Cardno
Shaping the Future

CAVAC Six Monthly Report
January–June 2015

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AFD	Agence Française de Développement
AIF	Agribusiness Innovation Fund
AQIP	Agricultural Quality Improvement Project
ATSA	Agriculture Technology Services Association
AUD	Australian Dollar
AWP	Annual Work Plan
BANTIC	Banteay Thleay Irrigation Community
BHG	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
EIA	Environmental Impact Assessment
EU	European Union
EWSI	East West Seed International
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
HARVEST	Helping Address Rural Vulnerabilities and Ecosystem Stability
HPC	Heng PichChhay
ICT	Information and Communication Technology
IFC	International Finance Corporation
IR	Indochina Research
IRRI	International Rice Research Institute
ISC	Irrigation Service Centre
ISF	Irrigation Service Fee
JJ	Jebsen and Jessen
KAP	Knowledge, Attitude and Practice
KRIC	Kampong Krasang Irrigation Community
MAFF	Ministry of Agriculture, Forestry and Fisheries
M&E	Monitoring and Evaluation
MODE	Minority Organisation for Development of Economy
MOWRAM	Ministry of Water Resources and Meteorology
MSG	Maly San Group Co., Ltd
NGO	Non-Governmental Organisation
O&M	Operation and Maintenance

PDA	Provincial Department of Agriculture
PDWRAM	Provincial Department of Water Resources and Meteorology
PLOVIC	Plov Touk Irrigation Community
PWS	Private Water Seller
QBIT	Queensland Biological Information Technology Group
RGC	Royal Government of Cambodia
RaPiD	Rice Pest and Disease Diagnostic Tool
SC	Secondary Canal
SEATV	South East Asia TV
SIF	Supplementary Investment Fund
SPM	Srov Pouch Meas, Co., Ltd.
TNA	Training Needs Assessment
TOT	Training of Trainers
UCA	United Cambodia Agriculture
UPL	United Phosphorus Limited
US	United States
USD	United States Dollar
UXO	Unexploded Ordnance
VVOB	Flemish Association for Development Cooperation and Technical Assistance

ANNEX 1: INTERVENTION UPDATES

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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: Inp 10.2	**AWP No: 1.2**	**Date: 30 June 2015**
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. The Cambodia Agricultural Value Chain Program (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:	▪ 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 carried significant risks. For example, risks relating to natural phenomena – 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. ▪ An intervention summary report has been produced to show completed activities, key findings during the implementation process, activity adjustments, and lessons learnt for this specific intervention.	
Next Steps:	None	
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 as mentioned above. At this stage, there seem to be no official seed producers/distributors for the varieties that best meet market demands.	

INTERVENTION UPDATE: Int. No: Inp 11.2	AWP No: 1.2	Date: 30 June 2015
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 yields.	
Achievements to Date:	Three rice seed production training sessions were conducted for 61 dry and wet season seed producers (including four staff members of the Provincial Department(s) of Agriculture [PDA]) 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. A draft intervention summary report has been produced to show completed activities, key findings during the implementation process, activity adjustments, and lessons learnt for this specific intervention.	
Next steps:	Finalise the intervention summary report.	
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 2015

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 Royal Government of Cambodia's (RGC) 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 such as yield increases. CAVAC expected farmers to better use inputs and adopt modern varieties that were appropriate for their conditions as a result of the intervention. Activities under this intervention spanned the period 2011-2013, and were closed in late 2014. CAVAC concluded that the intervention has achieved modest impact in terms of adoption, but has laid a foundation for more adoption, and more seed production to take place by itself if external conditions – such as market demand – become favourable in the future. Meanwhile, the problems with the market demand were beyond CAVAC's capacity to address at this stage.
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 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 were 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. CAVAC conducted two assessments in April 2013 and March 2014 to understand the adoption of modern varieties in these associations following paddy field demonstrations in 2011 and seed field demonstrations in 2012, and changes in association members/seed producers' Knowledge, Attitude and Practice (KAP). The assessments revealed that there was no real market demand for quality seed and due to this lack of market demand, half of association members stopped producing seed despite their knowledge gains on seed production. These assessments also indicated that the increase of production areas of modern varieties was 135 ha (91 households) in 2012 in three associations (Champei, Sre Cheng, Kvek), and 22 ha (64 households) 2013 in two associations (Boeung Nimul and Po Samroang). An intervention summary report was completed in January 2015.

Next Steps:	None
Lessons Learnt:	Both availability and adoption of modern varieties are largely dependent on or responsive to the market, i.e. higher paddy price, and consistent demands. Large buyers such as middlemen and rice traders are seen to play a key role in inducing production and adoption of commercially viable modern varieties; therefore, promotion of wet season modern varieties should concentrate more on working with these players and linking them to producers, rather than working with producers alone. In working with associations, it is important to assess their internal capacity, such as organisational structure, management skills and members' incentives, sufficiently before starting an intervention. That is because these factors determine their ability and commitment to carry out intervention activities properly, and therefore the success of an intervention.

INTERVENTION UPDATE: Int. No: Inp 12.9	**AWP No: 1.2**	**Date: 30 June 2015**
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 was 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. In the July-December 2014 period, CAVAC decided to close this intervention. An intervention summary report has been produced to show completed activities, key findings during the implementation process, and activity adjustments for this specific intervention.	
Next Steps:	None	
Lessons Learnt:		

INTERVENTION UPDATE: Int. No: Inp 12.10 AWP No: 1.2 Date: 30 June 2015	
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. Through this intervention, CAVAC planned to work with existing medium and large seed producers to improve their quality seed supply to the market. The intervention focussed 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, and it 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 and millers outside of its target provinces (Kampong Cham and Prey Veng provinces) to understand their rice seed production and business situation. Based on those contacts, CAVAC has found the following: ▪ Those seed producers received some kinds of training on seed production techniques from various non-governmental organisations/development programs. Those producers also faced the challenge of selling their seed, and thus produced good paddy instead of seed and did not get to apply proper seed production knowledge. ▪ Millers did not want to invest in the seed production business because they thought that this business was complicated and risky and that it should be a role of the government to ensure that farmers had good seed to use in order to meet real market demand.
Next Steps:	This intervention has been cancelled.
Lessons Learnt:	The rice seed market is complex from the policy to farmer level, which makes it challenging 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 therefore 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: Ext 10.1	**AWP No: 3.2**	**Date: 30 June 2015**
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 used 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 one of the leading fertiliser companies in Cambodia. CAVAC was working with HPC: ▪ to build HPC staff capacity on fertiliser use to enable staff to effectively operate help desks; ▪ to conduct more field demonstrations; and ▪ to 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 in these training activities was 447, of which 360 were farmers. ▪ Monitoring and 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 that 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 the first six months of 2014, 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. ▪ In early 2015, CAVAC had an interview with the Deputy Director of HPC to capture signs of sustatinability of the intervention. Around 20 field demonstrations were conducted in 2013 and 15 in 2014, most of which were mainly managed by its retailers. These numbers are lower if compared to the number of field demonstrations implemented in the intervention, but they were conducted with greater focus on ensuring each demonstration was of a higher quality quality. The company will keep the number of field demonstrations in 2015 in this range and will focus on wet season rice farmers as their knowledge on fertiliser use is still low. ▪ Though CAVAC is not satisfied with the quality of HPC's farmer workshops in terms of the effectiveness of information transfer, to the company, farmer workshops are an important marketing tool to promote the company's brand at a large scale and not only a fertiliser knowledge transferring tool. In previous years, the company conducted three to four workshops per year, but in 2015 it plans to do 10–15 workshops. The company estimated that 10%-20% of the workshop participants would be retailers and 80%-90% would be farmers, with an average total number of participants around 100. CAVAC understands that the superior knowledge transfer channel is through trained retailers. ▪ The intervention summary report was completed.	

Next Steps:	None
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 had shifted its focus from quantity to quality.

INTERVENTION UPDATE: Int. No: Inp 10.1	AWP No: 1.2	Date: 30 June 2015

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 maximum incomes. 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, thereby 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 have a greater focus 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 product supply chain and services as well as its retailers' and wholesalers' confidence in distributing fertiliser. The assessment was to find out if there was adulteration of Ye Tak's fertiliser within the supply chain and how fertiliser was adulterated.
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. At that time Ye Tak had five technical staff members that provided information services. ▪ In the first half of 2014, CAVAC conducted an assessment to measure change in 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. ▪ CAVAC finished capturing static and dynamic sustainability signs for this intervention. ▪ An intervention summary report was drafted. **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'. The study highlighted some claims about issues relating to adulterate quality of fertiliser leading to lower rice yields on farmer fields. However, the sample size of the study was too small, while the study was based largely on assumptions relating to farmer perception. There are many factors leading to lower yields from year to year. More precise study and analysis should be undertaken. At this stage, CAVAC concluded that the fertiliser quality issue is still in doubt and remains in observation.
Next Steps:	None

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. CAVAC must also consider the company's ability to commit time and staff capacity to implement the intervention in advance.

INTERVENTION UPDATE: Int. No: Inp 12.4	**AWP No: 1.2**	**Date: 30 June 2015**
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 less effective 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 '4Rs – '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 four 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. ▪ Within the second half of 2014, CAVAC conducted an assessment on the KAP change at the company level. ▪ The sustainability signs for this intervention were captured and incorporated in the sustainability report for the fertiliser market. It seems that no company has used major contents of the training curriculum but most have used pictures from the training to add into their extension materials.	
Next Steps:	None	
Lessons Learnt:	Most participants committed to apply the training in practice and showed their eagerness to maintain the network among participants from the training. Participating companies, which also sell pesticides, asked CAVAC to organise a similar training for best practice in pest management. Participating companies distributed 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 investigated ways that fertiliser training could focus on application advice in order to facilitate the largest possible potential yield increase. Most fertiliser companies conducted farmer meetings as part of their information services. They conducted a large number of meetings, and those meetings did not prove to be very effective. CAVAC now has a good understanding of how this service can be improved. After the training, all companies believed that village retailers play an important role in communicating directly with farmers. It has now been observed that some companies have put more focus on village retailers within their information services.	

INTERVENTION UPDATE: Int. No: Inp 12.5	AWP No: 1.2	Date: 30 June 2015
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 inconsistant 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; and ▪ 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. In May 2013, CAVAC decided to drop this intervention based on the results of its fertiliser KAP survey in early 2013.	
Next Steps:	None	
Surprises, Adjustments or Problems:		
Lessons Learnt:		

INTERVENTION UPDATE: Int. No: Inp 12.6	**AWP No: 1.2**	**Date: 30 June 2015**
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 activities are providing training in crop production to farmers using the company's products and field demonstration. However, the quality of its training and field demonstration were limited due to the poor technical knowledge of staff and limited understanding of effective methodology for these two activities. 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, 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 the first half of 2014, CAVAC conducted an assessment with 12 BHG staff members (including management staff). The assessment found the following: ▪ Participants were generally satisfied with the training. ▪ Fertiliser recommendations for four soil types in the areas around Tonle Sap (Bakan, Kbal Po, Tuol Sam Rong and Krakor) were updated after technical staff had received intensive knowledge of soil types and their characteristics from the training. ▪ BHG staff members were more confident in providing information services, such as farmer meetings, field demonstrations and technical assistance. ▪ BHG was also supplying organic pesticides to the market as there was a growing opportunity in the pesticide market within Cambodia. It has been observed that Bayon Heritage had a big change in its business operations after the staff training. To the Managing Director of Bayon Heritage, CAVAC's training activities contributes 3% to the change. CAVAC collected data to assess farmers' KAP changes due to the training conducted by Bayon Heritage staff. Based on CAVAC's recent observation in June 2015, BHG currently imports and distributes three types of chemical fertiliser (15-15-15 + TE, 15-15-15 and 16-16-8 + 13S).	
Next Steps:	▪ Analyse data and write a report on the assessment of the farmers' KAP. ▪ Write an intervention summary report	
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 2015

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 then requested support for effective retailer training. HPC and CAVAC shortly later planned 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 would conduct retailer training without CAVAC's support. In addition to retailer training, the company also requested CAVAC's 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 was to find more economically efficient fertiliser recommendations for the benefits of Cambodian farmers at large, both for wet season and dry season rice cultivation. Ten experiments were planned, five of which would be conducted with direct support of a selected technical consultant. This selected consultant would also provide mentoring and coaching to HPC's staff, as well as retailers who were involved in the activity. The other five field experiments would be managed by either HPC staff or HPC retailers (or both) so that they could 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. ▪ Four village retailer training sessions have been piloted by trained HPC staff in Takeo, Kampot, Prey Veng, and Battambang respectively, with 121 participants in total, including 20 females. The first two training sessions were conducted with technical support on participatory approaches from a CAVAC consultant, while the last two were 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 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. ▪ In May 2015, CAVAC conducted an assessment to verify and update the number of farmers who had obtained advice from retailers trained by HPC, the number of farmers who had changed their fertiliser application according to the advice , The results of the assessment are being finalised. ▪ A field experiment protocol was developed and shared with relevant HPC staff and retailers. ▪ Two dry season field experiments were removed from the analysis mainly because of the consultant's mismanagement of the fields. Four additional dry season field experiments were later cancelled per the company's request with the reason that it did not have manpower to implement the work as field experiment, unlike field demonstrations, demanded greater efforts. ▪ One wet season field experiment was completed. The prolonged drought in the 2014 wet season damaged the seedlings of one field and later two more fields were damaged due to severe infestation of rice blast, leaving only one field valid for experimentation. ▪ Based on the data analysis from the valid wet season rice field experiment, the two fertiliser treatments in experimentation provided similar yield. However, it is difficult to derive any meaningful conclusion from the experiment, as there was no replication. ▪ Currently the company still uses its initial fertiliser recommendations since the field experiment showed that the new treatment did not produce any difference in yield from its current recommendation, though results were based on only one case. ▪ After the fourth retailer training with CAVAC finished in July 2014, the company has not yet independently organised any training. The company is very satisfied with the training model and the improvement of its main trainer. Based on the company's current plan, a similar kind of traininig will only be provided per request from retailers and agricultural cooperative clients.
Next Steps:	▪ Write an intervention summary report.

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. However, the chance of failure of the field demonstration is high as it seems that this is an additional role of retailers in their business, and if they do not take ownership of it and commit with action plan to manage it, the demonstration can fail, impacting more negatively on the companies. Field experiments are complicated and time-consuming. The anticipated work process of field experiment should be communicated to the company in details to help it deliberate whether it has enough resources and strong commitment to undertake the work. Selecting a right consultant is also a critical aspect to a successful intervention. The company should take lead in selecting and managing responsible consultant(s) since it owns the intervention activities.

INTERVENTION UPDATE: Int. No: Inp 12.11	AWP No: 1.2	Date: 30 June 2015

Name:	**Supporting a fertiliser company in its retailer training and retailers' field demonstrations**
Summary:	After seeing the results and lessons learnt from the 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 sessions 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 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 level retailers, to be conducted by staff trained through group fertiliser training (from Inp. 12.4). This will allow staff to practise 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 its staff are competent in transferring this knowledge to retailers. The knowledge on this protocol will be transferred to selected trained retailers, who will conduct field demonstrations on their own fields. 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:** ▪ A 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 have been integrated into the curriculum. ▪ Seven village retailer training sessions have been conducted with trained staff facilitating some parts. An improvement plan from each training session has been integrated into the next training session, to ensure ongoing improvement. ▪ An assessment of trained retailers' KAP was conducted. Findings revealed that retailers had some level of technical knowledge but showed a thin link to Ye Tak's training as they have also received similar training from different companies/ institutions; many did not provide fertiliser advice because farmers did not ask for, and those who provided advice also pointed out that farmers could not follow the advice due to water unavailability and budget. ▪ A KAP assesment at the farmer level was conducted; however, analysis of results was yet to be finalised. **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 developed. ▪ Sixteen field demonstrations (eight in dry season and eight in wet season) were reportedly conducted, but six of them (five dry season and one in wet season) did not produce good results due to retailers' failure to comply with recommended techniques and destruction by natural disasters such as floods. Along with these field demonstrations, ten field days were also reportedly conducted. ▪ Eight field demonstration activities under this intervention could not be completed due to water shortage during the wet season of 2015. As a result, CAVAC and Ye Tak agreed to close this intervention given their inability to extend these activities beyond CAVAC's operation timeframe by September 2015. ▪ CAVAC interviewed Ye Tak Technical Manager in January 2015 to capture signs of sustainability of this intervention and has found the following: 1. PDAs in Siem Reap, Kandal, and Kampong Cham invited Ye Tak to provide lectures in their training to provide licenses for input retailers. It was estimated that 200 input retailers joined the training in the three provinces. 2. Ye Tak has used the training materials developed with CAVAC's support as presentations in the 2014 linking events organised by CAVAC in Kampot, Takeo, and Kampong Thom.

	3. Ye Tak has used the training materials to conduct five training sessions for about 50 model farmers in Battambang and Banteay Meanchey provinces in November and December 2014.
Next Steps:	▪ Settle outstanding payments for field demonstration activities already conducted. ▪ Finalise analysis results of the farmers' KAP survey. ▪ Write an intervention summary report.
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 2015

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 existing field demonstrations, which more closely resemble one-off field tests of products, and farmer meetings as a requirement for growth. Involvement of successful farmers in these information service activities is at the centre 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 twofold; 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 that of field days is nine. Activities under this intervention were carried out from in the November 2013 to January 2015 period. An initial KAP assessment showed positive changes in the company's delivery of information services. The company has adopted the participatory approaches in field demonstration management introduced by CAVAC.
Achievements to Date:	▪ Following the first three pilot fields and field days, a guideline on effective field demonstration management was developed for Papaya, incorporating lessons learned from the first 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 Kampong Cham office, and to staff in Battambang office by Papaya's focal person. ▪ Ten paddy field demonstrations and six field days were conducted by Papaya's focal persons in Kandal, Kampong Cham, Banteay Meanchey and Pursat following the suggested guideline. CAVAC provided constant feedback on the field demonstrations in Kandal and Kampong Cham. ▪ An assessment was made to understand Papaya's KAP change and signs of sustainability. Findings were positive with trained staff gaining better understanding of the principle of participatory approach in field demonstration management and with the company satisfied with the field demonstrations' results and intending to embrace them in its information services for paddy as well as other crops. ▪ At the farmer level, a KAP assessment was extrapolated from the findings of Maly San Group's assesement for the reason that certain main characteristics of these companies are similar. The findings suggest that 37% of farmers participating in field days have changed their practice. In Papaya's case, this suggests that 78 farmers have changed their practice because of Papaya's field demonstrations.
Next Steps:	▪ Write an intervention summary report.
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. Before conducting field demonstrations, companies need to ensure that sales of their fertiliser are available to farmers, i.e. available from local retailer stores or if not, it can be delivered with minimum cost and time; otherwise the result will not be effective, because despite interest, farmers cannot buy the fertiliser to try, let alone to use consistently. Economic analysis is the key part in field day to ignite farmers' interest in the demonstrated technology, as they can see clearly benefits of following the recommendation(s).

INTERVENTION UPDATE: Int. No: Inp 13.6 AWP No: 1.2 Date: 30 June 2015	
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. Later, however, small meetings to assess willingness of field demonstration farmers were added prior to the field demonstrations. Activities under this intervention, including monitoring KAP changes at the farmer level were completed in June 2015.
Achievements to Date:	▪ A technical consultant for field demonstration management was recruited to oversee the field demonstrations and coach MSG's staff on the field techniques. His contract, however, was later terminated as MSG found his performance unsatisfactory after the first field demonstration. MSG technical manager has taken over the role of the terminated consultant. ▪ Two farmer meetings were conducted, and CAVAC provided necessary feedback for future improvement. ▪ A field demonstration guideline was developed and oriented to all field staff. ▪ The staff have applied what they had been trained on (the field demonstration management guideline) in six field demonstrations: two wet season fields in Kampong Cham and four dry season fields in Kandal. Two field days were organised for those field demonstrations. ▪ CAVAC conducted a KAP assessment of Maly San's staff regarding their implementation of the field demonstration management guideline, and found that the staff trained had improved their practice in field demonstration management. They visit their fields more frequently. The company, in addition to its agreement with CAVAC, has conducted another 60 field demonstrations independently from June 2014 – April 2015 in seven provinces. ▪ In April 2015, CAVAC conducted an assessment of outreach among farmers attending MSG's field days, to ascertain who had had a chance to try/apply new knowledge in the next season. The results showed that farmers' knowledge was enhanced, and 37% of those assessed (192 farmers) changed their practice, i.e. to use the recommended products, to increase application from 1–2 to 2–3 times, and to increase the fertiliser amount in the next planting season. These farmers on average share the knowledge to 11 other farmers.
Next Steps:	▪ Write an intervention summary report.
Lessons Learnt:	Assessing partners' demand for support can be challenging if insufficient information is supplied by the key personnel responsible for the activity. During the initial discussions to determine the type of support MSG would need from CAVAC, the technical manager of MSG was not involved. This led to the decision to recruit a technical consultant to support MSG in the management of the field demonstrations. It was only when MSG's technical manager made a complaint about the consultant's unsatisfactory performance, and a subsequent request for the termination of his contract that it was clear that the consultant had not been the real demand, because the technical manager would be able to manage the technical aspects of the field demonstrations sufficiently. Spaces for continual learning and adjusting are crucial for companies to improve their extension activities. During the course of three field demonstrations with MSG, MSG has shown efforts to constantly experiment advice provided by CAVAC to improve its field demonstrations and farmer meetings. Following the essence of the guideline developed for managing its field demonstrations, MSG has adjusted a number of activities to increase the efficiency of its activities, including: - replacing farmer meetings of about 25 people with small and quick meetings of about 10 people; - negotiating a deal with field demonstration farmers that require them to pay for their own inputs while the company provides only full technical support; and - conducting big field day events (one field day for two-three demonstrations) to disseminate information on its field demonstrations.

INTERVENTION UPDATE: Int. No: Inp 13.6	AWP No: 1.2	Date: 30 June 2015
Name:	**Supporting a fertiliser company to develop fertiliser recommendations**	
Summary:	An international consultant hired by CAVAC to work 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-economic factors 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: i) to develop better fertiliser recommendations for Anachak on the selected soil types and ii) 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). Two 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 to develop detailed experimentation protocols and to mentor Anachak staff to operate experimentation and data analysis.	
Achievements to Date:	▪ 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. ▪ Four field experiment protocols were developed based on different soil types for wet season rice for different four provinces (Pursat, Battambang, Takeo and Kampong Cham). Experimentation in Takeo was cancelled because of bad drought in 2014. The wet season field in Kampong Cham was totally destroyed by rat. ▪ The data on wet season field experiments in Pursat and Battambang was analysed by CAVAC's consultant. The results from the wet season field experiments only provide a weak conclusion that treatment F6, using 65N-37.5P-25.75K per hectare for Somaly variety in Battambang province and treatment F5 using 80N-45P-38K for Sen Kro Ob variety in Pursat province were likely to perform better than other treatments in terms of yield. Nevertheless, the company decided to use these results to update its fertiliser recommendations. ▪ Anachak has two staff and recruited two temporary staff to manage field experiments. They were trained by consultants to implement the work. The two staff who were recruited as temporary staff to manage field experiments have become Anachak's full time staff. ▪ The two dry season field experiments in Kampong Cham and Prey Veng were completed. However, the IR 504 field in Kampong Cham lacked water during the flowering stage so there was no grain. The remaining usable data is being analysed by Anachak's staff with mentoring support from CAVAC's consultant. In order to ensure accurate results, CAVAC will analyse the data and compare the results with those from Anachak's staff.	
Next Steps:	▪ Closely follow up with the consultant and Anachak's staff to get the results from the dry season fields. ▪ Analyse the dry season data from the field experiments in Kampong Cham and Prey Veng. ▪ Follow up on the company's plan on dissemination of the updated fertiliser recommendations and other information services. ▪ Write an inventory summary report.	
Lessons Learnt:	There was a delay in starting this task due to the challenges in recruiting qualified consultants to implement the task. Field experiment management requires time, skills and resources to make sure everything follows the protocol in order to produce results as planned. Company partners in particular need to plan in advance to make sure all required resources are available during the implementation of the work. Because the company asked the farmers who own the fields to make the bunds for experiments and look after the field while company staff only monitor and check the progress, some farmers were not	

	happy with the implementation, with specific complaints relating to the required workload. Moreover, there is potential that the company relies too much on farmers for daily field monitoring. This can have an effect on the result of the experimentation. Therefore, the company has to minimise the roles of farmers and deploy their own staff in each experimentation site. Although good planning was done for the field experiment, there were many external factors which impacted the field experimentation. For instance, farmers could not make the bunds in some field experiments after the soil was harrowed because the soil type was enriched with sand; the field was damaged by rat infestation and pest outbreak; and there was a shortage of water at the beginning of the experiment.

INTERVENTION UPDATE: Int. No: Inp 13.9	AWP No: 1.2	Date: 30 June 2015
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 within the company in the long-run.	
Achievements to Date:	▪ Staff capacity building on fertiliser use, rice production, and participatory approaches was provided to Lay Seng's staff by relevant consultants. ▪ Mentoring support in four pilot farmer meetings was completed. Farmer meeting presentation slides were jointly developed between the company staff and a CAVAC consultant. The presentation slides were printed on posters, to be used in farmer meetings. Noticeably, posters have completely replaced PowerPoint presentation slides, as they are much more conveniently used in open air and better tailored to farmer meetings. ▪ The farmer meeting guideline based on four pilot farmer meetings was developed by CAVAC (English and Khmer versions) and shared to the company for use as needed. ▪ On the job training for Lay Seng staff on four field demonstrations in Takeo and Prey Veng provinces was completed. ▪ A field demonstration guideline incorporating the experiences and lessons learned from the four field demonstrations was updated by Lay Seng staff with support from CAVAC's consultant. ▪ Due to Lay Seng's interest the Rice Pest and Disease Diagnostic Tool (RaPiD), CAVAC provided the company with a generic version of RaPiD usable in both mobile devices and computers to enable the company staff to diagnose pest and diseases for farmers during their extension activities.	
Next Steps:	▪ Assess practice changes of farmers who attended Lay Seng's farmer meetings. ▪ Write an intervention summary report.	
Lessons Learnt:	The involvement of both the management staff and extension staff while implementing the agreed activities resulted in better quality of implementation. This is because the management staff could see the gaps within the company's extension activities, and thus were motivated to boost commitment of their staff to minimise the gaps altogether, leading to a faster practice change at the company level. Where a company really sees its own need for cooperation with CAVAC, chances of success within that intervention are high because the company staff are very enthusiastic, committed, willing to take the lead in all activities and open for improvement.	

INTERVENTION UPDATE: Int. No: Inp 11.4 and 12.1 AWP No: 1.2 Date: 30 June 2015	
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 Nokorthom Agricultural Development – a local pesticide company which imports pesticides from Vietnam for distribution within Cambodia. The company understands that information services are a strong component of product marketing. CAVAC's first intervention with Nokorthom 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, Nokorthom 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 Nokorthom'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 Nokorthom's information service providers were produced. ▪ CAVAC's M&E team conducted an assessment on the satisfaction of Nokorthom's staff trained under the capacity building intervention. In general, the company staff were satisfied with the training. ▪ CAVAC noticed changes within the company after the capacity building project had been completed. In early 2012, Nokorthom decided to double its sales volume. It then recruited more technical staff, improved information system materials, expanded information system activities and improved its product packaging. ▪ The information system strategy for the company was developed by an international consultant and completed in early 2013. Nokorthom was 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 based on the most updated report: o The company's field staff gained more knowledge on pest management. o The company's information services were not very satisfactory. Only 33% 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. Only 22% of farmers have changed their practice due to Nokorthom's farmer meetings. Meanwhile some emergency interventions have generated fairly good results – about 30% of farmers have changed their practice and many others have adopted some field practice. Farmers receiving emergency services were satisfied with the services. Some other challenges were observed – for instance, it was hard to meet with farmers who conducted field demonstrations. However, the only two farmers with whom CAVAC met were very satisfied with the effectiveness of Nokorthom's product in controlling pest. ▪ Based on discussions with the company in September 2013, the information dissemination strategy recommendation framework became a valuable asset for the company, both in the short and long term. It was evident that the company had started implementing some of the recommendations from the framework. However, in May 2015 Nokorthom was taken over by ANNONG Group, a pesticide company in Vietnam. Under the new management, the implementation of the information dissemination strategy recommendation framework has been put on hold, while Nokorthom is in the process of restructuring and forming new business strategies. This could be a good sign for the company improvement to continue competing in this dynamic market.

Next Steps:	▪ Write an intervention summary report.
Lessons Learnt:	Due to lack of domestic experts in pest management, Vietnamese trainers were selected for the Nokorthom 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 always to face new problems or new disease breakouts in the field. It has been observed that companies with strong technical human resources compete better in the market than companies with less technical human resources. Therefore, technical human resources is critical for the pesticide business, while it is not really the case for fertiliser companies. Nokorthom was started as a family-owned business. Many parts of its operations needed to be adjusted in order to accommodate the recommendations from the information dissemination strategy. As a result, Nokorthom could not incorporate all the recommendations into its implementation as planned and expected. To speed up the process, Nokorthom needed further support.

INTERVENTION UPDATE: Int. No: Inp 12.2	AWP No: 1.2	Date: 30 June 2015
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, resulting 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 in 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 replacing farmer meetings is field days upon completion of its successful field demonstrations. CAVAC has therefore decided to stop its M&E activity at that stage.	
Achievements to Date:	▪ The General Directorate of Agriculture (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 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. ▪ The company's focal point for CAVAC has been replaced since early 2014. The new focal point does not have any knowledge about the joint-activities between SPK and CAVAC, making the communication difficult. After many attempts to follow-up with the company, in late August 2014 CAVAC sent an official letter to SPK to inform the company of the remaining work within the agreement – leaflet printing – and gave the company a timeframe by which they should implement the remaining work (until 31 October 2014). The letter did not result in any action from SPK; therefore, the agreement between SPK and CAVAC was closed on 31 October 2014. ▪ An intervention summary report has been developed.	
Next Steps:	None	
Lessons Learnt:	A half-day orientation session is not sufficient to enable company 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 2015

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 pesticides; 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. With 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:	▪ A TNA was conducted. ▪ CAVAC and An Giang agreed to assess An Giang's previous training to find what could be improved in the 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. ▪ An Giang sent a copy of training materials to the GDA for comments. After about six months, the GDA provided feedback on the materials. The GDA suggested An Giang to change the picture of a man spraying pesticide without protecting himself to the one wearing safety clothing. Moreover, the GDA asked An Giang to show all active ingredients of all recommended pesticides in the training materials. ▪ 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. ▪ Eleven retailer training sessions were conducted by June 2015. In the first four sessions, An Giang worked closely with CAVAC to conduct the training sessions (as part of the training curriculum improvement and mentoring activities CAVAC agreed to work closely with An Giang's trainers in order assist the company to conduct more effective training). The last seven sessions were conducted by An Giang independently and randomly monitored by CAVAC. ▪ Improvement to the training materials and training methodology was done continuously after each of the first four training sessions. ▪ CAVAC continued monitoring An Giang's retailer training implementation and observed that it would need further improvement. CAVAC and An Giang agreed to have a reflection session among An Giang's trainers. The session was conducted in January 2015. The following points were proposed for improvement: a) Training should be conducted over half a day, preferably in the afternoon (13h30 to 17h30), b) The company should focus on trying to attract the main sellers to join training, c) the company should invite both An Giang and non An Giang retailers, d) When inviting attendees to the training, An Giang staff should ask the retailers which pests they have difficulty with when recommending customers how to control effectively, e) Modify the training slide presentation, f) Pre and post tests should be strictly conducted, and g) An Giang should seek assistance from the PDAs to identify non An Giang retailers. ▪ The Ministry of Agriculture, Forestry and Fisheries (MAFF) now strictly requires input companies to ask permission first before conducting any extension activities. An Giang received approval for its extension activities for 2015. ▪ An Giang proposed to CAVAC to reduce the number of retailer training from 50 to 41 sessions with the timeline up to the end of August 2015. ▪ CAVAC conducted a quick assessment with trained retailers of An Giang in June 2015. The results

	were not satisfactory. CAVAC plans to put much more effort to ensure that the next training sessions are of a good quality, especially to ensure that An Giang implements the agreed improvement points from the reflection session.
Next Steps:	▪ Continue monitoring training conducted by An Giang to ensure that improvement points from the reflection session are seriously implemented. ▪ Amend the agreement between CAVAC and An Giang to extend the completion date, to change the payment schedule and to reduce the number of training sessions.
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 joint training activities. This approach can also be adapted in other similar situations. It takes around six months to get comments from the GDA on the training materials.

INTERVENTION UPDATE: Int. No: Inp 13.4 AWP No: 1.2 Date: 30 June 2015	
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 worked 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 was used to develop training materials and methodologies for pesticide retailer training to be conducted in partnership with PDAs. This retailer training was different from the retailer training conducted by pesticide companies. Pesticide companies focus on their products in their training, but this retailer training focused on the active ingredients needed in pest control. The training curriculum included 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 was expected that this intervention would provide comprehensive and neutral knowledge to pesticide wholesalers / retailers so that they would 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 would be available for stakeholders (agricultural officials, non-governmental organisations [NGOs], private companies, and development programs). PDA teams working on this intervention would become good local sources of knowledge linking to retailers as well as farmers.
Achievements to Date:	▪ The 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 was completed. A dissemination workshop to launch the manual was conducted. This manual was also used as a reference to design the training curriculum for this joint pesticide retailer training with the PDAs. ▪ CAVAC also provided two technical training sessions on the pesticides for Kampot and Kampong Thom PDAs and one training session on the participatory methodology for Kampong Thom PDA. ▪ Several testings were conducted with pesticide retailers and farmers to get feedback on the training curriculum and materials. The feedback collected each time was used to improve the curriculum and materials. ▪ During the implementation, CAVAC also conducted a few feedback sessions to improve quality of the training and made some adjustments to the training curriculum and methodology. ▪ The pesticide retailer training for the three target provinces was completed: two training sessions in Kampot with 23 paticipants (19 males and four females); five training sessions in Takeo with 63 particpants (50 males and 13 females); and eight training sessions in Kampong Thom with 90 participants (65 males and 25 females). ▪ CAVAC started conducting an assessment to check retailers' knowledge and how retailers transferred knowledge to farmers.
Next Steps:	▪ Complete the assessment on retailers' knowledge and how they transfer knowledge to farmers. ▪ Write an intervention summary report.
Lessons	Before the TNA, CAVAC and the PDAs planned to invite all pesticide wholesalers / retailers to join

Learnt:	this training. However the findings from the TNA indicated that it would be better to invite only wholesalers / retailers who were willing to join the training. Asking retailers to list and prioritise their problems and to choose what topics they wanted to learn at the beginning of the session resulted in retailers maintaining strong focus throughout on the training. Selecting a right training location significantly contributed to successful training. When the training was conducted near retailer shops (within their districts), retailers did not need to stay overnight, leading to higher attendance and especially higher involvement from female retailers who often were main sellers. It is preferable that training is conducted in the afternoon, as more retailers are likely to participate. This is because retailers are extremely busy selling the products in the morning but tend to have some free time in the afternoon.

INTERVENTION UPDATE: Int. No: Inp 13.5 AWP No: 1.2 Date: 31 December 2014	
Name:	**Supporting a local pesticide company in implementing its information dissemination strategy**
Summary:	Nokorthom is a local pesticide company importing pesticides mainly from Vietnam. CAVAC previously supported Nokorthom in staff capacity building (Inp 11.4) and information dissemination strategy development (Inp 12.1). With the intention to optimise the benefits of embedded information services, Nokorthom approached CAVAC for further collaboration. A new agreement was signed, to facilitate a new intervention encompassing the company's key staff capacity building, development of a diagnostic tool, improvement of the company's operational systems and farmer training, and retailer coaching.
Achievements to Date:	▪ Staff capacity building was conducted for Nokorthom technical staff by trainers from Vietnam. ▪ The rice pest and disease diagnostic tool (RaPiD) was developed and provided to the company. Nokorthom also completed inputting the company's pest management advice and product information into the tool to customise it for the company's usage. The company installed it in three tablets for its field staff and one computer at the company office. ▪ CAVAC conducted training on how to operate RaPiD and provided some limited field training/practice for Nokorthom staff in Takeo, Kampot and Kampong Cham. ▪ The two remaining activities (i.e. improvement of the company's operational systems and farmer training and retailer coaching) have been cancelled. The cancellation resulted from the company's having been taken over by ANNONG Group. CAVAC understands that the company's focus at the moment is on restructuring the company and competing sales via wholesaler and retailer networks.
Next Steps:	▪ Write an intervention summary report.
Lessons Learnt:	Field practices appear to be very helpful to company field staff, assisting them to better understand how to operate RaPiD. It is challenging to get a number of retailers to attend a collective retailer training session. It therefore seems more feasible to undertake one-on-one retailer coaching instead of providing training for a group of retailers. Moreover, important messages can be passed on more effectively in a one-on-one session.

INTERVENTION UPDATE: Int. No: Inp 14.1 AWP No: 1.2 Date: 30 June 2015	
Name:	**Supporting a pesticide company to improve its information services for farmers through the use of a rice pest and disease diagnostic tool (RaPiD)**
Summary:	Nileda is a local pesticide company providing pest solutions for farmers in eight provinces of Cambodia. To improve its services by providing better solutions for farmers and to gain a competitive advantage over its competitors, the company has entered into a partnership agreement with CAVAC to integrate RaPiD into its current advisory services. It is planning to install RaPiD in 20 Android smart phones used by staff of the company. As RaPiD is a database of technical information on pesticides, the company expects that the more company staff use the tool, the more technical knowledge on pesticides staff will gain, leading to improved efficiency and effectiveness of the company's information services (including retailer coaching, farmer meetings, and field demonstrations). CAVAC expects that, with better information from using the tool, retailers' knowledge can be improved through the company's retailer coaching activities. As a result, CAVAC expects that retailers will provide better solutions to farmers. Likewise, sales staff will be able to better diagnose farmers' problems in the field and provide better solutions. Together, they will promote proper use of pesticides through which environmental impact will be reduced along with farmers' yield loss.
Achievements to Date:	▪ An agreement between CAVAC and Nileda was signed. ▪ Nileda finished inputting the company's pest management advice and product information into RaPiD to customise it to become the company's own tool. The mobile version of RaPiD has been developed.
Next Steps:	▪ Monitor the company's use of RaPiD and provide assistance if needed. ▪ Write an intervention summary report.
Lessons Learnt:	RaPiD was new to both CAVAC and the company. Creating the mobile version of RaPiD was time-consuming when detailed requirements had not been known from the beginning, leading to several errors. A detailed guideline from the software/programming company outlining what was required to develop a mobile version of RaPiD from the outset would have significantly helped both CAVAC and the partner company.

INTERVENTION UPDATE: Int. No: Inp 14.1 AWP No: 1.2 Date: 30 June 2015	
Name:	**Supporting a local pesticide company to improve its agronomic advisory system through integration of a rice pest and disease diagnostic tool (RaPiD)**
Summary:	The United Cambodia Agriculture (UCA) is a local company offering quality assured agricultural inputs to farmers, value-added with best-practice extension advice delivered through mobile commercial agronomists and in-store based advice. In order to improve services for its farmers, the company focusses on using Information Technology. UCA views the use of RaPiD as aiding its operations through increased staff capacity and confidence in pest diagnosis, which in turns helps build trust among farmers whose benefits will affect the sales of the company. For this purpose, CAVAC agreed to provide UCA with RaPiD, which will be implemented through two approaches: i) Mobile Commercial Agronomists using RaPiD on tablets, and ii) In-store based Commercial Agronomists using RaPiD on computers. It is expected that, with better information provided by the tool, UCA's agronomists will have better knowledge and confidence in pest diagnosis, leading to improved pest management advice for farmers. As a result, CAVAC expects this will result in a reduction in yield loss and an increase in income for farmers who utilise advice provided by UCA.
Achievements to Date:	▪ An agreement between CAVAC and UCA was signed. ▪ UCA has been inputting its own pest solutions into RaPiD in order to customise it to become the company's own database. The customisation process has taken a significant amount of time due to some miscommunication within the UCA team.
Next Steps:	▪ Continue supporting UCA in RaPiD customisation. ▪ Monitor the company's implementation of the tool.
Lessons Learnt:	The concept of RaPiD was not understood clearly by the technical staff member in charge of inputting UCA's pest solutions into the tool, largely because the UCA Director who understood the concept of RaPiD well during the initial discussions with CAVAC did not completely share this knowledge and information. Due to this lack of understanding, the technical staff member in charge failed to see the intended use of the tool, leading to UCA's slow progress of RaPiD customisation.

INTERVENTION UPDATE: Int. No: Inp 14.1 AWP No: 1.2 Date: 30 June 2015	
Name:	**Supporting a local pesticide company through the use of a rice pest and disease diagnostic tool (RaPiD) and improvement of its existing information services**
Summary:	With lack of proper support from public institutions on best practice of pest management, local pesticide companies face challenges relating to technical knowledge on pesticides and information system activities. Companies to do not possess sufficient technical knowledge and effective information system activities to pass on proper knowledge to farmers who are the ultimate customers of pesticides. Solutions to those challenges will benefit both companies and farmers. Angkor Green is a local pesticide company actively providing information services to farmers. The company expresses a commitment to grow in the highly competitive market using information systems as a marketing tool. Currently, Angkor Green implements field demonstrations, village-based farmer meetings, larger-scale farmer meetings and retailer/wholesaler meetings as its core information system activities. Through various discussions, Angkor Green and CAVAC have entered into a partnership agreement to improve Angkor Green' information services through the following activities: ▪ Building capacity of Angkor Green staff through introduction to RaPiD (which serves as a database of technical information on pesticides and assists training on pesticide resistance management). Angkor Green plans to equip its technical staff with tablets to access RaPiD so that they can use RaPiD in their field activities. Moreover, it plans to install RaPiD in one PC in the head office for any calling in for technical advice. ▪ Improving village-based farmer meetings and larger-scale farmer meetings. ▪ Improving field demonstrations.
Achievements to Date:	▪ An agreement between Angkor Green and CAVAC was signed. ▪ Angkor Green has been inputting its pest management advice and product information into RaPiD to customise it to become the company's own tool. ▪ Angkor Green, with support from CAVAC, successfully produced both the computer and mobile versions of RaPiD. Twenty out 35 technical staff members of Angkor Green were equipped with mobile devices with RaPiD. A computer version of RaPiD was installed in three computers of Angkor Green in the head office. ▪ A three-day training session (one day of in-class training and two days of field practice) about RaPiD was conducted in early May 2015. Thirty-five technical staff members of Angkor Green participated in the training. ▪ A two-day training session on the pesticide resistance management was conducted for Angkor Green staff. ▪ CAVAC and Angkor Green met three times to discuss improvements to Angkor Green's farmer meetings, village-based farmer meetings, and field demonstrations.
Next Steps:	▪ Monitor the company's use of RaPiD. ▪ Monitor the company's implementation of farmer meetings, village-based farmer meetings and field demonstrations after the improvement discussion. ▪ Write an intervention summary report.
Lessons Learnt:	In the three-day training session on RaPiD, the in-class session on theories was conducted before the field practice but it turned out that the company's staff did not gain much knowledge from the in-class session, leading to less successful field practice. It is likely to work better if staff are sent to the fields to use RaPiD first, so they have an understanding of the major obstacles and challenges preventing them from using RaPiD accurately. Once they are aware of these challenges, the trainer can provide the required training in order to fill the knowledge gap.

INTERVENTION UPDATE: Int. No: Inp 14.1 AWP No: 1.2 Date: 30 June 2015	
Name:	**Supporting a local pesticide company to improve its agronomic advisory system through integration of a rice pest and disease diagnostic tool (RaPiD)**
Summary:	While the fertiliser business of HPC is growing well, the pesticide business – which is only a small segment of the company's business at the moment – has a potential to become the company's new focus in the long term. Facing such prospects, HPC expressed desire to customise RaPiD to become the company's database, in order to integrate the tool into its information services for farmers, and to use it as a training resource for its staff in pest identification and management. The tool will be installed in staff's computers and smartphones. The tool should improve the pest management knowledge of the company's staff. Likewise, the company will introduce the tool to retailers to help them provide better solutions to their farmer customers. Technical improvement of both the company's staff and retailers is seen as a short term benefit whereas the long-term benefit is the pesticide brand image building of the company. Ultimately, the company, retailers, and farmers will all share benefits from this intervention. Better information will promote proper use of pesticide to farmers, which in turn will reduce negative impact on the environment and yield loss to farmers and result in higher sales to retailers and the company.
Achievements to Date:	▪ An agreement between CAVAC and HPC was signed. ▪ HPC has been in the process of customising RaPiD to become the company's tool.
Next Steps:	▪ Support the company in RaPiD customisation.
Lessons Learnt:	Though RaPiD is a user-friendly application, it is very new to agriculture extension companies and staff. On-going support is needed from CAVAC to produce company-tailored RaPiD.

INTERVENTION UPDATE: Int. No: Inp 14.1 AWP No: 1.2 Date: 30 June 2015	
Name:	**Supporting a pesticide company to improve its information services for farmers through the use of a rice pest and disease diagnostic tool (RaPiD)**
Summary:	Jebsen and Jessen (Cambodia) (JJ) distributes crop protection chemicals known as BAYER CropScience products to Cambodian farmers. The company's goal is to provide farmers not only with high quality products but also with necessary knowledge to get the most benefits out of the products while maintaining safe use standards for crop protection users and end consumers of the agricultural products. To do so, the company's technical staff, wholesalers and retailers need to have the capacity to transfer complicated technical knowledge to farmers in a way that is as simple and clear as possible. By using RaPiD, the company aims to increase its success rate in supporting its technical staff, wholesalers and retailers with consulting services they need to give to their farmer customers. This in turn will increase the company's likelihood to have successful business operations. The company aims to use RaPiD for marketing, extension, and training purposes to help develop the knowledge of its staff, wholesalers and retailers on rice pests and their control. The company expects that the tool will enable its staff and stakeholders to recommend optimal solutions to the farmers/end-users which are good for the environment, food safety, and agri-business. Seeing the benefits of RaPiD that also aligns with the company's existing interest, the company aims to develop a similar kind of tool for animal health.
Achievements to Date:	▪ An agreement between CAVAC and JJ was signed. ▪ A guideline and necessary software and documents have been provided to JJ to help the company prepare for RaPiD customisation.
Next Steps:	▪ Support the company in customising RaPiD.
Lessons Learnt:	

INTERVENTION UPDATE: Int. No: Inp 14.1 AWP No: 1.2 Date: 30 June 2015	
Name:	**Supporting a local pesticide company to improve its agronomic advisory system through integration of a rice pest and disease diagnostic tool (RaPiD)**
Summary:	Hen Chen Investment Co., Ltd. is a local company working closely with distributors, farmers and communities. It aims to share/exchange knowledge and experiences related to crop solutions and protection and farming productivity improvements. With products and services supplied to 22 provinces in Cambodia, Hen Chen aims to ensure quality support through extension services to its clients (wholesalers, retailers and farmers). Presently, Hen Chen implements field demonstrations, village-based farmer meetings, larger-scale meetings with farming communities, and retailer/wholesaler meetings as its core information system/extension activities. Hen Chen views the use of RaPiD as an aid to its operations through increased staff capacity and confidence in pest diagnosis, which will in turn build trust among farmers and retailers whose benefits will affect the sales of the company. For this purpose, CAVAC agreed to support Hen Chen to access and customise RaPiD, so that the tool can be implemented via two platforms: i) RaPiD on tablets and ii) RaPiD on computers. In addition, CAVAC has agreed to support Hen Chen to improve village-based farmer meetings, larger-scale farmer meetings, and field demonstrations. It is expected that with better information provided by the tool, Hen Chen's marketing and extension staff will have better knowledge and confidence in pest diagnosis, leading to improved pest management advice to retailers and farmers. CAVAC expects that this will ultimately improve the knowledge and practices of farmers, hence result in a reduction in yield loss and an increase in income for farmers who utilise advice provided by Hen Chen.
Achievements to Date:	▪ An agreement between CAVAC and Hen Chen was signed. ▪ Hen Chen has been customising RaPiD by inputting the company's pest management solutions into the database. ▪ CAVAC conducted a field visit to Hen Chen's village-based farmer meeting and provided feedback to the company to consider for improvement.
Next Steps:	▪ Continue supporting the company in RaPiD customisation. ▪ Work on improving the company's field demonstrations, village-based farmer meetings, and larger-scale farmer meetings.
Lessons Learnt:	Companies and CAVAC should anticipate some challenges in terms of time and resources required for customisation and operational process when working on a new information technological tool like RaPiD. Given these challenges, companies face a number of constraints regarding time and capacity to deliver the agreed results within tight deadlines. Work plans should incorporate such challenges, particularly when working with companies that operate in a less-functional structure or in family businesses.

INTERVENTION UPDATE: Int. No: Mar 11.1	AWP No: 1.2	Date: 30 June 2015

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. Baitang 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 Baitang 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, Baitang is aiming to introduce good quality seed in its catchment area of rice production to improve the quality of milled rice. In addition, Baitang 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 Baitang 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 Baitang rice production community. The activities of this intervention include: ▪ July – November 2012: Training in paddy production for a photosensitive rice variety (First) ▪ November 2012 – February 2013: Training in rice seed production (Second) and rice paddy production (Third) for a non-photosensitive variety ▪ July – November 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 Baitang staff gave advice to farmers while reselecting and re-organising Baitang community members. Post-training feedback found that farmers thought the knowledge learned was very useful, and Baitang staff also informed their manager about this. The work plan for backstopping the company's staff in their work within the community was completed. However, the backstopping sessions were delayed due to the resignation of three of Baitang's trained staff members in February 2014, and the promotion of another trained staff member to a higher position in a different department. Baitang recruited five new staff members with agronomic backgrounds in April 2014. CAVAC then requested Baitang to redraft a backstopping plan based on the company's needs and remaining duration of the contract. However, Baitang and CAVAC could not implement the revised backstopping plan as a result of prolonged drought and floods near the end of the wet season in Battambang in 2014. As of the first half of 2015, there had not been any progress in the implementation of this backstopping plan. In June 2015 CAVAC sent an official agreement closure letter to Baitang. In January 2015, an interim assessment was conducted on the impact at the company and farmer levels. Although concrete impact from this intervention would be more apparent in 2016, there were some indications of early signs of sustainability. Baitang did not abandon its plan of improving paddy production in its community despite the staff movement. Baitang has recruited new staff members and modified the company's staff motivation policy to retain staff for a longer term. The company also tried various solutions for seed production and prepared a budget to seek further support or investment in this matter. Through its community staff information sharing, farmers in the Baitang community understood the importance of using quality seed in order to produce quality paddy. An intervention summary report was completed.
Next Steps:	None
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 for the farmers.

INTERVENTION UPDATE: Int. No: Mar 11.2	**AWP No: 1.2**	**Date: 30 June 2015**
Name:	**Feasibility study of warehouse receipt system**	
Summary:	Eighty per cent of Cambodian paddy 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. To be able to reach the target of exporting one million tons of milled rice by 2015, approximately three million tons of paddy must be available for local millers. Therefore, the constraints in acquiring 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 Baitang Kampuchea Plc. are the companies that have the highest usage of their milling capacity. However, the percentage of capacity utilisation of these companies is only around 30 percent. 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 all at 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	
Lessons Learnt:	No agreement was reached. No player in the Cambodian rice export market seems ready to be involved in the warehouse receipt system.	

INTERVENTION UPDATE: Int. No: Mar 12.1	AWP No: 1.2	Date: 30 June 2015
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 the FCRMA and the European Union (EU) and United States (US) markets. This has later been amended to include all potential markets. In 2012, 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% of the costs of trade visits and 45% of the costs of buyer visits. During the last six months of 2014, the FCRMA has diverted its market focus to emerging Asian rice markets. A member of FCRMA made trips to Malaysia, China, and Brunei, and hosted buyers from Malaysia and Europe. According to the FCRMA, trade and buyer visits greatly helped Baitang, a member of the FCRMA, in strengthening the company's relations with the existing and prospective buyers. The visits have resulted in new or renewed purchasing orders from buyers visited and hosted. Baitang as the leading company of the FCRMA has also sourced milled rice from other members to supplement the supply to new and existing buyers. In the first semester of 2015, the FCRMA did not undertake any visiting or hosting activity. An intervention summary report was completed.	
Next Steps:	Continues to support the FCRMA in trade visits and buyer visits if there are any.	
Lessons Learnt:	The purpose of the intervention is to give all members of the FCRMA an opportunity to network with prospective buyers. However, only one company, Baitang Plc, whose director is the chairman of the FCRMA has taken the opportunity CAVAC is offering. In early 2013, CAVAC conducted a meeting with other FCRMA members to make them aware of the opportunity and let them give CAVAC feedback. CAVAC has found that other members rely on the FCRMA to take the lead on market development activities. CAVAC understand that there are several reasons why other members do not participate in the market development activities, including: ▪ 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 ▪ members prefer that business meetings are 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. Nevertheless, other FCRMA members could benefit from the intervention indirectly as Baitang has sourced milled rice from them to supplement its export volumes.	

INTERVENTION UPDATE: Int. No: Inp 13.3	AWP No: 1.2	Date: 30 June2015
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 early 2014, 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:		
Lessons Learnt:	Changes in a partner's internal operations can occur unexpectedly. Such changes can significantly affect the partner's work plan with CAVAC.	

INTERVENTION UPDATE: Int. No: Inp 12.3 (B) AWP No: 1.2 Date: 30 June 2015	
Name:	**Vegetable farmers' practice change – East West Seed International**
Summary:	The supply of locally-produced vegetables is often constrained due to several factors, including: 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 farmers with knowledge across several areas, including knowledge pertaining to 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 partnered with a large vegetable seed company, East West Seed International (EWSI), 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. After completing the first round of collaboration, an amendment to the agreement with EWSI was made and the new activities started in February 2015. The agreement was modified to become an output-based contract with four activities, including four catalogue farms with field days, 30 cultivation and variety trials to compare different methods of growing or to compare different varieties, development of extension materials, and two vegetable collector workshops to build stronger relationships.
Achievements to Date:	▪ The first round of intervention activities were completed in August 2014. ▪ One hundred and ninety-one (191) field demonstrations were established with 31 cancelled midway due to i) demonstration farmers failing to abide by the terms and conditions of their contracts with the company, ii) lack of household labour to maintain the fields, iii) lack of water; and/or iv) pest and disease infestation. ▪ It was noticed that the remaining 160 field demonstrations experienced different profits depending on the type of crops they produced. Thirteen crops in total were demonstrated and out of 192 cases,[1] 150 had profited. The exact profit depended on the crops produced, and ranged from US$62 (sponge gourd) to US$423 (wax gourd) per 5 ares of production land. ▪ Eighty-five (85) field days were conducted with attendance of 2,388 farmers (640 females). ▪ Twenty-four (24) training sessions were conducted. Two of the 24 sessions were on pest and disease management by Filipino trainers. The other training sessions focused on seed characteristics, seed coating, and proper input usage including seedling tray, plastic mulch and trellis net. The participants for all training sessions included 35 input retailers (seven females) and 48 vegetable collectors (22 females). ▪ A mini-survey on the changes in knowledge, attitude and practice of vegetable collectors and demonstration farmers was conducted in June 2014. 10 out of 14 collectors have shared their knowledge on seed characteristics with an average of 24 farmers per collector. ▪ In the same survey, 35 demo farmers were interviewed. All of them knew the new techniques introduced by the company. 66% of those interviewed learned about the pesticide use, while some learned about the type of fertiliser and time to apply it as well as the pruning technique from the demonstration. However, 37% of those interviewed have not applied the knowledge yet because the interview was conducted in rainy season that is not a favourable time for farmers to grow vegetables. Among those who had a chance to apply the knowledge, 82% continued to use seedling tray, 73% plastic mulch, 86% trellis net and 100% used improved seed. When asked about the future plan, 97% farmers said they would continue to apply at least one of the four new techniques in their farming practice, while 80% of demo farmers have shared the knowledge from the field demonstration to vegetable farmers. ▪ During the first semester of 2015, EWSI established two catalogue farms cultivating more than 10 vegetable crops in each farm to showcase to farmers. As of May 2015, the company established 16 trial farms of which 12 were in Kandal and four in Kampong Cham. Two field days of the catalogue farms were conducted with 120 participants in Kampong Cham and 33 participants in Kandal. Those participants included farmers, vegetable collectors, one vegetable seed distributor, one seed dealer, and the local authorities. Besides these activities, the company's field staff continued to monitor old field demonstration plots and do monthly information collection on market demand and vegetable prices in different marketplaces, and vegetable seed prices at seed shops.
Next Steps:	▪ Continue monitoring the company's planned activities and provide assistance when needed.

[1] The number of cases equals the number of crop cycles, rather than the number of field demonstrations, as each demo farmers can produce up to three crop cycles.

	▪ Conduct an outreach assessment.
Lessons Learnt:	▪ Frequent and constant monitoring by 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 customised to fit the availability of participants. The longest duration should be one day, and information regarding training needs should be gradually collected by the field staff when they do regular technical and other follow up to input retailers and vegetable collectors. The company should also target smaller-sized input retailers and vegetable collectors as these groups have more time to attend trainings and to advise and further promote technologies with their customers and farmers. ▪ Most vegetable collectors are unsure about the potential benefit of, and have no interest in, providing advice to farmers. Field staff must therefore be mindful of the importance of including the business case into their activities with collectors so that they are convinced about information sharing to farmers. ▪ Some failure in adoption was due to the misunderstanding by farmers that they have to apply all the techniques introduced by the company, which is not necessary and seemingly more expensive. Therefore, all farmers participated in field days must be made aware of the detailed information on cost and returns and the option of adopting the whole package or a single technology according to their own interest and needs. ▪ Sustainability of the intervention relies on the success level of the company. It is interesting to see the company trying different methods to improve its product flows and services to reach out to more farmers, and it is important that CAVAC assists them in such efforts. More specifically, EWSI since the first month of 2015 has been trying to be more commercial and build stronger relationships with market actors to get better information on market demand. ▪ It makes sense for a company to have separate teams for sales/promotion and extension. A clear division between these two teams/functions allows each team to have a clear focus and not to compromise the quality of either work.

INTERVENTION UPDATE: Int. No: Inp 12.3 (A) AWP No: 1.2 Date: 30 June 2015	
Name:	**Vegetable farmers' practice change – Pacific Seeds**
Summary:	The supply of locally-produced vegetables is often constrained due to several factors, including: 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 by 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) and cultivation techniques, and to demonstrate how improved use of inputs and cultivation techniques contribute to an increase of farmers' income. Trained participants 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. ▪ The budget and contract amendment are being renegotiated. 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 to 31 October 2015. ▪ The company managed to select one competent field technician but the delay in implementation has caused the initial recruit to move to another company. Therefore, the company is still in the process of recruiting staff to manage the demonstration plots and training activities.
Next Steps:	▪ Finalise the budget and contract amendment and start the implementation of model plots.
Lessons Learnt:	▪ It is very important for CAVAC staff to gain a strong understanding of the local situation, especially within new target provinces. 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 2015
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:	Continue ensuring 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 assume that vegetable seed retailers do not have enough time to provide advice, particularly those for whom seed selling is not their core business. 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 2015

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. In order 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 started a pilot UNI-MART in Battambang province, with the intention of replicating the model in other provinces if successful. This approach 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 its 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 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 was conducted for the UNI-MART staff by the experts from Pacific Seeds (Thailand) and UPL (Vietnam). ▪ Two staff members were assigned to attend training in Thailand for three weeks in September 2014. The important topics covered included design and development of promotional materials, marketing, sales, storage arrangement, financial management, and agronomy. ▪ CAVAC conducted interviews with some input retailers and farmers to check their knowledge and practice on maize production. These interviews showed that in general, the training conducted by the UNI-MART served as a refresher to retailers, but also covered some new content relating to the seed characteristics and new crops such as sunflower. The interviews also highlighted that farmers were facing some challenges, such as corn borers in some locations. Based on these interventions, CAVAC provided recommendations to the company to improve its future training. ▪ A new UNI-MART store was launched in Kampong Cham in December 2014. The field activities of the UNI-MARTs have now reached nine provinces: Battambang, Banteay Meanchey, Kandal, Kampong Cham, Kampot, Pailin, Pursat, Siem Reap and Thbong Khmum. ▪ As of May 2015, the UNI-MART (two stores) has conducted 54 training sessions on corn production for farmers, and another four sessions for seed retailers. In total, the company has reached 1,848 farmers and 47 seed retailers. ▪ CAVAC has been negotiating for an extension of the contract that will combine three interventions, the UNI-MART, Pacific Seeds Model Plots and the RaPiD Diagnostic Tool, together as an output-based contract, in order to better manage the activities under the same company management.
Next Steps:	▪ Continue providing feedback and guidance to the UNI-MART team to improve their training activities. ▪ Assist the UNI-MART in incorporating RaPiD Diagnostic Tool in their activity by providing necessary training to its implementing staff members. ▪ Ensure the printing of extension materials are completed and distributed by the end of the project.
Lessons Learnt:	▪ Technical training should be provided to input retailers who sell directly to farmers. It has been observed that dealers – both big and small – who are located in the production areas do sell directly to farmers. However, retailers at provincial markets tend to distribute seed to their sub-dealers and only sell directly to big farmers. These province-based retailers usually are too busy to advise farmers. ▪ Corn borers usually appear in rainy seasons. The company needs to provide further training to farmers on borer control. ▪ Most farmers use foliar fertiliser while very few use granular fertiliser. The company already started to introduce the latter which proved to have a better effect on crop growth. However, there is still a need to emphasise the difference between these fertilisers to farmers during the company training.

	▪ Maintaining availability of seed and introducing varieties that are suitable for different seasons is crucial to the company. So far, only one variety has been introduced. The supply of seed was not on time, causing one innovative farmer to spend much more money on seed from Thailand even though it was provided by the same company. This can be detrimental to a new company who is trying to penetrate the market and competing with other already well-established companies such as C.P. Cambodia and Pioneer. CAVAC can play a role in feeding this information back to the UNI-MART. ▪ Proposed activities should be in accordance with the company's available workforce to avoid any unnecessary delay in implementation. ▪ The double roles of extension staff and sales/promotion staff of the company can affect the quality of extension work. CAVAC should therefore be careful when facilitating work with such a company, to manage activities so that they do not result in the company compromising the quality of extension work.

INTERVENTION UPDATE: Int. No: Ext 11.1	AWP No: 1.2	Date: 30 June 2015
Name:	**Support to a media agency to produce a quality agricultural TV program (drama)**	
Summary:	While economic growth in urban areas is more visible, rural growth – especially in agriculture – is largely neglected. Information relating to agricultural livelihoods is important and can at the same time attract a large number of the rural audience. However, current Cambodian TV channels do not cater for rural audiences, instead focusing mostly on urban lifestyles. Advertisers have little choice but to sponsor existing TV programs. CAVAC has helped 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. Through this national drama program, advertisers would have a chance to promote their products and build their brands, especially among rural customers, instead of sponsoring programs that feature the urban needs. At the same time, a production house like Delight Cambodia can generate income from the activity. Potentially, this business model could be 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 agricultural 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 (FGDs) 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 approved by 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 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 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. Delight 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 approached CAVAC to seek support for the outstanding costs. CAVAC agreed to provide further support. In May 2014, Delight signed a contract with MyTV, a local TV channel, to air 27 episodes of the drama on Mon-Tue-Wed nights (6-7pm), starting from September 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 to get ready for the airing on MyTV. In September 2014, Delight started airing the drama on MyTV. As a result of the initial airing , there was an increase in the number of main sponsors (on MyTV side) from one sponsor to three. There was similarly an increase in the number of TV advertisements (loose spots) during commericial breaks from 22 to 25, which showed an improved level of interest in the drama from other advertisers. In November 2014, Delight finished airing the drama on MyTV. In December 2014, CAVAC conducted a survey to calculate the farmer outreach of the drama (farmers who have changed and/or will change their practices due to the drama). Based on the survey, 196,893 farming households have claimed to have changed and/or will change their practices according to the drama. Delight has been looking for sponsors for its second season of the drama since the completion of the	

	airing of the first season of the drama. Delight now sees more opportunities in the rural market, beyond its intervention with CAVAC. In May 2015, Delight signed a contract with Southeast Asia TV (SEATV) to produce 'Bun Phum', a linking event where businesses are invited to exhibit their agricultural and consumer products. Delight wants to manage the event with SEATV, while providing entertainment and advertising components of the event. This activity is independent of CAVAC's portfolio, however results from the drama activity with CAVAC.
Next Steps:	▪ Follow up on Delight's next wave of the drama (if any). ▪ Keep monitoring 'crowding-in' to ascertain whether this business model has been copied by others. ▪ Follow up on Delight's other activities (in addition to the drama) that result from this intervention with CAVAC.
Lessons Learnt:	Sponsors pay lower fees to place their advertisements in other TV dramas because of relatively lower production costs of those dramas compared to that of Delight's drama. It also appears that advertisers in Cambodia have not yet seriously considered the quality and popularity of different TV programs at this stage of the media market within the country; however, there are signs of increasing interests after the airing of Delight's drama. There should not be a boundary when defining prospective advertisers. Input companies should be targeted; however, they do not always have enough budget to cover the significant expense involved in TV publicity. Therefore, other large companies like Unilever or microfinance institutions deserve a significant focus especially when they also focus their sales in the rural areas. Deciding and processing intervention activities are very time consuming, due to many unplanned factors ranging from company's internal management to external factors like getting an approval from MAFF. Production and other related activities should be well-costed and negotiated during early planning stages. The number of sponsors required to break even or make profits should be thoroughly scaled to avoid undesired problems along the way. MAFF approval processes should also be well communicated in advance to avoid long delays.

INTERVENTION UPDATE: Int. No: Ext 13.1	AWP No: 1.2	Date: 30 June 2015

Name:	**Support to media research companies**
Summary:	The potential 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. There are many factors which have resulted in a lack of research into 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 sought to share some of these risks so that one or more research companies could kick-start research services that disaggregated 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 (IR) and Feedback Research to conduct the media consumption research and TV ratings, respectively, in the rural areas.
Achievements to Date:	**IR – Indochina Research** Under a cost-sharing agreement, CAVAC supported IR 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 companies that were interested in the rural market and media outlets. The IR was able to sell the first wave of its research to at least seven buyers and use the results of that research to inform its other research activities and reports. In May 2014, the IR collected feedback from its clients to improve the next wave of research. In June 2014, the IR finalised its questionnaires for the second wave of research, and started the research process. In September 2014, the IR finished the second wave of the research and started selling the research immediately. Overall, IR believes the research is important and adds value to other research it conducts. Therefore, the IR said that it would continue conducting this kind of research, however, on an adhoc basis when there is no support from CAVAC. CAVAC understands the rationale behind this approach, since IR is not specialised specifically in media consumption research despite being a leading research company. CAVAC understands that fierce competition in the industry will drive the company to focus on what it is best at. **Feedback Research** Under a cost-sharing agreement, CAVAC has been 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. When the data was ready for sale, Feedback Research boosted interest from the target clients on its first rural TV program rating by advertising on newspapers, magazines and the social media. In July 2014, Feedback Research launched an event to sell the research findings. Feedback Research also captured comments from participants to improve the next wave. At the event, Feedback also featured its new service of 'branding' using the rural TV program rating. In September 2014, Feedback Research started the second wave of the TV program rating in the same provinces as the first one. The data collection was completed in November 2014. Feedback launched an event to sell the results of its second wave of research on 4 February 2015. Solidus Media bought the data from Feedback; however, the other potential buyers unfortunately said they already bought data from other research companies. Feedback needs to have a different marketing strategy to attract more buyers.
Next Steps:	▪ Monitor Feedback's third wave of TV program rating. ▪ Work with Feedback to figure out ways to increase its sales of research.

Lessons Learnt:	The sampling and methodology should remain the same from one wave of research to the next in order that the data collected be easily compared through a series of time. This time-series data can be of significant value to buyers who need to compare different situations and timings. The mindset of 'rural means poor' is rooted among many players in the market although there has been a very significant increase of spending in the rural areas. Urban areas are still targeted by many advertisers, although competition in these markets is very fiece given the large number of advertisers and relatively small consumer base. Therefore, a convincing proof of the rural market's potential is needed when negotiating with possible partners. Demonstrating the importance of the rural media research findings within the media market at this stage is critical for raising people's interests especially when the product (the media research findings) is still new to the market. Since there is not yet a law to protect research companies from buyers further selling the research, it is still a big risk for research companies to invest in big rural media research. Therefore, in order to tackle this issue, either the companies try to provide valuable consultancy services along with their research data to make their products unique, or the government tries to reinforce the Cambodia's law on Copyright and Intellectual Property Rights. There should not be a boundary when defining prospective advertisers. Input companies are definitely targeted; however, they are not always the key consumers of research. Therefore, other big companies like Unilever deserve a significant focus especially when they also focus their sales in the rural areas.

INTERVENTION UPDATE: Int. No: Ext 10.3 and Ext 14.1 AWP No: 1.2 (Previously 3.2)

Date: 30 June 2015

Name:	**Activities with model farmers to improve model farmers' roles and knowledge**	
Summary:	Through extensive literature review and field discussions / observations with farmers, CAVAC understands 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 tailored 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 was 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 fertiliser KAP survey with 1200 samples 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 informally defined as Super Model Farmers. To support and stimulate this group and to disseminate innovation to other model farmers, CAVAC has a long-term plan to collect and disseminate their innovation stories through roadshows. To stimulate more innovation among these innovative farmers, CAVAC has developed 'challenge fund' and 'competition' activities. Under the challenge fund, selected farmers with innovative ideas receive financial support from CAVAC to assist them in conducting their experiments. Input companies are 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. As the Kampot training team finished conducting the training in all the wet season rice producing villages in Kampot, the team was assigned to move to Takeo to assist trainers there. Between January and June 2015, 123 training sessions using modified content and methodology were conducted: 56 in Takeo and 67 in Kampong Thom. Since the start of the model farmer training task, 1,576 training sessions were conducted: 608 in Takeo, 437 in Kampot and 531 in Kampong Thom. (Cumulative figure adjusted based on a new training database) On average, members of 10 households attend each training session. So far, there have been 18,151 model farmer households attending the training. (Cumulative figure	**Dry season** *Roadshows:* By 30 June 2015, CAVAC had conducted 128 roadshows: 97 in Takeo, four in Kampot and 27 in Kampong Thom. Roadshows in Kampot were completed in September 2014 after all rice growing villages in Kampot were reached (Kampot has fewer villages compared to Takeo and Kampong Thom). In total, 2,379 model farmers attended the roadshows. Thirty-six (36) innovative stories have been collected. However, only 15 stories have been used frequently due to their relevance to most farmers' constraints and the abilities of super model farmers to present in the roadshows. In each roadshow, selected super model farmers acted as agents of knowledge transfer to model farmers. Each roadshow's content and materials were continuously modified and updated to maximise the knowledge captured by model farmers. For each roadshow, pre and post evaluations were conducted to capture change in farmers' knowledge and to further adjust the content of the roadshows. Evaluation results were aggregated and analysed monthly. The evaluation from January to April 2015 indicated that on average each model farmer increased their knowledge on each topic trained in the roadshow by 87%, and that at least 90% of them earned more knowledge to some extent. CAVAC's internal survey with 68 samples shows that 90% of model farmers who attended the roadshow have changed or will change their farming practice due to the roadshow. The survey also shows that 69% of model farmers attending the roadshow will contact Super Model Farmers if they have any

	adjusted based on a new training database) In January 2015, CAVAC conducted 12 FGDs; six with trained model farmers and six with farmers to understand sustainability in terms of information sharing from trained model farmers to farmers. The results of the FGDs indicated that each trained model farmer shared information with 4–10 neighbour farmers, and trained model farmers were more confident in doing so. Based on the FGDs, trained model farmers were also more active in seeking information. To ensure sustainability of the model farmer intervention, the lists of trained model farmers were provided to four companies: Hen Chen, Hwang Long, Nelida and Angkor Green to contact for their extension activities. For each modified training session, pre and post training evaluations are conducted to capture any increase in farmers' knowledge and to further inform adjustments in the training. Evaluation results are aggregated and analysed monthly. Trained model farmers were randomly selected for training evaluation. However, as the topics of training were selected according to the actual needs of model farmers, not all model farmers participated in the evaluations across all the training topics. 1,486 model farmers trained from January to June 2015. Amongst all training topics during these five months, the most trained topics were fertiliser and weeds, and the least trained topic was leaf folder, and the average increases in knowledge amongst model farmers were indicated as follows: ▪ Fertiliser: 86% ▪ Weed: 88% ▪ Brown Plant Hopper 71% ▪ Rice blast 89% ▪ Caseworm 80% ▪ Leaffolder 86% ▪ Stemborer 94% ▪ Safe use of pesticide 89%	questions in the future. **Challenge Fund:** As an outcome from engaging 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. Two of the eight farmers were excluded from the activity in June 2014, due to non-compliance with the proposal and fund requirements. The 'challenge fund' topics revolved around rat control techniques during the dry-season rice cultivation season. Among the six remaining farmers, only two farmers had noticeable destruction from rats in their areas. The other farmers reported that there were almost no rats in their areas in 2014. CAVAC found that rat control techniques employed by the two farmers facing destruction from rats were effective when their fields were compared to their neighbours' fields. However, CAVAC could not conclusively ascertain whether their techniques were more cost effective because both farmers spent much more money and labor to control rats while their neighbours took almost no actions against rats. CAVAC produced a note describing rat control techniques of all farmers participating in the challenge fund. The challenge fund activities have concluded after the first round due to challenges in measuring the effectiveness and efficiency of the techniques. *Competition:* CAVAC partnered with an input company, Nileda Co., Ltd, to conduct a competition among lead farmers to find effective ways to control blast and stemborer in Takeo and Kampong Thom. The intervention with Nileda commenced in October 2014. 12 farmers were selected to join the competition. Unfortunately, Nileda's staff member who was assigned to manage the competition works on a commission basis for the company and the period when he had to monitor the competition was a peak farming period. Therefore the staff member did not spend enough time on monitoring the activity as agreed. This led to poor recording of participating farmers' performance change and undermined the ability of CAVAC and the company to determine effectiveness of farmers' techniques and to select the winner. As a result, CAVAC terminated the contract with the company in February 2015.
Next Steps:	**Wet season** ▪ Continue conducting wet season training for model farmers towards September 2015. ▪ Continue collecting feedback on the training materials, methodology and curriculum for wet season model farmer training and notify trainers on changes if necessary.	**Dry season** ▪ The roadshow intervention was concluded at the end of April 2015.
Lessons Learnt:	The previous model farmer training for wet-season rice farming 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. When working with a private company, it is important to check the type of contract it has with staff assigned to work with CAVAC. If the staff contract is based on a commission basis, staff tend to put much more focus on the responsibilities associated with that commission, affecting the joint collaboration between the company and CAVAC that is not commission-based.

INTERVENTION UPDATE: Int. No: Ext 11.2 AWP No: 1.6 (Previously 3.2) Date: 30 June 2015

Name: **Support to MAFF for extension materials**

Summary: The objective of this intervention was to develop stronger linkages between permanent sources of information (GDA, DAE, and the Cambodian Agricultural Research and Development Institute [CARDI]) and input suppliers and agribusinesses through the publication of science-based materials to support stronger rice productivity.

Achievements to Date: CAVAC supported MAFF in printing extension materials that MAFF considered as priorities. The DAE of MAFF has reported that the published materials have been distributed to relevant PDAs, district offices of agriculture, commune councils, non-governemental organisations (NGOs), private companies, and farmers. The list of MAFF's extension material publications supported by CAVAC is indicated as below:

No	Extension material publication	Type	Quantity	Supported partners
1	Technology Package for Increasing Rice Productivity	Book	20,000	CARDI
2	Soil Profile	Banner	2,775	CARDI
3	Fertiliser Rate	Banner	2,775	CARDI
4	Growing Techniques for Rice Intensification	Book	10,000	Rice crop department, GDA
5	Farmers' Success Stories on Growing Fruit Crops	Leaflet	80,000	DAE, GDA
6	Rice Production of the Ten Varieties	Banner	450	DAE, GDA
7	Vegetable Production	Leaflet	80,000	DAE, GDA
8	Manual on Operation and Maintenance of Power Tiller	Book	1,000	DAE, GDA
9	Vegetable Production	Book	650	DAE, GDA
10	Use of Drum Seeder	Book	11,500	DAE, GDA
11	Pailin Longan Production	Book	1,500	DAE, GDA
12	Use of Ploughing Machine	Book	1,000	DAE, GDA

*Support to printing MAFF's magazines five times was not included on the list as magazines were not considered as extension materials.

Next Steps:

Lessons Learnt:

INTERVENTION UPDATE: Int. No: Ext 11.3 AWP No: 1.2 (Previously 3.2) Date: 30 June 2015	
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 HARVEST. CAVAC has not provided any soft copies of information materials to NGOs over the period from January to June 2015.
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 2015	
Name:	**Linking events**
Summary:	CAVAC's Linking Event intervention aims to develop stronger links between model farmer households and other permanent sources of information, such as: PDAs and CARDI; input suppliers; and agribusinesses. By establishing and facilitating such links, access to knowledge is likely to improve. Therefore, if the events succeed in creating these linkages, sustainable access to better support, markets and information may be achieved. In 2011 and 2012, CAVAC 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. After conducting the first round of events, CAVAC had discussions 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 decided to continue paying for these activities as the purpose of the intervention was to build networks among all actors within agricultural input markets. A key output of the events is building strong networks. This output negates the need to conduct commercial events regularly. The strong relationships between model farmers and other permanent sources of information significantly contribute to the sustainability of the information channel from model farmers to other farmers. In early 2014 CAVAC decided to embark on a new program of linking events to strengthen linkages of 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 discussion indicated that the events were viewed positively, and those input companies that had attended previous linking events gave several suggestions to consider for future events. 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 focussed mainly on the interactions between trained model farmers and representatives of input companies. The interactions would be enforced through facilitators who encouraged discussions and networking. An event organiser, Hybrid Advertising, was contracted to conduct the events in 2014. CAVAC and Hybrid discussed and agreed that each participating company needed to cost-share/contribute US$50 for each booth at one event. A linking event in Takeo was held for one and a half days on 17–18 October 2014 with 337 model farmers attending. The first full day (17 October) was designed for invited model farmers, and in the morning of the next day (18 October) the event was opened to the public. Based on the observation and feedback from the companies participating in the event in Takeo, the event in Kampot with participation of 338 model farmers on 14 November 2014 was shortened into a one-day event with two sessions: one for the invited model farmers (morning until 4pm) and the other for the public (4–8pm). A discussion with input companies after the event in Kampot indicated that the event in Kampot has significantly improved compared to the first event in Takeo. Just after the event, a company, Malysan Group, mentioned that it would visit model farmers to look for a possibility to conduct field demonstrations as requested by model farmers visiting their booths. The event in Kampong Thom was conducted on 5 December 2014 with 21 companies and 390 model farmers attending. In total,1,065 model farmers and 52 retailers from the three provinces attended the linking events in 2014. During each event, Hybrid conducted a survey to evaluate the success of the event and the willingness of model farmers to contact the companies after meeting the company representatives in person at the events. CAVAC has reviewed the data from these three surveys and has given feedback to Hybrid for report finalisation. Evaluations after the events in 2014 showed that 58% of trained model farmers would contact company staff if they encountered problems.
Next Steps:	Conclude the intervention with an intervention summary report.
Lessons Learnt:	Linking event is potential in increasing the likelihood that model farmers will contact input companies and/or other permanent sources of information.

	CAVAC has learned from the 2014 linking events that facilitators played an important role in encouraging interactions between input company representatives and model farmers. Moreover, entertainment sessions were replaced by small sessions of questions and answers as provocative interaction between input company representatives and model farmers in addition to booth visits. Additional materials such as highlighters and envelopes were provided to participating model farmers to facilitate prioritisation of potential and interesting companies that each model farmer will be most likely to contact later. The 2014 linking events have also shown that events without a significant entertainment agenda could fulfil the main objective of linking model farmers with other permanent sources of information much more effectively. However, this lack of entertainment led to much less interest in the events from the public as CAVAC had anticipated.

INTERVENTION UPDATE: Int. No: Ext 11.6 AWP No: 1.2 (Previously 3.2) Date: 30 June 2015	
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 response to this feedback, CAVAC developed a menu database equipped with a diagnostic tool to assist with pest control queries. The tool has been developed and introduced to Asia Master and various input companies.
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 agricultural information service was 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. It was planned that this diagnostic tool would 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. After much hard work and many trial and errors, 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. This tool has received great interest from eight enterprises who have now signed agreements with CAVAC to use this tool. To understand whether non-technical individuals (those without any/much background on pests and agriculture) can successfully use the tool, CAVAC conducted a two-day test with three non-technical operators in August 2014 focussing on Takeo farmers. On the first day, the average success rate among the three operators was fairly low, with a success rate of 39%. However, there was a significant increase in the success rate for one enumerator on the second day; it went from 27% to 88%. As this rate was based on only one operator, CAVAC conducted two further tests with larger samplings in order to better understand the likelihood of success. The last two tests showed favourable results. CAVAC introduced the tool to Asia Master; the company was willing to invest in testing the tool and agreed to submit a plan to CAVAC. The main purposes of testing the tool were to establish the demand for information on pesticide from a call centre and to evaluate the correct rate of evaluation by call centre agents. In December 2014, CAVAC provided an orientation to Asia Master's call centre agents on how to use the tool as well as simple tips to interpret farmers' questions. In order to stimulate farmers' awareness and demand for a call centre service, CAVAC and Asia Master agreed to promote this call centre service via town criers in areas where farmers started broadcasting dry season rice seed in January 2015. The promotion was conducted from February – March 2015, using a variety of promotional methods. Town criers announced the call centre in two communes; Thnoat Chum and Kampong Thmar communes in Kampong Thom province. The agent of the call centre made direct calls to 16 model farmers in three communes; Thnoat Chum, Tbong Krapeu and Kampong Ko communes in Kampong Thom. Text messages were also sent to Metfone subscribers in Kampong Thom. After the promotion, the number of calls to the call centre increased from around 200 to 846 per day on average. However, there has been no call from Kampong Thom for agricultural information. As such, CAVAC concluded that there was no farmer interest in getting agricultural information through call centres. CAVAC finished the contract with Asia master and withdrew the diagnostic tool from Asia Master's call centre.
Next Steps:	Conclude the intervention.
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 call centre agents is necessary. Success of a call centre depends on the willingness of farmers to proactively use the phone/call centre in gathering advice on how to control pests and the ability of call centre staff to learn in a real call centre environment. The test with non-technical individuals in August 2014 found out that the accuracy of pest diagnosis using the tool was higher when farmers had affected plant samples in hand while calling for the diagnosis compared to when farmers described the pest symptomps from memory. The rate of diagnosis accuracy was 39% if a farmer had a sample of rice plants in hand while calling to describe the symptoms as opposed to 19% when he/she was describing the symptoms from memory. The call centre is a new media tool for which Cambodian rice farmers are not ready. It may take time for this tool to become popular among Cambodian rice farmers.

INTERVENTION UPDATE: Int. No: Irr 10.1 AWP No: 2.3 Date: 30 June 2015	
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 4 km 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 km 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 Banteay Thleay Irrigation Community (BANTIC – the Farmer Water User Community [FWUC] of the PRASAC canal constructed in 1997) structure and capacity building activities for this FWUG were completed in July 2012. Restructuring of BANTIC (a 15-year old FWUC) that was completed in the previous reporting period has had some positive impact on the performance of Krapum Chhouk FWUG.
Achievements to Date:	**Engineering** Construction commenced in April 2010 and was completed in June 2010. The community later requested that the canal be extended for an additional 1.5 km 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 March 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 and third year, all farmers started to grow two crops per year. **Operation and Maintenance (O&M)** CAVAC commissioned the Provincial Department of Water Resources and Meteorology (PDWRAM) of Takeo 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. This FWUG is part of the structure of a FWUC called BANTIC. In April 2014, the PDWRAM was contracted to restructure BANTIC through a re-election, to conduct a landholding survey, and to strengthen the FWUC capacity. CAVAC and the PDWRAM agreed on these activities in order to help improve the performance of BANTIC, as this FWUC had been established for quite a long time. The PDWRAM completed the re-election to restructure BANTIC. BANTIC's new structure consists of only two layers: the committee and secondary canal groups (previously called sub-groups). Krapum Chhouk is treated as a secondary canal of the whole BANTIC system. The land holding survey for BANTIC was also completed. The Krapum Chhouk FWUG started collecting the irrigation service fees (ISF) in 2013. The ISF collected was approximately US$1,350 in 2013, US$1,800 in 2014 and US$4,380 in 2015 (up to June). The fees collected in 2015 have increased due to the landholding survey data. The FWUG has been using the landholding survey data to collect the ISF from private water sellers (PWSs). The ISF collected by the FWUG have been deposited into the BANTIC's bank account to be used for the O&M of the whole scheme. There are currently 15 local PWSs operating in the area, who provide water supply to farmers in the surrounding areas. All of these PWSs have already been registered with BANTIC. A severe drought of 2015 in the Krampuk Chhouk area has had big impact on farmers. However, BANTIC has prioritised to rehabilitate Canal 90. This whole canal needs dredging but BANTIC has put a higher priority to another canal (Canal 90). In 2015, only 2,000 meters of the canal were dredged. The completed dredging work cost US$9,000 funded by four sources: US$900 from World Vision Cambodia, US$327.5 from PWSs, US$2,500 lent by the Tumnub Lork FWUC, and the rest from BANTIC.
Next Steps:	**Engineering** Follow up on the FWUC's maintenance activities. **O&M** Continue ad-hoc visits and providing technical support to the Krapum Chhouk FWUG and BANTIC 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 be taken as needed. In addition, once the canal is under water, removal of siltation should be performed using a

	crane excavator. **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 the FWUG/FWUC to manage the fee collection. A three-layer organisational structure of a FWUC appears not to be practical and effective, as it is confusing to the sub-group (or now called secondary canal group) members about who to report to. This makes a two-layer structure more effective.

INTERVENTION UPDATE: Int. No: Irr 10.3	AWP No: 2.3	Date: 30 June 2015
Name:	**Development and construction of an irrigation scheme: Tumnub Lork canal, Takeo province**	
Summary:	Prior to this intervention, 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 the first 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. Upon request from the FWUC of this scheme, CAVAC contracted a construction company to install water gates under two bridges built in 2011 in order to retain the water after the tide. The installation of these water gates was completed in August 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. In late 2014/early 2015 the PDWRAM completed a landholding survey to get accurate irrigated area data of this scheme and FWUC capacity re-strengthening activities. This FWUC is now performing better. For instance, its committee members have worked hard on fee collection, documenting, and discussing community matters. They also started initiating and holding monthly meetings. 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 respectively. In 2015, the FWUC has so far collected about US$4,896 and is expected to continue collecting more. The fees collected are used on the O&M of the scheme and stipends for FWUC committee members. For example, the FWUC spent some money to backfill the collapsed embankments, dredging 2,050 meters of the canal, and adding 26 pipe culverts along the canal for drainage and intake. This FWUC has also lent US$2,500 to BANTIC because BANTIC lacked money for canal dredging (see Irr 10.1, Krapum Chhouk).	
Next Steps:	**Engineering** Follow up on the FWUC's maintenance activities. The sliding of side slopes may occur after a few years of canal operation, as that is natural. To reduce this, the FWUC can do some low-cost slope protection works, such as grass sodding or wooden pegging. **O&M** Continue working with the PDWRAM to help the FWUC to use the data from the landholding survey as it implements contracts with PWSs. Continue ad-hoc visits and provision of technical support, including financial management skills.	
Lessons Learnt:	**Engineering** Several soil types along such long canals as Tumnub Lork are found. Although there was a soil investigation undertaken during the detailed design of the scheme, it was not sufficient to avoid slope failure along parts of the canal. To deal with this kind of soil type variation, a site engineer needs to continuously observe the types 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. Engineers need to take into consideration the changes of existing structures that might affect the functioning of the scheme. Types of water crossing structures should be discussed with farmers. Drainage should be well defined and added during construction. **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 2015

Name:	**Development and construction of an irrigation scheme: Kveng Tayi canal, Takeo province**
Summary:	Prior to this intervention, 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. Access to 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 July 2014. There had been some erosion around the wing walls of two bridges due to the big difference between the length of the wing wall and the height of each bridge (short wing wall). It was suggested that the FWUG put wooden poles around that area to strengthen the soil and prevent the erosion. In the July-December 2014 period, the FWUG filled up soil in that area as an acceptable, temporary solution. **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 was contracted to carry out a landholding survey in order to ascertain accurate irrigated area data for BANTIC. Both the restructuring of BANTIC and landholding survey were completed. Kveng Tayi is currently treated as a secondary canal of this BANTIC system. The Kveng Tayi FWUG has so far collected US$2,750 in 2013, US$1,950 in 2014 and around US$3,117 in 2015 (up to June). The collected fees have been deposited to BANTIC's bank account. Because BANTIC put a high priority to another canal (Canal 90), the Kveng Tayi FWUG did not have funds to dredge its canal. BANTIC decided to ask for help from PWSs to dredge the canal. 1,700 meters of the canal have been dredged but PWSs did not report actual costs to the FWUG and BANTIC, leading to a concern that the PWSs would use this reason to not pay to the FWUG later.
Next Steps:	**Engineering** Follow up on BANTIC's work to fix the erosion at the wing walls of the bridges. BANTIC should put this in its O&M budget plan. Continue considering the community's request for a bridge at the head of the canal. **O&M** Continue monitoring and assisting the FWUC's efforts in preparing contracts with PWSs, based on the map from the landholding survey. Monitor how the FWUG and BANTIC will solve the issue on the 1,700-meter dredging work with PWSs.
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 area data. A land holding map is essential for the FWUG and FWUC to manage the contracts with PWSs more effectively.

INTERVENTION UPDATE: Int. No: Irr 12.3	AWP No: 2.3	Date: 30 June 2015
Name:	**Development and construction of an irrigation scheme: So Hang canal, Takeo province**	
Summary:	Prior to this intervention, farmers in the communes of Borey Chulsa, Daung Kpos, Romenh, and Kork Po grew 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 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, but it 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 of Borey Chulsar district, especially Borey Chulsar commune intervened too much in the process of setting the water price. Some PWSs chose not to register with the FWUC because the price was too low for them to profit from the business. Without PWSs in some sections of the canal, some 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 (Borey Chulsar commune and Borey Chulsar district) did not welcome PWSs; second, farmers used other water sources to irrigate 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 largely due to the drying up of a nearby water source, resulting in farmers realising the importance of getting the water service from PWSs. The fees collected in 2014 were around US$2,625. In 2015, the FWUC has so far collected about US$625 and will continue collecting. The FWUC has spent the money on maintaining the canal by removing siltation, but only some parts have been fixed properly. The FWUC needs more funds to do dredging work. The FWUC has sought help from other sources. It has requested PWSs to pay the ISF in the amount of US$3,000 more and to the Takeo Provincial Governor's Office for support. The FWUC committee members have not received any stipends yet.	
Next Steps:	**Engineering** Continue observing the possibility to support PWSs in further developing this scheme. **O&M** Continue conducting follow-up visits to this FWUC to provide capacity building support as needed and feasible. The PDWRAM has been contracted to monitor the FWUC with the hope of finding possible solutions to the current management of the FWUC and to reduce political interference.	
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. The FWUC should collect all data of different parts of the command area to prepare a cropping calendar to avoid conflicts in water usage.	

INTERVENTION UPDATE: Int. No: Irr 12.4	AWP No: 2.3	Date: 30 June 2015

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 2 km from the Vietnamese border to avoid any cross border negative environmental impacts that could not be sufficiently investigated. Upon a request from the FWUC, some off-take structures were adjusted to the current practices of farmers. The improvements of these structures were 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. As a result, the PDWRAM/CAVAC intervention has had limited impact. A follow-up training has been contracted to the PDWRAM from April to September 2015 with the hope to improve the FWUC performance and increase the involvement of local authorities. The FWUC started collecting the ISF in 2015. So far the FWUC has collected about US$1,800. The FWUC spent the collected fees to rehabilitate about 400 meters of the canal embankment and build a fence around the FWUC building. However, the FWUC committee has not received any stipends since the FWUC's establishment, due to the small amount of the collected fees. Some farmers have formed groups to pump water from the canal instead of taking the service from PWSs. Some others also intend to do the same. 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:	**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 the PDWRAM to strengthen the capacity of this FWUC.
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 2015
Name:	**SIF: Support to BANTIC and PLOVIC in rehabilitating two secondary canals in Takeo**	
Summary:	**BANTIC – Banteay Thleay Irrigation Community** Prior to the intervention, 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 Irrigation Community** Prior to the intervention, 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 Supplementary Investment Fund (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); US$13,450 (2014); and US$27,025 (2015 – up to June). PLOVIC: The fee collection is around US$31,820 (2013); US$14,875 (2014); and US$20,000 (2015- up to June). The PDWRAM was contracted to conduct a landholding survey, re-election, capacity building, and monitoring for BANTIC. The BANTIC FWUC was re-elected on 14 November 2014. The FWUC has been restructured from three to two organisational layers: the FWUC committee and the secondary canal leaders. The landholding survey and capacity strengthening activities were officially completed in early 2015. As a result, BANTIC has improved its performance in fee collection significantly. The PWSs have changed their attitude to pay higher fees. Some PWSs had never paid to BANTIC at all, but because of the restructuring of BANTIC and landholding survey data they started paying ISF to BANTIC.	
Next Steps:	**Engineering** Follow up on the BANTIC's maintenance activities. **O&M** Continue ad-hoc visits to BANTIC. These visits are required, even after the re-election in order to ensure continuity between past committee members and those who are newly elected.	
Lessons Learnt:	**O&M** A landholding survey is needed to help a FWUC better manage its fee collection. FWUC restructuring that receives support from the local authorities significantly contributes to the FWUC's better performance.	

INTERVENTION UPDATE: Int. No: Irr 13.1	AWP No: 2.3	Date: 30 June 2015
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. Its members have a strong understanding of their roles in scheme O&M, but there are some limitations that need to be strengthened. The FWUC has collected about US$737 as of June 2015. It spent all the collected fees on scheme maintenance, such as fixing the embankment and building additional structures, but the FWUC committee members have not received any stipends yet due to the small amounts of the collected fees. There was a siltation issue at the head of this canal causing some problems to the water flow into the main canal every year. This FWUC gathered farmers and collected some money from them to do dredging work at the head of the canal. To further strengthen the capacity of this FWUC, CAVAC has contracted the PDWRAM to do additional training activities for this FWUC from April to September 2015.	
Next Steps:	**O&M** Conduct working with the PDWRAM to further strengthen the capacity of this FWUC. Continue supporting the FWUC through more collaboration with the local authorities of Takeo and Kandal to ensure a secure water source for Rokar Chhouk.	
Lessons Learnt:	The construction company's focal person needs to have good technical and communication skills. Otherwise, work may continue to be delayed due to miscommunication and disagreement between CAVAC and the construction company.	

INTERVENTION UPDATE: Int. No: Irr 13.2 and Irr 13.3 AWP No: 2.2 Date: 30 June 2015	
Name:	**SIF: Support to BANTIC and PLOVIC in dredging their main canal in Takeo**
Summary:	**BANTIC – Banteay Thleay Irrigation Community** Prior to the intervention, farmers in Prey Khla, Krapum Chhouk, and Prey Yuthka communes (Koh Andeth district) grew 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 Irrigation Community** Prior to the intervention, farmers in the Communes of Kamnob and Phnom Den communes (Kirivong district) grew 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 used this knowledge to monitor the construction work. The scheme was ready to be used when water started receding in December 2013. The PDWRAM had been contracted to conduct a landholding survey, re-election, and capacity building for BANTIC. Re-election, landholding survey and capacity building activities were finalised in early 2015.
Next Steps:	**Engineering** Follow up on BANTIC's scheme maintenance activities. **O&M** Continue ad-hoc visits to BANTIC.
Lessons Learnt:	**O&M** CAVAC has learned from this project the benefits in handing over construction monitoring work to the FWUC. Not only does this build the FWUC's ownership of the canal, but it 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 14.1	AWP No: 2.3	Date: 30 June 2015

Name:	**Development and construction of an irrigation scheme: Wat Thmey pumping scheme, Takeo province**
Summary:	Prior to the intervention, 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. Initial construction was completed and pumps were installed in mid-March 2015. Upon operation, under-scouring issues became apparent. The pumps were immediately removed for their protection and an independent review of the pump house design and construction process was undertaken. The reconstruction of the pump house started in late April and will be completed by the end of July 2015.
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. Heavy rains in November required that water be drained out of the surrounding fields. Lack of drainage structures resulted in severe damage of the crop. The construction team conducted a study to ascertain solutions to the problem. Based on these findings, the team added additional drainage structures to help solve the problem. By mid-March 2015, the construction was completed and pumps were installed. The pumps were fully operated in late March for about two weeks. However, due to some under-scouring, the pump house tilted over in early April and needs to be re-built. The new pump house is currently being constructed. It is expected to be completed by the end of July 2015. **O&M** CAVAC signed a contract with the PDWRAM to establish and build the capacity of a FWUC for this scheme. The FWUC establishment has been completed. The training on O&M is being provided by the PDWRAM with technical support from CAVAC. As this scheme crosses Kandal and Takeo provinces, the FWUC for this scheme is a joint structure between the two provinces. Much consultation has been conducted with farmers in every village on the functioning of the scheme, the ISF collection and other issues that farmers face. CAVAC's water management consultant will work closely with the FWUC and PDWRAM staff at Wat Thmey on the scheme O&M plan. Due to the size of the scheme and its complexity, the FWUC needs to be fully supported technically and financially by CAVAC for at least the first two years after the construction is completed. Therefore, a start-up funding grant is being provided by CAVAC. The FWUC's activities with the start-up fund need to be closely monitored by CAVAC staff to ensure that the FWUC will be able to perform their required tasks and manage the scheme after CAVAC finishes. For the FWUC to start off its work, it needs support not only from CAVAC but also from the PDWRAM and local authorities. So far the FWUC has been working closely with farmers to construct field channels. Each block leader has been collecting money to construct the channels and coordinate the work. Currently, 42 channels out of 52 have been constructed which are equivalent to 15,416 meters. The total construction costs of the 42 channels are around US$3,886 (only around US$2,787 has been collected from farmers).
Next Steps:	**Engineering** Complete construction work, particularly the new pump house, by August 2015. Drainage and irrigation PVC pipes will be added. The northern embankment of the main canal and brick lined canals must be repaired before CAVAC finishes. **O&M** Work with the PDWRAM to enhance the FWUC capacity in operating the electric pump house and managing the scheme. 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. Work with the FWUC to ensure that all the field channels will be constructed in order to ensure efficient water supply.
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. Full consideration of drainage and foundation structures is required in the design stage. **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. Without financial and technical support to a FWUC managing a complex scheme, such as Wat Thmey, the chance that the FWUC is able to perform O&M tasks over the initial few years of operation is low.

INTERVENTION UPDATE: Int. No: Irr 14.1	AWP No: 2.2	Date: 30 June 2015
Name:	**SIF: Support to BANTIC, PLOVIC and KRIC in dredging their main canal in Takeo**	
Summary:	**BANTIC – Banteay Thleay Irrigation Community** Farmers in Prey Khla, Krapum Chhuk, and Prey Yuthka communes (Koh Andet district) grow paddy along the PRASAC canal. This canal was 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 issue not only affected the surrounding area but also blocked water that flowed into Krapum Chhouk, Kveng Tayi and Tumnub Lork canals. It was therefore intended that the canal rehabilitation of the last section of BANTIC (6,443 m) would ensure water supply to the above mentioned canals. It would also benefit farmers in Krapum Chhouk, Prey Yuthka and Pech Sar communes, Koh Andeth district. **PLOVIC – Plov Touk Irrigation Community** Farmers in the Communes of Kamnob and Phnom Den (Kirivong district) grow paddy along the PRASAC canal. The length of this canal is 5,080m. This part of the canal was also significantly affected by siltation. Farmers in this community requested that this part of the canal be dredged to improve water supply and increase the area with reliable water for double cropping. The dredging of this canal would benefit farmers in Kamnob and Phnom Den communes, Kirivong district. **KRIC – Kampong Krasang Irrigation Community** This canal is located in Kampong Krasang commune, Borey Chulsar district, along the head of the PRASAC canal. This canal also benefits farmers in Thlea Prochum commune, Koh Andeth district. 2,100m of this canal required dredging. This part of the canal was affected by siltation from the water source, Steung Takeo. The dredging of this canal not only serves the needs of farmers in the upstream areas but also plays a crucial role in providing a reliable water source for BANTIC and PLOVIC. CAVAC supported 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** Work on these three SIF projects commenced in April 2014, and was completed in May, June and July at Banteay Thleay, Plov Touk, and Kampong Krasang, respectively. **O&M** The FWUCs of these 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.	
Next Steps:	**O&M** Continue conducting ad-hoc visits to these FWUCs, especially BANTIC, as it is associated with Krapum Chhouk and Kveng Tayi.	
Lessons Learnt:	**Engineering** The method of construction must be tailored to each site condition. Crane excavators are rarely used, but it is the only solution for dredging the siltation at the canal sections of BANTIC and KRIC. This method should not be applied for natural solid soil (clay). **O&M** CAVAC has learned from this project the positive significance of handing over construction monitoring work to the FWUC. Not only does this build the FWUC's ownership of the canal but it 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 2015
Name:	**Development and Construction of an Irrigation Scheme: Prey Tonle canal, Kampot province**	
Summary:	Prior to this intervention, 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. CAVAC therefore selected the 3.2 km Prey Tonle canal for implementation 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 suspend work on this FWUC, as most committee members of this FWUC had shown low interest and commitment. Moreover, collecting a fee for this scheme had proven 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 2015
Name:	**Development and construction of an irrigation scheme: Sbov Andeth canal, Kampot province**	
Summary:	Prior to this intervention, 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. All work was completed by mid-April 2012. This canal has achieved significant success to date. 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 also grow a third crop per year on rice fields in upper land areas which are unlikely to flood. In 2013, CAVAC and Kampot PDWRAM agreed to construct two lined secondary canals within 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. As the Hay Saun extension 2 canal links to Sbov Andeth, one group and three subgroups were established under the management of the Sbov Andeth FWUC to manage this Hay Saun extension 2 section. The sub-group and group leaders were trained by the PDWRAM on scheme O&M. With support from CAVAC, committee members of this FWUC have been collecting data in order to produce a landholding map for their own scheme. The data collection is expected to finish in late July 2015 and a map will be ready by the end of August 2015. After prolonged negotiations in 2014, the FWUC and a PWS agreed to set the price of water at which the PWS would charge farmers at US$87.5 per ha, with the PWS paying 50% of the full ISF to the FWUC (full ISF = 150 kg of paddy equivalent to US$30 per hectare). The FWUC and the PWS were planning to implement this agreed procedure at three secondary canals. However, during a meeting, farmers did not show much interest in the service from the PWS for the wet season of 2014, believing they could rely on the rain over the wet season. Farmers at this scheme were reluctant to depend on the PWS's service as they had never used it before. They preferred to wait and see how the service would go at the nearby Hay Saun scheme. After seeing the benefits of the PWS's water service at Hay Saun, most farmers at Sbov Andeth have become interested in the service. However, some farmers, especially those who have their rice fields close to the main canal, still do not want the service as they currently can get the water from the main canal easily. Meanwhile, the PWS is also busy expanding his water business at Hay Saun during 2015. It is expected that the PWS's investment at Sbov Andeth may happen in 2016.	
Next Steps:	**Engineering** No further action **O&M** Continue to strengthen the capacity of the FWUC committee, especially in fee collection, financial management, maintenance plan, through follow-up visits from CAVAC and the PDWRAM. Encourage the FWUC to regularly meet with the local authorities to boost its cooperation and understanding with the authorities.	
Lessons Learnt:	**Engineering** Proper irrigation water management at the watershed level is essential to ensure 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, there needs to be strong cooperation between all parties in order to ensure that they all work well together.	

INTERVENTION UPDATE: Int. No: Irr 10.7	AWP No: 2.3	Date: 30 June 2015
Name:	**Development and construction of an irrigation scheme: O'Kak canal, Kampot province**	
Summary:	Prior to the intervention, 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 by CAVAC 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, and 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 commenced 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 further capacity building was completed in June 2012. Farmers are now able to access the water in the canal, following completion of the scheme improvements. Most farmers prefer to cultivate vegetables and sugarcane as the soil there is suitable for these crops and they can get even better income from these crops if compared to early wet and dry season rice. After harvesting these crops, farmers cultivate wet season rice. In May and June 2015, the river that is the water source of the O'Kak scheme did not have much water due to limited rainfall and extensive pumping upstream of this scheme. The FWUC built a small dam between the river and the main canal and installed three pumping machines to pump water from the river into the canal. The cost of fuel for pumping was shared among those who got the water. As a result, farmers' crops, especially sugarcane, were saved. The FWUC plans to collect the ISF after farmers harvest their crops in August 2015 when they have money. The FWUC will buy one pumping machine to use during drought periods to save farmers' crops. With support from CAVAC, committee members of this FWUC have been collecting data in order to produce a landholding map for their own scheme. The data collection is expected to finish in late July 2015 and a map will be ready by the end of August 2015.	
Next Steps:	**Engineering** No further action **O&M** The FWUC will collect ISF in August 2015. Conduct follow-up visits to monitor ISF collection and to strengthen the FWUC's capacity in financial management and maintenance plan.	
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 the 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 2015

Name:	**Development and construction of an irrigation scheme: Thnoat canal, Kampot province**
Summary:	Prior to the intervention, 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 by CAVAC 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, with construction 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. **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. There have been five PWSs doing business at this scheme, all of whom have been registered and signed contracts with the FWUC. In late April and early May 2015 the FWUC committee conducted meetings with PWSs to discuss the cooperation and planning for the upcoming early wet season. The PWSs agree to pay the ISF to FWUC in late August 2015. The FWUC also negotiated with a local construction company to remove some soil from the high embankment of the scheme. The company can remove the soil but it has to put a laterite surface on the embankment. So far the company has completed work along 300 meters of the embankment. With support from CAVAC, committee members of this FWUC have been doing data collection in order to produce a landholding map for their own scheme. The data collection is expected to finish in late July 2015 and a map will be ready by the end of August 2015.
Next Steps:	**Engineering** No further action. **O&M** Conduct meetings regularly between the FWUC and PWSs to strengthen the relationships between them, to share work plans, and to solve any outstanding problems. Continue conducting follow-up visits to the FWUC to strengthen its capacity. Encourage the FWUC to hold regular meetings with the local authorities to build cooperation between the FWUC and local authorities.
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 2015
Name:	**Development and construction of irrigation scheme: Spean Touch canal, Kampot province**	
Summary:	Prior to the intervention, 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 by CAVAC 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. In June 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, with capacity building completed in September 2013. 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. The construction of an office for this FWUC was completed in July 2014. The committee of this FWUC continued to meet regularly every month until April 2015 to discuss its monthly plans, particularly fee collection. There is one PWS doing business at this scheme. This PWS pumped and irrigated about 15 hectares of rice fields during the early wet season of 2014 (April–July 2014). 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 the ISF to the FWUC. Due to the pest outbreak in 2014, most farmers who used to get the water service from this PWS decided not to do rice cultivation in the early wet season of 2015. Only some farmers who have rice fields along the main canal decided to conduct agricultural activities this year, and these farmers do not need the water service from the PWS. As a result, the PWS business prospects are again not strong for this year.	
Next Steps:	**Engineering** No further action. **O&M** Continue conducting follow-up visits to the FWUC to strengthen its capacity in terms of fee collection, financial management and maintenance plan.	
Lessons Learnt:	**Engineering** Soil containing acid sulphate, 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 2015
Name:	**Development and construction of irrigation scheme: Prey Leu canal, Kampot province**	
Summary:	Prior to this intervention, 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 by CAVAC 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, with capacity building undertaken from December 2012 to September 2013.	
Achievements to Date:	**Engineering** Construction commenced in March 2012 and finished in October 2012. Both the PDWRAM and CAVAC were satisfied with the overall progress and quality of the construction undertaken by the selected contractor. Some minor defects were 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. The construction of an office for this FWUC was completed in August 2014. The FWUC has signed contracts with PWSs conducting water business at this 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. In 2015, more farmers are cultivating early wet season rice and some have enlarged their farming areas. However, there was a drought in this area in May and June 2015, limiting the amount of water available in the main canal. Therefore, the FWUC spent US$310 hiring an excavator to dredge about 200 meters of the canal. The FWUC also worked with a PWS to install a pump, in order to pump the water from the water source into the main canal. The FWUC plans to purchase one pump to use when needed during periods of severe drought.	
Next Steps:	**Engineering** No further action. **O&M** The FWUC expects to collect the water fees again in early September after farmers harvest this early wet season rice. Continue conducting follow-up visits to the FWUC to strengthen its capacity.	
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 2015

Name:	**Development and construction of an irrigation scheme: Hay Saun canal, Kampot province**
Summary:	Prior to this intervention, farmers of Banteay Meas Khang Cheung 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 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 by CAVAC 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 over an additional 500 hectares 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. Unexploded Ordnances (UXOs) were 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 during this work. The topographical surveys and detailed designs for the extension parts of the canal were undertaken in 2013. The construction of the two extension canals started in early January 2014, and were completed in 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 Kampot PDWRAM and CAVAC in October 2013. The FWUC was established in May 2014. The training to build up the capacity of this FWUC committee was completed in August 2014. This FWUC is managing the Hay Saun canal (earthen part) and the Hay Saun extension 1 (a concrete lined canal) which is served by water pumped from the earthen canal. A landholding survey for this scheme was completed. The map resulting from the survey has become a useful tool to the FWUC to carry out O&M work especially in water delivery and fee collection. An office for this FWUC has been built and it is now being used by the FWUC to work and hold meetings. The committee of this FWUC conducts meetings on a monthly basis to discuss any issues related to the canal and to prepare monthly plans. The original part of the Hay Saun scheme is an earthen canal. The FWUC has signed a contract with a PWS to provide the water service to its members. The FWUC will collect ISF via this PWS. So far, around 80 hectares of paddy fields were irrigated by this PWS with the PWS agreeing to pay US$10 per hectare to the FWUC. It is expected that about US$800 will be paid by the PWS to the FWUC in early July 2015. The first extension part of the Hay Saun scheme (Hay Saun extension 1) is a lined canal with a pump station. The FWUC collects ISF directly from farmers based on the number of kilowatt-hours of electricity consumed. So far the FWUC has collected US$1,380 and spent about US$917 on the electricity. There was a drought in May and June 2015, affecting the water availability in the main canal. The FWUC in cooperation with the PWS did some rehabilitation work to the original part of the scheme (upstream of the earthen canal) where the siltation was high. So far, this PWS has rehabilitated one secondary canal to provide the water service to farmers. The PWS has signed another contract to expand his business to two other secondary canals. Therefore, the irrigated areas will increase in this 2015 early wet season.
Next Steps:	**Engineering** ▪ No further action **O&M** ▪ Continue conducting follow-up visits to the FWUC to strengthen its capacity on scheme O&M and financial management. ▪ Encourage the FWUC and farmers to construct field channels to ensure that water can be delivered far away from the concrete canals in order to enlarge the irrigated areas.
Lessons Learnt:	**Engineering** Presence of UXOs should be thoroughly investigated during the Environmental Impact Assessments (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 2015

Name:	**Development and construction of an irrigation scheme: Chamlong Chrey canal, Kampot province**
Summary:	Prior to the intervention, 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 as a scheme to be rehabilitated by CAVAC in 2013. A feasibility study was carried out and the canal was surveyed and designed. The construction commenced in October 2013 and was completed 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 was installed, with construction of the scheme 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 Kampot PDWRAM and CAVAC in December 2013. The FWUC was established in June 2014, and the capacity building for this FWUC was completed at the end of this reporting period. The landholding survey was completed. It has become a useful tool to the FWUC, especially for water delivery and fee collection. The construction of an office for this FWUC was completed in September 2014. After the canal completion, the FWUC and its members started to use the canal to irrigate their fields. Farmers have increased their crops to two-three per year. The scheme has so far irrigated 153 hectares for 238 farmer households. The irrigated areas will keep increasing every year. Since the canal completion farmers have done three cultivation seasons using water from the canal. In total the FWUC has collected US$6,043 and spent US$3,701 on the electricity, some on the FWUC committee's wages, and the rest on scheme improvements. With support from the FWUC, farmers in this community have built eight field channels. These field channels play a crucial role in irrigating the paddy fields that are far away from the main and secondary canals. Besides that, the FWUC has installed one drainage system in Block 2 as well.
Next Steps:	**Engineering** No further action **O&M** Continue providing follow-up support, especially in scheme O&M and financial management.
Lessons Learnt:	High-level of involvement with the community is very 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. A complete scheme – such as Chamlong Chrey (a scheme with secondary canals) – provides farmers ease in getting water and therefore contributes to efficient and sustainable scheme O&M.

INTERVENTION UPDATE: Int. No: Irr 13.1	AWP No: 2.3	Date: 30 June 2015
Name:	**Development and construction of irrigation scheme: Reservoir 77, Kampot province**	
Summary:	Prior to this intervention, farmers of Sre Cheng commune in Chum Kiri district grew mainly one rain feed rice crop (wet season rice) per year with unreliable water supply. Often their crops were 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, followed by the completion of capacity building and training of the FWUC committee. A landholding survey for this scheme was completed. The map resulting from this survey has become a useful tool to assist the FWUC in its O&M work. An office for this FWUC has been constructed, and now the FWUC can work and hold meetings there. Some farmers used water from the reservoir for their production of cash crops, such as maize and water melon, on 10 hectares of land during the dry season of 2015 as a pilot to show to other farmers. The FWUC decided not to collect ISF from the farmers who started cropping in the first season after the completion of construction of Reservoir 77 and its distribution canals, as the FWUC wanted to encourage the other farmers to do farming work using water from the reservoir. However, the FWUC plans to collect ISF after the rice harvest of the 2015 early wet season.	
Next Steps:	**Engineering** The stone masonry on the reservoir dam needs to be fixed. **O&M** Continue conducting follow-up visits to strengthen the capacity of this FWUC committee, especially in financial management and O&M plan.	
Lessons Learnt:		

NTERVENTION UPDATE: Int. No: Irr 10.12	AWP No: 2.3	Date: 30 June 2015
Name:	**Development and construction of an irrigation scheme: Thnoat Chum canal, Kampong Thom province**	
Summary:	The 1 January main 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 1 January main 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. The Thnoat Chum scheme was selected for rehabilitation in 2011. A feasibility study was carried out and a topo survey and design of the scheme was completed after that. Construction commenced in April 2011 and was completed in August 2012. Some repairs and scheme improvements were done in 2013. To further ensure that this canal serves as a reliable water source for farmers and helps expand the command areas, CAVAC commissioned a contractor to undertake major improvement works to the scheme, commencing in January 2014. Works included adding an intake structure at the head of the ADB canal; providing more hydraulic structures (cross structures and pipe culverts); and improving the canal embankments with laterite pavement. All works were completed in July 2014. A FWUC for this scheme was established by the PDWRAM and the capacity building for this FWUC was completed in September 2012. After analysing the FWUC performance in 2013, CAVAC learned that additional training on scheme O&M was necessary in order to further strengthen the FWUC's capacity. The Irrigation Service Center (ISC) has been contracted to carry out this training until September 2015.	
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. Additional works were needed to improve the existing scheme to enable it to serve all farmers within the command area and supply sufficient water. The construction of the improvement works at Thnoat Chum commenced in January 2014 and was completed by mid-July 2014. The scheme is now able to serve all farmers within the command area with sufficient water all-year round. **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. The ISC's activities will all be completed in September 2015. The ISC has so far completed a landholding survey, an ISF collection system, an O&M plan with financial information for the scheme, and an O&M manual. CAVAC also supported the FWUC to build an office. By June 2014, the construction of this FWUC office was completed and equipped with some office furniture.	
Next Steps:	**Engineering** Continue to support the FWUC on its O&M activities. **O&M** Continue monitoring the ISC's FWUC capacity building and the performance of this FWUC, including its ISF collection and maintenance activities and expenditures.	
Lessons Learnt:	**Engineering** It is essential that farmers and local authorities participate 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 2015

Name:	**Development and construction of irrigation scheme: Angko canal, Kampong Thom province**
Summary:	Prior to the intervention, farmers in Kampong Ko grew wet season rice and some 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 2 km further. The extension work was completed. In 2013, CAVAC and the PDWRAM discussed the potential to improve this scheme and decided to undertake additional 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 the Angko scheme commenced in January 2014. Due to slow progress of the construction work, about 20% of the workload has been removed from the contract. The remaining work under the contract was temporarily suspended during the 2014 flood season, but resumed in November 2014 and was completed in February 2015. 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 for a period of two years, concluding in October 2014. CAVAC has also commissioned the ISC to help strengthen the FWUC's capacity on O&M.
Achievements to Date:	**Engineering** The initial design of this scheme was undertaken by the PDWRAM. The construction work on the original length of the canal and the extension was completed in August 2012. 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 agreeable to 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. Construction work commended in January 2014 and the whole scheme was completed in April 2015. **O&M** CAVAC contracted the PDWRAM to establish and build the 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. The ISC's activities will all be completed in September 2015. The ISC has so far completed a landholding survey, an ISF collection system, an O&M plan with financial information for the scheme, and an O&M manual. 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 in 2012 to ensure adequate water delivery for double cropping. In October 2014, the contract came to an end. The FWUC is now operating the scheme itself. So far, the FWUC has collected the ISF for five cultivation seasons. Some of the collected fees have been spent on the electricity costs and some maintenance of the main canal. The installation of the screw pumps at the scheme has resulted in a reduction of pumping costs charged to farmers by 50% if compared to the costs farmers used to pay to the PWS.
Next Steps:	**Engineering** Continue to monitor the construction during the defects liability period and support the FWUC on its O&M plan. **O&M** Continue monitoring the ISC's FWUC capacity building and the FWUC 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** A scheme that is 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 2015
Name	**Development and construction of irrigation schemes: Secondary Canals 1, 2 and 3 of the 6 January Canal (Taing Krasang scheme), Kampong Thom province**	
Summary	Previously, farmers in the Tang Krasang commune only cultivated rain-fed wet season rice, and as a result, faced risks from both flood and drought. Farmers in this commune and the PDWRAM expressed an interest in CAVAC supporting the rehabilitation/construction of the Tang Krasang irrigation scheme. CAVAC selected this scheme 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 main canal (6 January canal). The 6 January canal gets water from the Tang Krasang reservoir, which is known as a reliable water source. The Tang 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 started in February 2013 and was completed in April 2014. Construction of SC1 started in late December 2013 and was completed in June 2014. In 2013 CAVAC signed a contract with the PDWRAM to help establish and provide capacity building for a FWUC. 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 was contracted by CAVAC and started capacity building work for the FWUC in September 2013. The ISC completed its activities in March 2015, including a landholding survey, an ISF collection system, an O&M plan with financial information for the scheme, and an O&M manual. CAVAC also supported the FWUC by building an office. This FWUC office has been built and handed over to the FWUC.	
Next Steps:	**Engineering** Continue to support the FWUC on its O&M activities. **O&M** Continue to check and monitor the FWUC's activities.	
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. **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 was 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 to address.	

INTERVENTION UPDATE: Int. No: Irr 14.1	AWP No: 2.3	Date: 30 June 2015
Name	**Development and construction of an irrigation scheme in Boeung Leas pumping scheme, Kampong Thom province**	
Summary	Prior to this intervention, farmers around the Boeung Leas scheme grew limited double cropping of recession rice and early wet season rice. These farmers typically achieved low productivity due to seasonal floods and droughts. Limited access to water was known to be a major constraint to improving 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. In early 2015, CAVAC undertook additional works to the scheme by constructing two lined canals and a gate structure to prevent floods. The additional works were completed in May 2015. 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 was completed in July 2014.	
Achievements to Date:	**Engineering** Construction started in January 2014 and was completed in May 2015. **O&M** CAVAC engaged the ISC to reactivate the existing FWUC with the aim of strengthening the FWUC's capacity on scheme O&M. The ISC completed its work in June 2014. An office was constructed for the FWUC of this scheme. The construction of the FWUC office was completed in July 2014.	
Next Steps:	**Engineering** Continue to monitor the works during the defects liability period and work closely with FWUC on its scheme O&M plan. **O&M** Continue to monitor the FWUC's O&M activities on the scheme.	
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 improving scheme O&M. It takes time for farmers to get used to the FWUC leadership in managing an irrigation scheme.	

ANNEX 2: DETAILS ON IRRIGATION SCHEMES AS AT JUNE 2015

			Scheme Details		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	Year of construction	Main Canal length in km	Rainfed Rice (RFR)	Early Wet Season Rice (EWSR)	Wet/ Recession Rice (WSR/RR)	Dry Season Rice (DSR)	Early Wet Season Rice (EWSR)	Wet/ Recession Rice (WSR/RR)	Dry Season Rice (DSR)	Early Wet Season Rice (EWSR)	Wet/ Recession Rice (WSR/RR)	Flooded/Non-flooded (F/N)	No of Rice crops	Before: Constr. Rainfed	Before: Constr. EWSR/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	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Takeo																										
1	Krapum Chhouk	Canal	2010	5.5			500		1,276	1,306		1,306	1,306	F	2	2.5	3.0	6.0	4.0	6.0	11,441	11,562	839	1.56	Y	C	Y
2	Kveng Tayi	Canal	2011	5.2			600		1,030	1,130		1,130	1,130	F	2	2.5	3.0	6.0	4.0	6.0	9,097	9,496	579	1.95	Y	C	Y
3	Tumnub Lork	Canal	2011/12/13	14.8			1,200		1,503	1,503		1,503	1,503	F	2	2.5	3.0	5.5	4.5	5.5	11,427	11,427	1,243	1.21	Y	C	Y
4	Prey Rumdeng	Canal	2012	6.9		428	1,616		1,720	2,150		2,150	2,150	F	2	2.5	3.0	5.5	4.5	5.5	13,431	15,364	1,625	1.32	Y	C	Y
5	So Hang	Canal	2011/12	8.7			1,476		1,180	1,476		1,476	1,476	F	2	2.5	3.3	5.5	4.5	5.5	8,560	9,894	1,062	1.39	Y	C	Y
6	Rokar Chhouk	Canal	2013/14	2.3			428		600	1,248		1,248	1,248	F	2	2.5	3.5	6.0	4.5	5.5	8,066	10,983	1,024	1.22	Y	C	Y
7	Wat Thmey	Pump	2014/15	7.0			1,334	Under construction			901	2,251	2,251	N/F	2/3	2.5	3.5	6.0	4.5	5.5		23,244	2,594	0.87	Y	O	Y
	Kampot																										
1	Prey Tonle	Canal	2010	3.2			218		284	284		460	460	F	2	2.5	4.0	7.0	6.0	6.5	2,678	4,878	460	1.00	Y	C	N
2	O'Kak	Canal	2011/12/14	2.9	240	50		24	90	240	100	240	240	N	3	2.0	3.5	6.5	5.5	6.0	1,436	2,755	240	1.00	Y	C	N
3	Sbov Andet	Canal	2011/14	9.7	1,100	100		184	1,196	1,196	500	1,196	1,196	N/F	2/3	2.0	3.5	6.5	5.5	6.0	12,400	14,454	1,196	1.00	Y	C	N
4	Thnoat	Canal	2011/14	6.8	1,650			140	817	1,537		1,790	1,790	N/F	2/3	2.5	4.0	7.0	6.0	6.5	11,748	18,250	1,790	1.00	Y	C	N
5	Spean Touch	Canal	2012/13	6.6			1,250	60	271	1,250	1,663	1,663	1,663	N	3	2.5	4.0	7.0	6.0	6.5	5,171	27,429	1,815	0.92	Y	C	Y
6	Prey Leu	Canal	2012	3.9	850			120	375	900	900	900	900	N	3	2.5	3.5	6.5	5.5	6.0	6,118	14,075	942	0.96	Y	C	Y
7	Hay Saun	Pump	2013/14	5.2	600	17		150	570	643	643	643	643	N	3	2.5	3.5	4.5	3.5	4.0	3,683	6,157	724	0.89	Y	C	Y
8	Chamlong Chrey	Pump	2013/14	1.7	300				187	306	306	306	306	N	3	2.5	3.0	4.5	3.5	4.0	1,129	2,922	225	1.36	Y	C	Y
9	Reservoir 77	Reservoir	2013/14	1.5	250					250		250	250	N	3	2.0			3.0	3.5	375	1,125	280	0.89	Y	C	Y
	Kampong Thom																										
1	Thnoat Chum	Canal	2011/14	7.3	900	15	50	50	150	1,200	500	500	1,200	F	2	2.5	4.0	6.0	5.5	5.5	5,215	9,840	1,275	0.94	Y	C	Y
2	Angko + improvement	Pump	2011/12/14/15	5.1	17	50	600	5	540	1,060	30	800	1,100	F/N	2/3	3.0	5.0	7.0	5.5	6.5	6,594	8,459	313	3.51	Y	C	Y
3	Boeung Leas	Pump	2014/15	0.5	15	25	300	10	160	190	25	200	300	F/N	2/3	3.5	4.0	7.0	5.5	6.5	833	1,873	250	1.20	Y	C	Y
4	6 January SC1, 2 and 3	Canal	2013/14	NA	1,187			5	5	1,259	800	1,200	1,450	N	3	2.0	3.5	5.0	4.5	5.0	3,969	14,276	789	1.84	Y	C	Y
20	**TOTALS/AVERAGE**			**104.7**	**7,109**	**685**	**9,572**	**748**	**11,954**	**19,128**	**6,368**	**21,211**	**22,561**			**2.5**	**3.6**	**6.1**	**4.8**	**5.6**	**123,368**	**218,461**	**19,265**	**1.30**			

Notes:

Columns 2, 3 and 4: The cultivated area before the construction/rehabilitation of the scheme; crop calendar largely depends on area being flooded or non-flooded.

Columns 5, 6 and 7: Full development over time depends on construction of secondary/tertiary canal system (CAVAC and/or private water sellers) and farmers adapting to crop intensification; recession crop in flooded areas and wet season crop in non-flooded areas.

Columns 8, 9 and 10: Potential area based on available water resources and complete scheme development (distribution system)

Columns 13 to 19: Yields in the before and after construction situation. Full development depends on best agricultural practices, sufficient water and proper on-farm water management.

Columns 20 and 21: Landholding based on overall average of the District/Commune; more accurate figures after completion of landholding surveys

Columns 22, 23 and 24: Progress on establishment and training of FWUCs. Continued training will be required till FWUCs are able to operate and maintain the schemes fully.

ANNEX 3: EXPENDITURE AGAINST WORK PLAN

Component Breakdown		Description	Interventions and Activities 2015	Budget (USD)	Total Expenditure to 30 June 2015 (USD)
Component 1: Agribusiness				**1,103,027**	**520,604**
1.1	Critical constraints to strategic value chains identified and developed for business action.	Completed for CAVAC	CAVAC team will undertake some analysis of the market system that may be included in work in the sector on a future program alongside other activities	–	–
1.2	Agribusiness partnerships supported to innovatively address constraints.	Improve input markets in rice and vegetables; including embedding and use of the Pest Diagnostic Tool. Work to continue with all companies to add extension activities. Linking events completed but work with companies and media to increase communication within their network.	Fertiliser	629,490	241,483
			Pest (diagnostic tool)		
1.3	Enhanced farmer services embedded within agribusiness practices.		Vegetable		
			Export		
			(Further budget for Export promotion activities may be determined)		
			Model Farmers		
1.4	Improved availability and communication of market information between value chain stakeholders.		Media		
			Wider market (Information and Communication Technology [ICT])		
			Research		
1.5	Participatory planning and construction of key infrastructure to address value chain bottlenecks.	On hold			–
1.6	Government led rice policy activities *	Activities led by the three PDAs	Continue to complete priority activities of MAFF and PDA already contracted	216,555	152,570
			Addional priority activities identified in 2015	120,000	25,003
			Impact Assessment/ M&E – 2015	30,000	–
		Activities led by the GDA	Rice Value Chain	106,982	101,548
Component 2: Irrigation and Water Management				**2,184,853**	**1,248,482**
2.1	Improved capacity of MOWRAM and PDWRAM to participate in	Intense collaboration with MOWRAM and PDWRAMs in the construction of schemes and in	All work for CAVAC is now complete.	–	4,870

Component Breakdown		Description	Interventions and Activities 2015	Budget (USD)	Total Expenditure to 30 June 2015 (USD)
	design and develop, operate and maintain irrigation schemes.	the detailed design of schemes.			
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.	275,978	158,934
2.3	Selected systems rehabilitated and transferred to effective FWUCs.	Finalising schemes and ensuring scheme are appropriate for handover	Finalising the construction of all schemes and FWUC offices including installation of pumps in schemes so designed.	1,825,480	1,058,918
2.4	Improved models of water management adopted in rain fed areas.	Completed		–	–
2.5	Increase use of hydrological data in the planning and management of irrigation systems.	Completed		–	–
9.0	Preparatory work for potential new program	Survey and Design concepts	Survey and designs for concepts of future new program including designs for two schemes for 2016	83,395	25,760
Component 3: Research and Information Systems – Integrated into other activities				**–**	**–**
Component 4: Business Enabling Environment – Integrated into other activities				**–**	**–**
Cross Component Activities				**139,527**	**22,052**
5.1 /5.2	Gender and Disability**	The gender and disability strategies will guide activities. Both will be mainstreamed in all activities. Finalisation of M&E will include gender analysis	Gender and disability are mainstreamed in all activities.	–	–
5.3	Environment and Disaster Risk Reduction***	Revised Environmental Strategy implemented and actions will continue to be taken.	All interventions have been screened for environmental impacts. Management plans prepared and activities implemented and monitored continually.	91,877	9,048
5.4	M&E	M&E will be an integral part of the work activities of CAVAC. Experts will be involved.	Surveys will be undertaken to assist with finalising the analysis of the program impact.	47,650	13,004
5.5	Training/seminars/capacity development support	Largely completed	Limited outside training with additional training will be undertaken within CAVAC, counterparts are encouraged to attend	–	–
Total				**$3,427,407**	**$1,791,138**

Notes:
* Actual expenditure includes expenditure incurred in the last two weeks of December 2014, as the budget was finalised in early December taking into account these planned expenditures.
Bank charges are not included here.

ADDITIONAL WORK UNDER THE RICE MILLING AND EXPORT STREAM

Component breakdown	Description	Budget (USD)	Total Expenditure to 30 June 2015* (USD)
Rice Millig and Export		$321,000	$13,490
Boeung Leas Scheme Improvement**	Boeung Lease scheme extension to provide additional 40 ha of command area for rice production intended for export to Europe	120,000	
Federation of Cambodian Rice Miller Associations (FCRMA)	Partnership agreement in place to support FCRMA to conduct trade visits and suppot buyer visits for the promotion of rice export in Cambodia	15,000	
Topographical surveys	2016 Designs – Rice Export	140,000	13,005
Concepts		5,000	
Pump house designs		8,000	
Soil investigations		15,000	
General Support Cost – Rice Export		18,000	485

Notes:
*In addition to these funds, AU$169,345 has also been expended on *Rice Milling and Export* during the period. This has been funded through the *Rice Milling and Export Unspecified Personnel* budget and as such is not reported against the *2015 Annual Work Plan* budget. The significant expenditure was for the initial research undertaken on the *Practical Approaches to Rice Export Promotion in Cambodia*.

Actual expenditure noted in the table above is for topographical surveying of a potential scheme in Takeo in 2016 and travel expenses paid under the Imprest Account.

**Boeung Leas scheme improvement work was completed in May 2015. The invoice for this work was submitted and paid in July 2015.