUCs monitored work progress with support from CAVAC.

3.3.6 Operation and maintenance (O&M)

Within the O&M activities, CAVAC continued to support the PDWRAMs in the establishment and training of FWUCs at CAVAC canals. During the period, CAVAC staff provided capacity development to O&M staff at the PDWRAMs in aspects of FWUC management. They also provided follow-up support and on-the job training to FWUCs and facilitated scheme development before, during and after construction activities.

In an effort to support longer term solutions to the constraints for O&M within Cambodia, CAVAC has initiated research looking at the role of the (growing) private sector in the delivery of O&M services. The research was completed and the final report was issued in April 2014. Based on the research, private water sellers can play four main roles in sustainable irrigation development:

1. development of a scheme;
2. pump operation and supply of irrigation water;
3. contribution to scheme maintenance;
4. agricultural extension.

The research also looked into factors that could limit the role of private water sellers and those included: uncertainties in this water business making private water sellers' investments risky; inefficient scheme or pumping equipment; lack of management capacity; and lack of legal support in contractual matters.

Currently, CAVAC is continuing to facilitate the process of engaging the private sector by involving all stakeholders in the initial discussions on:

- the involvement and contracting of private water sellers,
- strengthening the role of the FWUCs through assessment and management of available resources (land and water), and
- increased transparency and quality of contracts between FWUCs and private water sellers.

The weak link continues to be lack of proper legislation and required support from the local authorities and government agencies.

In Takeo, much time was spent on the reorganisation of BANTIC which is the overarching FWUC responsible for an irrigation area of about 7000 ha. Three schemes constructed by CAVAC are depending on water supplied through the main canal managed by BANTIC. CAVAC has initiated a landholding survey to assess the total area under BANTIC's responsibility. Ultimately, a transparent system for fee collection needs to be established for both farmers and private water sellers. Once the O&M plans are prepared, BANTIC should be able to operate, manage and maintain its irrigation area without much external support. Other notable activities in Takeo include the initial steps in the establishment and training of the FWUC of the *Wat Thmey* pumping scheme. This is the biggest and most expensive scheme supported by CAVAC and is a major challenge as the scheme includes a large pump house that is supposed to be managed by the FWUC. It is the first time in Cambodia that such a large pumping scheme will be managed by the FWUC without support of private sector or government.

In Kampot, CAVAC concentrated O&M activities on scheme improvements through established FWUCs and private water sellers. *Chamlong Chrey* is the first of CAVAC's five pumping schemes, and as such it will function as a model scheme for others. Training in operation of the scheme will be jointly provided by the PDWRAM, CAVAC and the company that has been contracted to install and commission the pumping equipment. There are very few good examples of well-functioning pumping schemes in Cambodia. For this reason CAVAC is of the opinion that the successful O&M of well designed and constructed small and medium scale pumping schemes will be one of the main achievements of the CAVAC's Irrigation and Water Management component.

In Kampong Thom, CAVAC in the previous reporting period contracted the Irrigation Service Centre to carry out follow-up training for existing FWUCs and to establish the FWUCs at new schemes including the pumping schemes that need to be operated well to be sustainable. Start-up funds were created at these pumping schemes as irrigation service fees will only be collected after the first harvest following pump operation. Collection of irrigation service fees is expected to be relatively easy as the designed pumps operate at an efficiency rate of 70–80% versus much lower efficiency rates of pumping prior to CAVAC's interventions.

3.3.7 Preparation for 2015

The selection of schemes for 2015, which is the last year of CAVAC, will be limited to the construction of one remaining part of the *Wat Thmey* scheme in Takeo (*Wat Thmey Package 3*) that could not be completed during this year due to budget constraints. The remaining budget will be spent on further improvement of the schemes completed in 2013 and 2014.

Table 5 provided an overview of the Potential Command Area of each scheme based on available water resources and geographical issues as well as hydraulic boundaries and the Current Practiced Command Area as per March / April of this year. This shows that none of the schemes have yet reached maximum potential. The CAVAC's Irrigation and Water Management component will work within the remaining one and a half years on further scheme development by conducting the following activities:

- continued support to the FWUCs in improving the O&M of schemes;
- construction of more secondary canals;
- facilitation of the sustainable involvement of private water sellers;
- assistance to the FWUCs in procurement of funds for scheme maintenance from the RGC and other sources; and
- downscaling of some of the Potential Command Areas as farmers use other water sources.

The next six months will also be used to analyse and discuss successes and failures of the irrigation component over the last four years and will serve as preparation for the formulation of the second phase of CAVAC. Depending on available budget some initial surveys and conceptual designs may be carried out.

Table 5 Status of CAVAC schemes as of 30 June 2014

Province		Scheme	Potential Command Area in Ha	% of Current Practiced Command Area in Wet Season	% of Current Practiced Command Area in Dry Season	Remarks
TAKEO	1	Tumnub Lork	2000	63%	35%	Land sloping upwards
	2	Kveng Tayi	1000	67%	55%	Lack of distribution canals and private water sellers
	3	Krapum Chhouk	590	57%	42%	Lack of distribution canals and private water sellers
	4	Prey Rumdeng	1980	82%	82%	Lack of distribution canals and private water sellers
	5	So Hang	1480	100%	50%	Lack of distribution canals and private water sellers
	6	Rokar Chhouk	700	100%	NA	Just completed
	7	Wat Thmey 1 and 2	2200	NA	NA	Pumping scheme with distribution canals under construction
KAMPOT	1	Prey Tonle	460	62%	62%	Another water source is used.
	2	Sbov Andeth	1220	76%	76%	CAVAC constructing distribution canals
	3	Thnoat Chong Srang	2000	41%	41%	CAVAC constructing distribution canals
	4	Spean Touch	1700	16%	NA	Just completed; lack of distribution canal and private water sellers
	5	O'Kak	240	100%	64%	Partly under construction
	6	Prey Leu	900	100%	34%	Lack of distribution canals and private water sellers
	7	Hay Saun	540	NA	NA	Just completed
	8	Hay Saun 1	220	NA	NA	Under Construction
	8	Hay Saun 2	500	NA	NA	Under Construction
	9	Chamlong Chrey	350	NA	NA	Pumping scheme with distribution canals under construction
	10	Reservoir 77	1000	NA	NA	Under construction
KAMPONG THOM	1	Thnoat Chum	900	100%	15%	Partly under construction
	2	Angko	1100	88%	36%	Partly under construction
	3	Beoung Leas	350	57%	37%	Partly under construction
	4	6 January SC1	1187	91%	NA	Just completed
	5	6 January SC2				
	6	6 January SC3				

4 GENDER EQUALITY

Early this reporting period, CAVAC finalised its support to six studies under the Gender and Agricultural Development Research Fund. The studies have generated some interesting findings for relevant stakeholders and raised questions for further study. Within this reporting period, CAVAC has also continued to incorporate a gender perspective in its program implementation. The continuous learning within the Program has provided CAVAC with gender information to keep improving the effectiveness of the interventions and to avoid any direct negative impacts. CAVAC's current learnings

have also highlighted the need for further work in capturing changes in gender aspects resulting from various changes within the agricultural sector of Cambodia.

Gender knowledge development is essential in Cambodia as there are several types of gender issues within the country ranging from domestic violence to maternal health issues. Even within the agricultural and rural development sectors, the range of gender issues are broad and most are outside of CAVAC's framework to address. To contribute to this gender knowledge development process, CAVAC in 2013 established a Gender and Agricultural Development Research Fund to support six studies:

1. Agricultural Income and Gender;
2. Comparative Study of Gender Constraints in High-Input And Sustainable Vegetable Farming;
3. The Role of Gender for Indigenous Rice Farmers In Mondulkiri;
4. Livestock and Gender in Rural Cambodian Households;
5. Social And Economic Impact on Gender in Mechanised Agriculture; and
6. Understanding the Knowledge, Attitude, and Practice of Gender Equality in Youth Education and Work in Rural Areas.

The six studies were all completed in late December 2013 / early January 2014. A presentation workshop was held on 16 January 2014 to disseminate the research findings to people from relevant institutions, such as MAFF and local and international non-governmental organisations working in agriculture and rural development.

The study on the Agricultural Income and Gender focused on rural households' income – not only from agriculture but also from other income sources, including non-farm self-employment, salaries and wages, and remittances. The research found that there were no significant differences in the total income per capita between male and female headed households. However, with regards to income from agriculture, male-headed households tend to make more than female headed households. The study further found that the agricultural income gap between these two groups narrows as education levels increase. The study on the Mechanised Agriculture finds that mechanisation is a profitable investment but it increases men's workloads and provides more time for women. There were some suggestions from the workshop attendees to extend the latter study to find out how women adapted to the changes in their workloads and whether they used their newly earned time to do other activities, especially income-generation work.

In the agribusiness sector, CAVAC's intention to transfer knowledge to the right people through its cooperation with private and public partners is key. The input retailer training has been adjusted to give more opportunities for the main sellers who interact with farmers on a regular basis and who are mostly based at the village level to attend the training. However, recent results indicate there is still much to be done. In the fertiliser and pesticide markets for rice, female sellers outnumber male sellers, however only 20% of participants at the fertiliser retailer training are women. For the vegetable input market, this does not appear to be an issue. Men tend to be more accredited by farmers for their advice on the use of inputs for vegetable production, especially pesticides. The majority of the participants at the vegetable input retailer training are also men. CAVAC has learned that for the training to be effective, the taskforce needs to constantly remind the private partners of the importance

of getting the right people to participate in the training and providing some training materials that could be passed on to the right people.

In the irrigation sector, continuous efforts have been made to generate a more balanced female representation at the management level of the FWUCs and to ensure that female water users, most of whom are female headed households, receive the same benefits as male headed households. By June 2014, 19 water user groups have been established, of which 17 are complete FWUCs while two attach themselves to existing FWUC structures. Among all the17 complete FWUCs, 11 FWUCs have a female representation at the highest level of the FWUC management structure. Many of the female committee members were encouraged to take the roles of finance officers while a few have been elected as FWUC Deputy Chiefs. In spite of being a minority within the working teams, the female members have been active in their roles and have earned great respect from the community.

Additionally, in 2014 CAVAC intends to conduct a study to capture changes in various aspects of gender resulting from current changes within the agricultural sector of Cambodia. It has been noticed that within the last couple of years the agricultural input market offers more choices to farmers. There has been irrigation investment in many parts of the country allowing farmers to increase their crops and agriculture has also become more mechanised resulting in more free time for farmers, particularly women. In addition to this, labour needs in the city and in foreign countries have also led to migration of rural people and the young generation tends to have an intention to leave farm work and start something new. CAVAC believes that all these recent changes have more or less affected the agricultural workforce within the country and as such gender aspects of that. Therefore, CAVAC feels that it is necessary to conduct this study to further shape its current strategies and interventions. CAVAC expects that this study will begin early in the next reporting period.

5 RISK MANAGEMENT

In this reporting period, several operational risks previously identified in the Risk Management Plan have decreased in likelihood or severity of impact on implementation due to the maturity of the Program and / or proper action taken to manage them. As such many of these risks have been removed from the Risk Management Plan.

In the last 18 months of the Program it is important to highlight a new management risk. As the Program gets closer to the financial limits of the head contract; managing partnership agreements and procurement contract payments becomes even more important whilst still being flexible to the Department of Foreign Affairs and Trade (DFAT) priorities. This is compounded by a fluctuating dollar and potential unforseen expenses particularly in regards to canals (Unexploded Ordnances [UXOs] and early wet season, flooding, etc.). A robust contract management system and regular communication with DFAT will help to minimise this risk.

In the remaining period of the Program, the focus will remain on effective monitoring of work progress against the plan, efforts to contribute to longer-term sustainability of impact and ensuring relationships with both public and private partners are responsive and constructive. **Annex 5** provides an updated Risk Management Plan.

ANNEX 1: INTERVENTION UPDATES

Number	Intervention Title	AWP
Rice Seed Market		
Inp 10.2	Improving quality and availability of commercial seed	1.2
Inp 11.2	Providing training to small seed producers (production knowledge)	1.2
Inp 11.3	Supporting associations to promote modern wet season rice seed varieties and market access for rice seed	1.2
Inp 12.9	Strengthening production knowledge to enhance availability of good quality rice seed in the market	1.2
Inp 12.10	Dry season rice seed market	1.2
Fertiliser Market		
Ext 10.1	Supporting a fertiliser company to improve its information services for farmers	3.2
Inp 10.1	Supporting a fertiliser company in providing training to retailers	1.2
Inp 12.4	Supporting fertiliser companies in staff capacity building	1.2
Inp 12.5	Fertiliser forum	1.2
Inp 12.6	Supporting a fertiliser company to provide better training to farmers	1.2
Inp 12.8	Supporting a fertiliser company in staff capacity building and pilot retailer training	1.2
Inp 12.11	Supporting a fertiliser company in its retailer training and retailers' field demonstrations	1.2
Inp 13.6	Supporting a fertiliser company in improving its field demonstrations	1.2
Inp 13.6	Supporting a fertiliser company in improving its field demonstrations and farmer meetings	1.2
Inp 13.6	Supporting a fertiliser company to develop fertiliser recommendations	1.2
Inp 13.9	Supporting a fertiliser company in staff capacity building, development of an effective field demonstration management guideline, and farmer meeting improvement	1.2
Pesticide Market		
Inp 11.4 and Inp 12.1	Supporting a local pesticide company through capacity building for technical staff and information dissemination strategy development	1.2
Inp 12.2	Supporting a pesticide company to provide better training to farmers	1.2
Inp 12.13	Supporting a pesticide company in its pesticide wholesaler / retailer training	1.2
Inp 13.4	Pesticide retailer training in partnership with PDAs	1.2
Inp 13.5	Supporting a local pesticide company in implementing its information dissemination strategy	1.2
Rice Export Market		
Mar 11.1	Technical assistance on rice and rice seed production for export markets	1.2
Mar 11.2	Feasibility study of warehouse receipt system	1.2
Mar 12.1	Export promotion – support to the federation's market linkages	1.2
Inp 13.3	Improving Golden Daun Keo Rice Mill's quality of paddy of export varieties	1.2
Vegetable Market		
Inp 12.3	Vegetable farmers' practice change – East West Seed International	1.2
Inp 12.3	Vegetable farmers' practice change – Pacific Seeds	1.2
Inp 12.7	Vegetable seed retailer outlet training	1.2
Inp 13.7	Support to an integrated retailer UNI-MART	1.2
Media Market		
Ext 11.1	Support to a media agency to produce a quality agricultural TV program (drama)	1.2
Ext 13.1	Support to media research companies	1.2

Number	Intervention Title	AWP
Model Farmers		
Ext 10.3	Activities with model farmers to improve role and knowledge of model farmers	1.2 (previously 3.2)
Wider Market		
Ext 11.2	Support to MAFF for extension materials	1.6 (previously 3.2)
Ext 11.3	Assisting training and information system support providers with training materials, capacity building and promotion	1.2 (previously 3.2)
Ext 11.5	Linking events	1.2 (previously 3.2)
Ext 11.6	Supporting a private call centre	1.2 (previously 3.2)
Irrigation Construction		
Takeo		
Irr 10.1	Development and construction of an irrigation scheme: Krapum Chhouk canal, Takeo province	2.3
Irr 10.3	Development and construction of an irrigation scheme: Tumnub Lork canal, Takeo province	2.3
Irr 10.4	Development and construction of an irrigation scheme: Kveng Tayi canal, Takeo province	2.3
Irr 12.3	Development and construction of an irrigation scheme: So Hang canal, Takeo province	2.3
Irr 12.4	Development and construction of an irrigation scheme: Prey Rumdeng canal, Takeo province	2.3
Irr 12.5	SIF: Support to BANTIC and PLOVIC in rehabilitating two secondary canals in Takeo	2.2
Irr 13.1	Development and construction of an irrigation scheme: Rokar Chhouk canal, Takeo province	2.3
Irr 13.2 and Irr 13.3	SIF: Support to BANTIC and PLOVIC in dredging their main canal in Takeo	2.2
Irr 14.1	Development and construction of an irrigation scheme: Wat Thmey pumping scheme, Takeo province	2.3
Irr 14.1	SIF: Support to BANTIC, PLOVIC and KRIC in dredging their main canal in Takeo	2.2
Kampot		
Irr 10.2	Development and construction of an irrigation scheme: Prey Tonle canal, Kampot province	2.3
Irr 10.6	Development and construction of an irrigation scheme: Sbov Andeth canal, Kampot province	2.3
Irr 10.7	Development and construction of an irrigation scheme: O'Kak canal, Kampot province	2.3
Irr 10.8	Development and construction of an irrigation scheme: Thnoat canal, Kampot province	2.3
Irr 12.1	Development and construction of an irrigation scheme: Spean Touch canal, Kampot province	2.3
Irr 12.2	Development and construction of an irrigation scheme: Prey Leu canal, Kampot province	2.3
Irr 13.1	Development and construction of an irrigation scheme: Hay Saun canal, Kampot province	2.3
Irr 13.1	Development and construction of an irrigation scheme: Chamlong Chrey canal, Kampot province	2.3
Irr 13.1	Development and construction of an irrigation scheme: Reservoir 77, Kampot province	2.3

Number	Intervention Title	AWP
Kampong Thom		
Irr 10.12	Development and construction of an irrigation scheme: Thnoat Chum canal, Kampong Thom province	2.3
Irr 10.13	Development and construction of an irrigation scheme: Angko canal, Kampong Thom province	2.3
Irr 13.1	Development and construction of irrigation schemes: Secondary Canals 1,2, and 3 of the 6 January canal, Kampong Thom province	2.3
Irr 14.1	Development and construction of an irrigation scheme: Boeung Leas pumping scheme, Kampong Thom province	2.3

Legend

Res = Research
Irr = Water and Irrigation
Inp = Input Markets
Bee = Business Enabling Environment
Mar = Production Markets
Gen = Others
Ext = Extension

INTERVENTION UPDATE: Int. No: Ext 10.1 AWP No: 3.2 Date: 30 June 2014	
Name:	**Supporting a fertiliser company to improve its information services for farmers**
Summary:	CAVAC's interviews with farmers and retailers indicated that most farmers did not possess an appropriate level of knowledge on fertiliser application. CAVAC found that farmers use fertiliser based on peer advice or trial and error, and made decisions based on available budget. In most cases this method does not provide an optimal yield. Disseminating information on appropriate use of fertiliser to farmers via retailers, or direct interaction with farmers by private companies, is seen to be an effective and sustainable way of reaching farmers. The purpose of this intervention was to enhance the capacity of Heng Pich Chhay (HPC)'s information services for farmers. Heng Pich Chhay is a fertiliser company in Cambodia. CAVAC was working with HPC to: ▪ build HPC staff capacity on fertiliser use to enable staff to effectively operate help desks; ▪ conduct effective field demonstrations; ▪ implement retailer training workshops
Achievements to Date:	▪ In 2011, two HPC staff members were sent to Vietnam to attend a three-month training course on fertiliser use in rice cultivation. ▪ CAVAC also supported HPC to conduct 120 field demonstrations, two field days in Kampot and Takeo, and two training workshops in Kampot and Kampong Thom. The total number of participants for these training activities was 447, including 360 farmers. ▪ Monitoring an Evaluation (M&E) activities were conducted by collecting information from HPC staff, trained retailers and farmers. These activities found that the capacity of staff trained in Vietnam remained insufficient after the training, and as such the staff remained unable to give appropriate advice over the telephone. The M&E also revealed that retailer training and field demonstrations were of low quality. The M&E results were discussed with HPC. Both CAVAC and HPC accepted that HPC did not have enough field staff to carry out the activities and that its staff's technical knowledge was still a constraint. In order to improve the quality of its information services, the company continued to build its staff capacity by sending two staff members (including one had previously received training in Vietnam) to join a training session with personnel from 11 other fertiliser companies in early 2013. The main topics covered by the training were fertiliser use, participatory retailer Training of Trainers (TOT), and the retailer business case. ▪ M&E activities were also conducted at the farmer level with a strong focus on assessing knowledge and practices of field demonstration farmers and other farmers for both dry and wet season rice cultivation. The M&E results revealed that the majority of demonstration farmers did not follow HPC's recommendations. This was due to HPC's limited capacity to manage field demonstrations (limited staff numbers / poor communication). As such, demonstration farmers were not convinced of HPC's recommendations, resulting in a lower than expected uptake. CAVAC observed that farmers who followed the company's recommendations on fertiliser use in their field demonstrations had become information sources for their communities. These farmers have increased their yield by roughly 15-30 per cent when compared to their previous practices. ▪ After CAVAC shared several M&E reports with the company, HPC shifted from conducting a large number of low quality extension activities to a reasonable number of focused activities. ▪ In this reporting period, CAVAC conducted a random check with various field demonstration farmers to confirm the previous findings. Again, the results have shown that most farmers did not remember or apply fertiliser according to the company's recommendations. This was due to low capacity of HPC staff at that time, which led to poor field demonstration management and communication between the company and field demonstration farmers.
Next Steps:	Complete an intervention summary report to close this intervention.
Lessons Learnt:	The retailer training workshop was not conducted effectively and as a result, trained retailers did not gain sufficient knowledge required to provide advice to farmers. In regards to field demonstrations, some farmers were given fertiliser without proper usage instructions or were not given fertiliser on time. This was due to the company's limited staff resources to carry out a large number of field demonstrations. Therefore, CAVAC needs to consider the capacity of the company's staff in carrying out agreed activities to ensure quality of demonstrations. Maximum involvement of the company staff in assessments especially at the retailer and / or farmer level significantly contributes to the company's acceptance of the findings. Both CAVAC and HPC have taken on board the valuable lessons from these activities. After sharing the results of the M&E activities, CAVAC observed that the company has shifted its focus from quantity to quality.

INTERVENTION UPDATE: Int. No: Inp 10.1 AWP No: 1.2 Date: 30 June 2014	
Name:	**Supporting a fertiliser company in providing training to retailers**
Summary:	Farmers' lack of knowledge on fertiliser application is a major issue preventing farmers from obtaining optimal yields. In order to help address this constraint, CAVAC works with fertiliser companies to provide better information services to farmers through their retailers. Fertiliser retailers interact directly with farmers and can provide greater outreach compared to traditional information service approaches. The expected impact of a retailer's provision of information services (such as advice to farmers) is to increase demand for that retailer's product, providing an incentive for the retailer to continue supplying information on the use of the product. If a retailer becomes successful using this approach, other retailers will offer similar services in order to retain customer share. Additionally if more products and services are offered by retailers, more information and choices become available to farmers. Farmers will increasingly be able to access information on the appropriate application of fertiliser to more efficiently produce crops. Furthermore, through training retailers, the fertiliser company will enhance its relationship with retailers, enabling improved quality control at the retailer level. CAVAC's intervention with Ye Tak supported retailer training. Prior to CAVAC's assistance, Ye Tak conducted national retailer training workshops, which were in the format of a promotional product campaign rather than technical training. At the beginning of the intervention, CAVAC supported Ye Tak to conduct one national retailer training workshop which was led and managed by the company. A joint assessment of the workshop revealed that improvements on technical information as well as the training methodology were needed and that the training should focus more on retailers rather than wholesalers. Ye Tak accepted the assessment results and continued working with CAVAC to conduct provincial retailer training with improved training curriculum and methodology. Six provincial retailer training sessions were conducted in 2012. In addition, CAVAC hired an international fertiliser quality assurance consultant to assess the quality of Ye Tak's products and services as well as its retailers' and wholesalers' confidence in distributing fertiliser.
Achievements to Date:	**Fertiliser retailer training** ▪ Two Training Needs Assessments (TNAs), one national retailer training session and six provincial retailer training sessions were conducted. ▪ CAVAC's M&E team evaluated the retailer training conducted by Ye Tak. Key lessons learned were collected and shared within the CAVAC team in order to improve the next retailer training activities. Following the training, Ye Tak added two staff members into its information system team – one newly recruited and one internally promoted. Ye Tak at that time had five technical staff members that provided information services. ▪ In this reporting period, CAVAC conducted an assessment to measure change in knowledge, attitude and practice (KAP) at the farmer level due to this intervention in Takeo, Kampot, Kampong Thom and Prey Veng. It was found that one retailer shared information on fertiliser usage to about 90 farmers on average per year. Of these farmers who received the information, 91% changed their practices, of which 55% followed the advice fully and 36% followed partly. **Fertiliser quality assurance** ▪ Ye Tak quality assurance assessment was conducted by an international consultant. The consultant visited a number of retailer outlets (small scale to large scale) in 15 different provinces. The consultant also assessed the operations of Ye Tak's competitors. However, the study found no evidence (outside of what could be considered as an occasional practice) of the misuse of the Ye Tak brand to promote sales of adulterated fertiliser or as a means to promote a competitor's product. The study suggested that the problem of adulterated fertiliser occurred primarily when the fertiliser price in the international market surged, particularly during 2007-2008. ▪ In April 2014 CAVAC reviewed a study by the Cambodia Development Resource Institute (CDRI) on the "Development of the Fertiliser Industry in Cambodia: Structure of the Market, Challenges in the Demand and Supply Sides, and the Way Forward". Based on the study, there are no major findings related to adulterate quality of fertiliser in the market. The study confirms that the issue of quality fertiliser has become less of a constraint in the market.
Next Steps:	Complete an intervention summary report to close this intervention.
Lessons Learnt:	The jointly conducted TNA found that the training methodology and curriculum used must take into account different educational backgrounds and knowledge in the use of fertiliser of the trainees, in order to ensure effective knowledge transfer. Retailers play an essential role in providing technical knowledge to farmers. Currently, farmers tend to accept retailers' advice more if retailers demonstrate their technical knowledge in the field. In the past, farmers believed that retailers lacked farming knowledge and as such they would not be able to provide effective advice.

	The last M&E activities conducted showed that village retailers were the key actors in influencing farmers' behaviour. This finding has been incorporated in current activities with input companies. When working with partners, it is important to discuss in advance the kind of data that CAVAC requires from them and their clients for M&E activities. A work plan should be developed and agreed with the company, with both sides able to update and modify at each implementing stage.

INTERVENTION UPDATE: Int. No: Inp 12.4 AWP No: 1.2 Date: 30 June 2014	
Name:	**Supporting fertiliser companies in staff capacity building**
Summary:	With the rapid change within the fertiliser market, farmers need to keep up-to-date with technical information on the types of fertiliser available and updated application techniques in order to increase their productivity and comparative advantage. Private enterprises are seen as a sustainable source to disseminate information to farmers. Though most companies have some information services, these are generally poor quality due to limited in-house technical knowledge and ineffective information transfer. This has made it harder for farmers and retailers to access information on appropriate fertiliser application. CAVAC aimed to improve fertiliser companies' capacity to provide knowledge of best practice fertiliser management. This focused on the general '4R's – 'right type, right amount, right time, and right application'. Facilitated by CAVAC, target fertiliser companies are now attempting to provide fertiliser application principles so that farmers can optimise their rice production to maximise income. For this intervention CAVAC worked with 12 fertiliser companies by providing training to improve the capacity of staff in three areas: 1) understanding the incentive to provide product information services and being able to develop business cases; 2) more appropriate technical knowledge of rice production; and 3) providing more effective training to their retailers / customers (through a participatory training approach).
Achievements to Date:	▪ Two training institutions were selected to conduct the training; the Agriculture Technology Services Association (ATSA) on technical knowledge of rice production, and SILAKA on the participatory training approach. ▪ Lessons learnt from the previous retailer training were incorporated into the curriculum. ▪ A total of 25 staff members from 12 fertiliser companies (including 4 female participants) attended the training. The business case development session was tailored to meet the needs of the participants by CAVAC staff. ▪ In early 2014, CAVAC conducted an assessment at the company level to capture any change in the companies' current information system activities resulting from group capacity building. Five companies (Heng Pich Chhay, Maly San, Papaya, Anachak and Ye Tak) requested further support from CAVAC (Intervention Number Inp 13.6). Some companies have integrated lessons learnt through the group training in their information services, such as participatory approaches, retailer business case (retailer's provision of product information to farmers is likely to bring more customers to the retailer), and disseminating fertiliser use information based on rice growth stages.
Next Steps:	▪ Conduct M&E activities at the farmer level. ▪ Share the M&E report with partners.
Lessons Learnt:	Most participants committed to applying the training into practice and showed eagerness to maintain the network among participants of the training. Participating companies, which also distribute pesticides, have asked CAVAC to organise a similar training for best practice in pest management. Participating companies distribute different types of fertiliser (i.e. mineral fertiliser, organic, and foliar). Based on a fertiliser KAP survey and literature review conducted with a sample size of 1200, it was highlighted that the application of mineral fertiliser might have a greater impact on rice crop production. Given this finding, CAVAC is investigating ways that fertiliser training could focus on application advice in order to facilitate the largest possible potential yield increase. Most fertiliser companies conduct farmer meetings as part of their information services. They tend to conduct a large number of meetings, and those meetings do not prove to be very effective. CAVAC is considering looking into this issue to figure out how this service can be improved.

INTERVENTION UPDATE: Int. No: Inp 12.5 AWP No: 1.2 Date: 30 June 2014	
Name:	**Fertiliser forum**
Summary:	With the fertiliser market in Cambodia growing quickly, fertiliser companies are trying to get technical information from a variety of different sources. However, private companies and public agricultural research institutes have different approaches to applying fertliser. These contrasting views have created challenges for farmers who require accurate information when making decisions, resulting in constrained productivity improvement. CAVAC initiated a fertiliser forum, bringing together scientists from research institutes, private companies, and other relevant participants. The main objectives were: ▪ To discuss issues around various fertiliser recommendations. ▪ To minimise the gaps between knowledge provided by all stakeholders. ▪ To discuss the practicality, economic efficiency, social impact, environmental impact and biosafety issues of organic, inorganic and bio-fertiliser. ▪ To build the relationship between the public and private sectors. However, CAVAC's 2013 KAP survey on fertiliser-yield response in rice production, with a sample of 1200 farmers, indicated that the yield response to fertiliser recommendations from private companies was already high. Based on this result, CAVAC has decided that a fertiliser forum should not be a priority at this stage.
Achievements to Date:	CAVAC's fertiliser team had discussions with a number of private fertiliser companies and institutions within the public sector in the first six months of 2012. During the TMR in May 2013, CAVAC decided to drop this intervention based on the results of its fertiliser KAP survey in early 2013.
Next Steps:	
Surprises, Adjustments or Problems:	
Lessons Learnt:	

INTERVENTION UPDATE: Int. No: Inp 12.6 AWP No: 1.2 Date: 30 June 2014	
Name:	**Supporting a fertiliser company to provide better training to farmers**
Summary:	CAVAC supported Bayon Heritage Holding Group Co., Ltd (BHG) to increase the effectiveness of its information system. The company currently imports and distributes fertiliser for the rice and vegetable markets. The company's main information system activity is providing training in crop production to farmers using the company's products. However, the quality of its training was limited due to the poor technical knowledge of staff and limited understanding of training methodologies. CAVAC designed an intervention with the company to improve its information system team's technical knowledge in rice and vegetable production and participatory training approaches. It was expected that after this training, the company would conduct more effective information services and increase the number of available services, which would ultimately influence farmers' behaviour and increase adoption of more efficient practices in crop management.
Achievements to Date:	Training on rice and vegetable production, and effective means of communication with farmers (i.e. through a participatory approach) was conducted by a jointly selected training provider, the Agriculture Technology Services Association ATSA. 43 staff members from Bayon Heritage participated in the training, of which five staff were female. ATSA submitted a training report. Based on a phone conversation with BHG's Sales and Marketing Manager in 2013, BHG staff were more confident in providing advice to farmers following the training. This finding was subsequently confirmed through M&E activities. During this reporting period (January to June 2014), CAVAC conducted an assessment with 12 BHG staff members (including management staff). The assessment found that participants were generally satisfied with the training, especially in the areas covering pest management. BHG is currently also supplying organic pesticides to the market as there is a growing opportunity in the pesticide market within Cambodia. BHG staff members are more confident in providing information services, such as farmer meetings, field demonstrations and technical assistance.
Next Steps:	Conduct M&E activities at the farmer level to assess farmers' KAP changes resulting from this intervention.
Lessons Learnt:	It has been noticed that organic fertiliser helps to contribute to the soil's capacity in maintaining nutrients from chemical fertiliser. Some actions may be taken to confirm this. It has been noticed that agricultural input companies supplying fertiliser have also started supplying pesticides, and those supplying pesticides tend to also add fertiliser to their products.

INTERVENTION UPDATE: Int. No: Inp 12.8 AWP No: 1.2 Date: 30 June 2014

Name:	**Supporting a fertiliser company in staff capacity building and piloting retailer training**
Summary:	The results of the intervention (Ext 10.1) to 'improve HPC's information services' showed that HPC did not have enough capacity to provide participatory training on appropriate fertiliser application and rice production to retailers and farmers. As such, the effectiveness and quality of the intervention's earlier training was compromised. CAVAC's M&E activities indicated that trained retailers and farmers could not recall the key messages of the workshop. Based on these lessons learnt, a new intervention has been designed to improve the effectiveness and quality of retailer training conducted by fertiliser companies, including HPC. The previous findings from the M&E activities for the first intervention revealed that HPC's retailer training workshops needed significant improvement. HPC has since requested support for effective retailer training. HPC and CAVAC are planning to pilot four retailer training sessions, to be conducted by the company's previously trained staff (from Inp.12.4) to village level retailers. After the intervention, it is expected that HPC will conduct retailer training without CAVAC's support. In addition to retailer training, the company also requested CAVAC support to undertake field experiments in order to improve and update the company's recommendations on fertiliser use. The main purpose of the field experiments is to find more economically efficient fertiliser recommendations for the benefits of Cambodian farmers at large, both for wet season rice and dry season rice cultivation. Ten experiments will be conducted, five of which will be conducted with direct support of a selected technical consultant. This selected consultant will also provide mentoring and coaching to HPC's staff, as well as retailers who are involved in the activity. The other five field experiments will be managed by either HPC staff or HPC retailers (or both) so that they can apply lessons learnt in a practical context.
Achievements to Date:	▪ The training curriculum and trainee selection criteria were jointly developed by CAVAC and HPC. Training materials which had been used to provide training to 12 fertiliser companies were integrated into the curriculum. ▪ Three village retailer training sessions have been piloted by trained HPC staff in Takeo, Kampot, and Prey Veng respectively, with 86 participants in total, including 18 females. The first two training sessions were conducted with technical support on participatory approaches from a CAVAC consultant, while the third one was fully delivered and managed by HPC staff. ▪ Two feedback sessions between CAVAC and HPC were conducted after each of the first two training sessions. Following the sessions, a list of improvements was been produced and agreed upon. These constructive comments, derived from the feedback sessions and the list of improvements, have increased the confidence of HPC trainers to carry out subsequent training themselves. ▪ One of the two trained staff (under Inp 12.4) has shown the capability and confidence to provide quality training. CAVAC's mentoring support through this intervention has helped to strengthen the capacity of this staff member (main trainer). The main trainer has also been mentoring two other staff members (late joiners) through on-the-job training and has started to transfer some sub-sessions of the training to them to carry out. ▪ A field experiment management consultant has been recruited, and a field demonstration protocol has been developed and shared to relevant HPC staff and retailers. ▪ Two out of six dry season rice field experiments have started and are being closely monitored. HPC staff and / or retailers are involved in managing these fields.
Next Steps:	▪ Monitor the quality of the fourth training session to be conducted in Battambang province. ▪ Conduct an early check on the change in farmers' practices after joining fertiliser retailer training with HPC. ▪ Monitor the company's field experiments. ▪ Work with the company and selected consultant to analyse and find ways to update the company's fertiliser recommendations.
Lessons Learnt:	Good communication between CAVAC and partners such as HPC is central to improvements in the quality of an intervention. For example, previous experience has shown that joint leadership by both parties and timely monitoring are important for intervention quality. While HPC took the lead on this intervention, CAVAC worked closely with the partner in each part of the implementation plan and ensured a timely update of work progress together with the partner. CAVAC has observed that HPC may now see the benefit of transferring technical knowledge to retailers and that they have increased the investment made in retailer training at the village level. The company also seems to have shifted its focus from quantity to quality. During a feedback session with the HPC Director, it was mentioned that the company tried to respond to retailers' feedback comments from the training to develop information services that would fit to their requirements. HPC has also started to build its retailers' capacity in managing field demonstrations, in order to disseminate the company's fertiliser recommendations as well as the company brand in their

	community. This is a new trend, where other companies have shown increased dependency on their village retailers. Another advantage from this model is that retailers have evidence in the actual fields to show and convince their farmer clients.

INTERVENTION UPDATE: Int. No: Inp 12.11 AWP No: 1.2 Date: 30 June 2014

Name:	**Supporting a fertiliser company in its retailer training and retailers' field demonstrations**
Summary:	After seeing the results and lessons learnt from its previous intervention on fertiliser retailer training (Inp 10.1), Ye Tak has shifted its focus from a national and provincial level training to more on demand-based training at the commune and village levels. The company has reallocated its budget to reflect this shift of focus. CAVAC has found that retailers who have gained knowledge on the use of fertiliser from the original training have been providing advice on correct fertiliser application to farmers. This enables retailers to attract more clients and sell more products. Some have even assured farmers of the expected yields if farmers follow their recommendations. Therefore, to improve the effectiveness of information services (including retailer training) and thus ultimately extend outreach as well as build a sustainable market system, CAVAC has been working to improve the Ye Tak's retailer capacity to deliver best advice to farmers. This intervention is divided into two parts: 1. Organise seven fertiliser training sessions aimed at the village retailer level, to be conducted by staff trained through group fertiliser training (from Inp. 12.4). This will allow staff to practice their knowledge and skills whilst also allowing the company to have a close interaction with retailers who have direct contacts with farmers. 2. Work with the company to develop an effective field demonstration protocol and ensure that staff are competent in transferring this knowledge to retailers. The knowledge on this protocol will be transferred by the company's staff to selected trained retailers. Those selected retailers will conduct field demonstrations on their own fields using the protocol given by the company staff. This will perpetuate the business case for retailers: The field demonstrations by retailers will provide real evidence to farmers, which will have a potential effect on influencing change in farmers' practices. In addition, it was later agreed that a short farmer meeting would be conducted before each field demonstration to draw farmers' interest and attention, and equip them with some basic knowledge on fertiliser application in rice production.
Achievements to Date:	**For Village Retailer Training:** ▪ Training curriculum and criteria for trainee selection have been jointly developed by CAVAC and Ye Tak. A list of lessons learnt from the previous intervention and M&E reports have been integrated into the curriculum. Some parts of the training materials from the group training for 12 fertiliser companies has been integrated into the curriculum. ▪ Seven village retailer training sessions have been conducted by trained staff. An improvement plan from each training session has been integrated into the next training session, to ensure ongoing improvement. **For Retailer Field Demonstrations:** ▪ A contract amendment to introduce a short farmer meeting prior to every field demonstration was made. ▪ A field demonstration protocol and a work plan for field demonstration management were finalised. ▪ Eight farmer meetings were conducted. Eight early wet season field demonstrations had started, and trained retailers were coached on how to manage field demonstrations by themselves with distance support from the company.
Next Steps:	**For Village Retailer Training:** ▪ Conduct an early check on the impact of the training at the retailer level. **For Retailer Field Demonstrations:** ▪ Monitor the on-going eight early wet field demonstrations and remaining farmer meetings and field demonstrations for the dry season (6) and wet season (10). ▪ Assist the company in organising field days to create interest among the retailer community on the importance of field demonstrations and share experiences from the field demonstrations. ▪ Prepare a work plan for retailer field demonstrations for the wet and dry seasons.

Lessons Learnt:	It is important that chances for adjusting activities to reflect changes in the market or new situations in the field are taken on board during implementation of the intervention. This requires CAVAC to allow some flexibility in activity implementation, in order to ensure the quality of work still remains. For example, during the preparation for the field demonstrations, a new idea was suggested by Ye Tak to add a short farmer meeting to each field demonstration to increase farmers' interest and participation in the field demonstrations through the provision of basic knowledge on fertiliser application and practical experiments in the field. A company's internal management issues, such as lack of willingness to delegate responsibilities from senior to junior staff, lack of commitment towards activity implementation given staff's time constraint in other activities, and staff movement, could negatively affect the intervention implementation. It is therefore important that CAVAC adequately assess a company's internal management aspects before starting an intervention.

INTERVENTION UPDATE: Int. No: Inp 13.6 AWP No: 1.2 Date: 30 June 2014	
Name:	**Supporting a fertiliser company in improving its field demonstrations**
Summary:	CAVAC has agreed to further support Papaya Trading Co., Ltd to improve the company's information services for farmers, following their participation in the group fertiliser training. Papaya believes that farmers' improved knowledge of correct fertiliser application holds the key to its success and growth in the long run. Papaya has identified improvements to its current field demonstrations and farmer meetings as a requirement for growth. Involvement of successful farmers in these information service activities is at the center of the company's focus, as they are the people who can use their credibility and knowledge to disseminate knowledge on proper use of fertiliser effectively to other farmers. These activities are in line with CAVAC's strategy in the fertiliser market 'to provide proper advice on best practice in fertiliser management on rice production, which can help farmers achieve cost effectiveness and optimal yields'. The benefits from these activities are two fold; addressing both farmers' constraints, and those of suppliers and the support market as a whole, which would potentially lead to increase in yield and incomes. Initially, CAVAC's support to Papaya focused on the development of an effective field demonstration management guideline by piloting six field demonstrations (four for paddy and two for vegetables) and six field days. However, as Papaya later found it was more beneficial to focus only on paddy field demonstrations and smaller size plots in order to increase marketing opportunities, it requested to convert the two vegetable field demonstrations into two paddy field demonstrations, and split each of the agreed number of paddy field demonstrations into two smaller ones. Therefore the revised total number of paddy field demonstrations is ten, and a total number of field days of nine.
Achievements to Date:	▪ Three paddy field demonstrations and two field days were conducted by Papaya's focal person, with constant feedback and support from CAVAC. ▪ Following the first three pilot fields and field days, a draft guideline on effective field demonstration management was developed for Papaya, incorporating lessons learned from the three demonstrations. It has become an insightful and practical tool for future field demonstration management, and assists in ensuring consistent quality and effectiveness across all Papaya's field demonstrations. ▪ The guideline was jointly presented by CAVAC staff and Papaya's focal person to Papaya's sales and technical staff in Kompang Cham office.
Next Steps:	▪ Consider a mechanism to ensure consistent quality and effectiveness across all Papaya's field demonstrations. In this case, a training session on how to manage a field demonstration effectively using a participatory approach for all its information service staff is likely to be arranged and provided by Papaya's focal person, whose capacity has been strengthened through the implementation of the three field demonstrations and two field days. CAVAC will support Papaya's focal point to foster confidence and capability in delivering the training independently. ▪ Monitor seven other field demonstrations and field days conducted by Papaya's staff, based on the presented guideline.
Lessons Learnt:	A participatory approach plays a very crucial role in effective field demonstration management. Besides demonstration farmers, other farmers need to be engaged in every step of a field demonstration, particularly the three fertiliser top dressings. This is to ensure that they have witnessed the field demonstration from the conception (i.e. broadcasting or transplanting) to its harvesting. To increase farmers' trust in a company's information services, the company needs to share and disseminate some basic knowledge of fertiliser, especially on nitrogen (N), phosphorus (P) and potassium (K) and then link it to the company's recommended product at each fertiliser top dressing. With this method, farmers tend to feel more confident to follow the company's advice this season or later.

INTERVENTION UPDATE: Int. No: Inp 13.6 AWP No: 1.2 Date: 30 June 2014	
Name:	**Supporting a fertiliser company in improving its field demonstrations and farmer meetings**
Summary:	Fertiliser companies such as Maly San Group Co., Ltd (MSG) have embedded various information services in their daily business operations. However, the outcomes are still limited and can be optimised through some improvements to their work. Following on from its participation in the group fertiliser training, MSG has requested further support to improve the capacity of its staff through joint collaboration in providing one farmer meeting, three wet season paddy field demonstrations and three dry season paddy field demonstrations. MSG hopes that by collaborating with CAVAC, its staff will become more knowledgeable and confident in implementing information services, which will help farmers increase yields, resulting in better trust between the company and its customers. During the implementation of the first field demonstration, which was preceded by a farmer meeting, MSG realised that it would be better to replace farmer meetings with field days to be conducted upon the end of field demonstrations, as their results would serve as hard evidence to convince farmers of the company's fertiliser quality.
Achievements to Date:	▪ A consultant for field demonstration management was recruited to oversee the field demonstrations and coach MSG's staff on the field techniques. ▪ Two farmer meetings were conducted, and CAVAC provided necessary feedback for future improvement. ▪ A field demonstration was conducted for dry season paddy.
Next Steps:	▪ Develop a tailored guideline for MSG on how to manage a field demonstration effectively, based on MSG's actual needs, and ensure that MSG's key staff in different areas are familiar with the methodology introduced in the guideline. This requires a short staff training session prior to the implementation of the next field demonstrations and field days. ▪ Continue monitoring the remaining field demonstrations and field days conducted by the company staff. These activities serve as a practical experimentation for them to apply knowledge from the training into the field. Throughout these activities, CAVAC is to provide constructive feedback related to participatory approaches for MSG to improve their next activities.
Lessons Learnt:	

INTERVENTION UPDATE: Int. No: Inp 13.6 AWP No: 1.2 Date: 30 June 2014	
Name:	**Supporting a fertiliser company to develop fertiliser recommendations**
Summary:	A consultant working on the development of an information dissemination strategy in 2012 identified the perception amongst Cambodian farmers that yields for wet season paddy and dry season paddy could be increased by 55% and 40%, respectively. The most important method to achieve the potential yield increase is correct fertiliser application in terms of both the amount and timing. Cambodia is a fertiliser importing country, with significant imports arriving from Thailand and Vietnam. As such, the fertiliser recommendations of most companies in Cambodia are directly translated from Thai and Vietnamese. Some of the instructions are not suitable for the Cambodian contexts, both in terms of the cropping system / pattern and socio-economics affecting the rice production profitability of Cambodian farmers. Therefore producing locally adapted fertiliser recommendations would benefit Cambodian rice farmers, as they would help increase farmers' yields and ultimately incomes. In return, the company would gain trust in its products and associated advice from farmers. CAVAC is currently working with a fertiliser company (Anachak) to conduct field experimentation to develop rice fertiliser recommendations on some major and representative soil types in Cambodia. The activity serves two main objectives, to develop better fertiliser recommendations for Anachak on the selected soil types and to build capacity of Anachak in fertiliser recommendation experimentation. The experimentation is planned to be conducted in both wet and dry season rice production in four different provinces (Kampong Cham, Takeo, Pursat and Battambang). Around three different varieties of each rice season will be selected for the experimentation. Different types of consultants were recruited to work on the activity, including consultants in field experimental design and data analysis, soil nutrients, rice varieties and field experimentation management.
Achievements to Date:	▪ An agreement between CAVAC and Anachak to support the company in its site specific fertiliser recommendation development was signed. ▪ Four consultants focusing on four different tasks (field experimental design and data analysis, soil nutrients, rice varieties, and field experimentation management) have been recruited to work with Anachak on this intervention. Contracts with the four consultants have been signed. ▪ The kick-start meeting was conducted among CAVAC, Anachak and the four consultants to facilitate the development of the first field experiment protocol (wet season) by the consultants.
Next Steps:	▪ Monitor the process of developing the wet season field experiment protocol. ▪ Monitor wet season field experiments, data collection, and data analysis to develop site specific fertiliser recommendations. ▪ Monitor the field experiment management consultant's coaching of Anachak staff.
Lessons Learnt:	

INTERVENTION UPDATE: Int. No: Inp 13.9 AWP No: 1.2 Date: 30 June 2014	
Name:	**Supporting a fertiliser company in staff capacity building, development of an effective field demonstration management guideline, and farmer meeting improvement**
Summary:	Due to limited in-house technical knowledge as well as information services, Lay Seng Co., Ltd. is concerned about the strength of its position in the fertiliser market. The company therefore decided to invest in its staff capacity and the improvement and diversification of its current information services in order to strengthen its market position and increase its market share, particularly in the southern part of Cambodia, where sales are not yet strong. This investment corresponds to the shortage of supply of information on proper use of fertiliser to farmers, contributing to improving the information flow from the company to the end users as well as the quality of the information itself. In early 2014, CAVAC agreed to a proposal of Lay Seng, which included three main activities: staff capacity building on fertiliser use and rice production, development of an effective field demonstration management guideline which is a new information service of Lay Seng, and improvement of its current farmer meetings. Four pilot paddy field demonstrations (i.e. two in wet season and two in dry season) and four pilot farmer meetings will be conducted as part of the development of the relevant guideline. It is expected that after the staff training activity, staff will be sufficiently competent and confident to conduct the pilot field demonstrations as well as pilot farmer meetings with mentoring support from selected consultants in relevant activities. Finally, after these pilot activities, it is expected that staff will be fully competent and confident to carry out information services for Lay Seng, and thus become resource persons of the company in the long-run.
Achievements to Date:	▪ CAVAC and its consultant on participatory approaches observed one farmer meeting of Lay Seng in Kampong Chhnang province. CAVAC and Lay Seng staff also met afterwards to discuss feedback from the observation. ▪ Staff capacity building on fertiliser use, rice production, and participatory approaches was provided to Lay Seng's staff by relevant consultants.
Next Steps:	Work with Lay Seng to develop a new program for farmer meetings, and pilot four farmer meetings based on the new program. – Develop an effective farmer meeting guideline, based on the four pilot farmer meetings and agreed comments between Lay Seng and CAVAC. – Recruit a field demonstration management consultant. – Conduct four pilot field demonstrations (two for wet season and two for dry season). – Develop and share an effective field demonstration management guideline.
Lessons Learnt:	

INTERVENTION UPDATE: Int. No: Irr 10.1 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of an irrigation scheme: Krapum Chhouk canal, Takeo province**
Summary:	Before the commencement of this intervention, farmers in Krapum Chhouk typically grew a rice recession crop. Those close to the existing 'PRASAC' canal had limited access to water for a second rice crop. The Krapum Chhouk scheme was proposed to increase the potential command area of the main PRASAC canal. This proposed scheme included the development of a four (4) kilometre secondary canal (otherwise known as Canal 85), and was selected for implementation at the start of CAVAC in March 2010. Construction of the first phase was completed in June 2010. A 1.5-kilometre extension was constructed in 2011, and completed in June 2011. The construction of this secondary canal has improved access to reliable water for double cropping. To ensure the canal is managed and maintained effectively, a Farmer Water User Group (FWUG) was established under the BANTIC (the FWUC of the PRASAC canal constructed in 1997) structure and capacity building activities for this FWUG were completed in July 2012.
Achievements to Date:	**Engineering** Construction commenced in April 2010 and was completed in June 2010. The community later requested the canal be extended for an additional 1.5 kilometres to serve a larger command area, and to connect the canal embankments with an existing road. The same contractor was engaged for the additional work in 2011. In the first year, not all farmers could grow two crops due to soil acidity. When the soil became sufficiently flushed in the second or third year, all farmers started to grow two crops per year. **O&M** CAVAC commissioned the PDWRAM to establish and build the capacity of a FWUG for this canal. The FWUG was established in February 2012, and the capacity building was completed in July 2012. In this reporting period (2014), the PDWRAM has been contracted to partially restructure the FWUC through a re-election, to conduct a landholding survey, to re-strengthen the FWUC capacity and to monitor the FWUC. CAVAC and the PDWRAM understand that this contract is needed in order to improve the performance of BANTIC as this FWUC had been established for quite a long time. CAVAC has continued conducting follow-up visits to the BANTIC FWUC and Krapum Chhouk FWUG in order to ensure that the established FWUG for Krapum Chhouk is well integrated into the current organizational structure of BANTIC. Although the fee collection has started, the amount collected does not yet correlate to what is possible in relation to the irrigated areas. PWSs have paid the fees to the FWUC, but not in full amounts. This is due to the fact that the FWUC does not have complete irrigated area data. The FWUG collected approximately US$1,350 in 2013 and US$1,800 (half year) in 2014. This money was deposited into the BANTIC FWUC account to be used for the O&M of the whole scheme. These funds have been used for the maintenance of Canal 98 (PRASAC Canal) which is the main canal in order to ensure water supply. There are currently seven local PWSs operating in the area, who provide water supply to farmers in the surrounding areas. Three of the seven PWSs have already been registered with BANTIC.
Next Steps:	**Engineering** Provide support on improvements to the scheme if required. **O&M** Complete the land holding survey for BANTIC to clearly determine the FWUC members' irrigated areas and payments of the irrigation service fees (ISF). BANTIC will use the map to monitor and validate the fee collection from PWSs. Continue strengthening the capacity of the FWUG and FWUC through follow-up visits and provision of technical support in order to ensure sustainability of the scheme.
Lessons Learnt:	**Engineering** Sediment in each canal silts up year after year due to several factors, including water waves from the wind and boats traveling along the canal, and disturbance of the canal banks. It is recommended that the level of siltation in each canal be checked once a year and that appropriate action is taken as needed. **O&M** Before integrating a new FWUG into an existing structure, it is necessary to get an in-depth understanding of the existing FWUC for the whole structure to function smoothly. Close follow-up activities to the newly established FWUG and FWUC are needed after their establishment. A land holding survey is a key tool to assist FWUG / FWUC to manage the fee collection.

INTERVENTION UPDATE: Int. No: Irr 10.3 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of an irrigation scheme: Tumnub Lork canal, Takeo province**
Summary:	Farmers in the communes of Pech Sa and Krapum Chhouk were growing wet season paddy and some limited dry season paddy. Agricultural production was limited by unreliable access to water. The community expressed a need for canal rehabilitation that would improve access to water supply and increase the area for double cropping. The Tumnub Lork canal was selected for rehabilitation in 2011. A feasibility study was carried out and the canal was surveyed and designed. Construction of the canal commenced in March 2011. A contract amendment was signed with an alternate contractor for additional drainage and crossing structures along the canal. Improvements to the canal were completed in August 2013.
Achievements to Date:	**Engineering** Construction commenced in March 2011. Additional structures were requested by farmers and CAVAC agreed to include these structures by amending the construction contract. The first contractor's poor performance resulted in long delays and finally cancellation of their contract. In 2013, CAVAC re-tendered the remaining works, and all works were completed in August 2013. Cropping has increased from one to two crops per year since the main part of the canal was rehabilitated. In this reporting period, CAVAC contracted a construction company to install water gates under two existing bridges in order to retain the water after the tide. The company started work on these water gates in May 2014 and is hoping to finish it in July 2014. **O&M** CAVAC commissioned the PDWRAM to establish and build the capacity of a FWUC for this canal. The FWUC was established in early February 2012, and the capacity building was completed in June 2012. CAVAC has continued following up with the trained FWUC to strengthen its capacity. In the first year after completion (2012), the FWUC started collecting the ISF. In the second year (2013) and third year (2014), the FWUC could collect about US$3,000 and US$3,500 (half year) respectively. The fees collected are used on the O&M of the scheme and incentives for FWUC committee members. For example, the FWUC spent some money to backfill the collapsed embankments. That has given the FWUC much confidence in managing the scheme. The FWUC has now started to take on more responsibilities in canal ownership. The organisation now has a better understanding of how to deal with PWSs who do not pay ISF. The FWUC is now at a point where the PDWRAM and CAVAC only assist this FWUC in dealing with larger issues. The support from the local authorities to this FWUC has also improved significantly in 2014. This is mainly due to the intervention from the PDWRAM. The relevant local authorities now know the important role the FWUC plays in the community. The PDWRAM has been contracted to carry out a landholding survey in 2014 in order to get accurate irrigated area data for the FWUC. Capacity re-strengthening activities and monitoring are also included in the contract.
Next Steps:	**Engineering** Complete construction of the water gates in July 2014. **O&M** After the landholding survey is completed, the FWUC will be trained on how to use the data from the survey as it implements contracts with PWSs. This data will help the FWUC to manage its contracts with PWSs as well. Continue strengthening the capacity of the FWUC through close follow-up visits and provision of technical support, including financial management skills. Work with the FWUC on additional structures, if necessary, in order to encourage farmers to pay the fees to the FWUC as most structures contribute to decreased pumping costs.
Lessons Learnt:	**Engineering** There are often several soil types found along long canals such as this Tumnub Lork. Although there a soil investigation undertaken during the detailed design of the scheme, this is not usually enough for schemes with long canals. To deal with this kind of soil type variation, a site engineer needs to continuously observe the type of soil and determine an appropriate embankment slope for each soil type. For example, when a canal passes through unstable and erodible soil sections, a flatter slope needs to be adopted to avoid a slope or embankment failure. Daily construction supervision is important to ensure that the contractor's work meets the requirements of the design and technical specifications. **O&M** Any existing structures taken out during the rehabilitation of a canal should be put back, as those structures are usually useful to farmers. A more fully developed scheme does matter to the participation of farmers in the O&M of the canal.

	Working closely with each FWUC in the first few years is essential to guide the FWUC in dealing with various issues related to O&M. It builds up the FWUC's capacity and confidence through all sorts of experiences. The best way to build the capacity and confidence of the FWUC is not to work with it every day, but to connect it with different stakeholders and intervene when needed and possible. The PDWRAM's intervention to get the local authorities to support each FWUC is necessary for good FWUC performance and canal sustainability.

INTERVENTION UPDATE: Int. No: Irr 10.4 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of an irrigation scheme: Kveng Tayi canal, Takeo province**
Summary:	Farmers in the commune of Prey Yutka were growing recession and early wet season paddy and some limited dry season paddy close to the PRASAC canal. Agricultural production was limited by unreliable access to irrigation water from the main canal. Before the construction, farmers found it difficult to get enough water for their second crop. The water was not reliable as farmers had to negotiate to buy water from Vietnam, and prices fluctuated yearly. The community expressed a need for canal construction to increase the area with access to reliable water for double cropping. The Kveng Tayi canal was selected for rehabilitation in 2011. A feasibility study was carried out and the canal was surveyed and designed. Construction commenced in April 2011 and was completed in June 2012.
Achievements to Date:	**Engineering** Construction commenced in April 2011. The original work was completed in early 2012. Additional structures (two bridges and one drainage structure), requested by the community, were added to the contract through a contract amendment, and the construction of these structures was completed in mid-2012. Farmers started using water from the Kveng Tayi canal immediately after the canal completion for one or two crops per year. Following a request from the community, CAVAC supported dredging work along 1,300 meters of the canal. This work was completed in June 2014. There has been some erosion around the wing walls of two bridges due to the difference between the length of the wings and the height of each bridge. It is suggested that the FWUG put wooden poles around that area to strengthen the soil and prevent the erosion. This is an inexpensive way to solve the problem. **O&M** As this scheme is also under BANTIC (the FWUC of the PRASAC canal), CAVAC commissioned the PDWRAM to establish and build capacity of a FWUG for this canal. The FWUG was established in February 2012, and the capacity building was completed in July 2012. CAVAC has been following up with the trained FWUG to strengthen its capacity. As mentioned in the Intervention Number Irr 10.1, the PDWRAM has been contracted to carry out a landholding survey in order to ascertain accurate irrigated area data for BANTIC. While the FWUG of this scheme is similar to the one for Krapum Chhouk, CAVAC has noticed that the cooperation among its members is stronger. The FWUG has collected about US$2,750 in 2013 and US$1,950 in 2014 (half year). These fees have been used for the maintenance of CAVAC 98 (main canal for Krapum Chhouk and Kveng Tayi) and incentives for FWUG committee members.
Next Steps:	**Engineering** Follow up on the work to fix the erosion at the wing walls of the bridges. Consider the community's request for a bridge at the head of the canal. **O&M** Complete the landholding survey. Once the landholding survey is completed, the FWUC will use the irrigated area data from the survey to prepare contracts with PWSs. Closely follow-up with the FWUG to continue strengthening its capacity in financial management and maintenance planning.
Lessons Learnt:	**Engineering** The designs of structures should include sufficient erosion protection. The function of each structure significantly determines its design. The design engineer needs to collect information from farmers and incorporate farmers' practices into each design. Good and regular construction supervision is important to ensure that the quality of the work meets the required standards. **O&M** The FWUC and FWUG do not have accurate irrigated area data. The data that they have is from PWSs. Given the fact that PWSs are entrepreneurs who are profit-oriented, most of them tend not to reveal actual irrigated data. A land holding map is essential for the FWUG and FWUC to manage the contracts with PWSs more effectively. Defining new roles of a FWUG in an existing FWUC structure requires many efforts.

INTERVENTION UPDATE: Int. No: Irr 12.3 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of an irrigation scheme: So Hang canal, Takeo province**
Summary:	Farmers in the communes of Borey Chulsa, Daung Kpos, Romenh, and Kork Po grow traditional wet season rice and / or some limited dry season rice with very limited access to reliable water supply. The community expressed a need for rehabilitation of the So Hang canal to improve the water supply and increase access to a reliable water source. The So Hang canal was then selected for rehabilitation. A feasibility study was done and the canal was surveyed and designed. Construction commenced in April 2012, however was not completed as planned due to several required modifications. The construction was completed in August 2013.
Achievements to Date:	**Engineering** Construction commenced in April 2012. Some modifications have been done on structural and earth works to improve water reliability of the scheme. The construction was completed by the end of August 2013. The repairs during the defects liability period were finished in June 2014. **O&M** CAVAC commissioned the PDWRAM to establish and build the capacity of a FWUC for this canal. The FWUC establishment was completed in May 2013, and the capacity building was completed in October 2013. Some meetings between the FWUC, PWSs, and the local authorities took place during and after the FWUC establishment process to discuss the water price for farmers and other issues surrounding the water business. The local authorities intervened in the process of setting the water price. PWSs chose not to register with the FWUC because the price was too low for them to profit from the business. Without PWSs, farmers had to pump water using their own pumps with limited capacity. As of the completion of construction (recession rice season of 2013), only about 10 percent of the total command area was irrigated. This was due to a number of reasons: First, the local authorities and farmers at this scheme did not welcome PWSs; Second, farmers used another water source for their fields, and; Third, farmers used their own pumps with limited capacity. However, during the early wet season of 2014, about 80 percent of the total command area was irrigated. This significant increase was because the water source nearby dried up and farmers realised the importance of getting the water service from PWSs.
Next Steps:	**Engineering** Consider whether it is necessary to construct secondary canals for PWSs. **O&M** Make recommendations to the FWUC and local authorities on proper O&M systems based on the findings of the PWS study conducted in early 2014.
Lessons Learnt:	**Engineering** A canal deeper than four meters should be avoided, due to: large land losses; high pumping costs; and high maintenance costs for the FWUC. The coffer dams installed at the canal for structure construction must be properly removed in order not to block the water flow. Each structure side slope needs to be built and checked according to the specifications. **O&M** The effectiveness of O&M work largely depends on the involvement and interventions of the local authorities. The quality and appropriateness of these interventions largely influence the success of the scheme O&M.

INTERVENTION UPDATE: Int. No: Irr 12.4 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of an irrigation scheme: Prey Rumdeng canal, Takeo province**
Summary:	Farmers in the communes of Prey Rumdeng and Ta O in Kirivong district requested that the Prey Rumdeng canal be rehabilitated to improve the irrigated water supply, and therefore increase the number of crops per year. CAVAC conducted a feasibility study and the canal was surveyed and designed. Construction commenced in March 2012. Some additional structures were added, and all work was completed in December 2012.
Achievements to Date:	**Engineering** Construction commenced in March 2012 and was completed in December 2012. Initially there was an agreement with the authorities in Vietnam to connect the Prey Rumdeng scheme to the Vin Te canal in Vietnam – this would ensure a continuous supply of irrigation water. CAVAC's Environmental Expert recommended that without a comprehensive environmental impact assessment in Vietnam, the canals should not be connected. Therefore, the canal construction was stopped two kilometres from the Vietnamese border to avoid any cross border negative environmental impacts that could not be sufficiently investigated. During this reporting period, some off-take structures were added to the scheme. The construction of these structures is currently on-going and will be completed in July 2014. **O&M** CAVAC commissioned the PDWRAM to establish and build the capacity of a FWUC for this canal. The FWUC establishment commenced in September 2012 and was completed in April 2013. Capacity building for the FWUC was completed in October 2013. Several meetings between the FWUC, PWSs, and the local authorities took place. Political interference has weakened the authority of the FWUC in negotiating contracts with PWSs. The FWUC is yet to undertake fee collection. As a result, the PDWRAM / CAVAC intervention has had limited impact. Some farmers want to form a group to pump water from the canal instead of taking the service from PWSs. The FWUC, with support from CAVAC, will help those farmers determine the costs and benefits of pumping on their own so that they can make a better informed decision on running this pumping group.
Next Steps:	**Engineering** Complete off-take structures at the scheme in July 2014. **O&M** Follow up on the farmers' intention to form their own pumping group, and provide support to ascertain the feasibility of this option. Work with this FWUC has been assigned a lower priority for now, due to political interference.
Lessons Learnt:	**Engineering** The off-take structures are the last things required to take water from the canal to the field level. Engineers should consult with farmers about their practices and incorporate them in the designs. Environmental issues need to be considered during the feasibility study or detailed design to avoid any conflict during the construction phase. **O&M** This canal is directly connected to the Thnoat canal in Kampot province. The fee system at Thnoat was set up differently and is much cheaper than the fees paid at Prey Rumdeng. This has created some issues with farmers' participation in paying the ISF. Therefore, the extension of a canal across the provincial border should be carefully considered before construction, as it creates challenges for FWUC operation at a later stage. The political relationship between PWSs and local authorities (communes and districts) can create contractual difficulties for the FWUC to manage – i.e. PWSs not paying O&M fees to the FWUC.

INTERVENTION UPDATE: Int. No: Irr 12.5 AWP No: 2.2 Date: 30 June 2014	
Name:	**SIF: Support to BANTIC and PLOVIC in rehabilitating two secondary canals in Takeo**
Summary:	**BANTIC – Banteay Thleay** Farmers in Krapum Chhouk commune, Koh Andeth district, grew recession paddy and some limited dry season paddy along the PRASAC canal. Agricultural production was limited by unreliable access to water. The community requested a secondary canal from the PRASAC canal to be rehabilitated to improve water supply and increase the area with reliable water for double cropping. **PLOVIC – Plov Touk** Farmers in Kirichong Koh commune, Soam district, and Phnom Den commune, Kirivong district grew recession paddy and some limited dry season paddy along the PRASAC canal. Agricultural production was limited by unreliable access to water. The community requested rehabilitation of a secondary canal branching from the PRASAC canal to improve water supply and increase access to reliable water for double cropping. CAVAC agreed to support these two schemes, which were funded through the SIF mechanism on a cost-sharing basis with the community.
Achievements to Date:	**Engineering** The canal construction started in April 2012 and finished in June 2012. **O&M** The two FWUCs were very active in monitoring the construction progress. Farmers have been irrigating their paddy rice fields using water from these two canals rehabilitated through the SIF grants. The FWUC has also been collecting the ISF since the rehabilitation. Below is the fee collection data for the whole BANTIC and PLOVIC. BANTIC: The fee collection is around US$15,770 (2013); and US$13,450 (2014 – half year). PLOVIC: The fee collection is around US$31,820 (2013); and US$14,875 (2014 – half year). The PDWRAM has been contracted to conduct a landholding survey, re-election, capacity building, and monitoring for BANTIC.
Next Steps:	**Engineering** Consider providing more support to the two FWUCs through the SIF scheme under new contracts. **O&M** Complete the landholding survey, re-election, and capacity building for BANTIC.
Lessons Learnt:	**O&M** A landholding survey is needed to help a FWUC manage its fee collection better.

INTERVENTION UPDATE: Int. No: Irr 13.1 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of an irrigation scheme: Rokar Chhouk canal, Takeo province**
Summary:	Farmers in the commune of Char in Prey Kabas district requested rehabilitation of Rokar Chhouk canal to improve the water supply from a depression area. This would enable rice farmers to produce two crops per year. The Rokar Chhouk canal was selected for rehabilitation in 2013. A feasibility study was conducted and the canal was surveyed and designed. Construction commenced in March 2013. Some structures were added, and all work was completed in June 2014.
Achievements to Date:	**Engineering** Construction commenced in March 2013. Work could not be completed before the floods came in 2013. In 2014, some structures were added. Some parts of the embankment were shifted at the depression area to enable the canal to retain more water. A 100-meter local road was also built upon the request from the community. All work was completed in June 2014. **O&M** CAVAC signed a contract with the PDWRAM to establish and build the capacity of a FWUC for this canal. The FWUC establishment process was completed in November 2013 and the capacity building for the FWUC was completed in February 2014. A land holding survey for this scheme, which is part of the FWUC establishment and capacity building contract, was also completed by the PDWRAM. This FWUC is quite active. There was a siltation issue at the head of this canal causing some problems to the water flow into the main canal. This FWUC gathered farmers and collected some money from them to do dredging work at the head of the canal.
Next Steps:	**Engineering** Monitor the scheme during the defects liability period and have repair works done on the scheme if required at the end of the defects liability period. **O&M** Conduct follow-up visits to the FWUC to strengthen its capacity. Sign a contract with the PDWRAM to support the department to conduct FWUC monitoring work.
Lessons Learnt:	

INTERVENTION UPDATE: Int. No: Irr 13.2 and 13.3 AWP No: 2.2 Date: 30 June 2014	
Name:	**SIF: Support to BANTIC and PLOVIC in dredging their main canal in Takeo**
Summary:	**BANTIC – Banteay Thleay** Farmers in Prey Khla, Krapum Chhouk, and Prey Yuthka communes (Koh Andeth district) grow paddy along the PRASAC canal. This canal has been heavily affected by siltation. The community requested for the scheme to be dredged to improve water supply and increase the area with reliable water for double cropping. **PLOVIC – Plov Touk** Farmers in the Communes of Kamnob and Phnom Den communes (Kirivong district) grow paddy along the PRASAC canal. This part of the canal has also been significantly affected by siltation. Farmers in this community have requested that this part of the canal be dredged to improve water supply and increase the area with reliable water for double cropping. CAVAC supported both communities to rehabilitate the canal through dredging. These two projects were funded through the SIF mechanism on a cost-sharing basis with the community.
Achievements to Date:	**Engineering** Work on these two SIF projects commenced in May 2013 and was completed in August 2013. At Plov Touk, work was done on the ground using a regular excavator and a long-arm excavator. At Banteay Thleay, work was done during high tide using a crane excavator standing on a barge. **O&M** The FWUCs of both schemes were active in monitoring the construction progress. CAVAC showed them how to measure canal depths using depth sounders and tape measures. The FWUCs have used this knowledge to monitor the construction work. The scheme was ready to be used when water started receding in December 2013. The PDWRAM has been contracted to conduct a landholding survey, re-election, capacity building, and monitoring for BANTIC.
Next Steps:	**Engineering** Consider providing more support to the two FWUCs through the SIF scheme under new contracts. **O&M** Complete the landholding survey, re-election, and capacity building for BANTIC.
Lessons Learnt:	**O&M** CAVAC has learned from this project the benefits in handing over construction monitoring work to the FWUC. It does not only build the FWUC's ownership of the canal but also builds the capacity of the FWUC in using equipment such as a depth sounder to measure the level of excavation needed to dredge a canal under water. The longer the committee members of a FWUC stay in their positions without re-election, the higher the chance of built-in nepotism networks becomes.

INTERVENTION UPDATE: Int. No: Irr 14.1AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of an irrigation scheme: Wat Thmey pumping scheme, Takeo province**
Summary:	Farmers in the communes of Snoa, Kampong Reap, and Prey Lvea in Prey Kabas district and the commune of Prek Ambil in Sa-ang district, Kandal province relied on limited water supply from a depressed area and wells within their communities for their rice cultivation. They have requested rehabilitation of Wat Thmey pumping scheme to enable them to produce two to three crops per year. The Wat Thmey scheme was subsequently selected for rehabilitation in 2014. A feasibility study was conducted and the canal was surveyed and designed. The water source for this scheme is from Stung Prek Ambel. The construction for this scheme commenced in January 2014. Some additional structures were added and designs were revised. It is expected that the construction work will be completed by the end of 2014.
Achievements to Date:	**Engineering** Due to the large size of this project, the construction was tendered in two packages. The first package covers the main canal and pump house, and the second package contains the distribution canals and related structures. The initial contracts were both cancelled due to the contractor's poor performance. The contracts were later awarded to the second cheapest and qualified contractor. Several design revisions were made due to some unforeseen issues, such as the soil condition, land loss issues and safety. By the end of June 2014, the first and second work packages have been completed to 35% and 50%, respectively. **O&M** CAVAC signed a contract with the PDWRAM to establish and build the capacity of a FWUC for this scheme. The FWUC establishment process is underway. The contract is expected to be completed by the end of 2014. Currently, the land holding survey activities are in progress and are expected to finish by the end of August 2014. As this scheme crossed Kandal and Takeo provinces, the FWUC for this scheme will be a joint structure between the two provinces. Although there are fewer farmers in Kandal province benefitting from the scheme, they are quite active in FWUC work. The support from Kandal local authorities is also very positive. Furthermore, CAVAC is planning to contract the ISC to assist the PDWRAM in the process of FWUC establishment and capacity building.
Next Steps:	**Engineering** Complete construction work by December 2014. **O&M** Sign a contract with the ISC to assist the PDWRAM in establishment and capacity building of the FWUC. Enhance the FWUC capacity in operating the electric pump houses and managing the canal. Close follow-up with the FWUC is required by the team from CAVAC (engineering and O&M) to ensure that the scheme can be well operated.
Lessons Learnt:	**Engineering** Soil investigations and collecting monthly climatic data including river water levels are needed during the detailed design stage. A hydrological study is an absolute requirement for such a large scheme as Wat Thmey. Consultation with local people is needed because not all hydrological information is available from the Local Office of Hydrology. **O&M** It is important to consult with farmers during the design stage and the early stages of scheme construction. By doing this, farmers feel informed and involved and therefore are willing to provide support and cooperation.

INTERVENTION UPDATE: Int. No: Irr 1 AWP No: 2.2 Date: 30 June 2014	
Name:	**SIF: Support to BANTIC, PLOVIC and KRIC in dredging their main canal in Takeo**
Summary:	**BANTIC – Banteay Thleay** Farmers in Prey Khla, Krapum Chhuk, and Prey Yuthka communes (Koh Andet district) grow paddy along the PRASAC canal. This canal has been heavily affected by siltation. The community requested for the scheme to be dredged to improve water supply and increase the area with reliable water for double cropping. The siltation not only affects the surrounding area, but also it blocks water that flow into Krapum Chhouk, Kveng Tayi and Tumnup Lork canals. Therefore, the canal rehabilitation of the last section of BANTIC (6,443m) ensures water supply to above mentioned canals. It will also benefit farmers in Krapum Chhouk, Prey Yuthka and Pech Sar communes, Koh Andeth district. **PLOVIC – Plov Touk** Farmers in the Communes of Kamnob and Phnom Den communes (Kirivong district) grow paddy along the PRASAC canal. The length of the canal rehabilitation is 5,080m. This part of the canal is likewise significantly affected by siltation. Farmers in this community have requested that this part of the canal be dredged to improve water supply and increase the area with reliable water for double cropping. The canal will benefit to farmers in Kamnob and Phnom Den communes, Kirivong district. **KRIC – Kampong Krasang** The canal located in Kampong Krasang commune, Borey Chulsar district along the the head of PRASAC canal. The length of the canal which requires dredging is 2,100m. This part of the canal is affected by siltation from the water source, steung Takeo. The canal benefits farmers in the communes of Thlea Prochum commune, Koh Andeth district, who utalise the canal for irrigation. The purpose of this canal dredging does not only serve the needs of upstream farmers, but also it plays a crucial role in providing reliable water source for BANTIC and PLOVIC. CAVAC was supporting the three communities to rehabilitate the canal through dredging. These three projects were funded through the SIF mechanism on a cost-sharing basis with the community.
Achievements to Date:	**Engineering** Works on these three SIF projects commenced in April 2014 and are expected to finish by end of July 2014. At Plov Touk, work was completed in June 2014 using two excavators and one long-arm excavator. At Banteay Thleay, work was completed in May 2014 by using onee excavator and one long-arm excavator standing on a barge. At Kampong Krasang, the work is 65% complete. **O&M** The FWUCs of both schemes were active in monitoring the construction progress. CAVAC showed them how to measure canal depths using depth sounders and tape measures. The FWUCs have used this knowledge to monitor the construction work. The scheme is ready to be used when water starts receding in December.
Next Steps:	**Engineering** Engineer will provide support to FWUC for canal rehabilitation or removal of siltation in canal with appropriated method. **O&M** Contract to the PDWRAM to conduct a land-holding survey and enhance the BANTIC FWUC structure. The BANTIC FWUC office is to be built for future work.
Lessons Learnt:	**Engineering** The method of construction must be fitted for each site condition. Crane excavators are rarely used, but it is the only solution for dredging the siltation in this canal. This method should not be applied for natural solid soil. **O&M** CAVAC has learned from this project that it is great to handover construction monitoring work to the FWUC. It does not only build the FWUC's ownership of the canal but also builds the capacity of the FWUC in using equipment such as a depth sounder to measure the level of excavation needed to dredge a canal under water. The longer the committee members of a FWUC stay in their positions, without being re-elected, the higher the chance of built-in nepotism networks will be.

INTERVENTION UPDATE: Int. No: Irr 10.2 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and Construction of an Irrigation Scheme: Prey Tonle canal, Kampot province**
Summary:	The farmers of Prey Tonle grew a wet season paddy crop. Agricultural production was limited by unreliable access to irrigation water, and the community expressed a need for the construction of a run-off-river canal that would improve water supply and increase access to water for double or triple cropping. The 3.2-kilometer Prey Tonle canal was selected for implementation at the start of CAVAC in March 2010. Construction work was completed in June 2010. A FWUC was established and capacity building was completed in June 2012.
Achievements to Date:	**Engineering** The detailed design was undertaken by the PDWRAM under an agreement with CAVAC. CAVAC ran a tender process and construction was awarded to Taing Cheng Oing, Co., Ltd. Construction commenced in April 2010, and was completed in June 2010. Construction supervision was conducted by the PDWRAM, under an agreement with CAVAC. **O&M** CAVAC commissioned the PDWRAM to establish and build the capacity of a FWUC for this canal. The FWUC was established through community meetings and elections, and the capacity building for this FWUC was completed in June 2012. Village meetings were facilitated by the FWUC, CAVAC, local authorities, and the PDWRAM staff to provide fee collection information to farmers in June 2013. CAVAC continued to conduct follow-up visits to this FWUC to strengthen its capacity in scheme O&M until October 2013. In October 2013, CAVAC decided to drop work on this FWUC as most committee members of this FWUC showed low interest and commitment. Moreover, the fee collection at this scheme had been very challenging because parallel to the CAVAC canal, another canal of 6.5 km in length was constructed by the government and farmers were not required to pay any fees for using water from the government canal.
Next Steps:	**Engineering** No further action. **O&M** No further action.
Lessons Learnt:	**O&M** Fee collection is very challenging at a scheme close to another scheme where water is provided for free.

INTERVENTION UPDATE: Int. No: Irr 10.6 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of an irrigation scheme: Sbov Andeth canal, Kampot province**
Summary:	The farmers in Sdach Kong Khang Cheung grew wet season paddy and some limited dry season paddy close to the Stung Touk Meas perennial river. Agricultural production was limited by unreliable access to irrigation water. The community expressed a need for canal construction and some rehabilitation to improve water supply and increase the area with reliable water to enable double cropping. The Stung Touk Meas is influenced by high water levels downstream from Vinte canal which is part of the Lower Mekong / Bassac River systems. The Sbov Andeth canal was selected for rehabilitation in 2011. A feasibility study was carried out and the canal was surveyed and designed by Kampot PDWRAM. Construction commenced in April 2011 and was completed in mid-April 2012. A FWUC was established in February 2012 and capacity building was completed in June 2012.
Achievements to Date:	**Engineering** Construction commenced in April 2011. Some additional structures were added to improve drainage and canal functionality. By mid-April 2012 all work was completed. This canal is very promising for farmers. Before canal rehabilitation, farmers only grew wet season paddy which was very unpredictable and low yielding. Currently, almost 100% of farmers have increased production from one to two crops, and about 20% of farmers grow three crops per year because they have rice fields in upper land areas, not likely to be flooded. In 2013, CAVAC and Kampot PDWRAM agreed to construct two pilot lining secondary canals at the scheme. Construction of these two secondary canals started in January 2014 and was completed in May 2014. **O&M** A FWUC for this scheme was established in February 2012, and the capacity building for it was completed in June 2012. CAVAC has continued to do follow-up visits to this FWUC to further strengthen its capacity. The FWUC started its first collection of the ISF in May 2013 but it could collect only a small amount. The main reason for a small amount of fees collected was a delay between harvest and fee collection times – when some farmers had no more money left to pay and others were reluctant to pay. The FWUC has encouraged farmers to construct secondary canals to increase the irrigated area. So far, 58 small secondary canals have been dug. The FWUC conducts meetings regularly to discuss its workplan especially for fee collection, but the fee collection rates are still low. The FWUC recently conducted a meeting to discuss the possibility to engage PWSs in water management at the scheme as well as to increase the fee collection rate. The price for water has been set at US$100 per hectare; this water price is charged by PWSs to farmers and it also includes the ISF for the FWUC. Some farmers are not interested to get water from PWSs while others are interested but still complain that the water price is a bit high and suggest PWSs to lower it. Other meetings will be held to negotiate the water price and find out appropriate ways through which PWSs can pump the water to irrigate the rice field for farmers interested in getting the water service from PWSs. Construction of the FWUC office is expected to be completed by August 2014. Since public land was not available for the construction of the FWUC office, the FWUC decided to use the money from the ISF to buy a piece of land for the FWUC office, which will be located along the main canal. As mentioned in the main text of the report, the Hay Saun extension 2 canal is being constructed and it links to Sbov Andeth. For the management of this canal, three subgroups have been established under the management of the Sbov Andeth FWUC. The sub-group and group leaders are currently undertaking training – provided by PDWRAM – to build up their capacity on scheme O&M.
Next Steps:	**Engineering** No further action will be taken for this scheme except monitoring the scheme during the defects liability period. **O&M** Continue to strengthen the capacity of the FWUC committee, especially in financial management and maintenance planning, through follow-up visits from CAVAC, follow-up training, and provision of exchange visits to successful FWUCs. Conduct more meetings between the FWUC, PWSs and farmers to negotiate the water price and suitable ways for PWSs to pump water for their farmer customers. Start conducting a landholding survey for this scheme in August 2014. Hold a workshop for the FWUCs to share and exchange practical experience.
Lessons Learnt:	**Engineering** Proper irrigation water management at the watershed level is essential to ensure a long-term access to water for irrigation purposes. **O&M**

	Regular FWUC meetings are very important and should be conducted preferably every two months. Engagement of PWSs in water management might be very beneficial for this scheme, especially in fee collection. However, the cooperation between all involved parties needs to be strong to ensure that they all work well together.

INTERVENTION UPDATE: Int. No: Irr 10.7 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of irrigation scheme: O'Kak canal, Kampot province**
Summary:	The farmers in Touk Meas Khang Lech grew wet season paddy and some limited dry season paddy close to the Stung Touk Meas perennial river. Agricultural production was limited by unreliable access to water. The community expressed a need for canal rehabilitation to improve water supply and increase reliable water access for double or triple cropping. The O'Kak canal was selected for rehabilitation in 2011. A feasibility study was carried out and the canal was surveyed and designed. Construction commenced in April 2011 and was completed in May 2012. A FWUC was established in November 2011 and capacity building was completed in June 2012.
Achievements to Date:	**Engineering** Construction commenced in April 2011. Some additional drainage and crossing structures were needed. By May 2012 all work was completed. Due to sandy soil conditions, parts of the canal embankments collapsed, blocking the flow of water in the canal. Several options were reviewed for stabilisation of canal embankments. It was finally decided to provide concrete lining at the section where the embankment had collapsed. This scheme improvement work was started in early 2013 and was postponed during the wet season. The construction was resumed in early December 2013 and was fully completed at the end of June 2014. **O&M** A FWUC for this scheme was established in November 2011, and the capacity building for it was completed in June 2012. After the canal rehabilitation, only a small percentage of farmers started to use the water in the canal for their second crop. The water level in the canal was low and farmers were concerned about the lack of water to use for their crop. An office for this FWUC is being built and with its expected completion by the end of July 2014. Besides cultivating wet season rice, farmers grow vegetables and sugar cane using available water in the canal. As the canal embankment is still very high, after consultation with farmers, they have requested that CAVAC install culverts across the embankment to ease pumping. One PWS was introduced to this scheme with the possibility of investing in providing water services. However, the PWS does not appear interested in the scheme, since the command area is small and the canal is too deep, resulting in high pumping costs.
Next Steps:	**Engineering** No further action will be taken for this scheme except correcting defects during the defect liability period. **O&M** When the canal is able to provide reliable water for farmers, the following action will be undertaken: 1. The FWUC, in cooperation with the local authorities, will conduct awareness meetings to re-inform farmers about the ISF so that they can start the first fee collection smoothly. 2. Conduct follow-up visits to the FWUC to strengthen its capacity. 3. Start conducting a landholding survey for this scheme, to be commenced in August 2014. 4. Hold a workshop for the FWUCs to share and exchange practical experience.
Lessons Learnt:	**Engineering** Sandy soil in a scheme area necessitates substantial investment in canal lining. Alternative options should be studied at the feasibility study stage. These skills are limited at PDWRAM level. For this specific scheme, the construction of a pumping scheme would have been a more feasible option. **O&M** Farmers were not particularly enthusiastic about construction of a pump house at the intake site of the canal. CAVAC should have been more active in providing information regarding land loss, gravity fed irrigation, and the ease of operating pumping equipment.

INTERVENTION UPDATE: Int. No: Irr 10.8 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of an irrigation scheme: Thnoat canal, Kampot province**
Summary:	The farmers of Thnoat Chong Srang grew wet season paddy and some limited dry season paddy close to the Prek Ansar perennial river. Agricultural production was limited by unreliable access to water. The community expressed a need for canal rehabilitation to improve water supply and increase the area with access to reliable water for double or triple cropping. The Thnoat canal was selected for rehabilitation in 2011. A feasibility study was carried out and the canal was surveyed and designed. Construction commenced in April 2011 and was completed in May 2012. A FWUC was established and the capacity building was completed in March 2012.
Achievements to Date:	**Engineering** Construction commenced in April 2011. Some drainage and soil erosion protection structures were added to the contract. The construction was completed in May 2012. In December 2013, a contract was awarded for the construction of a pilot secondary canal (3.5 km) at this scheme site. The construction of this pilot secondary canal started in early February 2014, and was completed in June 2014. During this reporting period, CAVAC and the FWUC committee of this scheme have identified another secondary canal which requires rehabilitation. **O&M** The FWUC was established through community meetings and elections. The capacity building was completed in March 2012. CAVAC has continued conducting follow-up visits to the FWUC to strengthen its capacity in scheme O&M. There had been no PWSs in the area before the canal was rehabilitated. After the canal rehabilitation, PWSs came from nearby areas to start investing in water delivering services for farmers by taking water from the Thnoat canal. Currently, there are seven PWSs doing business at this scheme, all of whom have been registered and signed contracts with the FWUC. The FWUC has so far collected about $1,600 in fees. The FWUC has spent about US$500 of the ISF collected to repair the road access on some parts of the canal embankments. During this reporting period, some representatives of this FWUC also met with the local authorities to solve some problems at the canal site, such as farmers' allowing buffalos to roam into the canal. Construction of the FWUC office has also been completed.
Next Steps:	**Engineering** CAVAC and the PDWRAM will conduct a topographical survey and detailed design for another secondary canal in July and August 2014. **O&M** ▪ Conduct meetings regularly between the FWUC and PWSs to strengthen the relationships between them, to share workplans, and to solve any outstanding problems. ▪ Continue conducting follow-up visits to the FWUC to strengthen its capacity. ▪ Start conducting a landholding survey for this scheme in August 2014. ▪ Hold a workshop for the FWUCs to share and exchange practical experience.
Lessons Learnt:	**O&M** The relationship between PWSs and the FWUC should be formalised. The local authorities, especially the commune councils, should be involved to facilitate the formalisation process through effective contract management.

INTERVENTION UPDATE: Int. No: Irr 12.1 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of irrigation scheme: Spean Touch canal, Kampot province**
Summary:	The farmers of Prey Kroeus grew traditional wet season rice and / or short-term dry season rice with limited access to reliable water. The community expressed a need to rehabilitate the Spean Touch canal to improve water supply and increase the command area with access to a reliable water source for double or triple cropping each year. The Spean Touch canal was then selected for rehabilitation in 2012. A feasibility study was carried out and the canal was surveyed and designed. Construction commenced in late April 2012 and was completed in August 2013. A FWUC was established, and capacity building for the FWUC was completed.
Achievements to Date:	**Engineering** Construction of this scheme commenced in late April 2012 and was completed in August 2013. Additional off-take PVC pipes were placed to provide farmers with ease in pumping water from the main canal. Using these pipes farmers can reduce pumping costs and the risk of damaging the embankments. **O&M** A FWUC for this scheme was established in February 2013, and the capacity building for it was completed in September 2013. The FWUC's committee meets regularly every month to discuss its monthly plans. A landholding survey for this scheme was completed in 2013. A map resulting from this survey has proven to be very useful in assisting the FWUC in its O&M work. An office for this FWUC is being constructed, with completion expected by the end of July 2014. There is one PWS doing business at this scheme. This PWS pumped and irrigated about 15 ha of rice fields during the past cultivation season. However, because the rice fields were destroyed by a pest outbreak, this PWS has reduced the water price or did not collect any fees at all from some farmers, following an agreement not to pay ISF to the FWUC. The FWUC and PWS at this scheme have requested CAVAC to rehabilitate some existing secondary canals and / or construct new secondary canals to enlarge the irrigated area. However, there are some concerns at this scheme that rehabilitation may expose acid sulphate soils to the surface.
Next Steps:	**Engineering** ▪ Continue studying the impact and management of acid sulphate soil on paddy production. **O&M** ▪ Continue conducting follow-up visits to the FWUC to strengthen its capacity. ▪ Hold a workshop for the FWUCs to share and exchange practical experience.
Lessons Learnt:	**Engineering** Acid sulphate soil, when exposed, creates additional challenges for the design and construction of canals and structures.

INTERVENTION UPDATE: Int. No: Irr 12.2 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of irrigation scheme: Prey Leu canal, Kampot province**
Summary:	The farmers of Banteay Meas Khang Lech grew traditional wet season rice and some limited dry season rice with very limited access to reliable water supply. The community expressed a need for rehabilitation of Prey Leu canal to improve the water supply and increase access to a reliable water source. The Prey Leu canal was then selected for rehabilitation. A feasibility study was completed and the canal was surveyed and designed. Construction commenced in March 2012 and was completed in October 2012. A FWUC was established successfully and capacity building was started in December 2012 and finished in September 2013.
Achievements to Date:	**Engineering** Construction commenced in March 2012 and finished in October 2012. Both the PDWRAM and CAVAC are satisfied with the progress and quality of the construction done by the selected contractor. Some minor defects had been identified by CAVAC's engineer in charge of Kampot and were corrected by the responsible contractor (Daun Penh Construction) in May 2014. **O&M** A FWUC for this scheme was established in November 2012, and the capacity building for it was completed in October 2013. A landholding survey for this scheme was completed in 2013. A map resulting from this survey has proven very useful in assisting the FWUC in its O&M work. An office for this FWUC is being constructed with completion expected by the end of August 2014. The FWUC and PWSs had a meeting and agreed to sign contracts between the FWUC and PWSs in the water business at the scheme. The FWUC committee meets regularly to discuss O&M work for the scheme. So far, the FWUC has collected the ISF of about US$800. It has also spent some of the ISF collected on scheme O&M, including canal cleaning and minor maintenance on road access. More farmers have started doing early wet season rice cultivation and some have enlarged their farming areas following their experience from 2013 showing that water at this canal was reliable. Thus, some PWSs, in agreement with the FWUC, have started improving subsidiary canals to ensure that they have enough water in their canals to irrigate farmers' fields where it is needed.
Next Steps:	**Engineering** ▪ Conduct surveys and designs of some secondary canals in order to provide farmers (and potential water sellers) with the ability to deliver water at lower costs to the whole command area. **O&M** ▪ Continue conducting follow-up visits to the FWUC to strengthen its capacity. ▪ Build up the cooperation between the FWUC and PWSs through creating contracts between the FWUC and PWSs, with the involvement of the local authorities. ▪ Hold a workshop for the FWUCs to share and exchange practical experience.
Lessons Learnt:	To ensure good cooperation between the FWUC and PWSs. It is important that CAVAC and the local authorities facilitate this cooperation at an early stage.

INTERVENTION UPDATE: Int. No: Irr 13.1 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of an irrigation scheme: Hay Saun canal, Kampot province**
Summary:	The farmers of Banteay Meas Khang Cheung grow traditional wet season rice and some limited dry season rice with very limited access to reliable water supply. The community expressed a need for rehabilitation of Hay Saun canal to improve the water supply and increase the area with access to a reliable water source. The Hay Saun canal was then selected for rehabilitation in 2013. A feasibility study was carried out and the canal was surveyed and designed. Construction commenced in February 2013. In response to the community's request through Kampot PDA and MAFF, the Hay Saun canal has been extended further to the south to increase its command area for about 500 ha more through two construction contracts (Hay Saun Extension 1 and 2).
Achievements to Date:	**Engineering** Construction of the original design of the scheme commenced in February 2013 and was completed in June 2014. A UXO was found in the canal area during construction in 2013. The Cambodian Mine Action Centre (CMAC) was then engaged to investigate and clear the surrounding areas. The construction work was suspended for approximately two weeks. The topographical surveys and detailed designs for the extension parts of the canal were done in 2013. The construction of the two extension canals started in early January 2014, and will be completed by July 2014. **O&M** CAVAC commissioned the PDWRAM to establish and build the capacity of a FWUC for this scheme. A FWUC establishment and capacity building contract was signed between PDWRAM and CAVAC in October 2013. The FWUC was established in May 2014. Training to build up the capacity of this FWUC committee is currently still ongoing. A landholding survey for this scheme is being conducted by the PDWRAM and it is expected to be completed by the end of July 2014. The map resulting from the survey will be helpful for the FWUC to carry out O&M work. An office for this FWUC is being constructed, with its expected completion by August 2014.
Next Steps:	**Engineering** ▪ Complete the construction work of the Hay Saun Extension 1 and 2 in July 2014. **O&M** ▪ Continue conducting follow-up visits to the FWUC to strengthen its capacity. ▪ Hold a workshop for the FWUCs to share and exchange practical experience.
Lessons Learnt:	**Engineering** Presence of UXOs should be thoroughly investigated during the EIAs of all new schemes. When reported, immediate actions need to be taken.

INTERVENTION UPDATE: Int. No: Irr 13.1 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of an irrigation scheme: Chamlong Chrey canal, Kampot province**
Summary:	The farmers of Sdach Kong Khang Lech grew traditional wet season rice and some limited dry season rice with limited access to reliable water supply. The community expressed a need for rehabilitation of Chamlong Chrey canal to improve the water supply and increase the area with access to a reliable water source. The Chamlong Chrey canal was selected for rehabilitation. A feasibility study was carried out and the canal was surveyed and designed. The construction commenced in October 2013 and it is expected to finish in July 2014.
Achievements to Date:	**Engineering** The survey and detailed design of the canal including a pump house were undertaken by CAVAC as a model scheme for PDWRAM. The construction of this scheme commenced in October 2013. The electricity line for the pump station has been installed. The construction of the scheme is expected to be completed in July 2014. **O&M** CAVAC commissioned the PDWRAM to establish and build the capacity of a FWUC for this canal. A FWUC establishment and capacity building contract was signed between PDWRAM and CAVAC in December 2013. The FWUC was established in June 2014. The capacity building for this FWUC is currently on-going and will be completed in July 2014. The landholding survey is being conducted by the PDWRAM and will be completed in July 2014. An office for this FWUC is also being constructed, with its expected completion by the end of August 2014.
Next Steps:	**Engineering** ▪ Commission the pumps at this scheme in July 2014. ▪ Monitor the functions of the scheme, identify what needs to be corrected in the event of any observed irregularity, and improve the scheme. **O&M** ▪ Complete the landholding survey. ▪ Work with the PDWRAM to build the capacity for this FWUC. The PDWRAM will conduct regular capacity building activities, while CAVAC will conduct additional training for this FWUC as this scheme is a model pumping scheme. ▪ Hold a workshop for the FWUCs to share and exchange practical experience.
Lessons Learnt:	High level of involvement with the community is really important for the scheme design and construction, especially for a scheme such as Chamlong Chrey where the scheme needs to comply with farmers' needs in order for it to function well.

INTERVENTION UPDATE: Int. No: Irr 13.1 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of irrigation scheme: Reservoir 77, Kampot province**
Summary:	The farmers of Sre Cheng commune in Chum Kiri district grow mainly one rain feed rice crop (wet season rice) per year with unreliable water supply. Often their crops are destroyed by droughts which occur in the late wet season. Crop damage can also occur during dry spells in the middle of the wet season. The local authorities of Sre Cheng have expressed a need for rehabilitation of Reservoir 77 to improve water supply and increase access to a reliable water source. In conjunction with Kampot PDWRAM, CAVAC's irrigation team conducted a number of visits to the site in order to collect socio-economic and engineering data. A commitment has been made to rehabilitate the existing reservoir scheme.
Achievements to Date:	**Engineering** A detailed topographical survey for this scheme was conducted by Kampot PDWRAM, and detailed designs for this reservoir and distribution system were conducted by CAVAC. As the survey work was implemented, CAVAC commissioned CMAC to clear UXOs within a defined boundary of this scheme. Around twenty (20) UXOs were found within a 30-meter buffered zone along the dam of Reservoir 77. In December 2013, a contract was awarded for the construction of distribution canals in this Reservoir 77 scheme. The construction works of Reservoir 77 were fully completed at the end of January 2014. The construction works of Reservoir 77 distribution canals commenced in early January 2014 and finished at the end of May 2014. **O&M** CAVAC commissioned the PDWRAM to establish and build the capacity of a FWUC for this scheme. A FWUC establishment and capacity building contract was signed between the PDWRAM and CAVAC in December 2013, The FWUC was established in May 2014 and the training to build up the capacity of this FWUC committee is currently ongoing. A landholding survey for this scheme is being conducted and it is expected to be completed by the end of July 2014. A map resulting from this survey will be a helpful tool to assist the FWUC in its O&M work. An office is being constructed for the FWUC of this scheme, with its expected completion by August 2014.
Next Steps:	**Engineering** ▪ No further action will be taken for this scheme except monitoring the scheme during its defects liability period. **O&M** ▪ Complete the capacity building activities for this FWUC. ▪ Continue to strengthen the capacity of this FWUC committee, especially in financial management and maintenance planning, through follow-up visits from CAVAC, follow-up training, and provision of exchange visits to successful FWUCs. ▪ Hold a workshop for the FWUCs to share and exchange practical experience.
Lessons Learnt:	

INTERVENTION UPDATE: Int. No: Inp 10.2 AWP No: 1.2 Date: 30 June 2014	
Name:	**Improving quality and availability of commercial seed**
Summary:	The seed production business requires intensive capital investment, skilled production knowledge, effective and efficient human resource management and good branding. CAVAC intended to contribute to the growth of seed businesses through its support on building seed producers' capacity to produce and market quality seed. In 2011, CAVAC started partnering with a seed producer in Kampong Thom, Srov Pouch Meas Co., Ltd. (SPM). CAVAC's intended intervention plans with this partner were divided into two phases: 1) Technical Assistance and Business Development; and 2) Business Expansion. CAVAC's activities with SPM in the first phase included: ▪ Conducting a study on the intellectual property rights for non-Cambodian rice varieties; ▪ Hiring an international seed production specialist from Vietnam to train key technical staff of SPM in seed production techniques; and ▪ Hiring a company to develop a Rice Seed Business Plan for SPM. This plan assisted the company's strategic direction and informed methods to seek new partners. CAVAC's second phase of support to SPM on business expansion was put on hold due to land tenure issues faced by the company. In early 2013, SPM approached CAVAC again to request equipment support. This request was analysed and reviewed and was not approved as CAVAC understood that the rice seed business was not a priority for SPM given that it had many businesses.
Achievements to Date:	Activities completed to date include: ▪ A study was completed on the intellectual property rights for non-Cambodian rice varieties. ▪ A rice seed business plan for SPM was developed in order to provide strategic directions and inform methods for the company to seek business partners. ▪ A rice seed production manual was developed. ▪ Rice seed production training for technical staff (theoretical and practical concepts) was held. ▪ SPM's Agribusiness Innovation Fund (AIF) application on the business expansion assistance project was approved but it has not progressed due to the company's land tenure issues. ▪ In September 2013, CAVAC conducted an assessment on the progress of SPM's rice seed production and on farmers' buying SPM's seed. The assessment found that the rice seed market remained unfavourable and uncertain, as good quality seed production required large-scale investment which carries significant risk. For example, risks relating to natural phenomenon - such as unpredictable floods, which often destroy paddy fields and a volatile paddy price - mean that farmers are reluctant to buy good quality seed. There are also risks relating to farmers' habit of seed retaining and exchange.
Next Steps:	Complete an intervention summary report to close this intervention.
Lessons Learnt:	SPM has faced land tenure issues because some of its dry season rice cultivation areas are situated in Zone 3 of the Tonle Sap area, a zone where cultivation is not allowed. This is a reminder for CAVAC that before reaching an agreement with any new partner, it is necessary to physically check and confirm the location of production land. It is hard to find committed partners in the rice seed market as the rice seed business is costly as well as risky. CAVAC should focus on looking at price volatility constraints before a rice seed production intervention can be introduced.

INTERVENTION UPDATE: Int. No: Inp 11.2 AWP No: 1.2 Date: 30 June 2014	
Name:	**Providing training to small seed producers (production knowledge)**
Summary:	This intervention aimed to provide individual small seed producers with training in appropriate seed production techniques, which can be applied in both wet and dry seasons. It was expected that the training would enable small seed producers to increase their production of modern varieties, resulting in greater adoption among smallholder farmers through seed purchase or exchange, thereby leading to higher yield.
Achievements to Date:	Three rice seed production training sessions were conducted for 61 dry and wet season seed producers (including four PDA staff members) in Takeo and Kampong Thom. After the training, an informal assessment was conducted with some of the trained seed producers. The assessment revealed that most smallholder producers had knowledge on proper rice production techniques and practiced some of those techniques, but had less access to information on appropriate use of inputs, including fertiliser and pesticide, compared to trained seed producers contracted with the Agricultural Quality Improvement Project (AQIP) and large scale producers (2-10 hectares). Follow-up phone calls in May 2013 found that some producers were producing modern varieties and exchanged their seed with other farmers' paddy or sold it at the paddy market price. This has helped increase farmers' access to modern varieties.
Next steps:	Compete an intervention summary report to close the intervention.
Lessons Learnt:	Some neighbouring farmers of the trained seed producers have provided feedback that some of the production techniques, such as single row planting, were useful for their paddy production – using less seed and producing higher yields. Exchanging paddy for good seed also creates challenges for seed producers. To CAVAC, the culture of paddy exchange allows a faster and wider spread of new varieties that provide higher yields to farmers; therefore it is, in a way, beneficial, especially in areas where farmers are still producing traditional varieties.

INTERVENTION UPDATE: Int. No: Inp 11.3 AWP No: 1.2 Date: 30 June 2014	
Name:	**Supporting associations to promote modern wet season rice seed varieties and market access for rice seed**
Summary:	CAVAC's intervention to support rice seed production associations is in line with the RGC's policy to support the establishment of farmer cooperatives. The policy enables farmers to organise into legally recognised cooperatives, which could improve their market and legal positions and access to financial and technical support. CAVAC supported associations in the areas of seed production techniques and knowledge of rice seed marketing. This included aspects of optimal input usage, quality control of seed production, crop protection and post-harvest management. CAVAC also supported rice seed production associations in developing market access strategies so that they could become self-reliant in the long run. CAVAC linked rice seed production associations to rice seed sellers, paddy traders, and rice millers through field day activities in order to create linkages among all the actors in the market. Activities under this intervention were expected to provide information to wet season rice farmers on new and more profitable practices – especially the benefits of using modern varieties which were yield increases. CAVAC expected farmers to better use inputs and adopt modern varieties that were appropriate for their conditions.
Achievements to Date:	In 2011, CAVAC supported four associations to conduct 11 paddy field demonstrations. CAVAC organised four field days to share demonstration results with farmers within communities; and to link associations with millers and rice / paddy traders to stimulate commercial interest for modern wet season varieties. An adoption study was conducted in early October 2012 for the work completed with the four associations in 2011 (Champei in Takeo, Sre Cheng and Boeung Nimul in Kampot and Kvek Meanrith in Kampong Thom). The study found that the adoption rate of Phka Rumduol variety was high in commercial areas such as Kvek and Champei but it was very low in non-commercial areas such as Boeung Nimul. Boeung Nimul seems isolated from the market and has had no record of producing Phka Rumduol before. Thus, paddy traders have never approached this area for the particular variety. Overall, the finding was positive. Despite the early introduction of the variety, CAVAC's field demonstrations and field days contributed to increased production areas of Phka Rumduol. The area increase was in total 135 hectares (92 households) in the four communities of the four associations. In the first half of 2012, 10 rice seed producers (who are association members) were trained by CAVAC in rice seed production techniques. CAVAC worked with three associations to organise 10 rice seed production demonstrations; and with one association in Po Samrong on paddy production. In addition, four field days for rice seed field demonstrations were conducted to link actors on the supply side (such as seed producers) with the actors on the demand side (such as farmers, village chiefs, commune council members, paddy traders, seed sellers and millers). In the first half of 2013, the rice seed market strategies were developed for Kvek Meanrith, Champei and Boeung Nimul associations. CAVAC discussed finding ways to ensure sustainability of the associations' seed production while achieving the goal of having wet season rice farmers shift from producing traditional to modern varieties that are higher-yielding – further boosting incomes. After the strategies had been developed, five field demonstrations (one with Champei and four with Boeung Nimul) were managed by association chiefs in nearby villages / communes of the associations, using seed provided by the same associations (Phka Rumduol for Champei and Phka Romeat for Boeung Nimul). Input retailers / companies also took part through their contribution to the costs of fertiliser. CAVAC was mainly acting as a back-stopper on technical aspects and other relevant expenses including field days, of which two were conducted in 2013. During the implementation of these field demonstrations, it was found that rat infestation and other pest and disease damage were a major concern in Champei while Boeung Nimul was hardly affected.
Next Steps:	▪ Finalise the 2013 field demonstration report which includes analysis of the current practice of neighbouring farmers. ▪ Complete the assessment of field demonstrations conducted in 2012 at the farmer level. ▪ Revisit the market access strategies and have further discussions with associations to discern their commitment in expanding their seed business as well as spreading modern varieties in their communities, as well as other communities. ▪ Look at other possible ways to introduce modern varieties more sustainably either with or without CAVAC's support.
Lessons Learnt:	Despite the fact that associations have great potential to contribute to the adoption of modern rice seed varieties and serve as sources of knowledge on modern varieties and proper usage of inputs, other local constraints such as pest management and fertiliser usage must be addressed before a more meaningful change in farmers' adoption can be seen.

INTERVENTION UPDATE: Int. No: Inp 12.9 AWP No: 1.2 Date: 30 June 2014	
Name:	**Strengthening production knowledge to enhance the availability of good quality rice seed in the market**
Summary:	The seed production business requires intensive capital investment, skilled production knowledge, effective and efficient human resource management and good branding. CAVAC intended to contribute to the growth of seed businesses through its support on building seed producers' capacity to produce and market quality seed. In 2012, CAVAC started partnering with Mr. Sokunthea – a seed producer in Kampong Thom. CAVAC's intervention plan with Mr. Sokunthea included: ▪ Hiring a local rice seed market access expert to help Mr. Sokunthea's team develop a rice seed market strategy and an implementation plan for his rice seed business. ▪ Hiring a local seed production specialist to provide Mr. Sokunthea's team with theoretical and practical knowledge about proper seed production for both wet and dry seasons.
Achievements to Date:	A rice seed market access strategy for Mr. Sokunthea has been developed. As of July 2013 Mr. Sokunthea officially informed CAVAC that he was unable to produce seed yet due to several reasons: 1. lack of water due to damage to his irrigation system. This was due to an inability to get approval to dig a canal from a tributary of Tonle Sap; 2. limited access to his fields in wet season, as per the above constraint; and 3. unpredictability and likelihood of flood which can lead to crop loss during production and harvest. As a result, the recruitment of a part-time rice seed production consultant has been delayed.
Next Steps:	Confirm with Mr. Sokunthea and write up a closing note.
Lessons Learnt:	

INTERVENTION UPDATE: Int. No: Inp 12.10 AWP No: 1.2 Date: 30 June 2014	
Name:	**Dry season rice seed market**
Summary:	Cambodian dry season rice farmers are entrepreneurial. The majority use rice varieties that respond to paddy buyers' demands and requirements. Without support, Cambodian medium and large dry season rice seed producers are struggling with access to quality seed. There is also limited knowledge of seed production and how to market quality seed. This intervention planned to work with existing medium and large seed producers to improve their seed quality supply to the market. It was supposed to focus on providing seed producers with appropriate seed production techniques through training; and linking producers with the best local or international seed production companies through study tours.
Achievements to Date:	In 2012, CAVAC conducted training in dry season rice seed production techniques in Kampong Thom. A quick assessment was conducted which revealed that most seed producers produced good paddy, not seed, and that the culture of exchanging seed also played a main role in the dry season rice seed market. As the rice seed business is associated with high risks, it is less likely that the current so-called seed producers will become legitimate seed producers. CAVAC understands that it cannot contribute much to addressing any constraints in this market. In the first half of 2013, CAVAC contacted several dry season rice seed producers outside of its target provinces (Kampong Cham and Prey Veng provinces) to understand their rice seed production and business situation.
Next Steps:	This intervention has been cancelled.
Lessons Learnt:	The rice seed market is complex from the policy to farmer level, which makes it hard for seed producers to secure their businesses. The price of rice seed has not been high enough to compensate for the high cost of the recommended rice seed production techniques. This has led producers to keep producing only good paddy to sell as seed. Moreover, Vietnamese varieties are popular for dry season rice cultivation and those varieties are not supported by the RGC policy. The rice seed business is considered to have a number of high risks associated with it. It is challenging to find existing seed producers who conform to seed production standards as defined by the International Rice Research Institute.

INTERVENTION UPDATE: Int. No: Mar 11.1 AWP No: 1.2 Date: 30 June 2014	
Name:	**Technical assistance on rice and rice seed production for export markets**
Summary:	The RGC's paddy production and rice export policy indicates that a key success factor for domestic export millers will be their ability to purchase sufficient paddy at competitive prices. Baitong Kampuchea, Plc. has been identified as a key partner for this intervention – a rice milling and exporting company based in Battambang province. There are some fundamental issues which make it difficult for Baitong to achieve its rice export goal. Although highly attractive fragrant varieties are being produced, they are not pure and this has an impact on milling efficiency and the quality of the rice being produced. With the support of CAVAC, Baitong is aiming to introduce good quality seed in its catchment area of rice production to improve the quality of milled rice. In addition, Baitong will aim to build its capacity to conduct successful field demonstrations which demonstrate the impact of correct production methodologies for its rice producing community. CAVAC's intervention with Baitong focuses on providing technical assistance on rice seed and paddy production for selected export varieties. To stimulate this, CAVAC contracted a rice specialist to conduct training, including field demonstrations for selected company staff members. These trained staff will extend knowledge and practice to the Baitong rice production community. The activities of this intervention include: ▪ July – Nov 2012: Training in paddy production for a photosensitive rice variety (First) ▪ Nov 2012 – Feb 2013: Training in rice seed production (Second) and rice paddy production (Third) for a non-photosensitive variety ▪ July – Nov 2013: Training in rice seed production for a photosensitive variety (Last) ▪ Backstopping support
Achievements to Date:	All the above training activities were completed by the end of December 2013. The topics that were addressed in the training included: seed preparation; transplanting; replanting; insect and disease management; fertiliser application at the panicle initiation stage; roguing off-type plants; and harvesting and postharvest management. During the final training Baitong staff gave advice to farmers while reselecting and re-organising Baitong community members. Post-training feedback found that farmers thought the knowledge learned was very useful, and Baitong staff also informed their manager about this. Feedback suggests that they are prepared for the up-coming backstopping sessions. The work plan for backstopping the company's staff in their work within the community has been completed. However, the backstopping sessions have been delayed due to the resignation of three of Baitong's trained staff members in February 2014, and the promotion of another trained staff member to a higher position in a different department. Baitong recruited five new staff members with agronomic backgrounds in April 2014. CAVAC has since requested Baitong to draft a backstopping plan based on the company's needs and remaining duration in the contract.
Next Steps:	Prepare and implement a backstopping plan for the 2014 wet season.
Lessons Learnt:	Prior to working with a partner, CAVAC needs to ensure that: 1) the partner has a clear future plan on how to use knowledge from the intervention activities; 2) the partner has a committed team to work with CAVAC; and 3) the training program should be flexible enough to assist new trainees with gaps in their knowledge. Staff turnover slows down the progress of each activity because time is required to train newly recruited staff. To deal with this problem, a program intervention to develop an application such as a diagnostic tool or the like would be a better alternative to frequent staff training. With an application like a diagnostic tool, new staff members may need some limited training but it is likely to take less time. It would therefore be a good idea to introduce such a tool to companies that want to improve their embedded services to the farmers.

INTERVENTION UPDATE: Int. No: Mar 11.2 AWP No: 1.2 Date: 30 June 2014	
Name:	**Feasibility study of warehouse receipt system**
Summary:	Eighty per cent of Cambodian rice is produced in the wet season. During the harvest months traders from Vietnam and Thailand come to buy paddy, competing with Cambodian millers on price. Milled rice exported from Cambodia was assessed as approximately 60,000 tons per annum in 2010 which was equivalent to about 100,000 tons of paddy rice. To be able to reach the target of exporting one million tons of milled rice by 2015, approximately three million tons of paddy rice must be available for local millers. Therefore, the constraints in aquiring paddy (quality and quantity) are increasing. Having a consistent supply of paddy will help rice millers to best utilise their milling capacity throughout the year. According to the French Agency of Development's (L'Agence Française de Développement (AFD)) economic survey of the rice sector in Cambodia, Golden Rice and Baitong Kampuchea Plc. are the companies that have the highest usage of their milling capacity. However, the percentage of capacity utilisation of these companies is around only 30 per cent. Warehouse receipts provide farmers with an instrument that will allow them to extend the sales period of modestly perishable products well beyond the harvesting season. It also provides financial assistance for farmers. By producing warehouse receipts in designated banks, farmers will be able to access finance. Rice millers would therefore have a constant supply of paddy to utilise their milling capacity. This also eases rice millers' financial burden, as they would not need to buy paddy once in the harvest season to store for an entire year.
Achievements to Date:	▪ CAVAC has discussed with a few potential millers and exporters the possibility of CAVAC playing a facilitation role in implementing the warehouse receipt system. However, the discussions have not led to an agreement. The warehouse receipt system is new within the Cambodia context, and important players, such as millers, financial institutions, and farmers, are not ready for it at this point of time. ▪ Within the first semester of 2013, CAVAC also held follow-up talks with other development partners involved in this sector, such as the Helping Address Rural Vulnerabilities and Ecosystem Stability (HARVEST) and the International Finance Corporation (IFC), and learned that they had not yet taken further steps on the warehouse receipt system due to the uncertainty of the sustainability and ownership of the system – and how the benefits would be shared. ▪ Considering internal capacity and current market, CAVAC has decided not to work on this intervention.
Next Steps:	None
Surprises, Adjustments or Problems:	No agreement was reached. No player in the Cambodian rice export market seems ready to be involved in the warehouse receipt system.
Lessons Learnt:	

INTERVENTION UPDATE: Int. No: Mar 12.1 AWP No: 1.2 Date: 30 June 2014	
Name:	**Export promotion – support to the federation's market linkages**
Summary:	Cambodian-milled rice is new to international markets. Therefore, there are weak commercial linkages with international purchasers and poor understanding of international market requirements within Cambodia. Further, the Cambodian market has limited understanding of the quality standards of milled rice products required by international buyers, as well as the quality standards for processing facilities required to produce standard-compliant milled rice products. The continued push in export market development is expected to help contribute to the one million-ton milled rice export goal of the Cambodian Government by 2015. CAVAC is supporting efforts to increase knowledge of export markets through the facilitation of international networking opportunities both in Cambodia and abroad.
Achievements to Date:	CAVAC signed a contract with the Federation of Cambodian Rice Miller Associations (FCRMA) to increase its knowledge on rice export markets and build up its international business networks. Initially the agreement was to create linkages between FCRMA and European Union (EU) and United States (US) markets. This has now been amended to include all potential markets. A member of the FCRMA made a visit to Malaysia and hosted a buyer in Cambodia, and a number of sale agreements were reached. Further, a member and an adviser from the FCRMA visited seven countries in the EU and Singapore where they gained more knowledge on quality assurance and market requirements in those countries. Other FCRMA members have expressed their interest in joining trade visits to the EU, Australia and the US. CAVAC has also discussed with FCRMA members about opportunities to collaborate on other possible activities. Some have suggested marketing support such as website development. After a series of discussions both within CAVAC and with the FCRMA, CAVAC has decided to continue this export promotion facility for the FCRMA on the same basis as before, with any member of the FCRMA eligible to receive support up to 50 per cent of the costs. During the past six months, some FCRMA members contacted a group of business delegates in Seattle, United States of America, to organise a visit planned for May. The trip was delayed as members were busy with an election to form the management of the Cambodian Rice Federation.
Next Steps:	CAVAC is currently waiting for new proposals from FCRMA members.
Lessons Learnt:	CAVAC found that most FCRMA members did not participate in market development activities for the following reasons: ▪ business visits to foreign countries are expensive; ▪ most FCRMA members are suppliers to Baitang (the head of the FCRMA), as their individual production is not large enough for them to export on their own; ▪ lack of language capacity to communicate with buyers; and ▪ it is preferred that business meetings be conducted one-on-one with buyers, as each meeting usually discusses sensitive business information. FCRMA members have expressed some concern regarding the usefulness of the trips, as they only want to spend time and resources with potential buyers, rather than general buyers. They have asked CAVAC to advise them who the potential buyers are. As CAVAC has similar information regarding buyers as FCRMA, CAVAC asks buyers to decide destinations and submit proposals to CAVAC when found (on an ad hoc basis). Language barriers – and limited understanding of international trade and international marketing – could be a major constraint for exporters.

INTERVENTION UPDATE: Int. No: Inp 13.3 AWP No: 1.2 Date: 30 June 2014	
Name:	**Improving Golden Daun Keo Rice Mill's quality of paddy of export varieties**
Summary:	There are two types of rice which are attractive to large mills interested in exporting rice: the fragrant varieties generally aimed at the high end export markets, such as the US and Europe; and white rice usually targeted at less discerning markets. A key constraint in the export of both types of varieties is the lack of uniform seed, causing the purchase of mixed paddy which decreases the quality of the milled rice, and increases milling losses. To successfully export milled rice, millers need to ensure effective monitoring of all steps involved in the process, from paddy production to milling. This intervention was aimed at increasing the availability of quality dry season rice seed and modern wet season rice seed varieties to help ensure sufficient export quality rice. CAVAC's planned support to the Golden Daun Keo focused on capacity building on rice seed production for its technical field staff and contracted small seed producers; and post-harvest management for the company's mill technicians and paddy collectors.
Achievements to Date:	In 2013, CAVAC and the company discussed and agreed on an activity plan, cost-sharing options, the nature of collaboration, and the details of a confidentiality agreement. In this recent reporting period, the Golden Daun Keo decided to withdraw from this collaboration because the company did not have sufficient staff capacity to implement its plan with CAVAC.
Next Steps:	Commence search for new rice export partners.
Lessons Learnt:	Changes in a partner's internal operations can occur unexpected. Such changes can significantly affect the partner's workplan with CAVAC.

INTERVENTION UPDATE: Int. No: Inp 12.3 AWP No: 1.2 Date: 30 June 2014	
Name:	**Vegetable farmers' practice change – East West Seed International**
Summary:	The supply of locally-produced vegetables is often constrained by: the effects of seasonality; water shortage in the off-season; pest infestation; farmers' knowledge of inputs; production techniques; and ability to access appropriate knowledge. Productivity increases can be achieved by providing knowledge to farmers on: high-yielding crop varieties that adapt to the local climate; use of quality seeds; improved irrigation; modern production techniques; proper use of fertiliser and pesticide; and harvest and postharvest handling techniques. This information can be transferred through demonstration plots, on-site training, extension material development, or other methods through specialised seed companies and fertiliser or pesticide companies. To contribute to helping farmers achieve vegetable productivity increases, CAVAC is partnering with a large vegetable seed company, East West Seed International, to conduct vegetable demonstration plots (including coaching for farmers and their neighbours on growing techniques), field days, and training on insect and disease management for vegetable collectors and input retailers.
Achievements to Date:	▪ As of June 2014, 185 demonstration plots have been established and 157 are still active. ▪ 86 field days have been conducted in three provinces (Kandal, Kampong Cham, and Thboung Khmum (a former district of Kampong Cham and currently reformed as a new province) with 2,588 farmers participating. ▪ 34 input retailers have been reached and introduced to modern farming practices. ▪ 39 vegetable collectors have been trained on the advantages of seed coating, general crop management practices to produce better crops, and how to use guiding manuals for certain crops. ▪ 19 input retailers and 21 collectors in the three provinces were trained on pest and disease management. ▪ An informal evaluation of the first phase was jointly conducted by East West Seed and CAVAC in October 2013 to collect lessons learned to improve the second phase. ▪ In this reporting period, two studies were conducted: a mini-survey of input retailers' sale increase and a Knowledge, Attitude and Practice (KAP) survey on vegetable collectors and demonstration farmers in Kandal, Kampong Cham and Thboung Khmum. ▪ The mini-survey of input retailers' sale increase indicated that the products introduced by East West Seed (trellising nets, seedling trays, plastic mulches and improved seeds) have in general become more popular among input retailers. Retailers have brought the products for sale, however, about half of trained input retailers did not recall at least one of the introduced technologies. Thus the training for input retailers and vegetable collectors needs some modification to ensure that they gain knowledge to better advise farmers. ▪ The results of the KAP survey are being analysed and will be reported during the next period.
Next Steps:	▪ Monitor East West Seed's implementation of the current contract, until mid-August 2014. The current contract includes implementation of demonstration plots and training for input retailers and vegetable collectors. ▪ Discuss the possibility of a new contract and new activities to be included.
Lessons Learnt:	▪ Farmers in certain areas may already have some commercial opportunities and experience. These farmers tend to have less interest in the new technologies introduced and ignore the invitations to field days and other activities. This needs to be considered when choosing locations to conduct future interventions. ▪ Frequent and constant follow-up monitoring of the company's field staff is essential in ensuring successful implementation of field demonstrations. These activities can help solve farmers' problems in each cultivation season on time. ▪ Training sessions for input retailers and vegetable collectors should be topic specific, short, precise, and customized to fit the availability of participants. The company should also target smaller sized input retailers and vegetable collectors as these groups have time to attend the training and to provide advice to their customers and farmers.

INTERVENTION UPDATE: Int. No: Inp 12.3 AWP No: 1.2 Date: 30 June 2014	
Name:	**Vegetable farmers' practice change – Pacific Seeds**
Summary:	The supply of locally-produced vegetables is often constrained by: the effects of seasonality; water shortage in the off-season; pest infestation; farmers' knowledge of inputs; production techniques; and the ability to access appropriate knowledge. With the purpose of helping farmers to increase productivity, CAVAC intends to help farmers gain knowledge on high-yielding crop varieties that adapt to the local climate; use of quality seeds; modern production techniques; proper use of fertiliser and pesticide; and harvest and postharvest handling techniques. To achieve this, CAVAC, is partnering with Pacific Seeds, in addition to partnering with East West Seed International. The activities with Pacific Seeds focus on the introduction of modern techniques and inputs through conducting model plot demonstrations. This activity is followed up with training sessions at harvest in Kandal, Battambang, Pailin and Banteay Meanchey, and the distribution of associated training materials. Pacific Seeds' model plots and training sessions are conducted in order to demonstrate to input suppliers, vegetable collectors, and farmers the best use of inputs (seed, fertiliser and pesticide), cultivation techniques and how that contributes to the increase of farmers' income. Trained participants who obtain the knowledge are expected to pass on the information to farmers who are their clients and neighbours. Some farmers will also receive information through training materials disseminated by training participants. The activities will also allow the company to test the market (supply and demand) for vegetables and related inputs and contribute to the company's market entry plan.
Achievements to Date:	The company has already set up its representative office in Battambang, however it has not started implementing this intervention yet as it is still in the process of recruiting field staff to manage the demonstration plots and training activities. The contract is being amended and the project will be scaled down to suit the company's current capacity. The target locations to conduct demonstration plots will be changed from seven to four, and the target provinces of Siem Reap and Kampong Cham will be replaced by Pailin and Banteay Meanchey. The project end date will also be extended from July 2014 to July 2015.
Next Steps:	▪ Sign an amendment to the current agreement. ▪ Start implementing the model plot demonstrations and training at the selected locations by incorporating some of lessons learned from the intervention with East West Seed.
Lessons Learnt:	Understanding the situation especially within new target provinces is very important. As such, it will be useful for the CAVAC team to accompany Pacific Seeds' field staff at the beginning of the implementation to ensure the effectiveness of the activities.

INTERVENTION UPDATE: Int. No: Inp 12.7 AWP No: 1.2 Date: 30 June 2014	
Name:	**Vegetable seed retailer outlet training**
Summary:	Cambodian vegetable farmers interested in purchasing quality seed rely on seed produced in neighbouring countries which are supplied through local market distributors. While seed production requires detailed agronomic knowledge, seed distribution requires logistical understanding. The support market has developed in such a way that there is limited information exchange between distributors and retailers, and information on new varieties and agronomic practices are not effectively shared. To improve this, CAVAC is showing seed companies the benefits derived from providing retailer training, and presenting these activities to the resident seed companies to encourage them to continue the improvements sustainably.
Achievements to Date:	▪ A vegetable value-chain study was conducted. ▪ TNAs were conducted in Takeo and Kampot, and a training module was developed and improved. ▪ Retailers' knowledge of vegetable seed was assessed. ▪ An irrigation study was conducted to understand the 'lack of water' in vegetable production and to determine feasible activities to be included in this intervention. ▪ Four training sessions were delivered (one in Kandal province, one in Takeo, and two in Kampot). Three vegetable seed companies attended three of the four training sessions. In the other training session, three companies and one NGO attended. Two companies showed an interest in partnering with CAVAC: East West Seed International and Pacific Seeds. ▪ Impact assessments at both the support provider (trained retailers) and farmer levels were completed. Based on assessments prior to the training, 90 per cent of retailers interviewed did not give any advice on vegetable seed and production techniques to farmers because they did not have any practical or theoretical knowledge. After the training, about 20 per cent of these retailers gave advice without being asked by farmers, and almost all of them gave advice when farmers asked. Questions that farmers asked included the expiration date, germination rate, type of variety with good yield, and pest management.
Next Steps:	Ensure that lessons learnt are used in other interventions.
Lessons Learnt:	Most vegetable seed retailers tend to give advice only when farmers ask. This tends to happen mostly to regular or long-term customers but not to new customers. A session on advising vegetable seed retailers to share information with farmers should be included in future training so that retailers know the importance of advising new customers, not just their long term customers. Evaluations have revealed that farmers do not ask seed retailers questions or seek advice because they assume that retailers are only committed to their core business, and do not have the agricultural background to answer questions. Farmers also assumed that vegetable seed retailers do not have enough time to provide advice, particularly those for whom seed selling is not their core business. For example, when farmers were asked why they did not ask retailers questions, a few farmers responded that they thought those retailers had never been trained in vegetable growing techniques. However, if farmers know that the retailers have joined technical training sessions, farmers are more likely to seek their advice. Therefore, increasing awareness among famers that retailers are a possible source of information should be considered as part of CAVAC's intervention activities. CAVAC has also learned that vegetable collectors are an effective channel of information.

INTERVENTION UPDATE: Int. No: Inp 13.7 AWP No: 1.2 Date: 30 June 2014	
Name:	**Support to an integrated retailer UNI-MART**
Summary:	The vegetable market is complex and dynamic, and supply and demand can fluctuate. Vegetable growers tend to grow crops that they have the most experience in cultivating, or crops with expected high market value. For farmers to try and achieve good results in a new / unfamiliar crop, they must have access to good quality inputs and information on the appropriate use of those inputs. Currently vegetable producers cannot access quality information. Previous training on the use of vegetable seed provided to vegetable seed retailers increased the capacity of these retailers to inform producers. As the vegetable sector becomes increasingly professional, more specialised services and information will be required, including choices of varieties fitted for consumer preference and market prices. Currently these services are largely limited to inputs, but they will need to respond to the dynamics of the market. A UNI-MART is an integrated model of a retail store conceptualised in India, which acts as a training / advisory centre. The model benefits farmers whose first point of contact is a retail store. The UNI-MART handles seeds, other inputs and technologies (cultivation practices and control measures for major pests and diseases), in addition to other useful market information. In collaboration with CAVAC, Pacific Seeds starts a pilot UNI-MART in Battambang province, with the intention of replicating the model in other provinces if successful. This allows the company to test its market and demand for new products, while promoting its branding through consultancy services. It will also enable easier access to quality inputs, improved agronomic practices and better market information for farmers through their one-stop solution centre.
Achievements to Date:	▪ The Ministry of Commerce granted approval for the registration of UNI-MART, under the official name of "UNI-MART AGRI SOLUTION CENTER Co., Ltd." in April 2014. ▪ The company finished the office set up in Battambang, which included an office with training facilities, an advisory counter and a mobile training truck. Four staff members have also been recruited for the operation of this UNI-MART. ▪ The official launch of the UNI-MART was conducted on 21 June 2014, with participation from the Executive Director of the UPL Group (United Phosphorus Limited India and Vietnam), Pacific Seeds, local authorities, one local pesticide company, input retailers and cooperative farmers. ▪ A two-day training session on physiology and agronomic practice in sweet corn and sunflower cultivation, as well as agrochemicals were conducted for the four recruited staff members by the experts from Pacific Seeds (Thailand) and UPL (Vietnam). ▪ By the end of June 2014, the UNI-MART team has completed: o 24 farmer training sessions (16 in Battambang and 8 in Pailin); o 9 input retailer trainings (8 in Battambang and 1 in Pailin); o 6 corn demonstration plots (2 in Battambang, 2 in Pailin, 1 in Siem Reap, and 1 in Kampot); o 2 field days (1 in Palin and 1 in Kandal); and o over 5,000 copies of training materials handed out.
Next Steps:	Continue to observe Pacific Seeds' implementation of the UNI-MART and provide feedback for improvement.
Lessons Learnt:	

INTERVENTION UPDATE: Int. No: Inp 11.4 and 12.1 AWP No: 1.2 Date: 30 June 2014	
Name:	**Supporting a local pesticide company through capacity building for technical staff and information dissemination strategy development**
Summary:	Pests are a serious constraint for Cambodian farmers seeking to achieve high yields. Farmers, particularly commercial ones, use pesticides to target specific pests. While pesticides are used fairly regularly, it is commonly accepted that pesticide management among Cambodian farmers needs to be improved. One of the major constraints for the uptake of pesticide management amongst Cambodian farmers is a lack of knowledge on pesticide management within the pesticide market. The pesticide market covers a broad spectrum of actors such as farmers, pesticide companies (and their information service staff), retailers and the PDAs. CAVAC has found that most pesticide distributors are local companies whose in-house technical expertise is limited. As such, information distribution from companies to retailers and farmers on pesticide management could be significantly improved. To improve this information flow, CAVAC entered into a partnership with Nokor Thom Agricultural Development – a local pesticide company which imports pesticides from Vietnam for distribution within Cambodia. The company has always understood that information services are a strong component of product marketing. CAVAC's first intervention with Nokor Thom was conducted in 2011. That intervention focused on capacity building for the company's information agents, as those agents were known to have limited practical knowledge on pesticide management. Given the dynamics and increased competition within the pesticide market, Nokor Thom requested support from CAVAC to develop a clear information dissemination strategy in order to establish a strong position in the market. CAVAC hired an international consultant to design the strategy, which was completed in early 2013.

Achievements to Date:	▪ Capacity building for Nokor Thom's information service providers was completed in November 2011. This capacity building intervention was a joint training session provided by Cambodian and Vietnamese trainers from Nong Lam University. The training was composed of in-class lectures, two field trips within Cambodia and a field trip to Vietnam. Seven case studies on farmers' receiving information services directly from Nokor Thom's information service providers were produced.
	▪ CAVAC's M&E team conducted an assessment on the satisfaction of Nokor Thom's staff trained under the capacity building intervention. In general, the company staff were satisfied with the training.
	▪ The company has seen changes following the capacity building project. In early 2012, Nokor Thom decided to double its sales volume. It then recruited more technical staff, improved information system materials, expanded information system activities and improved packaging for products.
	▪ The information system strategy for the company was developed by an international consultant and completed in early 2013. Nokor Thom is happy with the strategy and committed to incorporating most of the recommendations into its implementation.
	▪ In August 2013, a small assessment was conducted with the company staff, pesticide retailers, PDAs, and farmers to collect more information on the potential impact of the staff capacity building intervention. Below are some results of the assessment:
	  ▪ The company's field staff have gained more knowledge in pest management.
	  ▪ The company's information services were not very satisfactory. Only 25% of retailers who were coached received knowledge on pest control, as the coaching was done very quickly using leaflets. Farmer meetings have also led to a very small change in farmers' practices because they were not conducted effectively. Emergency interventions have generated pretty good impact. Farmers receiving emergency services were satisfied with the services. For field demonstrations, it was hard to meet with farmers who conducted field demonstrations. One farmer with whom CAVAC met was very satisfied with the effectiveness of Nokor Thom's product in controlling pest.
	▪ An assessment on the information dissemination strategy at the company level was conducted in September 2013. The information dissemination strategy recommendation framework is still a precious resource for the company and it will stay valuable for the company in the long term.

Next Steps:	▪ Continue monitoring Nokor Thom's implementation of the recommendations from the information dissemination strategy and keep observing changes made at Nokor Thom due to CAVAC's support. ▪ Prepare for M&E activities at the farmer level for the capacity building intervention.
Lessons Learnt:	Due to lack of domestic experts in pest management, Vietnamese trainers were selected for the Nokor Thom staff training. Training materials were not translated in advance for trainees. The training quality would have been even better had the materials been translated into Khmer beforehand. Providing one-off capacity building to field staff is not sufficient. Based on this experience, companies operating in the pesticide market need to ensure that core staff keep gathering information from field staff, and that they continue to research in order to find solutions to continuously train and support field staff. This is crucial because farmers continue to face new problems or new disease breakouts in the field.

	Nokor Thom was started as a family-owned business. Many parts of its operations need to be adjusted in order to accommodate the recommendations from the information dissemination strategy. As a result, Nokor Thom could not incorporate all the recommendations into its implementation as planned and expected. To speed up the process, Nokor Thom needs further support. Nokor Thom understands that there is vast information in the field including lessons that can help the company improve its information system activities. Nokor Thom has shown interest in M&E system development, as it had learned how M&E could provide useful business information.

INTERVENTION UPDATE: Int. No: Inp 12.2 AWP No: 1.2 Date: 30 June 2014	
Name:	**Supporting a pesticide company to provide better training to farmers**
Summary:	In Cambodia, farmers' knowledge of pesticide application remains basic. Consequently, most farmers do not apply pesticide on their crops appropriately, which results in significant yield loss and / or large pesticide costs. CAVAC found that major market actors (such as private companies, PDAs, and retailers) had limited knowledge of pest management and their method for distributing information to farmers needed improvement. The pesticide market in Cambodia is dynamic. There are many companies which recognise the importance of embedded information to provide this knowledge to farmers. Most private companies conduct direct farmer meetings, and SPK (a local pesticide company that imports pesticides from Vietnam) was one of them. However, facilitating a high quality farmer meeting is known to be a challenge for most companies. To help address this challenge, CAVAC and SPK worked together to improve the quality of information system materials and staff capacity in farmer meetings. At the time of implementation of this intervention, farmer meetings / training was a major information service of SPK. It was expected that after the intervention, SPK would be able to conduct more effective farmer meetings, which would lead farmers to alter practices which would result in yield increases. Consequently, trained farmers would have more confidence in using SPK's products, which in return would result in an increase in company sales. SPK would increase profits from its sales due to embedded information services, and it would continue to improve and update its information services – thereby contributing to the sustainability of the intervention. Since January 2014, SPK has stopped implementing farmer meetings due to the difficulty of inviting farmers to join the training. Instead, the company has turned to a strategy based on "Standby at Retailer Store" activity, in which staff help to diagnose the problems of farmers coming to the store and then recommend appropriate SPK products. Another new activity increasing replacing farmer meetings is field days. CAVAC has therefore decided to stop our M&E activity at this stage.
Achievements to Date:	▪ The GDA of MAFF reviewed SPK's information system materials and provided comments. SPK then updated its information system materials based on GDA's comments. The updated material was approved by the GDA, and much of it was printed. ▪ One half-day training of trainers (TOT) session on new training materials and methodology for SPK field staff was conducted in December 2012. An assessment was then conducted in January 2013 to see how well SPK staff could perform in farmer meetings after the TOT. The result was not satisfactory; it was found that field staff still lacked confidence, as their knowledge on pest management and the participatory approach remained very limited. ▪ In August 2013 a small assessment at the company level (SPK field and management staff) was conducted. It was suggested that training materials and methodologies need to be improved. ▪ CAVAC observed two farmer meetings of SPK to obtain the overall understanding and quality of the activities conducted. Although some parts need to be further improved, the meetings were acceptable in quality (in a sense of the product push nature) with a good impression from farmer participants. ▪ In April 2014, an ad hoc assessment was conducted at the farmer level with a sample of 30 farmers, in order to capture the effectiveness of SPK's farmer meetings in terms of farmer practice change in Prey Veng and Takeo. The study found that about 86% of farmers interviewed were satisfied with the meetings, and 30% of trained farmers have changed to use SPK's products, particularly herbicide. 89% of trained farmers who have changed practice were direct users of pesticide. Nevertheless, CAVAC also found that some farmer meetings reported by SPK did not actually happen.
Next Steps:	▪ Meet with SPK management staff to understand how they have used the printed information system materials and knowledge gained from CAVAC training in its current information services. ▪ Follow up on the printing of leaflets. ▪ Continue to be open to SPK's request for further support. ▪ Write up an intervention summary report to wrap up the intervention.
Lessons Learnt:	A half-day orientation session is not sufficient to enable a company's staff to conduct participatory training for farmers. Moreover, solid knowledge of pest management is very important; otherwise, field staff cannot educate farmers beyond the training materials and methodology. A longer training session should be considered for future staff training to cover essential aspects of both technical knowledge and participatory methodology. CAVAC had difficulty in locating farmers for interviews because many farmers could not remember whether they had joined SPK farmer meetings as they had attended many similar meetings. In the future, CAVAC should consider creating a distinctive feature of a particular information service of the company so that farmers can distinguish the company's activity from that of its competitors. In addition, that distinctive feature can be a crucial point contributing to the success of the activity as well as it stands out from other similar activities in the market. From the farmer KAP assessment, we can infer that a meeting with direct users of pesticide is more successful than a meeting with non-direct users. Hence, a company should be as selective as possible

	when inviting farmers to participate in any information service.

INTERVENTION UPDATE: Int. No: 12.13 AWP No: 1.2 Date: 30 June 2014	
Name:	**Supporting a pesticide company in its pesticide wholesaler / retailer training**
Summary:	CAVAC's field interviews with farmers determined that the proper use of pesticides remains an important issue among farmers. Farmers lack even the most basic information, such as: which pesticides are appropriate for which pest; when in the pests' life cycle should farmers apply pesticide; what doses are required to be effective; which pesticide mixes are safe; what is the correct re-entry after spraying; and during which pre-harvest period it is best not to spray. Both farmers and pesticide sellers realise that it is important to receive and supply instructions on the usage of pesticides. However there is still a limitation in pesticides knowledge from the sellers' side. This makes it difficult for sellers to convey the right message to farmers even on safe product use, let alone explaining the techniques in using any specific product. CAVAC's intervention intends to assist An Giang Plant Protection, a pesticide company in Cambodia, in training its wholesalers / retailers in the following content: ▪ Pest identification; ▪ Techniques in pesticide usage (timing and amount, etc.); ▪ Safe product use; ▪ New policies on pesticides, i.e. penalties on selling illegal / banned pesticides; ▪ Ethics in the pesticide business; and ▪ Business case of providing information to farmers. Regarding the above-mentioned content, trainees will be able to understand technical, legal and business aspects of pesticides and will therefore be better equipped to convey clear and accurate messages to end users (farmers). With the right approach used in applying pesticides, farmers can decrease their yield loss resulting from pests, insects, and diseases, etc. In addition, farmers' increased knowledge on the benefits and the importance of information from the sellers will create more demand for information linked to sales, which will further generate better information services.
Achievements to Date:	▪ The agreement between CAVAC and An Giang was signed in January 2014. ▪ A training needs assessment (TNA) was conducted. ▪ CAVAC and An Giang agreed to assess An Giang's previous training to find what could be improved in the up-coming joint retailer training activities. The assessment looked at the curriculum, methodology and participants' satisfaction. An assessment was conducted and a conclusion was drawn jointly with An Giang. ▪ Training materials were developed by An Giang with comments from CAVAC. Picture booklets and posters were printed out. ▪ A session plan for the training was developed by CAVAC's consultant on participatory approaches. ▪ An orientation on the training session plan and the "business case" topic (the incentives for retailers to do information services) was conducted for An Giang's trainers. ▪ Six retailer training sessions have been conducted. ▪ Improvement on the training materials and training methodology was done continuously after each of the six training sessions.
Next Steps:	▪ Continue monitoring training conducted by An Giang. ▪ Continue conducting feedback sessions with An Giang trainers.
Lessons Learnt:	An Giang assessed its training curriculum, materials, and methodology as fairly strong. However, a joint assessment was needed to confirm this and to collect lessons in order to improve new training activities. This approach can also be adapted in other similar situations.

INTERVENTION UPDATE: Int. No: Inp 13.4 AWP No: 1.2 Date: 30 June 2014	
Name:	**Pesticide retailer training in partnership with PDAs**
Summary:	Pest control contributes significantly to reducing yield loss of rice farmers. As such, pest management has been identified as one of the main constraints for Cambodian rice farmers. Most farmers believe that only pesticide application can minimise their rice yield loss. With limited knowledge of good pesticide use, farmers use whatever they can find without any solid foundation. The current practice can lead to many negative side effects, such as ineffective pest control, environmental impact, and health issues. It was observed that when farmers faced a pest outbreak, the main sources of support for pest control were retailers, who provide both prescription and product supply. However, a number of research activities found that retailers' knowledge on pesticide use was limited and led to inappropriate recommendations on pesticide use to their clients (farmers). As stated in Sub-decree 69 as well as in a new law on Chemical Fertiliser and Pesticide Management, all pesticide wholesalers / retailers must be licensed by MAFF before conducting any business within Cambodia. To obtain a license, pesticide wholesalers / retailers are required to attend a training course organised by PDAs to ensure that wholesalers / retailers are knowledgeable in pesticide application. To date, PDAs have conducted some training sessions for pesticide wholesalers / retailers; however, their training curriculum is predominantly based on pesticide legislation, storage, and management. Technical knowledge on chemical control for pest management is not included in the training curriculum. The absence of this critical information is due to the fact that there is not a widely approved technical manual at the ministry level. CAVAC is working with the GDA to develop a Rice Pest Management Manual. The manual is expected to provide detailed technical knowledge on chemical control of major pests, including practical identification of pests, the types of pesticide to be used, when to apply pesticide based on the pest development cycle and suitable time of day, how much to use, and how to apply. The manual is used to develop training materials and methodologies for pesticide retailer training to be conducted in partnership with PDAs. This retailer training is different from the retailer training conducted by pesticide companies. Pesticide companies focus on their products, but the retailer training focuses on the active ingredient needed in pest control. The training curriculum includes general information, such as pest identification, pest morphology, life development cycle of pests, symptoms of destruction, and active ingredients to be used with each major pest, timing of pesticide spraying, and field practice. It is expected that this intervention will provide comprehensive and neutral knowledge to pesticide wholesalers / retailers so that they have knowledge on pest management to recommend to farmers. Moreover, a technical manual on good practice of pesticide use and the training materials and methodology for major pest training will be developed for stakeholders (agricultural officials, non-governmental organisations (NGOs), private companies, and development programs). PDA teams working on this intervention will become good local sources of knowledge linking to retailers as well as farmers.
Achievements to Date:	▪ The Training Needs Assessment (TNA) was conducted in the three provinces and the results of the TNA were agreed between CAVAC and the PDA teams. ▪ The GDA's Rice Pest Management Manual is being finalised. Several workshops were conducted to review and improve the quality of the manual. This manual has also been used as a reference to design the training curriculum for this joint pesticide retailer training with the PDAs. ▪ A list of common pest problems for retailers and farmers was produced based on the TNA and shared to the three PDA Directors. ▪ CAVAC also provided two technical training sessions on the pesticide for Kampot and Kampong Thom PDAs and one training session on the participatory methodology for Kampong Thom PDA. ▪ The three PDAs and CAVAC agreed on the final training curriculum, training plan and schedule. ▪ An orientation was conducted by the technical consultant on the pesticides for the consultant selected to conduct this training and the consultant on participatory approaches.
Next Steps:	▪ Work with district agricultural officers to conduct the training. ▪ Keep conducting feedback sessions after the training in order to improve it.
Lessons Learnt:	In the TNA, some wholesalers / retailers expressed high expectations from the training. To meet these expectations, more focus needs to be put on the quality of the training. Before the TNA, CAVAC and the PDAs planned to invite all pesticide wholesalers / retailers to join this training. However the finding from TNA indicated that it is better to invite only wholesalers / retailers who are willing to join the training.

INTERVENTION UPDATE: Int. No: Inp 13.5 AWP No: 1.2 Date: 30 June 2014	
Name:	**Supporting a local pesticide company in implementing its information dissemination strategy**
Summary:	Nokor Thom is a local pesticide company importing pesticides mainly from Vietnam. CAVAC previously supported Nokor Thom in staff capacity building (Inp 11.4) and information dissemination strategy development (Inp 12.1). With its strong intent to optimise the benefits of embedded information services, Nokor Thom approached CAVAC again for further collaboration. The new agreement has been signed, and this new intervention encompasses the company's key staff capacity building, development of a diagnostic tool, improvement of feedback systems, and farmer meeting improvement.
Achievements to Date:	▪ A new agreement between CAVAC and Nokor Thom has been signed. ▪ The pest identifying / diagnostic tool has been developed and tested several times with both technical staff of Nokor Thom and farmers. Improvement has been made to the tool after each testing to ensure that the tool works. Nokor Thom's staff tested the diagnostic tool with farmers and are satisfied that it works well. The tool has now been further developed so that it can be accessed through handheld Android devices. ▪ Factsheets for the diagnostic tool were sent to Nokor Thom to add the information on how the company manages each type of pest. By the end of June 2014, Nokor Thom had completed some of the factsheets. ▪ Nokor Thom and CAVAC also met to discuss the plan for other activities.
Next Steps:	▪ Ensure the final versions of all factsheets from Nokor Thom are added into the diagnostic tool. ▪ Ensure that the diagnostic tool is installed in Nokor Thom's tablets and provide training on the diagnostic tool use. ▪ Work with Nokor Thom to implement other activities in the agreement.
Lessons Learnt:	

INTERVENTION UPDATE: Int. No: Ext 11.1 AWP No: 1.2 Date: 30 June 2014	
Name:	**Support to a media agency to produce a quality agricultural TV program (drama)**
Summary:	Cambodia television tends to feature popular Korean dramas, especially during peak viewing times. A large percentage of the peak viewing audience lives in rural areas. Whilst Korean dramas are popular with this segment of the population, rural Cambodian viewers are also keen to watch programing which provides important information relating to their livelihoods. CAVAC is helping an entertainment management firm – Delight Cambodia – to produce a quality entertaining agricultural drama, which would service a rural audience interested in both agricultural information and entertainment. Instead of sponsoring Korean-made dramas, advertisers would have a chance to promote their products through a national drama program and build their brand, especially among rural customers. At the same time, a production house like Delight Cambodia can generate income from the activity. Pending successful implementation, this business model could be easily replicated within Cambodia. CAVAC, therefore, expects to see a similar focus on the rural population from other production houses in the future. Ultimately, this will assist farmers to acquire additional agricultural information from a number of sources.
Achievements to Date:	**Support has been provided to Delight Cambodia through:** *Capacity building on agriculture knowledge* – In 2011 CAVAC supported Delight to conduct several field visits and meetings to acquire agriculture knowledge. This included: one exchange visit to model farmer training; a linking meeting with various stakeholders within the agricultural sector; the Second National Farmers' Forum Consultation; and an exchange visit to Vietnam to understand the technical use of pesticides and agricultural production. *Assistance with basic technical agriculture knowledge for script development* – In late 2011 the research team of Delight, with support from CAVAC, travelled to 10 provinces within Cambodia to undertake focus group discussions with different farmers to better understand their agricultural practices for script development. This included farmers who grew vegetables, rice and fruit trees, and raised chickens and pigs. In January 2012, the research team briefed the script writing team about the information that they had collected so that the writing team could script a pilot drama video. *Capacity building on media production* – In January 2012 two technical production staff from Delight enrolled in a five-week media training session in London from 25 January until 1 March 2012. This media training focused on media production techniques. *Production of two 20-minute pilot drama episodes* – The script for two pilot drama episodes was agreed by Dr. Mak Soeun, Director of the Department of Agricultural Extension (DAE) of MAFF in June 2012 and shooting was completed in October 2012. In December 2012, Delight showed these two pilot episodes to some farmers in six provinces of Cambodia for feedback. Delight, after getting feedback, finished the first two episodes successfully by the end of 2012. To ensure the reliability of the quality of Delight's drama, CAVAC hired an external company, TNS Global, to do an evaluation of the drama. In July 2013, TNS Global conducted focus group discussions (FGDs) in Takeo, Kampot and Battambang to seek feedback from farmers on the drama. The result showed full satisfaction from farmers. In October 2013, Delight finished writing storylines for 40 episodes. Delight also conducted an event to show the drama to potential sponsors. The TNS Global's evaluation results were also presented during the event. The turn-out to the event was smaller than expected, however attendees expressed significant interest in sponsoring the drama. During the current reporting period, Delight continued to present the drama to potential sponsors. To date, Delight has found several sponsors - including a microfinance institution, a pesticide company, a soft drink company and others – to finance part of the production costs for 27 episodes. Delight has since approached CAVAC to seek support for the outstanding costs. CAVAC has agreed to provide further support. In May 2014, Delight signed a contract with MyTV to air 27 episodes of the drama on Mon-Tue-Wed nights (6-7pm), starting from August 2014. MyTV is the most viewed Cambodian channel during the proposed time slot, according to TV program rating research conducted by Feedback Research. In June 2014, Delight started shooting additional episodes of the drama.
Next Steps:	▪ Monitor Delight's production of additional episodes of the drama. ▪ Monitor the airing of the drama on MyTV to see how much sponsorship and popularity Delight receives, and calculate the program's profitability. ▪ Monitor 'crowding-in' to ascertain whether this business model has been copied by others.
Lessons Learnt:	Within Cambodia's current media market, the quality of the drama produced by Delight is considered to be outstanding. However, TV stations also produce dramas themselves, generally of lower quality to that produced by Delight. Production costs are generally less on these lower quality dramas, and as a result, advertisers spend less on advertising. This creates a challenge for Delight to find sponsors who are willing to pay higher sponsorship costs. Nevertheless, Delight has so far found more sponsors than what was initially anticipated by CAVAC. This indicates that advertisers see the quality of Delight's product and value in sponsoring it.

INTERVENTION UPDATE: Int. No: Ext 13.1 AWP No: 1.2 Date: 30 June 2014	
Name:	**Support to media research companies**
Summary:	The potentiality of the rural media market is unknown because there is no research on the rural audiences' media consumption. This prevents media houses from investing in quality programs for the rural audiences and hinders potential sponsors from investing in advertising. The lack of information on rural audiences' media consumption also makes it hard for advertisers to effectively place their ads and therefore makes them reluctant to invest in advertising on the mass media. There are many factors which have resulted in a lack of research in to rural media consumption; however, one of the main barriers for many research companies is the high cost, given that there are few consumers interested in buying and using the research findings. To solve this, CAVAC is looking to share these risks so that one or more research companies can kick-start research services that disaggregate the urban and rural population. By making information available to TV stations, advertising agencies and potential advertisers, it is expected that the commercial media market for agricultural programs will become more functional and will assist in the creation of commercial programming. This will be more responsive to the needs of farmers and those of the agricultural input companies, allowing them to select programs and timeslots that are of interest to their target audience. Farmers will then have access to more relevant and improved agricultural information, which will lead to improving their knowledge and skills. CAVAC has found two interested research companies to partner with on media research. CAVAC has been working with Indochina Research Limited (IRL) and Feedback Research to conduct the media consumption research and TV ratings, respectively, in the rural areas.
Achievements to Date:	**IRL** Under a cost-sharing agreement, CAVAC has been supporting the IRL to conduct media consumption research in Kampot, Prey Veng, and Svay Rieng, focusing on rural and remote areas for data collection. The agreement includes two waves of research, with the first wave of research conducted in June 2013. The results of the first wave of research were presented to potential buyers in September 2013, including input for companies that were interested in the rural market and media outlets. So far, the IRL was able to sell its research to seven buyers and use the results of this research to inform its other research activities and reports. In May 2014, the IRL collected feedback from its clients. Feedback will be used to improve the next wave of research. In June 2014, the IRL finalised its questionnaires for the second wave of research, and started the research process. **Feedback Research** Under a cost-sharing agreement, CAVAC is supporting Feedback Research to conduct TV rating research in Siem Reap, Kampong Cham, Preah Vihear, Kampot, Svay Rieng, and Battambang. This agreement includes four waves of research. In September and October 2013, Feedback Research completed the first wave of the TV rating research. After talking to various potential buyers, Feedback Research was able to sell to some of the research. In April 2014, Feedback Research boosted interest from the target clients on its first rural TV program rating by advertising on newspapers, magazines and the social media.
Next Steps:	▪ Together with Feedback Research, hold an event to officially launch the first wave of TV program rating. ▪ Together with the two research companies, further develop sales channels, as well as plan for and implement the next waves of research. ▪ Monitor the changes in sales between the two waves.
Lessons Learnt:	The two research companies did not initially anticipate that it would take much time to move from one wave of research to the next. However, in reality it took a significant period of time after the end of the first wave before starting the second wave. This was due to a number of internal corporate factors. For example, IRL had to find ways to sell its research; to collect feedback from the clients; and to improve the questionnaire before commencing the second wave of research.

INTERVENTION UPDATE: Int. No: Ext 10.3 AWP No: 1.2 (Previously 3.2) Date: 30 June 2014

Name:	**Activities with model farmers to improve role and knowledge of model farmers**
Summary:	Through extensive literature review and field discussions / observations with farmers, CAVAC realises that innovations in farming communities start with innovative farmers who try new ideas and technologies; and their successful innovations are then passed down to other farmers. As an agricultural development program, CAVAC aims to support and stimulate innovation in rural communities throughout its three target provinces. To fulfil this objective, CAVAC has implemented model farmer training, through which CAVAC continues to learn from the process, thereby improving its implementation. A fertiliser KAP survey with 1,200 samples and a study to redefine CAVAC's strategy with model farmers were conducted in early 2013. These have informed a redesign of model farmer activities which tailors different training activities for different types of model farmers. CAVAC has designed several interventions for both wet and dry season model farmers. For wet season model farmers, the fertiliser KAP survey indicated that the yield of trained farmers was higher than that of non-trained farmers. This showed the importance of wet season model farmer training, and as such, CAVAC decided to continue implementing the training for wet season model farmers. The training is not intended to provide specific fertiliser recommendations, but rather basic knowledge for model farmers to try new ways of applying fertiliser through their own yield optimisation process. The content of the training is being made modular, enabling the content to readily reflect local requirements, including modules on fertiliser, pest and disease control and weed control. For dry season model farmers, the study showed that there were limitations to the previous training model. Findings indicated that a group of model farmers were intrinsically innovative when thinking of the future of farming. This group has been defined as Super Model Farmers. To support, stimulate and disseminate innovation within this group, CAVAC has a long-term plan to collect and disseminate their innovation stories through roadshows and printed materials. Other options for better information dissemination include the use of 'challenge fund' activities and competitions. With the challenge fund, selected farmers with innovative ideas receive financial support from CAVAC to assist them in conducting their experiments. Input companies are to be engaged, in order to facilitate competitions among farmers who have innovative approaches to agriculture.
Achievements to Date:	**Wet season** Nine model farmer household trainers were trained in participatory teaching and rice production techniques, enabling them to conduct day-to-day training in the three CAVAC target provinces. The team started implementing training for model farmer households in April 2011. In 2013, CAVAC started modifying the training content and tailoring it towards only wet season model farmers. The content on nutrient management was modified and shortened. The findings of the Fertiliser KAP Survey were incorporated in the training content. The information on the pesticide application was also included. The new training materials were tested several times and use of farmers' terminology was ensured. Between January and June 2014, 130 training sessions using modified content and methodology were conducted: 45 in Takeo, 40 in Kampot and 5 in Kampong Thom. Since the start of the model farmer training program, 1,324 training sessions were conducted: 473 in Takeo, 419 in Kampot and 432 in Kampong Thom. In average, members of 10 households attend each training session. So far, there have been 15,411 model farmer households attending the training. For each modified training session, pre and post training evaluations are conducted (with a total sample size of 280 surveys) to capture an increase in farmers' knowledge and to further inform adjustments in the training. Based on the evaluations, 75% of trained	**Dry season** *Roadshows:* By 31 June 2014, CAVAC had conducted 14 roadshows: 6 in Takeo, 4 in Kampot and 4 in Kampong Thom. Roadshows highlight 18 successful innovation stories collected in 2013. In each roadshow, selected model farmers act as agents of knowledge transfer to model farmers. Each roadshow's content and materials have been continuously modified and updated to maximise the knowledge captured by model farmers. For each roadshow, pre and post evaluations have been conducted to capture change in farmers' knowledge and to further adjust the content of the roadshows. The evaluations indicated that 90% of the model farmers who join the roadshows have gained knowledge. *Challenge Fund:* As an outcome from engagement with two external consultants, eight farmers were selected in May 2014 to implement activities from the 'challenge fund': three from Takeo, three from Kampot, and two from Kampong Thom. One of the eight farmers was excluded from the activity in June 2014, due to non-compliance with the proposal and fund requirements. The 'challenge fund' topics revolve around rat control techniques during the dry-season rice cultivation season. Monitoring is ongoing throughout the season to measure the effectiveness of farmers' implementation of the challenge fund activities, and to capture the success and lessons learned from their experiments.

	model farmers have gained knowledge on fertiliser use and 78% of trained model farmers have gained knowledge on pesticide use.	*Competition:* Proactive engagement with input companies in order to facilitate the competitions among farmers has been in progress. It is expected that engagement with the private sector will help to ensure the sustainability of farmers' agricultural innovation.
Next Steps:	**Wet season** ▪ Publish training materials and discuss the content of those materials with input companies. ▪ Continue conducting wet season training for model farmers. ▪ Continue improving training materials, methodology and curriculum for wet season model farmer training. ▪ Publish modified training materials if necessary. ▪ Measure the impact of wet season model farmer training and seek to understand knowledge transfer mechanisms from model farmers to farmers.	**Dry season** ▪ Further collect innovation stories of Super Model Farmers, and continue conducting roadshows. ▪ Modify and update current innovation stories for roadshows. ▪ Develop booklets of collected successful innovation stories for roadshows. ▪ Continue monitoring the challenge fund activities being implemented by farmers. ▪ Capture the success stories or lessons learned from the 'challenge fund' for the roadshows' stories. ▪ Execute the 'competition' initiative with input companies on selected agricultural techniques, particularly rat control and labour saving. ▪ Measure the outcome and impact of the roadshows, challenge fund and competition.
Lessons Learnt:	The previous model farmer training was designed based on the information CAVAC understood would be useful to farmers (supply-driven). The training has now been redesigned to incorporate farmers' demand for information. This has been done in a more radical manner for the dry season than the wet season due to the dynamic nature of dry season farming. Previously, CAVAC conducted training by giving visual presentations using posters as a guide. In the modified training, CAVAC gives presentations using A3 size posters with facilitators sitting close to trainees. The new approach seems to be more effective with participants more actively engaged in the discussion.	

INTERVENTION UPDATE: Int. No: Ext 11.2 AWP No: 1.6 (Previously 3.2) Date: 30 June 2014	
Name:	Support to MAFF for extension materials
Summary:	The objectives of this intervention are to develop stronger linkages between permanent sources of information (GDA, DAE, and CARDI) and input suppliers and agribusinesses through the publication of science-based materials to support stronger rice productivity.
Achievements to Date:	CAVAC has continued to support MAFF in printing extension materials that MAFF considers as priorities. In this January-June 2014 period, CAVAC supported MAFF in printing booklets on vegetable production techniques and booklets on how to use a drum seeder.
Next Steps:	Continue supporting MAFF in printing its priority extension materials.
Surprises, Adjustments or Problems:	
Lessons Learnt:	

INTERVENTION UPDATE: Int. No: Ext 11.3 AWP No: 1.2 (Previously 3.2) Date: 30 June 2014	
Name:	**Assisting training and information system support providers with training materials, capacity building and promotion**
Summary:	Farmers' limited knowledge is a key constraint for rice productivity in Cambodia. Farmers access information through several channels: public, private, and NGOs. The quality and the capacity to deliver information are still limited. Changing government strategies towards improved agricultural information systems also requires adjustments of information system materials. The activities of this intervention include: ▪ CAVAC investigations into services that NGOs or public providers are likely to deliver, and whether CAVAC can support quality improvements. ▪ Sharing of CAVAC materials, and support for capacity building when requested, and when this support is likely to be sustainable. ▪ CAVAC's provision of start-up support to private institutions.
Achievements to Date:	Training materials and methodologies developed by CAVAC have been adopted by the PDAs of the three CAVAC provinces, a local school (ABC) and six development partners: including Srer Khmer, Minority Organisation for Development of Economy (MODE); Farmer Livelihood Development (FLD); Gesellschaft für Internationale Zusammenarbeit (GIZ); VVOB Cambodia working with Kandal PDA; and Helping Address Rural Vulnerabilities and Ecosystem Stability (HARVEST). CAVAC has not provided any soft copies of information materials to NGOs over the period from January to June 2014.
Next Steps:	CAVAC remains open to requests from NGOs, agricultural technical schools, and other development projects to use CAVAC's information system materials.
Lessons Learnt:	

INTERVENTION UPDATE: Int. No: Ext 11.5 AWP No: 1.2 (Previously 3.2) Date: 30 June 2014	
Name:	**Linking events**
Summary:	CAVAC's Linking Event intervention aims to develop stronger links between permanent sources of information, such as: PDA and the Cambodian Agricultural Research and Development Institute (CARDI); input suppliers; agribusinesses; and model farmer households. As such, CAVAC has hosted three provincial events to create linkages between model farmer households and other sources of information in order to support stronger rice productivity within the farmer community. Additionally, access to knowledge is likely to improve, and if linkages are made from these events, sustainable access to better support, markets and information may be achieved. CAVAC had conversations with several private event organisers to negotiate the possibility of getting the events organised in a commercially viable way; to stimulate sustainable, systemic change. However, due to the high costs of the events, private event organisers were not willing to manage these events themselves. As such, CAVAC will continue to pay for these activities as the purpose of the intervention is to build networks among all actors within agricultural input markets. A key output of the events is to build strong networks, which negates the need to conduct commercial events regularly. The strong relationships between the permanent sources of information and model farmers significantly contribute to the sustainability of the information channel from model farmers to other farmers. CAVAC has decided to embark on a new program of linking events in 2014 to support model farmers in their information networks.
Achievements to Date:	A one-day linking event was held in each of the three CAVAC target provinces: in Kampot on 31 August 2011; in Takeo on 10 February 2012; and in Kampong Thom on 24 February 2012. Each linking event successfully attracted between 350-500 model farmers, 40-80 local retailers and 22-33 input supply companies. Lessons learned were recorded for future linking events. In the first half of 2013, CAVAC conducted a survey with 32 model farmers who had joined the linking events to understand their satisfaction with the events and interaction with companies. The result shows that 80 per cent of model farmers have contacted companies whom they had met at the event, and have requested further events. In November 2013, CAVAC conducted a discussion with 17 input companies on linking events. The discussions indicated that the events were viewed positively, and those that had attended previous linking events gave several suggestions to consider for future events. Some feedback suggested, for example, that the events should be open to the public. While companies appreciated the format of the events, some suggested minimising activities such as long speeches, comedy shows and songs. Some companies suggested that the events be conducted in other provinces besides CAVAC's target provinces, such as Battambang, Prey Veng, Pursat and Banteay Meanchey. After analysing various suggestions from input companies, CAVAC chose to conduct linking events in its target provinces and to add some new features to the events. The 2014 events will focus mainly on interactions between trained model farmers and representatives of input companies. The interactions will be enforced through facilitators who encourage discussions and networking. An event organiser, Hybrid Advertising Company, was contracted to conduct the event in 2014. The company was introduced to the three PDAs, and they discussed together the features of the events and clarified each group's roles and responsibilities in arranging the events. CAVAC has announced the event to input companies, but has received few responses to date.
Next Steps:	Hold discussions with input companies to finalise their contribution to the events. Follow up with the event organiser and PDAs on the execution of the operational plan.
Lessons Learnt:	Linking events seem to increase the likelihood that model farmers will contact input companies and / or other sources of information. It appears unlikely that CAVAC will be able to find commercial partners to support linking events in a sustainable way, and as such CAVAC will continue conducting linking events as a facilitation activity. It is more effective to contact input companies directly instead of through announcements on the radio or newspapers.

INTERVENTION UPDATE: Int. No: Ext 11.6 AWP No: 1.2 (Previously 3.2) Date: 30 June 2014	
Name:	**Supporting a private call centre**
Summary:	CAVAC has implemented an intervention to support a Private Call Centre (Asia Master) in order to develop the agricultural content of its database; build capacity of its staff in agricultural knowledge; and promote the service to users. CAVAC initially expected that if the company could provide useful information and knowledge to farmers - and that if farmers adopted and applied this information successfully - more farmers would use the call centre service. The company would also make greater profits from this service and it would continue to improve and update the agricultural content of its database. However, after providing support, CAVAC conducted a study on callers' satisfaction with Asia Master's service. The study showed that the majority of the callers had not been satisfied with the information provided. The information they were predominantly seeking was related to pest control. In respond to this feedback, CAVAC is developing a menu database equipped with a diagnostic tool to assist with pest control queries. The agents of the call centre will then be able to identify pests, and suggest appropriate control methods in a more effective manner. The demonstration version of the database would be developed and tested by other input companies and private call centres.
Achievements to Date:	Following the completion of CAVAC's first round of support to Asia Master – and based on the study results indicating that callers were not satisfied with Asia Master's service - the call centre's information service on agriculture has been halted. CAVAC subsequently signed a contract with the Biological Information Technology Group (QBIT) of the University of Queensland to develop a rice-based pest and disease diagnostic tool. This diagnostic tool will be provided through-cost sharing deals to pesticide companies, call centres and telecom companies to enable them to respond to farmers' queries on crop protection more effectively. The initial version of the diagnostic tool was developed and tested several times with farmers. The tool was modified, using questions and suggested answers to capture the characteristics of the problems affecting Cambodia farmers. Finally, the tool was also tested by Nokor Thom company staff, who reported satisfactory results. The tool has been developed in three configurations: a server version which can be accessed from various computers in an office at the same time; a stand-alone version; and finally a version for handheld android devices. Factsheets of key pests and diseases have also been developed to be uploaded into the diagnostic tool.
Next Steps:	▪ Finalise the diagnostic tool and factsheets. ▪ Discuss further work with Asia Master after the database is fully operational. ▪ Find new partners. ▪ Test the prototype with a few selected companies.
Lessons Learnt:	Given the complexity of the problems described by farmers, intensive training on how to use the tool and to provide the contexts of farmers for information service staff is necessary.

INTERVENTION UPDATE: Int. No: Irr 10.12 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of an irrigation scheme: Thnoat Chum canal, Kampong Thom province**
Summary:	The January 1 canal from the Stung Chinit reservoir was constructed about 10 years ago. Under an Asian Development Bank (ADB) loan project, a secondary canal was constructed in 2010 to connect to the January 1 canal. As farmers in Thnoat Chum (a commune close to the ADB canal) grew only wet season rice, Kampong Thom PDWRAM requested CAVAC to extend the ADB canal to increase the command area for double cropping. This Thnoat Chum scheme was then selected for rehabilitation in 2011. A feasibility study was carried out and the canal was surveyed and designed. Construction commenced in April 2011 and was completed in August 2012. Some repairs were later needed, with the contractor completed these repairs in July 2013. To further ensure that this canal is a reliable water source for farmers and to help expand the command areas, CAVAC had a contractor start major improvement works to the scheme in January 2014. Works included adding an intake structure at the head of the ADB canal; providing more hydraulic structures; and improving the canal embankments with laterite pavement. A FWUC for this scheme was established by the PDWRAM and the capacity building for this FWUC was completed in September 2012. Analysing the FWUC capacity in 2013, CAVAC learned that additional training to further strengthen the FWUC's capacity on the scheme O&M was necessary. The ISC has been contracted to carry out this training.
Achievements to Date:	**Engineering** The construction of the original design commenced in April 2011. Some structures were added and all works were completed in late 2012. However, additional works were needed to improve the existing scheme to enable it to become a reliable water source for farmers. The construction of the improvement works at Thnoat Chum commenced in January 2014 and were completed in June 2014. **O&M** CAVAC contracted the PDWRAM to establish and build the capacity of a FWUC for this scheme. The FWUC was established in April 2012 and the capacity building was completed in September 2012. CAVAC has been following up with the FWUC to further strengthen its capacity on scheme O&M. To ensure that the FWUC has sufficient capacity to implement its roles and responsibilities, CAVAC has contracted the ISC to further strengthen the FWUC capacity. During this reporting period, CAVAC also supported the FWUC to build an office. By June 2014, the construction of this FWUC office was completed and it has subsequently been equipped with some office furniture.
Next Steps:	**Engineering** Monitor the scheme during its defects liability period. **O&M** Continue monitoring the ISC's FWUC capacity building, and the FWUC's performance in the ISF collection, financial management, conflict resolution, and implementation of its O&M plan.
Lessons Learnt:	**Engineering** Participation of farmers and local authorities is essential during the conceptual design and construction stages. Careful review of conceptual designs by CAVAC's engineering team is necessary for the success of schemes. **O&M** A poorly designed scheme will be unable to serve farmers to a satisfactory level. In such cases, the FWUC of that scheme will not function properly.

INTERVENTION UPDATE: Int. No: Irr 10.13 AWP No: 2.3 Date: 30 June 2014	
Name:	**Development and construction of irrigation scheme: Angko canal, Kampong Thom province**
Summary:	Farmers in Kampong Ko grew wet season rice and limited dry season rice. Agricultural production was limited by unreliable access to water. The community expressed a need for rehabilitation of the Angko canal to improve water supply for double cropping. The Angko canal was selected for construction in April 2011. In 2012, CAVAC and the PDWRAM agreed to extend the Angko Canal two kilometres further. The extension work was completed but it needed additional structures. In 2013, CAVAC and the PDWRAM discussed the improvement for this scheme and decided to undertake more work in order to enable the scheme to become a more complete scheme that could cover a larger command area and require lower O&M costs. Additional work includes: developing a concrete canal with a pumping station along the existing canal; constructing secondary earth canals connecting to the concrete canal; adding hydraulic structures; and converting the existing main earth canal to a drainage canal. Improvement works for Angko commenced in January 2014. Due to slow progress of the construction work, about 20% of the workload has been removed from the contract. It is expected that the remaining work in the contract will be completed in August 2014. A FWUC was established in January 2012 and capacity building was completed in September 2012. The FWUC signed a contract with a PWS in October 2012. CAVAC has recently commissioned the ISC to help strengthen the FWUC's capacity on O&M.
Achievements to Date:	**Engineering** The initial design of this scheme was done by the PDWRAM. The construction work on the original length of the canal and the extension was completed. Repair work was completed in June 2013. In 2013 the CAVAC design team worked for almost a year in order to come up with an improved design that was agreed by farmers, local authorities and the PWS who had an on-going contract with the farmers. The team decided to design a complete scheme with the objective to lower the pumping costs for farmers. The improved design includes a pump house to serve the whole command area and lined canals to reduce seepage. The scheme will enable farmers to irrigate their fields by gravity. These major improvement works commenced in January 2014. By the end of this reporting period 85% of the work was completed. **O&M** CAVAC contracted the PDWRAM to establish and build capacity of a FWUC for this canal. These activities were completed in September 2012. An assessment of the FWUC in 2013 showed that the FWUC was dysfunctional and needed further capacity building. The ISC has been contracted to carry out further capacity building for this FWUC. CAVAC also supported the FWUC in building an office. This FWUC office has now been built and will be used to hold meetings and collect the ISF. The FWUC signed a contract with a PWS for a three-year period in 2012 to ensure adequate water delivery for double cropping. So far, the FWUC has collected the ISF for three cultivation seasons. It has collected about US$15,000 and this money has been spent every season on the O&M of the scheme. Once the construction of the pump house is completed, it will be managed and operated by the FWUC. It is expected that with the pump house, farmers' pumping costs will be reduced by 50%.
Next Steps:	**Engineering** Complete construction works in the existing contract in August 2014. **O&M** Continue monitoring the ISC's FWUC capacity building and the FWUC's performance.
Lessons Learnt:	**Engineering** The scheme has proven to be too complex to be designed by PDWRAM staff. Daily construction supervision is important to ensure that the contractor's work meets the requirements of the design. **O&M** Schemes that are not well designed and constructed cannot be well managed by a FWUC.

INTERVENTION UPDATE: Int. No: Irr 13.1 AWP No: 2.3 Date: 30 June 2014	
Name	**Development and construction of Tang Krasang irrigation schemes: Secondary Canals 1, 2 and 3 of the 6 January Canal, Kampong Thom province**
Summary	Previously, farmers in the Taing Krasang commune could only cultivate rain-fed wet season rice, and as a result, facing risks from both flood and drought. Farmers in this commune and the PDWRAM have expressed their needs for CAVAC's support to rehabilitate / construct the Taing Krasang irrigation scheme. This scheme was selected for implementation in 2013 and 2014. CAVAC's Tang Krasang irrigation scheme has three secondary canals (SCs), namely SC1, SC2 and SC3 which connect to the 6 January canal – the main canal. The 6 January canal gets water from the Tang Krasang reservoir, which is known as a reliable water source. The Taing Krasang scheme has been designed to be a complete scheme with a gravity-fed system. The scheme has a main drainage canal and each SC has several tertiary canals and hydraulic structures. Construction of SC2 and SC3 was started in February 2013 and was completed in April 2014. Construction of SC1 was started in late December 2013 and was completed in June 2014. In 2013 CAVAC signed a contract with the PDWRAM on the FWUC establishment and capacity building. CAVAC also commissioned the ISC to strengthen the capacity of this FWUC.
Achievements to Date:	**Engineering** Construction of SC2 and SC3 commenced in February 2013 and was completed in April 2014. Construction of SC1 commenced in late December 2013 and was completed in June 2014. **O&M** The PDWRAM completed FWUC establishment and capacity building in June 2014. The ISC contracted by CAVAC also started capacity building work for the FWUC of this scheme in September 2013. The ISC work will continue until June 2015. CAVAC also supported the FWUC in building an office. This FWUC office has been built and handed over to the FWUC.
Next Steps:	**Engineering** Support the FWUC in the operation of the scheme and assist in the construction of field canals. A pilot block will be used as an example for farmers on how best to irrigate and manage water in their fields. **O&M** Continue monitoring the ISC's FWUC capacity building and the FWUC's performance.
Lessons Learnt:	**Engineering** Strict supervision of the quality of construction is essential to reach the standards required for farmers to operate a scheme well. This is especially true with regard to contractors whose construction quality is not up to a high standard. Supervision of such contractors has proven to be a very challenging task. In some cases structures need to be corrected or replaced. **O&M** Farmers in this scheme do not have experience in rice cultivation using irrigation water. Transformation from rain-fed rice cultivation to intensive irrigated rice cropping takes time. The training given by the PDWRAM staff to the FWUC is not sufficient. Follow up training is essential and may take longer than originally foreseen. Conflicts of interest, participation of local authorities and relations with the PDWRAM related to upstream management of water in the main canal took a significant amount of time.

INTERVENTION UPDATE: Int. No: Irr 14.1 AWP No: 2.3 Date: 30 June 2014	
Name	**Development and construction of an irrigation scheme in Boeung Leas pumping scheme, Kampong Thom province**
Summary	Farmers around the Boeung Leas scheme grew limited double cropping of recession rice and early wet season rice. These farmers achieved low productivity due to seasonal floods and droughts. Limited access to water was known to be a major constraint to improve rice productivity for farmers in this community. The existing FWUC of this scheme requested support from CAVAC and Kampong Thom PDWRAM to rehabilitate the Boeung Leas scheme, in order to increase the cultivation areas for double cropping. A feasibility study, topographical work, detailed design and tender process were conducted in 2013. Construction of the Boeung Leas scheme commenced in January 2014. Several hydraulic structures (off-take, crossing, and check structures, etc.), concrete lining and earthen canals, and a pump station were constructed and completed in June 2014. By the end of June 2014, 80% of the project was completed and full completion is expected in August 2014. CAVAC contracted the ISC to reactivate and strengthen the existing FWUC of Boeung Leas. The ISC started its work in September 2013 and completed it in June 2014. CAVAC also supported the FWUC in building an office, which will be completed in July 2014.
Achievements to Date:	**Engineering** Construction started in January 2014 and 80% of the work was been completed by the end of this reporting period. Construction supervision is jointly carried out by the PDWRAM and CAVAC. **O&M** CAVAC engaged the ISC to reactivate the existing FWUC with the aim to strengthen the FWUC's capacity on scheme O&M. The ISC completed its work in June 2014. An office is being constructed for the FWUC of this scheme. It is expected that the construction of this FWUC office will be completed in July 2014.
Next Steps:	**Engineering** Continue monitoring the construction work to be completed as planned in August 2014. **O&M** Work closely with the trained FWUC to ensure that it is able to manage the scheme sustainably.
Lessons Learnt:	**Engineering** Daily construction supervision is important to ensure that the contractor's work meets the requirements of the design. **O&M** The coordination between the FWUC, farmers and local authorities is critical to improve scheme O&M.

ANNEX 2: STORIES FROM THE INPUT UNIT

East-West Seed International's story

The situation

Vegetable production serves as an alternative means of income generation and a supplementary nutrition for the rural families in Cambodia. As of 2010[1], the sector engaged over 30,000 families countrywide with a growth rate of 10% per annum. In spite of this growth, Cambodia continues to import large percentage of its vegetable, mainly from Vietnam. This is due to the lack of good quality seed, farmers' limited production techniques, water shortages in off-seasons, and the lack of access to relevant information.

Through studies and interviews it became clear that there is limited information exchange between value chain actors such as seed companies, input suppliers, vegetable collectors, and vegetable producers. Seed companies do not utilise retailer networks to disseminate information of their products; retailers' knowledge on their inputs in the shops is often minimal and therefore they are not confident in advising farmers, while farmers feel reluctant to ask for information and advice because they assume that retailers do not have technical know-how or enough time to advise them.

Striking the deal with companies

Initially, seeking suitable partners was a significant challenge. Most, if not all, of the vegetable seed companies CAVAC approached, geared their strategies towards merely marketing their products – neglecting the importance of providing additional extension services. In addition, it is almost a norm that development projects working with companies allow much more favourable conditions in particular without cost sharing arrangement, making it difficult for CAVAC to do otherwise. East West for example initially advised CAVAC to buy their products and give it to farmers like other development projects do. On that account, CAVAC initiated vegetable seed retailer trainings with participation from seed companies and input retailers to showcase the business case of providing more information with the sale of inputs to vegetable retailers and to enable networking opportunities and generate interest from the seed industry as a whole. As a result, within a year CAVAC entered into agreements with two major vegetable seed companies, East West and Pacific seeds.

The partnering with East-West Seed International Limited (EWSI) started in February 2013. It aimed to increase the demand and access to quality seeds of appropriate varieties and related agro-inputs, improve the flow of information among market actors, develop embedded services with agro-input dealers and vegetable collectors, and improve farmers' agronomic practices through demonstration farms, trainings of model farmers, vegetable collectors and input retailers, and extension material development and distribution.

A 50%-50% cost sharing was agreed.

[1] Data from National Committee for Subnational Democratic Development

How everything works

Demonstration farms: Demonstrations exhibit good production techniques to neighbouring farmers. They offer a source of technical, financial and market information on varieties that are in demand in the market. They also reduce the risk aversion associated with investing in new technologies. It is critical that a good farmer and a good farm location are in place before a demonstration plot can be initiated. In other words, the farmer must be diligent; andthe plot must be easily seen with good source of water etc. To fulfil this criteria, field staff spend between two to 15 days to select one plot depending on the information they have and the varying interest of farmers in each area, and sometimes the support from the local authorities. Within 18 months of the initial agreement, 177 demonstration farms have been established across three provinces with weekly technical monitoring and advice from field staff for two cropping cycles per farm. It does not end there, when the crop is ready for harvest, the field staff arrange a field day for every two demonstration farms to foster linkages between market actors and to disseminate technical, financial and marketing information to farmers from within and outside of the village. It usually requires as much as one third of the company staff's time and from the CAVAC vegetable team to monitor and ensure effective management of the farms and field days.

Extension training: as direct and long term sources of information and knowledge for farmers, input retailers and vegetable collectors need to improve their understanding of variety characteristics and appropriate use of other agro-inputs so that their future services to farmer clients can be improved. To ensure just that, EWSI field staff visit the retailers and collectors weekly and invite them to training and field days. The effort of engaging these stakeholders however has proved difficult and time consuming. Often the expected number of trainees is less than half of expected participants due to their constant need to be at their shop or on their farms collecting vegetables. An example can be drawn from a pest and disease management training in Kandal province. Thirty seven invitations were sent to retailers, and 20 to collectors. A trainer was flown in from the Philippines and the rest of arrangements were finalised. Only five confirmations were received two days before the training date. Kandal has been the most challenging location where EWSI staff often cannot convince farmers and other market actors to join the training. Kandal has a long history of vegetable cultivation and farmers are more experienced compared to producers and retailers in other provinces. In addition, the newly recruited staff at EWSI were not eloquent in their communication with stakeholders. As the date drew near and with few confirmations, EWSI panicked and contacted CAVAC for immediate support. The day before the training, one of the CAVAC team spent the day on the telephone existing networks of collectors and asking them to help by attending and inviting others. Another two members of the CAVAC team visited every retailer shop they could find in Kandal to verbally invite them – explaining why they should attend the training and what they would gain from it. Top convice retailers a accommodation and food allowance was provided and ithe fact that is was a once in a lifetime chance to be trainer by a foreign export explained[2]. After hundreds of phone calls and face-to-face contact, it worked! On the day of the training, 10 collectors and 15 retailers attended and those who missed out later expressed their regret and requested similar training opportunities in the future. The whole training would have been a total waste of resources with CAVAC prompt and proactive support.

[2] In Cambodia people tend to value the outside than the local resources as it is believed that the local has lower education attainment with less desirable quality than those educated abroad.

The rewarding beauty along the bumpy roads

Notwithstanding some of the ups and downs, the journey has been encouraging and there are positive signs that this intervention is generating knowledge and bringing changes within the target communities. At farmer level, the considerable adoption of improved seed and associated technology packages is due to potential yield increase and labour saving (up to 50 to 70%3). It is found that 63%4 of demostration farmers have already applied their knowledge gained from the project. Consequently, it has a ripple effect on the sale of retailers. In Kandal, 71% of interviewed retailers started to sell the new inputs (East-West seed, trellis nets, seedling trays, and plastic mulches) out of which 33% experienced sale increases. In the other two provinces, the increase ranges from half to all interviewed retailers depending on different input items5.

The road ahead

To improve productivity of vegetable cultivation in Cambodia, everything from having good quality seed, improved agronomical practices, enhanced information sharing among market actors, elimination of the paucity of information on market demands needs to be in place. Collaborating with private company to develop and provide embedded services to farmers is a good way to achieve this.

The road to success does not promise a smooth ride now or in the future, particularly when the unpredictable occurs such as staff movement in the partner's company in the middle of the project and many other difficulties will be faced by the collaborating company. It will require more resources from CAVAC to lend a supporting hand so that the quality of work is well maintained. However, the positive impacts we will see in the lives of the thousands in this sector will be promising, rewarding and worth striving for.

[3] CAVAC and East-West Seed phase 1 project review conducted in October 2013.
[4] M&E assessment on the knowledge, application, and practice of demo farmers conducted in late June 2014.
[5] Mini survey of the sale volume of input retailers conducted in early June 2014.

Heng Pich Chhay's Story

First Intervention

In the early days of CAVAC during a field trip to Takeo, farmers told the CAVAC team about field demonstrations from a company called Heng Pich Chhay (HPC). CAVAC initial approached the Company to better understand its business and to assess the potential for collaboration. Several months later and after a number of meetings with the Company, CAVAC started the first intervention with HPC – making HPC the first private partner of CAVAC. CAVAC support would allow the Company to significantly increase and improve its engagement with farmers.

The intervention began in mid-2010 and involved three activities:

- paddy field demonstrations,
- rice cultivation workshops and
- staff capacity building.

Following this initial engagement, CAVAC's monitoring questioned the success of these activities. Firstly, doubling the size of their existing field demonstrations made them hard to managed with the limited number of staff and poor management skills.In addition there was not a proper information transfer mechanism in place. For instance, HPC staff did not visit the demonstration fields as regularly as required (due to the small size of the demonstration fields) and fertilisers were transferred from original bag to plastic bag without labels. HPC staff failed to effectively instruct farmers. These things led to low adoption of knowledge and unimpressive demonstration fields. Moreover, knowledge transfer in workshops was not effective due to their large size and one-way communication lecture style. Finally, the two staff members trained in Vietnam did not acquired sufficient knowledge in rice production and fertiliser use to take over the hotline service from HPC senior technical staff.

Admittedly, given this was the CAVAC team's first intervention, the CAVAC team had very limited experience in working effectively with the private sector. Therefore, the team did not monitor the on-going progress of the work closely enough. This initial intervention was a very important learning tool for the CAVAC team and critical in changing the way CAVAC worked with partners. The key lesson was that many agricultural input companies grow out of family businesses and often their systems are still weak. These companies require additional support in implementing change to ensure quality.

Notwithstanding the disappointing initial results, HPC still believed that extension activities were a key market strategy in the competitive fertiliser market. HPC also recognised that the key element to implementing successful activities was staff capacity.

Second Intervention

Fertiliser Retailer Training: Understanding that an effective and low cost method to reach a large number of farmers was to build fertiliser companies'capacity to provide effective fertiliser training for farmers. As such, the CAVAC team initiated a training program intervention. Top ensure competitive neutrality, the CAVAC team invited approximately 20 companies to participate. Ultimately, 12 fertiliser companies including HPC showed interest and sent their staff to participate in the training on a cost-sharing basis. The training took place in March 2013 after a long process of negotiation to gain

consensus from all companies and after delays recruiting appropriate consultants to provide the training. A particular problem was finding a consultant that understood the business case for engaging with farmers. Finally it was decided that the CAVAC team would provide the training themselves.

After attending the 12-company training, HPC started to shift its focus from big dealers to village retailers as its main information source and brand builder with farmers. As a result, the Company wanted to try fertiliser training at the village retailer level. However HPC was concerned that the HPC trained staff did not possess sufficient confidence to do the training themselves. CAVAC agreed to provide mentoring support to HPC staff who would be the trainers and facilitators. After several meetings to discuss the details (purpose, expected outcomes, process, and estimated budget of the activity) the agreement was put into an Agribusiness Innovation Fund application. A new agreement was signed in June 2013 in which CAVAC agreed to support HPC to pilot four small-scale retailer trainings, but with a mentor to support the first two training only. From initial discussions to activity completion, the CAVAC team worked closely with the Company – supporting HPC in producing the Agribusiness Innovation Fund proposal; reviewing and monitoring the training content, the trainee selection process, and the actual training as well as feedback sessions. For example, after the training content and materials were agreed by both parties, the first training was held in October 2013 in Takeo. In this training, one of CAVAC staff and one participatory methodology consultant joined to observe the whole training; and then feedback was provided.

For the first two trainings, HPC had difficulty in finding a suitable training venue to fit in 25 – 27 trainees, especially in terms of training activities such as group work, games, and role play. In addition it was found that the trainers did not have enough time to pay attention to every trainee. Therefore, the training of 25 participants was split into two groups with one group of 13- 15 participants and the one and a half day training was reduced to one day. In this way, the trainers could manage the training more easily while each trainee could participate more. Based on the last fertiliser retailer training of HPC in Battambang province on 3-4th July 2014, it was found that the trainings were more effective.

HPC's trained staff have now become qualified trainers of the company. '*We are happy with the model as the retailers were very satisfied with the training and they understand fertiliser applications much better. They can share this better to their farmers. In return, with a better knowledge and yield and thus their income, farmers will appreciate our products and continue using them; this will translate in increasing sales of retailers and ultimately the increase in the company's sales*.' said Mr. Sophal, deputy director of HPC, prospectively.

Over a phone call, Mr. Duch Narn, a trained retailer in Koak Kros village, Koak Prech commune, Kirivong,Takeo, told CAVAC that he and his wife (who also joined the same HPC training in October 2013) were very satisfied with the training, and had started to provide advice to farmers on proper use of fertiliser though many of them did not take up the advice immediately. He also applied HPC's recommendations on his own field of 3 hectares, and added that '*we got yield of about 5-6tons per hectare while with the previous fertiliser application, I got only 4 tons maximum, and my rice plant got fewer diseases as well*.'

Field Experimental Demonstration: In addition to the retailer training , joint experimental field demonstrations are also a much appreciated support from CAVAC. A large survey conducted by CAVAC showed new findings in effective fertiliser applications relevant to changing varieties and field

practices. The survey showed that some of the current company fertiliser recommendations could be outdated. '*If the results of the joint experimental field demonstrations prove this is the case, HPC will update the company's fertiliser recommendations accordingly*' added Mr. Sophal. In this activity, CAVAC has contributed a technical consultant to coach HPC staff managing field experiments and Company provides all inputs as well as its staff's time, and farmers provide the land and field labour. CAVAC staff are very involved in assuring the quality of work and a smooth cooperation from the Company. On-going meetings are conducted with both the consultant and the Company. The wet season experimental fields are expected to be finished in November 2014 while the dry season experiment fields in March 2015.

Where is HPC now

Current Activities: Based on lessons learnt from the first intervention, the Company has reduced the number of field demonstrations by half to a more manageable number of about 20 per year. The field demonstrations now cover other provinces such as Kampong Chhang, Battambang and Prey Veng, where before they were mainly concentrated in the three targeted provinces of CAVAC. Interestingly, the management of field demonstration is being transferred to its retailers. According to Mr. Sophal, this model could let retailers put what they've learnt from the training into practice. At the same time field demonstration acts as evidence for retailers to show their farmers. Rice cultivation workshops are still being conducted as a means to promote the company's products to farmers as well as to raise their awareness of proper use of fertiliser. Farmers can then obtain further details from trained retailers. Finally, four fertiliser retailer training sessions (which are supported by CAVAC) have been conducted with a total of 122 participants in four provinces: Takeo, Kampot, Prey Veng, and Battambang.

Way Forward: Next year, with support from its supplier (i.e. UPL), HPC plans to recruit six staff in two teams to conduct direct marketing with a 1-on-1 basis at retailer stores. This new activity will augment its wide range of extension activities that also include media broadcasting, farmer workshop, booklets, etc. Though it is yet unclear of how many training sessions will be conducted, the model of fertiliser retailer training will continue to be used but be adjusted to include one-day pesticide content since there is a demand from its retailers in pesticide knowledge and in line with the company's new focus to promote its pesticide products. Besides that, HPC continues importing more products to meet the condition and demand of the market.

SPK's Story

Initial engagement

Though Cambodian farmers have a long history in farming, using chemical products to control pests is still a very new concept. SPK is a pesticide company that has used farmer meetings as extension activities to promote its products to farmers.

In late 2011, after seeing CAVAC's Model Farmer Training in the field, SPK staff approach the Program and requested permission to join CAVAC's Model Farmer training as a resource to assist with answering some of the technical questions from farmers. Satisfied in the way in which CAVAC's Model Farmer Training was delivered, SPK became interested in improving the quality of its own 'farmer meetings'. To do this the Company needed to improve the capacity of its staff to transmit key technical messages on pesticide use to farmers. SPK then approached CAVAC for assistance in building staff capacity in participatory methodology and to develop extension materials that could be used for its farmer meetings.

Understanding that private input companies are a sustainable source of information and knowledge transfer for farmers, CAVAC agreed with the proposal and a partnership agreement was signed in February 2012.

Working with the company

Using SPK's existing technical content ten 'One-page One-Concept' posters were designed and produced. In October 2012 a half-day training on how to conduct effective farmer meetings, with the newly designed posters, was then provided to 15 members of the SPK sales team. After the staff training program, there remained are two additional activities outlined in the partnership agreement:

- Leaflet printing; and
- Monitoring and Evaluation on the effectiveness of the training.

In February 2014, CAVAC was informed that the design of the leaflet was complete and a printing house had been selected, to date there has been no further progress. Rather than continue to pressure the company, CAVAC decided to allow the company to set its own priorities. Particular given that the leaflet would be the property of the company.

About one year after the staff training as part of CAVAC's M&E process, the CAVAC team met with the company staff to access their knowledge gained from the training as well as their satisfaction in using a participatory approach and the newly designed posters in actual farmer meetings. In general, SPK staff were satisfied with the posters and participatory approach. While the posters and new approach made hteir meeting more interesting, it was also acknowledge that the meetings were time-consuming given that there was more discussion taking place. To understand more how SPK actually conducted farmer meetings, the CAVAC team initial went to Takeo to observe a farmer meeting; however the meeting was cancelled due to insufficient attendance. Following this the team did manage to observe two SPK farmer meetings – one in Takeo and one in Kampong Cham.

When accessing the outcome of the initial training provided to SPK staff CAVAC also requested data on how many farmer trainings had been conducted since completing in initial CAVAC training. SPK

was unable to provide an exact number as it did not have a systems in place to track this information. While the Company did require a participants list from sales staff after each training, a number of these were missing. In April 2014, using the remaining lists, the CAVAC team did an early review of farmers' knowledge, attitude, and practice as well as their satisfaction on SPK farmer meetings. In this survey, the team had difficulty in locating farmers on the lists because some of the meetings did not actually happen. At the end, CAVAC requested one company staff member in their responsible province(s) to guide the team to their farmers. It found that among 30 farmers interviewed, 86% were satisfied with the meeting, 50% said that the meetings helped their rice production someway, while only 30% claimed to have changed practices after the meeting.

In June 2014, the Regional Sales Manager of SPK who was the main focal point working with CAVAC was replaced. The new manager does not have any knowledge about the cooperation between CAVAC and SPK. This made the remaining M&E work difficult. In addition, like in many family businesses, all decision making power is with the Managing Director of the company, who manages a number of businesses at once. This slows down the internal communication and decision making.

Current Activity of the Company

SPK are no longer holding farmer meetings. The meetings have stopped due to limited farmer interest in attending[6]. The activity has been replaced with 'retailer's store standby' where sales staff stand at a store and help the retailer diagnose the problems faced by farmers and recommend their product accordingly. This strategy is becoming very popular among many pesticide companies as it is seen to be more effective than farmer meeting. Field days, to show the results proper applications and to promote the company's products, have also replaced the farmer meetings.

With the new regional sales manager in place, SPK has a new target to hold 10-15 field demonstrations per month per staff member with 14 staff operating across 16 provinces across Cambodia.

Even though farmer meeting no longer exists, CAVAC will investigate whether knowledge and posters from the staff training have been adapted into other SPK extension activities.

[6] The difficulty in gathering farmers to join the meeting is probably because farmers are becoming the target of many stakeholders such as MFIs, other projects, and private companies, who use farmer meeting as a mechanism to directly reach them.

ANNEX 3: EXPENDITURE AGAINST WORK PLAN

Component breakdown		Description	Interventions and activities 2014	Budget (USD)	Total Expenditure to Date	Total Commitment to Date*
Component 1: Agribusiness				**$1,905,000**	**$616,085**	**$1,887,050**
1.1	Critical constraints to strategic value chains identified and developed for business action.	Completed		$0	$0	
1.2	Agribusiness partnerships supported to innovatively address constraints.	Improve input markets in rice and vegetables; tools in rice; improve availability of efficient and affordable pump units. All companies will be encouraged to add extension activities. CAVAC to organise a number of linking events and will encourage companies to improve communication within their network.	**Rice seed market:**	$1,080,000	$381,621	
			Cont. support to seed producer			
			Support to seed associations			
			Support seed producer trainings			
			‘Deepening’ intervention			
1.3	Enhanced farmer services embedded within agribusiness practices.		**Inputs:**			
			Cont. support to input providers			
			Joint training with PDAs			
			Support to more companies if licences approved			
			Pumps:			
			Cont. support to producers			
			Events with retailers			
			Awareness campaign			
			Support to retailers			
			Media:			
			Cont. support to media company			
			General offer to market based on Studies results			
			Support one / two more media companies			

Component breakdown		Description	Interventions and activities 2014	Budget (USD)	Total Expenditure to Date	Total Commitment to Date*
1.4	Improved availability and communication of market information between value chain stakeholders.		**Rice Export promotion:**			
			Cont. support to exporter (warehouse sys)			
			Support to exporter (contract farming)			
			Support to an additional company / ies.			
			Vegetables:			
			Cont. support seed retailers			
			Rice in KPT, ultra poor farmers:			
			One or two interventions			
1.5	Participatory planning and construction of key infrastructure to address value chain bottlenecks.	On hold until opportunities have been found.		$0	$0	
1.6	Governmnet led rice policy activities	Activities led by the three PDAs	Continuation of activities as related to the Policy Paper on the Promotion of Paddy Production and Rice Export.	$600,000	$234,464	
		Activities led by the GDA	Completion of current contract and GDA priorities as required	$200,000		
		GDA materials production and disemination	Support to materials production and information dicemination of GDA technical material as required.	$25,000		
Component 2: Irrigation and Water Management				**$5,584,593**	**$4,691,146**	**$11,834,568**
2.1	Improved capacity of MOWRAM and PDWRAM to participate in design and develop, operate and maintain irrigation schemes.	Intense collaboration with MOWRAM and PDWRAMs in the construction of schemes and in the detailed design of schemes.	Extensive collaboration and subcontracting with all 3 PDWRAMs including survey and design and construction supervision.	$123,000	$77,537	

Component breakdown		Description	Interventions and activities 2014	Budget (USD)	Total Expenditure to Date	Total Commitment to Date*
2.2	Improved capacity of FWUCs to efficiently and effectively operate and maintain their irrigation systems.	CAVAC and PDWRAMs will support FWUCs and other players to improve likelihood of the sustainability of schemes.	Training and other support to FWUCS and other players in the O&M market.	$700,000	$459,153	
			Research / studies looking at O&M issues in Cambodia.			
			Supplementary Investment Fund will have a new round.	$100,000		
2.3	Selected systems rehabilitated and transferred to effective FWUCs.	Depending on the decision of the NSC in 2011, CAVAC will tender schemes and commence construction in 2012. On top of that, one or two FWUCs will receive co-funding for improvements.	Finalising assessments of final schemes as required.	$4,661,593	$4,154,457	
			Construction of new schemes.			
2.4	Improved models of water management adopted in rain fed areas.	Completed		$0	$0	
2.5	Increase use of hydrological data in the planning and management of irrigation systems.	Completed		$0	$0	
Component 3: Research and Information Systems				**$50,000**	**$31,425**	**$31,425**
3.1	Priority research and extension activities address constraints in selected value chains.	Four large research studies are no longer under CAVAC's scope of work		$0	$0	
		Action Research fund	Round two of research grants provided to local organisations in areas of interest for CAVAC.	$50,000	$31,425	
3.2	Enhanced capacity of formal and informal extension providers to transfer improved technologies and information to farmers.	Included in 1.2		$0	$0	
3.3	Partnership program linking researchers, extensionists, farmers and agribusinesses developed and implemented.	Included in 1.2		$0	$0	
3.4	Budgetary support to Cambodian Agricultural Research and Development Institute..	No longer under CAVAC's scope of work		$0	$0	

Component breakdown		Description	Interventions and activities 2014	Budget (USD)	Total Expenditure to Date	Total Commitment to Date*
Component 4: Business Enabling Environment				**$350,000**	**$70,163**	**$70,163**
4.1	Improved research and understanding of the enabling environment surrounding key value chains.	CAVAC will assess impacts of a number of new regulations for agriculture and specifically CAVAC activities.	Issue studies to be undertaken and where possible activities will be initiated.	$0	$0	
4.2	Increased opportunity for public private dialogue around key enabling environment issues.	Activities with both RGC and the private sector to increase understanding and wider discussion around enabling environment issues	Seminars, workshops , studies, study tours and other activities which promote the understanding of enabling environment issues within Cambodia.	$100,000	$70,163	
4.3	Strengthened industry representative organisations.	Activities may emerge from other activities.		$0	$0	
4.4	Increased use of Public Private Partnership investment model.	Integrated with 2.2 and 2.3.		$0	$0	
4.5	Policy Support Funding Facility	This facility will support activities initiated by MAFF / MOWRAM / AusAID with approval from the Executive Group of the NSC.	RGC initiatives supported	$250,000	$0	
Cross Component Activities				**$400,000**	**$78,947**	**$78,947**
5.1 / 5.2	Gender and Disability**	The gender and disability strategies will guide activities. Both will be mainstreamed in all activities. On top of this one or two dedicated interventions are likely.	Gender and disability are mainstreamed in all activities.	$0	$0	
5.3	Environment and Disaster Risk Reduction***	Revised Environmental Strategy will be implemented in 2011 and continued in 2012.	All interventions will have been screened for environmental impacts. Management plans prepared and activities implemented and monitored.	$0	$0	
5.4	M&E	M&E will be an integral part of the work activities of CAVAC. All experts will be involved.	All interventions will have impact logics and monitoring plans. Cross cutting issues will be integrated.	$175,000	$5,559	
5.5	Training / seminars / capacity development support	CAVAC will prepare a training needs assessment and training plan for its staff and government counterparts.	CAVAC and RGC staff better able to implement activities.	$200,000	$70,338	
5.6	Equipment	Support to MAFF, MOWRAM, PDA	RGC partners to be better able to	$25,000	$3,050	

Component breakdown		Description	Interventions and activities 2014	Budget (USD)	Total Expenditure to Date	Total Commitment to Date*
		and PDWRAM for office equipment and communication	execute their CAVAC related activities			
			Total	**$8,289,593**	**$5,487,766**	**$13,902,153**

*Total Commitment to Date includes outstanding values of contracts supporting activities being conducted until December 2015

**Expenditures on gender and disability are included in agribusiness expenditures.

***Expenditures on environmental work are included in irrigation expenditures.

ANNEX 4: DETAILS ON IRRIGATION SCHEMES AS A JUNE 2014

		Scheme Location		Scheme Detail		Command Area in ha Before			Irrigated Area in ha At Present			Command Area in ha Potential			Crop Intensity		Yields in T / ha							Landholdings		FWUC		
No	Name	Type	Province	Year of construction	Main Canal length in km	Rainfed	Early Wet Season with irrigation	Recession	Dry season irrigated	Early Wet Season Irrigated	Wet / recession with suppl. Irrigation	Dry season irrigated	Early Wet Season Irrigated	Wet / recession with suppl. Irrigation	Flooded / Non-flooded (F / N)	No of Rice crops	Before: Constr. Rainfed EWS	Before: Constr. Rec.	After: Dry season irrigated	After: Early wet season Irrigated	After: Recession with suppl. Irr	Yield increase at present in Ton	Yield increase potential in Ton	No of HH's	Average landholding / HH in ha	Established Y / N	Training Comleted / Ongoing	Landholding Survey Y / N
		1			2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1	Krapum Chouk	canal	Takeo	2010	5.5	50		500		247	336		590	590	F	2	2.5	3.0	6.0	4.0	6.0	1,329	4,275	278	2.12	Y	C	N
2	Kveng Tayi	canal	Takeo	2011	5.2	600		600		553	669		1,000	1,000	F	2	2.5	3.0	6.0	4.0	6.0	2,326	6,700	336	2.98	Y	C	N
3	Tumnub Lork	canal	Takeo	2011 / 12 / 13	14.8			1,200		702	1,267		2,000	2,000	F	2	2.5	3.0	5.5	4.5	5.5	7,128	16,400	1,293	1.55	Y	C	N
4	Prey Rumdeng	canal	Takeo	2012	6.9		428	1,616		1,616	1,616		1,980	1,980	F	2	2.5	3.0	5.5	4.5	5.5	11,478	13,668	1,625	1.22	Y	C	Y
5	So Hang	canal	Takeo	2011 / 2012	8.7			1,476		738	1,476		1,480	1,480	F	2	2.5	3.3	5.5	4.5	5.5	8,192	9,929	1,062	1.39	Y	C	Y
6	Rokar Chhouk	canal	Takeo	2013 / 2014	2.3			428	under construction				690	700	F	2	2.5	3.5	6.0	4.5	5.5		5,457	1,024	0.68	Y	O	Y
7	Wat Thmey	pump	Takeo	2014	7.0			1,334	under construction			900	820	2,200	N / F	2 / 3	2.5	3.5	6.0	4.5	5.5		16,521	2,200	1.00	N	O	N
1	Prey Tonle	canal	Kampot	2010	3.2	218				284	284		460	460	F	2	2.5	4.0	7.0	6.0	6.5	2,569	5,205	460	1.00	Y	C	N
2	O'Kak	canal	Kampot	2011 / 12 / 14	2.9	315	50		150	240	150	240	240	240	N	3	2.0	3.5	6.5	5.5	6.0	1,678	3,515	240	1.00	Y	C	N
3	Sbov Andeth	canal	Kampot	2011 / 14	6.8	1,200	100			924	924		1,223	1,220	N / F	2 / 3	2.0	3.5	6.5	5.5	6.0	5,026	11,297	1,220	1.00	Y	C	N
4	Thnoat	canal	Kampot	2011 / 14	6.8	1,650				817	817		2,000	2,000	N / F	3	2.5	4.0	7.0	6.0	6.5	2,788	20,875	2,000	1.00	Y	C	N
5	Spean Touch	canal	Kampot	2012 / 13	6.6			1,250		271	1,250	1,700	1,700	1,700	F	3	2.5	4.0	7.0	6.0	6.5	6,626	28,150	1,815	0.95	Y	C	Y
6	Prey Leu	canal	Kampot	2012	3.9	850			120	306	900	900	900	900	N	3	2.0	3.5	6.5	5.5	6.0	4,038	14,500	942	0.66	Y	C	Y
7	Hay Saun	canal	Kampot	2013	3.8	457	17		just completed			540	540	540	N	3	2.5	3.5	4.5	3.5	4.0		5,278	540	1.00	Y	O	Y
8	Chamlong Chray	pump	Kampot	2013 / 14	1.7	350			under construction			350	350	350	N	3	2.5	3.0	4.5	3.5	4.0		3,325	350	1.00	Y	O	Y
9	Reservoir 77	reservoir	Kampot	2013 / 14	1.5	500			under construction					1,000	N	1	2.0			3.0				1,000	1.00	Y	O	Y
10	Hay Saun extension 1	pump	Kampot	2014	1.4	220			under construction			220	220	220	N	3	2.5	3.5	4.5	3.5	4.0		2,090	220	1.00	Y	O	Y
11	Hay Saun extension 2	canal	Kampot	2014	2.9	500			under construction			500	500	500	N	3	2.0	3.5	5.0	4.5	5.0		6,250	500	1.00	Y	O	Y
																							–					
1	Thnoat Chum	canal	Kg. Thom	2011	7.3	600				542	600		600	600	F	2	2.5	4.0	6.0	5.5	5.5	4,181	5,100	600	1.00	Y	O	N
	Thnoat Chum impr.	canal	Kg. Thom	2014		300				300	300		300	300	N	3	2.5	4.0	6.0	5.5	5.5	2,250	2,550	300	1.00			
2	Angko + extension	canal	Kg. Thom	2011 / 12	3.5			600		247	247		600	600	F / N	2 / 3	3.0	5.0	7.0	5.5	6.5	2,064	4,200	600	1.00	Y	O	N
	Angko improvement	pump	Kg. Thom	2014	5.1			500	under construction				500	500	F / N	2 / 3	3.0	5.0	7.0	5.5	6.5		3,500	500	1.00			
3	Boeung Leas	pump	Kg. Thom	2013 / 14	0.5			300	under construction				350	350	F / N	2 / 3	3.5	4.0	7.0	5.5	6.5		3,000	350	1.00	Y	O	N
4	6 January SC2	canal	Kg. Thom	2013 / 14	4.6	266			just completed			266	266	266	N	3	2.0	3.5	5.0	4.5	5.0		3,325	266	1.00	Y	O	Y
5	6 January SC3	canal	Kg. Thom	2013 / 14	4.1	691			just completed			691	691	691	N	3	2.0	3.5	5.0	4.5	5.0		8,638	691	1.00	Y	O	Y
6	6 January SC1	canal	Kg. Thom	2014	1.7	230			under construction			230	230	230	N	3	2.0	3.5	5.0	4.5	5.0		2,875	230	1.00	Y	O	Y
23	**TOTALS / AVERAGE**				**116.8**	**8,767**	**595**	**9,804**	**270**	**7,787**	**10,836**	**6,537**	**20,230**	**22,617**			**2.4**	**3.6**	**5.9**	**4.8**	**5.6**	**61,671**	**206,622**	**20,642**	**1.14**			

ANNEX 5: RISK MANAGEMENT PLAN

Cambodia Agricultural Value Chain Program (CAVAC)

Manual of Operations
CAVAC Risk Management Plan

July 2014

Abbreviations and Acronyms

CAVAC	Cambodia Agricultural Value Chain Program
FWUC	Farmer Water User Community
MAFF	Ministry of Agriculture, Forestry and Fisheries
MOWRAM	Ministry of Water Resources and Meteorology
NSC	National Steering Committee
O&M	Operation and Maintenance
RGC	Royal Government of Cambodia
UXO	Unexploded Ordinance

Risk Matrix

This Risk Matrix provides a detailed analysis of the risks associated with the Cambodia Agriculture Value Chain Program (CAVAC). The Matrix: analyses key risk events, and their potential adverse impact; identifies effective containment measures; and assesses the level of risk. The Matrix is broken into the five key areas in which CAVAC operates: 1) Agribusiness Development; 2) Irrigation and Water Management; 3) Research and Information Systems; 4) Business Enabling Environment; and 5) Operational Management. The risks identified against each of CAVAC's components (1 – 4) refer to the major uncertainties that could reduce the intended impact of the program. Operational Management risks (5) are those which affect the ability to manage the program effectively, and deliver outputs on time and on budget.

To compare risks, a priority ranking mechanism has been used. A priority listing of risks is a simple instrument for ranking risks and is based on scaling and then combining the likelihood of a risk and the severity of its impact. A risk will be high if it is likely to occur or its consequences are large, and will be highest if both are present. Diagram 1 illustrates the method used for calculating the risk ratings of the Program. The Overall Risk level has been used to develop appropriate containment measures, with the focus in particular on higher level risks which have been given specific actions that require control, monitoring, and the appropriate level of management attention.

Analysing and Ranking Risk Levels

	Consequences				
Likelihood	**1. Negligible**	**2. Minor**	**3. Moderate**	**4. Major**	**5. Severe**
5. Almost certain	**Moderate**	**Moderate**	**High**	**Extreme**	**Extreme**
4. Likely	**Moderate**	**Moderate**	**High**	**High**	**Extreme**
3. Possible	**Low**	**Moderate**	**High**	**High**	**High**
2. Unlikely	**Low**	**Low**	**Moderate**	**Moderate**	**High**
1. Rare	**Low**	**Low**	**Moderate**	**Moderate**	**High**

The scales used to analyse and rank the risk levels are:

Likelihood

5. Almost certain expected to occur in most circumstances
4. Likely will probably occur in most circumstances
3. Possible might occur at some time
2. Unlikely could occur at some time
1. Rare may occur only in exceptional circumstances

Consequences

5. Severe	would stop achievement of functional goals and objectives
4. Major	would threaten goals and objectives; requires close management
3. Moderate	would necessitate significant adjustment to the overall function
2. Minor	would threaten an element of the function
1. Negligible	routine procedures sufficient to deal with the consequences

Overall Risk Level

E: Extreme risk	most likely to occur and prevent achievement of objectives, causing unacceptable cost overruns or schedule slippage.
H: High risk	could substantially delay the activity schedule or significantly affect technical performance or costs, and requires a plan to handle.
M: Medium risk	requires identification and control of all contributing factors by monitoring conditions and reassessment at activity milestones.
L: Low risk	normal control and monitoring measures sufficient.

Risk Matrix

Risk Event	Potential adverse impact	Likelihood	Consequence	Overall Risk	Containment measures (risk treatment)
Agribusiness and Information Systems Development					
Other donor programs have a negative influence on sustainability by offering non-market based subsidisation in target provinces.	Agribusiness and farmers undertake opportunistic behaviour, focusing on short term gains over long term, more sustainable options.	3	2	M	There have been a few incidences of overlap with other donor Programs however, so far these have had very limited impact on the program. CAVAC is aware of activities implemented by other donor programs and will continue to consult with donors as issues arise.
Significant increase in the cost of farmer labour or reduction in the price of paddy adversely impacts farm innovation.	Farmers are disinclined to invest in farm based innovation reducing the impact of CAVAC. Further consolidation in the farming sector occurs.	3	3	H	Broader economic changes cannot be impacted however farmers and input suppliers can be flexibly responsive to changes: ▪ Continue to support systemic change in the market system; ▪ Monitor changing environment and support public and private partners to adjust to changes.
Changing rules and regulations affect supported markets.	Impacted sector or market support is no longer viable.	2	2	L	Interventions are screened for the likelihood of expected changes. When needed, CAVAC can support companies to adjust to operate within new regulations.
Gender imbalance in program activities	Ineffective interventions by ignoring existing roles, responsibilities and practices in agriculture	2	2	L	▪ Screen all interventions to ensure the activity benefits all beneficiaries, male and female, in an optimal way. ▪ Continue to monitor activities and their results and conduct remedial action and adjust interventions when issues arise. ▪ Ensure relevant staff resources are available to screen and offer support to activities to ensure gender is taken into account effectively.
Government partners supported by CAVAC to work on their priorities, seek reimbursement from CAVAC for work already funded through another donor.	Financial management fundamentally compromised, potential mismanagement of Australian tax payer dollars. Relationship with government partners compromised.	2	4	H	▪ Work with government partners to ensure understanding and compliance with CAVAC financial management requirements. ▪ Ensure contracts or agreements outline the Program approach to financial management. ▪ Continue to liaise with the donor community on support provided to government counterparts.
Irrigation and Water Management					
Communities and government agencies	Low service charge recoveries is unlikely	4	2	H	▪ Work only on schemes where there is strong commitment to forming a

Risk Event	Potential adverse impact	Likelihood	Consequence	Overall Risk	Containment measures (risk treatment)
are insufficiently resourced to establish and sustain the management of improved systems.	to affect operation of the schemes, but may reduce the likelihood of long term sustainability. Some schemes may not continue to function in 7 to 10 years' time.				functional FWUC. ▪ Work intensively with the FWUC to build O&M capacity.
O&M budgets misappropriated by FWUCs.	Loss of faith. Budget unavailable to support O&M.	2	3	M	▪ Provide advance training and capacity-building for FWUC executive. ▪ Construct FWUC offices to support a more transparent basis for FWUC activities.
Canal / irrigation system rehabilitation requires loss of land.	Involuntary loss of land with associated social problems and adverse media coverage.	2	3	M	Identify land issues during feasibility studies: ▪ Discussion with commune councils regarding any issues. ▪ Review written agreements. ▪ Visual inspection of sites. ▪ Verification of farmer sites by: – Random selection of households. – High risk households as determined with reference to: o Staff advice. o Discussions with commune councils. o Visual inspection. The collaboration with the RGC to solve emerging issues has been very effective and will continue to be applied. In the event of an unexpected emerging issue CAVAC will consider technical solutions and design adjustments to solve the issue.
Potential drowning at canal sites due to construction activities.	Adverse social problems with commune councils and adverse media coverage.	1	5	H	▪ Identify potential drowning situations during feasibility studies ▪ Clauses to be inserted into contracts for construction of canals that particular notice should be taken concerning safety and security in relation to any open excavations around structures. ▪ Continual risk assessments to be undertaken during and after construction including regular independent safety inspections of construction sites.
Potential excavation of UXO's at canal sites.	Adverse social problems with commune councils and adverse media coverage. Potential injury and / or loss of life	2	4	H	▪ Identify potential UXO's during feasibility studies. If they are discovered prior to construction, contract de-mining company to sweep total area and remove mines. Ensure appropriate signage and education for communities, as required.

Risk Event	Potential adverse impact	Likelihood	Consequence	Overall Risk	Containment measures (risk treatment)
					▪ Clauses to be inserted into contracts for contractors to notify CAVAC immediately if UXO's are sited – cordon off the area and stop work until CAVAC confirms that the site has been cleared.
Negative environmental impacts during and following the construction of the canals	Adverse social problems with commune councils and adverse media coverage. Detrimental impact to the environment and associated ecosystems Economic impacts to program beneficiaries. CAVAC's monitoring system may reveal suboptimal water conditions in or downstream of the canal	2	3	M	▪ Environmental Consultant to conduct Environmental Impact Assessments with CAVAC's locally engaged Environment Officer during canal feasibility stage. ▪ If potential environmental impacts are identified, implement CAVAC's Environmental Management System ▪ Clauses to be inserted into contracts for construction of canals to monitor environmental issues. Contractors to be site-managed accordingly. ▪ Continual environmental assessments to be undertaken during and after construction. ▪ Remedial actions to be taken of reduce or eliminate the negative impacts (additional structure, additional training, temporary action like cleaning up pollution)
Severe flooding events	Delays in canal construction and associated program impacts Damage to construction works and equipment, and increases in program costs	5	2	H	▪ Move forward procurement and tender processes for irrigation construction. Construction to commence early to be completed before the wet season. ▪ Construction to take into account flood mitigation measures, including: improved erosion control, coffer dams and better drainage.
Quality and timeliness of completion of construction for irrigation schemes	Delays in construction by contractors lead to incomplete schemes as defects liability periods become set at the end of the Program. Additional work required on schemes if contractors are unable to produce the quality required to complete the scheme successfully.	2	3	M	▪ Ensuring no new construction in the last year and a half before the end of the program. ▪ Reinforce financial penalties for contractors who work over their allotted work schedule. ▪ Ensure sufficient site supervision resources are available at each site to ensure issues are caught and dealt with quickly. ▪ Procurement processes for contractors focus on availability of resources for construction, past experience and include approval of site managers. ▪ Bids for construction projects which lie 20 per cent higher or lower than the CAVAC engineer estimates are not included in the evaluation.
Business Enabling Environment					

Risk Event	Potential adverse impact	Likelihood	Consequence	Overall Risk	Containment measures (risk treatment)
Insufficient interest from industry in developing or supporting business associations / advocacy agents.	Poor communication from industry to government on their needs; Limited industry capacity for self-organisation and self-development.	3	3	M	▪ Focus on the most progressive and non-political examples, and get them up and going as demonstrations of the potential role of industry associations; ▪ Develop a real advocacy role (eg through PPD), and therefore vested interest in supporting. ▪ Expose key decision-makers to the role of industry organisations in other countries.
Implementation of CAVAC becomes disconnected from on-going evolution of the Cambodian policy.	Disconnect occurs between government policy and CAVAC, and opportunities to influence RGC policy, framework and scale-up and sustain the benefits of CAVAC are lost.	2	2	L	▪ On-going engagement with MAFF and MOWRAM to monitor development of, and alignment with RGC policy; ▪ Adopt a flexible programmatic approach; ▪ Use the Policy Support Facility to support further development of the RGC policy.
Operational Management Risks					
Significant fall in AUD exchange rates result in contracted works exceeding Imprest limits.	Funds are not available to meet contract commitments at the end of the Program.	1	3	M	▪ Clear work plan developed and agreed with budget and commitments quantified. ▪ Monthly review of expenditure by team.
Conflicting and changing directions from the NSC.	Deterioration of the relationship with government partners.	2	3	M	▪ Consult with DFAT to manage the relationship and changing dynamic of the NSC. ▪ Work closely with MAFF and MOWRAM including with the DTLs to facilitate a smooth working relationship including within the NSC membership.
Inadequate consideration and integration of key cross-cutting issues, including gender, sustainability, environment and anti-corruption.	Reduced effectiveness of program and delivery of long-term impact.	2	3	H	▪ Ensure that there is continued understanding of these policies ▪ Enhance the involvement of women in all key management and decision-making structures. ▪ Continue to emphasise the importance of environmental preservation in CAVAC activities. ▪ Enhance local ownership by national staff and partners. ▪ Ensure contracts or agreements outline the Program approach to cross-cutting issues and that there is consistent understanding of these issues.
Staff turnover	Corporate memory is lost through staff	2	2	L	▪ Provide opportunities for staff to grow in their roles including

Risk Event	Potential adverse impact	Likelihood	Consequence	Overall Risk	Containment measures (risk treatment)
	movement. Staff motivation is decreased with regular staff movement. Towards the end of the program uncertainties may cause staff to leave premature leading to a reduced capacity to implement.				professional development and management responsibilities. ▪ Foster an environment which promotes effectiveness, openness and creativity / innovation. ▪ Monitor the likelihood and adjust the portfolio of activities accordingly. Hire temporary staff if needed to fill the gaps. ▪ Provide clarity on career opportunities and transition arrangements that may be available in CAVAC Phase 2
Procurement Risks					
Program funds are used for corrupt or fraudulent purposes	Otherwise sound procurement is disrupted and / or invalidated. Perceptions of broader program procurement is damaged.	2	3	M	▪ Provide appropriate staff training to all staff to ensure processes and procedures are clearly understood; ▪ Dealings with goods and services providers to be carried out strictly in accordance with processes and procedures in the procurement manual. ▪ Regular auditing of procurement and financial systems.
Undeclared conflicts of interest.	Integrity of procurement processes fundamentally compromised.	2	3	M	▪ Provide clear guidelines and declarations of interest required in all major procurement processes for civil works and consultancies.
Program procurement procedures are not adhered to.	Procurement activities fundamentally compromised.	2	4	H	▪ An international procurement expert and two local procurement officer appointed full time on CAVAC to manage all procurement processes. ▪ Detail clear procurement processes and procedures in the procurement manual and ensure adherence to these processes through consistent monitoring and clear delegation channels. ▪ Work closely with Cardno to quality assure and integrate procurement processes and templates from Cardno's ISO9001 Quality Management System
Misappropriation of CAVAC funds by staff and / or counterpart agencies.	Financial management fundamentally compromised, potential mismanagement of Australian tax payer dollars, damage to programs reputation with client, reduced impact of program and negative impact on staff morale.	3	3	H	▪ Clarify current procedures and processes to manage Program finances / administration and provide training for all staff. ▪ Payment to counterpart agencies for field trips will be paid strictly in accordance with government amounts with signed receipt at time of payment. These regulations are outlined in contracts with partner agencies. ▪ Ensure continued implementation of strong financial processes to locate inconsistencies.