■ FINAL REPORT-

Final Report
Results & Recommendations

Offering BDS services to Domestic Private Water Operators in Cambodia

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Location: Cambodia
Client: ***Water and Sanitation Program*** *– Contract:* ***7167614***

Offering BDS services to Domestic Private Water Operators in Cambodia *aims to design, market deliver and monitor the results of business development services in order to improve operational performance of participating private water providers.*

WSP / Cambodia

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ABBREVIATIONS

AFD	French Development Agency
Consortium/consultant	Gret and EMC
BDS	Business Development Services
CWA	Cambodia Water Association
DBL	Design-Build-Lease
DPWOs:	Domestic Private Water Operators
EBITDA	Earnings before Interest, Taxes, Depreciation, and Amortization
EMAS	Enterprise Monitoring and Advisory System
ERMS	Enterprise Resources Management System
EU	European Union
FTB	Foreign Trade Bank
JICA	Japanese International Cooperation Agency
Kolka	Communal Authorization
HH	Household
MIH	Ministry of Industry and Handicraft
MSMEs	Micro, Small and Medium Enterprise
Prakas	Ministerial Decree
OBA	Output-Based-Aid
O&M	Operation and Maintenance
SOE	State Owned Enterprise
WB	The World Bank Group
WSP	Water and Sanitation Program
WTP	Water Treatment Plant

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Exchange rate used:

4000 Riels for 1 USD
1 € for 1.14 USD

EXECUTIVE SUMMARY

There has been a growing interest in the potential roles that Domestic Private Water Operators (DPWOs) can play in supplying rural population growth centers and small towns in Cambodia. The most recent update[1] of the Cambodian DPWOs licensed list showed that 138 DPWOs have currently obtained a license (ministerial decree) at the national level (MIH). Cambodia is unique considering the number of DPWOs, the level of investment and their willingness to continue into the future. Indeed, several studies have confirmed the great potential that Cambodian DPWOs could play in improving and increasing access to safe water in small and medium-sized towns. The potential of the market's growth in this sector is underpinned by high demand and willingness to pay, strong economic growth and urbanization of rural growth centers, and strong interest for investment from DPWOs.

Based on previous experience from 2009-2011, the Water and Sanitation Program redefined a scalable approach to Business Development Services (BDS), introducing market-based principles; the DPWOs had to pay 10% to 30% of the total costs of services. This approach aims to design, market, deliver, and monitor the results of business development services in order to improve operational performance of participating private water providers.

The challenges faced were i) to design adapted BDS packages, ii) to market these packages in order to prove that DPWOs are ready to pay (at least a small amount) to improve their skills and performances, iii) to scale-up the delivery whilst maintaining the quality of trainings and institutionalizing this through embedding BDS services within the Cambodian Water Supply Association (CWA), iv) generate evidence that training and coaching contributes to improved performance of service delivery. With a view to diversify the profiles, the design, and delivery of the BDS, packages were tailored to two targets groups: "Beginner" and "Advanced".

The implementation of this program was divided into two phases: Phase A (June 2013 - August 2014) aimed to design adapted BDS packages to be effectively delivered to 30 operators; Phase B (September 2014 - November 2015), aimed to improve the delivery of the BDS packages, through an improved training agenda and extended coaching visits for 20 additional operators. This second phase, aimed to consolidate all the processes and strengthen the CWA's role and responsibilities in the whole process.

The overall BDS packages contains:

[1] Communication with the Ministry of Industry and Handicraft in June 2015.

- **Booklets and tools:** using the previous training catalogue[2], new booklets and training tools were compiled with both technical and business lessons. These formed 3 new booklets, corresponding to 3 levels of understanding: "Upgrade your water business", "Run your water business" and "Plan your water business". The existing ERMS software (Enterprise Resource Management System) was offered to trainees, and support was provided for setting-up and using it[3].
- **Training:** 8 to 9 days *group training*, both on technical and business skills, were provided. The costs for transportation, hotel, and meals were covered by the BDS packages for one trainee (additional trainees paid for their transport and living costs).
- **Coaching:** 2 days *coaching* at the water utilities divided into 1 day on technical aspects and 1 day on business aspects. The topics were selected by the DPWOs at the end of the training session, and the assessment carried out by trainers. In the second phase, coaching was expanded to 4 days.
- **Hotline:** a hotline service was available Monday to Friday, between 09:00 to 15:00 hours. The cost of phone communication was covered by the BDS packages.
- **Regular monthly monitoring:** DPWO's were called monthly, in order to measure performance, record key data and to provide advice on the needs to improve the water utility's performance. A web-based platform, called EMAS (Enterprise Monitoring & Advisory System), although not part of the ToR requirements, was designed to record this data. EMAS will transition to serve ISEA, a newly established local BDS provider, in order to provide tailored services, and support the CWA in diagnostics of their members' performance.
- In addition, **video trainings** were produced that will be accessible through CDs distributed to each participant and on the CWA website

Selection and Marketing

The marketing strategy was developed in partnership with the CWA to disseminate information through 4 workshops, a radio spot, and direct calls. The BDS package fees, as well as the selection criteria/process, were set transparently, and fine-tuned in Phase B. The fees were as follows: i) **618 USD** for the Beginner BDS package, ii) **1,298 USD** for the Advanced BDS package. In order to remain fair to all DPWOs across the two phases of the program, the pricing strategy was not changed, although 2 days coaching were added in Phase B. For phase B, criteria were fine-tuned, whilst the marketing strategy remained the same. The CWA chose to allow Beginners in Phase A to move into Phase B, to the Advanced BDS packages. A test was added to the selection process to facilitate this move to a higher learning level package. Indeed, Phase A shows that some Advanced DPWOs could not follow the lecture on accounting due to their lack of basic knowledge on this topic. Consequently, the CWA in coordination with the Consortium organized an accounting test during the selection. The levels were decided by the DPWO and validated by the Consortium after the test.

[2] Previous training catalogue was deemed too lengthy and theoretical, thus it was decided to modify its content

[3] As the ERMS needed to be further enhanced to address shot comings in its software design and to further tailor it to requirements of users, WSP and CWA jointly with a local IT-company- have recoded and upgraded the software, which is slated for release by Nov 2015 under licensing agreement with CWA.

The selection criteria were based on a scoring method containing three mains areas: (i) level of compliance with legal framework; (ii) willingness and motivation in water supply sector; (iii) social performances reached.

Figure 1 - Selection flow process

BDS Delivery

47 operators were trained, 30 during Phase A (15 Advanced, 15 Beginners) and 17 during Phase B.

#DPWOs	**Advanced**		**Beginners**		***Total***
Phase A	15 DPWOs	24-29 participants	15 DPWOs	24 participants	30
Phase B	5 DPWOs	6 participants	12 DPWOs	17 participants	17
	20	***34 part.***	***27***	***41 part.***	

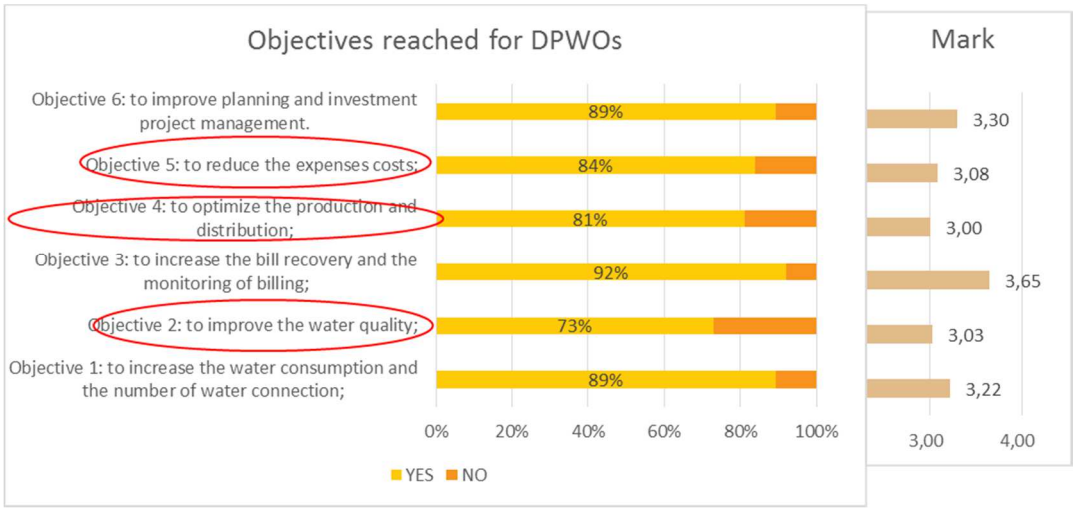
The package was structured around differently emphasized modules and lessons according the level of the participant. Satisfaction was quite high for the training sessions, but some difficulties were met during coaching that it seems necessary to take into account. Most Advanced DPWOs came with their staff (technical and business), which meant more training staff had to be mobilised to correctly conduct the exercises and practical lessons.

	Advanced	**Beginners**
Module 1: Overview of water facility	✓	□
Module 2: Overview of water supply business	✓	□
Module 3a: Manage your revenue	✓	✓
Module 3b: Manage your revenue	✓	✓
Module 4:Manage your expenses and inventory	✓	✓
Module 5: Manage your facilities	✓	✓
Module 6: Expand your infrastructures	□	✓
Module 7: Finance your infrastructures	□	✓
Module 8: Manage infrastructures projects	✓	✓

Monitoring of performance and outcomes

Improvements of their skills and practices can first be measured from the DPWO perspectives, who were quite satisfied by the program: 89% of them considered that they reached most of their objectives. 92% considered that they improved their bill recovery and their own monitoring. On the other hand, only 73% considered that they improved their water quality, whilst 81% considered that they have improved their production and distribution.

Figure 2 - Perception of improvements



Through baseline data, some KPIs were identified to effectively measure the changes and improvements realised following the same 6 objectives. Some limitations should be noted: the results observed cannot be causally attributed to the BDS program (there may be many confounding factors that have contributed to these observed changes in performance). It is only plausible that the BDS program have contributed to these observed changes. Another limitation is the time lag which is apparent in terms of building individual staff knowledge and skills, translating this to change within the water operator environment in terms of practices and attitudes, and then translating in improved performance. Especially phase B, that only captures a short time frame of 4 months. Finally, comparisons and averages don't reflect the variety of profiles of the DPWOs: those who have a long time history and those that recently started have totally different KPIs.

Despite these limitations, some overall changes can be observed that provide interesting trends. A summary table of overall KPIs is below.

		UNIT	Overall (n= 45)		
			BS	ES	%
OBJ.1	Objective 1: Increase the water consumption and the number of water connections;				
1.1	Number of active connections	Average number of connections	1 163	1 434	*23%*
1.2.1	Coverage rate inside the network area	Average connection rate inside the network area	*51%*	50%	*-2%*
1.2.2	Coverage rate inside the license area	Average connection rate inside the license coverage area	32%	36%	*12%*
1.3	Lenghth of the network	Average of km of pipes installed	25 928	35 518	*37%*
1.4	Densification of the network	Nb of active connections (HH)/length of the network (km)	55,37	50,68	*-8%*
1.5.1	Water consumption	Average of l/cap/day	92,42	97,90	*6%*
1.5.2	Water consumption	Mediane of l/cap/day	57,23	66,78	*17%*
OBJ.2	Objective 2: Improve the water quality and water quality monitoring practices;				
2.1	% of tests of Water quality passed done by Gret	Av of % of test passed	61%	61%	*0%*
2.2	Average of number of tests done by DPWOs	Total tests done by DPWOs (per month) declared	307	616	*101%*
2.3	% of DPWOs that have improved their water quality	% of DPWO whose test have shown improvement (nb of tests passed in ES > nb of test passed in BS)	16%		
2.4	% of residual chlorine test at the end of network passed by gret	% of tests passed	15%	19%	*24%*
OBJ.3	Objective 3: Increase the billing collection rates and the monitoring of billing;				
3.1	Number of DPWOs using software for billing	# DPWOs	26	42	*62%*
3.2	Revenue per connection (USD)	Average revenues per connection	10,7	8,9	*-17%*
3.3	Net income per connection	USD/m3	7,1	6,0	*-15%*
OBJ.4	Objective 4: Optimize the production and distribution;				
4.1	Pressure at the end of network	mH2O	8,4	12,1	*45%*
4.2	NRW	Av. NRW rate	15%	13%	*-12%*
4.3	Preventive maintenance	Av. # preventive actions	5,8	10,6	*84%*
4.4	Water availability (hours)	Average hours	21,3	21,9	*3%*
4.5	Average hours of pumping	Average hours	10,3	12,7	*24%*
4.6	Number of DPWOs that decrease the NRW	% of DPWOs	49%		
OBJ.5	Objective 5: Reduce the operational expenditures;				
5.1	Expenses per connection	Av. Expense per connection	3,2	2,9	*-11%*
5.2	Staff per connection*	Av # staff/ 1000 connections	20,5	36,1	*76%*
5.3	Time to bill	# days	5,2	4,8	*-8%*
5.4	Cost per m3 (all)	Riels/m3	997	941	*-6%*
5.5	Cost of energy per m3	Riels/m3	497	339	*-32%*
5.6	Cost of chemicals per m3	Riels/m3	91	177	*94%*
OBJ.6	Objective 6: Improve planning and investment project management .				
6.1	Total investment (USD)	USD (total since beginning)	301 470	321 381	*7%*
6.2	Gross margin	Av. gross margin	34%	32%	*-7%*
6.2.1	Increase of their gross margin	% of DPWOs	42%		
6.3	Bank account availability for water business	% of DPWOs having a bank account	53%	60%	*13%*
6,4	Average investment	USD (total since baseline)	9 356		
6.5	Net profit	USD/month	6 265	7 092	*13%*
6.5.1	% of DPWOs having increased their net profit	% of DPWOs	51%		

More in-depth analysis allows us to present the following key results:

- The 47 DPWOs are serving a total of 69,275 connections (estimated 345,000 people), 95% are active connections. 90% of the DPWOs were closely monitored, the others were in the process of building their facility. The average coverage rate inside the area of the

network was stable (around 50%) and has, in terms of the whole license area, increased from 32% to 36%[4]. If the water sold has consequently increased (19% for DPWOs in Phase A, 73% for phase B), the average consumption has not grown so much (+10% for Phase A, 0% for Phase B). 56% of the operators have extended their network; 38% have densified their network rather than extending it.

- In terms of water quality improvement, results based on water quality tests (turbidity and chlorine) carried out by Gret during the baseline and endline, do not show an improvement as expected. Only 16% of the DPWOs improved their water quality[5] (and 69% showed no change). Out of the 174 tests done, 60% passed during the endline survey, the same percent that passed during the baseline (98 out of 162 tests). Nevertheless, water quality concerns seem to be of growing importance to operators; the number of tests done on average each month by the operators themselves has doubled. Moreover, 50% of the DPWOs more tests per month during endline than during baseline. For water quality concerns to become a top priority and to internalize better self-monitoring, increased regulatory enforcement would be needed, as well as more communications campaigns to Cambodian customers, who have strong sensitivity to chlorine taste (due to preference of using rainwater for drinking/cooking).
- Financial performance depends on the capacity of the operator to decrease (optimize) his expenses and increase his revenue. The opportunities and management decisions of operators to improve financial performance were shown to be dependent on many factors, such as the size of the operator, the main source of water, the number of staff, the configuration of the area (dense or less dense). 36% of the DPWOs have increased their revenues per connection. Almost half of the DPWOs saw their expenses per connection decrease. This is mainly explained by both an energy cost per m^3 decrease (-39%) and an input cost decrease (-18%). As a result, net incomes[6] showed improvement. Nearly half of the DPWOs (47%) have seen their net income per connection increase, 17% of them (4/23) have more than doubled their net income. 42% have seen an increase in their gross margin ratio.
- Although not directly translated into KPIs, an important outcome of the program is the introduction of better data recording. Monthly reports showed improved and good consistency and almost all operators transitioned to using software systems (including ERMS) for billing purposes (94% of Advanced and 81% of Beginner). Expenses were recorded, at least in a record book, for 68% of the DPWOs (24% of operators have a simple record, 31% use Excel and 13% uses accounting software). The overall time to bill rebated from 5.2 days to 4.8 days.
- Concerning service provision, the average number of hours of delivery per day was close to 22 and similar for Advanced and Beginners; no significant changes were observed (from 21.4 to 21.9 h) Already 68% of the DPWOs delivered water 24h/day at baseline (and 75% at end line). An area where major improvements were observed is water pressure at the end of the water network. This increased from 8.4 to 12.1 mH_2O (+45%). Also, the number of operators that do not measure pressure at all has decreased from 7 to 5. 41% of the DPWOs have reached the standard of 10 mH_2O at the end of the network, during

[4] Average across the operator profile

[5] meaning an increase of the number of tests done and passed by GRET

[6] Net income = Revenues from billing and connections – operating expensed

endline. Another improvement concerns the evolution of non revenue water (NRW); half of the DPWOs saw their NRW decrease during the program.

- Outcomes related to technical training are manifested in better operation and maintenance practices. 94% of Advanced DPWOs and 70% of Beginner DPWOs currently record technical data (they were respectively 71% and 26% during baseline survey).71% of the Advanced (65% during baseline) and 48% of the Beginners (30% during endline) also monitor their losses.
- Finally, the last objective was to improve DPWO ability to plan investment. At the end of the program, 60% of DPWOs had a specific bank account for their water business (55% before the project). 72% of the DPWOs invested more than the average amount of investment (32,000 USD). In total, around 1,440,000 USD has been invested by the 47 operators from baseline to endline surveys, 57% have been realized by Advanced, representing 55% of the connections.

The objective of the monitoring strategy was two-fold: i) provide evidence on the evolution of performances that could plausibly be attributed to the BDS and ii) provide real-time diagnostic information to share the advisory of DPWO monthly management. This monitoring confirmed that the BDS packages are adapted to the needs and expectations of the DPWOs. It also confirmed the DPWO's satisfaction, via survey. The challenge remains to tailor quantitative improvements on technical and financial KPIs for each DPWO. The second objective proved to be too challenging, especially as the development of EMAS and its use by operators, encountered delays in its implementation. The BDS program initiates a self-diagnosis by operators, some quick wins can be made, but some aspects need more time, more intense coaching and more investments.

Lessons Learned & Challenges

Conclusions and lessons learned from this program regarding the innovative approach are as follows:

i) the program has proven that a BDS package is **relevant considering the needs for scaling-up and to sustainably fund training**

ii) the program has reinforced **CWA's role and recognition** and

iii) **the program has given some evidence** on the need to continue to strengthen the performances of the DPWOs

On the other hand, **persisting challenges and trade-offs** exist that mostly relate to the delivery of group training versus individual on-site coaching. The uniformity of the group training package, despite the "rough" tailoring of Advanced and Beginner does not do justice to the different levels of capacities of both the individual trainees as well as the diverse level of performance and sophistication of the operators.

Following the lessons learned, the next steps and recommendations are based on the evolution of the sector. The DPWOs will face increasing challenges in reducing their costs, improving their performances to be more transparent and accountable; but also to reduce their tariffs and

be more efficient. Indeed, during the last two years, the sector has faced tremendous changes with the issuance of a new prakas in May 2014 *on issuing, revising, suspending and revoking permit for water supply businesses*. Moreover, some programs, initiated by WSP[7] and AFD[8] promote access to commercial loans for the water operators, providing them technical assistance for planning their investment. In that sense, CWA can be a key player for continuing the support to its members. The main recommendations are the following:

- **Provide an updated, lighter BDS package** organize trainings sessions, small coaching groups and coaching days, outsourcing the training when needed. Selection and marketing strategy could be also lightened with only direct calls, and information broadcast through the CWA's Facebook page and website.
- **Diversify the services on accounting & legal issues –** despite progress DPWOs still lack accounting and financial management capacity. Outsourcing accounting services, tax registration or financial analysis could be an option that would interest operators that still have low capacities to manage these activities.
- **Facilitate access to service providers –** this includes their rating/the benchmarking of their costs. Following the new regulation and on-coming technical standards, there will be a need for guaranteeing fairness, information, and transparency for the DPWOs regarding the different services offered by consultants and firms. The CWA can support its members to choose good suppliers and good service providers.

  Strengthen the CWA advocacy role and network facilitation through the review of the business model –Following the program, DPWOs recognize the important role of the CWA in network facilitation. CWA has done a lot of progress in implementing the BDS package and should reaffirm what are its strengths and its strategy to strengthen its members : i) an important network, ii) the large geographical coverage, iii) the capacity to mutualize some needs for the benefits of its members (training services, hotline, accounting services). CWA should focus on core priorities and avoid mission creep. Further study on the business model for the CWA is also recommended; increasing membership fees may be a way to facilitate the continuation of some of the services offered.

[7] Access to finance program –A2F- implemented by a Consortium EMC/Gret)

[8] Access to finance for Small Water Enterprises and Rural Electricity Enterprises in Cambodia – implemented by FTB with a technical assistance to the bank on one side (Enclude) and a TA to the operators (GRET/ARTELIA/SEESAW/ISEA)

INTRODUCTION: AN INNOVATIVE APPROACH FOR SUPPORTING WATER SERVICE PROVIDERS

There has been a growing interest in the potential roles that Domestic Private Water Operators (DPWOs) can play in supplying populations of small and medium-sized towns in Cambodia. The most recent update[9] of the Cambodian DPWOs license list indicated that 138 DPWOs currently hold a license (ministerial decree) at the national level (MIH). Cambodia is unique considering the number of DPWOs, the level of investment and their drive to continue into the future. Indeed, all studies have confirmed the great potential that Cambodian DPWOs could play in improving and increasing access to safe water in small and medium-sized towns. The market potential of this sector, and the interest of DPWOs to invest in it, has been confirmed several times. The potential of the market's growth in this sector is underpinned by high demand and willingness to pay, strong economic growth and urbanization of rural growth centers and strong interest for investment from DPWOs.

1. Previous experiences supporting DPWOs

Aside from small-scale projects carried out by development partners, little attention has been given on how Business Development Services (BDS) could potentially be provided to DPWOs, and how they could increase their to access finance for investments. A demand and supply study[10] for BDS services (Barbian et al.) illustrated key challenges faced by DPWOs: (i) the low quality of specialized technical services available for DPWOs and the lack of knowledge of DPWOs to assess the quality of services provided; (ii) the difficulties of DPWOs to compile records (through software use), which is a limiting factor for accessing finance for local and/or regional commercial banks; (iii) lack of technical and business management and when advisory services are provided, the limited motivation for follow-up of service performance.

The Water and Sanitation Program of the World Bank launched a pilot program in 2009 aimed at strengthening the capacity of 9 DPWOs. During the pilot phase three major products were created: i) a technical training book, ii) a business training book and iii) the Enterprise Resources Management System (ERMS). Considering the positive interest of the DPWOs, WSP

[9] Communication with the Ministry of Industry and Handicraft in June 2015.
[10] Bibliography in annex #13

wished to scale-up this program through a market-based approach, in order to facilitate a transition towards more sustainable support systems. This approach included support to the recently created Cambodian Water Association (CWA) launched in 2011, which includes more than 70% of the DPWOs nationwide. Informed by the lessons from the pilot, the rationale of the program was based on designing standardized but adapted tools to different DPWO segments, on delivering the support through an approach that introduces market principles (BDS services purchased by the DPWOs, albeit at subsidized price levels) and monitor the results of business development services in order to improve operational performance of participating private water providers. Technical assistance over 2013 also focused on other aspects, such as access-to-finance, institutional strengthening of the CWA, and support to the MIH on regulation, licensing and M&E.

This report presents the results and findings of the BDS program, hosted with the CWA, and jointly executed by the CWA and EMC/GRET (with EMC/GRET, hereafter called the Consortium). This technical assistance was implemented in two phases, from June 2013 to August 2013 and a second extension till November 2015.

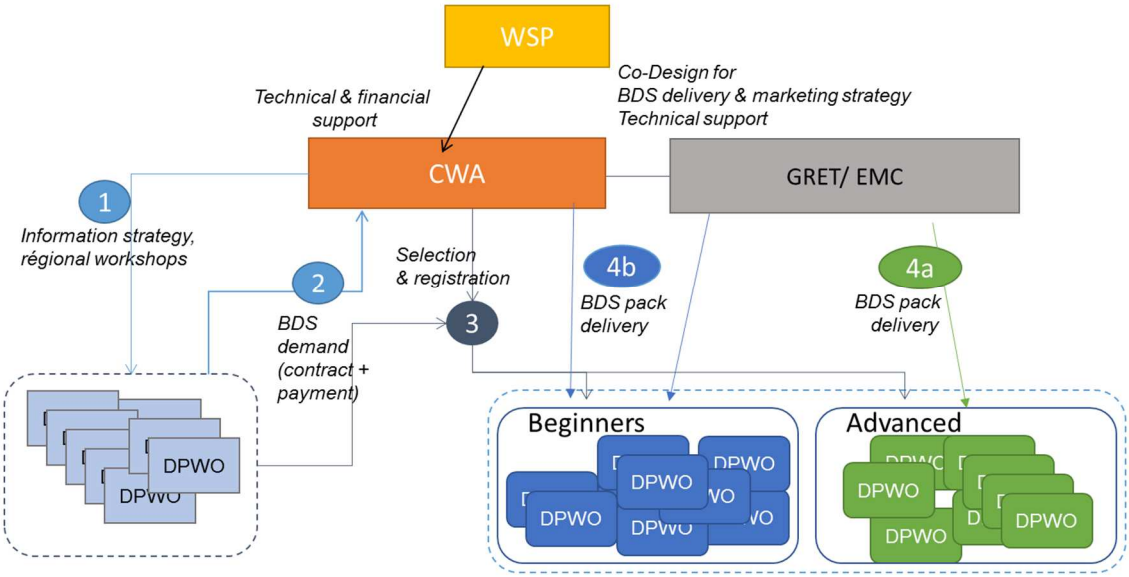
2. Key principles of the approach

The BDS approach in this program is different from previous experiences. The objectives were i) to design tailored BDS packages to different segments of operators, ii) to market these packages to demonstrate that DPWOs are ready to pay, at least a partial amount, for improving their skills and performances, iii) to scale-up the delivery keeping the quality of trainings, using a national institution, here the CWA, iv) to generate evidence that training and coaching can plausibly contribute to improvement in skills and performances of service delivery. Regarding the diversity of profiles, it was decided to design, tailor and deliver the BDS packages to two target groups: “BBeginner” and “AAdvanced”.

Beginner DPWOs are mostly family business with generally a smaller number of water connection (but it can be up to 1,500) characterized by: limited or no records or bookkeeping, limited or no computer literacy, weak technical and business capacities and non-specialized staff.

Advanced DPWOs are semi-professional operators (from 750 to 3,000 water connections). They are characterized by: a background of computer knowledge, quite high business skills and often employ specialized staff to manage technical and business parts of their water supply services.

Figure 3 - Key stakeholders involved



3. Specific objectives and timeframe

The specific objectives of the technical assistance contract of the Consortium were to:

- Design a detailed proposal for the delivery of business development packages for Beginner and Advanced water providers, in order to increase their operational performances, including the development of a transparent selection process.
- Develop and implement a marketing plan to ensure outreach, demand creation, and broad participation of high-potential water providers in the program.
  - Effectively deliver the content of the BDS to a total of at least 50 motivated DPWOs, aiming for an equal distribution between “Beginner” and “Advanced” providers and geographic representation of the distribution of DPWOs.
- Monitor and analyze the performance of the participating DPWOs before and after using the BDS.
- Assess and provide recommendations on the continuation, expansion and improvement of BDS, following a market-based approach, institutionally anchored at with the CWA

Figure 4 - General flow process of the BDS program

The program was divided and implemented into two phases. Phase A, from June to August 2013, aimed to design the tools and targeted 30 DPWOs while Phase B, from September 2014 to November 2015, aimed at targeting an additional 20 DPWOs and transferring experience and skills to the CWA.

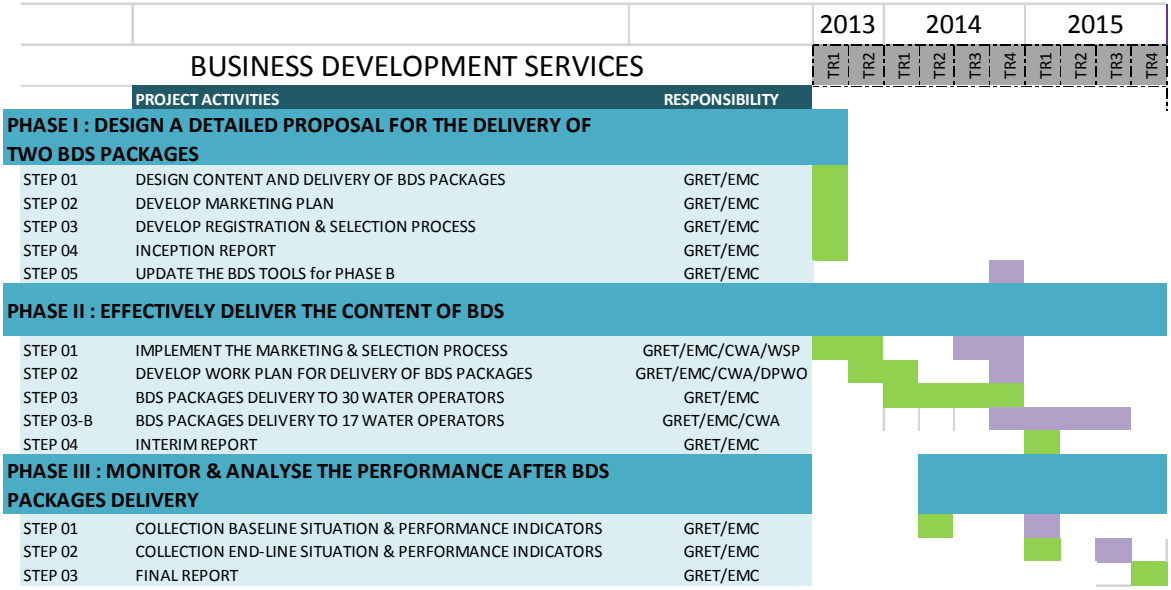


Figure 5 - Overall timeframe

4. Approach to monitor the implementation of the BDS package

The Consortium delivered the technical assistance services in close collaboration with the CWA, as well as through regular interaction and technical support from the WSP team.

This program was designed in order to learn about the following key aspects:

i. lessons on the delivery approach: marketing, price setting and selection strategy, as well as user satisfaction on the tools[11]

ii. lessons on the effectiveness of the packages to improve water provider practices and performances[12]

iii. lessons for further scaling-up of BDS packages, informed by cost-effectiveness of different tools and (emerging) operator needs, and the role of CWA in the program and in the future[13]

Recommendations are formulated in Chapter V- Conclusions & Recommendations

The following methods and tools were used to generate evidence to support the learning lessons

Training sessions: a short evaluation form was distributed during each training to measure satisfaction of the trainees: i) on the overall organization, ii) on the training arrangements, iii) on the results of the trainings and iv) on the level of understanding of each lesson. The score given goes from 1 (low level) to 5 (high level).

Hotline support: a database was set-up and followed to measure the use of the hotline. Some improvements were made on the coding of the problems and the follow-up for each call. The consultants also noticed that some calls were still directly addressed to the trainer not through the hotline.

Baseline and endline survey for each participant: monitoring the DPWOs is a learning process. It was based on three main tools: i) a baseline survey was conducted before program implementation just after signing the agreement, ii) a monthly monitoring phone call to each DPWO to assess performance, iii) a final assessment on the field in order to do the comparative analysis with the baseline data[14]. The Key Performance Indicators (KPIs) were linked to the performance objectives that were defined (the complete list of KPIs is in Annex X). The organization of the BDS was based on 3 main areas of performance improvement: i) service coverage and water quality performances; ii) commercial and financial performance; iii) operation and maintenance performance. These 3 main areas aim at reaching 6 objectives:

- Objective 1: to increase the water consumption and the number of water connections;
- Objective 2: to improve the water quality and water quality monitoring practices;
- Objective 3: to increase the billing collection rates and the monitoring of billing;
- Objective 4: to optimize the production and distribution; (including non-revenue water and water pressure)
- Objective 5: to reduce the operational expenditures;
- Objective 6: to improve planning and investment project management.

[11] These lessons will be discussed with underpinning data in chapter II – Implementation process, section 3 and 4

[12] These lessons will be discussed with underpinning data in chapter III – Results of performances

[13] These lessons will be discussed with underpinning data in chapter IV – Perspectives & lessons for scaling-up

[14] Following the ToR, the final survey has been done in two phases, from January to February 2015 for Phase A and in august 2015 for Phase B.

CHAPTER I - IMPLEMENTATION PROCESS

I. DESIGN OF BDS PACKAGES

1. Key features to design BDS packages

The BDS package was developed based on previous findings and training materials produced during the 2009-2011 WSP Technical Assistance (jointly implemented by VBNK and Gret). Whilst this curricula and materials were a good start, the approach was found to be too theoretical, too broad and too intensive for scale-up. Moreover, there was no segmentation, thus it was not tailored to the different capacity levels of the operators. The Consortium redesigned the packages and materials, with advisory input from the CWA aiming to combine standardization (required for large dissemination) and tailoring to individual operator needs. Booklets, group training sessions and exposure visits were better focused on giving basic and general knowledge, on sharing experience between operators, while on-site coaching and hotline support aimed to provide specific advisory for individuals. Tools have also been designed following 8 modules that balance financial and business issues and technical ones in order to address the specific skills of each staff.

As per the ToR, the Consortium designed training curricula (for groups), and individual coaching and advisory tools base on the following principles: simplification and adaptation of the tools to operator profiles; different improvement steps for Beginner and Advanced; result-oriented training to achieve quick-win performance improvements, and positively impact on the bottom line.

Box 1: Different improvements steps for Beginner and Advanced DPWOs

Beginner DPWOs are mostly family businesses with weak technical and business capacities and non-specialized staff. The specific objectives for them were to improve their basic skills (regular reading of head water meters, improve the basic knowledge on how to operate and maintain each component of their system, improve their ability to test raw water to improve their treatment, etc.), start to record historic data, improve loss management and their billing system. For this group, the curriculum proposed was focused on basic utility and revenue management, with an emphasis on improving their billing system and customer management.

On the other side, Advanced DPWOs are semi-professional operators with a background of computer knowledge, quite high business skills and often with specialized staff to manage technical and business

	Beginners	Advanced
Module 1: Overview of water facility	✓	
Module 2: Overview of water supply business	✓	
Module 3a: Manage your revenue	✓	✓
Module 3b: Manage your revenue	✓	✓
Module 4:Manage your expenses and inventory	✓	✓
Module 5: Manage your facilities	✓	✓
Module 6: Expand your infrastructures		✓
Module 7: Finance your infrastructures		✓
Module 8: Manage infrastructures projects	✓	✓

parts of their water supply services. The objectives for them were to formalize their business, improve general management and planning capacity and ability to give reliable accounting data to banks for getting commercial loans. The curriculum included lessons on how to discuss with consulting firms, on how to design extension, and plan their investment.

2. Overview of BDS packages

The BDS package contains a wide range of tools covering technical and business improvements. It was slightly different for Beginners and Advanced, and was improved following the lessons learned during Phase A.

	Package Beginner		**Package Advanced**	
	PHASE A	PHASE B	PHASE A	PHASE B
Tools				
Booklets (*Upgrade your water business, Run your water business, Plan your water business*)	✓		✓	
ERMS software (Enterprise Resource Management System) installation	✓		✓	
Billing part	✓		✓	
Accounting part			✓	
Water quality toolkit	✓		✓	
Metphone card	✓		✓	
Hotline 5/7 days - between 9 am to 3pm	✓		✓	
Exposure visits	✓ (1 day)		✓ (1 day)	
Training sessions				
Upgrade your water business	✓ (1 day)		✓ (0,5 days)	
Run your water business	✓ (5,5 days)		✓ (5,5 days)	✓ (4 days)
Plan your water business	✓ (1 day)		✓ (1,5 days)	✓ (5 days)
On-site coaching				
Technical coaching	✓ (1 day)	✓ (2 days)	✓ (1 day)	✓ (2 days)
Financial coaching	✓ (1 day)	✓ (2-3 days GC)	✓ (1 day)	✓ (2 days)
Monitoring & advisory				
Advisory & Monitoring online of their performances (EMAS access, baseline & endline survey)	✓		✓	

A large range of tools

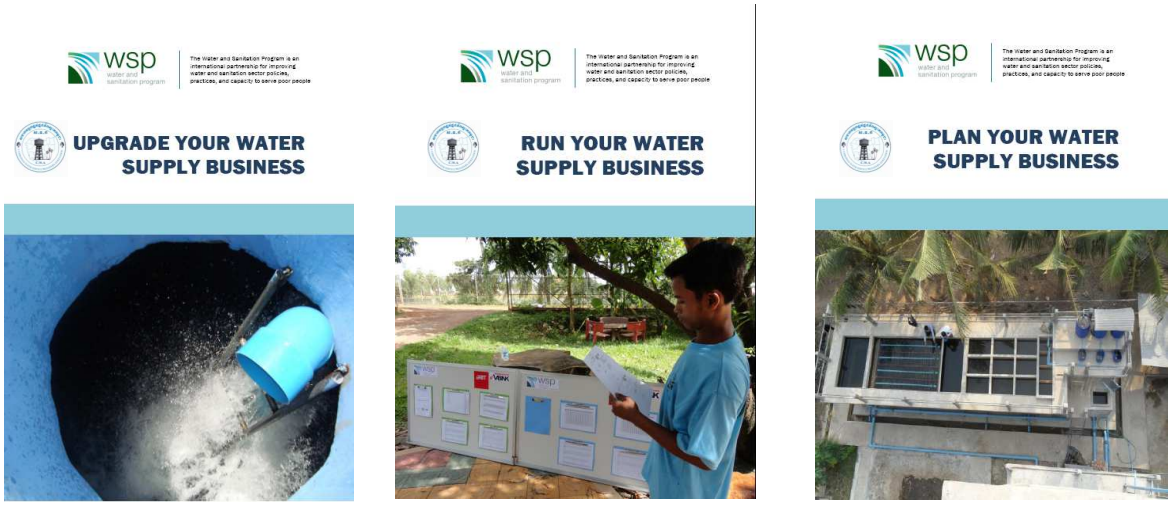
Booklets

Three training booklets that contain more detailed explanations about each lesson were offered to each water operator, through short lesson supported by PowerPoint and case-study/handouts. The booklet also contains forms, practical tools, and examples to help properly manage, operate and monitor a water supply utility. The booklets are structured to address the different levels of the DPWOs.

- The *Upgrade your water supply business* booklet addresses the needs of Beginners and proposes the basic elements and tools to start and improve a water supply business;
- The *Run your water supply business* booklet addresses the needs of both the Beginner & Advanced DPWOs to operate a water supply business;

- The *Plan your water supply business* booklet addresses the needs of Advanced DPWOs that have some capacity to invest and expand their current system.

Figure 6 - Three booklets



ERMS Software

The Enterprise Resource Management System (ERMS) is a software system designed and developed by VBNK/GRET under the previous technical assistance.

After a review of the ERMS by the Consortium, a list of issues (bugs/instability of the system, design flaws, and absent but desired functionalities) was drawn-up. WSP recruited Green ICT, a local IT-firm, to solve/improve all outstanding ERMS issues before the launch of the BDS program. However, persistent challenges remained which caused delays and a lack of trust in the software from the operators (especially during Phase A)[15].

While the software includes many modules (customer, billing, technical, inventory, human resources, accounting) to record information relevant to managing a water business, it was decided to introduce the modules step by step. Beginners were trained on the use of the billing and customer management modules, whilst advanced training expanded upon this to include the accounting module.

[15] WSP remained committed to supporting the CWA with the delivery of functional water operator software. To address overall design flaws (a web-based design, which is essentially used as a windows-based application) WSP and the CWA entered into an agreement with a local third party Software company (Biz Tools) to add a few more functionalities and develop the billing, customer and accounting functions as part of a desktop application (instead of a web-based application).

Figure 7 - ERMS System

Other products offered

In order to incentivize DPWOs to join the program, the following tools were distributed:

- Project bag & T-shirt
- pH and Chlorine test kits for testing water quality
- A 3G Modem

Video-training

Due to delays, video-training was not ready to be given to the DPWOs at the start of the program. However, they were employed at the end of the program during a refresher training on ERMS. These short videos complete the training material through key practical lessons covering technical fields:

- Overview of the water supply utility (~3 min)
- Operation & maintenance (~8 min)
- Water quality issues (~12 min) including: i) introduction, ii) chemical substances, iii) jar tests, iv) chemical injection
- Focus on pumping: from design to maintenance (~5 min)
- Water distribution network (~15 min) including: i) water meter selection & installation; ii) pipe installation; iii) leakage control & how to solve problems met on distribution

These videos will also be broadcast on YouTube and on the CWA's website and Facebook page.

Group training sessions

All sessions were divided between technical modules and business modules. In comparison to the initial design idea, there were few changes made to the number of training sessions provided. The training curriculum was also kept the same as the initial concept, which was designed

for two different capacity levels of water operators. It was structured around sessions, modules and lessons. Each session took from 2.5 days to 3 days to deliver and was designed to correspond to the status of the trainee (Beginner or Advanced) and their specific skills (technical or financial). Without a preliminary test on basic accounting, trainees faced difficulties during ERMS training sessions. This slowed down the training agenda and the program was slightly changed from Phase A to Phase B. The costs for transportation, hotel and meals were covered for one trainee. Additional trainees were asked to pay an additional 25 to 50 USD fee. A maximum of 3 trainees per site was accepted.

An overview of the Advanced and Beginner training curriculum can be viewed in the table below. The full training agenda can be found in annex #10.

Table 1 – Training organization for Advanced water operators

	Advanced					
	Topic-PHASE A	*Duration*	*PHASE A*	*Topic-PHASE B*	*Duration*	*PHASE B*
Session 1	Module 1: Overview of water facility	0.5 day	04-06 December 2013	Module 1, 2 &5-Run your business (technical)	1 day	18-21 march 2015
	Module 3a: Manage your revenue	2.0 days		Module 6 & 8-Expands Infrastructure & Manage Investment Project	0,5 days	
	Module 3b: Manage your revenue	0.5 day		Module 8 & EMAS-Entreprise Monitoring and Advisory System	0,5 days	
				Module 5 & Field Visit-Leakage Control & Field visit	1 day	
Session 2	Module 4:Manage your expenses and inventory	1.5 days	23-25 December 2013	Module 2-Introduction	0,3 days	30-31 march 2015
	Module 7: Finance your infrastructures	0.5 day		Module 3-Manage your revenue	0,7 days	
	Module 2: Overview of water supply business	0.5 days		Module 4-Finance & Accounting	0,5 days	
				Module 07-Develop your business plan	0,5 days	
Session 3	Module 5: Manage your facilities	1.5 day	04-06 January 2014	Module 3-Manage Your Revenue	1 day	09-10 April 2015
	Module 6: Expand your infrastructures	0.5 days		ERMS-Practice ERMS from Customer to Staff Management	1 day	
	Module 8: Manage infrastructures projects	0.5 day				
Session 4				ERMS-Practice ERMS from Staff to Customer Management	1 day	23-24 April 2015
				Module 4-Financial Accounting	1 day	

Table 2 – Training organization for Beginner water operators

	Beginners					
	Topic-PHASE A	*Duration*	*PHASE A*	*Topic-PHASE B*	*Duration*	*PHASE B*
Session 1	Module 1: Overview of water facility	0.5 day	04-06 February 2014	Module 2-Introduction and reminder	0,5 days	03-04 March 2015
	Module 2: Overview of water supply business	0.5 days		Module 3-Manage your revenue	0,5 days	
	Module 3a: Manage your revenue	1.5 days		Module 3 & ERMS-Module 3 & Practice ERMS from Staff to Customer Management	1 day	
Session 2	Module 3b: Manage your revenue	1.5 day	24-26 February 2014	Module 1 & 5-Overview of Water Facility	1 day	23-25 March 2015
	Module 5a: Manage your facilities	1.0 day		Module 1, 2 & EMAS-Overview of Water Facility & EMAS	1 day	
				Module 5 & Field Visit-Leakage Control & Field visit	0,5 days	
Session 3	Module 5b: Manage your facilities	1.5 day	06-08 April 2014	ERMS-Practice ERMS from Staff to Customer Management	1 day	02-03 April 2015
	Module 8: Manage infrastructures projects	1.0 day		ERMS-Practice ERMS from Staff to Customer Management	1 day	

Training sessions were changed following input from the CWA. For the Advanced level, all (two) business training sessions were conducted at the beginning, followed by a longer tech-

nical training session to allow sufficient depth. For the Beginner level, the first session was business training, the second session was about both technical and business training, and the third was about technical training.

Coaching & hotline

In order to follow performance progress after the training and deepen training on the specific weaknesses of each operator, 2 to 4 coaching visits were organized for each of them. These coaching visits aimed at improving specific skills and at clarifying the topics that were less understood during the group training sessions. The specific topics for the onsite coaching lessons were selected by the DPWOs at the end of the training session, and based on the assessment that was done by trainers. A hotline service was also available from Monday to Friday, between 09:00 -15:00 hours. The hotline was mainly used by DPWOs with specific issues on installation and running of ERMS.

Figure 8 - Financial coaching on ERMS

Advisory support & regular monthly monitoring

Each DPWO was called monthly, in order to review and record key performance data and to provide advice on ways to improve the water utility's performances, as per the operator's needs. A web-based platform called EMAS (Enterprise Monitoring & Advisory System) was designed to record the data in order to provide real-time feedback to the operators on the performance of their utilities. Due to delay in the design of the EMAS system, this tool was not used optimally (See also section III-2).

Box 2: EMAS presentation

Going beyond the scope of work of the ToR and with significant investment from GRET, a database was developed to store and facilitate the analysis of the data collected for the 30 DPWOs: beneficiaries of the program. This web-based platform entitled "Enterprise Management & Advisory system", EMAS, was launched at the end of the program (www.emasonline-kh.com) but all the data collected during the program was integrated in the database. The platform was managed during the project by Consultant staff. The website is bilingual – Khmer and English – on the same pages. Two kinds of data are stored: general information collected once during the baseline and "endline" survey and specific information entered each month by each DPWO.

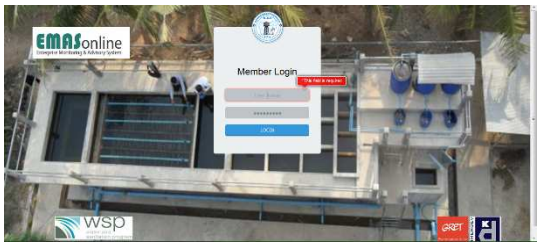


Figure 9 - EMAS System

Box 3: Key lessons on the design of a BDS package

Thanks to a close relationship with the CWA and their regular input, the tools were designed to be consistent and relevant with the DPWOs needs. This approach turned out to be appropriate in many ways. It enabled the development of a large range of tools that addressed different DPWO needs (tailored support and basic knowledge) and encouraged participation in the program. It gave visibility and credibility to the CWA to propose different tools and created a real dynamic of experience and knowledge sharing between DPWOs.

- **A close assessment of the needs is crucial**

In order to define the main package and for each of the tools, the preliminary assessment of DPWOs skills and capacities was crucial. The determination of profiles should be based on objective criteria balancing quantitative and qualitative information (understanding, motivation) but for each component of the package, a clarification of the targets and the expected results helps addressing needs that are partially explicit.

- **Phasing and delivery of group training session matters**

2 day group training sessions were appreciated because staff could be mobilized without having much impact on weekly management. Starting with business sessions seemed to be better understood by trainees and allowed different DPWO staff to participate in sessions of their interest and skills. Having a place for theoretical topics, balanced with practical exercises appears quite important to support understanding. Training on software use is quite specific; ERMS was installed on every computer during the sessions but to import previous data (customer databases) required specific time. Dividing this session into two parts, developing practical exercises and encouraging group coaching more than group training,[16] would allow close support and better understanding of the software.

- **Coaching and direct advisory should be framed before beginning and the action plan should be clarified**

Coaching plans were defined at the beginning of the program after discussing with the DPWOs and auditing the water supply utilities. Standardized coaching days (two on financial issues, two on technical ones) were proposed and were globally appreciated. However, the diversity of profiles raised the issue of prioritizing improvements and measuring specific performance indicators for each DPWO. This should be taken into account at the beginning in a coherent action plan. Performance improvement plans were piloted during Phase B and should be monitored and adjusted over time. The direct advisory strategy should be framed from the beginning with priorities and clear and reasonable objectives of improvement in each area defined. Separate coaching with different staff hindered close dialog and communication between "coachers" and led to a lack of consensus of objectives.

[16] the difference is in the number of participants attending the session, group coaching are sessions from 2 to 4 people unlike group training can be up to 15 participants

➢ **Follow-up dissemination of tools turned out to be essential**

The choice to develop a large range of tools was time-consuming. Time constraints prevented all the tools to be finalized within the timeframe. Delays were encountered in providing a stable version of ERMS software, in managing the import of data and optimizing ERMS versions, in finalizing the web-based monitoring tool (EMAS), and in providing the video-training support. This challenging implementation of new tools requires time and follow-up actions. The key challenges remain to follow-up the dissemination of the tools by the CWA and other suppliers: maintenance and update of ERMS to new versions, support the advisory dimension of EMAS, dissemination of the "refresher" video-trainings, based on the booklets.

II. SELECTION & MARKETING STRATEGY

1. Marketing strategy and process

BDS fee structure and incentives

The positioning of the fee structure for the BDS packages is critical to convince and incentivize future customers to pay for such services. The BDS-program initiated paid-for water operator services for the first time. Based on intense discussion between the CWA, the WSP and the Consortium, the following fee structure was proposed that i) promotes discounts to CWA members in order to grow their membership base, and ii) takes into account ability to pay for BBeginner and AAdvanced DPWOs.

Thus, two kinds of incentives were applied:

- ✓ To promote CWA membership: 15% discount of package tariff applied to all applicants who are CWA members.
- ✓ To encourage first applicants: early-bird discount of 5% to all applicants who submitted their application form during the regional workshop, and registered within specified deadline (two weeks after marketing event).

  The BDS training were designed for one staff per operator, and additional fee of 25 to 50 USD was to be paid if operator wished to send additional staff.

Table 3 – Final fee structure for BDS packages

	Full BDS costs*	Contribution from DPWO	Basic fee	15% discount CWA member	5 % early bird discount	Fee for one additional staff per training module
BDS Beginner	4,256 USD	14.5%	**618 USD**	525 USD	494 USD	50 USD
BDS Advanced	4,256 USD	30.5%	**1,298 USD**	1,103 USD	1,038 USD	25 USD

* the full cost of the BDS delivery are based on the delivery costs of the BDS package by the Consortium and do not include the costs associated with the development of the curriculum and the analysis of performance monitoring data (including the baseline and end line visits).

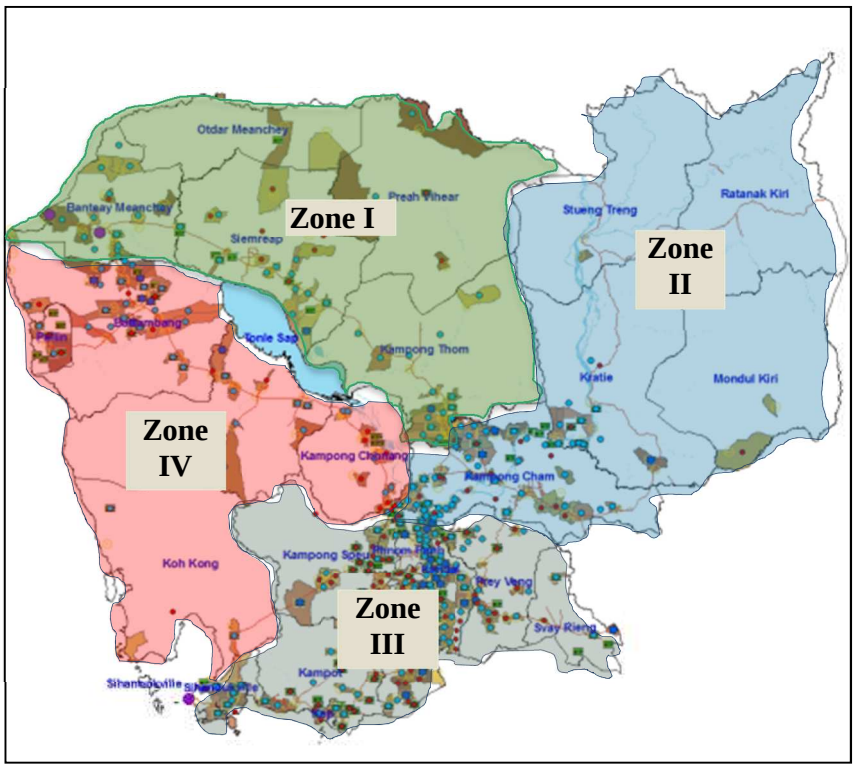
The branding strategy centered around positioning the CWA as the primary hosting organization to access BDS, with supporting branding by the executers GRET and EMC. Five marketing products were developed:

- **Direct phone marketing**: based on the licensee list (from MIH), the list of CWA members and the list of unlicensed DPWOs (Gret, PDIH), the CWA and the Consortium contacted DPWOs by phone in order to motivate them to participate in regional workshops.
- **Leaflet distribution**: promotional leaflets were distributed to each DPWO during regional workshops. The leaflet contained fee information, workshop session date and key marketing messages (refer to annex #1).
- **TV spot**: The Consortium prepared a TV spot in order to promote BDS packages and the regional workshops. This TV spot was broadcast once.
- **Radio Spot**: The Consortium prepared two radio spots: One was aired before the regional workshop providing information on where to attend (12 times), and one was aired afterwards to provide information on how to register, for DPWOs who could not attend the regional workshop. Two Cambodian radio channels (96 Radio Station and Sarika station) disseminated the spot over one month period twice per day.

Regional workshop location

To reduce transportation costs for interested operators, the regional workshops were initially targeted to four locations across Cambodia.

Figure 10 - Location of existing and potential DPWOs in Cambodia



However, almost all DPWOs from zone II, and some from zone IV, participated in the regional workshop in Phnom Penh. Therefore, three regional workshops were conducted in three different zones, namely Phnom Penh, Siem Reap and Battambang during phase A. Based on the lessons from phase A, marketing focused on direct phone contact during phase B. An additional workshop was organized in Phnom Penh for phase B (refer to annex #2 and #3 for the workshop agenda and the minutes).

Table 4 – Regional Workshop Location



	City name	Date	Number of participants expected	Number of participants coming	Gret-EMC Participants	CWA members Participants	Others (MIH, PDIH WSP, PPWSA)	Applicant (A: Advanded, B: Beginner, NA: Not Answer)
1	Phnom Penh	14 August 2013	100	95	5	1	4	13 A, 7 B, 7 NA
2	Siem Reap	16 August 2013	15	13	2	1	1	1A, 1 B
3	Battambang	19 August 2013	25	19	2	2	1	5A, 1 B
4	Phnom Penh	08 December 2014	50	60	3	4	3	36
	Total		**190**	**187**	**12**	**8**	**9**	**71**


2. Selection and registration process

Key issues

The selection process was developed based on transparency and fairness for Beginner and Advanced DPWOs in case demand outstripped the places available in the BDS program. In that sense, the selection process needed to:

– **Take into account previous support provided**: it was agreed that DPWOs that have already been trained in the past would not be prioritized.
– **Recognize the social performance of the operator**: operators that charged a high water tariff (e.g. more 3,000 Riel/m^3) and charged a high (above cost) connection fees were penalised (because these practices limit the expansion of the business and access to water for the poor).
– **Take into account geographical distribution:** nationwide DPWOs are unequally distributed. Most of them are located in zone III when zones I, II and IV have less utilities. Most DPWOs located in zone III have gained support over time. The program aimed to ensure that a geographical balance would be achieved.

Criteria for entry and prioritization

In collaboration and agreement with the CWA, the selection process was totally open at the national level (everyone can apply). Entry criteria and commitments were used to ensure compliance with national regulation and to make sure that BDS packages would be effective and fit the level of the operator

- Step One – a limitation was applied at the entry of the application process:
  - Only DPWOs that have a license at the national level (*Prakas*) or are in the process of obtaining it (or have a provincial *Deka*) could apply.
  - Only one license site (water scheme) can be proposed for training and coaching. If a DPWO have several water schemes, he or she can apply for only one site in order to train its staff.
- Step Two – prioritization applied at the end of the selection process:

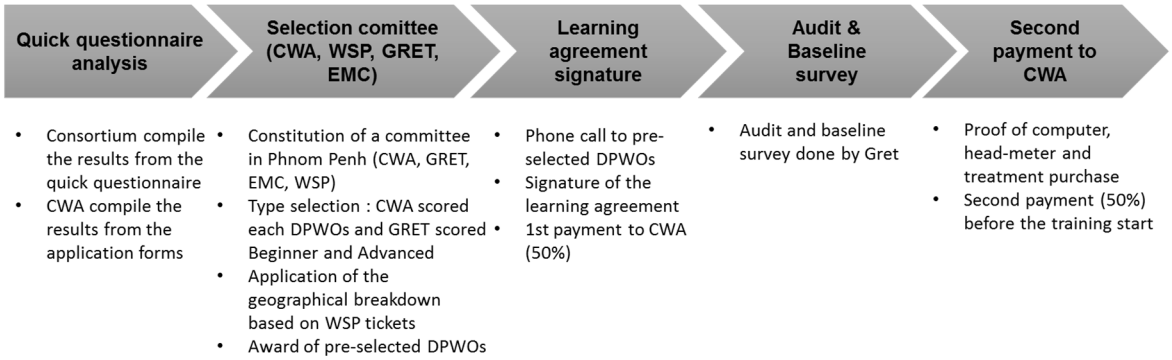
  Prioritization: The priority criteria – in case of high demand – given to both Beginner and Advanced DPWOs. Priority would be given to those that had not participated in the previous DPWOs support programs and/or did not receive financial or technical support from other partners (Gret, USAID, World Bank).

  Commitments: Each candidate had to commit to the following in order to be selected:
  – *Beginners* had to invest before the project started in, a computer and printer (300 USD at the minimum), a head-meter (200 USD at the minimum) to control the losses and in a low-cost chemical feeding system (100 USD at the minimum);
  – *All candidates:* had to attend all events organised by the BDS program, pay for the services to the CWA, and provide data on their technical and business performances on a monthly basis.
  – *These commitments are underlined in a "learning agreement" signed at the beginning of the program (see Annex #5).*

Selection process

The selection process was designed around five steps in order to ensure that DPWOs are well selected and also respect their engagement:

Figure 11 - Selection process flow



- **Step 1 - Application forms[17] and Quick Questionnaires**

▷ During the regional workshops, each candidate:
  – Submitted the application forms to the CWA that contained key elements on their profile, background, infrastructure performance, motivations, difficulties, and provided answers to the key selection questions.
  – Passed a short interview with Gret/EMC and a CWA member in order to determine the Beginner or Advanced status of the DPWOs for each staff that will attend the training.

▷ Determination of the status: Gret/EMC were responsible for the identification and/or confirmation of the Beginner or Advanced status of the participants. During the regional workshops, Gret and EMC conducted a quick interview in order to collect background information regarding the DPWOs. The final level of each DPWO was based their own view and preference for the kind of training provided. However, it was crucial to confirm that each DPWO had the necessary background to follow the trainings. This was to avoid DPWOs choosing Advanced training, without having the required entry level experience and skills. To confirm the status each of DPWO, Gret and EMC chose a simple method using four indicators: i) two assessing computer use and knowledge; ii) two assessing technical knowledge and skills. For Phase B, criteria were more stringent for those who wanted the "Advanced" level, and a test on basic accounting was elaborated.

  ▷ The DPWOs had 15 days to submit their application form, counting from the regional workshop date.

- **Step 2 – Selection committee and award**

▷ The CWA and the consultants analyzed the application forms (Annex #4) in order to score each candidate.

[17] Annex n°#4

- ▷ The Consortium informed or confirmed the Beginner or Advanced status of each DPWOs.
- ▷ The final list was validated by the selection committee. It was composed by the board of the directors of the CWA (3 votes), the Consortium (Gret/EMC (2 votes)) and the WSP (2 votes).
- ▷ The CWA phoned selected candidates, to have them sign the learning agreement and to remind them of the payment requirements.

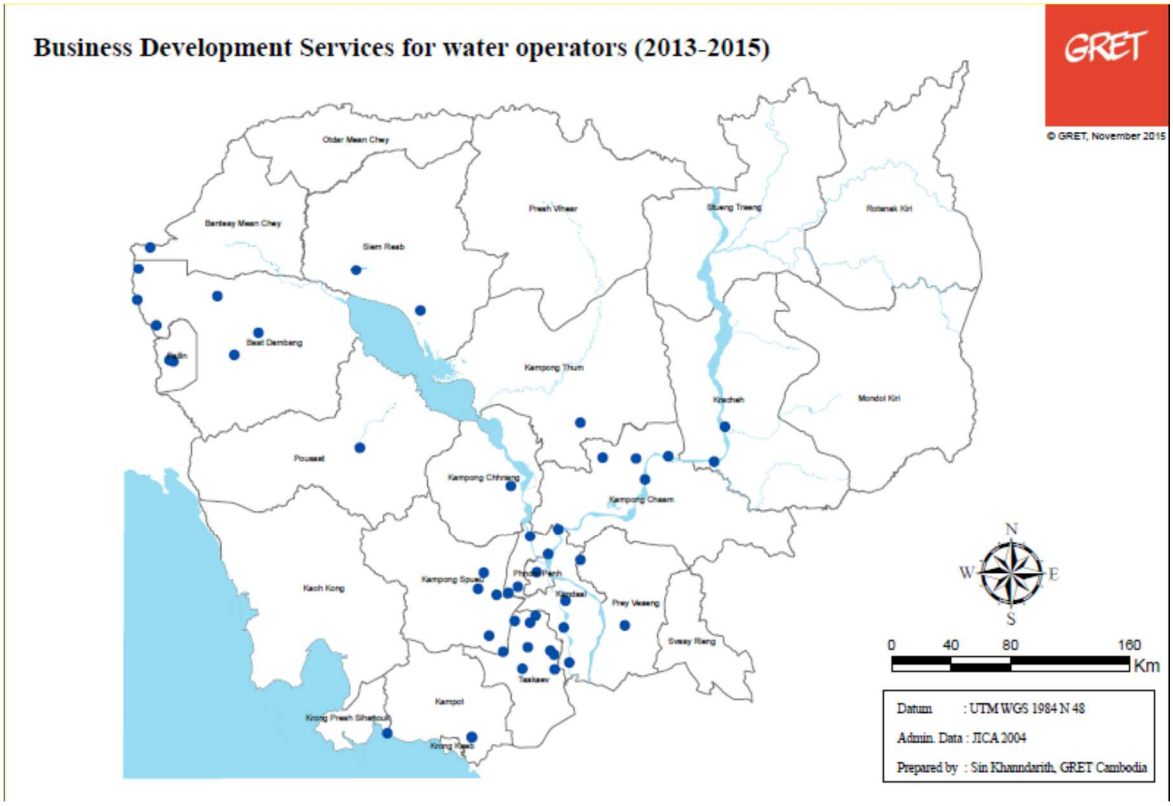
- **Step 3 – Learning agreement[18]:** the CWA managed the learning agreement signature. The learning agreement was signed a week after the official award by phone. The complete payment of the fee was requested before the group training started. 50% of the payment was required upon signing the learning agreement and before the baseline survey was conducted.
- **Step 4 – Baseline and Audit[19]:** the CWA informed the Consortium when each DPWO paid their contribution (50%) and signed their learning agreements. Based on that, the Consortium conducted the baseline survey.
- **Step 5 – Final payment and investment on tools required before trainings session**

The details of selection can be found in annex #6

Finally, 47 DPWOs[20] were selected, 20 of them at an Advanced level and 27 Beginners. In terms of geographical distribution, almost all provinces are represented. In total, the program has reached almost a third of the licensed DPWOs in Cambodia. One of the operators participated both in Beginner and Advanced course.

[18] See Annex #5
[19] See Annex #11
[20] Final list in annex #7

Figure 12 - Geographical distribution of DPWOs participating in the program



Box 4: Lessons on marketing, selection, pricing strategy

- **<u>Marketing and demand creation could be lightened for further steps</u>**

To reach the scale-up objective, a simplified presentation of the BDS package and a broad strategy for informing the DPWOs was necessary and justified. It enabled the Consortium to reach more than 190 participants during workshops, corresponding to half the potential DPWOs in Cambodia. For further marketing, since DPWOs are currently better known, the marketing strategy can be lightened. Based on feedback gathered from operators and the CWA, direct phone marketing is seen as the most effective way to reach out to potential operators, including further spreading information through CWA's Facebook account. However, this communication channel does not concern unlicensed DPWOs and specific efforts should be made if those are to be targeted.

- **<u>A simplified selection process is needed</u>**

The selection process in 5 steps and criteria chosen were also designed for a first scale-up considering that there would have been more demand than the number of places. This assumption was partially wrong. The selection process could be simplified for next steps keeping balance between objective and qualitative criteria.

- **<u>Pricing strategy can be adjusted based on components</u>**

The payment of Advanced DPWOs was without problems. However, in many cases, Beginner DPWOs needed to invest in a computer and a head meter to start the BDS program and even if the BDS fee was cheaper, they faced difficulties to pay even in two instalments. During phase B, the consultant proposed to improve the payment modalities for Beginner by proposing a payment in four instalments in order to decrease the level of financial pressure when they start the BDS program. Feedback from DPWOs shows that the fee is considered as affordable and fairly cheap for most of them (73% of the 37 DPWOs surveyed at the end of the programme found the fee acceptable). Furthermore, all but two of the interviewees agreed to pay again a similar amount in the future.

The current two level pricing strategy was convenient to manage and quite easy to inform about. For further steps, a simple pricing strategy should be kept, and different tools proposed kept included in the package. However, it could be possible to adjust the content of each package and create a third level corresponding to "lighter" packages with less training days and that target new staff.

Despite efforts in marketing, the fact that it wasn't possible to reach 20 trainees in phase B led to increasing the waiting list, this means that are still limits on reaching all the operators. The uniformity of the package can be one of the weak points, the cost of the package can be another. For next round, it is useful to better understand the constraints of those who did not want to engage with the package. It can also be a possible perspective to propose a less costly package (fewer training days and less coaching) in order to reach some very small operators that couldn't afford the package.

III. DELIVERY OF BDS PACKAGES

1. Group training sessions

Training sessions were delivered in three to four sessions of group training for BBeginner and AAdvanced DPWOs. There were 8 to 9 days dedicated to group training. A total of 77 staff were reached during the sessions and a total of 32 training days were delivered for more than 500 equivalent man/days. In addition to the group training, the CWA organized 4 group-coaching sessions on ERMS billing for Beginners during Phase B. Based on the learning from Phase A more attention was needed to build operator skills. The final training program was delivered as below.

Table 5 – Training session for the Advanced classroom

Session	Date	Water Operator	GRET/EMC	CWA	MIH, WSP, IT, Others	Total participant
Session 1 -A	04-06 December 2013	29	2	2	5	38
Session 2 –A	23-25 December 2013	26	4	1	5	36
Session 3- A	04-06 January 2014	24	2	2	4	32
Session 1 -B	18-20 March 2015	6	3	2	1	12
Session 2 –B	30-31 March 2015	6	3	2		12

Session 3- B	09-10 April 2015	6	3	2		12
Session 4-B	23-24 April 2015	7	1	2	1	11

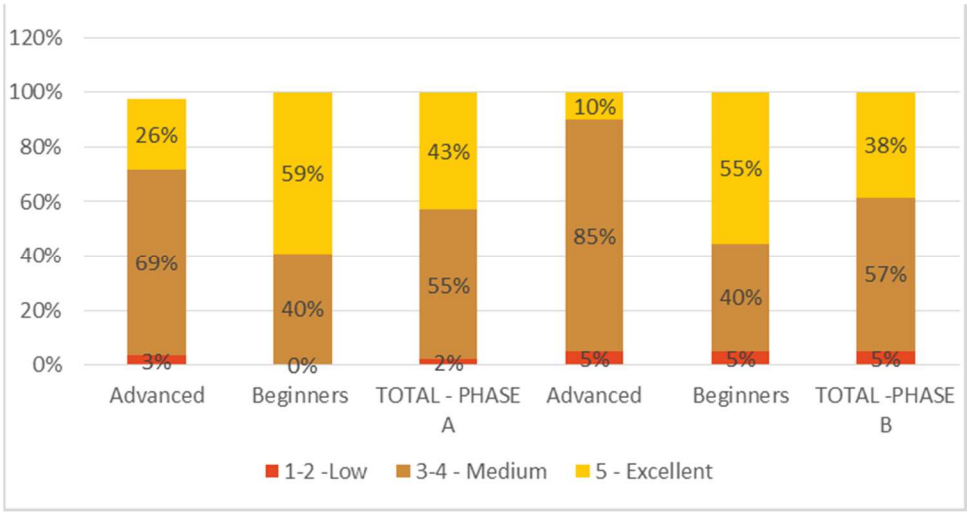
Table 6 – Training session for the Beginner classroom

Session	Date	Water Operator	GRET/EMC	CWA	MIH, WSP, IT, Others	Total participant
Session 1 -A	04-06 February 2014	24	2	2	5	33
Session 2 –A	24-26 February 2014	24	2	2	5	33
Session 3- A	06-08 April 2014	23	2	2	5	32
Session 1 -B	03-04 March 2015	17	3	2		22
Session 2 –B	23-25 March 2015	17	3	2	2	24
Session 3- B	02-03April 2015	17	3	2		22
Group coaching	11th-23rd May 2015	12	1	2		15

Training session satisfaction

12 training sessions were organized and hosted predominantly in Phnom Penh. The satisfaction of the trainees was quite high for both Beginner and Advanced operators. Since evaluation modalities changed between Phase A and B in order to simplify the questions, detailed calculation won't be presented here. Other figures can be found in Annex #10.

Figure 13 - Overall satisfaction



Through a score given by the DPWO from 1 (low) to 5 (high)[21] satisfaction was evaluated in four main areas: i) general arrangements of the meeting, ii) training materials and quality of presentations iii) result of the training itself and iv) level of understanding of each lesson.

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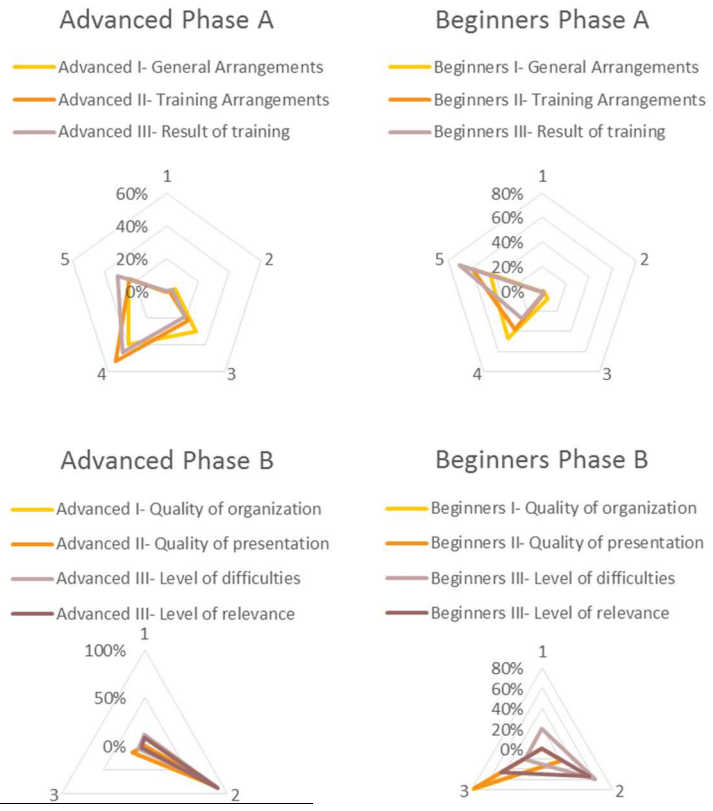


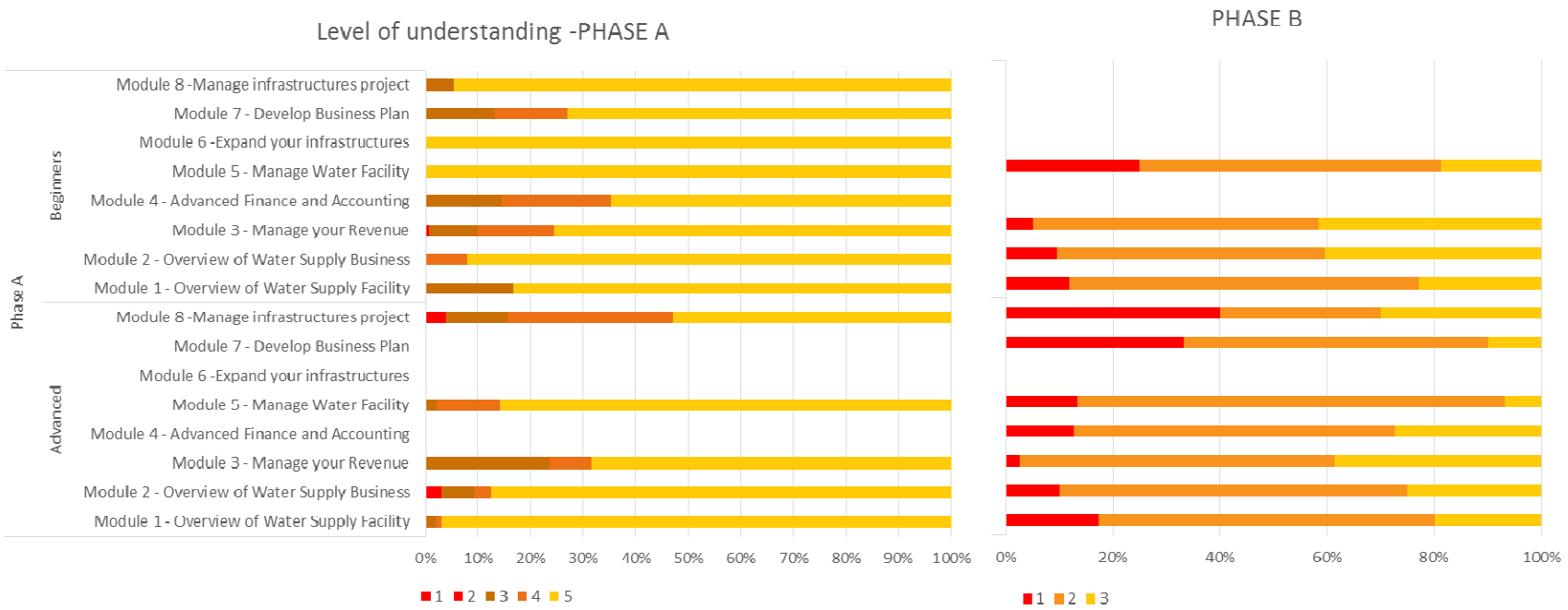
Satisfaction is slightly different between each level. Advanced DPWOs generally scored less than Beginners. Different expectations between Beginners and Advanced can explain these differences regardless of the fact that the level of understanding was shown to be quite high for each topic (refer to annex 10).

Modules 6 to 8, corresponding to investment planning and infrastructure expansion, were the modules less understood. Along with high expectations, these modules were new and had never been tested before,

[21] Evaluation modalities changed between Phase A and B in order to simplify the content of the questions and the time to answer the forms. The scores were from 1 (low) to 5 (high) during Phase A while during Phase B, it was from 1 to 3 only.

which could explain the limited score.

Figure 14 - Level of understanding on the training sessions



The scoring method was simplified between Phase A & Phase B from 1 (low) to 5 (high) to 1 to 3 (high)

2. Coaching & hotline

Two days of coaching was organized from March to November 2014 (Phase A) and four days of coaching from May to July 2015 (Phase B). Through these coaching days, more than 160 operator staff were reached. In total, 120 days of coaching was delivered [22].

Table 7: Coaching days organization

	Advanced					Beginners				
	Topic	***PHASE A***		***PHASE B***		***Topic***	***PHASE A***		***PHASE B***	
Coaching	Financial issues (ERMS, accounting,…)	*1 day*	April - july 2014	*2 days*	*April - july 2015*	Financial issues (ERMS, customer management,…)	*1 day*	*April - july 2014*	*2 days (group coaching)*	*April - july 2015*
	Technical issues	*1 day*	April - july 2014	*2 days*	*April - july 2015*	Technical issues	*1 day*	*April - july 2014*	*2 days*	*April - july 2015*

Technical and business coaching aimed to be specific to the needs of each DPWO. More than 80 people in Phase A and 42 people during Phase B were involved in visits. Different points were emphasized with each operator. With regards to technical aspects, focus was placed upon flow rate measurements, jar test use and coagulant dosing and recommendations on the WTP. For business aspects, coaching was focused on the use and handling of ERMS. The objectives were defined with the DPWOs, points of improvements and a coaching plan[23] were commonly defined during the first session.

Box 5: Example of a technical coaching session

M. Yorng Sambath, manager of Hann Chey Water Supply in Kratie (Beginner) and his business partner participated in two coaching days. The following points were discussed; i) Flow rate measurement and formula to calculate it; ii) Pipe section calculation and sizing; iii) Calculation of the water volume in the pipe network; iv) Daily & monthly data recording; v) pH & residual chlorine measurement; vi) Chlorine consumption calculation. The need for improvements and advice given during the first session concerned improving his existing chemical feeding system and revising his coagulant calculation and focusing on water leakage and measuring the water pressure at the end of the network. At the end of the second session, the aforementioned improvements had been carried out. After having calculated his coagulant consumption, he decided to add more PAC to improve the treatment, despite the additional cost. Although the efforts and practices of M. Yorng Sambath may only be slowly improving, his awareness of the issues and his desire to solve them has vastly increased. Thus, even though he can't take immediate action to improve his system (high investment needed), the coaching sessions have enabled him to prioritize problems and gather information on how to solve them.

[22] See annex n°#9 – Coaching plan

[23] See an example of an Advanced DPWO coaching plan Advanced– Phase A in Annex #9

Figure 15 - Technical coaching

Hotline use

The hotline was implemented from September 2014. This tool was fairly well utilised, although still less than expected. Approximately 3 out of 5 days budgeted for were used per week with an average of 15 calls per month.

The main issues raised during calls were related to ERMS use. 60% of the Advanced DPWOs and 78% of Beginners called the hotline for support at least once. 15% of the DPWOs (7 DPWOs) represented 48% of the calls. More than 40% needed maintenance and debugging of ERMS errors.

Figure 16 - Hotline use

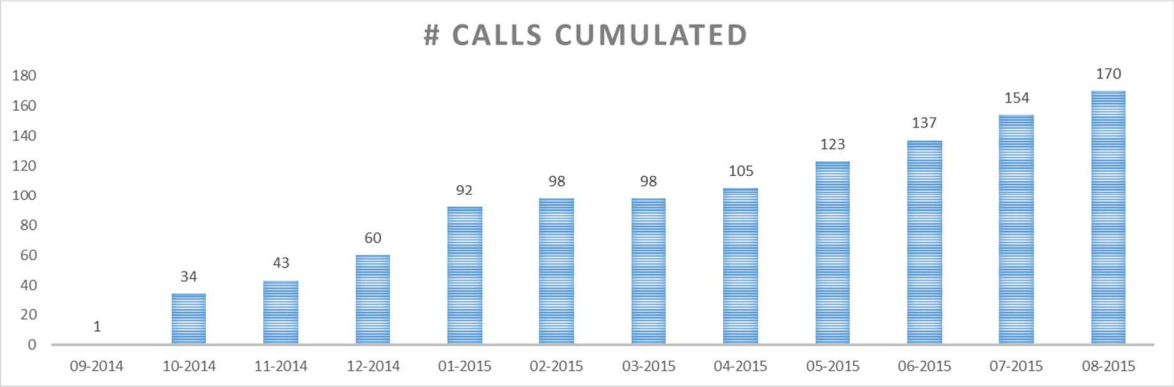
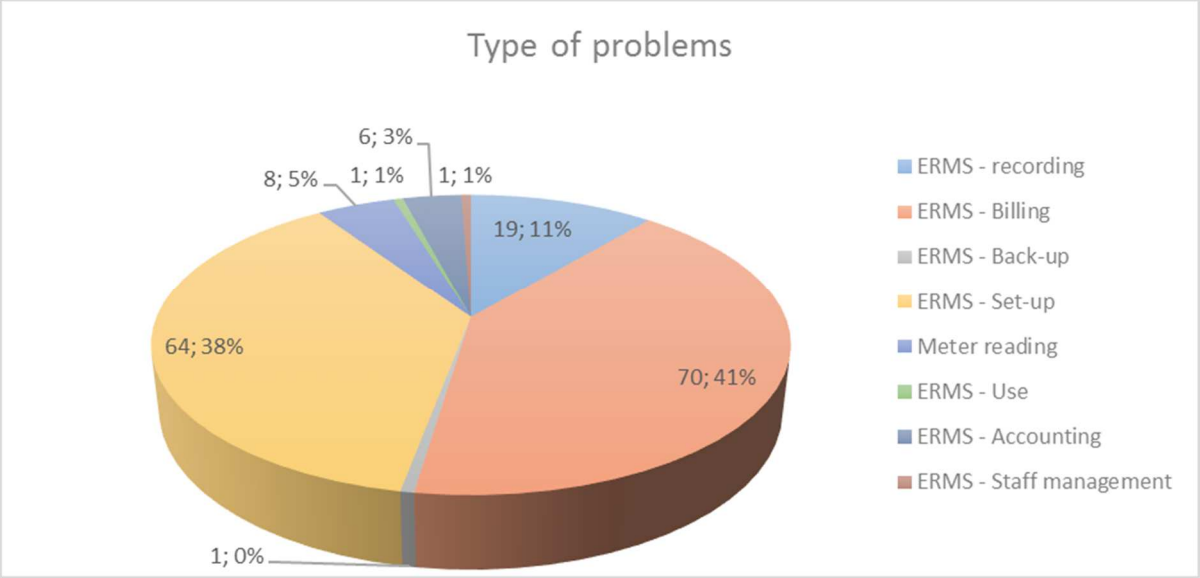


Figure 17 - Hotline main problems



Box 6: Story of a water operators

Mr. Chiek Kimker, Phum Krangoung Water Supply owner since 2001, was left feeling quite satisfied by the program. He said that he was initially planning to invest on a billing system developed by a well-known company in Phnom Penh for which the quotation price was around 2,000 to 3,000 USD depending on the characteristic of the system that he wished to develop. However, during this consideration he was convinced by the program to sign up and participate at the Advanced level. He considered it good value that for 1,500USD he could get training on a range of activities through the BDS package, in which he could improve both his technical and business skills, including training on the ERMS system.

Issuing hand written invoices was not convenient for Mr. Chiek Kimker. Unfortunately, after training, ERMS was not running as smoothly as he was expecting and intervention through the hotline took a long time. Despite this, issuing bills through ERMS still enables Mr. Chiek Kimker to reduce preparing his invoices by a day.

He has also gained other skills through the program; he now knows how to optimize the quantity of chemical reagents injected, how to install distribution pipelines and how to control pressure. Thanks to the program, he has now replaced around 3km of old PVC pipes with HDPE pipes. Finally, Mr. Chiek Kimker deems the fee to be fairly cheap. He found the group trainings to be quite interesting, as he could share his experience and problems with other DPWOs.
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Box 7: EMAS future development issues

The success of tailored advisory services links to challenges encountered in the program in providing real-time advisory support. The delays in the ERMS upgrading and the late development of the EMAS platform did not allow for adequate experiences and learning with regard to operators's appreciation and use of such monitoring and advisory services.

The ERMS tool is going to be used by a newly created Cambodian engineering & advisory consulting firm, called iSEA in order to continue to advise water operators on their performance. On a voluntary basis, current data remain confidential and free of charge for the DPWOs. Improvement should be done on the reports and KPI analysis, in order to be accurate for, and involve, DPWO staff.

3. Costing analysis

A cost benefit analysis is quite arduous since each of the tools present advantages and drawbacks that the cost is not able to value. A costing analysis on the other hand can be proposed.

If we exclude the cost of the design and the participation of international experts to the program, a short analysis of the costs on phase B (2015) provides the following results:

Table 8 : Costing analysis (Phase B only)

	Training	Coaching (4 days)	Exposure visits (Siem Reap)	ERMS & Hotline	Tools	Assumptions
Training arrangement	3 800		690			
PD / transport	3 300	6 380	1 700			
Documents & printings	500				880	
Direct costs	**7 600**	**6 380**	**2 390**	**-**	**880**	
Trainers / fees	3 300	13 600	200	1 680		200 USD/day/trainer; 70 USD/day/IT
Overhead costs (10%)	4 060	14 240	440			10% of the indirect costs
Unexpected expenses (5%)	800	1 800	200		100	10% of the total costs
TOTAL COSTS	**15 760**	**36 020**	**3 230**	**1 680**	**2 660**	
Total direct costs per part	**447**	**375**	**141**	**-**	52	17 DPWOs
Total costs per part	**927**	**2 119**	**190**	**99**	**156**	17 DPWOs
Total costs per day	955	1 595	3 230			16,5 days of training, 4 days of coaching for each operator
Total costs per day per part	56	94	190		-	

*

The total cost per participants for Phase B (without international overhead) is nearly 3,500 USD, representing almost three times the cost of the package paid by Advanced participants. "Replication" of the BDS package would require either reducing the number of coaching sessions and adjustments in the package, or increased fees. Therefore, either 65% subsidies are needed to continue the program as it was proposed, or a doubling of the price for the package is required. In addition, a cost per participant can't be enough to design the package, some of the tools must be optimized following the number of participants; an additional participant doesn't increase proportionally the costs for hotline support, exposure visits or training.

Box 8: Key lessons on the delivery of BDS package

- The **ambitious objective** to deliver the package to 47 DPWOs in 21 months, keeping the quality of activities was challenging; the previous pilot phase was performed in three years for 10 operators. Time was needed to standardize the logistics and the planning which forced time constraints onto the project and subsequently impacted on beneficiaries.
- One of the main barriers that the program met was, the **number and the nature of staff** attending the trainings and benefitting from the coaching. Indeed, the program was based on the fact that most of the operators in Cambodia were small-scale and family businesses with low skills and limited staff. Even if the package for Advanced was adapted to more structured companies, the challenge to train different staff remains. In fact, an increasing number of operators have 2 and even 3 staff for 1,000 connections. This should be better taken into account in packages specifically designed per "skills" and professions.
- In parallel, the **CWA has gained important experience** in organizing trainings and coaching small-group sessions. They were quite autonomous in delivering coaching to Beginners on their own on financial issues.
- **The pricing strategy seems to be coherent and appropriate for the DPWOs** for this full package but it still needs either subsidies or an increase of the fees in order to sustain the delivery of the full package.

CHAPTER II- IMPROVEMENTS ON PERFORMANCES

I. METHODOLOGY

Performances versus evolution

There were three sources of information: i) the baseline survey that was done before the start of the training sessions, ii) the endline survey done at the end of each phase and iii) monthly monitoring of each DPWOs.

Table 9 : Timeline of monitoring steps

		Baseline survey	Endline survey	Monthly monitoring
Phase A	**Beginners**	February 2014	February 2015	Jan 14 - July 2015
	Advanced	November 2013	February 2015	March 14 - July 2015
Phase B	**Beginners**	February 2015	August 2015	April 15 - July 2015
	Advanced	February 2015	August 2015	April 15 - July 2015

- Data given by the DPWOs was strictly confidential in order to encourage operators not to censor or control results; all public information will be shared without identifying company or participant names.
- Although the learning agreements state the commitment to share data, the BDS program operated on voluntary data submission (mandatory data submission is only required for the regulator). DPWOs needed to be convinced that collection of data can be useful; therefore particular attention was paid to the selection of KPIs and their quality to ensure relevance and practicality.
- Finally, the KPIs were used to monitor performances on the 6 objectives set at the beginning of the project: i) increase the water consumption and the number of water connection; ii) improve the water quality; iii) increase the bill recovery and billing monitoring; iv) optimize production and distribution; v) reduce expenses and production costs; vi) improve planning and investment project management.

An important limitation of the analysis is that the performance results observed cannot be causally attributed to the BDS program (there may be many confounding factors that have contributed to these observed changes in performance). Using a benchmarking approach helps

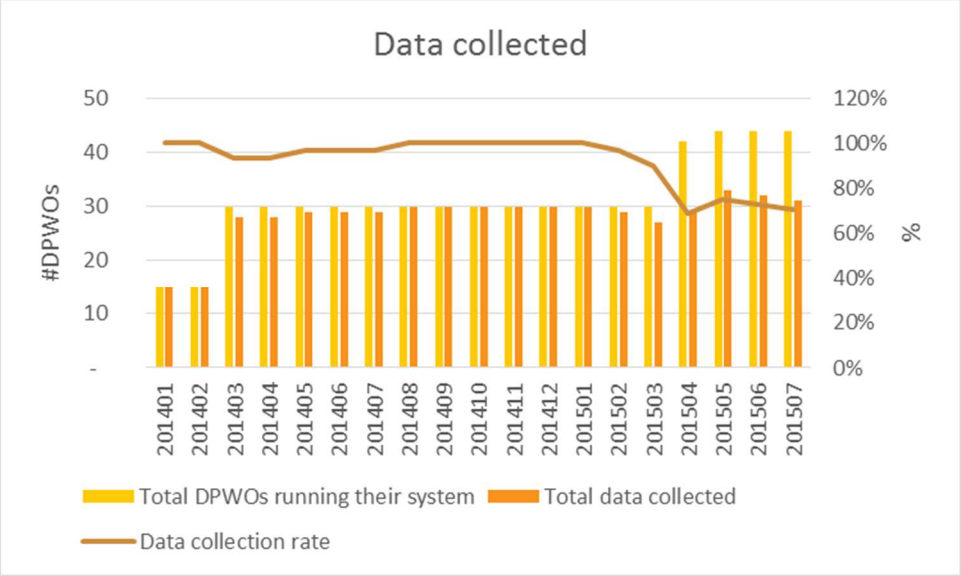
to underline the important progress made by some operators. It is plausible that the BDS program will have contributed to these observed changes.

Another limitation is the time lag that is apparent in terms of building individual staff knowledge and skills and translating this to change within the water operator environment in terms of practices and attitudes, and then translating it into improved performance. Especially for Phase B, as it only captures a short time frame of 4 months.

Missing data

Despite considerable efforts to collect data, some operators continue to be difficult to reach and/or are not interested in sharing their data for various reasons, such as confidentiality concerns. Figure 18 shows that on average 30 operators provide data on a regular basis. A decrease in data collection was seen during the period of March to July 2015 and 70% of operators stopped giving data after July 2015. Excluding 2 Advanced DPWOs and 1 Beginner operator whose water schemes are still under construction, the overall data collection rate was 75% (33 out of 44), 56% for Advanced operators (10 out of 18) and 78% for Beginner (23 out of 26).

Figure 18 - monthly basis data



*2 DPWOs are not yet running their system and one operator was Beginner during Phase A and Advanced during Phase B. This explains the difference between the 44 and 47 DPWOs monitored.

The analysis will be made based on completed baseline and endline data for all the DPWOs. Monthly analysis will be presented if it gives added value to the report.

II. RESULTS

1. Characteristics and overview of BDS participants

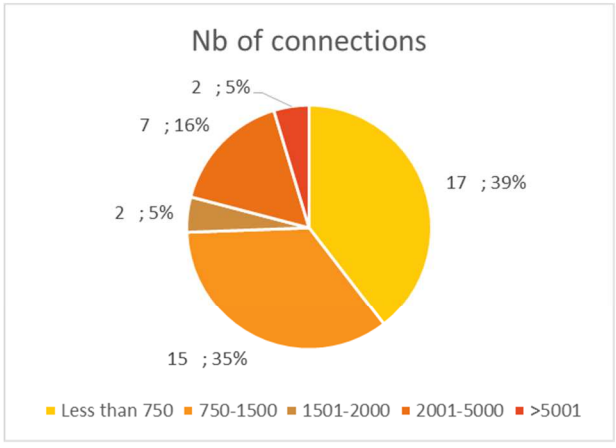
Participating DPWOs represent almost a third of licensed schemes covering 69,275 active connections (345,000 people). On average, each DPWO has more than 1,500 connections, of which 96% are active connections. The average coverage rate within the network area reaches 60%. On average these DPWOs have been operating for just under 10 years.

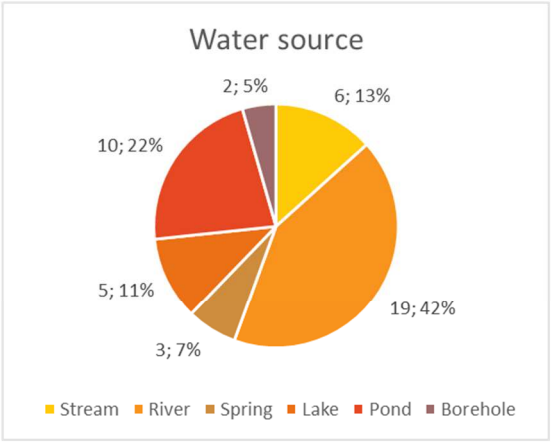
Table 10: Technical characteristics of the systems

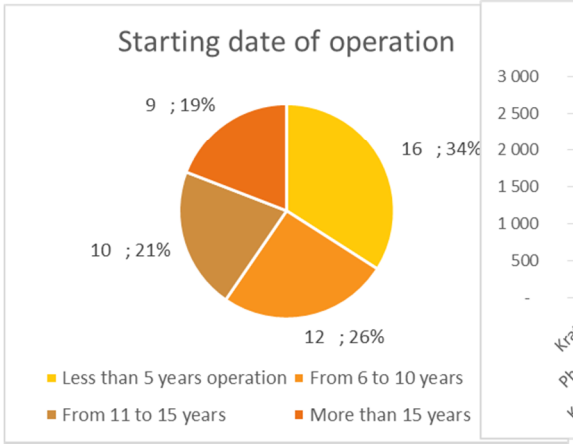
	Unit	Advanced	Beginners	Overall
Average length of the network	km	29,3	19,6	22,9
Average Coverage area (network)	% of network area	61%	58%	60%
Average production capacity	m3/h	100,0	54,9	72,5
Average water produced	m3/month	35 714,2	16 421,3	23 430,1
Average consumption	L/cap/day	102,9	81,4	90,0
Average Tariff	Riels/m3	2 444,5	2 340,1	2 394,0
Average Connection fee	USD	64,9	59,3	61,8

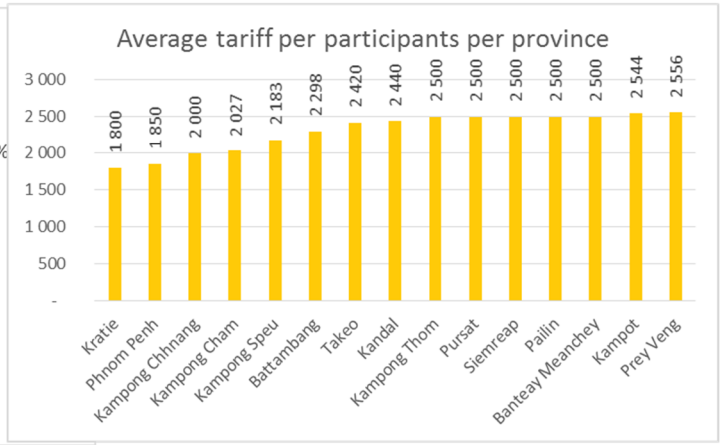
** * These data and the followings Table 10 and Figure 19 are the average from monthly monitoring data; differences between these data and baseline and endline surveys are explained by period of monitoring and the sample that is slightly different (n=42 instead of n=47*

Figure 19 - General figures (47 operators)







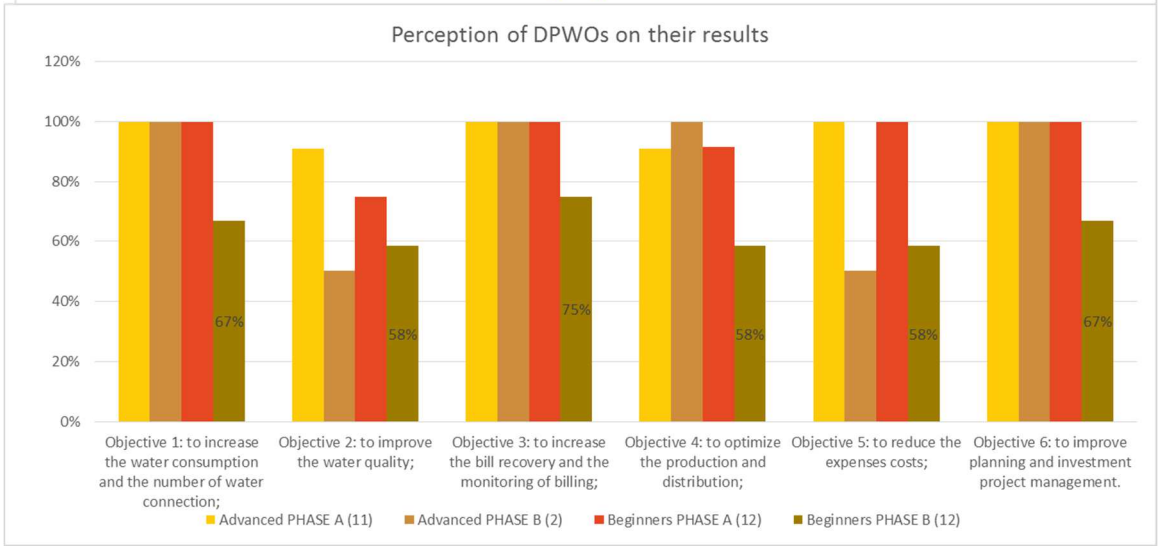


The profile of operators is quite heterogeneous: 84% use electricity, and 16% diesel, which have a significant impact on costs. 42% have the Mekong River for the main source of water; this group invested on average almost 300,000 USD and average 5 staff per 1,000 connections. 26% of operators are fully registered (Ministry of Commerce, tax registration and MIH license, 45% partially (meaning that they have either MoC registration either tax), and 30% have only a sectorial registration.

1. Overall perception

To gather overall participant perception of the program, a quantitative survey was carried out at the end of the program (October 2015) in which 80% of participants were interviewed by phone and asked to rate their perception of their own performance . Objectives 2 and 4 appear to be those where less improvement was seen by the DPWOs.

Figure 20 - overall perception of their improvements



* The question was formulated as follows: Regarding the following objectives, do you consider that the program helped you to reach them? (YES/NO), How do you measure your improvements (1 - No improvement to 5 - A lot of improvement)?

1. Key performance indicators

Additional analysis of the KPIs can be found in Annex #14. The following values represent averages unless medians are specified.

Objective 1 – Increase of connections

Impact on service coverage and water consumption

Table 11: KPI - Water connections

		UNIT	PHASE A (n=30)			PHASE B (n=15)		
			BS	ES	%	BS	ES	%
OBJ.1	Objective 1: Increase the water consumption and the number of water connections;							
1.1	Number of active connections	Average number of connections	1 410	1 682	*19%*	701	971	*39%*
1.2.1	Coverage rate inside the network area	Average connection rate inside the network area	56%	51%	*-9%*	41%	49%	*19%*
1.2.2	Coverage rate inside the license area	Average connection rate inside the license coverage area	34%	38%	*10%*	28%	33%	*18%*
1.3	Lenghth of the network	Average of km of pipes installed	26 370	40 360	*53%*	25 044	26 740	*7%*
1.4	Densification of the network	Nb of active connections (HH)/length of the network (km)	60,66	54,11	*-11%*	44,77	44,47	*-1%*
1.5.1	Water consumption	Average of l/cap/day	73,35	81,02	*10%*	131,92	131,66	*-0,20%*
1.5.2	Water consumption	Mediane of l/cap/day	57,57	66,62	*16%*	50,80	67,79	*33%*
1.4.1	% of DPWOs that have extended their network	% of DPWO that have their length of network increasing	63,3% (19)			16,7% (5)		
1.4.2	% of DPWOs that have densified their network	% of DPWOs that have their nb of HH/km growing	67% (20)			67% (10)		
1.4.3	% of DPWOs that have extended without densifying their network	% of DPWOs that have their nb of HH/km decreasing	33% (10)			20% (3)		

On average, the number of active connections for all operators, increased by 29% between baseline and endline data collection. The total connections grew from 57,140 to 69,275, thus 12,135 new connections were installed. This growth is came from both Beginner (+15%) and Advanced (25%) DPWOs. In absolute numbers, since Advanced DPWOs have more connections, 61% of those new connections have been installed by Advanced operators and 39% by Beginner operators.

48% of the DPWOs have seen their number of connections increase by more than the median (163 connections). Moreover, 56% of the DPWOs have extended their network (median of 2.5 km for each DPWO).

This increase of connections consequently impacts on water coverage. It improved from 31% to 36% in general. However, for 36% of the DPWOs, this increase was through an extension of their current network; 58% densified their network (positive increase of the number of HH/km).

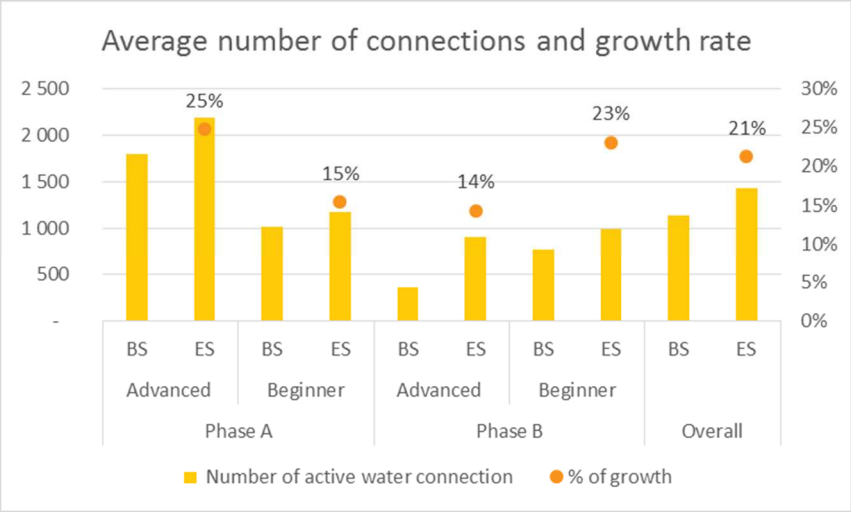


Figure 21 - Average number of connections

The average water consumption is around 15m^3 per month/connection, corresponding to an average consumption of 92l per capita/day, with quite important differences between Beginner and Advanced operators. 22% of the DPWOs have an average consumption per capita higher than 100 l/cap/day. Most are located in the Pailin province, at the Thai border, having industries in their service area. 13% of the DPWOs (6) in the endline survey had more than 50% of water sales (more than 50,000 m^3 sold per month). If we exclude those 6 DPWOs, all the DPWOs have seen their water sales increase (+40%, from 8,768 m^3 to 12,110 m^3/month). If we compare water consumption from March to May 2014 and the same period for 2015; water consumption has grown 9% for Advanced DPWOs and 3% for Beginners.

35% of the DPWOs install more than 20 connections per month (the median is 16 connections per month).

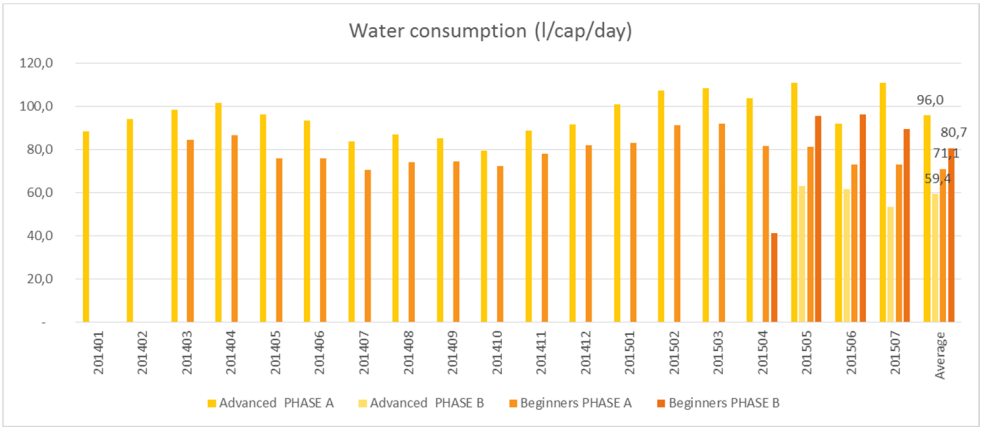


Figure 22 - Water consumption evolution (l/cap/day)

Through improved recording and benchmarking of data, DPWOs are better able to assess their performances in terms of water coverage. The lessons on customer management also helped

operators to become more knowledgeable regarding their active connections, enabling more efficient recording to take place through customer codes and segmentation of their network. With a better-structured database, DPWOs can anticipate their revenues and connection growth rate.

Objective 2 - Performance improvement on water quality

Table 12: KPI - Water quality

		UNIT	PHASE A (n=30)			PHASE B (n=15)		
			BS	ES	%	BS	ES	%
OBJ.2	Objective 2: Improve the water quality and water quality monitoring practices;							
2.1	% of tests of Water quality passed done by Gret	Av of % of test passed	64%	59%	*-8%*	54%	64%	*19%*
2.2	Average of number of tests done by DPWOs	Total tests done by DPWOs (per month) declared	278	575	*107%*	29	41	*42%*
2.3	% of DPWOs that have improved their water quality	% of DPWO whose test have shown improvement (nb of tests passed in ES > nb of test passed in BS)	13% (4)			21% (3)		
2.4	% of residual chlorine test at the end of network passed by gret	% of tests passed	19%	17%	*-10%*	8%	23%	*200%*

Water quality results based on tests carried out by Gret during baseline and endline data collection do not show the expected improvement. Only 16% of the DPWOs have improved their water quality[24] whilst 69% presented with identical results to baseline measures.

Of the tests conducted, an average of only 53% passed during baseline data collection, and 57% during endline data collection. Out of the 174 tests carried out, 60% passed during the endline survey and the same ratio passed during the baseline (98 out of 162 tests). However, some disparities appear concerning the type of test. Analysis of the monthly residual chlorine and pH tests carried out by the operators indicates pass rates of approximately 94% for chlorine and 99% for pH. In comparison with the independent tests, these results do not seem reliable as only 17% of the tests on residual chlorine at the end of the network passed for Phase A operators and 23% for Phase B. All of the operators passed the pH tests. In total, only 2 additional operators have increased chlorine levels (from 6 operators to 8).

Nevertheless, concerns surrounding water quality appear to be of growing importance to operators, as the number of tests carried out each month by the operators themselves has doubled. Moreover, 50% of the DPWOs were shown to be carrying out more tests per month at the endline than during baseline. For water quality concerns to become a top priority and to internalize better self-monitoring, increased regulatory enforcement would be needed, as well as more communications campaigns to customers, who in Cambodia have strong sensitivity to chlorine taste (they prefer to use rainwater for drinking/cooking).

Finally, practices have also improved in terms of using testing kits. During baseline, only 43% of the DPWOs were seen to be using the chlorine test kits and 38% were carrying out pH tests. In comparison, 79% of DPWOs were shown to be using chlorine test kits and 81% were carrying out pH tests at endline.

[24] meaning an increase of the number of tests done and passed by GRET)

Objective 3 – Increase of the revenues

Table 13: KPI - Billing and revenues

		UNIT	PHASE A (n=30)			PHASE B (n=15)		
			BS	ES	%	BS	ES	%
OBJ.3	Objective 3: Increase the billing collection rates and the monitoring of billing;							
3.1	Number of DPWOs using software for billing	# DPWOs	20	28	*40%*	6	14	*133%*
3.2	Revenue per connection (USD)	Average revenues per connection	8,0	8,1	*0%*	16,2	10,6	*-34%*
3.3	Net income per connection	USD/m3	4,9	4,7	*-4%*	11,4	8,6	*-25%*
3.4	Changes in terms of number of operators							
3.4.1	Increase of the revenue per connection (USD)	% of DPWOs	27% (8)			53% (8)		
3.4.2	No change of the revenue per connection (USD)	% of DPWOs	13% (4)			% (0)		
3.4.3	Decrease of the revenue per connection (USD)	% of DPWOs	53% (16)			33% (5)		
3.4.4	NA	% of DPWOs	7% (2)			13% (2)		

Financial and business improvement

Good financial performance expressed by the operating ratio of the business, depends on many different factors. Among those are the capacities of the operator to decrease (optimize) expenses and increase revenues. Many levers can be used and management choices depend on many factors such as the size of the operator, main source of water, the number of staff and the configuration of the area (dense or less dense).

To better compare the financial performances, a separate analysis of revenues, net incomes and expenses (before tax and depreciation) was carried out to understand key trends. Revenues, net incomes and expenses have been expressed as averages per active connection.

- ✓ The average revenue per connection is not significant from baseline to endline for Advanced DPWOs (+4%) and actually decreased for Beginners (-5%). As shown in the graph below, results are quite heterogeneous and do not give clear improvement trends. Looking more deeply at each operator is necessary; 36% of DPWOs have increased their revenue (+35% in average), 56% of them being Beginners (which are slightly under-represented[25]). 49% have seen their revenue decrease and 7% kept the same revenue. These trends are inversed for expenses.
- ✓ Almost half of the DPWOs have seen their expenses decrease, mainly explained by both energy cost per m^3 decrease (-39%) and input cost decrease (-18%).
- ✓ The increase of expenses, in parallel is not that simply explained. For 2/3 of them, it's explained by an increase of 63% of energy costs and a 480% increase of their inputs costs.

[25] Over the 45 operating DPWOs, 18 are Advanced (40%), 27 are Beginners (60%)

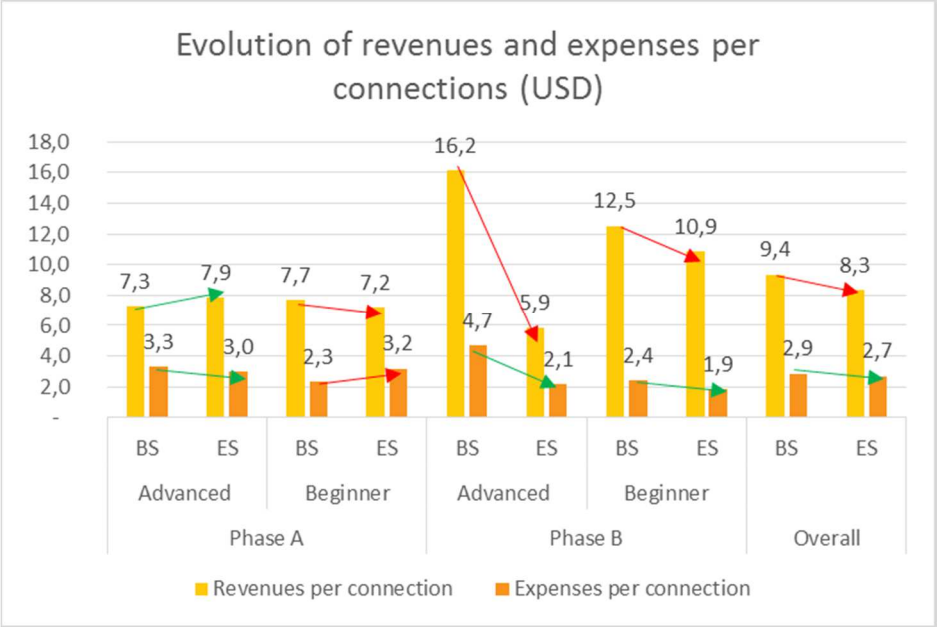


Table 14 : Evolution of production costs

	Evolution	Production cost / m3		Cost of energy / m3		Cost of chemicals / m3	
Phase A	Decrease	20	67%	18	60%	14	47%
	Increase	9	30%	11	37%	14	47%
	NA	1	3%	1	3%	2	7%
Phase B	Decrease	9	53%	7	44%	8	47%
	Increase	3	18%	3	19%	3	18%
	NA	5	29%	6	38%	6	35%

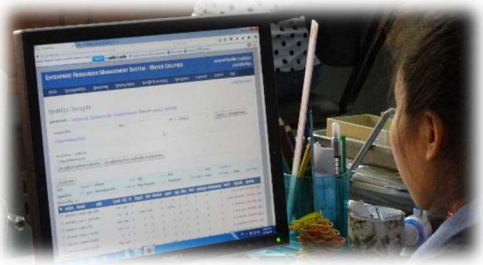
Figure 23 - Evolution of revenues and expenses per connections (USD)

- ✓ As a result, the net income[26] shows the same trends. Nearly half of the DPWOs have seen their net income per connection increase, 17% (4/23) have more than doubled their net income whilst 42% have had their gross margin ratio increase. .

While general trends can be observed, there is a lot of underlying variability when looking more deeply into each operator's performance. Individual performance profiles are also compiled for discussion with operators (attached as a separate volume to this report).

- ✓ More practically, billing and expense record tools have notably improved due to the specific attention that was paid to this issue. During baseline survey, 24% of operators did not keep records of their expenses in comparison to only 7% at the end of the program. 93% of the DPWOs now use software to bill (Excel, Access or ERMS) as opposed to only 57% at baseline. In terms of tools, the DPWOs have also changed their

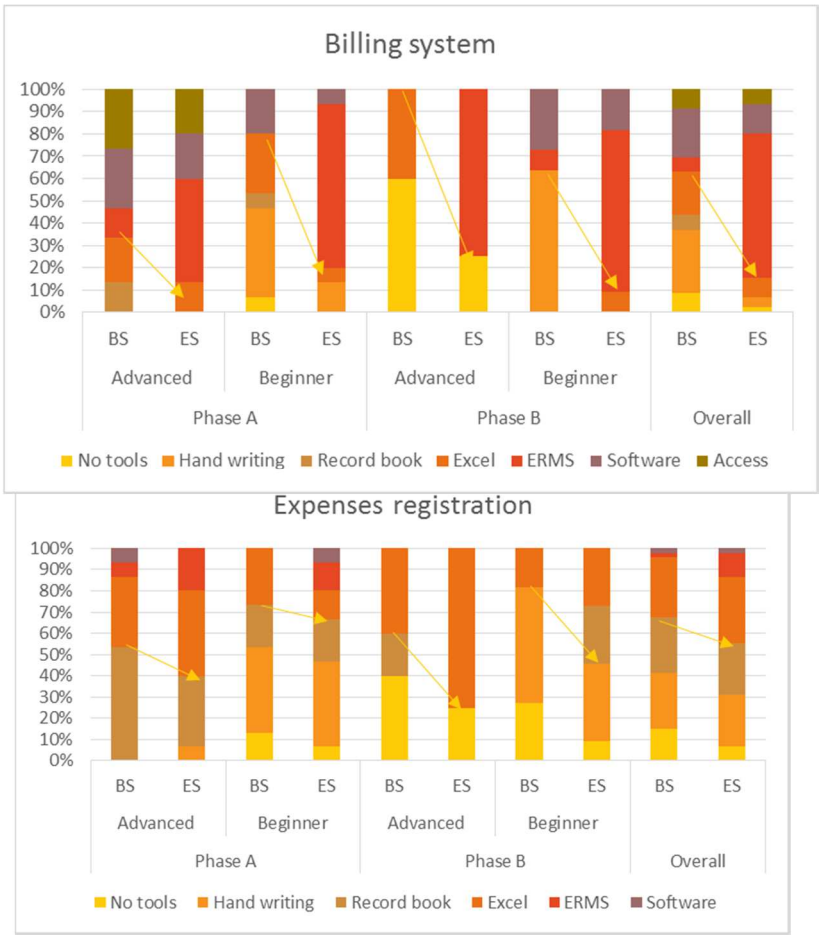
[26] Net income = Revenues from billing and connections – operating expenses



practices, 43% of operators were issuing hand written bills, using record books or did not have any tools at baseline, verses only 6% at the end of the program. .

- ✓ The main change is the use of ERMS, only 7% of operators used this software at the start of the program in comparison to 64% at endline, who now use if for billing. For accounting, the main tool is still Excel (31% use it to record their expenses). .
- ✓ The overall time to bill has reduced from 5.2 days to 4.8 days. 31% of DPWOs have seen this time decrease, 36% did not notice any change and 27% actually saw an increase in time taken (6% are "Not applicable" since they aren't operating yet their system) Indeed, these tools seem to have had a better impact on Beginners than on Advanced DPWOs, notably in regards to time taken to prepare and deliver invoices. For Beginners, time taken has decreased from 5.4 days to 4.4 (-12%) days while for Advanced DPWOs time taken has increased from 3.6 days to 4.6 days (+25%).

Figure 24 - Tools used for business management



ERMS: Uptake challenges

According to one of the operators surveyed during the endline evaluation, there is still reluctance to use ERMS as some DPWOs already used better customized software prior to the start

of the program. Therefore, the need was greater for Beginners who didn't have any tool to record their customer data. For this function, despite bugs and errors, ERMS turned out to be consistent with the needs of these DPWOs and conformed to their expectations. The software simplifies the printing of invoices and enables easy recording of customers on a regular basis. Some drawbacks remain on specific functionalities and on the user interface (reports are not user-friendly enough, it is slow and unresponsive during important database management).

Objective 4 – Optimize the production & distribution

Table 15: KPI - Production & distribution

		UNIT	PHASE A (n=30)			PHASE B (n=15)		
			BS	ES	%	BS	ES	%
OBJ.4	Objective 4: Optimize the production and distribution;							
4.1	Pressure at the end of network	mH2O	5,5	7,8	*42%*	14,8	20,7	*40%*
4.2	NRW	Av. NRW rate	14%	12%	*-19%*	16%	16%	*4%*
4.3	Preventive maintenance	Av. # preventive actions	7,5	14,2	*89%*	2,5	3,9	*59%*
4.4	Water availability (hours)	Average hours	22,1	23,1	*5%*	19,8	19,5	*-1%*
4.5	Average hours of pumping	Average hours	11,1	13,3	*20%*	8,4	11,1	*32%*
4.6	Number of DPWOs that decrease the NRW	% of DPWOs	46,7% (14)			53,3% (8)		

Objective 4 covers specific issues on technical management. Due to poor initial designs or lack of experience in managing water supply systems, improvement can be quite important but less visible. It also depends on each scheme and averages may sometimes misrepresent trends. Staff issues, quantity of chemicals reagents used or energy management are specific to situations and the same figure can be a success or a major problem depending on the point of view. The key results can be structured on the one side on service provision improvements and on the other side on internal management.

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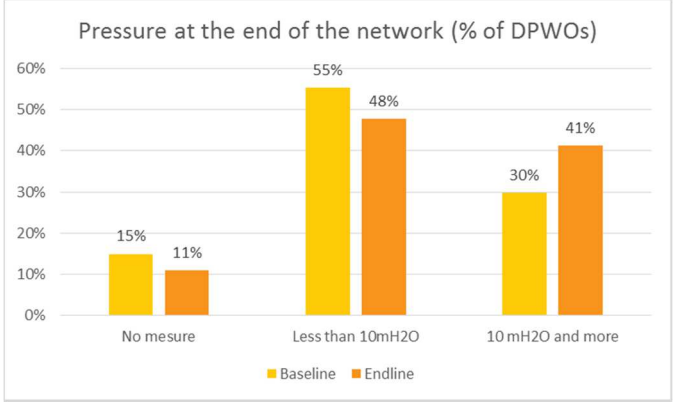
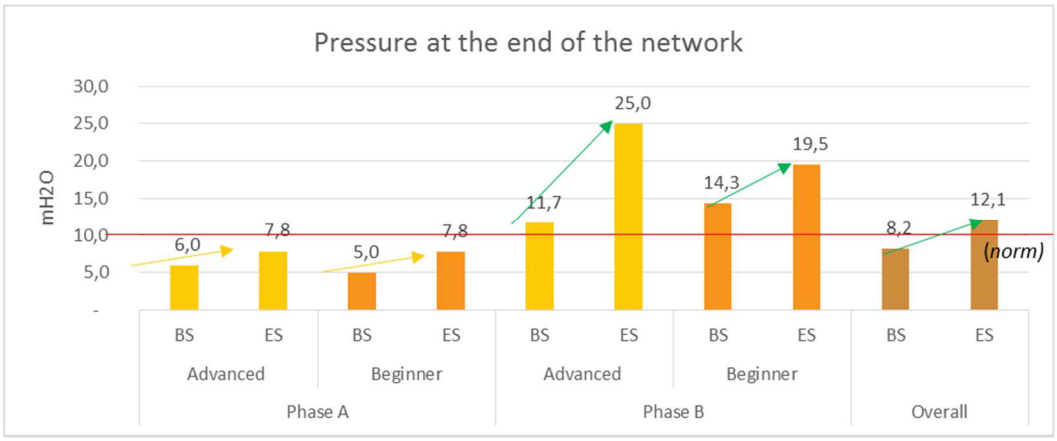
- ✓ Concerning service provision, the average hours of delivery per day is close to 22 hours, 23.1h for Phase A and 19,5h for Phase B. No significant changes were observed. At baseline, 68% of the DPWOs delivered water 24h/day and 75% at endline.
- ✓ Water pressure at the end of the water network, is an area where major improvements were observed: pressure increased from 5.8 to 9.2 mH_2O (+59%). Additionally, the number of operators that do not measure pressure at all has decreased from 7 to 5. Finally, endline results show that 41% of the DPWOs have reached the standard 10 meters of H_2O at the end of the network.

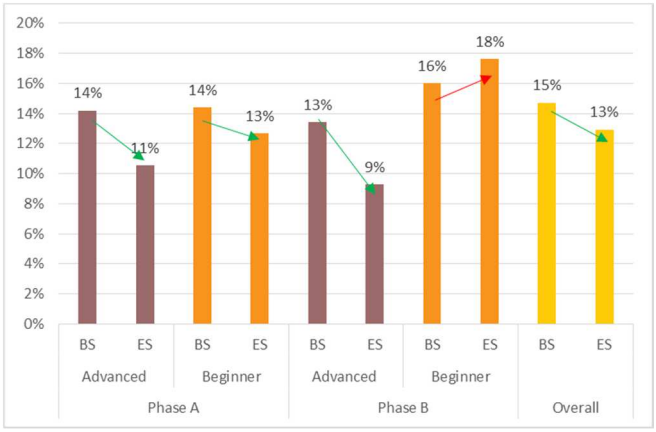
Figure 25 - Water pressure at the end of the network





✓ Another improvement concerns non revenue water evolution. Half of the DPWOs have seen their NRW decrease during the program. For Phase A DPWOs, the NRW reduced from 14% to 12% on average, whilst in Phase B, it decreased from 16% to 15%.

Figure 26 - Non-revenue water evolution



✓ One of the most important impacts that should not be neglected is the qualitative impact on practices. The fact that operators accept to give their data and the consistency of the monthly reports provided is in itself proof that the DPWOs are keeping records

on their activity. Therefore, building a credible and reliable data history should also be highlighted as a major improvement both on technical and business performance.

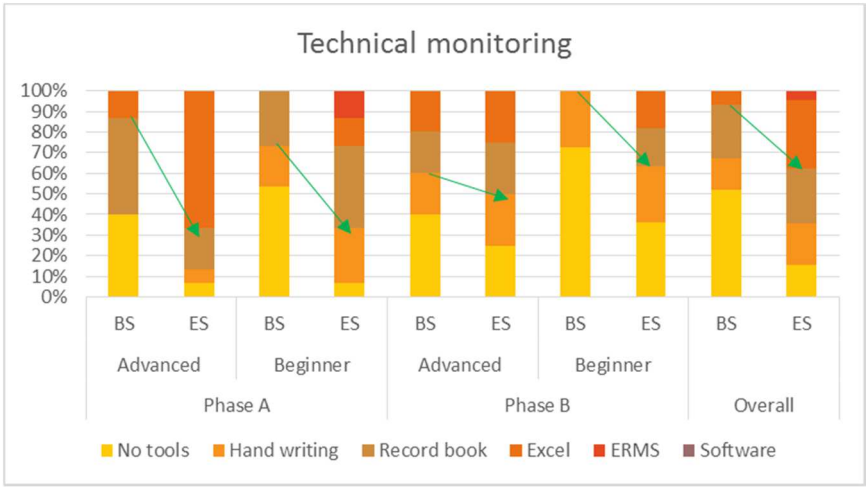
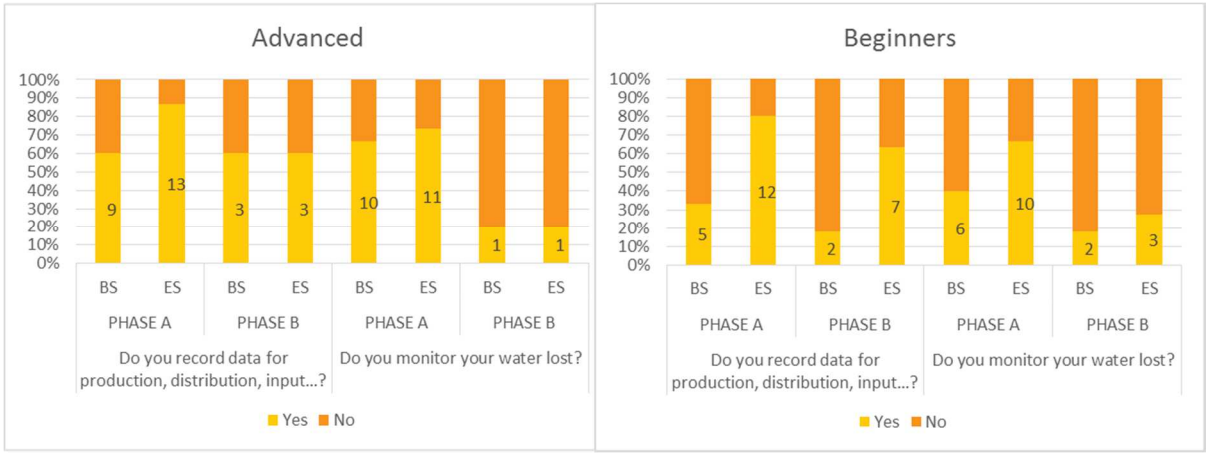


Figure 27 - Tools for monitoring technical performances



✓ 94% of Advanced DPWOs and 70% of Beginner DPWOs currently record technical data (they were respectively 71% and 26% during the baseline survey). 71% of the Advanced (65% during baseline) and 48% of the Beginners (30% during endline) also monitor their losses.

Figure 28 - stock management

Objective 5 – Reduce operational expenditures

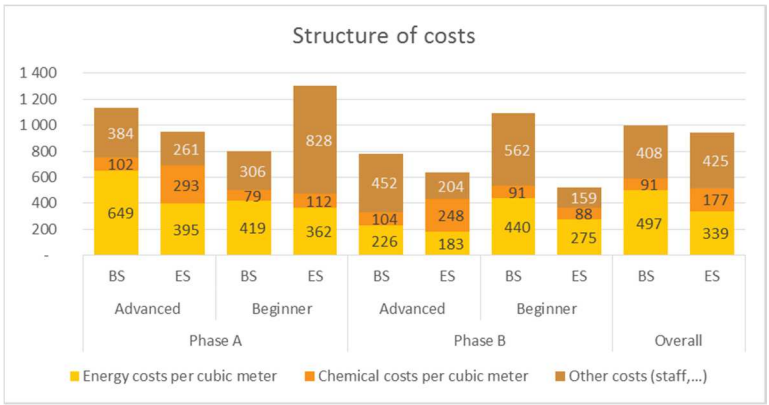
Table 16 : KPI- Operational expenditures

		UNIT	PHASE A (n=30)			PHASE B (n=15)		
			BS	ES	%	BS	ES	%
OBJ.5	Objective 5: Reduce the operational expenditures;							
5.1	Expenses per connection	Av. Expense per connection	3,1	3,3	7%	3,6	2,1	-42%
5.1.1	% of operators that have decreased of expenses par connection	% of DPWOs	47% (14)			53% (8)		
5.1.2	% of operators that have decreased their production cost	% of DPWOs	67% (20)			60% (9)		
5.1.3	% of operators that have decreased their energy cost	% of DPWOs	60% (11)			50% (7)		
5.2	Staff per connection*	Av # staff/ 1000 connections	9,5	13,9	47%	43,4	80,3	85%
5.3	Time to bill	# days	4,6	4,7	2%	6,4	4,9	-24%
5.4	Cost per m3 (all)	Riels/m3	975	1 126	16%	1 046	546	-48%
5.5	Cost of energy per m3	Riels/m3	538	379	-30%	407	255	-37%
5.6	Cost of chemicals per m3	Riels/m3	91	203	123%	93	122	31%

Understanding the above trends requires a deeper analysis of production costs. The production cost is calculated on average in the baseline and endline survey. It has globally decreased (-6%) from baseline to endline.

- ✓ Taking into account the numbers of DPWOs concerned, improvements turn out to be more significant: 64% of DPWOs have decreased their production costs, 56% of DPWOs have had their energy costs decreased and 50% decreased their chemical input cost. Moreover, half of DPWOs have decreased their expenses per connection..
- ✓ The staff per 1,000 connections is one of the ratios where interpretation can be different when looking at Beginners and Advanced levels. The average number of staff per connection has increased from 5.8 staff to 6.9 staff which appears quite significant. However looking in detail, if we consider the median as an indicator of good performance, we can see that 49% of the operators have decreased their number of staff per 1,000 connections, gaining some efficiency and 22% have increased but remained less than the median (which can be explained by the recruitment of specialized staff by Beginners and this can be seen as a positive improvement).

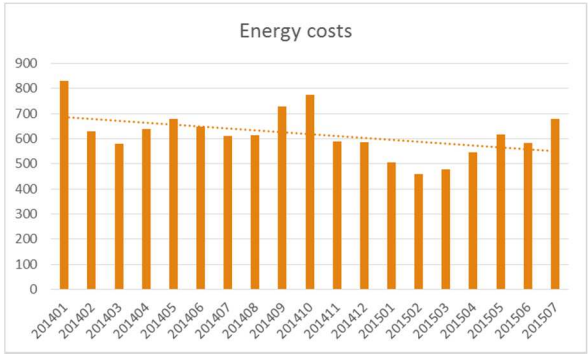
Figure 29 - Structure of costs



Evidence from water operators…

M. Sear Seng Heab (B.C.Water Supply (Kandal Province)

Since 2007, M. Sear Seng Heap has invested in a piped network in the *Krang Mkak commune without skills or technical capacities. His system today has a 270 m^3/h capacity. From November 2013 to July 2015, he has increased his water connections from 1,930 to 2,553 active connections (+32%), approximately one connection per day. Water production as well as water sold has also increased rapidly (+36%) reaching 88,243 m^3/month in July 2015. He has also progressively structured his enterprise and now has 20 permanent employees as opposed to 11 in January 2014. During this year, he has invested around 105,000 USD (73% in the distribution). He has great potential as his monthly production capacity is only reaching 45% (considering continuous production). M. Sear Seng Heap states that previously, his way of operating his WTP and network was "not professional". He didn't know about chemical dosage calculation, didn't have a water meter and wasn't used to manage leakages. It was "a family business" more than an enterprise, he didn't record his domestic expenses separately from his business revenues and he didn't have any staff management procedures. According to M. Sear Seng Heap, this program has helped him to upgrade his business; he now follows the labour law, giving some holidays to his staff. He was the only one trained on all the topics provided during the training, however he attempts to extend these skills to his staff by giving advice and through encouraging learning by doing. M. Sear Seng Heap found the group discussions and exposure visits to be of most interest. Sharing experiences with other water enterprises was really interesting as it allowed him to gain experience from the others and better share good (and bad) practices. However, he also appreciated coaching visits that were specific to his enterprise as during this time, he could ask questions related to his own system. He understands what his challenges are – combating losses reaching 18% of water his company produces. Thus he wants to better manage leakages and change poor quality water meters at the HH level. Another challenge is to reduce his tariff. As the expenses per m^3 produced are quite high reaching 1,300 Riels/m^3, the average tariff is also high, 2,800 Riels/m^3. He intends to reduce his energy costs in order to reduce his costs. His intentions are on trend, as the energy costs have progressively decreased from 831 Riels/m^3 to 677 Riels/m^3. Finally, regarding the overall program, he is quite satisfied and encouraged to continue training, focusing on group discussions and/or exposure visits*



Objective 6 – Improve planning & investment project management

Table 17 : KPI - Investment and planning

		UNIT	PHASE A (n=30)			PHASE B (n=15)		
			BS	ES	%	BS	ES	%
OBJ.6	Objective 6: Improve planning and investment project management .							
6.1	Total investment (USD)	USD (total since beginning)	334 842	367 422	*10%*	227 027	229 298	*1%*
6.2	Gross margin	Av. gross margin	35%	35%	*0%*	32%	25%	*-22%*
6.2.1	Increase of their gross margin	% of DPWOs	43% (13)			40% (6)		
6.3	Bank account availability for water business	% of DPWOs having a bank account	63%	70%	*0%*	33%	40%	*0%*
6,4	Average investment	USD (total since baseline)	43 742			9 356		
6.5	Net profit	USD/month	6 886	7 218	*5%*	5 100	6 856	*34%*
6.5.1	% of DPWOs having increased their net profit	% of DPWOs	48% (14)			56% (9)		

The final objective was to improve DPWOs ability to plan and manage investment projects. This objective specifically concerned Advanced DPWOs. This explains the differences of bank account availability. At the end of the program, 60% of DPWOs have a specific bank account for their water business (55% before the project).

- ✓ 72% of the DPWOs have invested more than the average amount of 32,000 USD. Around 1,440,000 USD was invested in total, 57% by Advanced DPWOs, representing 55% of the connections.
- ✓ Although improvements are more important for Advanced DPWOs, some indicators also show improvements for Beginners. The average amount of investment per connection for Beginners has increased from 316 USD/active connection at baseline to 338 USD (+7%) at endline, in comparison to aAdvanced DPWOs for which it has decreased from 253 USD/HH to 211 USD/HH (-17%).
- ✓ The gross margin has also increased more rapidly for Beginners than for Advanced DPWOs. Although only 42% of DPWOs have improved their gross margin, Beginners represent two thirds of them. Thus, 48% of Beginners have increased their gross margin in comparison to only 39% of Advanced DPWOsBeginner.

Box 9: Key Lessons on performance monitoring

- ➢ The monitoring strategy aimed to generate information and trends on the evolution of performances, which has largely been achieved. The improvements of financial and technical performances are remarkable, especially for some operators and the satisfaction that they express. A package of 8 days group training and 2-4 days of coaching cannot solve all problems. Challenges remain, especially on Advanced financial skills (such as expense registration and accounting), sustained uptake of monitoring and software systems (especially after a new CWA licensed version of ERMS will be released in November), and on continuous improvements – beyond those changes initiated during the BDS program – on technical issues, especially those that may need larger investments (such as upgrading water treatment plants and investments to improve water quality monitoring).
- ➢ An overall analysis using averages does not allow key trends or key improvements in terms of KPIs to be identified. Each operator has specific challenges and their own

strategy. This emphasizes the fact that benchmarking is useful but a strategy of close advisory services for each operator is also relevant in order to sustain improvements and strengthen skills. DPWOs should be able to analyse their own business and make adequate decisions since clear trends of the KPIs are context specific.

- Whilst challenges were encountered, with data collection and reliability of some of the data (such as water quality), overall data reports show consistency and provide excellent information on the management and characteristics of each water system and operator. This report has provided, mostly, information on average performances; however, rich individual performance reports will be shared with operators in a voluntary feedback session (see sample attached in annex #12).
- Although key performance indicators were used to diagnose and understand where progress was made, future BDS would benefit from setting much more specific goals and targets for individual operators. As discussed in Chapter IV, such individual services have trade-offs in terms of costs and may not be able to be scaled on a fee for service basis (may require public subsidies/grants).

CHAPTER III- LESSONS LEARNED

Lessons on relevance, satisfaction and willingness to pay for BDS services

The program has proven that a BDS package is **relevant considering the needs for scaling-up and sustainably funding training**. Almost 1/3 of the DPWOs in Cambodia received support, reaching 47 operators in 2 years (21 months); more than 130 days of training and coaching have been given to date. It also shows that the strategy to develop different tools (group training, coaching, booklets, exposure visits, ERMS, hotline) has been well received. Some operators found the cost of the package cheap, when considering the services provided. Regarding the quality of each component, the suggestions were diverse, some operators appreciated group trainings and the exposure visits that allowed them to share their experience, whilst others preferred coaching. All considered these components to be complementary; even if some noticed the lack of availability of the hotline, or difficulties related to ERMS use, they were generally mostly satisfied with this "package".

Thanks to a close relationship with the CWA and their regular input, the tools designed have been consistent and relevant with DPWOs needs. This approach turned out to be appropriate in many senses: It enabled the development of a large array of tools that addressed different needs (tailored support and basic knowledge), and encouraged participation in the program; it has given visibility and credibility to the CWA to propose different tools and has created a real dynamic of sharing experience and knowledge between DPWOs. The following lessons learnt should be noted regarding the design:

- A close assessment of the needs is crucial
- Phasing and delivery of group training session plan matters
- Coaching and direct advisory should be better framed before it start and the action plan should be clarified
- Follow-up dissemination of tools turned out to be essential
- A transparent selection process is needed
- Pricing strategy seems to be coherent and appropriate for the DPWOs but can be adjusted based on components

Despite efforts in marketing, the fact that the project could not reach 20 trainees in phase B led to increasing the waiting list, indicating there are still limits on reaching all the operators. The **uniformity of the package** may be one of the weak points, the cost of the package could be another. For the next round, it is recommended to better understand the constraints of those who didn't choose the package (likely due to failure to appreciate its benefits). Another option

would be to propose a less costly package (justified with fewer training days and less coaching) in order to reach the very small operators (that couldn't afford the package).

Related to this previous point, a cost analysis has shown that coaching is quite expensive compared to the other components. There can be some **improvements to each tool**; the hotline is quite cheap and can provide important services to DPWOs if it were better managed. This tool can be reliable if there were a better availability of the staff behind it and if it was more efficient and faster in responding. Therefore investment in this tool could being added benefits through having a more formalized "procedure" to answer the questions. Coaching visits could be optional depending on the means of the DPWOs. A coaching voucher mechanism could be paid at the CWA when the training is carried out by a consultant. Exposure visits or group training could be organized, focused on practical problems, and giving a large place to discussions and experience sharing.

Lessons on improved practices and performance

The monitoring strategy aimed to generate information and trends on the evolution of performances. This has largely been achieved: the improvements in financial and technical performances are remarkable, especially for some operators, and the satisfaction they have expressed is encouraging. However, a package of 8 days group training and 2-4 days coaching cannot solve all problems; challenges remain on Advanced financial skills (such as expense registration and accounting), sustained uptake of monitoring and software systems (especially after a new CWA licensed version of ERMS will be released in November), and on continuous improvements – beyond those changes initiated during the BDS program – on technical issues, especially those that may need larger investments (such as upgrading a water treatment plants and investments in better water quality monitoring equipment).

If the program hasn't impacted directly on the sector, it's noticeable that it has clearly **encouraged DPWOs to understand** the technical and financial requirements to provide reliable history data to banks, and the issue of transparency and accountability. They also better understand their challenges through regarding one another's experiences and through benchmarking. This has a great influence on skills, but also in creating strong relationships between operators and creating a force of advocacy that CWA can benefit from.

Lessons on replication

The second objective, to reinforce the **CWA's role and recognition,** also appears to have been reached. Indeed, 93% of the DPWOs are members of the CWA. They have received considerable information from the CWA during the program. The CWA has carried out the marketing strategy independently during second phase and has reached the set objectives. They have also independently organized some group training on business issues for Beginners. Their technical as well as financial skills have certainly improved through their involvement in regular training and monthly meetings. Through the organization of the activities, they have also improved their network facilitation skills. Training is an on-going process and should continue after the end of the program.

CHAPTER IV - CONCLUSIONS AND RECOMMENDATIONS

CHALLENGES AND NEXT STEPS

These next steps and recommendations are based on the evolution of the sector. This evolution will see DPWOs facing increasing challenges in reducing their costs, improving their practices to be more transparent, and accountable; but also to reduce their tariffs and be more efficient. These evolutions provide incentive and requirements for operators to strongly improve their performances.

Indeed, during the last two years, the sector has faced tremendous changes with the issuance of a new prakas in May 2014 *on issuing, revising, suspending and revoking permit for water supply businesses*. Regulation has been strengthened and a new tariff policy is in the process of being set. Moreover, some data will be regularly transmitted to the MIH that is looking more closely at operator practices. The objective is to get increasing coverage for those operators that are encouraged to expand their networks.

Furthermore, some programs initiated by the WSP[27] and AFD[28], promote access to commercial loans for the water operators, providing them technical assistance for planning their investment. One of the main challenges is to change the modality of granting loans, including cash-flow analysis in addition to the classical collateral in land title analysis. The DPWOs will have the opportunity to obtain loans that are three times greater than in typically available from commercial banks. Monitoring, coaching, and follow-up of improvements is a crucial business development service that can develop projects with historic data, and in doing so build bank confidence.

In this sense, the CWA can be a key player in continuing the support to its members. Therefore, one action is to continue to provide the BDS package.

- **Provide an updated, lighter BDS package** including trainings sessions, small coaching groups and coaching days - outsourcing the training itself when needed. The topics should be organized the same way, but the tools can be improved to correspond to the

[27] Access to finance program –A2F- implemented by a Consortium EMC/Gret)

[28] Access to finance for Small Water Enterprises and Rural Electricity Enterprises in Cambodia – implemented by FTB with a technical assistance to the bank on one side (Enclude) and a TA to the operators (GRET/ARTELIA/SEESAW/ISEA)

"new" needs of the DPWOs (specialized staff, better management practices, better knowledge, and turn-over of technical staff). Specific curriculum targeted at different skills may be useful to clarify the aims of individual packages and divide them into sets. The marketing strategy could be also lightened with only direct calls and information broadcast through the CWA's Facebook page and website. Briefings should be organized on a regular basis to allow DPWOs to subscribe to the training sessions of their choice, and a coaching voucher mechanism set-up in order to allow "coachers" to do the marketing themselves. The pricing strategy should be adapted to this updated package, proposing a lighter package with only a few training days, less coaching days, and some basic services to fit to the new DPWOs demand.

Another area for development is to diversify the BDS package by providing new services to its members:

- **Strengthen the role of service providers on accounting & legal issues –** despite progress, DPWOs still lack accounting and financial management skills. Outsourcing accounting services, tax registration, or financial analysis could provide an option that may interest operators that still have low capacities to manage these activities.
- **Facilitate access to service providers –** this includes their rating/the benchmarking of their costs. Following the new regulation and on-coming technical standards, there will be a need for guaranteeing fairness, information, and transparency for the DPWOs regarding the different services offered by consultants and firms. The CWA can support its members to choose good suppliers and good service providers.
- **Strengthen the CWA advocacy role and network facilitation** – following the program, DPWOs recognize the (important) role of the CWA in network facilitation. They also understand the CWA's role in discussing common issues and problems such as road works causing network disruption. Finally, some other services should be provided - such as attorney services, or services to facilitate relationships with authorities. CWA has experienced good progress implementing the BDS package and should reaffirm its key strengths and strategy to strengthen its members: i) an important network, ii) large geographical coverage, iii) capacity to mutualize some needs for the benefits of its members (training services, hotline, accounting services). CWA should focus on core priorities and avoid mission creep. Further study on the business model for the CWA is also recommended; increasing membership fees may be a way to facilitate the continuation of some of the services offered.

ANNEX

- App #1 –Leaflet in English and Khmer
- App #2 – Workshop agenda
- App #3 Regional Workshop minutes
- App #4 Applicant profile example
- App #5 Learning agreement example
- App #6 Note on selection process and registration
- App #7 Final list of participants
- App #8 Group coaching Participation
- App #9 Coaching Plan – example
- App #10 Detailed evaluation of training
- App #11 Baseline questionnaire (complete)
- App #12 Example of Performance report
- App #13 References and bibliography
- App #14 Complementary data / analysis on KPI / full set of KPI