Ministry of Public Works and Housing
Republic of Indonesia

The Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Republic of Indonesia

Project Completion Report

Supplemental Documents I

November 2018

Japan International Cooperation Agency (JICA)

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Project Completion Report
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Supplemental Document 1

Baseline Survey and COE Program Review

The Project on Strengthening COE (Center of Excellence) Program for PDAMs in Republic of Indonesia

Baseline Survey and COE Program Review

March 2016

1. Objectives

- Measure the baseline data of indicators that are used to measure achievement of the project purpose and outputs including the counterpart's capacity improvement.
- Collect information in the current COE program and its outputs
- Consider the points that need improvement in the current COE program

2. Positioning of COE Program

(1) Policy on COE Program

- In December 2013, the Ministry of Public Works established the National Policy and Strategies on Water Supply (No.13/PRT/M/2013), in which the COE Program is positioned as one of the PDAM assistance programs.

(2) Plan and Budgeting for COE Program

- Budget for COE Program in 2016 is approximately 18,807 million which is about the same as the 2015 budget. It consists of two management consultant contracts and five field consultant contracts.
- In the 2016 program, in addition to the existing three modules, GIS and Water Treatment Plant Management modules will be implemented.

COE Program Consultant Contracts in 2016

Management Consultants	Field Consultants	Provinces
Region I (Approx.Rp.1,500 million)	Package 1 (5 provinces) (Approx. Rp.3,394 million)	- Aceh - **Jawa Barat** - Sulawesi Utara - Kalimantan Barat - Kalimantan Timur
	Package 4 (5 provinces) (Approx. Rp.3,243.7 million)	- Nusa Tenggara Timur - Sumatera Utara - Banten - Sulawesi Tenggara - Kalimantan Selatan
Region II (Approx.Rp.1,500 million)	Package 2 (6 provinces) (Approx. Rp.3,000 million)	- Papua & Papua Barat - Jambi & Lampung - Jawa Timur - Sulawesi Tengah

	Package 3 (6 provinces) (Approx. Rp.3,000 million)	- Maluku & Maluku Utara - **Sumatera Selatan** - Jawa Tengah & DIY - **Sulawesi Selatan**
	Package 5 (5 provinces) (Approx. Rp.3,169.3 million)	- Nusa Tenggara Barat & Bali - Sumatera Barat - Sulawesi Barat - Kalimantan Tengah
Total: 2 packages Approx. Rp.3,000 million	Total 5 packages Approx. Rp.15,807 million	

3. Status of COE Program

(1) COE Program Implementation Records

・ The implementation record of COE Program from 2012 to 2015 年 are summarized in the table below. COE has initiated with three target provinces in 2012 and has been expanded to nation-wide since 2014. In 2015 the number of Provincial Training participants was 210 and that of Kabupaten/Kota Training was 562.

Status of COE Program Trainings

	Item	2012	2013	2014	2015
1	Participating provinces	2 provinces (South Sulawesi and South Sumatra)	3 provinces (South Sulawesi, South Sumatra and Bali)	32 provinces	25 provinces
2	Training Modules	3 Modules	3 Modules	3 Modules	3 Modules
3	Provincial Training venues	PIP2B	BTAMS Region I and II	BTAMS Region I and II	BTAMS Region I and II
4	Number of Provincial Training Participants of Provincial Training (passed)	4 trainings 18 (8)	6 trainings 76 (37)	12 trainings 181 (79)	15 trainings 210 (71)
5	Number of Kabupaten/Kota Trainings Participants of Kabupaten/Kota Training a	4 trainings 15	9 trainings 76	42 trainings 504	50 trainings 562
6	Number of National Training Participants of National Training (passed)	N/A	N/A	3 trainings 25 (22)	3 trainings 28 (19)

(2) Program Implementation

・ Current implementation setup of the program is described in the figure below. Major terms of reference (TOR) of the management consultant for 2016 COE program are summarized below.

- Planning of activities and coordination with stakeholder organizations
- Monitoring and supervision of field consultants' implementation of National/Provincial Training and Kabupaten/Kota Training
- Revision of GIS and WTP training modules

- Coordination with JICA project such as participation in Working Groups for FAM and CR training modules, etc.

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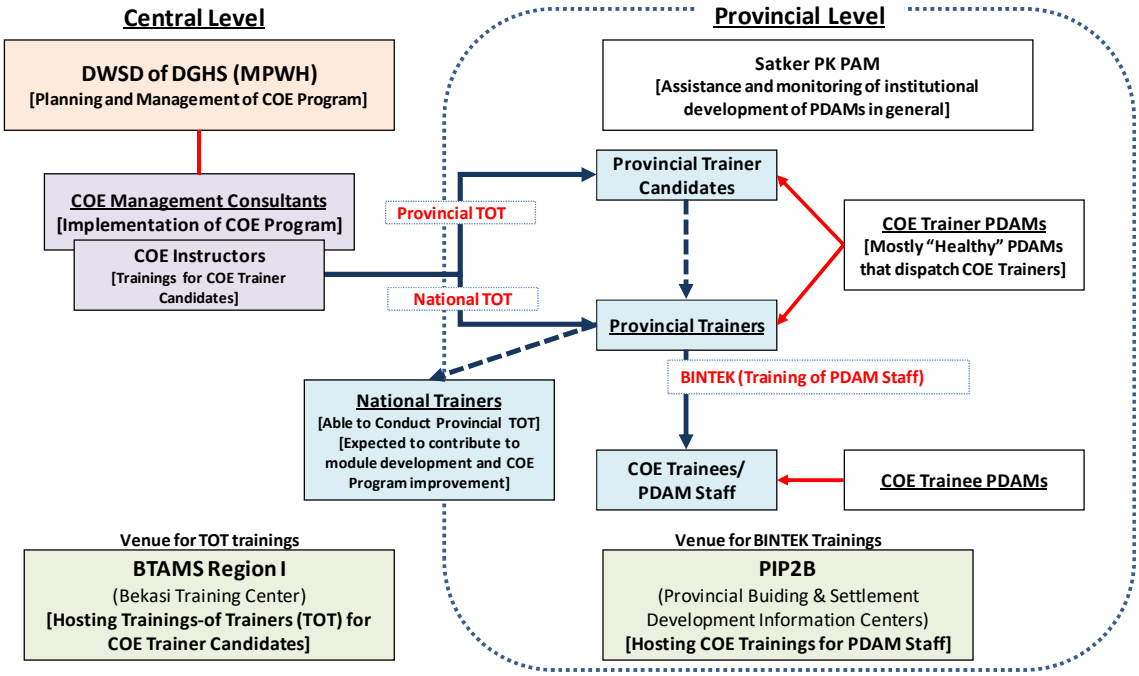


(3) Current situation of Monitoring and quality control (PDCA cycle)-

・ Whole of Program : The system of quality control is being developed partially, in the whole of program. A workshop to evaluate the COE program was conducted in December 2015, where the following issues were identified.

・

- ・ It is desirable that Kabupaten/Kota Training deals with basic contents and PT (Provincial Training) should deal with advanced contents. By this way there is phased progress from Kabupaten/Kota Training to PT.
- ・ NRW contents should be enriched by basic hydraulics knowledge. EE contents should deal with more pump selection and revolution speed control.
- ・ Trainees of PT should be targeted for PDAM directors and decision makers.
- ・ COE overemphasizes the training of trainers. Aftercare or follow-up of trainers is also needed.
- ・ Trainers are tend to be sent by a limited number of PDAMs. Database of trainers is needed.
- ・ Monitoring of COE program should include if PDAMs are actually practicing the knowledge learnt at the COE.

However, including the above issues, there is no clear and established system (PDCA cycle) to reflect such issues and findings.

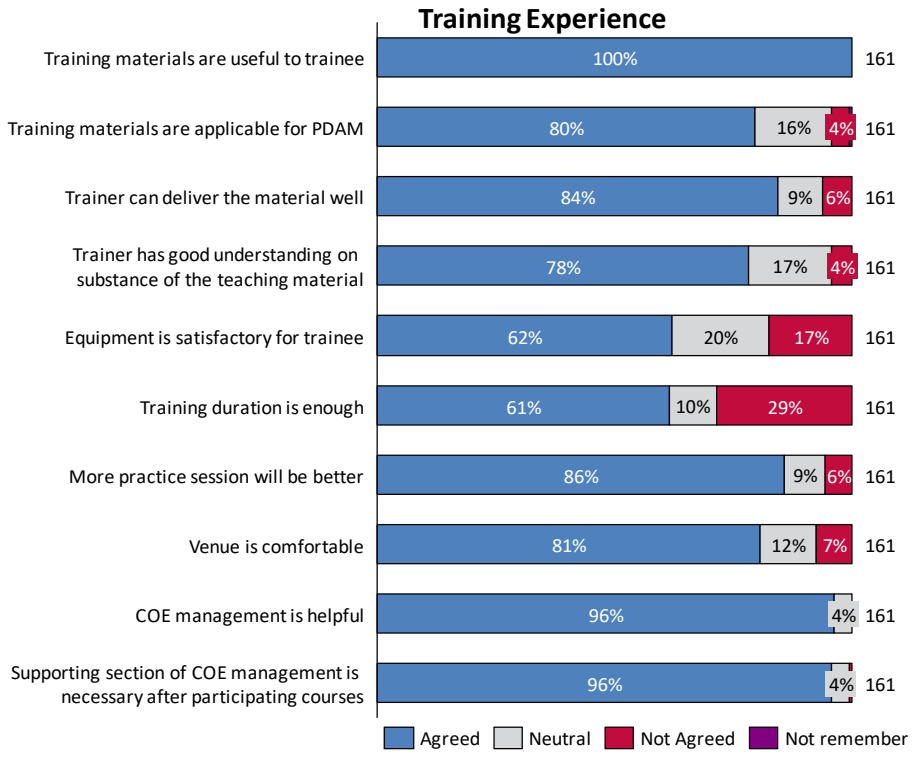
- Contents and implementation of trainings : There is a system to evaluate a trainee's level in understanding course contents. However there is no system (e.g. questionnaire survey) to grasp trainees' evaluation on course contents and course implementation, and make use of the evaluation for future activity and module revision.
- Implementation of training contents at PDAMs : There is no monitoring system, particularly at the PDAM level, to check whether PDAMs have actually put in practice what they have learnt at COE courses, for their operation improvement.
- Current situation of certificate issuance : Currently no certificate is issued for COE course trainees, thus incentives to attend COE training courses are lacking. Whether or not the future COE course contents should accord with the system of the official certification system (SNI) needs to be discussed in the master plan of COE program.

4. Results of questionnaire survey to trainees

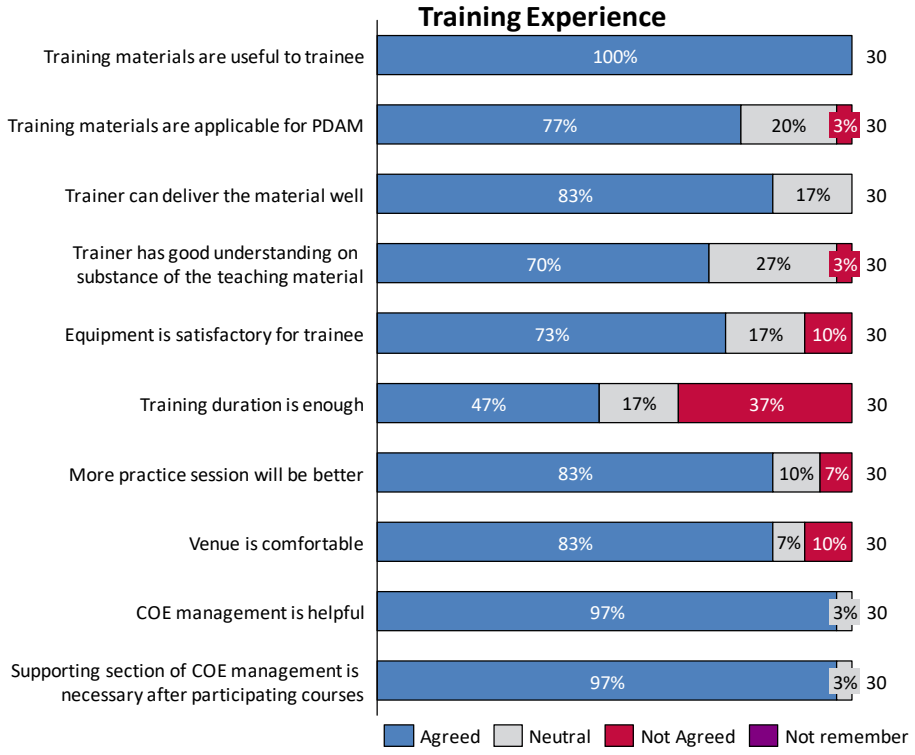
(1) Evaluation of participants of COE Program Kabupaten/Kota Training

- - Survey has been carried out to 2014 COE Program participants (a total of 356 people) (see Annex 2). The evaluation result for Kabupaten/Kota Training participants are as follows:

Participants of Kabupaten/Kota Training of NRW



Participants of Kabupaten/Kota Training of Energy Efficiency



(2) Implementation of obtained knowledge after Kabupaten/Kota Trainings

- Regarding implementation of COE training result in the PDAM are shown in the table below. Although many Kabupaten/Kota Training participants share obtained knowledge in their PDAM, actually participants who buy new equipment to support PDAM improvement is low, only 15% of NRW participants and 20% of EE participants. In addition, as a failure of obtained knowledge implementation, the most common causes cited by participants are "lack of equipment" and "lack of budget".
- These limitation factors are major bottleneck for the improvement of PDAM management. Thus, this project will promote cooperation for ① small business loan fund from the World Bank IWISIF, which does not depend on the equipment and capital investment; ② training module management that includes improvement measures, such as correspondence needed (for example measures for non-payment customers, such as in customer management).
- In terms of the area where limitation of equipment and budget is considered less relevant, those who "have improved the way of work" reach 75% of NRW participants and 77% of EE participants. It is considered appropriate as an indicator of "improvement of PDAM management capacity" which is overall goal of the project.

Have you implemented the knowledge you obtained at COE course to your PDAM?		Kabupaten/Kota Training participants in 2014			
		NRW		EE	
No		**21**	**13%**	**1**	**3%**
Yes	Sharing to other staff in my PDAM	134	83%	28	93%
	Improve way of working	120	**75%**	23	**77%**
	Buy new equipment to support PDAM improvement	24	**15%**	6	**20%**
	Develop new system	50	31%	11	37%
	Invited by (an)other PDAM(s) to give unofficial training	7	4%	1	3%
	Others	13	8%	0	0%
	Subtotal	**140**	**87%**	**29**	**97%**
Total		**161**	**100%**	**30**	**100%**

5. Development and Revision of Training Modules

(1) Organization for Module Development and Revision

- DWSD established working groups for revision of existing modules (NRW・EE) and development of new modules (WTP Operation・GIS).
- AKATIRTA trainers are main contributors for the module development and revision. AKATIRTA trainers have drafted the revisions and the drafts were finalized through the working group discussion.
- The similar working group members will be involved in the future revision work.

Working Group members for NRW and EE modules

No	Name	Institution
A	Subject: Non Revenue Water Reduction	
1	Ir. Awaluddin Setya Aji, M. Eng	AK Tirta Magelang
2	Gagak E Bhaskoro, ST	AK Tirta Magelang
3	Ir. Hernadi, MM	IUWASH
4	Ir. Agus Sunara	Perpamsi
5	Supian, ST, MT	PDAM Kota Banjarmasin
6	Suwito, ST	PDAM Kota Malang
7	Hari Sundana, ST	PDAM Kabupaten Bandung
8	Ir. Rosyid	IUWASH
9	Ir. Tanobaya	Water Supply Expert
10	Ir. Hudaya	Water Supply Expert
11	Ir. Budi Sutjahyo, MT	YPTD Perpamsi
B	Subject: Energy Efficiency	
1	Prijono, ST	AK Tirta Magelang
2	Ir. Sardjiono, MM	Dit. PAM, Kemen PUPR *(DWSD, Ministry of Public Works and Housing)*
3	Suhadi, ST	Balai Teknis Cipta Karya *(Technical Center of Human Settlements)*
4	Benny Sihaholo	Water Supply Expert
5	Peni Pintarto, ST	PDAM Kabupaten Jember
6	Hasan	PDAM Kabupaten Bogor
7	Raharjono	PDAM Kota Malang

(2) Review of Existing Modules and Approaches for Revision

【Non Revenue Water（NRW）】

2016 NRW text is mainly composed of the following subjects, and the duplication and textbook structure was improved for easier understanding.

- Significance of NRW issues and necessity of countermeasures
- Definition and understanding of NRW
- Water Balance Analysis
- Organization for NRW countermeasures and preparation of implementation plan
- Countermeasures for physical loss (DMA, Step Test, leak detection methods)
- Countermeasures for commercial losses (water meter management, illegal connection control, etc.)

The challenges of the existing module are summarized as follows:

- The existing NRW modules focus on leakage.
- Less cost method to reduce NRW including apparent loss control should be added. (meter reader training, contractor training, activities against illegal connections)
- Preventive methods such as pressure control, service connection installation improvement, procurement of better quality water meters and pipe materials should be introduced.
- New leakage survey technology appropriate for local conditions of PDAMs should be introduced.
- Selection rule for training participants and curriculums applicable for different participant levels should be prepared.
- Good experiences in NRW reduction in Indonesia and other countries should be introduced.

Further revision of NRW module would be carried out in the following direction.

① 2016 version covers the definition of NRW and major contents for NRW issues and countermeasures and this version will be utilized as it is. The revision will be made as the additional text covering the following subjects.

【Main Additions】

- Leakage survey methods which do not rely on DMA and Minimum Night Flow Analysis. (simple evaluation of leakage priority area by dividing distribution area by mesh.),

- Distribution pressure control,
- Service connection installation and leak repair methods,
- Introduction of good practices (water meter reader training in Maminasata, contractor training for pipe installation works in Pontianak, Licensing system for service connection installation in Japan, procurement rule for water meters in other countries)
- Introduction of innovative NRW survey equipment

② The revision work will be carried out with Working Group members through discussions on the draft prepared by JET, so that the additional contents is appropriate for the local circumstances of PDAMs.

【Energy Efficiency（EE）】

- Revised 2016 EE Text focusses on theoretical training on EE for pumping unit and electrical facilities.
- Most of the contents are understandable for engineers but for operators the contents should be adjusted.
- Challenges of the existing module is summarized as follows;
  ① EE curriculum should be prepared considering the levels of training participants.
  ② EE issues form the viewpoints of the entire water supply system is not included.
  ③ Approaches for improving EE in the entire water supply system are not introduced but unit based improvements are included.
  ④ The approaches how to improve the existing equipment are not included.
- Further revision will be made in the following direction:
  ① 2016 version will be utilized as it is, and appropriate pump selection and operation methods in terms of the energy efficiency of the whole system will be introduced.
  ② The following subjects will be added.
  - Water transmission and distribution system plan for improving energy efficiency
  - Pumping system planning for better energy efficiency

(3) New Training Module Development

【Customer Relations（CR）】

- Most of PDAM have introduced customer management softwares such as Bimasakti and SiKompak.
- These systems are utilized for mainly for water billing by preparing and issuing bills, issuing and recording uncollected water bills, recording arrear and negotiation history, recording disconnection and reconnection. Thus, most PDAMs have such a customer

management system for billing and collection.

- Regarding handling of customer complaints, complaints data are collected and categorized into such problems as supply interruption, pressure and flow problems, water quality problems. However, area-wise analysis of complaints data and the analysis of causes of complaints are not realized yet so as to reflect on the future improvement plan of water supply system.
- Among medium-sized or small sized PDAMs surveyed, most PDAMs have not yet introduced GIS. However, most PDAMs are keen to introduce GIS in the future so that pipeline data and customer data could be liked on GIS, which enables PDAMs to provide customers with daily operation information on water supply interruption, water pressure, etc.
- CR module will be composed of the contents in the table below, and training duration will be 2～3 days .

Training Topics	Contents
Customer information	・ Development and usage of customer database ・ Analysis of customer database
Customer management for NRW reduction	・ Customer meter reading (training for meter readers, meter intangible flow, etc.)
Water bill collection	・ Water bill collection: response to unpaid bills, etc.
Complaint response and management	・ Call center/ customer center ・ Development of action flow for complaint response
Mapping and GIS	・ GIS, Water pressure map, water quality map, etc.
Public awareness activities and Public relation	・ Event/ campaign for water saving, etc. ・ Public events in communities/ schools

【Financial Analysis and Management (FAM)】

- SAK ETAP course was the only “financial” subject in COE module. In fact, SAK ETAP was “accounting” subject, which served to teach a newly introduced accounting standard to PDAM staff in accounting section.
- After being conducted during 2012-2015, demand for SAK ETAP course has reached saturation. Thus the course may be discontinued in 2016.
- “Financial Management and Analysis (FAM)” course is selected to replace SAK ETAP, on the basis of request from DWSD.
- Possible training topics the FAM module could deal with had been identified in the 2014 preparatory study which are as follows.

Training Topics	Contents
Financial Analysis	・ Financial ratios and PDAM performance indicators ・ Simplified cost-benefit analysis
Financial management information system	・ Consciousness raising for self supporting finance ・ Collection of accounts receivable ・ Debt reduction ・ Financial statement practice
Business plan preparation	・ Action plan ・ Long term plan
Water tariff setting	・ Practical process learning
Case study	・ Case studies of business plan preparation, water tariff setting, etc.

・ Findings of the COE program survey and field visits to PDAMs in 2015, indicate that among identified topics above, Business Plan (BP) formulation shows high demand from PDAMs.

・ Although many PDAMs already have BP, few PDAMs can update BP annually as "5 year rolling BP", meaning that many of BPs do not reflect PDAM's latest situations.

6. Equipment Provision for COE Training

Some inefficiency of trainings caused by shortage of equipment in practice is often pointed out by the COE training participants. To cope with the situation DWSD has purchased many pieces of equipment for 2016 program especially for Kabupaten/Kota Trainings. Following consideration was made to determine the needs for additional provision of equipment by JICA.

(1) Relevance of the additional provision of equipment

- Training module improvement and additional equipment
  - Resolution of lack of equipment for number of training participants
  - Introduction of new technologies
  - Understanding of diverse functions and models of equipment by different manufacturers
- It is assumed that equipment provided by JICA will be used in National/Provincial Training and equipment by DWSD will be used in Kabupaten/Kota Training.
- Practice using equipment ensures trainees learn the functions and appropriate usage of equipment. Operational procedures are different by equipment manufacturers. Therefore, the basic principles of detection and measurement in training.
- Since it is necessary for trainees to learn the universal principles for detection and measurement in training, usage of different types of equipment is not a problem.

- Revised training modules provides introduction to new technologies from Japan; therefore, new equipment for location and detection of non-metal pipe leakage should be purchased.

(2) Number of equipment to be procured by JICA

- The 28 sets of equipment are procured by DWSD for Kabupaten/Kota Training in each province but stored and maintained in Jakarta by DWSD for a while. When in use the equipment is managed by the field consultants responsible to the Kabupaten/Kota Trainings. It is possible they hold Kabupaten/Kota Training in different locations at the same time. Therefore, BTAMS Region I (Bekasi Training Center) needs to keep adequate number of equipment for National/Provincial Training.
- Since one training class consists of 10 to 15 participants, it is preferable to have at least one equipment per three participants as for the equipment for individual use such as acoustic bars.

The table below shows the number of equipment to be used in COE program and revised provision by JICA based on the abovementioned consideration.

Procurement of Equipment for NRW

Training Equipment	2016 DWSD's Procurement	Existing at BTAMS	JICA Procurement	Explanation
Potable Ultrasonic Flowmeter	28	0	5	This is a very important equipment for water balance study, leakage survey such as step test and minimum night flow analysis. Enough quantity is available for Kabupaten/Kota Training and the flowmeters JICA procures are used for National/Provincial Training at BTAMS1.
Data Logger (Pressure)	30	0	5	Enough quantity is available for Kabupaten/Kota Training and JICA procures 5 sets for National/Provincial Training at BTAMS1.
Digital-Type Compact Leak Detector	0	0	5	This is used for National/Provincial Training only to understand different types of detectors. Such knowledge is useful for TOR trainers.
Correlator	28	0	2	Correlators introduced by JICA will be used for National/Provincial Training and have more advantages for detection of leakage from plastic pipes with longer survey spans than those procured for Kabupaten/Kota Training. National/Provincial Training trainer candidates will understand the difference of functions and explain the common functions of different correlators in Kabupaten/Kota Training.
Conventional Type Leak	15	16	0	Enough quantity is available for both Kabupaten/Kota Training and National/Provincial Training.

Detector				
Metal Pipe Locator	15	6	0	Enough quantity is available for both Kabupaten/Kota Training and National/Provincial Training.
Non-Metal Pipe Locator (sound method)	15	0	0	Enough quantity is available for Kabupaten/Kota Training.
Plastic Pipe and Leak Detector (Electromagnetic Induction Method)	0	0	10	5 sets for National/Provincial Training and 5 sets for Kabupaten/Kota Training are introduced by JICA as a new technology effective for detecting leak from plastic pipes as well as locating underground plastic pipes.
Acoustic Bar	56	17	0	Enough quantity is available for both Kabupaten/Kota Training and National/Provincial Training.
Acoustic Bar (with electrical amplifier)	15	3	2	Enough quantity is available for Kabupaten/Kota Training and JICA procures 2 sets for National/Provincial Training at BTAMS1.
Simple Acoustic Bar (produced by simple metal work locally available)	0	0	50	Simple and low cost tool convenient for NRW survey introduced 10 for National/Provincial Training and 40 for Kabupaten/Kota Training.

Procurement of Equipment for EE Training

Training Equipment	2016 DWSD's Procurement	Existing at BTAMS	JICA Procurement	Explanation
Power Quality analyzer	28	0	5	Enough quantity is available for Kabupaten/Kota Training and JICA procures 5 sets for National/Provincial Training at BTAMS1.
Clamp Meter	15	2	3	Enough quantity is available for Kabupaten/Kota Training and JICA procures 3 sets for National/Provincial Training at BTAMS1.
Tachometer/Rotation Tester (Stroboscope)	28	3	2	Enough quantity is available for Kabupaten/Kota Training and JICA procures 2 sets for National/Provincial Training at BTAMS1.
Infrared Thermometer (Infrared Camera/ Thermal Imager)	15	0	5	Enough quantity is available for Kabupaten/Kota Training and JICA procures 5 sets for National/Provincial Training at BTAMS1.

7. PDAM Performance Data

- Based on the "PDAM Kinerja 2015" published by BPPSPAM, PDAM performance indicator data are collected and analyzed. Data of year 2014 performance were collected from 356 PDAMs (93% of all PDAMs in Indonesia).
- Among all 356 PDAMs, 192 PDAMs are categorized as healthy, 99 are less healthy and 67 are sick.

・ The table below summarizes the performance indicators relevant to the COE training modules.

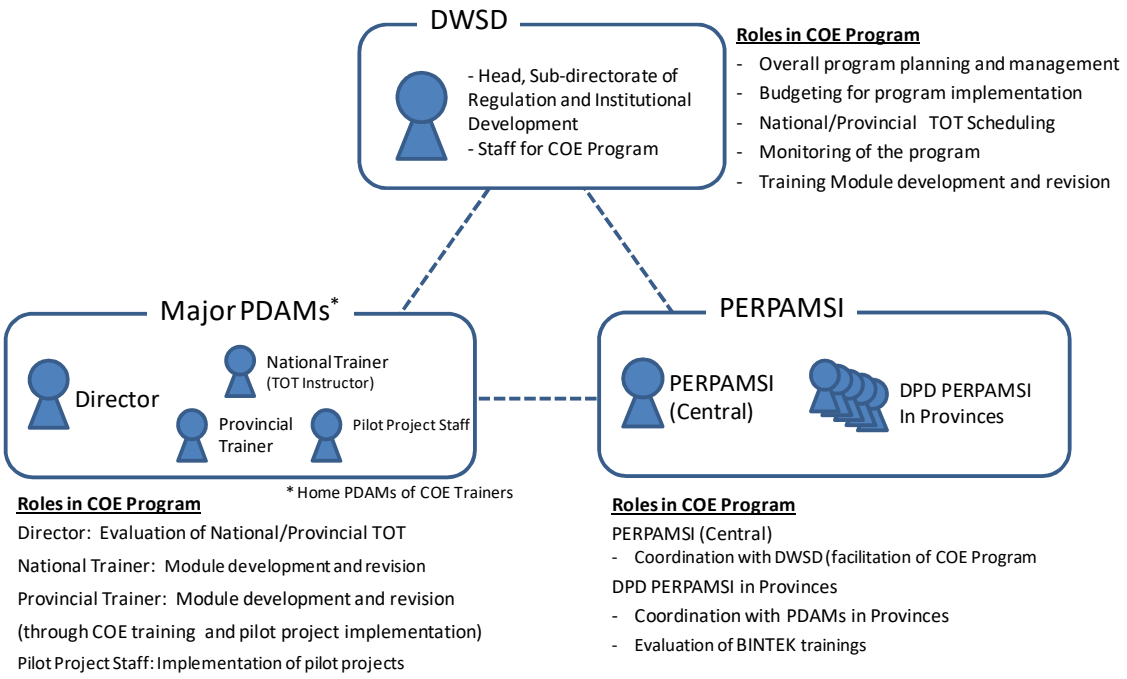
Performance Indicators Relevant to COE Training Modules

Training Module	Indicator	Formulae	2014 Performance	
			Median	Mean
NRW Reduction (NRW)	Non-revenue water (NRW)	= (water distribution – revenue water) / water distribution * 100	30.3%	33.7%
	Water meter replacement	= number of replaced water meters in year / total customer *100	2.6%	4.5%
Energy Efficiency (EE)	Production Efficiency	= realization of production in m^3 / installed capacity in m^3 *100	61.0%	59.8%
	Energy cost	= energy cost (electricity, diesel, gas and others) in a year / total production	Rp.448/m^3	Rp.460/m^3
Customer Relations (CR)	Collection efficiency	= total revenue of water billing / total water revenue * 100	90.9%	87.1%
	Complaint resolution level	= number of completed complaints / number of complaints * 100	100.0%	91.5%
Financial Analysis and Management (FAM)	Operating Ratio	= operation expenses / operation revenue	1.1	1.3
	Return on asset (ROA)	= net profit after tax / total assets	-1.1%	-2.0%

8. Challenges of COE Program and Orientation for Improvement

(1) Future Implementation Structure

As the future implementation structure of COE Program, DWSD has intention to transfer its roles to provincial levels and DWSD will monitor the implementation and provide financial supports as shown in figure below. DPD PERPAMSI which is the provincial branch of PERPAMSI and PIP2B are expected to be key players of COE Program at provincial levels.



COE Program is presently implemented by the strong initiatives of DWSD Central Government with the help of hired COE management consultants. However, it is necessary to establish sustainable management system for the future scale expansion of the program, planning of training implementation appropriate to local conditions, and continuous monitoring

The following are challenges in consideration of the future COE management system, and should be discussed through the preparation of COE Master Plan among the agencies concerned.

① PIP2B Status :

- PIP2B in each province is still in the transition to be under provincial government and their organizational capacity is limited.
- For the near future, it should be decided whether the role of PIP2B should be limited to provision of training venues.

② Roles of Satker PAM :

- From Satker PAM, Satker PK PAM is taking a role of invitation of COE program to PDADs and other minor supportive work. Presently COE management consultants are mainly organizing and preparing Kabupaten/Kota Training. It is questionable whether Satker PAM can take over these activities.

③ Roles of DPD PERPAMSI：

・ DPD PERPAMSI is the PDAM which is regarded as the leading PDAM in each province. Involvement of PERPAMSI and DPD PERPAMSI should be discussed including DPD PERPAMSI's capacity for training implementation and role of PERPAMSI (central) in COE

④ Quality management of training module contents:

・ There should be periodical revision of training module contents. Feedback mechanism of provincial level evaluation to central level is also necessary. Working Group composed of AKATIRTA and main PDAMs are taking important roles in this regard.

⑤ Roles of Local Consultants：

・ There seem to be still the consultants' roles needed such as preparation of training materials, logistics of training management in the future implementation mechanism.

⑥ Program Budget and Management of DWSD：

・ It is necessary to define management of DWSD over COE program and establish finance sources for continuation of COE program.

(2) Development of Master Plan

COE Mater Plan (M/P) formulation has been delayed due to constraints of TOR for local consultants. JET will facilitate and support the preparation of M/P through the following activities:

・ DWSD is the key organization for M/P preparation working together with related agencies such as PERPAMSI, BTAMS. The working group for M/P is mainly composed of the participants of the training in Japan (April, 2016), and will organize three or four workshops for drafting the M/P under the support of JET in 2016.

・ JET will contribute to the preparation of M/P contents, advices based on the survey results, facilitation of workshops, documentation of discussion in workshops (including drafting M/P). In addition, JET will make further hearing and information collection from agencies concerned to facilitate the discussion of the work shop towards the preparation of viable M/P.

・ JET will make further input of 1- 2 M/M of Japanese experts and one local consultant dedicated to this purpose. The draft M/P will be prepared in 2016.

(3) Terms of Reference (TOR) of COE Management Consultants

- As stated in section 3.(2) above, there are needs for improvement of the management consultant TOR in monitoring, evaluation and quality control of the program.
- It is also necessary to make adjustment of management consultants' activities to those of JICA project which requires consultation among stakeholders after selection of the management consultants.

Attachments

- Questionnaire Survey Results
- Analysis of PDAM Performance 2014

2014 COE Program Survey Report

Technical Cooperation Project on Strengthening COE (Center of Excellence) Program for PDAMs in Republic Indonesia

January 2016

Background

There is urgent need for massive capacity development of PDAM staff besides the conventional trainings at centralized BTAMS.

Center of Excellence (COE) Program was launched in 2012 by DWSD, Directorate General of Human Settlements, Ministry of Public Works and Housing.

Japan International Cooperation Agency (JICA) has commenced its new Technical Cooperation Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Mid of August 2015.

COE

Modules:
1. Non Revenue Water Reduction
2. Energy Efficiency
3. SAK ETAP

Trainings-of-Trainers (TOT) type education (cascade method trainings:
1. National Training (at Hotel in Jakarta or Bandung)
2. Provincial Training (at BTAMS)
3. Kabupaten/Kota Training (at PIP2B in each province)

to improve

This 2014 COE program survey is conducted to evaluate the impact of COE Program for the PDAM participants

Objectives

- *To evaluate the status quo of COE program along with the PDAM verifiable indicator items, especially to confirm follow-up actions taken by COE trainees, to improve performance of their PDAMs and the results of such actions.*

- *To evaluate performance of stakeholders involved in each stage of the COE program e.g. program implementation and management, Instructors, Trainers, BINTEK participants, module contents and materials, training setup and format, venue, etc.*

Questionnaire

- There are 6 types of questionnaire, i.e.:

1	Questionnaire for National Training/Provincial Training Participant: a. For NRW course participants b. For EE course participants c. For SAK ETAP course participants	In general, the questionnaire consists of four sections of question: ▪ Respondent profile ▪ Teaching opportunities ▪ Implementation/application of knowledge obtained from COE, including barriers/challenges faced ▪ Experience as COE trainee and as trainer
2	Questionnaire for Kab./Kota Training Participant: a. For NRW course participants b. For EE course participants c. For SAK ETAP course participants	In general, the questionnaire consists of three sections of question: ▪ Respondent profile ▪ Implementation/application of knowledge obtained from COE, including barriers/challenges faced ▪ Experience as COE trainee

Survey Method

Survey will be conducted by telephone/email/fax

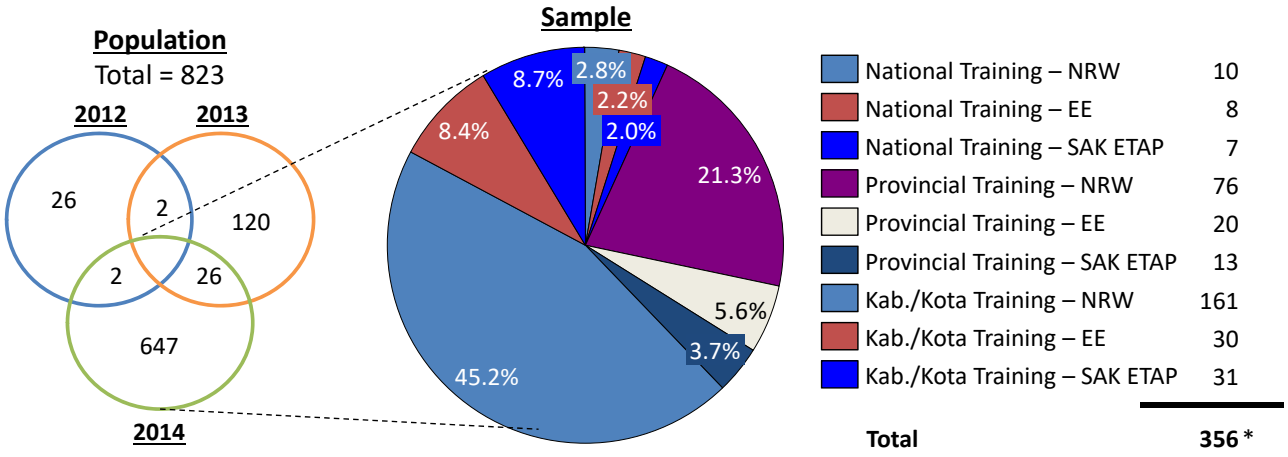
- Survey Procedure:
  - Surveyor contact respondent by telephone;
  - Surveyor introduce and ask availability time of the respondent;

    If the respondent ask for reschedule time, then surveyor will contact the respondent later on agreed time;

    If the respondent ask for the questionnaire sent by email/fax, then surveyor will send the questionnaire and follow up the respondent by telephone on agreed time;

    If the respondent refuse to be interviewed, then surveyor will find another respondent;
  - Surveyor explain survey's background (on preface of questionnaire's sheet);
  - Surveyor start interview according to the questions in the questionnaire;
  - Surveyor thank to respondent for participating.

Sample



Remark:

* Targeted sample = 446 respondents
The remaining 90 respondent cannot be surveyed because:

- Unreachable : 54 respondents
- Refuse to be surveyed : 23 respondents
- Already resigned : 8 respondents
- Already retired : 4 respondents
- Already passed away : 1 respondents

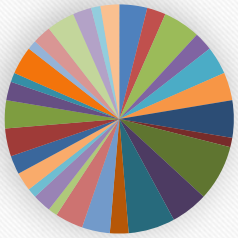
The targeted sample is 66% of 2014 population (or 54% of total population). However, due to some reasons as explained in remark, only 53% of 2014 population (or 43% of total population) can be surveyed.

Sample proportion based on province – NRW

National Training

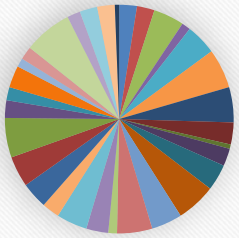
- Bali (20%)
- Jawa Barat (10%)
- Jawa Timur (20%)
- Kalimantan Barat (10%)
- Kalimantan Selatan (20%)

Provincial Training



- Bali (4%)
- Bangka-Belitung (2.6%)
- Banten (5.3%)
- Bengkulu (2.6%)
- DIY Yogyakarta (4%)
- Gorontalo (4%)
- Jambi (5.3%)
- Jawa Barat (1.3%)
- Jawa Tengah (7.9%)
- Jawa Timur (5.3%)
- Kalimantan Barat (6.6%)
- Kalimantan Selatan (2.6%)
- Kalimantan Tengah (4%)
- Kalimantan Timur (4%)
- Kalimantan Utara (1.3%)
- Kepulauan Riau (2.6%)
- Lampung (1.3%)
- Maluku (2.6%)
- Maluku Utara (2.6%)
- NAD (4%)
- NTB (4%)
- NTT (2.6%)
- Papua Barat (1.3%)
- Riau (4%)
- Sulawesi Barat (1.3%)
- Sulawesi Selatan (2.6%)
- Sulawesi Tenggara (4%)
- Sulawesi Utara (2.6%)
- Sumatera Barat (1.3%)
- Sumatera Selatan (2.6%)

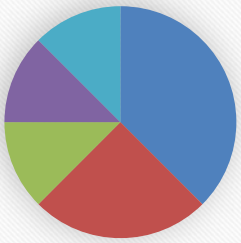
Kabupaten/Kota Training



- Bali (2.5%)
- Bangka-Belitung (2.5%)
- Banten (4.3%)
- Bengkulu (1.2%)
- DIY Yogyakarta (4.3%)
- Gorontalo (5.6%)
- Jambi (5%)
- Jawa Barat (3.1%)
- Jawa Tengah (0.6%)
- Jawa Timur (2.5%)
- Kalimantan Barat (3.7%)
- Kalimantan Selatan (5.6%)
- Kalimantan Tengah (4.3%)
- Kalimantan Timur (5%)
- Kalimantan Utara (1.2%)
- Kepulauan Riau (3.1%)
- Lampung (4.3%)
- Maluku (2.5%)
- Maluku Utara (3.7%)
- NAD (4.3%)
- NTB (5.6%)
- NTT (2.5%)
- Riau (1.9%)
- Sulawesi Barat (3.1%)
- Sulawesi Selatan (1.2%)
- Sulawesi Tengah (1.9%)
- Sulawesi Tenggara (6.8%)
- Sulawesi Utara (1.9%)
- Sumatera Barat (2.5%)
- Sumatera Selatan (2.5%)
- Sumatera Utara (0.6%)

Sample proportion based on province – EE

National Training

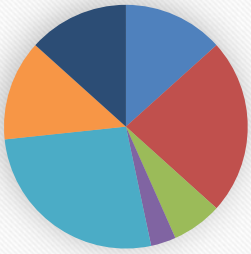


- Jawa Barat (37.5%)
- Jawa Timur (25%)
- Kalimantan Selatan (12.5%)
- Sumatera Selatan (12.5%)

Provincial Training

- Bali (15%)
- DIY Yogyakarta (15%)
- Jawa Tengah (20%)
- Jawa Timur (25%)
- Kalimantan Selatan (10%)

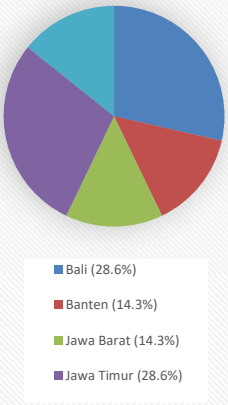
Kabupaten/Kota Training



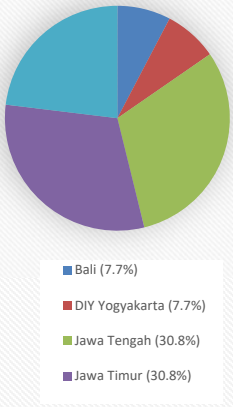
- Bali (13.3%)
- DIY Yogyakarta (23.3%)
- Jawa Barat (6.7%)
- Jawa Tengah (3.3%)
- Jawa Timur (26.7%)
- Kalimantan Selatan (13.3%)
- Riau (13.3%)

Sample proportion based on province – SAK ETAP

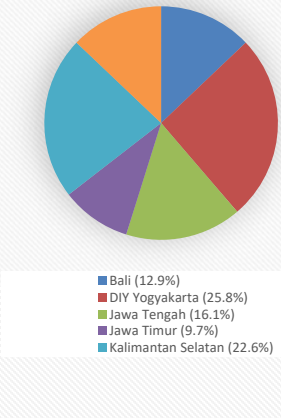
National Training



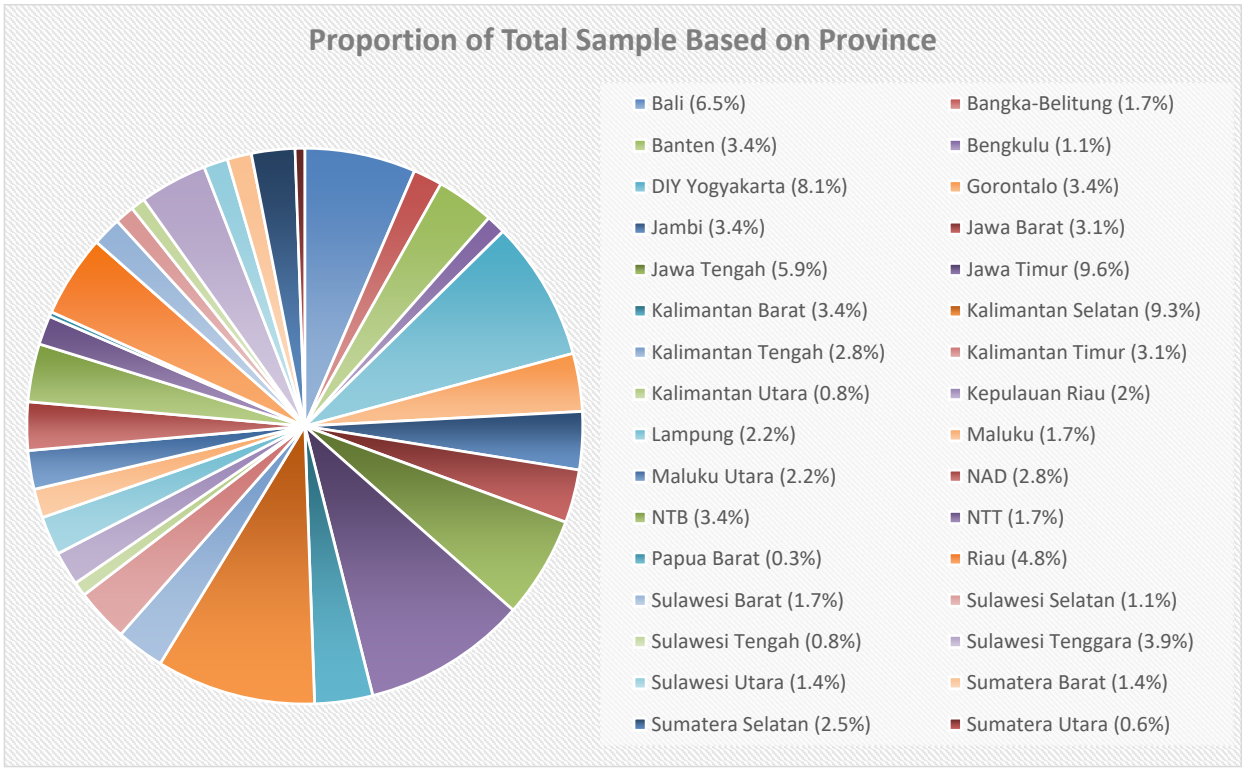
Provincial Training



Kabupaten/Kota Training



Sample proportion based on province – Total



Conclusion of 2014 COE Program Survey Result [1/2]

- Respondent profile
  - Most COE participants are 41-50 years old with 11-30 years of experience working in PDAM.
  - The participants are mostly male, except for Kab./Kota Training SAK ETAP.
  - Mostly, the participants graduated from university, except for Kab./Kota Training NRW and Kab./Kota Training EE (mostly graduated from senior high school).
- Training experience
  - The majority complaint from respondents regarding their training experience is training duration. In their opinion, the training duration is not enough to fully understand the material.
  - Most respondents agreed that more practice session will be better to improve the COE program.
- Teaching experience
  - All the national trainer respondents have experience on teaching. However, only ±60% of provincial trainer respondents have taught.
  - Some of the provincial trainer respondents were not satisfactory with the equipment for teaching. However, COE Management is quite helpful for them.
- Implementation of knowledge obtained from COE
  - Most respondents have implemented their COE knowledge, especially in form of sharing to the other staffs in their PDAM and improving their working ways. However, some obstacles have been found on the implementation, i.e. equipment, budget, and human resources constraints.

Conclusion of 2014 COE Program Survey Result [2/2]

- NRW-related questions
  - The greatest NRW cause factors in respondents' PDAM are:
    - Leakage on transmission and/or distribution pipe and equipment;
    - Customer meter inaccuracies and systematic data handling errors;
    - Leakage on service connection up to customer meter.
- EE-related questions
  - The most energy problem faced by respondents' PDAM are:
    - High monthly electricity bill;
    - Pump system are often disrupted (tripped);
    - Electricity supply problem from PLN (power outage, limited supply, unstable voltage, etc.).
  - Mostly, the weakness of pump installation in respondents' PDAM is:
    - Layout of cables, measuring tools, and other instruments in the panel or relay station is in disheveled condition (untidy/disorganized).
- Financial Management and Analysis-related questions
  - The most expected subject for course of 'Analyze and Financial Management' are:
    - Business plan preparation;
    - Monitoring by management information.

Some facts gathered from survey

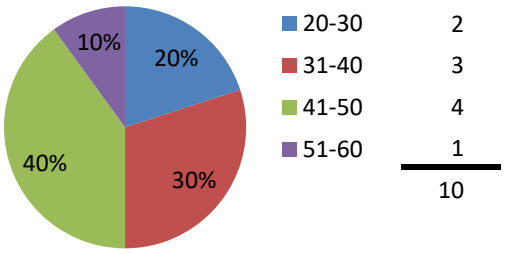
- Some respondents do not know whether they passed as trainer or not.
- Almost all respondents ask about certificate.

2014 COE PROGRAM SURVEY RESULT

NATIONAL TRAINING – NRW

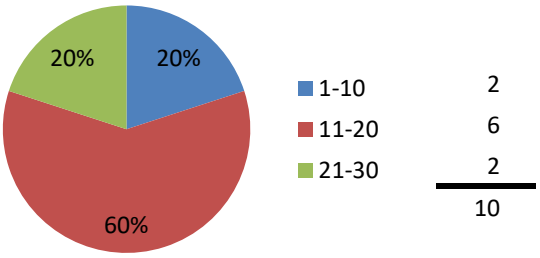
Respondent Profile

AGE



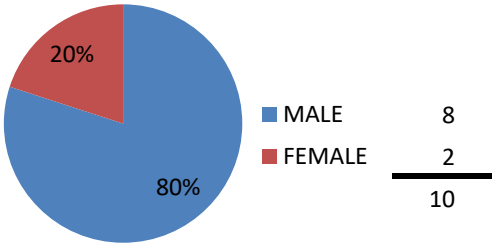
Majority respondents are 41-50 years old.

EXPERIENCE WORK IN PDAM



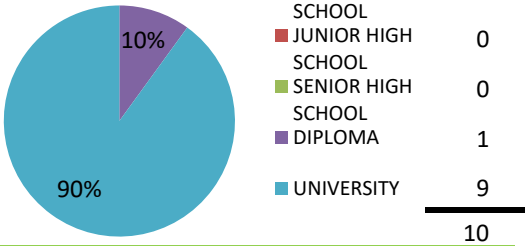
Majority respondents have been working in PDAM for 11-20 years.

GENDER



Majority respondents are male.

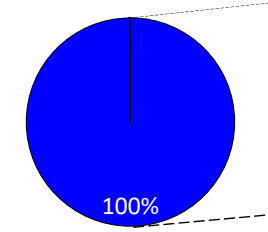
GRADUATED



Majority respondents are graduated from university.

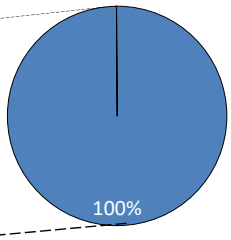
Number of respondents who have taught

Number of respondents who passed the National Training



Passed	10
Not Passed	0
Don't know	0
	10

Number of passed respondents who have conducted any Provincial Training or Kab./Kota Training



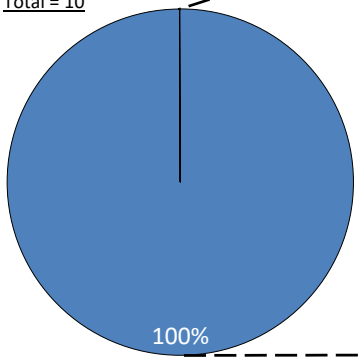
Number of passed respondent who have not taught	0
Number of passed respondent who have taught	10
	10

All respondents passed the training and all the passed respondents already taught.

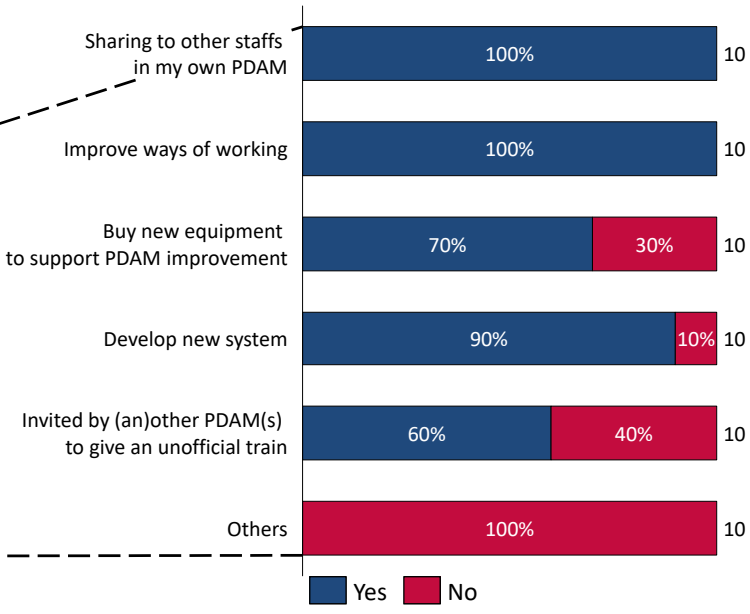
Implementation of the knowledge obtained from COE

Have you implemented the knowledge you obtained at COE course to your PDAM?

Total = 10



What have you done regarding implementation of COE knowledge?

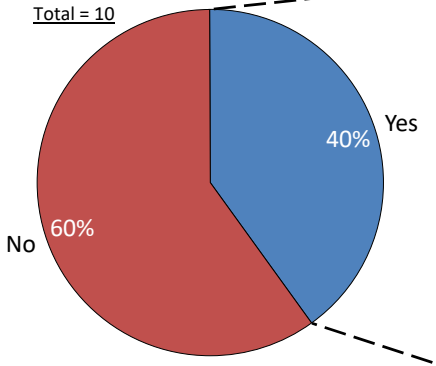


All the respondents have implemented their COE knowledge, especially by improve the ways of work and share to other staffs in their own PDAM

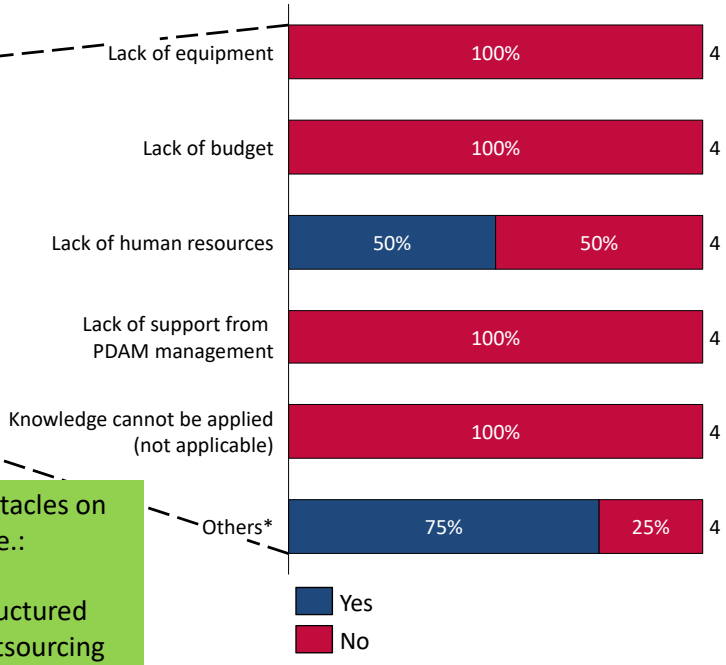
Obstacles found when implemented the knowledge

Are there any obstacles found on the implementation of COE knowledge?

Total = 10



What kind of obstacles found on the implementation of COE knowledge?



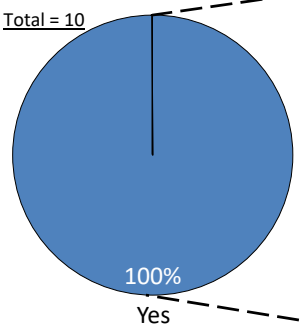
Almost half of the respondents found obstacles on the implementation of COE knowledge, i.e.:

1. Lack of human resources
2. Others: NRW division hasn't been structured yet, time limitation, problem with outsourcing company, infrastructure constraints, difficult to get excavation permit.

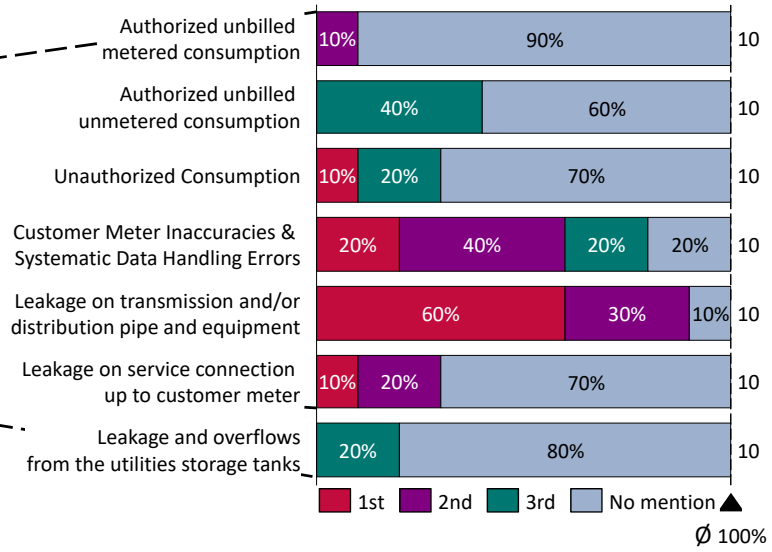
Greatest NRW cause factors in respondents' PDAM

Could you put in the right order the greatest NRW cause factors in your PDAM?

Total = 10



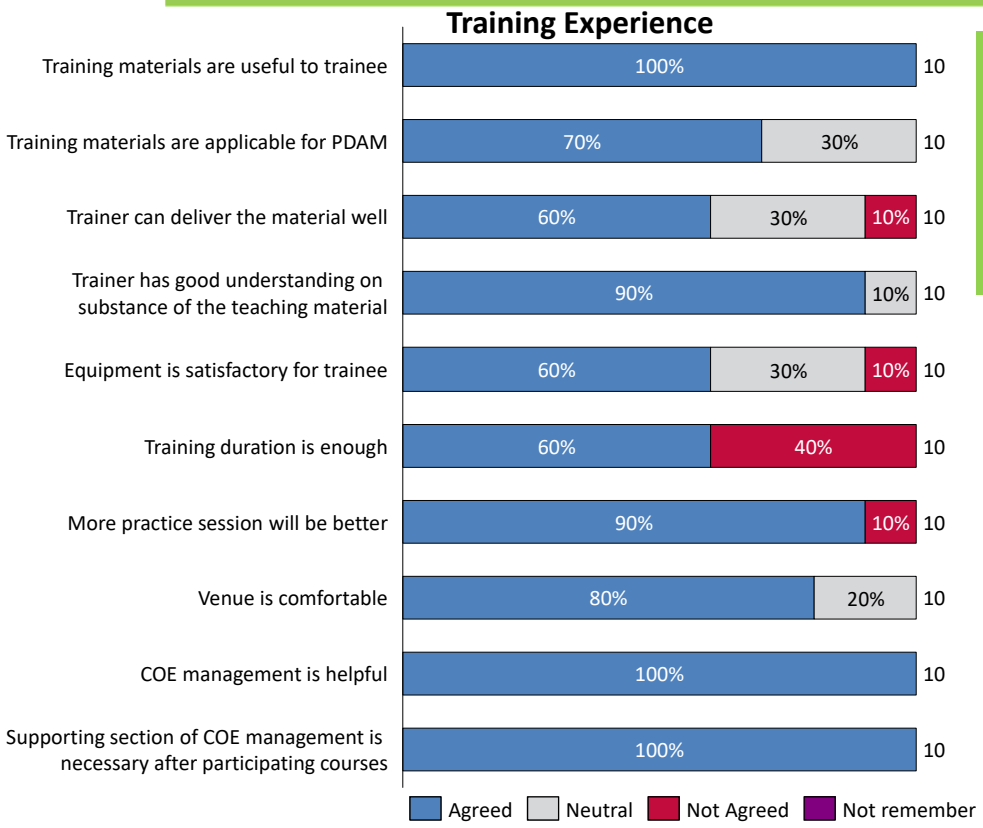
Three greatest NRW cause factors in your PDAM
(Sort from the greatest into the smallest contribution to NRW (1-3))



All respondents know the greatest NRW cause factors in their PDAM. The result of majority respondents sorting are:

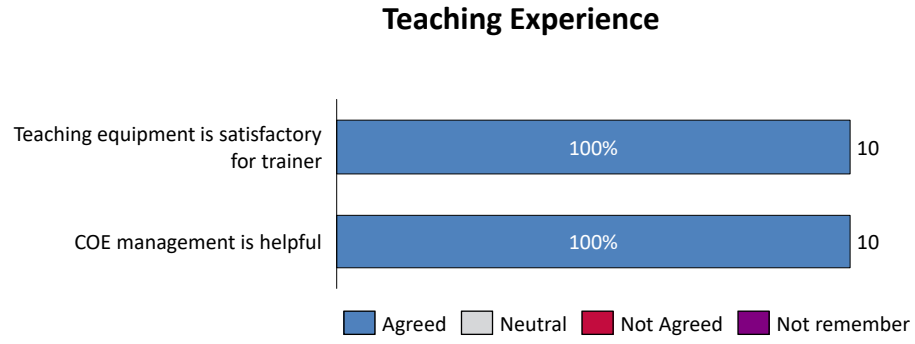
1. Leakage on transmission and/or distribution pipe and equipment
2. Customer Meter Inaccuracies & Systematic Data Handling Errors
3. Leakage on service connection up to customer meter

Training Experience



Some respondents opine that current training duration is not enough. And, most respondents also agreed that more practice session will be better.

Teaching Experience

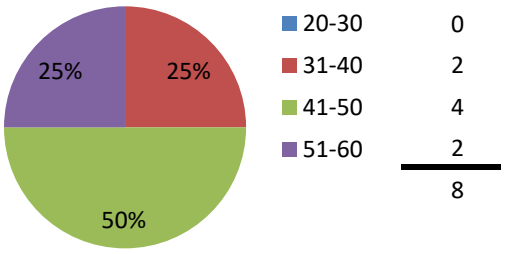


Teaching equipment is satisfactory for trainer and the COE management is helpful.

NATIONAL TRAINING – EE

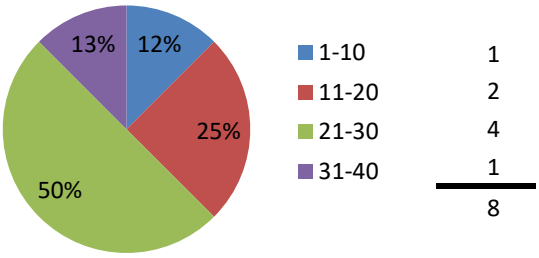
Respondent Profile

AGE



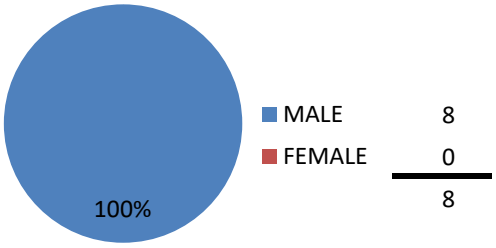
Majority respondents are 41-50 years old.

EXPERIENCE WORK IN PDAM



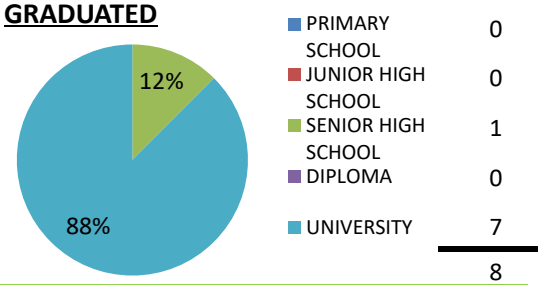
Majority respondents have been working in PDAM for 21-30 years.

GENDER



All the respondents are male.

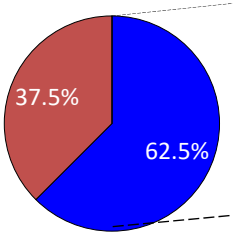
GRADUATED



Majority respondents are graduated from university.

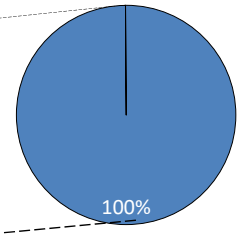
Number of respondents who have taught

Number of respondents who passed the National Training



Passed	5
Not Passed	3
Don't know	0
	8

Number of passed respondents who have conducted any Provincial Training or Kab./Kota Training

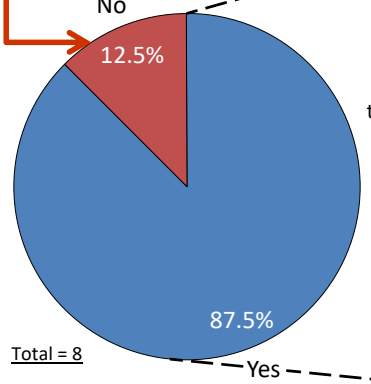


Number of passed respondent who have not taught	0
Number of passed respondent who have taught	5
	5

The 62.5% of respondents passed the training and all the passed respondent already taught.

Implementation of the knowledge obtained from COE

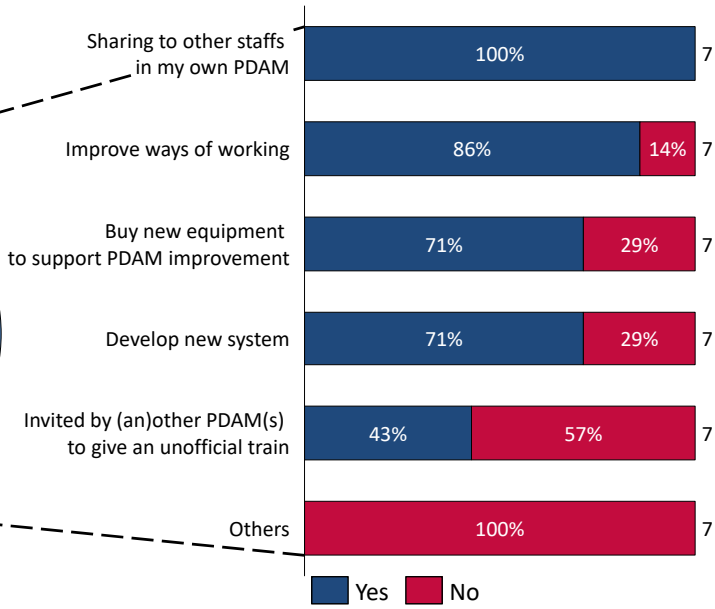
A respondent didn't implement the knowledge because lack of equipment and he isn't member of Division EE.



Total = 8

Have you implemented the knowledge you obtained at COE course to your PDAM?

What have you done regarding implementation of COE knowledge?

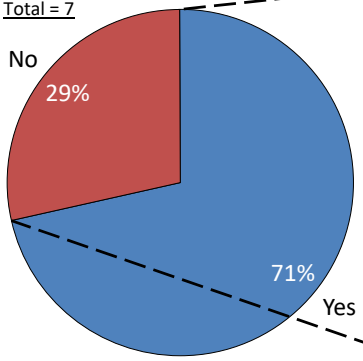


Most respondents have implemented their COE knowledge, especially by share to other staffs in their own PDAM and improve ways of working.

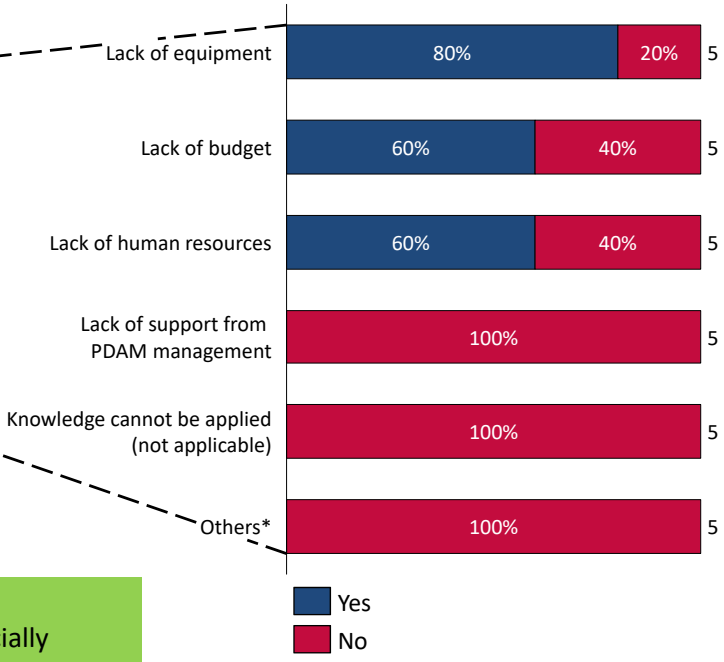
Obstacles found when implemented the knowledge

Are there any obstacles found on the implementation of COE knowledge?

Total = 7



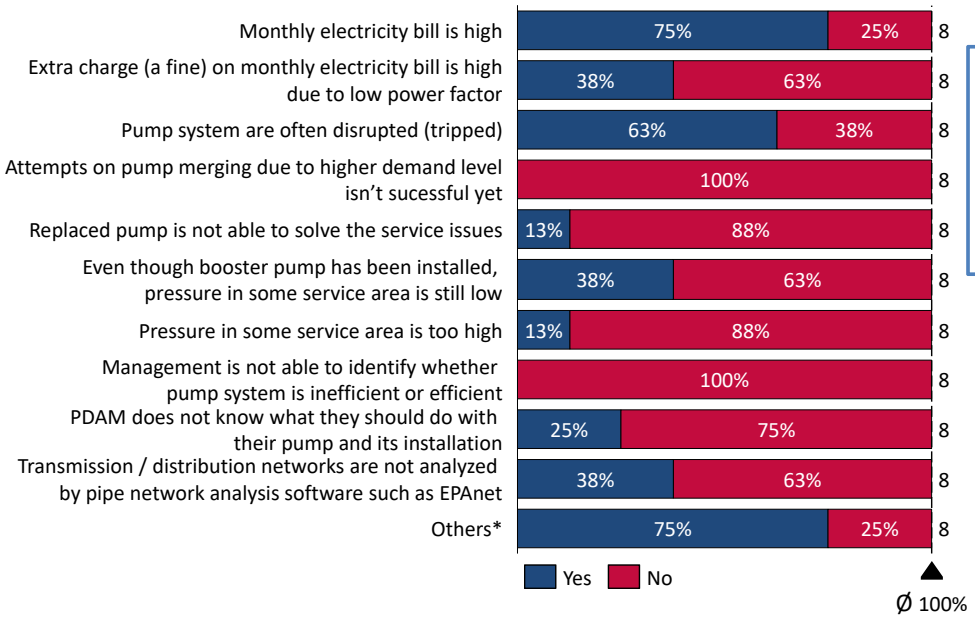
What kind of obstacles found on the implementation of COE knowledge?



Most respondents found obstacles on the implementation of COE knowledge, especially related to the equipment, budget, and human resources constraints.

Energy problems faced by respondents' PDAM

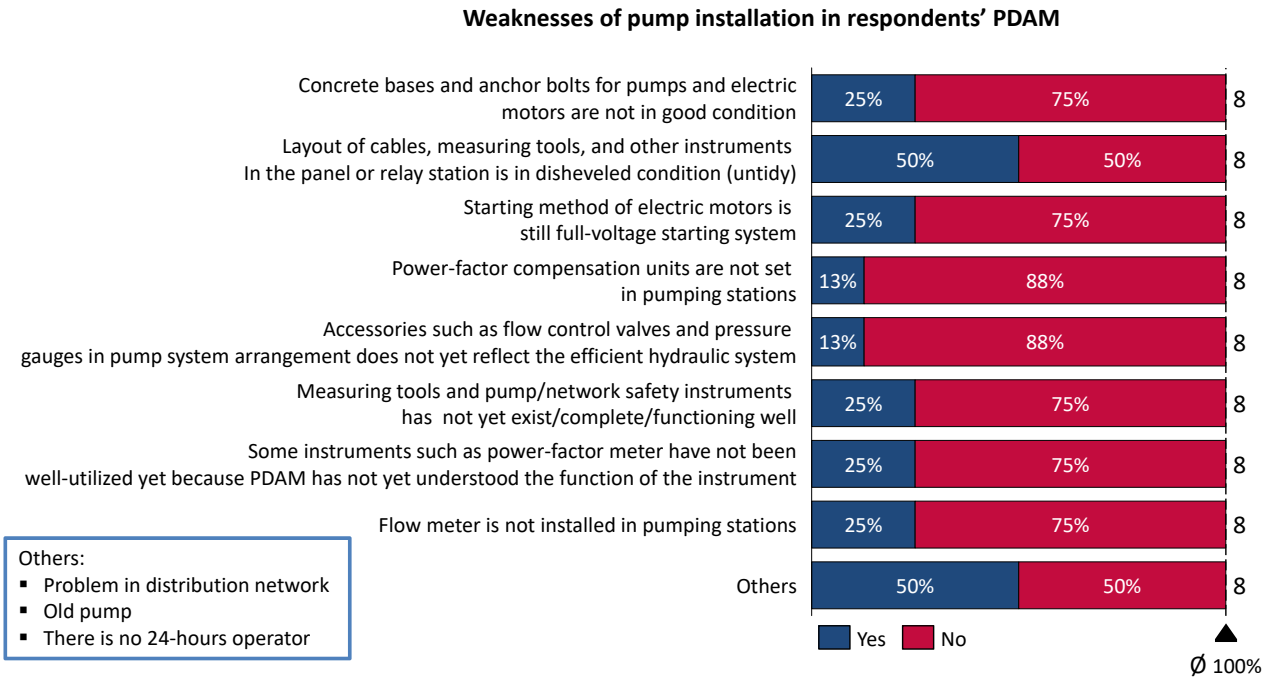
Energy problem faced by respondents' PDAM



Others:
- Low and unstable electricity voltage from PLN
- Lack of resources compared to broad service area
- Bad quality of spare part
- PDAM is required to use non-subsidies fuel → high cost

Most energy problems faced by respondents' PDAM are:
1. Monthly electricity bill is high
2. Pump system are often disrupted (tripped)

Weaknesses of pump installation in respondents' PDAM

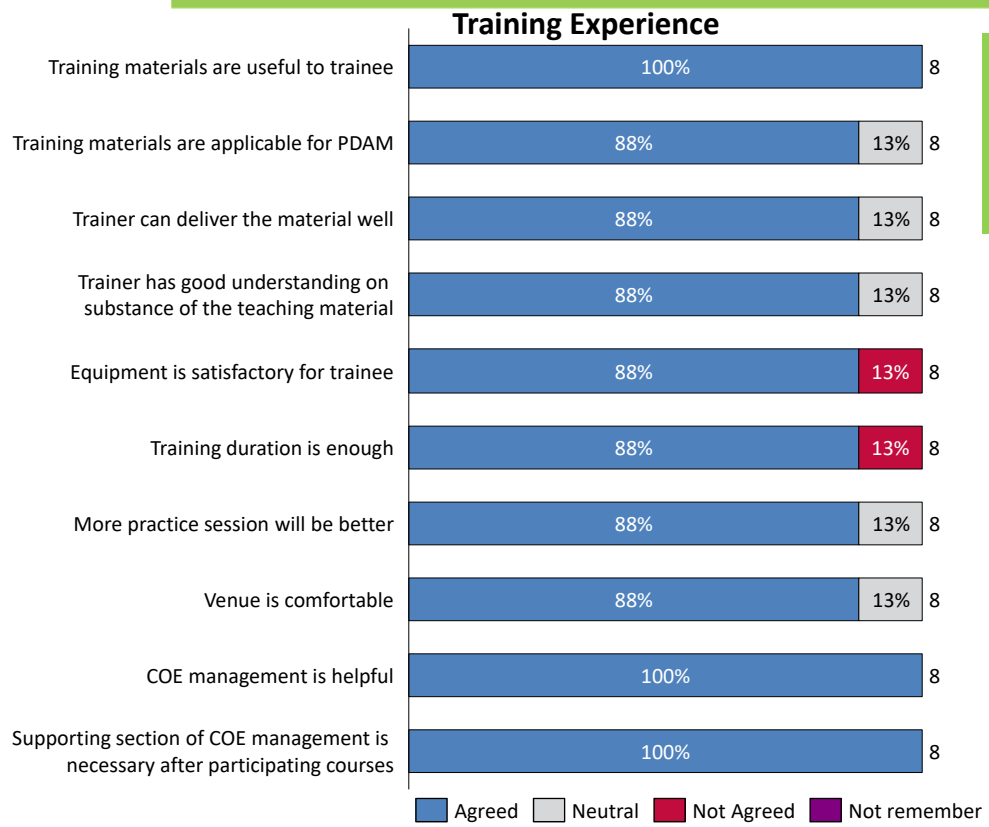


Others:
- Problem in distribution network
- Old pump
- There is no 24-hours operator

Most weaknesses of pump installation in respondents' PDAM is:

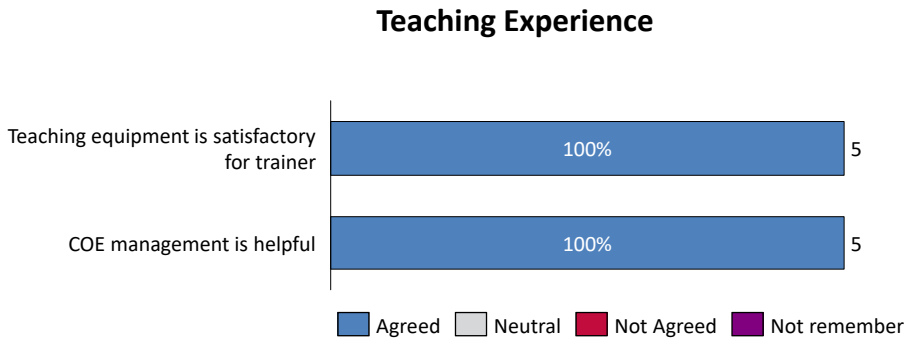
1. Layout of cables, measuring tools, and other instruments in the panel or relay station is in disheveled condition (untidy/disorganized)

Training Experience



Most respondents are satisfy with their COE training experience. However, more practice session will be better.

Teaching Experience

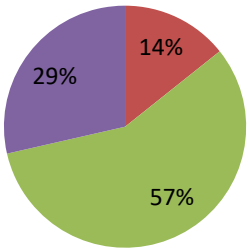


Teaching equipment is satisfactory for trainer and the COE management is helpful.

NATIONAL TRAINING – SAK ETAP

Respondent Profile

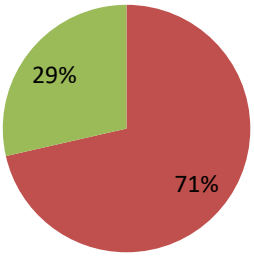
AGE



20-30	0
31-40	1
41-50	4
51-60	2
	7

Majority respondents are 41-50 years old.

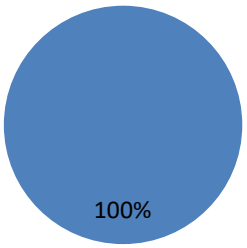
EXPERIENCE WORK IN PDAM



1-10	0
11-20	5
21-30	2
31-40	0
	7

Majority respondents have been working in PDAM for 11-20 years.

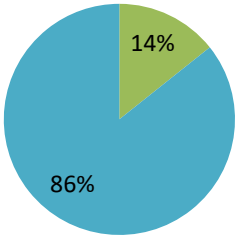
GENDER



MALE	7
FEMALE	0
	7

All the respondents are male.

GRADUATED

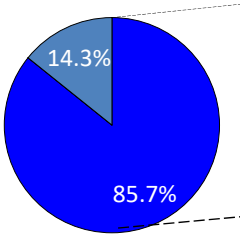


PRIMARY SCHOOL	0
JUNIOR HIGH SCHOOL	0
SENIOR HIGH SCHOOL	1
DIPLOMA	0
UNIVERSITY	6
	7

Majority respondents are graduated from university.

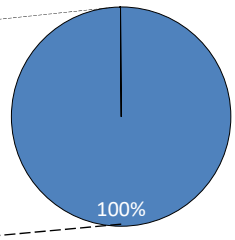
Number of respondents who have taught

Number of respondents who passed the National Training



Passed	6
Not Passed	0
Don't know	1
	7

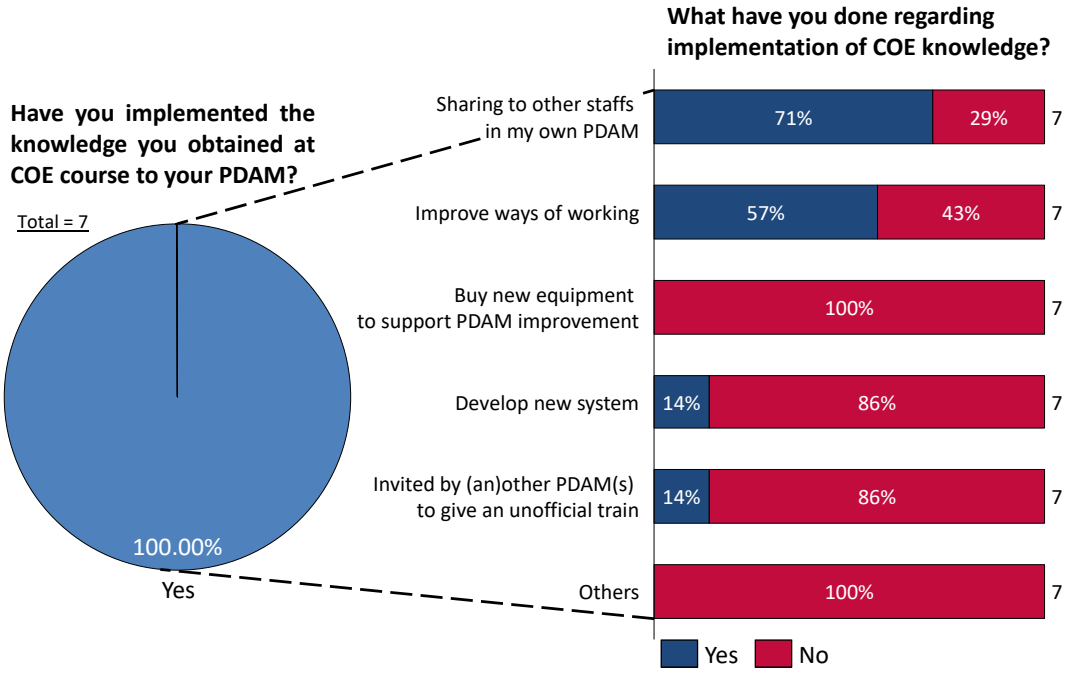
Number of passed respondents who have conducted any Provincial Training or Kab./Kota Training



Number of passed respondent who have not taught	0
Number of passed respondent who have taught	6
	6

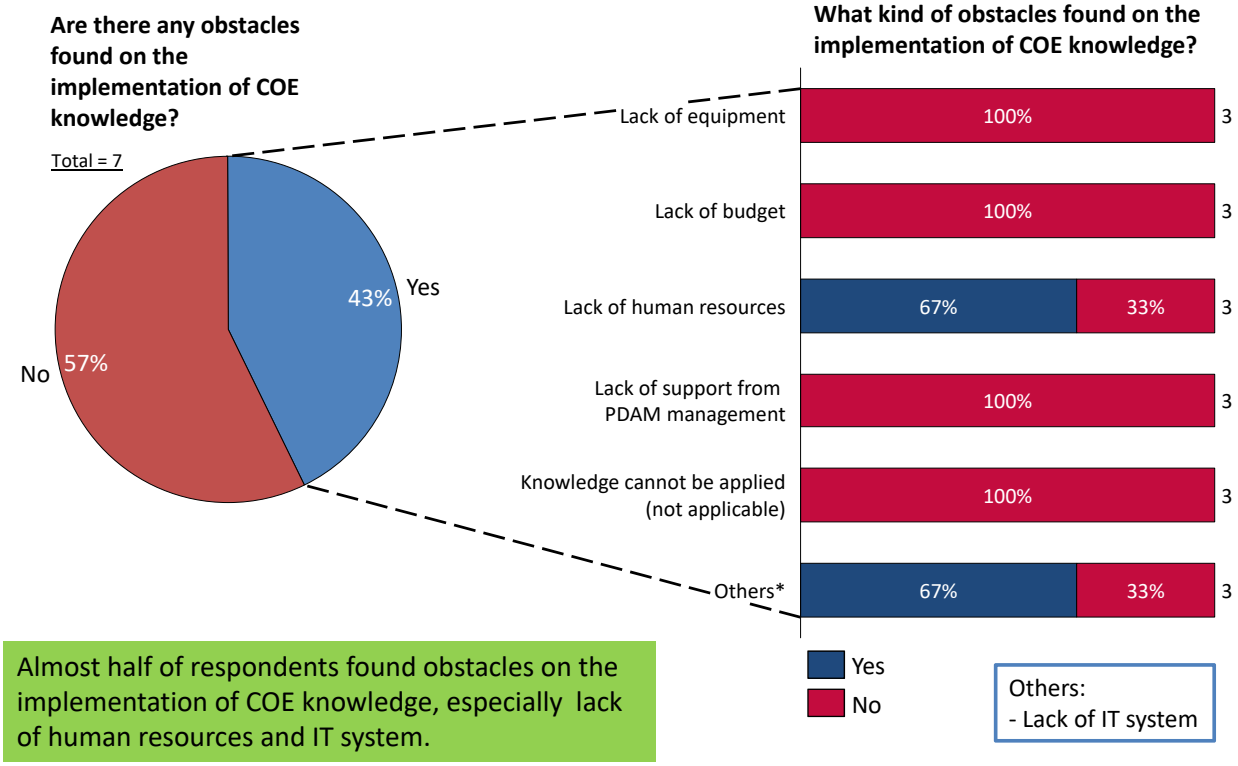
The 85.7% of respondents passed the training and all the passed respondent already taught.

Implementation of the knowledge obtained from COE



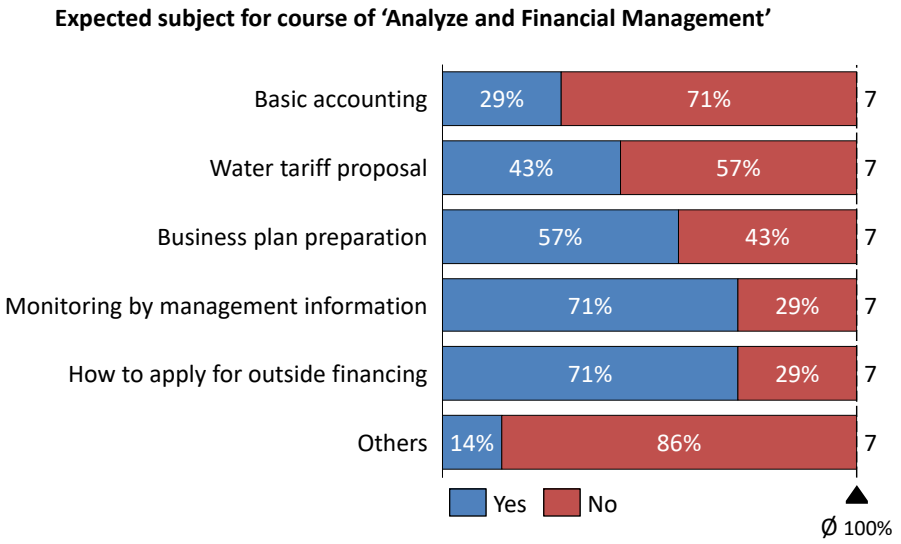
All the respondents have implemented their COE knowledge, especially by share to other staffs in their own PDAM and improve ways of working.
Some respondents already good in SAKETAP, joined COE is only for polishing their knowledge.

Obstacles found when implemented the knowledge



Almost half of respondents found obstacles on the implementation of COE knowledge, especially lack of human resources and IT system.

Expected subject for course of 'Analyze and Financial Management'

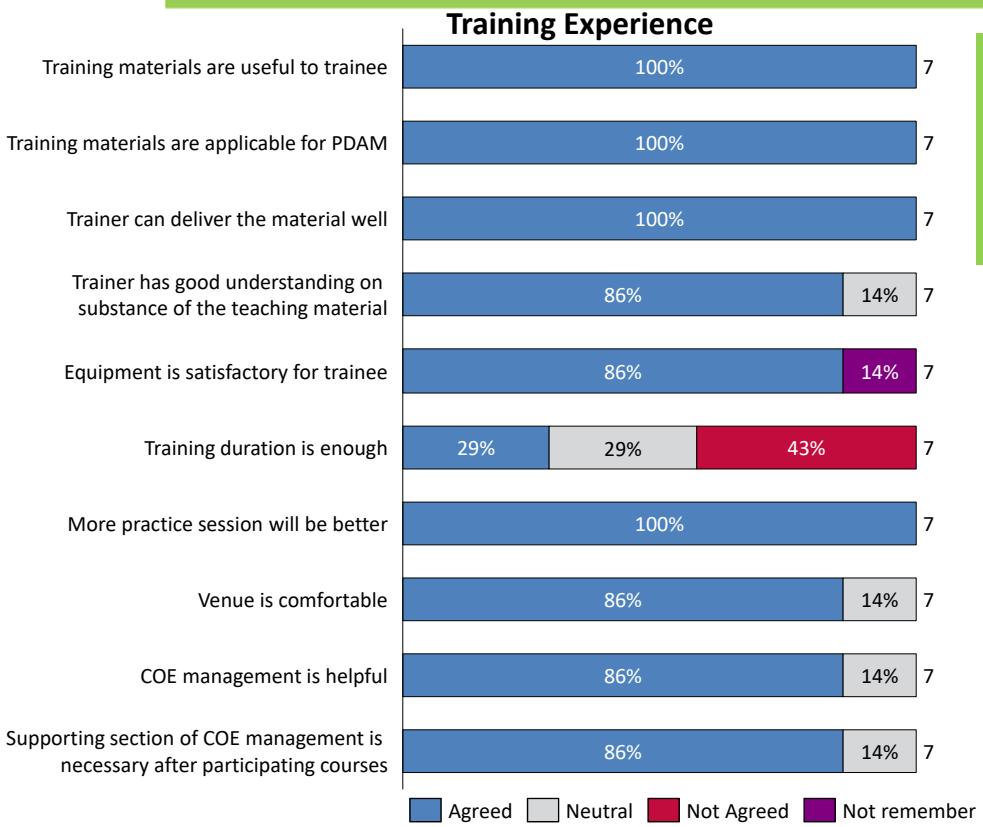


The most expected subject for course of 'Analyze and Financial Management' are:

1. Monitoring by management information
2. How to apply for outside financing
3. Business plan preparation

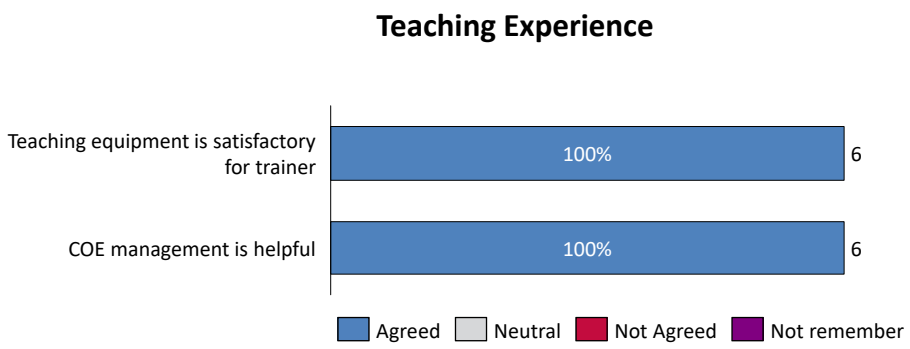
A respondent suggest a subject, i.e. preparation of performance report (operational, financial, administration)

Training Experience



Some respondents opine that current training duration is not enough. And, all respondents agreed that more practice session will be better.

Teaching Experience

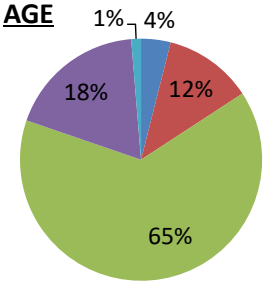


Teaching equipment is satisfactory for trainer and the COE management is helpful.

PROVINCIAL TRAINING – NRW

Respondent Profile

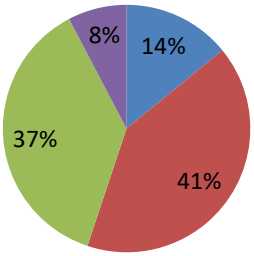
AGE



20-30	3
31-40	9
41-50	49
51-60	14
61-70	1
	76

Majority respondents are 41-50 years old.

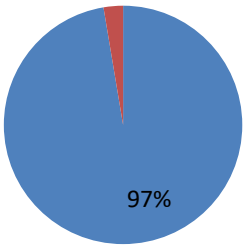
EXPERIENCE WORK IN PDAM



1-10	11
11-20	31
21-30	29
31-40	5
	76

Majority respondents have been working in PDAM for 11-20 years.

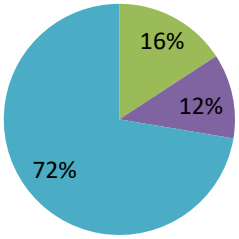
GENDER



MALE	74
FEMALE	2
	76

Majority respondents are male.

GRADUATED

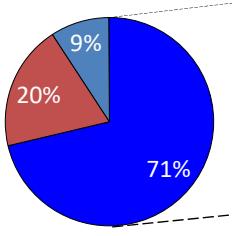


PRIMARY SCHOOL	0
JUNIOR HIGH SCHOOL	0
SENIOR HIGH SCHOOL	0
DIPLOMA	1
UNIVERSITY	9
	10

Majority respondents are graduated from university.

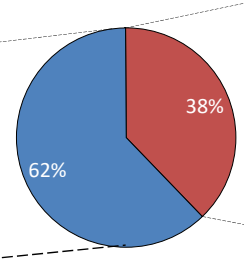
Number of respondents who have taught

Number of respondents who passed the Provincial Training



Passed	54
Not Passed	15
Don't know	7
	76

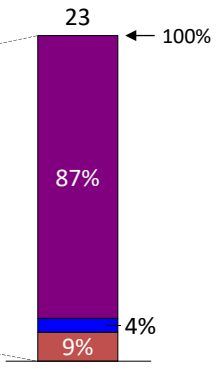
Number of passed respondents who have conducted any Kab,/Kota Training



Number of passed respondent who have not taught	23
Number of passed respondent who have taught	38
	61

*incl. don't know whether passed or not passed

Reason of respondent who have not taught

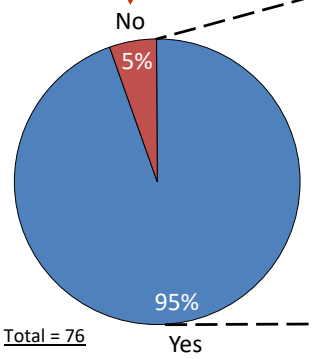


- Didn't receive any invitation from COE Management
- Receive invitation but didn't get permission from PDAM Management
- Receive invitation but the timing was not conveniently arranged to me
- Others

Only 62% of respondents who passed the training and who don't know the status of their test result already taught. The remaining 38% mostly have not taught because they did not receive any invitation to teach from COE Management.

Implementation of the knowledge obtained from COE

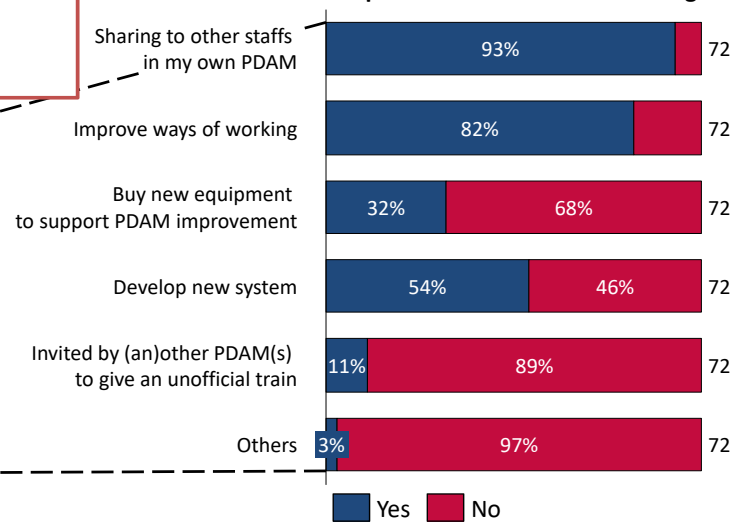
The 5% of respondents have not implemented their knowledge due to:
- Lack of equipment (2 of 4 respondents)
- Lack of budget (2 of 4 respondents)
- Lack of human resources (1 of 4 respondents)
- Lack of support from PDAM management (1 of 4 respondents)
- Knowledge cannot be applied (1 of 4 respondents)



Total = 76

Have you implemented the knowledge you obtained at COE course to your PDAM?

What have you done regarding implementation of COE knowledge?



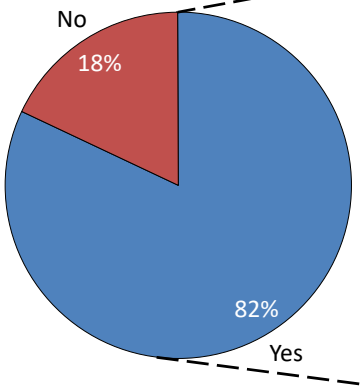
Others:
- Planning on developing DMA
- Establish NRW team

Most respondents have implemented their COE knowledge, especially by share to other staffs in their own PDAM and improve the ways of work.

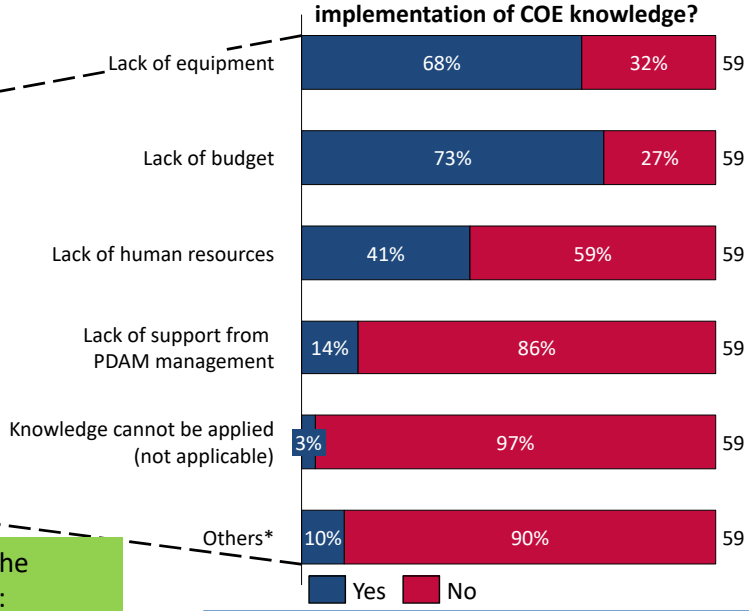
Obstacles found when implemented the knowledge

Are there any obstacles found on the implementation of COE knowledge?

Total = 72



What kind of obstacles found on the implementation of COE knowledge?

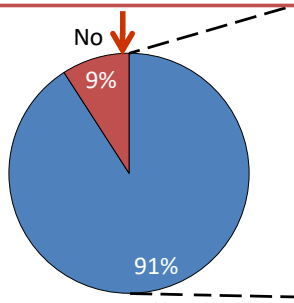


Others:
- Lack of time
- Didn't know how to find non-physical leakage
- Lack of commitment
- The head of division doesn't have deep understanding about NRW

Most respondents found obstacles on the implementation of COE knowledge, i.e.:
1. Lack of budget
2. Lack of equipment
3. Lack of human resources

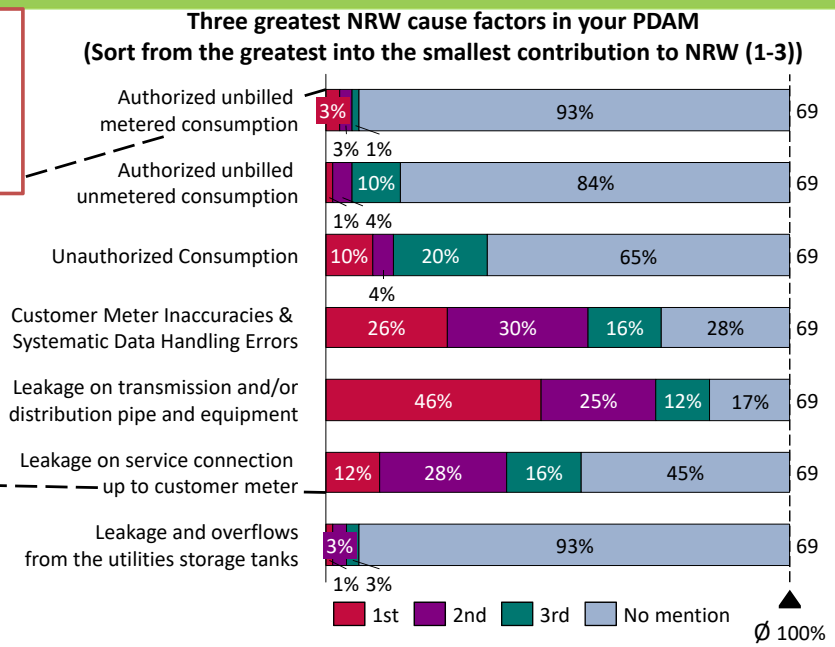
Greatest NRW cause factors in respondents' PDAM

9% of respondents cannot sort their PDAM NRW cause factors because:
- Lack of equipment (2 of 7 respondents);
- Didn't understand how to do the identification (2 of 7 respondents);
- Others (have not be implemented yet, his position is not related, no data)



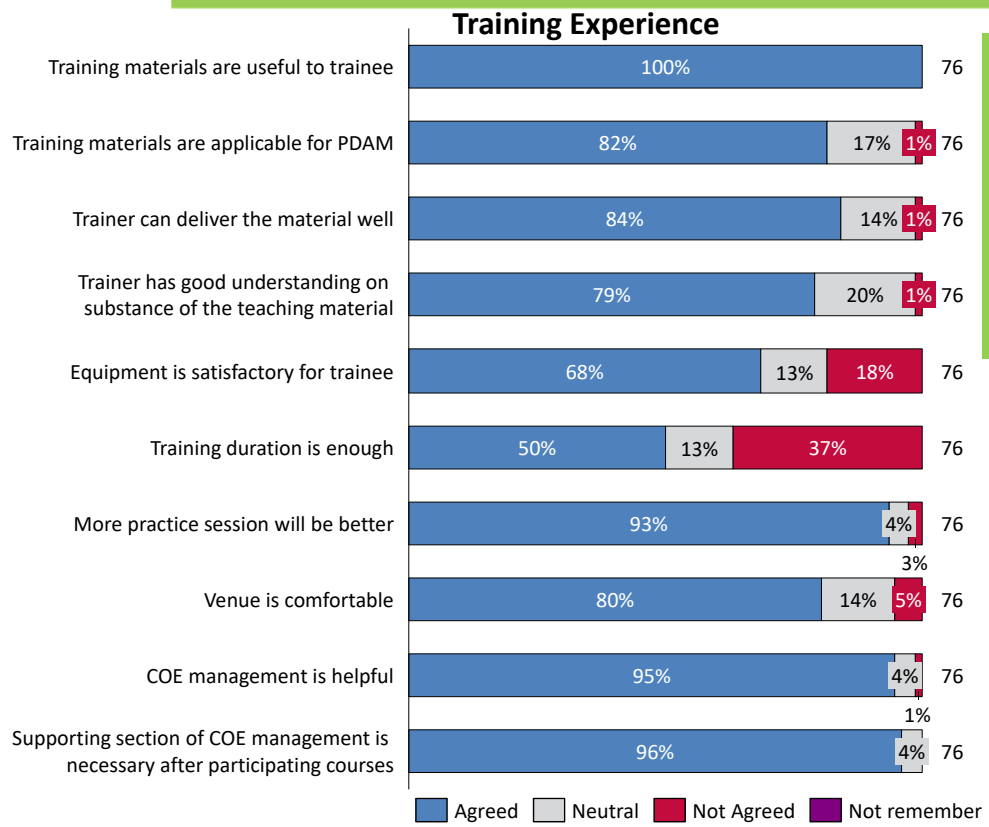
Total = 76

Could you put in the right order the greatest NRW cause factors in your PDAM?



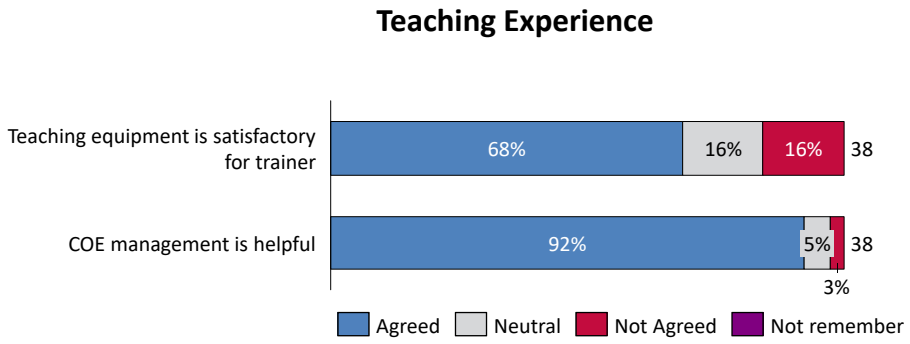
Most respondents know the greatest NRW cause factors in their PDAM. The result of majority respondents sorting are:
1. Leakage on transmission and/or distribution pipe and equipment
2. Customer Meter Inaccuracies & Systematic Data Handling Errors
3. Leakage on service connection up to customer meter

Training Experience



Some respondents opine that current training duration is not enough and the equipment isn't satisfactory. Most respondents also agreed that more practice session will be better.

Teaching Experience

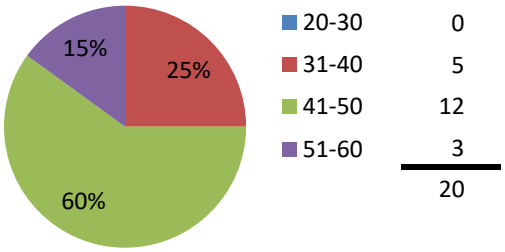


Teaching equipment is quite satisfactory for trainer and the COE management is helpful.

PROVINCIAL TRAINING – EE

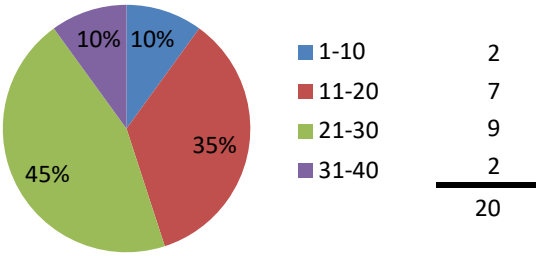
Respondent Profile

AGE



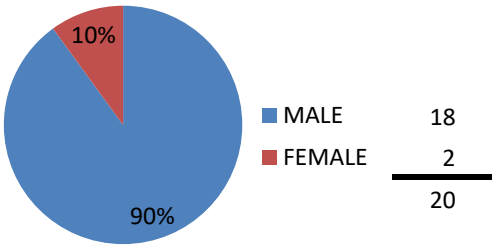
Majority respondents are 41-50 years old.

EXPERIENCE WORK IN PDAM



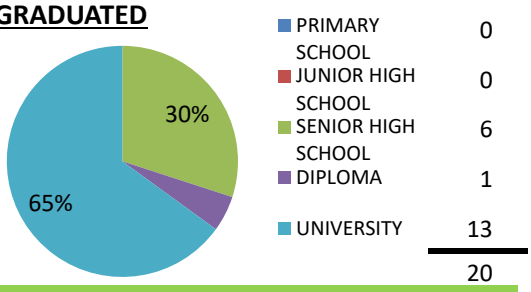
Majority respondents have been working in PDAM for 21-30 years.

GENDER



Most respondents are male.

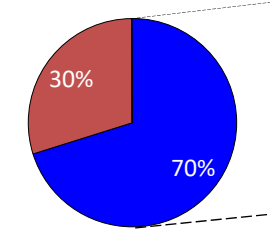
GRADUATED



Majority respondents are graduated from university.

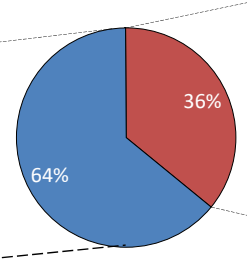
Number of respondents who have taught

Number of respondents who passed the Provincial Training



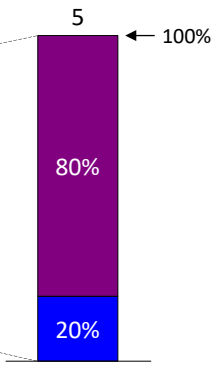
Passed 14
Not Passed 6
Don't know 0
20

Number of passed respondents who have conducted any Kab./Kota Training



Number of passed respondent who have not taught 5
Number of passed respondent who have taught 9
14

Reason of respondent who have not taught

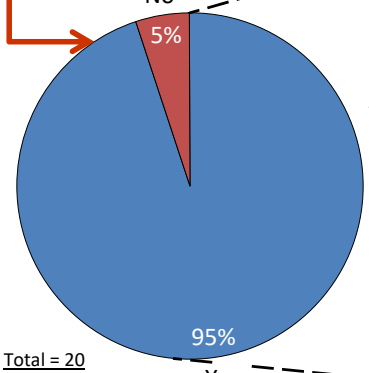


Didn't receive any invitation from COE Management
Receive invitation but didn't get permission from PDAM Management
Receive invitation but the timing was not conveniently arranged to me
Others

Only 64% of respondents who passed the training already taught. The remaining 36% mostly have not taught because they did not receive any invitation to teach from COE Management.

Implementation of the knowledge obtained from COE

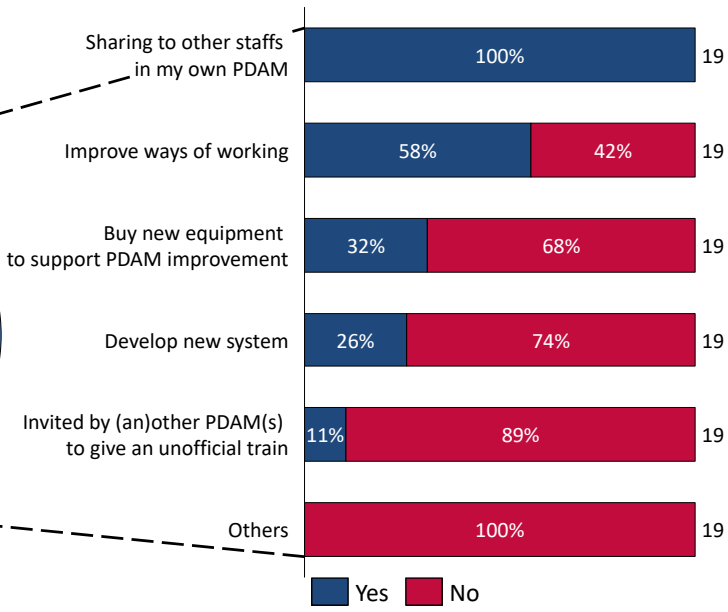
A respondent didn't implement the knowledge because he is not a PDAM staff anymore. Currently, his position is committee.



Total = 20

Have you implemented the knowledge you obtained at COE course to your PDAM?

What have you done regarding implementation of COE knowledge?

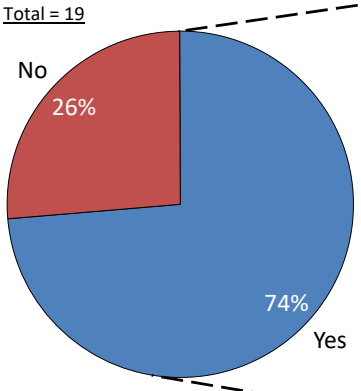


Most respondents have implemented their COE knowledge, especially by share to other staffs in their own PDAM and improve ways of working.

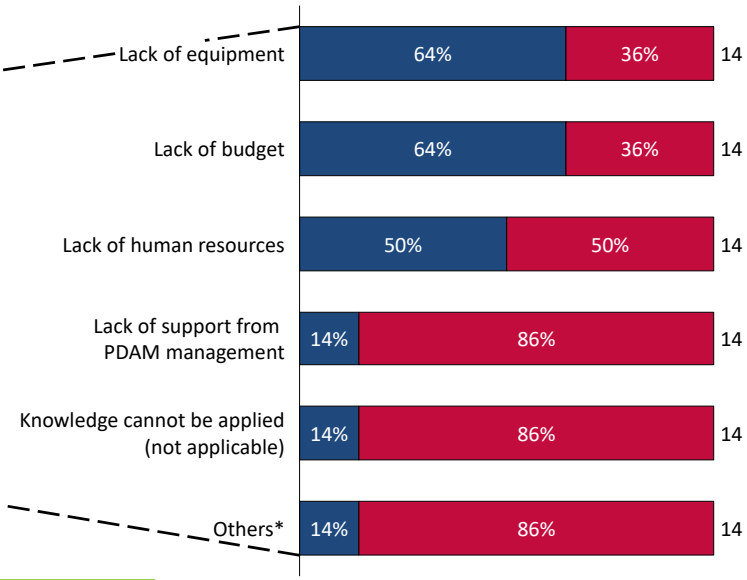
Obstacles found when implemented the knowledge

Are there any obstacles found on the implementation of COE knowledge?

Total = 19



What kind of obstacles found on the implementation of COE knowledge?

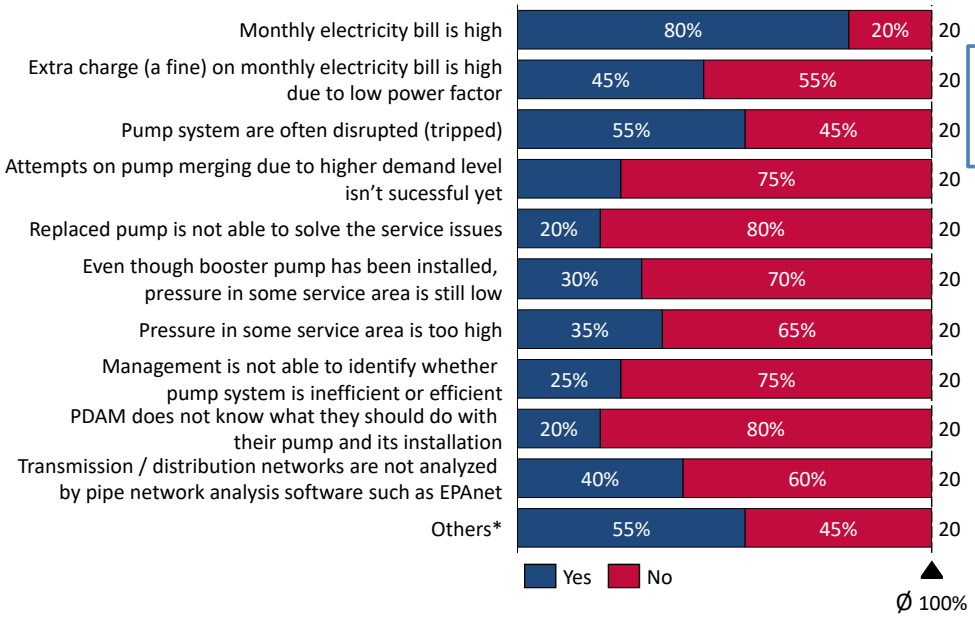


Others:
- Difficulty on real implementation
- Old installation

Most respondents found obstacles on the implementation of COE knowledge, especially related to the equipment, budget, and human resources constraints.

Energy problems faced by respondents' PDAM

Energy problem faced by respondents' PDAM

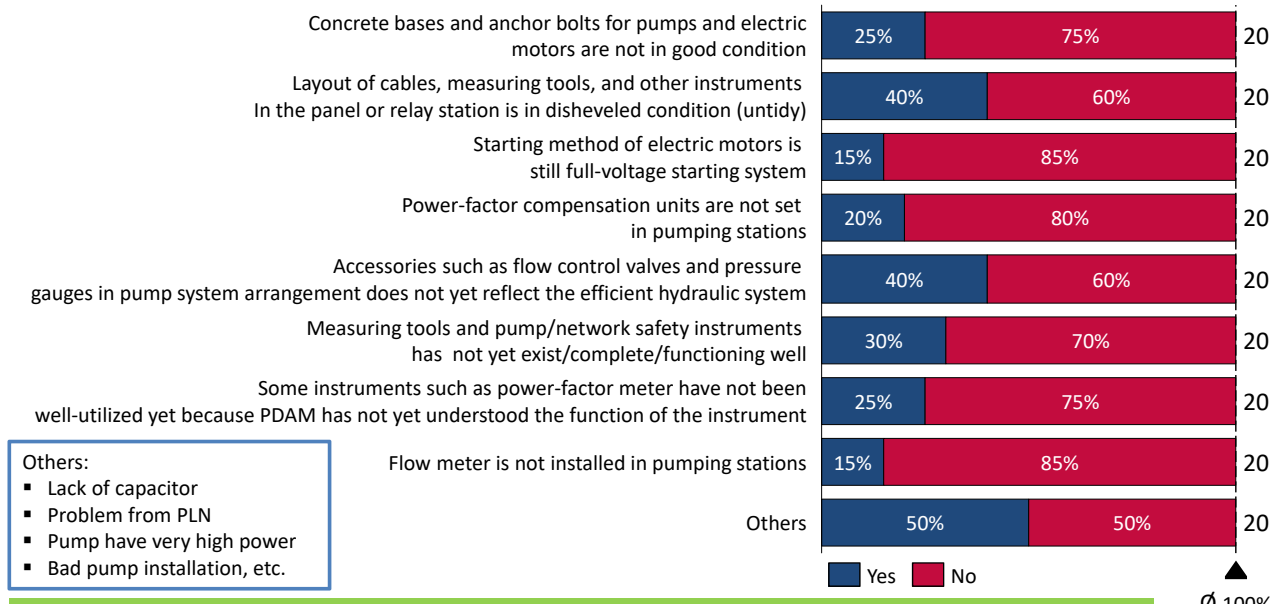


Others:
- Problem from PLN (off, unstable voltage)
- Still use analog panel

Most energy problems faced by respondents' PDAM are:
1. Monthly electricity bill is high
2. Pump system are often disrupted (tripped)

Weaknesses of pump installation in respondents' PDAM

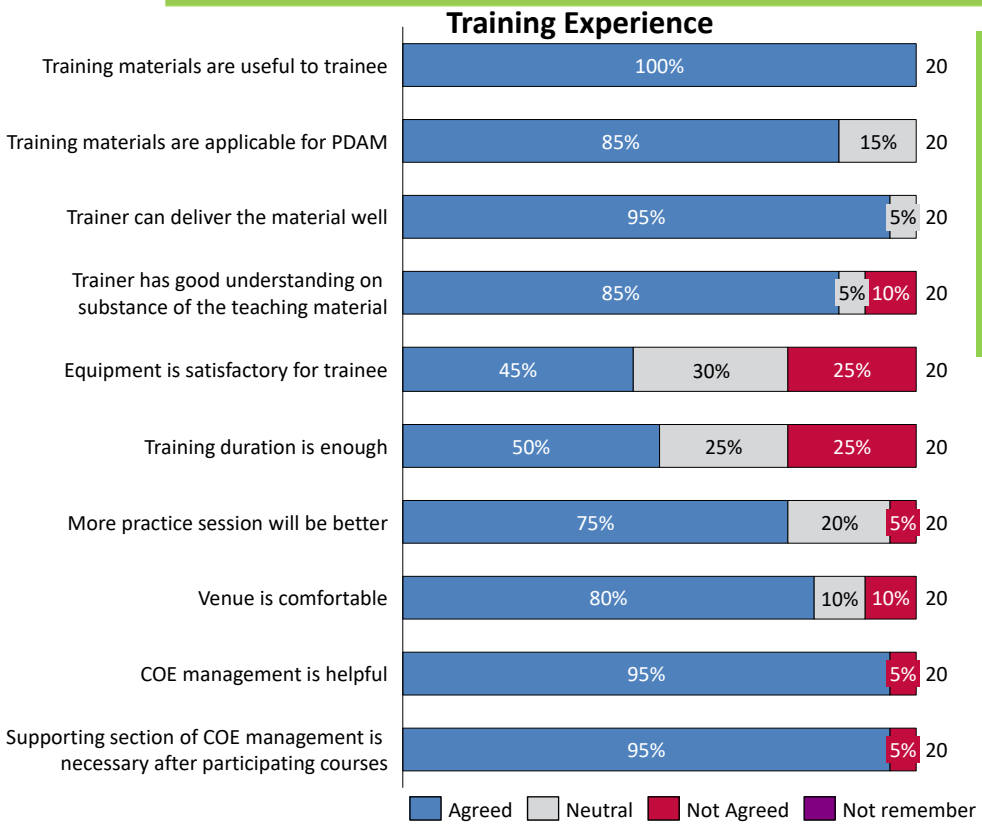
Weaknesses of pump installation in respondents' PDAM



Others:
- Lack of capacitor
- Problem from PLN
- Pump have very high power
- Bad pump installation, etc.

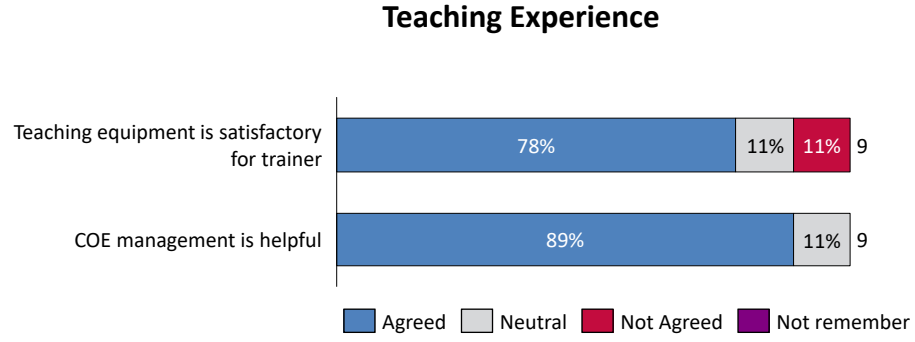
Most weaknesses of pump installation in respondents' PDAM is:
1. Layout of cables, measuring tools, and other instruments in the panel or relay station is in disheveled condition (untidy/disorganized)
2. Accessories such as flow control valves and pressure gauges in pump system arrangement does not yet reflect the efficient hydraulic system

Training Experience



Some respondents opine that current training duration is not enough and the equipment isn't satisfactory. And, majority respondents also agreed that more practice session will be better.

Teaching Experience

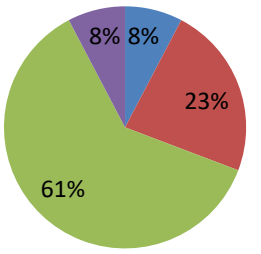


Teaching equipment is satisfactory for trainer and the COE management is helpful. However, improvement on teaching equipment will be good.

PROVINCIAL TRAINING – SAK ETAP

Respondent Profile

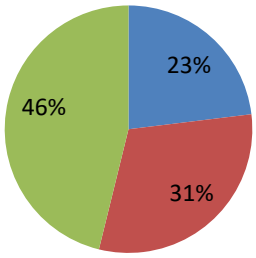
AGE



20-30	1
31-40	3
41-50	8
51-60	1
	13

Majority respondents are 41-50 years old.

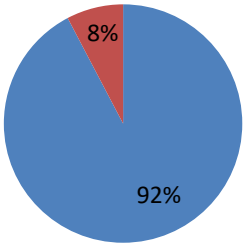
EXPERIENCE WORK IN PDAM



1-10	3
11-20	4
21-30	6
31-40	0
	13

Majority respondents have been working in PDAM for 21-30 years.

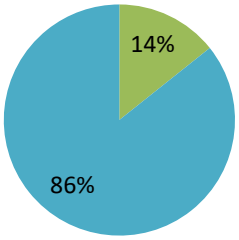
GENDER



MALE	12
FEMALE	1
	13

Most respondents are male.

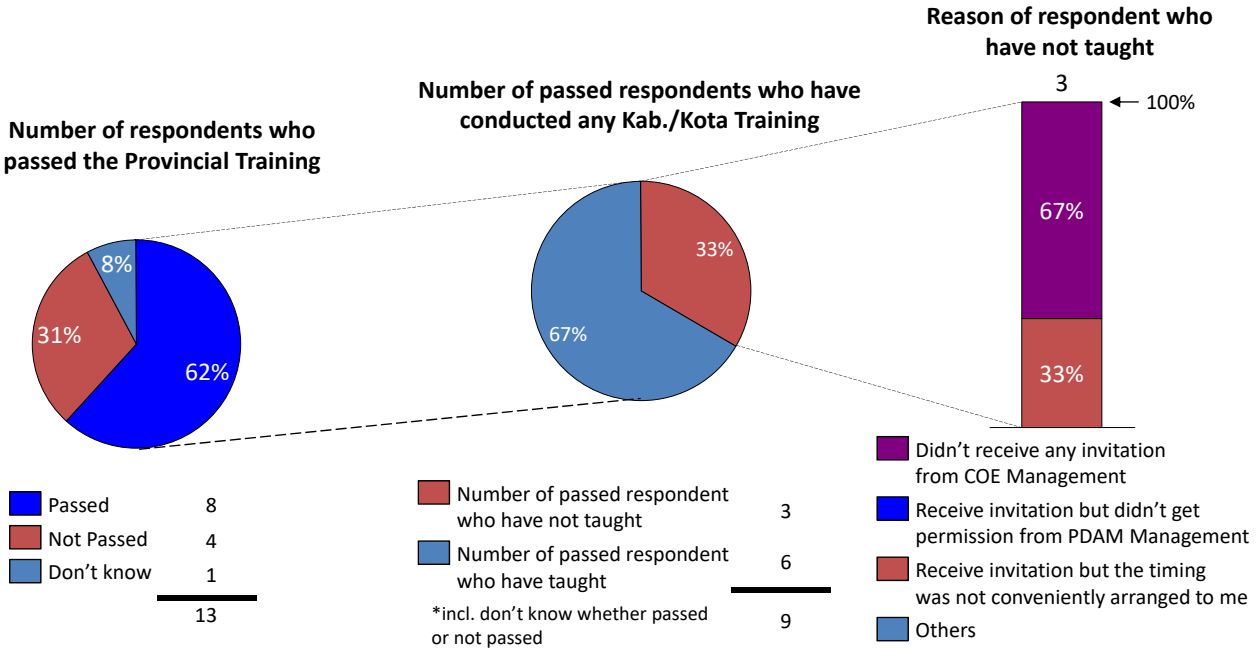
GRADUATED



PRIMARY SCHOOL	0
JUNIOR HIGH SCHOOL	0
SENIOR HIGH SCHOOL	1
DIPLOMA	0
UNIVERSITY	12
	13

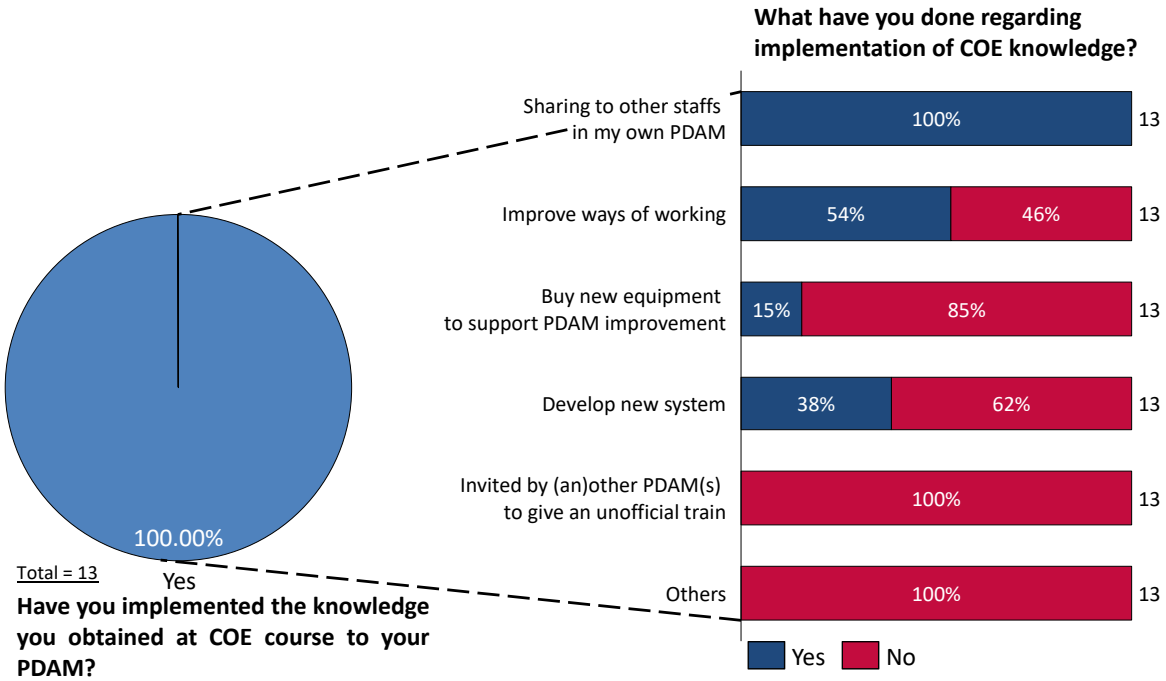
Majority respondents are graduated from university.

Number of respondents who have taught



Only 67% of respondents who passed the training and who don't know the status of their test result already taught. The remaining 33% mostly have not taught because they did not receive any invitation to teach from COE Management.

Implementation of the knowledge obtained from COE

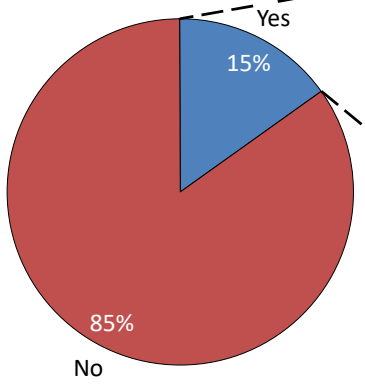


All the respondents have implemented their COE knowledge, especially by share to other staffs in their own PDAM and improve ways of working.
Some respondents already good in SAKETAP, joined COE is only for polishing their knowledge.

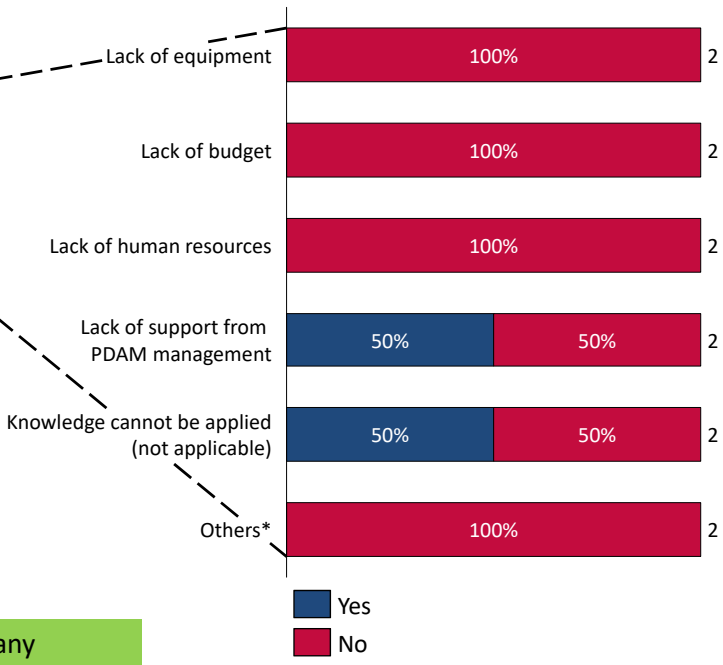
Obstacles found when implemented the knowledge

Are there any obstacles found on the implementation of COE knowledge?

Total = 13



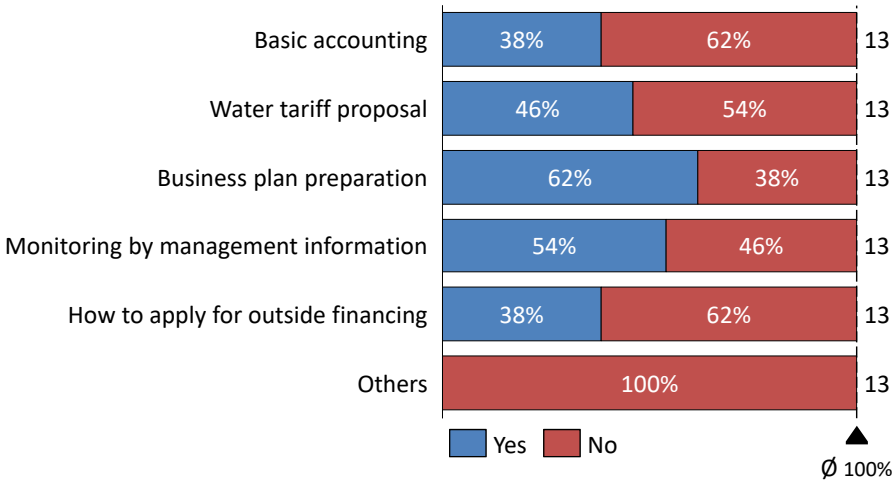
What kind of obstacles found on the implementation of COE knowledge?



Most of the respondents have not found any obstacle when implemented the knowledge.

Expected subject for course of 'Analyze and Financial Management'

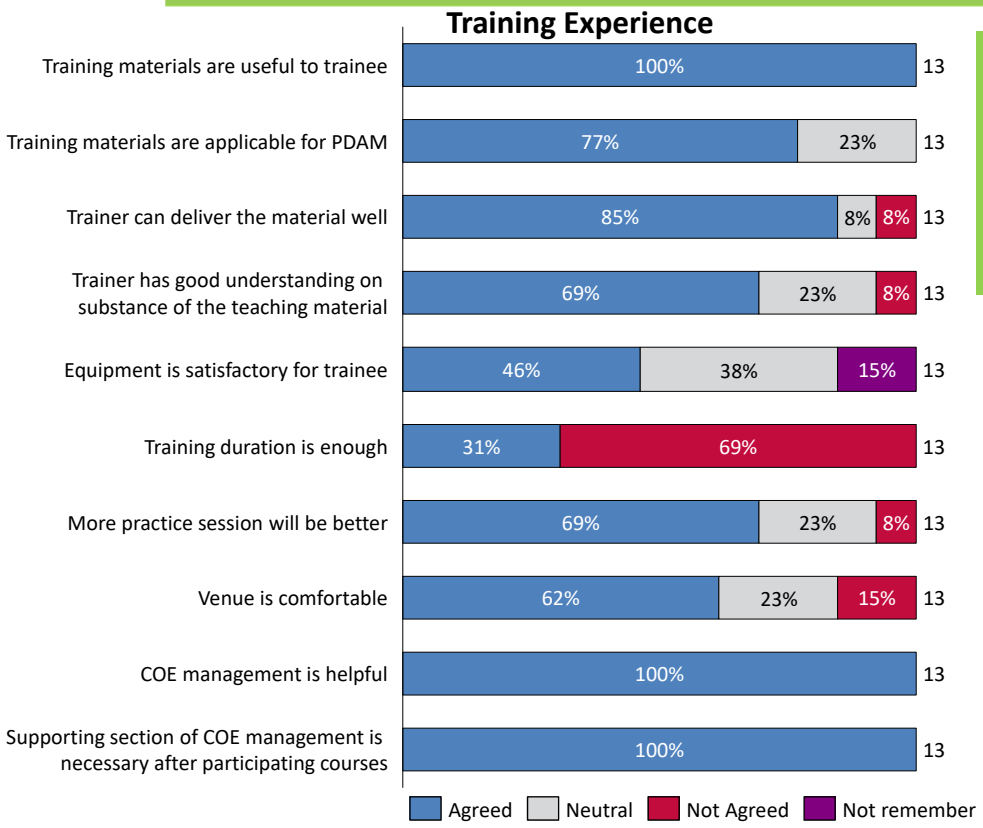
Expected subject for course of 'Analyze and Financial Management'



The most expected subject for course of 'Analyze and Financial Management' are:

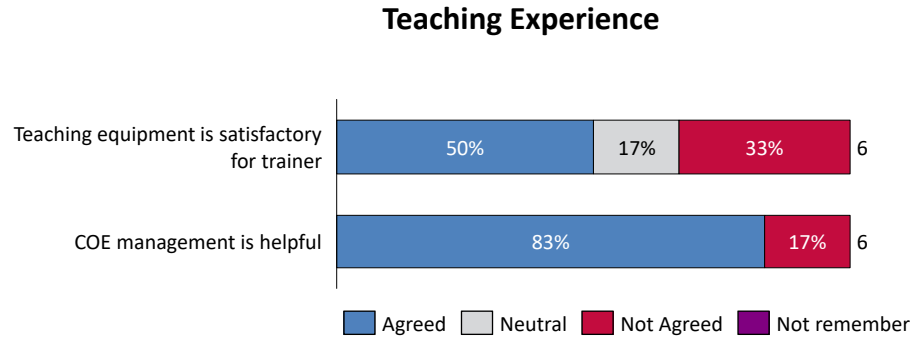
1. Business plan preparation
2. Monitoring by management information
3. Water tariff proposal

Training Experience



The respondents opine that current training duration is not enough. And, majority respondents also agreed that more practice session will be better.

Teaching Experience

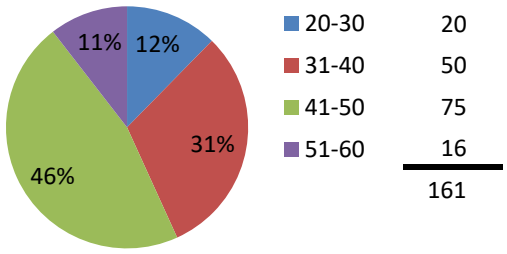


Teaching equipment is not satisfactory for some trainer. However, the COE management is relatively helpful.

KABUPATEN/KOTA TRAINING – NRW

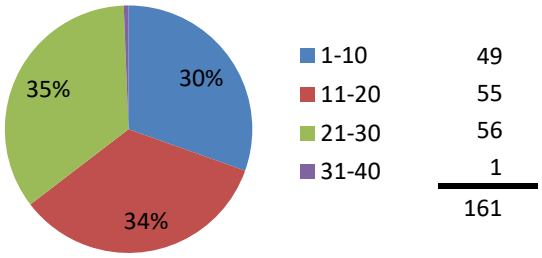
Respondent Profile

AGE



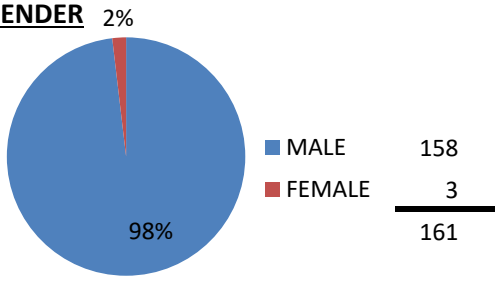
Majority respondents are 41-50 years old.

EXPERIENCE WORK IN PDAM



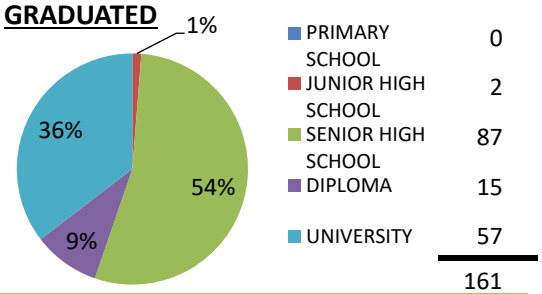
Majority respondents have been working in PDAM for 21-30 years.

GENDER



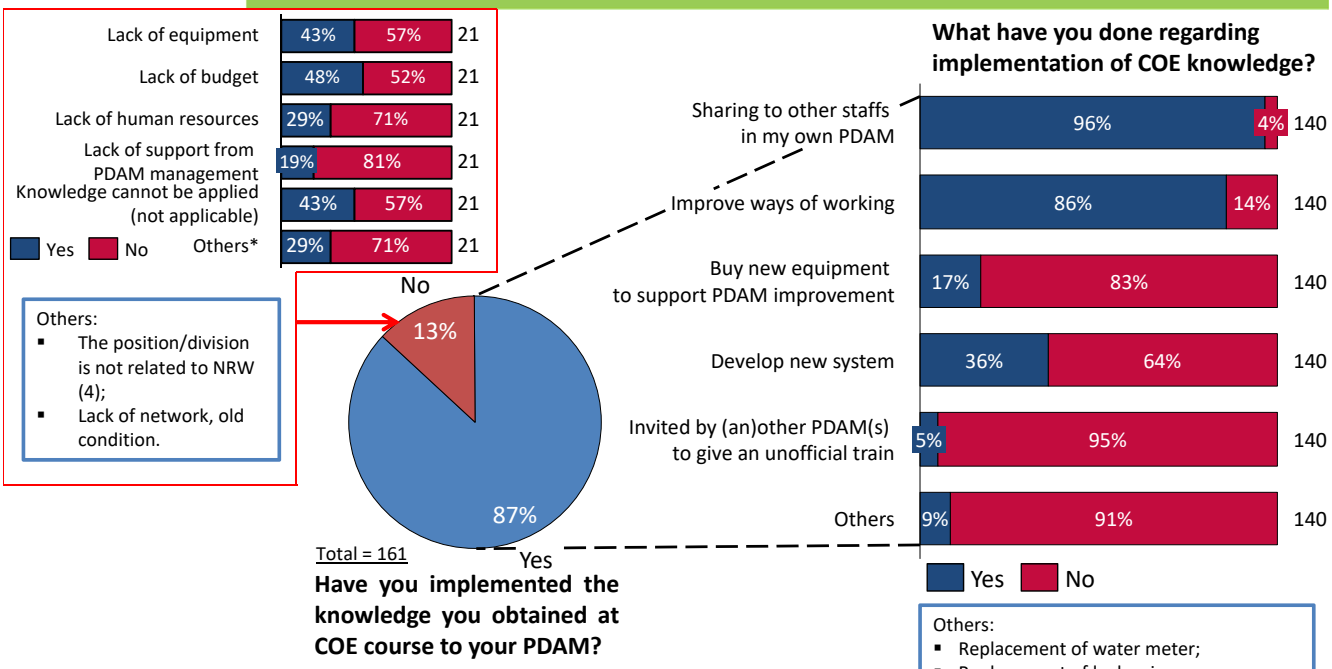
Majority respondents are male.

GRADUATED



Majority respondents are graduated from senior high school.

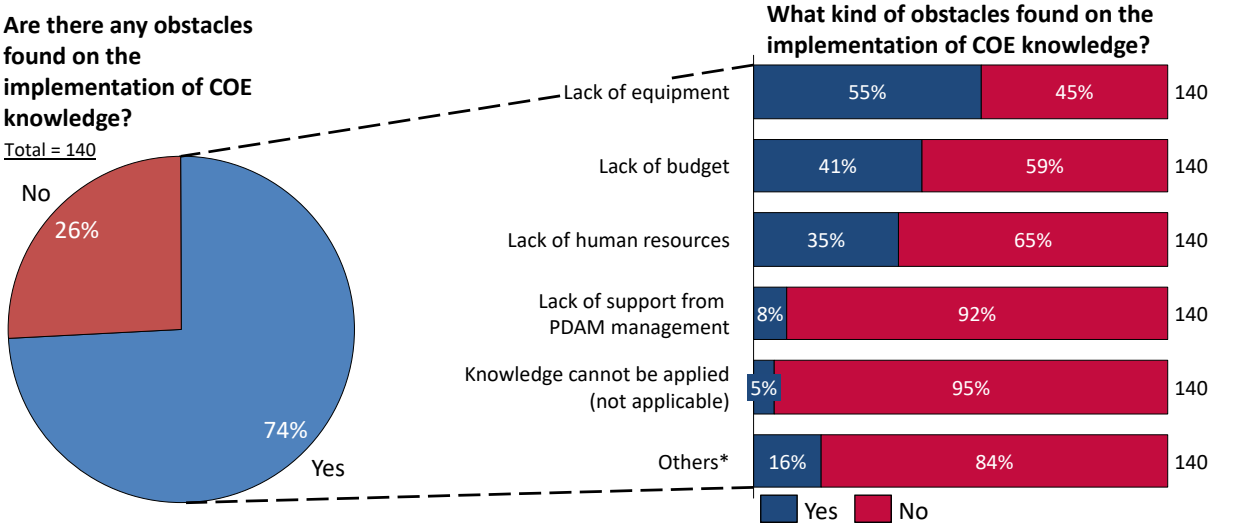
Implementation of the knowledge obtained from COE



Most respondents have implemented their COE knowledge, especially by share to other staffs in their own PDAM and improve the ways of work.

The other respondents cannot implement the knowledge because lack of budget and equipment as well as the knowledge cannot (or difficult to) be applied.

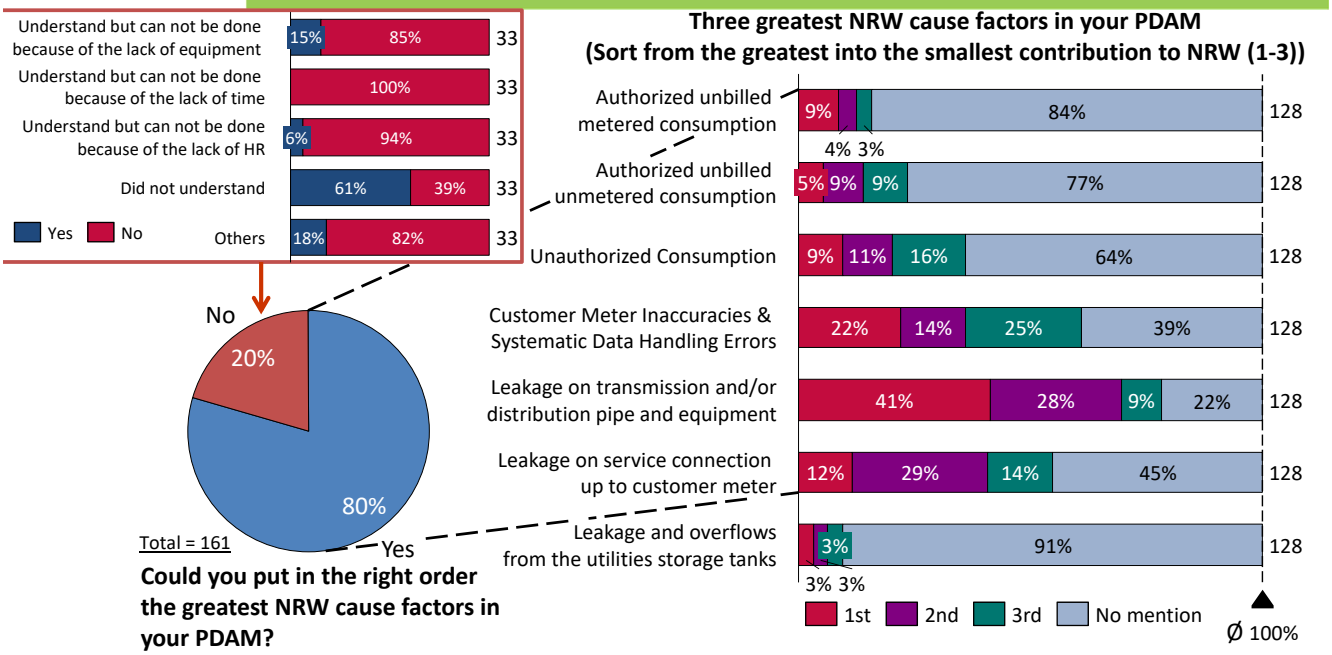
Obstacles found when implemented the knowledge



Most respondents found obstacles on the implementation of COE knowledge, i.e.:

1. Lack of equipment
2. Lack of budget
3. Lack of human resources

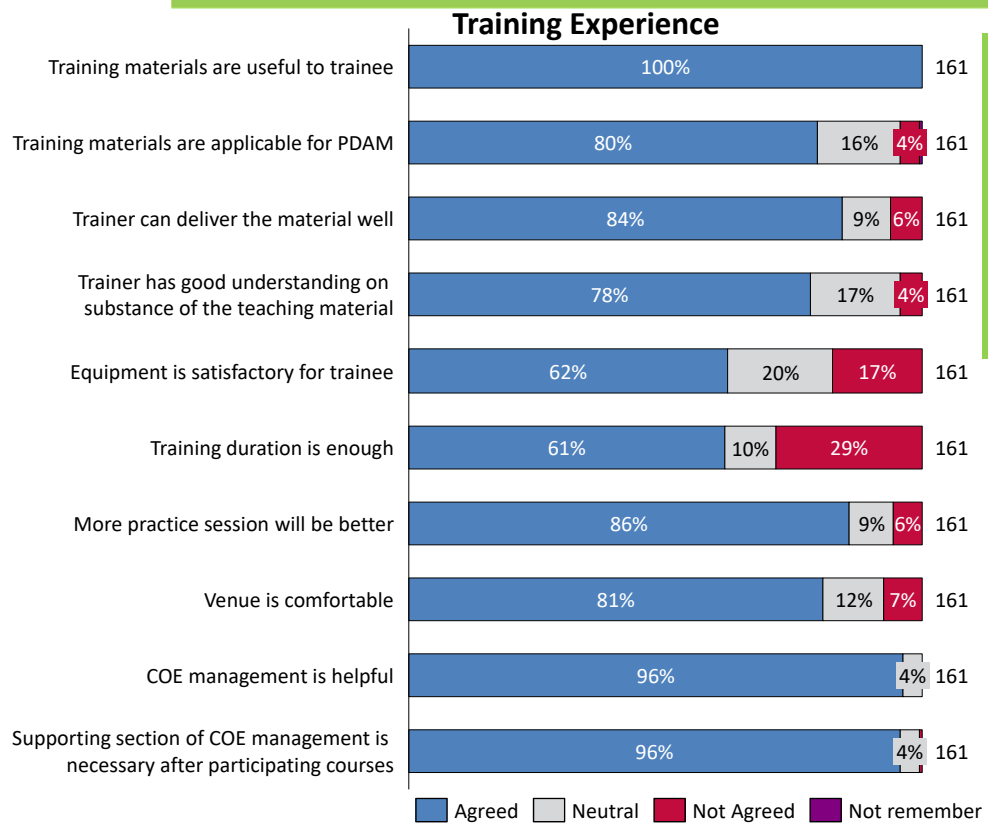
Greatest NRW cause factors in respondents' PDAM



Most respondents know the greatest NRW cause factors in their PDAM. The result of majority respondents sorting are:

1. Leakage on transmission and/or distribution pipe and equipment
2. Customer Meter Inaccuracies & Systematic Data Handling Errors
3. Leakage on service connection up to customer meter

Training Experience

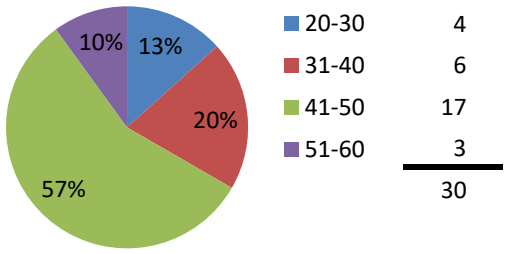


Some respondents opine that current training duration is not enough and the equipment isn't satisfactory. Majority respondents also agreed that more practice session will be better.

KABUPATEN/KOTA – EE

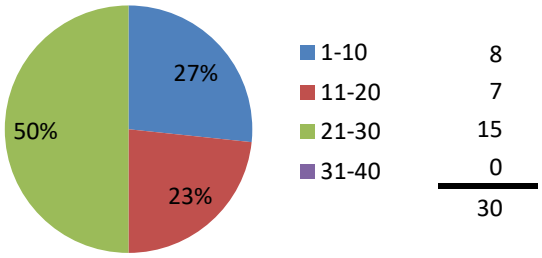
Respondent Profile

AGE



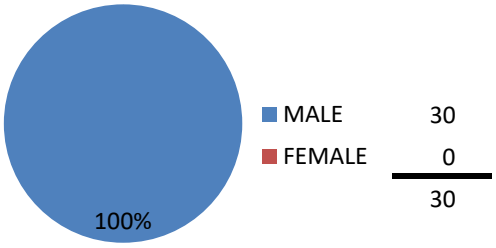
Majority respondents are 41-50 years old.

EXPERIENCE WORK IN PDAM



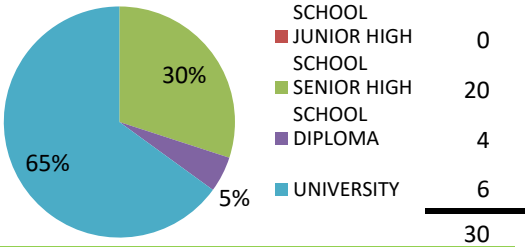
Majority respondents have been working in PDAM for 21-30 years.

GENDER



All respondents are male.

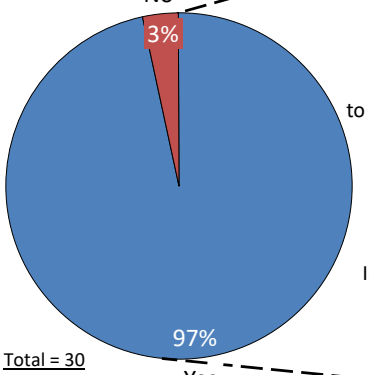
GRADUATED



Majority respondents are graduated from senior high school.

Implementation of the knowledge obtained from COE

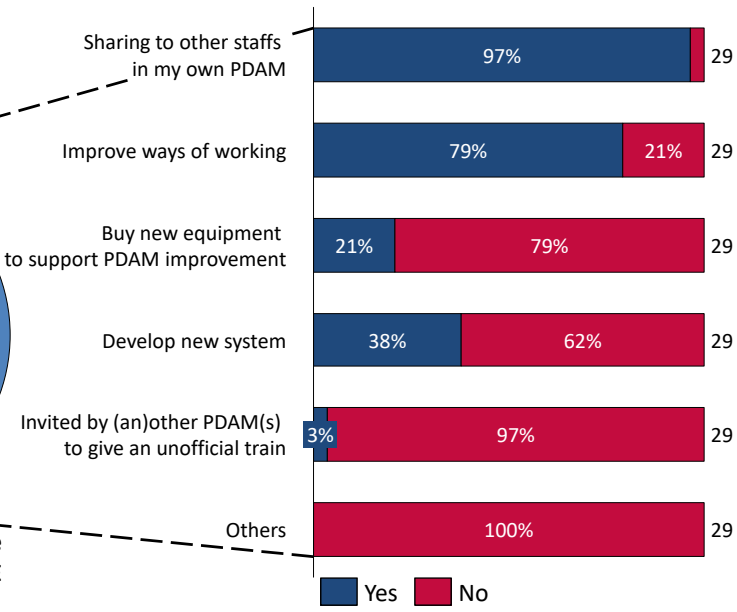
A respondent didn't implement the knowledge due to lack of budget.



Total = 30

Have you implemented the knowledge you obtained at COE course to your PDAM?

What have you done regarding implementation of COE knowledge?

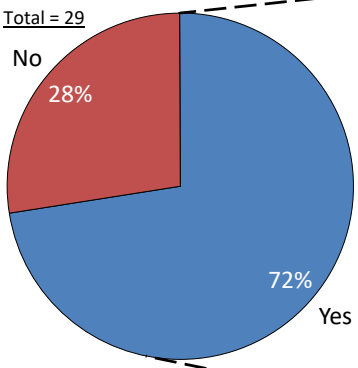


Most respondents have implemented their COE knowledge, especially by share to other staffs in their own PDAM and improve ways of working.

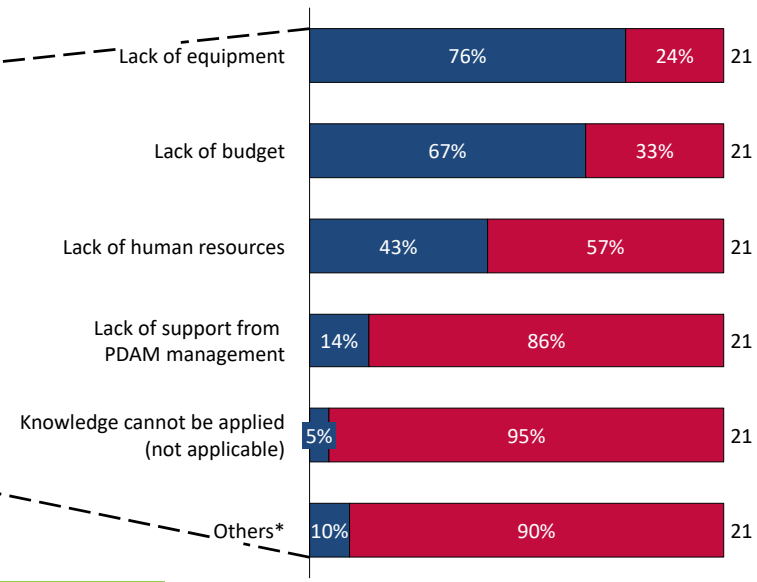
Obstacles found when implemented the knowledge

Are there any obstacles found on the implementation of COE knowledge?

Total = 29



What kind of obstacles found on the implementation of COE knowledge?

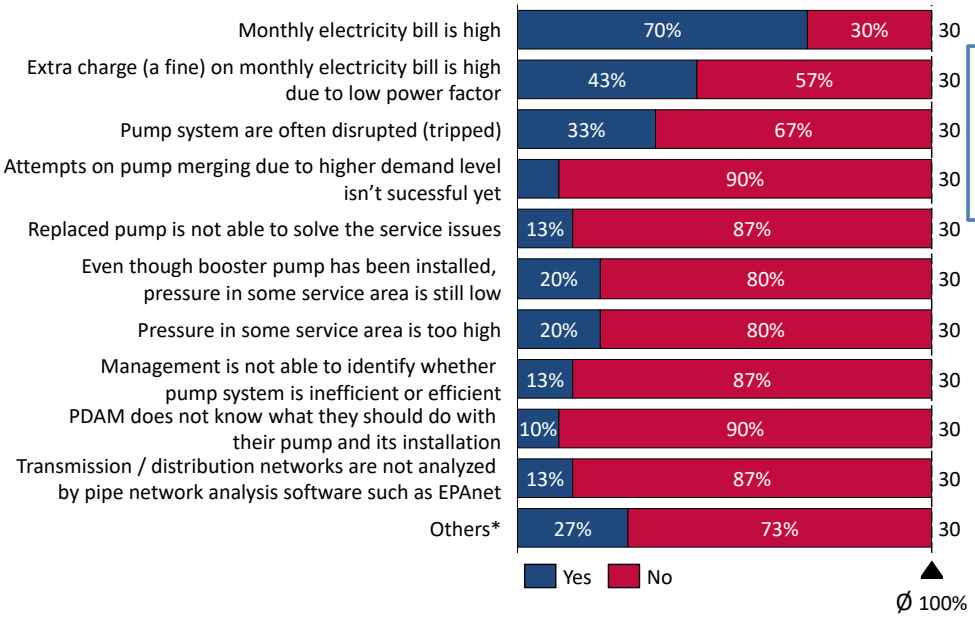


Others:
- Water distribution issues;
- Lack of coordination with the supervisor.

Most respondents found obstacles on the implementation of COE knowledge, especially related to the equipment, budget, and human resources constraints.

Energy problems faced by respondents' PDAM

Energy problem faced by respondents' PDAM

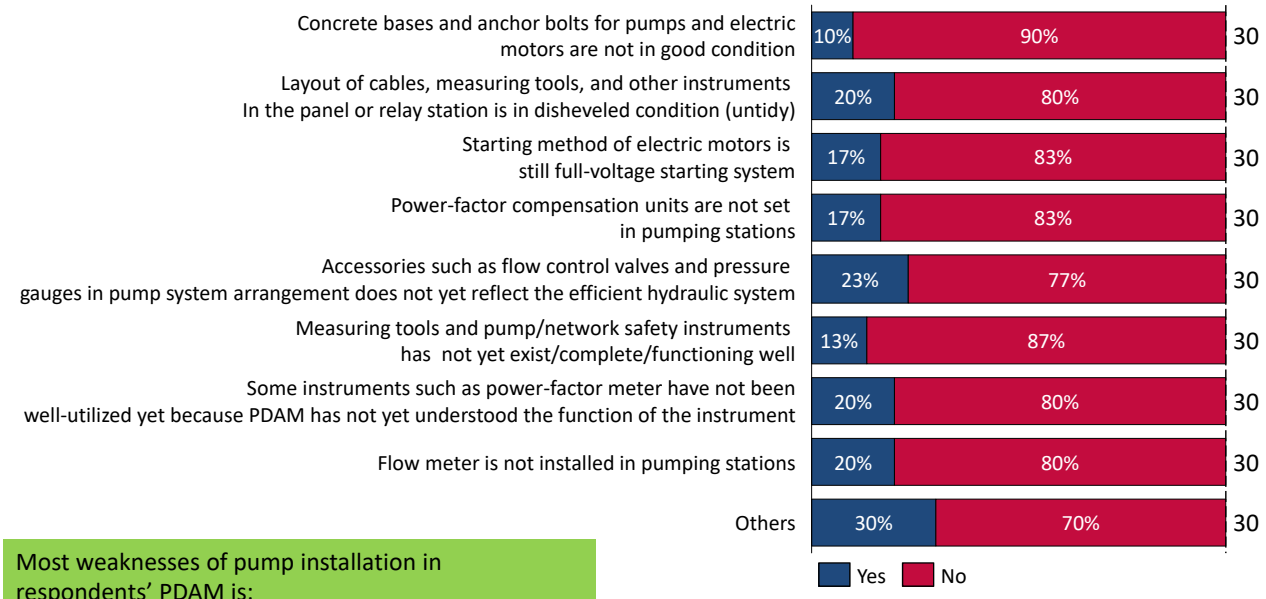


Others:
- Electricity supply problem (power outage, limited supply, unstable voltage, etc)
- Pump issues (wasteful power consumptions, etc.)

Most energy problems faced by respondents' PDAM are:
1. Monthly electricity bill is high;
2. Extra charge (a fine) on monthly electricity bill is high due to low power factor.

Weaknesses of pump installation in respondents' PDAM

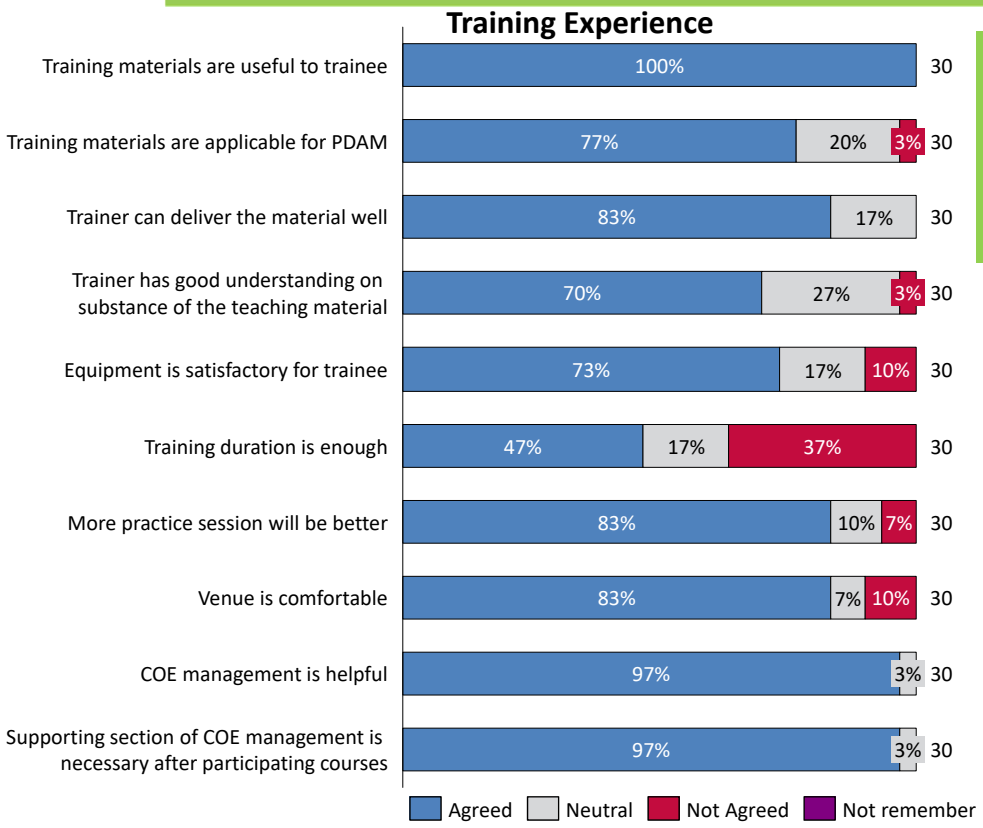
Weaknesses of pump installation in respondents' PDAM



Most weaknesses of pump installation in respondents' PDAM is:
1. Accessories such as flow control valves and pressure gauges in pump system arrangement does not yet reflect the efficient hydraulic system
2. Pump problem (easy to be leak, energy > output, old, low power, etc)

Others:
- Pump problem (easy to be leak, energy > output, old, low power, etc);
- System is wasteful electricity consumption;
- The system have not connected to the internet system;
- Location of the system is too far → budget constraint;
- Lack of stock of pump.

Training Experience

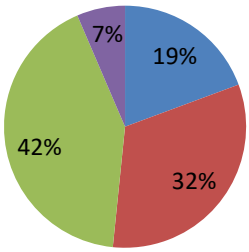


Some respondents opine that current training duration is not enough. And, most respondents agreed that more practice session will be better.

KABUPATEN/KOTA – SAK ETAP

Respondent Profile

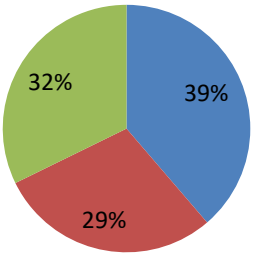
AGE



20-30	6
31-40	10
41-50	13
51-60	2
	31

Majority respondents are 41-50 years old.

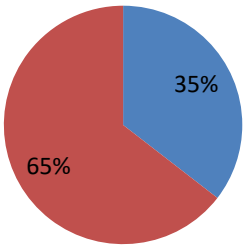
EXPERIENCE WORK IN PDAM



1-10	12
11-20	9
21-30	10
31-40	0
	31

Majority respondents have been working in PDAM for 1-10 years.

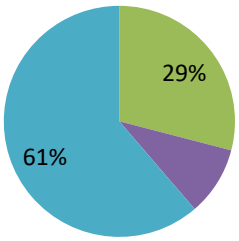
GENDER



MALE	11
FEMALE	20
	31

Majority respondents are female.

GRADUATED

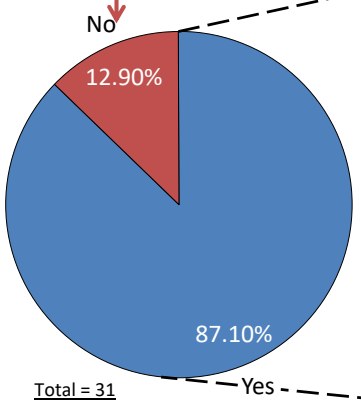


PRIMARY SCHOOL	0
JUNIOR HIGH SCHOOL	0
SENIOR HIGH SCHOOL	9
DIPLOMA	3
UNIVERSITY	19
	31

Majority respondents are graduated from university.

Implementation of the knowledge obtained from COE

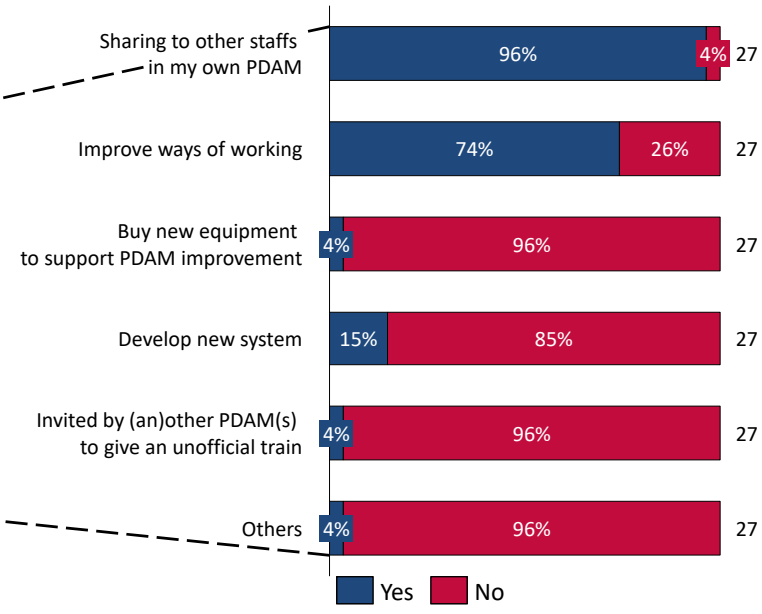
The 12.9% of respondents have not implemented their knowledge due to:
- Position is not relevant (2 of 4 respondents)
- PDAM use different program (1 of 4 respondents)
- Knowledge cannot be applied (1 of 4 respondents)



Total = 31

Have you implemented the knowledge you obtained at COE course to your PDAM?

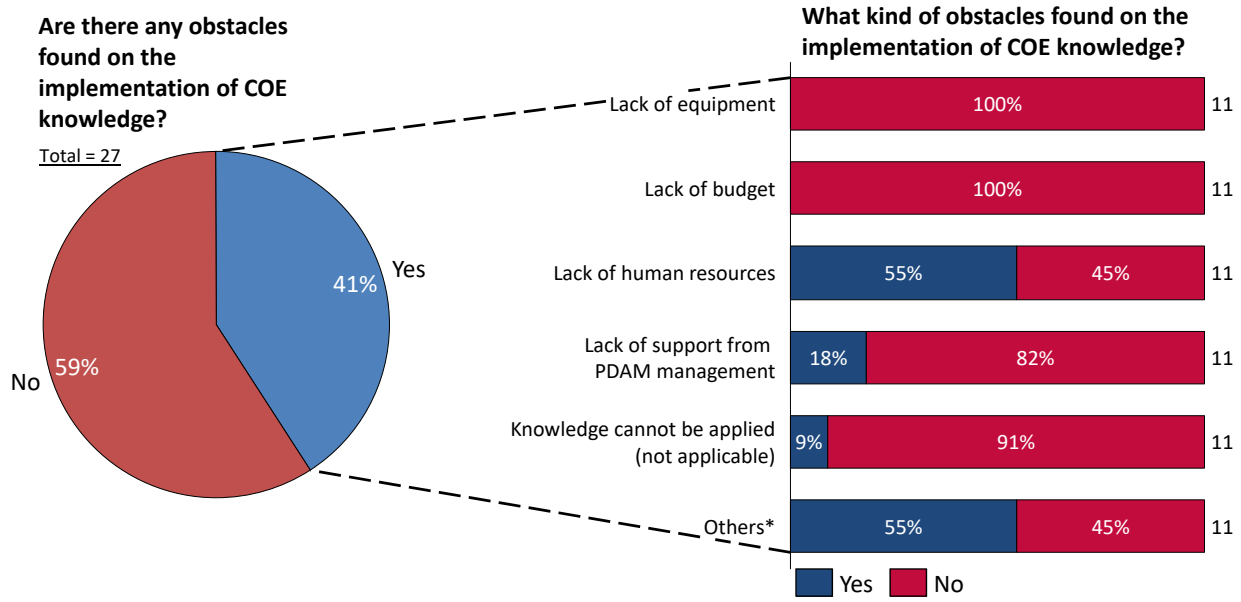
What have you done regarding implementation of COE knowledge?



All the respondents have implemented their COE knowledge, especially by share to other staffs in their own PDAM and improve ways of working.

Others:
- Adjust the policy.

Obstacles found when implemented the knowledge



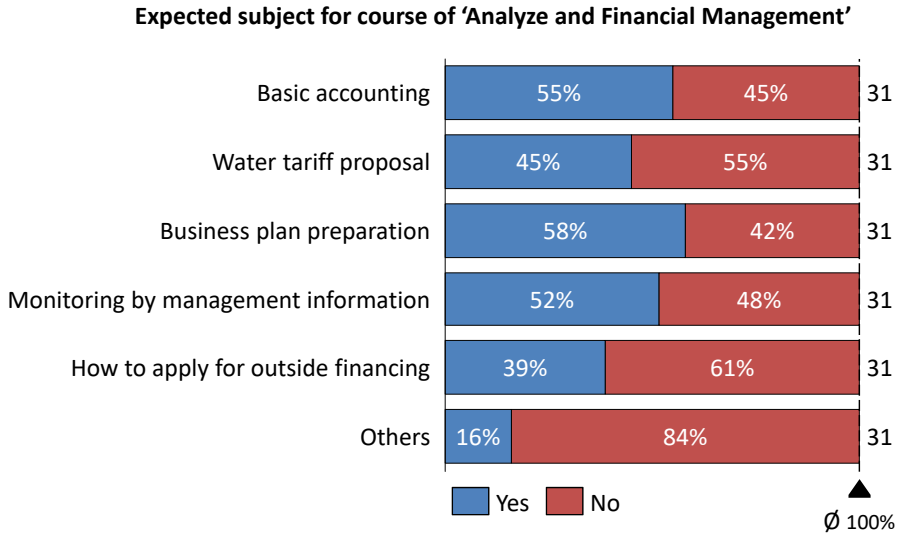
Some respondents found obstacles on the implementation of COE knowledge, i.e.:

1. Lack of human resources

Others:

- Not understand yet;
- Education background is not related to the knowledge;
- Issues on assets transfer from Regional Government to PDAM;
- Still using manual system;
- Age related issues.

Expected subject for course of 'Analyze and Financial Management'



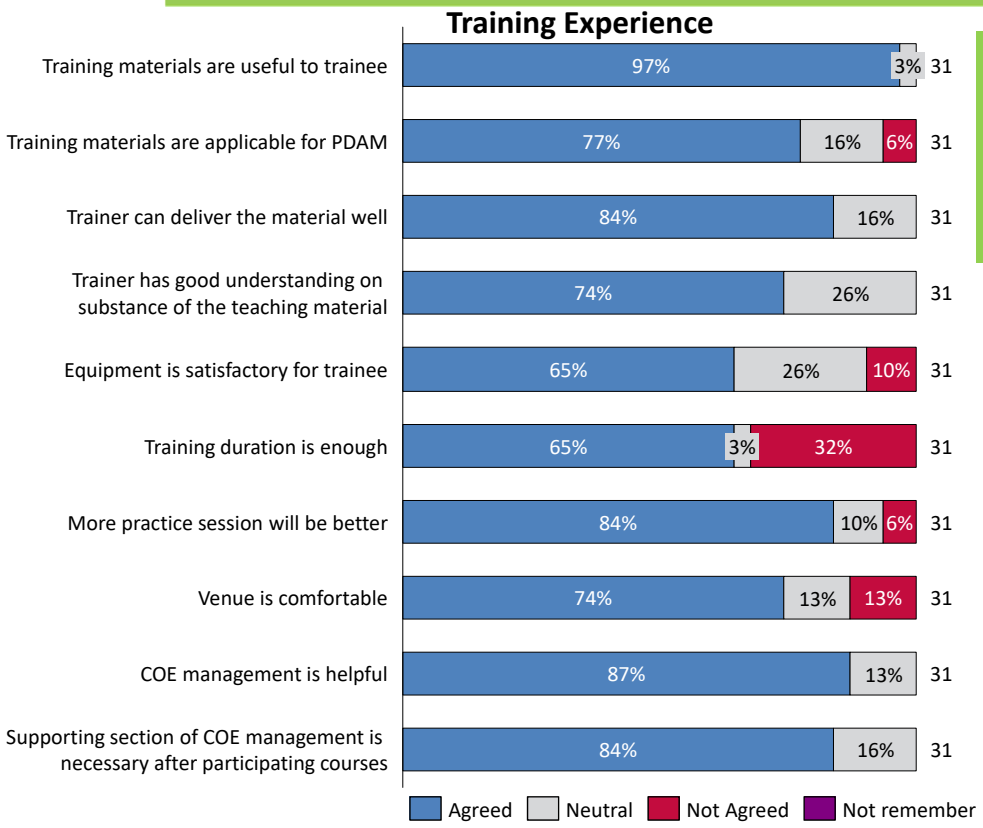
Others:

- Budgeting;
- How to fix the system in the PDAM;
- Capital participation;
- How to develop balance sheet ;
- Business corporate plan.

The most expected subject for course of 'Analyze and Financial Management' are:

1. Business plan preparation
2. Basic accounting
3. Monitoring by management information

Training Experience



Some respondents opine that current training duration is not enough. And, most respondents agreed that more practice session will be better.

THANK YOU

Baseline Survey - Analysis of PDAM Performance 2014

January 2016

JICA Project Team for Strengthening COE Program for PDAMs

1. Methodology

The analysis of PDAM performance data of the year 2014 was conducted to clarify the operation status of PDAMs relevant to the JICA Technical Cooperation Project on Strengthening COE Program for PDAMs (“the Project”) at the time of project commencement. The analysis was run, following Steps 1 to 4 below.

Step 1. Classification of PDAMs

The “PDAM performance book 2015”, compiled by BPPSPAM contains the year 2014 performance data of 356 PDAMs, accounting for 93% of the total PDAMs registered as PERPAMSI members in December 2013. Those 356 PDAMs can be classified in terms of the target province status determined by the Project. The target provinces are places where major on-site project activities will take place. Three target provinces selected are South Sulawesi, South Sumatra, and West Java. Thus, the 356 PDAMs were broken down into the following four groups:

- 23 PDAMs in South Sulawesi
- 12 PDAMs in South Sumatra
- 23 PDAMs in West Java
- 298 PDAMs in other provinces

Furthermore, within the three target provinces, data of each PDAM were identified separately.

Step 2. Indicator selection

The PDAM performance book 2015 shows over 50 types of indicators and values, of which the following indicators are considered as relevant to the COE program input. Those indicators and relations to each COE module are shown in Table 1.

The "Solvency" was proposed in the Inception Report as one of indicators to be analyzed. After conducting a test data entry and evaluation of the 2011-2013 data, it was noted that "solvency" values had considerably wide dispersion. As a result, its mean values were often affected by extremely small minimum numbers or extremely large maximum numbers. Such distorted mean values cannot be considered as proper representatives of groups. Thus we decided to check “solvency” data but not take it as an indicator to be analyzed. Instead, the "return on assets" indicator was selected as an additional indicator related to Financial Analysis and Management module.

Also added was the “COE participation rate”. This indicator is to analyze the level of COE program input to each PDAM group. This indicator is computed from data of the PDAM performance book 2015, and the COE program survey which was conducted by the JICA Project Team.

Table 1　Indicators to Be Analyzed and Relation to COE Modules

✓Comparatively well-related

Indicator	NRW	Energy efficiency	Customer relations	Financial analysis & management
Operating ratio				✓
Collection efficiency			✓	
Solvency				✓
Complaint resolution level			✓	
Production efficiency		✓		
NRW	✓			
Water meter replacement	✓			
Return on assets				✓
Energy cost		✓		
COE participation rate	✓	✓	✓	✓

Definitions and explanations of the selected indicators are as follows:

- Operating ratio = operation expenses / operation revenue

  This is to indicate the level of total operating expenditures which generate total operating revenues. Generally this ratio is considered good if it is below 1.

- Collection efficiency = total revenue of water billing / total water revenue * 100

  This is to indicate collectibility of billing. Theoretically the collected amount should be recovered from the original bills. Thus, the nearer to 100%, the better.

- Solvency = total assets / total debts * 100

  This is to measure PDAM’s ability to meet debt obligations. Generally the higher the solvency, the better.

- Complaint resolution level = number of completed complaints / number of complaints * 100

  This is to indicate capability of complaint-solving. However, there is no established definition of the status of “problem sold”. The nearer to 100%, the better.

- Production efficiency = realization of production in m3 / installed capacity in m3 * 100

  This is a capacity utilization indicator of a PDAM’s water production facilities. The

nearer to 100%, the better.

- NRW = (water distribution - revenue water) / water distribution * 100

  This is the very direct indicator of NRW. The lower, the better.

- Water meter replacement = number of replaced water meters in year / total customer * 100

  There is no official requirement for periodical water meter replacement. The quality of water meter also affects this rate. Generally the higher the replacement rate, the better. If water meters are being replaced regularly once in ten years, this indicator will show 10%.

- Return on assets = net profit after tax / total assets

  The return on assets (ROA) tells how effectively a PDAM is generating income given its asset base. A higher ratio provides some indication of future growth prospects. But excessively high ROA resulting from increasing net income may indicate that the PDAM is charging its customers more than is required to run the system.

- Energy cost = energy cost (electricity, diesel, gas, and other fuels) in a year / total production

  This is a straightforward indicator to show energy costs. The lower, the better. It should be noted however, that every PDAM is subject to different facility mix and geography factors. Thus comparison among different PDAM groups in this indicator has to be done with care.

- COE participation rate = number of COE program participants from 2012 to 2014 / number of PDAM employees in 2014 * 100

  Low COE participation rates could be construed good as such PDAMs with low COE participation might be already healthy enough therefore not need the COE input. However we take it naturally that high COE participation rates are good as they represent positive attitude in the PDAM operation.

Step 3. Comparator selection

Data of the three PDAM groups corresponding to the three target provinces are compared with those of PDAMS in non-targeted provinces. Comparison from another perspective is doable vis-à-vis PDAM groups according to health status. The 356 PDAMs shown in the PDAM performance book 2015 are classified into “healthy” (192 PDAMs), “less healthy” (99 PDAMs), and “sick” (65 PDAMs) groups. Therefore relative positions of the three target-province groups can be judged in comparison with data of the three health-status groups.

Step 4. Comparative analysis

Selected indicators of the three target province groups are compared with selected comparators, taking the mean values as average. Basically no data correction is made from the original data

shown in the PDAM performance book 2015[1]. Attempts are made to interpret findings from the comparisons.

2. Findings

(1) Characteristics of the target province PDAM groups

The distribution of the three health status in the PDAM groups are shown in Table 2.

Table 2 Distribution of 3Heatlh Status in PDAM Groups

(Number of PDAMs)

	South Sulawesi	South Sumatra	West Java	Other provinces	Total
Healthy	10	3	21	158	192
%	43%	25%	91%	53%	54%
Less healthy	6	4	2	87	99
%	26%	33%	9%	29%	28%
Sick	7	5	0	53	65
%	30%	42%	0%	18%	18%
Total	23	12	23	298	356
%	100%	100%	100%	100%	100%

The distribution pattern of the South Sulawesi PDAM group is the most similar, among the three target province groups, to that of the entire PDAM group. The pattern of the South Sumatra PDAM group is rather different and leans toward the unhealthy side. In the South Sumatra group, “Less healthy” and “sick” PDAMs account for 75%. The pattern of the West Java group is quite the contrary. As much as 91% of the West Java PDAMs are “healthy” PDAMs. The pattern of the other (non-targeted) provinces is almost the same as that of the entire PDAM group. This is understandable because the number of PDAMs in the non-targeted provinces is 298, accounting for as much as 84% of all PDAMs.

Table 3 shows values of selected indicator at the three target province groups, the non-target province group, and the three health-status based groups.

[1] It should be noted that some of original data shown in the PDAM performance book 2015 look extremely unrealistic. Although JET was not supposed to check whether such abnormal data were real, only one direct enquiry to the original data source PDAM was attempted. The Kabpaten Fak-Fak PDAM showed its operating ratio as 97.8, meaning that its expenditure was nearly 100 times the revenues. As a result of the direct enquiry, it was concluded that the real data was 1.2.

Table 3 Comparison of Target Provinces

	PDAMs in South Sulawesi	PDAMs in South Sumatra	PDAMs in West Java	PDAMs in other provinces	All PDAMs	Healthy PDAMs	Less Healthy PDAMs	Sick PDAMs
Operation indicators (mean value)								
Operating ratio (ratio)	1.2	1.8	1.0	1.3	1.3	1.0	1.7	1.6
Collection efficiency (%)	81.0%	72.1%	91.0%	87.9%	87.1%	92.1%	84.6%	76.5%
Solvency (%)	1903.0%	19768.0%	613.5%	18054.7%	15930.2%	16974.1%	16215.7%	12372.9%
Complaint resolution level (%)	90.9%	87.2%	95.2%	91.4%	91.5%	94.9%	92.0%	81.3%
Production efficiency (%)	53.4%	47.3%	71.3%	59.9%	59.8%	69.0%	52.8%	43.5%
NRW (%)	30.2%	34.4%	30.5%	34.2%	33.7%	28.5%	36.3%	45.1%
Water meter replacement (%)	2.2%	2.3%	7.7%	4.5%	4.5%	5.7%	3.6%	2.1%
Return on assets (ratio)	-0.03	-0.04	0.03	-0.03	-0.02	0.02	-0.06	-0.09
Energy cost (Rp/m3)	593	506	294	460	460	442	483	477
COE participation rate (%)	2.2%	2.0%	1.0%	1.5%	1.5%	1.4%	2.0%	1.7%
Operation scale (total value)								
Number of PDAMs	23	12	23	298	356	192	99	65
Number of employees (person)	2,794	1,990	6,947	40,225	51,956	38,578	8,508	4,870
Real production (l/sec)	5,311	5,250	15,424	104,784	130,769	115,062	10,576	5,131

(2) Operating ratio

South Sulawesi PDAMs --- Not so good since the average of this PDAM group is 1.2, which exceeds 1.0. The healthy PDAM group maintains the average value of 1.0 for this indicator.

South Sumatra PDAMs --- The average value of 1.8 is considered bad. Even the less healthy PDAM group has the average value of 1.7.

West Java PDAMs --- This is considered good since it is same as the healthy PDAM group.

(3) Collection efficiency

South Sulawesi PDAMs --- Not so good. Its 81.0% is only between the levels of less healthy PDAM group and sick PDAM group. Also in comparison among the three target province groups and the non-target province group, South Sulawesi is only the second worst.

South Sumatra PDAMs --- Bad, because its 72.1% is the worst among all the PDAM groups shown here.

West Java PDAMs --- Good. Its 91.0% is the best among the three target province groups and the non-target province group. However the healthy PDAM groups shows even higher value, 92.1% .

(4) Solvency

"Solvency" of the three target province groups are completely dispersed, being 1,903% (South Sulawesi), 19,768% (South Sumatra), and 613% (West Java). The solvency is considered good if it is higher. However those heights shown in the three target province group already exceeds the level that meaningful explanation is applicable to all constituent PDAMs data. Also the three health status PDAM groups show high level solvency. Presumably many PDAMs have capital injection from local governments as a result of inability to borrow debts, resulting in the high solvency rates in general. This suggests that the high solvency does not necessarily mean PDAM's soundness. Because of the data dispersion and the suspected unnatural representation of indicator, it is confirmed that "solvency" value is not used for evaluation.

(5) Complaint resolution

South Sulawesi PDAMs --- Not so good. Although its over-90% level may sound good, factually it is lower than the level of the non-targeted province group, all PDAM group, "healthy" PDAM group, and "less healthy" PDAM group.

South Sumatra PDAMs --- Not so good, by the same reason as South Sulawesi.

West Java PDAMs --- Very good. This is the highest among all the groups here, including "healthy" PDAM group.

(6) Production efficiency

South Sulawesi PDAMs --- Not so good. In comparison among the three targeted province PDAM groups and the non-targeted province PDAM group, its 53.4% is only higher than the South Sumatra PDAM group. Compared with the health status PDAM groups, only the less healthy PDAM group has a slightly lower value.

South Sumatra PDAMs --- Bad. Its average value of 47.3% is the lowest among 1.8 is the three targeted province PDAM groups and the non-targeted province PDAM group. Only the sick PDAM group shows the lower average of 43.5%.

West Java PDAMs --- Good. Its average value of 71.3% is better than the other two target province groups and the non-target province group. Also it exceeds the average value of the healthy PDAM group.

(7) NRW

South Sulawesi PDAMs --- Not so good. In general, the NRW rate over 30% is considered unsatisfactory. Although the South Sulawesi's average is 30.2%, which is the best of the three target province groups and the non-target province group, it is below the average of the healthy PDAM group, which is 28.5%.

South Sumatra PDAMs --- Bad. Its average value of 34.4% is the worst among the three target province groups and the non-target province group. It is however better than the averages of the less healthy PDAM and the sick PDAM groups.

West Java PDAMs --- Not so good, by the same reason as South Sulawesi.

(8) Water meter replacement

South Sulawesi PDAMs --- Bad. It shows the average value of 2.2%, which is the lowest among the three target province groups and the non-target province group. It is only slightly higher than the average of the sick PDAM group.

South Sumatra PDAMs --- Bad. It shows the average value of 2.3%, which is the second lowest among the three target province groups and the non-target province group. It is only slightly higher than the average of the sick PDAM group.

West Java PDAMs --- Very good. This is by far the highest among the three target province groups and the non-target province group. It is even much higher when compared with the average of the healthy PDAM group.

(9) Return on assets

South Sulawesi PDAMs --- Not so good. Its average is negative 0.03. Although this is the second best among the three target province groups and the non-target province group, the negativity means that this PDAM group does not generate income given its asset base. However, when compared with the health status PDAM groups, this value is only worse than the healthy PDAM group.

South Sumatra PDAMs --- Not so good, by the same reason as South Sulawesi PDAMs

West Java PDAMs --- Good. Its average value of 0.03 is the best among the three target province groups and the non-target province group. This is even higher than the healthy PDAM

group’s average of 0.02.

(10) Energy cost

South Sulawesi PDAMs --- Very bad. The average of this PDAM group is Rp. 593, far exceeding any of the other group values.

South Sumatra PDAMs --- Bad. Its average value of Rp. 506 is lower than only South Sulawesi. All other groups show a lower value.

West Java PDAMs --- Very good. Its average value of Rp. 294 is much lower than all other groups.

(11) COE participation rate

Prior to this baseline survey point, or during the period 2012-2014, the 356 PDAMs presented in the PDAM performance book 2015, received the COE program input in the form of their staff’s participation in the COE training courses. The number of such PDAM staff who participated in the COE course totaled 779. As the total number of staff of the 356 PDAMs was 51,956, the national average of the COE participation rate is computed at 1.5%.

South Sulawesi PDAMs --- Good participation level. Its 2.2% participation rate is higher than that of the national average and also higher than those of the healthy, less healthy, and sick PDAM groups.

South Sumatra PDAMs --- Good participation level. Its 2.0% participation rate is higher than that of the national average and also higher that of healthy PDAM group.

West Java PDAMs --- Bad. Its participation rate is 1.0%, which is the lowest in all the PDAM groups shown here.

(12) Each PDAM data in the target provinces

Tables 4 to 6 show those selected indicator values of each PDAM in the three target provinces.

Table 4 Performance of South Sulawesi PDAMs

PDAM name	Kab.Bantaeng	Kab.Takalar	Kab.Enrekang	Kota Palopo	Kab.Sinjai	Kota Makassar	Kab.Luwu Utara	Kab.Luwu Timur	Kab.Maros	Kab.Gowa	Kota Pare-Pare	Kab.Sidendreng Rappeng
PDAM code	3144	3123	3125	3127	3128	3129	3139	3140	3141	3126	3124	3130
Operation indicators												
Operating ratio (ratio)	0.94	1.46	2.68	0.72	1.03	0.88	0.9	1.3	1.0	1.05	1.08	1.23
Collection efficiency (%)	93.2%	50.0%	96.1%	90.6%	97.2%	91.4%	79.6%	92.2%	96.6%	96.0%	66.5%	111.0%
Solvency (%)	3431.97%	8899.6%	6622.6%	419.1%	100.3%	110.5%	5242.3%	0.0%	105.5%	1283.7%	220.0%	691.9%
Complaint resolution level (%)	12.9%	100.0%	100.0%	97.3%	100.0%	93.1%	100.0%	0.0%	100.0%	100.0%	98.1%	100.0%
Production efficiency (%)	67.85%	54.8%	37.42%	79.1%	63.88%	93.19%	37.4%	98.6%	73.5%	52.72%	72.11%	55.13%
NRW (%)	24.2%	18.0%	20.9%	38.8%	23.5%	49.5%	35.2%	24.4%	34.5%	21.5%	31.7%	18.9%
Water meter replacement (%)	0.97%	1.47%	2.63%	3.02%	2.94%	2.99%	5.8%	2.6%	3.0%	1.23%	2.53%	1.94%
Return on assets (ratio)	0.12	-0.09	-0.12	0.02	-0.04	0.08	0.11	-0.05	0.00	-0.02	-0.07	-0.05
Energy cost (Rp/m3)	106	867	9	71	1015	57	269	-	530	427	743	400
COE participation rate (%)	#VALUE!	7.3%	9.2%	2.6%	11.3%	#VALUE!	2.7%	#VALUE!	5.0%	2.6%	4.5%	#VALUE!
Operation scale												
Health status	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Less	Less
Number of employees (person)	90	82	65	152	62	996	37	31	101	152	112	62
Real production (l/sec)	112	100	77	364	57	2,999	37	89	159	458	180	61

PDAM name	Kab. Jeneponto	Kab.Wajo	Kab.Luwu	Kab.Bone	Kab.Tana Toraja	Kab.Kepulauan Selayar	Kab.Soppeng	Kab.Barru	Kab.Bulukumba	Kab.Pinrang	Kab.Pangkajene Kepulauan
PDAM code	3131	3132	3138	3145	3133	3134	3137	3142	3143	3135	3136
Operation indicators											
Operating ratio (ratio)	1.37	1.29	2.0	1.0	1.25	1.18	1.2	1.3	1.1	1.5	1.0
Collection efficiency (%)	58.8%	65.1%	80.0%	82.3%	91.2%	92.0%	75.0%	68.7%	74.9%	33.1%	82.2%
Solvency (%)	550.4%	96.1%	0.0%	214.6%	103.2%	10578.2%	3889.6%	1037.2%	89.5%	50.5%	31.4%
Complaint resolution level (%)	100.0%	100.0%	100.0%	98.9%	100.0%	100.0%	100.0%	99.8%	100.0%	91.0%	100.0%
Production efficiency (%)	38.08%	66.55%	51.6%	93.5%	48.4%	24.7%	18.0%	29.2%	33.0%	26.5%	12.9%
NRW (%)	31.9%	40.8%	21.8%	24.7%	35.7%	36.8%	29.7%	34.5%	23.7%	46.6%	28.3%
Water meter replacement (%)	0.41%	2.99%	0.20%	2.20%	3.28%	0.10%	6.50%	2.0%	0.0%	0.0%	1.8%
Return on assets (ratio)	-0.18	-0.15	-0.09	0.03	-0.05	-0.05	0.00	-0.04	-0.04	-0.06	0.01
Energy cost (Rp/m3)	1,394	681	101	611	208	1,211	1,144	549	932	668	1,059
COE participation rate (%)	#VALUE!	12.1%	6.5%	3.7%	1.5%	#VALUE!	#VALUE!	6.5%	1.4%	4.2%	6.3%
Operation scale											
Health status	Less	Less	Less	Less	Sick	Sick	Sick	Sick	Sick	Sick	Sick
Number of employees (person)	81	66	31	217	66	57	71	77	74	48	64
Real production (l/sec)	52	106	34	103	57	39	46	47	32	42	60

Table 5 Performance of South Sumatra PDAMs

PDAM name	Kota Palembang	Kab.Muara Enim	Kab.Banyuasin	Kab.Musi Banyuasin	Kota Lubuk Linggau	Kab.Ogan Ilir	Kab.Ogan Komering Ilir	Kab.Ogan Komering Ulu	Kab.Ogan Komering Ulu Selatan	Kab. Lahat	Kab.Ogan Komering Ulu Timur	Kab.Empat Lawang
PDAM code	1109	1113	1115	1110	1111	1112	1120	1116	1117	1118	1119	1121
Operation indicators												
Operating ratio (ratio)	0.7	1.2	1.1	1.9	1.2	3.3	2.9	1.1	1.1	1	1.8	4.2
Collection efficiency (%)	98.0%	87.1%	89.6%	80.9%	78.6%	66.1%	70.9%	88.8%	45.0%	42.6%	81.4%	35.9%
Solvency (%)	280.0%	25073.4%	0.0%	0.0%	13859.9%	161598.6%	825.5%	1618.5%	1289.7%	42.7%	32627.3%	0.0%
Complaint resolution level (%)	93.2%	100.0%	100.0%	64.7%	90.7%	100.0%	100.0%	100.0%	100.0%	64.3%	100.0%	33.3%
Production efficiency (%)	94.9%	49.1%	68.3%	27.6%	62.9%	36.3%	24.4%	69.0%	53.5%	36.1%	36.2%	9.7%
NRW (%)	24.9%	30.3%	36.5%	22.6%	44.9%	19.7%	20.5%	45.6%	59.2%	26.7%	23.6%	58.2%
Water meter replacement (%)	2.8%	0.9%	0.3%	2.8%	0.4%	4.5%	2.7%	0.0%	0.0%	2.4%	1.2%	9.3%
Return on assets (ratio)	0.13	-0.02	-0.03	-0.06	-0.04	-0.12	-0.13	-0.05	-0.05	0.09	-0.07	-0.10
Energy cost (Rp/m3)	370	782	593	943	144	437	585	592	212	647	715	49
COE participation rate (%)	#VALUE!	0.9%	2.9%	1.0%	1.2%	#VALUE!	#VALUE!	#VALUE!	#VALUE!	2.6%	#VALUE!	#VALUE!
Operation scale												
Health status	Healthy	Healthy	Healthy	Less	Less	Less	Less	Sick	Sick	Sick	Sick	Sick
Number of employees (person)	555	232	196	334	109	38	46	166	162	70	61	21
Real production (l/sec)	3,674	249	253	316	220	69	40	221	111	47	33	17

Table 6 Performance of West Java PDAMs

PDAM name	Kota Cirebon	Kota Bogor	Kab.Garut	Kab.Bandung	Kab.Subang	Kab.Bekasi	Kab.Indramayu	Kab.Majalengka	Kab.Purwakarta	Kab.Bogor	Kab.Ciamis	Kab.Tasikmalaya
PDAM code	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2054	2055
Operation indicators												
Operating ratio (ratio)	1.0	0.8	0.9	0.9	1.0	0.9	1.0	1.0	1.0	0.8	1.0	0.9
Collection efficiency (%)	96.8%	89.0%	82.1%	94.6%	94.7%	95.0%	96.3%	85.1%	95.2%	95.8%	97.6%	87.6%
Solvency (%)	175.0%	290.9%	538.5%	581.7%	389.3%	501.2%	246.7%	373.0%	275.4%	834.1%	479.5%	253.8%
Complaint resolution level (%)	100.0%	85.8%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Production efficiency (%)	89.6%	82.8%	48.3%	73.5%	59.7%	73.7%	80.8%	79.1%	53.7%	80.2%	60.1%	91.1%
NRW (%)	40.6%	33.1%	27.2%	31.9%	22.7%	27.8%	24.6%	31.2%	23.7%	27.9%	29.5%	35.0%
Water meter replacement (%)	12.4%	6.4%	0.3%	4.3%	1.9%	20.0%	4.3%	4.9%	2.0%	20.0%	8.0%	2.2%
Return on assets (ratio)	0.03	0.08	0.02	0.03	0.01	0.08	0.01	0.03	0.02	0.10	0.00	0.10
Energy cost (Rp/m3)	10	48	397	129	458	405	606	201	258	484	288	106
COE participation rate (%)	#VALUE!	1.0%	1.2%	#VALUE!	0.9%	#VALUE!	2.9%	#VALUE!	#VALUE!	2.6%	#VALUE!	#VALUE!
Operation scale												
Health status	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy
Number of employees (person)	262	562	393	323	199	571	404	171	160	656	139	252
Real production (l/sec)	950	1,699	332	772	336	2,010	796	203	219	2,031	190	348

PDAM name	Kab.Cianjur	Kab.Cirebon	Kab.Kuningan	Kab.Sukabumi	Kab.Sumedang	Kab.Karawang	Kota Bandung	Kota Depok	Kota Bekasi	Kota Sukabumi	Kota Banjar
PDAM code	2056	2057	2059	2058	2060	2063	2064	2065	2053	2061	2062
Operation indicators											
Operating ratio (ratio)	1.0	1.0	1.0	1.0	1.0	0.9	0.9	1.4	1.0	1.0	1.1
Collection efficiency (%)	96.8%	94.3%	97.4%	93.0%	90.2%	77.8%	88.1%	77.7%	96.7%	85.8%	84.6%
Solvency (%)	942.8%	189.6%	140.9%	1064.2%	278.3%	679.6%	73.7%	1495.4%	2778.3%	111.4%	1417.8%
Complaint resolution level (%)	100.0%	100.0%	100.0%	86.0%	100.0%	96.0%	99.1%	100.0%	22.4%	100.0%	100.0%
Production efficiency (%)	41.3%	75.1%	63.2%	45.1%	38.3%	81.9%	82.3%	100.0%	93.0%	73.1%	73.1%
NRW (%)	29.1%	26.4%	31.9%	22.4%	27.4%	27.8%	32.2%	30.4%	14.5%	68.8%	34.5%
Water meter replacement (%)	20.5%	1.7%	0.1%	6.1%	10.0%	5.3%	13.9%	21.2%	8.1%	2.3%	1.9%
Return on assets (ratio)	0.00	-0.01	0.023	0.01	0.01	0.07	0.09	-0.08	0.01	0.01	-0.02
Energy cost (Rp/m3)	232	245	85	441	468	447	92	-	418	78	572
COE participation rate (%)	#VALUE!	#VALUE!	0.3%	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
Operation scale											
Health status	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Less
Number of employees (person)	370	262	195	157	355	332	678	57	173	197	79
Real production (l/sec)	326	305	363	292	226	720	2,274	78	419	403	132

3. Conclusion

The findings presented in the previous chapter are summarized in Table 7. The “solvency” indicator is deleted because of its wide data dispersion. For each indicator, ranking is clarified among the three target province groups and the non-target province group. It is clearly recognized that the West Java PDAM group is the best in many indicators. Also the South Sumatra PDAM group is the worst in many indicators.

Table 7　Rank Orders According to Indicators

Indicator	Related COE module	Rank order
Operating ratio	FAM	①W.Java ②S.Sulawesi ③Others ④S.Sumatra
Collection efficiency	CR	①W.Java ②Others ③S.Sulawesi ④S.Sumatra
Complaint resolution level	CR	①W.Java ②Others ③S.Sulawesi ④S.Sumatra
Production efficiency	EE	①W.Java ②Others ③S.Sulawesi ④S.Sumatra
NRW	NRW	①S.Sulawesi ②W.Java ③Others ④S.Sumatra
Water meter replacement	NRW	①W.Java ②Others ③S.Sumatra ④S.Sulawesi
Return on assets	FAM	①W.Java ②S.Sulawesi ②Others ③S.Sumatra
Energy cost	EE	①W.Java ②Others ③S.Sumatra ④S.Sulawesi
COE participation rate	NRW,EE,CR,FAM	①S.Sulawesi ②S.Sumatra ③Others ④W.Java

We attempted to compute an overall score of the three target province groups and the non-target province group. For ease of understanding and computation, evaluation grade of each indicator value was simplified. It was graded as either, “good”, “medium”, or “bad”. Also a point was allocated to each grade. Definitions and points of the three grades are:

- Good (1 point) = equal to or better than the best average value of healthy/ less healthy/ sick groups
- Medium (0 point) = worse than the best average of healthy/ less healthy/ sick groups, and equal to or better than that of the second best average of healthy/ less healthy/ sick groups
- Bad (minus 1 point) = worse than the second best average of healthy/ less healthy/ sick groups

The results are summarized in Table 8. The West Java PDAM group is by far the best, having an overall score of 5. The second, third, and forth places are respectively, other provinces, South Sulawesi, and South Sumatra.

Table 8　Overall Score of Target Province Groups

Indicator	Related COE module	South Sulawesi	South Sumatra	West Java	Other Provinces
Operating ratio	FAM	Med (0)	Bad (-1)	Good (1)	Med (0)
Collection efficiency	CR	Bad (-1)	Bad (-1)	Med (0)	Med (0)
Complaint resolution level	CR	Bad (-1)	Bad (-1)	Good (1)	Bad (-1)
Production efficiency	EE	Med (0)	Bad (-1)	Good (1)	Med (0)
NRW	NRW	Med (0)	Med (0)	Med (0)	Med (0)
Water meter replacement	NRW	Bad (-1)	Bad (-1)	Good (1)	Med (0)
Return on assets	FAM	Med (0)	Med (0)	Good (1)	Med (0)
Energy cost	EE	Bad (-1)	Bad (-1)	Good (1)	Med (0)
COE participation rate	NRW,EE,CR,FAM	Good (1)	Good (1)	Bad (-1)	Bad (-1)
	Total Score	Minus 3	Minus 5	Plus 5	Minus 2

The following tables are presented on subsequent pages. Those data can be used when more detailed analyses are needed.

Table 9 Median, Mean, Largest, and Smallest Values of Selected Indicators (1/2)

2. Operating ratio (ratio)	No. of samples	Median	Mean	Largest	Smallest
All PDAMs	356	1.1	1.3	19.2	0.7
Healthy PDAMs	192	1.0	1.0	2.7	0.7
Less healthy PDAMs	99	1.2	1.7	19.2	0.8
Sick PDAMs	67	1.3	1.6	5.7	0.9
South Sulawesi	23	1.2	1.2	2.7	0.7
South Sumatra	12	1.2	1.8	4.2	0.7
West Java	23	1.0	1.0	1.4	0.8
Other provinces	298	1.1	1.3	19.2	0.7

4. Collection efficiency (%)	No. of samples	Median	Mean	Largest	Smallest
All PDAMs	356	90.9%	87.1%	205.6%	32.0%
Healthy PDAMs	192	94.6%	92.1%	130.5%	50.0%
Less healthy PDAMs	99	87.0%	84.6%	205.6%	32.0%
Sick PDAMs	67	81.4%	76.5%	100.0%	32.1%
South Sulawesi	23	82.3%	81.0%	111.0%	33.1%
South Sumatra	12	79.8%	72.1%	98.0%	35.9%
West Java	23	94.3%	91.0%	97.6%	77.7%
Other provinces	298	91.4%	87.9%	205.6%	32.0%

9. Complaint resolution level (%)	No. of samples	Median	Mean	Largest	Smallest
All PDAMs	356	100.0%	91.5%	161.8%	0.0%
Healthy PDAMs	192	100.0%	94.9%	161.8%	0.0%
Less healthy PDAMs	99	100.0%	92.0%	100.0%	0.0%
Sick PDAMs	67	99.7%	81.3%	100.0%	0.0%
South Sulawesi	23	100.0%	90.9%	100.0%	0.0%
South Sumatra	12	100.0%	87.2%	100.0%	33.3%
West Java	23	100.0%	95.2%	100.0%	22.4%
Other provinces	298	100.0%	91.4%	161.8%	0.0%

13. Production efficiency (%)	No. of samples	Median	Mean	Largest	Smallest
All PDAMs	356	61.0%	59.8%	100.0%	9.7%
Healthy PDAMs	192	70.5%	69.0%	100.0%	19.0%
Less healthy PDAMs	99	50.5%	52.8%	93.5%	20.7%
Sick PDAMs	67	41.2%	43.9%	100.0%	9.7%
South Sulawesi	23	52.7%	53.4%	98.6%	12.9%
South Sumatra	12	42.7%	47.3%	94.9%	9.7%
West Java	23	73.7%	71.3%	100.0%	38.3%
Other provinces	298	61.0%	59.9%	100.0%	15.3%

Table 10 Median, Mean, Largest, and Smallest Values of Selected Indicators (2/2)

14. NRW (%)	No. of samples	Median	Mean	Largest	Smallest
All PDAMs	356	30.3%	33.7%	85.9%	3.6%
Healthy PDAMs	192	27.9%	28.5%	52.3%	8.8%
Less healthy PDAMs	99	32.7%	36.3%	73.9%	12.3%
Sick PDAMs	67	41.0%	44.6%	85.9%	3.6%
South Sulawesi	23	29.7%	30.2%	49.5%	18.0%
South Sumatra	12	28.5%	34.4%	59.2%	19.7%
West Java	23	29.1%	30.5%	68.8%	14.5%
Other provinces	298	30.7%	34.2%	85.9%	3.6%

17. Water meter replacement (%)	No. of samples	Median	Mean	Largest	Smallest
All PDAMs	355	2.6%	4.5%	30.9%	0.0%
Healthy PDAMs	192	3.5%	5.7%	30.6%	0.0%
Less healthy PDAMs	99	1.9%	3.6%	30.9%	0.0%
Sick PDAMs	66	1.0%	2.1%	17.3%	0.0%
South Sulawesi	23	2.2%	2.2%	6.5%	0.0%
South Sumatra	12	1.8%	2.3%	9.3%	0.0%
West Java	23	5.3%	7.7%	21.2%	0.1%
Other provinces	297	2.6%	4.5%	30.9%	0.0%

41. Return on assets (ratio)	No. of samples	Median	Mean	Largest	Smallest
All PDAMs	356	-0.01125	-0.02	0.30	-1.10
Healthy PDAMs	192	0.02	0.02	0.21	-0.34
Less healthy PDAMs	99	-0.06	-0.06	0.30	-0.36
Sick PDAMs	67	-0.07	-0.09	0.29	-1.10
South Sulawesi	23	-0.04	-0.03	0.12	-0.18
South Sumatra	12	-0.05	-0.04	0.13	-0.13
West Java	23	0.02	0.03	0.10	-0.08
Other provinces	298	-0.018	-0.03	0.30	-1.10

44. Energy cost (Rp/m3)	No. of samples	Median	Mean	Largest	Smallest
All PDAMs	340	448	460	2411	0
Healthy PDAMs	183	447	442	2411	2
Less healthy PDAMs	94	436	483	1728	0
Sick PDAMs	65	455	478	1474	0.42
South Sulawesi	22	580	593	1394	9
South Sumatra	12	136	166	555	21
West Java	23	262	302	678	57
Other provinces	284	450	460	2411	0

Table 11 All PDAMs Performance Data

	Indicator	No. of samples	Median	Mean	Largest	Smallest
1	Return on equity (%)	355	-2.1%	-3.4%	2375.4%	-1444.7%
2	Operating ratio (ratio)	356	1.1	1.3	19.2	0.7
3	Cash ratio (%)	354	59.4%	37869.1%	12570164.0%	-25.7%
4	Collection efficiency (%)	356	90.9%	87.1%	205.6%	32.0%
5	Solvency (%)	354	728.9%	15930.2%	794983.5%	0.0%
6	Finance aspect score (point)	356	0.70	0.71	1.14	0.25
7	Service ratio (%)	356	39.2%	42.9%	99.9%	3.7%
8	Customer growth (%)	355	6.3%	8.7%	141.2%	-46.6%
9	Complaint resolution level (%)	356	100.0%	91.5%	161.8%	0.0%
10	Water quality satisfaction (%)	352	75.0%	55.3%	143.1%	0.0%
11	Domestic water consumption (point)	356	16.4	17.4	304.0	0.2
12	Service aspect score (point)	356	0.80	0.76	1.20	0.30
13	Production efficiency (%)	356	61.0%	59.8%	100.0%	9.7%
14	NRW (%)	356	30.3%	33.7%	85.9%	3.6%
15	Service hour (hour)	356	20	18.9	24	0
16	Water pressure satisfaction (%)	354	41.8%	44.2%	100.9%	0.0%
17	Water meter replacement (%)	355	2.6%	4.5%	30.9%	0.0%
18	Operation aspect score (point)	356	1	0.96	1.8	0.1
19	Number of staff per 1000 connections (ratio)	356	7.8	8.9	45.5	2.1
20	Employee training ratio (%)	356	17.2%	24.2%	133.3%	0.0%
21	Training cost to employee cost ratio (%)	356	0.9%	1.7%	65.0%	0.0%
22	Staff aspect score (point)	356	0.43	0.39	0.67	0.15
23	Total score (point)	356	2.84	2.80	4.17	1.47
24	Category (Healthy = 3, Less healthy = 2, Sick = 1)	356	3	2	3	1
25	Average water price (Rp/m3)	356	3529	3695	11180	892
26	Water production cost (standard NRW base) (Rp/m3)	356	3445	3843	20939	540
27	Water production cost (real NRW base) (Rp/m3)	356	4281	4943	64081	956
28	Water production cost (excl. depreciation & interests) (Rp/m3)	356	3348	3702	29347	660
29	Margin of water price to production cost (standard NRW base) (Rp/m3)	356	136	-148	6497	-14916
30	Margin of water price to production cost (real NRW base) (Rp/m3)	356	-497.5	-1248	2584	-58058
31	Margin of water price to production cost (excl. depreciation & interests) (Rp/m3)	356	218.5	-7	3926	-24129
32	Total fixed assets (Rp.000)	356	17915118	1340585815	4.64023E+11	244450
33	Total assets (Rp.000)	356	25664847.5	59697369	1302381018	1203103
34	Current liabilities (Rp.000)	334	1805370	14675946	1126493816	1152
35	Long-term liabilities (Rp.000)	133	1586359	490782191	62764820660	0
36	Total equity (Rp.000)	356	19309345	35602713	1087863851	-1300541364
37	Profit / loss after tax (Rp.000)	356	-257488.5	1558183	211957708	-20241362
38	Total income (Rp.000)	353	10501353	1642746789	5.64023E+11	317598
39	Profit margin (%)	356	-3.0%	-18.3%	925.0%	-464.4%
40	Asset turnover (%)	353	47.0%	54.0%	507.0%	2.0%
41	Return on assets (ratio)	356	-0.01125	-0.02	0.3	-1.1
42	Asset ratio per customer unit (Rp/CU)	356	2055256	3093134	42957992	163770
43	Chemical cost (Rp/m3)	258	89	120	751	-
44	Energy cost (Rp/m3)	340	448	460	2411	0
45	Maintenance cost (Rp/m3)	351	141	179	1928	3
46	General administrative cost to total revenue (%)	350	48%	53%	384%	0%
47	Installed capacity (l/sec)	356	255	501	18050	10
48	Real production (l/sec)	356	133	367	17382	3
49	Number of customers (CU)	356	12321	27033	813356	261
50	Number of inhabitants in administrative area (person)	352	333530	649084	9424208	38103
51	Number of inhabitants in service area (person)	356	211031	405946	9424208	133
52	Population served (person)	356	78468	176397	5788057	1566
53	Number of employees (person)	356	94	146	2763	8
54	Employee average monthly cost (Rp/employee/month)	356	3889799	24256324	4553636827	323585
55	COE participation rate (%)	224	3.2%	2.4%	0.8%	12.5%

Table 12 South Sulawesi PDAMs performances

	Indicator	No. of samples	Median	Mean	Largest	Smallest
1	Return on equity (%)	23	-5.2%	-72.1%	164.6%	-1444.7%
2	Operating ratio (ratio)	23	1.2	1.2	2.7	0.7
3	Cash ratio (%)	23	12.8%	1150.1%	25305.8%	0.0%
4	Collection efficiency (%)	23	82.3%	81.0%	111.0%	33.1%
5	Solvency (%)	23	220.0%	1903.0%	10578.2%	0.0%
6	Finance aspect score (point)	23	0.59	0.57	1.09	0.25
7	Service ratio (%)	23	42.3%	43.8%	95.2%	5.3%
8	Customer growth (%)	23	10.1%	11.7%	40.2%	-10.7%
9	Complaint resolution level (%)	23	100.0%	90.9%	100.0%	0.0%
10	Water quality satisfaction (%)	22	10.7%	42.0%	100.0%	0.0%
11	Domestic water consumption (point)	23	14.4	14.9	22.7	6.5
12	Service aspect score (point)	23	0.70	0.72	1.10	0.40
13	Production efficiency (%)	23	52.7%	53.4%	98.6%	12.9%
14	NRW (%)	23	29.7%	30.2%	49.5%	18.0%
15	Service hour (hour)	23	20	19.3	24	10
16	Water pressure satisfaction (%)	23	0.0%	20.9%	100.0%	0.0%
17	Water meter replacement (%)	23	2.2%	2.2%	6.5%	0.0%
18	Operation aspect score (point)	23	0.9	0.89	1.5	0.4
19	Number of staff per 1000 connections (ratio)	23	8.7	9.5	16.5	5.5
20	Employee training ratio (%)	23	10.8%	15.4%	46.8%	0.0%
21	Training cost to employee cost ratio (%)	23	0.8%	0.8%	2.1%	0.0%
22	Staff aspect score (point)	23	0.36	0.35	0.51	0.15
23	Total score (point)	23	2.6	2.52	3.22	1.47
24	Category (Healthy = 3, Less healthy = 2, Sick = 1)	23	2	2	3	1
25	Average water price (Rp/m3)	23	3770	3757	5918	1870
26	Water production cost (standard NRW base) (Rp/m3)	23	3904	4014	7493	903
27	Water production cost (real NRW base) (Rp/m3)	23	4570	4603	7757	956
28	Water production cost (excl. depreciation & interests) (Rp/m3)	23	3592	3422	5189	660
29	Margin of water price to production cost (standard NRW base) (Rp/m3)	23	61	-256	2606	-5109
30	Margin of water price to production cost (real NRW base) (Rp/m3)	23	-549	-846	937	-5191
31	Margin of water price to production cost (excl. depreciation & interests) (Rp/m3)	23	171	335	1367	-956
32	Total fixed assets (Rp.000)	23	11472415	23933842	203568787	402194
33	Total assets (Rp.000)	23	13852910	32586315	286019496	3141347
34	Current liabilities (Rp.000)	21	4378173	17692975	244355095	1152
35	Long-term liabilities (Rp.000)	14	302274.5	1379988	14565826	0
36	Total equity (Rp.000)	23	10363381	15000319	77342495	-11189855
37	Profit / loss after tax (Rp.000)	23	-634931	-47747	24020185	-9085143
38	Total income (Rp.000)	23	5193746	19807592	287026353	1336303
39	Profit margin (%)	23	-7.5%	-21.9%	14.5%	-167.9%
40	Asset turnover (%)	23	51.0%	58.6%	181.0%	7.0%
41	Return on assets (ratio)	23	-0.04	-0.03	0.12	-0.18
42	Asset ratio per customer unit (Rp/CU)	23	1754893	2463460	10317732	308518
43	Chemical cost (Rp/m3)	20	81	160	751	3
44	Energy cost (Rp/m3)	22	580	593	1394	9
45	Maintenance cost (Rp/m3)	23	112	133	325	16
46	General administrative cost to total revenue (%)	23	44%	50%	117%	26%
47	Installed capacity (l/sec)	23	160	325	3218	66
48	Real production (l/sec)	23	61	231	2999	32
49	Number of customers (CU)	23	7611	16275	162984	2196
50	Number of inhabitants in administrative area (person)	23	297313	444149	2380039	96194
51	Number of inhabitants in service area (person)	23	165461	235275	1429200	133
52	Population served (person)	23	54624	100894	973554	5076
53	Number of employees (person)	23	71	121	996	31
54	Employee average monthly cost (Rp/employee/month)	23	2769530	308698077	4553636827	1423208
55	COE participation rate (%)	16	6.3%	3.6%	0.8%	3.2%

Table 13 South Sumatra PDAMs performances

	Indicator	No. of samples	Median	Mean	Largest	Smallest
1	Return on equity (%)	12	-5.8%	-4.7%	20.1%	-15.2%
2	Operating ratio (ratio)	12	1.2	1.8	4.2	0.7
3	Cash ratio (%)	12	25.1%	198.1%	1416.9%	0.0%
4	Collection efficiency (%)	12	79.8%	72.1%	98.0%	35.9%
5	Solvency (%)	12	1057.6%	19768.0%	161598.6%	0.0%
6	Finance aspect score (point)	12	0.59	0.61	1.14	0.31
7	Service ratio (%)	12	29.1%	33.3%	98.5%	10.2%
8	Customer growth (%)	12	6.9%	7.1%	29.4%	-14.8%
9	Complaint resolution level (%)	12	100.0%	87.2%	100.0%	33.3%
10	Water quality satisfaction (%)	12	36.6%	44.8%	100.0%	0.0%
11	Domestic water consumption (point)	12	19.2	19.9	27.3	14.4
12	Service aspect score (point)	12	0.70	0.72	1.20	0.40
13	Production efficiency (%)	12	42.7%	47.3%	94.9%	9.7%
14	NRW (%)	12	28.5%	34.4%	59.2%	19.7%
15	Service hour (hour)	12	10	13.0	22	7
16	Water pressure satisfaction (%)	12	70.3%	49.1%	100.0%	0.0%
17	Water meter replacement (%)	12	1.8%	2.3%	9.3%	0.0%
18	Operation aspect score (point)	12	0.75	0.78	1	0.6
19	Number of staff per 1000 connections (ratio)	12	11.5	14.2	31.4	2.3
20	Employee training ratio (%)	12	4.0%	8.6%	40.5%	0.0%
21	Training cost to employee cost ratio (%)	12	0.3%	0.6%	2.7%	0.0%
22	Staff aspect score (point)	12	0.29	0.29	0.48	0.15
23	Total score (point)	12	2.47	2.39	3.76	1.51
24	Category (Healthy = 3, Less healthy = 2, Sick = 1)	12	2	2	3	1
25	Average water price (Rp/m3)	12	3541	3517	5458	1643
26	Water production cost (standard NRW base) (Rp/m3)	12	4640	4570	8308	2213
27	Water production cost (real NRW base) (Rp/m3)	12	5039	5648	12844	3031
28	Water production cost (excl. depreciation & interests) (Rp/m3)	12	3903	3694	5118	2202
29	Margin of water price to production cost (standard NRW base) (Rp/m3)	12	-501	-1053	3154	-4781
30	Margin of water price to production cost (real NRW base) (Rp/m3)	12	-1321	-2131	1024	-10884
31	Margin of water price to production cost (excl. depreciation & interests) (Rp/m3)	12	0.5	-177	1785	-2831
32	Total fixed assets (Rp.000)	12	37640212	94846809	390372653	1205824
33	Total assets (Rp.000)	12	43505027.5	121235065	571580867	2631218
34	Current liabilities (Rp.000)	9	1114055	3466319	17963159	24882
35	Long-term liabilities (Rp.000)	3	99004	8629588	25746711	43049
36	Total equity (Rp.000)	12	42046719.5	103137276	367783166	-3531071
37	Profit / loss after tax (Rp.000)	12	-1987350	2702049	74046924	-20241362
38	Total income (Rp.000)	12	8380540	41827802	363165948	1281177
39	Profit margin (%)	12	-18.9%	-58.7%	20.7%	-259.6%
40	Asset turnover (%)	12	25.5%	43.3%	226.0%	7.0%
41	Return on assets (ratio)	12	-0.05	-0.04	0.13	-0.13
42	Asset ratio per customer unit (Rp/CU)	12	3766203	6516738	27179159	681133
43	Chemical cost (Rp/m3)	10	112	144	391	45
44	Energy cost (Rp/m3)	12	589	506	943	49
45	Maintenance cost (Rp/m3)	12	180	215	600	39
46	General administrative cost to total revenue (%)	12	47%	47%	63%	34%
47	Installed capacity (l/sec)	12	264	627	3870	90
48	Real production (l/sec)	12	166	438	3674	17
49	Number of customers (CU)	12	9318	31094	244425	669
50	Number of inhabitants in administrative area (person)	12	493572	595354	1571466	216490
51	Number of inhabitants in service area (person)	12	199535	336739	1474074	76970
52	Population served (person)	12	65587	189560	1452250	7874
53	Number of employees (person)	12	136	166	555	21
54	Employee average monthly cost (Rp/employee/month)	12	2876073	4244389	16949165	1712352
55	COE participation rate (%)	5	3.0%	3.1%	2.7%	4.8%

Table 14 West Java PDAMs performances

		No. of samples	Median	Mean	Largest	Smallest
1	Return on equity (%)	23	1.9%	3.0%	16.9%	-25.0%
2	Operating ratio (ratio)	23	1.0	1.0	1.4	0.8
3	Cash ratio (%)	23	88.6%	128.9%	412.2%	2.1%
4	Collection efficiency (%)	23	94.3%	91.0%	97.6%	77.7%
5	Solvency (%)	23	389.3%	613.5%	2778.3%	73.7%
6	Finance aspect score (point)	23	0.86	0.82	1.14	0.50
7	Service ratio (%)	23	38.2%	43.4%	92.6%	15.5%
8	Customer growth (%)	23	6.8%	7.2%	15.2%	1.1%
9	Complaint resolution level (%)	23	100.0%	95.2%	100.0%	22.4%
10	Water quality satisfaction (%)	23	94.8%	93.5%	100.0%	79.7%
11	Domestic water consumption (point)	23	15.6	15.8	20.7	12.8
12	Service aspect score (point)	23	0.90	0.89	1.20	0.70
13	Production efficiency (%)	23	73.7%	71.3%	100.0%	38.3%
14	NRW (%)	23	29.1%	30.5%	68.8%	14.5%
15	Service hour (hour)	23	22	22.0	24	17
16	Water pressure satisfaction (%)	23	54.8%	55.5%	100.0%	0.3%
17	Water meter replacement (%)	23	5.3%	7.7%	21.2%	0.1%
18	Operation aspect score (point)	23	1.2	1.20	1.5	0.9
19	Number of staff per 1000 connections (ratio)	23	6.0	6.5	13.0	3.0
20	Employee training ratio (%)	23	39.7%	43.1%	98.2%	4.1%
21	Training cost to employee cost ratio (%)	23	0.7%	1.0%	2.5%	0.1%
22	Staff aspect score (point)	23	0.47	0.46	0.59	0.29
23	Total score (point)	23	3.45	3.34	4.04	2.53
24	Category (Healthy = 3, Less healthy = 2, Sick = 1)	23	3	3	3	2
25	Average water price (Rp/m3)	23	4241	4598	6747	2491
26	Water production cost (standard NRW base) (Rp/m3)	23	3781	3963	7857	1931
27	Water production cost (real NRW base) (Rp/m3)	23	4247	4578	9036	3511
28	Water production cost (excl. depreciation & interests) (Rp/m3)	23	3685	3879	6593	2766
29	Margin of water price to production cost (standard NRW base) (Rp/m3)	23	539	635	2897	-2178
30	Margin of water price to production cost (real NRW base) (Rp/m3)	23	0	20	1406	-3357
31	Margin of water price to production cost (excl. depreciation & interests) (Rp/m3)	23	655	719	1818	-914
32	Total fixed assets (Rp.000)	23	53216741	85665630	303891242	12100739
33	Total assets (Rp.000)	23	68550002	125609339	441715095	17937188
34	Current liabilities (Rp.000)	23	8100508	13126566	81459470	1675314
35	Long-term liabilities (Rp.000)	17	5595627	34333224	311614710	91455
36	Total equity (Rp.000)	23	39788238	76701405	388758925	-104230190
37	Profit / loss after tax (Rp.000)	23	913783	6932459	45835924	-3379088
38	Total income (Rp.000)	23	36966473	75749715	301315489	10584122
39	Profit margin (%)	23	2.9%	3.1%	18.3%	-30.6%
40	Asset turnover (%)	23	61.0%	60.2%	120.0%	23.0%
41	Return on assets (ratio)	23	0.02	0.03	0.1	-0.08
42	Asset ratio per customer unit (Rp/CU)	23	1823821	2347842	5573569	797335
43	Chemical cost (Rp/m3)	21	132	142	482	5
44	Energy cost (Rp/m3)	22	273	294	606	10
45	Maintenance cost (Rp/m3)	23	167	199	494	26
46	General administrative cost to total revenue (%)	23	51%	51%	73%	30%
47	Installed capacity (l/sec)	23	589	910	2764	78
48	Real production (l/sec)	23	348	671	2274	78
49	Number of customers (CU)	23	37607	57488	188356	8115
50	Number of inhabitants in administrative area (person)	23	1768532	2094302	6549374	190845
51	Number of inhabitants in service area (person)	23	706055	1134542	4897521	155234
52	Population served (person)	23	267882	423197	1735357	59314
53	Number of employees (person)	23	262	302	678	57
54	Employee average monthly cost (Rp/employee/month)	23	5587900	6171395	13158969	2457345
55	COE participation rate (%)	6	0.8%	1.2%	1.5%	1.8%

Table 15 Non-Target Province PDAMs performance

	Indicator	No. of samples	Median	Mean	Largest	Smallest
1	Return on equity (%)	297	-2.2%	1.5%	2375.4%	-468.1%
2	Operating ratio (ratio)	298	1.1	1.3	19.2	0.7
3	Cash ratio (%)	296	69.2%	45182.0%	12570164.0%	-25.7%
4	Collection efficiency (%)	298	91.4%	87.9%	205.6%	32.0%
5	Solvency (%)	296	874.7%	18054.7%	794983.5%	0.0%
6	Finance aspect score (point)	298	0.76	0.72	1.14	0.25
7	Service ratio (%)	298	39.3%	43.2%	99.9%	3.7%
8	Customer growth (%)	297	6.1%	8.6%	141.2%	-46.6%
9	Complaint resolution level (%)	298	100.0%	91.4%	161.8%	0.0%
10	Water quality satisfaction (%)	295	70.6%	53.7%	143.1%	0.0%
11	Domestic water consumption (point)	298	16.4	17.6	304.0	0.2
12	Service aspect score (point)	298	0.80	0.76	1.20	0.30
13	Production efficiency (%)	298	61.0%	59.9%	100.0%	15.3%
14	NRW (%)	298	30.7%	34.2%	85.9%	3.6%
15	Service hour (hour)	298	20	18.9	24	0
16	Water pressure satisfaction (%)	296	42.6%	44.9%	100.9%	0.0%
17	Water meter replacement (%)	297	2.6%	4.5%	30.9%	0.0%
18	Operation aspect score (point)	298	1	0.95	1.8	0.1
19	Number of staff per 1000 connections (ratio)	298	7.7	8.8	45.5	2.1
20	Employee training ratio (%)	298	17.5%	24.0%	133.3%	0.0%
21	Training cost to employee cost ratio (%)	298	1.0%	1.9%	65.0%	0.0%
22	Staff aspect score (point)	298	0.43	0.39	0.67	0.15
23	Total score (point)	298	2.84	2.80	4.17	1.49
24	Category (Healthy = 3, Less healthy = 2, Sick = 1)	298	3	2	3	1
25	Average water price (Rp/m3)	298	3423	3628	11180	892
26	Water production cost (standard NRW base) (Rp/m3)	298	3283	3791	20939	540
27	Water production cost (real NRW base) (Rp/m3)	298	4154	4969	64081	1125
28	Water production cost (excl. depreciation & interests) (Rp/m3)	298	3281	3710	29347	873
29	Margin of water price to production cost (standard NRW base) (Rp/m3)	298	98	-164	6497	-14916
30	Margin of water price to production cost (real NRW base) (Rp/m3)	298	-534	-1341	2584	-58058
31	Margin of water price to production cost (excl. depreciation & interests) (Rp/m3)	298	153	-82	3926	-24129
32	Total fixed assets (Rp.000)	298	17064471	1589226847	4.64023E+11	244450
33	Total assets (Rp.000)	298	24444258	54224640	1302381018	1203103
34	Current liabilities (Rp.000)	281	1475762	14936319	1126493816	3162
35	Long-term liabilities (Rp.000)	99	2233878	652981394	62764820660	3058
36	Total equity (Rp.000)	298	18653028.5	31301271	1087863851	-1300541364
37	Profit / loss after tax (Rp.000)	298	-300214.5	1221276	211957708	-19743967
38	Total income (Rp.000)	295	9855269	1956575813	5.64023E+11	317598
39	Profit margin (%)	298	-4.2%	-18.1%	925.0%	-464.4%
40	Asset turnover (%)	295	47.0%	53.6%	507.0%	2.0%
41	Return on assets (ratio)	298	-0.018	-0.03	0.3	-1.1
42	Asset ratio per customer unit (Rp/CU)	298	2034504	3061393	42957992	163770
43	Chemical cost (Rp/m3)	207	80	112	737	-
44	Energy cost (Rp/m3)	284	450	460	2411	0
45	Maintenance cost (Rp/m3)	293	141	180	1928	3
46	General administrative cost to total revenue (%)	292	49%	54%	384%	0%
47	Installed capacity (l/sec)	298	252	479	18050	10
48	Real production (l/sec)	298	129	352	17382	3
49	Number of customers (CU)	298	11833	25350	813356	261
50	Number of inhabitants in administrative area (person)	294	306922	554248	9424208	38103
51	Number of inhabitants in service area (person)	298	202265	365672	9424208	14905
52	Population served (person)	298	77353	162646	5788057	1566
53	Number of employees (person)	298	91	135	2763	8
54	Employee average monthly cost (Rp/employee/month)	298	3908527	4504433	19928395	323585
55	COE participation rate (%)	185	2.2%	2.4%	0.8%	12.5%

Supplemental Document 2

Terms of Reference (TOR) of COE Management Consultant

TERMS OF REFERENCE (TOR)

MANAGEMENT OF WATER UTILITY IMPROVEMENT THROUGH CENTER OF EXCELLENCE

CONTRACTUAL - 5

2018

DIRECTORATE OF WATER SUPPLY SYSTEM DEVELOPMENT
DIRECTORATE GENERAL OF HUMAN SETTLEMENT
MINISTRY OF PUBLIC WORKS AND HOUSING

TERMS OF REFERENCE (TOR)

MANAGEMENT OF WATER UTILITY DEVELOPMENT THROUGH CENTER OF EXCELLENCE

1. Background

In order to achieve the target to provide 100% safe water service to the community as stated in National Medium-Term Development Plan (RPJMN) 2014-2019, it is essential to have an enforcement in Water Supply System (SPAM) companies, especially PDAM as the main priority in SPAM in Indonesia.

Based on the result of an audit by National Agency for Water Supply Improvement (BPPSPAM), in 2017, only 209 out of 378 PDAMs in Indonesia are in healthy condition. The other 103 PDAM are in less healthy condition, and 66 other PDAM are in sick category. Performance evaluation by BPPSPAM is based on 4 aspects namely financial, service, operation, and human resource. By this, it can be concluded that human resource factor has an important role in the effort of PDAM performance improvement.

Related to the importance of the role of human resource in Water Utility, Directorate of Water Supply Development, DGHS, started Center of Excellence (CoE) program since 2012 and continues until 2018. CoE program is expected to solve the issues on distribution and acceleration of human resources in water sector. In the future, CoE program can enhance PDAM human resource competence, as well as supporting Water Supply Technical Training Center (BTAM) in training the human resource in water sector.

For that reason, to continue CoE program as an innovation in competence development of human resource in water supply system, CoE program is resumed in 2018 by applying distribution principles. These fundamental principles determine that PDAM will be developed into a training center according to its thematic potential (NRW, EE, SAK ETAP, WTP Operational, GIS, Customer Relation, and Financial Analysis & Management). In addition, there will be a partnership among PDAM to exchange experience and knowledge by using WOPs scheme.

In order to implement CoE program, Directorate General of Human Settlement, Ministry of Public Works

and Housing holds PDAM Development Management through Center of Excellence activities. This program is also stated in Central Goverment Budget (APBN) 2018. In general, this activity is a monitoring for competence improvement of professional human resource in water sector through Center of Excellence. In addition, this activity also functions as the preparation for future CoE implementation.

2. Aim and Objective

2.1 Aim:

The aim of this activity is to be an effective and efficient acceleration program for PDAM performance improvement through human resource development.

2.2 Objective:

The objectives of this activity are listed as follows :

a. To prepare the mechanism of CoE program implementation starting from planning, implementation, up to post training activities, as well as to evaluate each of these steps
b. To provide input/recommendation on evaluation result in order to develop the Standars Operating Procedure (SOP) of CoE which includes the involvement of PERPAMSI and BTAM
c. Review the capacity of PERPAMSI related to the formation of CoE PDAM Training Team, covering: personnel, organization and financial status of PERPAMSI
d. Preparing the MoU on the joint cooperation of CoE Program between DWSD and PERPAMSI, inculding a financing plan to support the CoE program
e. Review the capacity and readiness of PD PERPAMSI across Indonesia as Kab/Kota training implementer, covering: personnel, finance and organization, and giving recommendation of strategy of strengthening PD PERPAMSI
f. To compose an analysis and evaluation of CoE implementation in PDAM (that have been chosen as training center) by involving local government and PD Perpamsi
g. To monitor and evaluate CoE programs implementation which includes: (1) monitoring the result of CoE program implementation in each

training, (2) the annual evaluation of CoE program (relevance, effectiveness, efficiency, impact, and sustainability), and (3) monitoring the implementation and outcome of the CoE program through the questionnaire survey (JICA recommendation)

h. To evaluate and revise the questionnaire that is used to evaluate CoE programs implementation
i. To compose CoE programs achievement and target, especially on WTP Operational module, GIS module, Customer Relation Module, as well as Financial Analysis and Management Module
j. To compose an analysis on the success rate of Provincial Trainers and Kab/Kota Trainers in improving PDAM human resource at their own region
k. To be actively involved and to support JICA Team in completing two new modules (Customer Relationship and Financial Analysis and Management Module) and two existing modules (NRW and EE Module);
l. To compose the competence scheme for all CoE modules that is modified according to National Work Competency Standard (SKKNI) for water sector;
m. Review the capacity of LSP-AMI and Competency Test Location (*Tempat Uji Kompetensi/*TUK) available in Indonesia and provide recommendation for CoE participant's fecilitation strategies to obtain competence certificate from LSP-AMI
n. To provide suggestions for the guidance of partnership implementation among PDAM (CoE participants) draft using WOPs scheme;
o. To provide recommendation on PDAM that have potential to build partnership based on WOPs;
p. To provide feedback on PDAM criteria that will be determined as training center, composed by PDAM Capacity Improvement Consultant as Training Center through CoE;
q. To conduct other events based on the suggestions from technical team.

3. Target

To implement supervision as well as to compose

		analaysis and evaluation on the whole Center of Excellence activities that cover CoE regular programs as well as PDAM development as training center. This also covers partnership mechanism among PDAM by implementing WOPs scheme.
4.	**Activity Location**	The locations for PDAM Competence Improvement Management through Center of Excellence are in 11 provinces with different activities yet still in part of CoE activities (North Sumatera, South Kalimantan, Nusa Tenggara Barat/NTB, Central Java, East Java, South Sulawesi, South Sumatera, West Kalimantan, Nusa Tenggara Timur/NTT, North Sulawesi, and Maluku) in Indonesia.
5.	**Funding Source**	This activity is supported by Central Goverment Budget (APBN) 2018 in Budget Implementation List of Directorate of Water Supply System Development with capped amount of 1,800,000,000 IDR (one billion and eight hundred million rupiah).
6.	**The Commitment-making Official Name and Organization**	Directorate of Water Supply System Development
7.	**Basic Data**	-
8.	**Technical Standard**	-
9.	**Previous Studies**	1. PDAM Human Resource Development Through Center of Excellence of 2012, 2013, 2014, 2015, 2016 and 2017 2. Human resource development management of 2014, 2015, 2016 and 2017.
10.	**Legal Reference**	1. Law No. 11 of 1974 on Waterworks 2. Government Regulation (PP) No. 122 of 2015 on Drinking Water Supply System (SPAM) 3. Minister of Public Works and Housing Regulation (Permen PUPR) No. 10 of 2016 about Indonesia National Work Competency Standard (SKKNI) in the Management of Drinking Water Supply System
11.	**Scope of Work**	**Scope of work.** The scope of Management of Water Utility Improvement Activities with the Center of Excellence System are: **A. Planning:** 1. Prepare work plan and activity schedule; 2. Coordinate the program with BTAM, the Provincial Work Unit of Water Supply System (Satker PAMS

Provinsi), Provincial Perpamsi, and other related organizations;

3. Review the capacity of PERPAMSI and facilitate assistance related to the formation of CoE PDAM Training Team in PERPAMSI
4. Preparing the MoU on the Joint Cooperation of COE Program between DWSD and PERPAMSI, including the CoE Program financing plan
5. Review the capacity and readiness of PD PERPAMSI nationwide as implementing Kab/Kota training, and provide recommendation for strategy of strengthening PD PERPAMSI
6. Coordinate with the implementation consultant (Field Consultant) of human resource improvement in water supply sector through the Center of Excellence Program in order to synchronize the work plan and schedule of the implementation of the CoE program activity
7. Review the preparation and methodology of CoE program training implementation and other activities, as well as Standard Operating Procedures (SOP) of CoE program which includes the involvement of PERPAMSI and BTAM in order to improve the SOP of CoE Program
8. Provide recommendations on participant's criteria for Provincial Training and Kabupaten/Kota Training;
9. Provide input on the guidance of implementation of cooperation among PDAM (CoE participants) with WOPs scheme;
10. Developing the competency scheme and active in finalizing the development of all modules according to SKKNI in water sector
11. Prepare a teaching guide, including achievement and target that adjusted to the training type (National / Provincial / Kabupaten&Kota).
12. Review the capacity of LPS-AMI and TUK nationwide and provide recommendation for CoE participant;s facilitation strategies to obtain competency certificates from LSP-AMI

B. Implementation:

1. Monitor well all stages in the implementation of Human Resources Improvement activities through CoE Scheme that implemented by CoE's Field Consultant.
2. Coordinate the program with the Provincial Work

Unit of Water Supply System (Satker PAMS Provinsi), Provincial PD Perpamsi, PDAM, Water Supply Technical Training Center in Bekasi (BTAM Bekasi) and stakeholders in the implementation of the CoE program;

3. Provide recommendations in determining PDAM as the candidate location of training center.
4. Review/Study the success of the PDAM as a training center location;
5. Provide recommendations in selecting PDAM as training center candidate
6. Review/Study the success of PDAM in implementing cooperation with other PDAMs;
7. Prepare a competency scheme for all CoE modules that are adjusted to SKKNI in drinking water sector;
8. Implement and coordinate the implementation of coordination meeting with the Field Consultants package.
9. Monitor the Provincial Training
10. Together with the Field Consultant to provide recommendation of Provincial Trainers candidates who meet the feasibility to then apply the Provincial Training results on the implementation of Kabupaten/Kota Traning.
11. Study/Review the success rate of Provincial and Kab/Kota Triners in an effort to improve PDAM's human resources in their respective regions.
12. Prepare a long-term CoE implementation mechanism by focusing on implementation in the regions/villages.
13. Conduct a consignment discussion of the CoE implementation mechanisms in the future;
14. Conduct annual monitoring and evaluation of CoE Program covering relevance, effectiveness, efficiency, impact, and sustainability through questionnaire that has been evaluated and perfected
15. Coordinate with the donor agency i.e. JICA team, KIAT, ect.
16. Conduct other activities in accordance with input from the technical team

C. Work Completion:

1. Prepare reports;
2. Prepare reports of monitoring and evaluation of CoE program assistance results from planning, preparation, implementation, and post implementation.

12. Output

The outputs generated in this activity are:

1. Human Resources in drinking water sector that can be a professional trainers at the national level.
2. Data processing result of questionnaire distribution.
3. Report of the CoE Program implementation.
4. Recommendation on the future scheme of CoE Program implementation from planning, implementation and follow-up post implementation.
5. CoE's SOP (already includes the involvement of PERPAMSI and BTAM)
6. Report on the result of review of PERPAMSI's capacity (Central Board/PP and Regional Board/PD) in support of CoE and strengtheing of PD PERPAMSI
7. Competency Scheme that has been in accordance with SKKNI of drinking water sector.
8. Draft of MoU of joint cooperation between DWSD and PERPAMSI
9. Report on monitoring result of the CoE Program impelemtation in each training
10. Report on annual evaluation (relevance, effectiveness, efficiency, impact, and sustainability)
11. Draft Guidance of the implementation of cooperation between PDAM (CoE participants) with WOPs scheme.
12. List of PDAMs that can cooperate with WOPs scheme
13. Other reports in accodance with the objectives and scope of work

13. Material Tools, Personnel and Facilities from Commitment-making Official

a. Data

Service provider will facilitate the needs of data/information to complete the composition of this activity.

b. Business Trip Facility

Service user does not provide business trip facility.

c. Supervisory Staff

Service user will establish a technical team as a supervisor of the activity in order to run consulting

service.

14. Tools and Materials from Consulting Service Provider

a. Accommodation

Accommodation for professional staffs must be provided by service provider by using its own budget.

b. Provision by Service Provider

Service provider must provide the facilities that support the activity and must calculate all the costs that will be added into proposal cost consisting of the following:

1. Desktop computer and printer for 7 (seven) months.
2. Supply computer for 7 (seven) months.
3. Communication for 7 (seven) months.

In its offer, service provider must provide the calculation of operating and meeting cost that elaborated as follows:

1. Business trips for the experts in form of monitoring visit to PDAM training center candidate in 6 provinces (North Sumatera, South Kalimantan, NTB, Central Java, East Java, and South Sulawesi)
2. Business trips for the experts to seupervise the training implementation in PDAM training center candidate in 6 provinces for at least 6 days.
3. Business trips for Provincial Training assitance in South Sumatera, West Kalimantan, and NTT for at least 7 days.
4. Business trips for the experts in form of PDAM supervision with WOPs scheme in North Sulawesi for two times and at least 5 days.
5. Business trips for Kab/Kota Training assistance inMaluku for at least 5 days.
6. Cost for proposal application assistance in the province
7. Consignment of future CoE implementation mechanism (35 persons x 1 fullboard x 3 times) in Jakarta.
8. Coordination meeting with field consultants for full day (30 persons x 1 day x 2 times) in Jakarta.
9. Meeting with the technical team (25 persons x 3 times)

15. Scope of Authority for Service Provider

To help the Directorate of Water Supply System Development, Directorate General of Human Settlements, the Ministry of Public Works and Housing in accelerating PDAM improvement program.

16. Time Period for Activity Completion

The period of this activity is 7 (seven) months or 210 calendar days.

Position	Qualification			Total OB
	Education	Skill *)	Experience	
Expert staff :				
Team Leader	Bachelor Degree of Civil Engineering /Environmental Engineering	Young Expert (Ahli Muda)	4 years	7
Water System Expert	Bachelor Degree of Environmental Engineering /Civil Engineering	Young Expert (Ahli Muda)	3 Years	7
Information System Expert	Bachelor degree in information system		4 Years	7
Human Resource Development Expert	Bachelor degree in all major, but preferred to have bachelor degree in management/psychology		4 years	7
Mechanical Electrical Expert	Bachelor Degree of Machine Engineering/Electrical Engineering	Young Expert (Ahli Muda)	4 years	7
Financial Expert	Bachelor Degree of Economy/Accounting		4 years	7
Expert assistant:				
Water Supply assistant	Bachelor Degree of Environmental Engineering /Civil Engineering		2 years	7

Human resource development assistant	Bachelor degree in all major, but preferred to have bachelor degree in management/psychology		2 years	7
Supporting staffs				
Secretary				7

17. 1 Personnel Description

Team Leader

Team Leader must possess at least a bachelor degree in environmental engineering / civil engineering / management and possess at least 4 years of experience as a team leader.

Team leader is required to have an experience in holding PDAM human resource training, especially in CoE program. 1 Team Leader is in charge for 7 MM.

Team leader tasks and responsibilities:

- To continuously coordinate and discuss with the technical team, CoE consultants, BTAM, and other stakeholders
- Coordinate and conduct coordination meeting with Strategis Unit's Field Consultants
- To compose the concept of future CoE program implementation with joint cooperation method between DWSD and PERPAMSI including mOU and financing scheme
- To compose an analysis on questionnaire distribution
- To compose recommendation from the evaluation result on PDAM as training center candidate
- To coordinate, monitor, and evaluate provincial training
- To monitor PDAM supervision by using WOPs mechanism
- To provide recommendation on the mechanism of partnership among PDAM
- To conduct annual monitoring and evaluation of CoE

program based on Effectiveness, Efficiency, Impact, and Sustainability

- To coordinate, monitor and evaluate provincial trainer implementation by consultant
- Compile a competency scheme for CoE module that is adaptes to SKKNI for drinking water
- Review the capacity of LSP-AMI and TUK to obtain competency test mechanism for COE program participants
- Coordinate and monitor the coE module teaching guides that is adjusted to the types of Kab/Kota Training
- Formulate the mechanisms of Kab/Kota Training implementation that inculde self-development materials to prepare Kab/Kota trainers to teach community group
- To coordinate, monitor, and evaluate Kab/Kota Training implementation
- To coordinate and monitor each outcome of every CoE program implementation by the consultant
- To always coordinate and work together with other experts in composing the report
- To take responsibilities on report completion and report implementation

Water Supply Expert

Water Supply Expert with minimum requirement at least Bachelor Degree of Environmental Engineering/Civil Engineering and an experience of 3 years in drinking water field. The expert must have an experience in holding a training activity, especially in the previous CoE activities. The position is for 1 (one) expert who will be on duty for 7 OB each (14 OB in total).

Drinking Water Experts roles and responsibilities:

- To continuously coordinate and discuss with the technical team
- To actively coordinate with CoE consultants, BTAM, JICA and other stakholders
- To monitor and to evaluate provincial training implementation for WTP Operation and/or NRW
- To compose the concept of CoE program in several regions
- To conduct and to prepare coordination meeting

substance with CoE consultants

- To study/review the capacity of LSP-AMI as TUK to obtain the competency test mechanism for WTP and NRW modules
- To monitor and to evaluate training implementation by CoE filed consultants for WTP Operational and NRW
- To conduct the formulation, achievement, and target of CoE activities for WTP module
- To compose the competence scheme concept based on drinking water SKKNI on the whole CoE modules especially on WTP and/or NRW
- to monitor each outcome from every step in CoE program activities by the consultant
- To compose the concept of competency scheme based on SKKNI of Drinking Water for WTP and/or NRW module
- To compese the teaching guide for WTP and/or NRW module
- To monitor and evaluate the annual activities of CoE Program
- To provide input to the criteria and the study of PDAM as training center
- To provide input to cooperation schemes between PDAMs
- To be responsible on report completion and report implementation
- To be responsible in completing report and implementing the report according to the task assigned by the Team Leader

Information System Expert

Information system expert with minimum education of bachelor degree in information system and possessing 4 years of experience in web and portal making. There would be 1 (one) experts that will each serve for 5 MM.

The roles and responsibilities of Information System Expert are as follows :

- To conduct and to prepare coordination meeting substance together with CoE field consultant
- To review and to improve CoE database application and information system according to the suggestion

from the technical team

- To update the database of PDAM participated in CoE based on the questionnaire distribution results
- To compose an analysis from questionnaire distribution and mapping the gaps in the number of CoE Program's Trainers and Participants
- To conduct and to prepare coordination meeting substance together with CoE field consultant
- To study/review the capacity of LSP-AMI as TUK to obtain the compentence test mechanism for GIS subject
- To monitor and evaluate Training implementation by CoE's field consultant, especially GIS module
- Conduct preparation, achievement and target of CoE activities for GIS module
- To compose a concept of competency scheme based on water supply SKKNI for GIS module
- To develop teaching guide for GIS module
- To monitor and to evaluate the annual activities of CoE program
- To provide input on the criteria and the study of PDAM as training center
- To provide input on the cooperation schemes between PDAMs
- To be responsible on report completion and report implementation
- To be responsible on report completion according to the tasks given by Team Leader

Human Resource Development Expert

Human resource development expert is required to have at least a bachelor degree in Management/Psychology and a 4 years of experience in human resource management field in PDAM especially related to training. It is preferred for the expert to have previously been involved in CoE program. There will be 2 (two) experts that serve for 7 MM.

The task and responsibilities of human resource development expert are as follows:

- To continuously conduct coordination and discussion with the technical team
- To conduct an active coordination with CoE field

consultant, BTAM, and other related stakeholders

- To conduct and to prepare coordination meeting substance together with CoE field consultant
- To monitor and to evaluate the implementation of provincial training in BTAM
- To prepare monitoring and evaluation format for the human resource that have involved in CoE programs, that describes the improvement of their self-capacity and the things that they have done in order to improve the condition in their own PDAM
- To study/review on capacity of LSP-AMI as TUK to obtain the competence test mechanism for CR module
- To conduct preparation, achievement, and target of CoE activities for CR module
- To monitor and to evaluate the supervision on provincial trainers by the field consultant
- To compose competence scheme concept based on water supply SKKNI on the whole CoE module especially on GIS module
- To monitor and to evaluate the implementation of training by CoE field consultant
- To monitor the outcome of each CoE programs by the field consultant
- To prepare the concept of Kab/Kota Training implementation that will be conducted like Provincial Training mechanism that involves self-development material in preparation of Kab/Kota Trainers to become trainers for community groups
- To monitor and evaluate the annual activities of CoE Program
- To provide input to the criteria and the study of PDAM as training center
- To provide input to cooperation schemes between PDAMs
- To take responsibility on report completion and report implementation
- To take responsibility on report completion and report implementation according to the tasks given by team leader

Financial Expert

Financial expert is expected to possess at least a bachelor degree in Economy/Accounting and an experience of at least 4 years in finance, especially on PDAM financial. There would be 1 (one) financial experts that will each serve for 7 MM.

The roles and responsibilities of Financial Expert are as follows:

- To continuously conduct coordination and discussion with the technical team
- To conduct an active coordination with CoE field consultant, BTAM, and other related stakeholders
- To monitor and evaluate the Provincial Training implementation for SAK ETAP and/or FAM module
- Preparation the concept of CoE Program Implementation in rural area
- To analyze the result of the questionnaire distibution and make impreovement to the questionnaire
- To impelment and prepare the substance of coordination meeting with CoE's field consultant
- To review the capacity of LSP-AMI as TUK to obtain competence test mechanism for SAK ETAP and FAM modules
- To monitor and to evaluate the implementation of provincial training by CoE's field consultant for SAK ETAP and/or FAM module
- To conducting preparation, achievement, and targets of CoE activities for FAM module
- To compose a competence scheme based on water supply SKKNI and apply it on the whole CoE module especially on SAK-ETAP and/or FAM module
- To monitor the outcome of all CoE program actiivites by CoE field consultant
- To compose the concept of compatency scheme based on SKKNI of dringking water for SAK ETAP and/or FAM module
- To compose the teaching guide for SAK ETAP and/or FAM module
- To monitor and to evalate the annual activities of CoE program
- To provide input to the criteria and the study of PDAM as training center

- To provide input to cooperation schemes between PDAMs
- To take responsibility on report completion and report implementation
- To take responsibility on report completion and report implementation according to the tasks given by team leader

Mechanical and Electrical Expert

Mechanical expert with minimum education of bachelor degree in mechanical engineering/ electrical engineering and possessing 4 years of experience in mechanical electrical operation and maintenance. There would be 1 (one) mechanical electrical young expert that would serve for 7 MM.

Mechanical and Electrical expert roles and responsibilities are as follows :

- To continuously coordinate and to discuss with the technical team
- To conduct an active coordination with CoE field consultant, BTAM, JICA and other related stakeholders
- To monitor and to evaluate the implementation of Provincial Training for WTP and/or EE module
- To compile the concept of CoE program implementation
- To analyze the result of questionnaire distirbution
- To conduct and prepare the subtance of coordination meeting with CoE field consultant
- To review the capacity of LSP-AMI as TUK to obtain competence test mechanism for WTP and EE modules
- To monitor and to evaluate the training implementation by CoE field consultant for WTP and/or EE module
- To compile the concept of competency scheme based on SKKNI of drinking water to all CoE modules, especially for WTP and/or EE module
- To monitor the outcome of each CoE program activity by field consultant
- To compile the concept of competency scheme based on SKKNI of drinking water for WTP and/or EE

module

- To compile the teaching guide for WTP and/or EE module
- To monitor and to evaluate the annual acitivities of CoE program
- To provide input to the criteria and the study of PDAM as training center
- To provide input to cooperation scheme between PDAMs
- To responsible to report completion and report implementation
- To responsible to report completion in accordance with the tasks given by the team leader
- To coordinate and to discuss with techinical team periodically
- To actively coodinate with CoE field consultants, BTAM, JICA, and other stakeholders
- To monitor and to evaluate the Provincial Training implementation for WTP and energy efficiency modules
- To compile the concept of CoE program implementation
- To analyze the result of questionnaire distibution and make improvement to the questionnaire
- To conduct and to prepare the substance of coordination meeting with CoE field consultants
- To monitor and to evaluate the Training implementation by CoE field consultant especially on WTP and/or Energy Efficiency module
- To monitor the outcome of each CoE program activity by field consultant
- To compile the concept of competency scheme based on SKKNI of drinking water for SAK ETAP and/or FAM module
- To compile the teaching guide for SAK ETAP and/or FAM
- To monitor and evaluate the annual activities of CoE program
- To provide input to the criteria and the study of PDAM as training center

- To provide input to cooperation scheme between PDAMs
- To take responsibility on report completion and report implementation
- To take responsibility on report completion and report implementation in accordance with the tasks given by the team leader

Water Supply Assistant

Water supply assistant with minimum education of Bachelor Degree in Environment Engineering/Civil Engineering, is expected to have minimum 2 years of experience in drinking water field especially in composing technical module as well as drinking water field training. There will be 1 (one) drinking water expert that will serve for 6 MM.

The roles and responsibilities of drinking water expert are listed as follows:

- To monitor and to evaluate the implementation of provincial training
- To compose and analysis on questionnaire distribution
- To monitor and to evaluate the implementation of supervision by CoE field consultant especially on NRW and WTP operational subject
- To monitor and to evaluate the implementation of training by CoE field consultant especially on WTP and GIS subject
- To always coordinate and work together with the other experts in completing the report
- To take responsibility on report completion and report implementation
- To be responsible on report completion according to the tasks given by Team Leader

Human Resource Development Assistant

Human resource development assistant is required to possess at least a bachelor degree in any discipline, but is preferred to have a degree in management/psycholody. A 2 years experience is also required especially in PDAM human resource training. There will be 1 (one) human resource development assistant that will serve for 6 MM.

The roles and responsibilities of human resource development assistant is as follows:

- To conduct and to prepare coordination meeting substance with CoE field consultant
- To monitor and to evaluate the implementation of provincial training in BTAM
- To prepare monitoring and evaluation format for the human resource that has been involved in CoE activities, which describes their self improvement and what they have done to improve their PDAM.
- To monitor and to evaluate supervision on provincial trainer candidate by field consultant
- To monitor and to evaluate the implementation of training by CoE field consultant
- To monitor the outcome of each steps in CoE programs by field consultant
- To take responsibility on report completion and report implementation

Supporting Staffs

a. Secretary (1 person) serves for 7 MM.
b. Computer operator (1 person) serves for 7 MM.

18. Activity Implementation Schedule

Provider must compose implementation schedule according to the neccesities of Management of Water Utility Competence Improvement through Center of Excellence.

No	Kegiatan	Bulan 1				Bulan 2				Bulan 3				Bulan 4				Bulan 5				Bulan 6				Bulan 7			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	SPMK																												
2	Koordinasi dengan tim teknis dan stakeholders																												
3	Laporan pendahuluan																												
4	Rapat koordinasi persiapan kegiatan dengan konsultan pelaksana SPAM Strategis																												
5	Konsinyasi 1																												
6	Monitoring persiapan bimtek provinsi																												
	Pelaksanaan Bimtek Provinsi																												
7	Monitoring kunjungan ke PDAM Calon Training Center																												
8	Monitoring persiapan monitoring terpusat																												
9	Laporan antara																												
10	Monitoring pelaksanaan Pelatihan di PDAM Calon Training Center																												
11	Konsinyasi 2																												
12	Rapat koordinasi persiapan kegiatan dengan konsultan pelaksana SPAM Strategis																												
13	Monitoring Pelaksanaan Pendampingan dengan WOPs																												
13	Monitoring persiapan bimtek kab/kota																												
14	Monitoring pelaksanaan bimtek kab/kota																												
15	Konsinyasi 3																												
16	Konsep laporan akhir																												
17	Monitoring Pelaksanaan Pendampingan Proposal																												
18	Perbaikan laporan																												
19	Laporan akhir																												

19.	**Preliminary Report**	**Preliminary Report :** This report covers the following: a. Activity background, b. scope, c. methodology and strategy of work implementation, and CoE Program's SOP d. organization structure e. work plan agreement and activities schedule that will be conducted by the consultant based on the result of coordination meeting and workshop. The report that has been approved by the technical team is submitted 2 (two) weeks after work order is issued and is printed in 3 (three) copies.
20.	**Interim Report**	Interim Report contains the following: a. monitoring result of the implementation activities in PDAM training center candidate b. monitoring result of provincial training c. preliminary result of the concept of CoE implementation in the region indule the initioal concept of joint coordination between DWSD and PERPAMSI d. analysis result of questionnaire distribution e. result of questionnaire revision and suggestion for JICA CoE master plan f. coordination meeting report g. adjustment scheme of CoE module with SKKNI h. report of Kab/Kota training preparation i. report of PDAM supervision preparation using WOPs scheme Interim Report that has been discussed and approved by the technical team must be submitted at least 3.5 months after work order is issued and the result will be printed in 3 (three) copies .
21.	**Report on Workshop Result**	-
22.	**Executive Summary**	The report that contains summary and result of the activities.
23.	**Final Report Concept**	The report must be compeleted 6 (six) months after work order is issued and it must be printed in 3 (three) copies). The report contains the following: a. Recommendation for PDAM Training Center b. Teaching guide that adjustes to the training types

c. Monitoring result from training implementation by CoE field consultant
d. Competency scheme to the all CoE modules that are adjusted to SKKNI of drinking water
e. Monitoring result from PDAM supervision
f. CoE implementation mechanism in remote areas
g. Restoration of CoE database application and information system

22.	**Final Report**	This report contains the revision of final report concept . Final report is submitted at least 7 (seven) months after work order is issued and it is printed in 3 (three) copies. A soft copy should be included in one hard disk, which also contains executive summary and the documentation of the activities.
23.	**Domestic Production**	All the activities listed in this TOR must be implemented in The Republic of Indonesia area. An exception is stated in TOR number 4 that such condition can change based on the consideration of limited competence in domestic area.
24.	**Partnership Requirement**	Not necessary .
25.	**Guidance on Field Data Collection**	Not necessary.
26.	**Knowledge Transfer**	The involvement of experts in this activity must generate a maximum benefit in terms of knowledge transfer. It can be achieved by establishing partnership with media and conducting a continuous, routine discussion.

Jakarta, January 2018

Approved by	**Composed by**
Director of Water Supply System Development	**Commitment-making Official Technical Guidance**
Ir. Muhammad Sundoro, M.Eng	**Ir. Susi Simanjuntak, MT**
NIP. 196605121996031001	**NIP. 196011211990072001**

Supplemental Document 3

Master Plan for COE Program

Final Version
08 August 2018

Directorate of Water Supply System Development
Directorate General of Human Settlements
Ministry of Public Works and Housing

MASTER PLAN

For Center of Excellence (COE) Program

Human Resource Development Program
In Indonesia Water Supply Sector

August 2018

JICA Technical Cooperation Project on Strengthening COE Program for PDAMs in Republic of Indonesia

Master Plan for COE Program

CONTENTS

Abbreviations

AKATIRTA	*Akademi Teknik Tirta Wiyata* (*Tirta Wiyata* Engineering Academy)
APBN	Indonesian Central Government Budget
BINTEK	Technical Guidance (Training)
BPPSPAM	Agency for Improvement of Water Supply System Development
BTAM	*Balai Teknik Air Minum* (Water Supply Technical Training Center), i.e. the MPWH's training center for the water supply sector located in Bekasi city, West Jawa province. BTAM implements Regular Trainings for PDAMs and other central and local authorities and belongs to the Secretariat General of DGHS in the MPWH organzaition.
COE	Center of Excellence
CR	Customer Relations
DGHS	Directorate General of Human Settlements
DWSD	Directorate of Water Supply System Development
EE	Energy Efficiency
FAM	Financial Analysis and Management
GIS	Geographic Information System
HRD	Human Resource Development
IDR	Indonesian Rupiah
IUWASH	Indonesia Urban Water, Sanitation and Hygiene Program (USAID)
JET	JICA Expert Team
JICA	Japan International Cooperation Agency
Kab/Kota	*Kabupaten/Kota* (Regency/City)
KMP	*Konsultan Manajemen Pelaksana* (COE Management Consultant)
KT	Kabupaten/Kota Training
LSP	Professional Certification Agency (*Lembaga Sertifikasi Profesi*)
LSP-AMI	Professional Certification Agency – Indonesian Water Supply
M/P	Master Plan
MPWH	Ministry of Public Works and Housing (PUPR)
MOU	Memorandum of Understanding
NT	National Training
NRW	Non-Revenue Water
NUWAS	National Urban Water Supply Program (World Bank)
PAMSIMAS	*Program Penyediaan Air Minum dan Sanitasi Berbasis Masyarakat* (Water Supply and Sanitation Program for Low Income Communities)
PDAM	Water Supply Company (*Perusahaan Daerah Air Minum*)
PD PERPAMSI	Regional Board of Indonesian Water Supply Association
PERPAMSI	*Persatuan Perusahaan Air Minum Seluruh Indonesia* (Indonesian Water Supply Association)
PIP2B	*Pusat Informasi Pengembangan Permukiman dan Bangunan* (Information Center for Housing and Building Development)
PT	Provincial Training
PU	Public Works
SAK-ETAP	Indonesian Accouting Standards for Non-Publicly-Accountable Entities
SKKNI	*Standard Kompetensi Kerja Nasional Indonesia* (Indonesian National Work Competency Standards)

TUK	*Tempat Uji Kompetensi* (Competence Examination Place)
UPTD	*Unit Pelaksana Teknis Dinas Daerah* (Technical Local Service Implementation Unit) of local governments
WB	World Bank
WG	Working Group
WOPs	Water Operators' Partnerships
WTP	Water Treatment Plant
YPTD	*Yayasan Pendidikan Tirta Dharma* (*Tirta Dharma* Educational Foundation)

Definitions

Provincial Training	COE Training on central level for qualified PDAM staff to produce Provincial Trainers
Provincial Trainer	PDAM staff trained to conduct Kabupaten/Kota Training for other PDAM staff on provincial level
Kabupaten/Kota Training	COE Training on provincial level conducted by Provincial Trainers
National Training	COE Training on central level for most competent Provincial Trainers to produce National Trainers
National Trainers	PDAM staff qualified to conduct Provincial Training and provide expertise in development and improvement of COE training modules

Executive Summary

1. Outline of Master Plan

(1) Objective of COE Program Master Plan

The objectives of COE Master Plan development is to analyze the current performance and challenges of COE Program, and to enhance COE Program implementation set-up to secure sufficient competent water utilities staff members all over the country.

(2) Implementing Organizations

- Directorate of Water Supply System Development (DWSD), Directorate General of Human Settlement (DGHS), Ministry of Public Works and Housing (MPWH)
- Indonesian Water Supply Association (*Persatuan Perusahaan Air Minum Seluruh Indonesia*: PERPAMSI)

(3) Master Plan Period

- From 2018 to 2027 (10 years)

(4) Master Plan Goals and Key Milestones

The present Master Plan proposes the transfer of Kabupaten/Kota Training of COE Program from DWSD to PERPAMSI by 2024 through gradual involvement of PERPAMSI in the program starting from 2018 and consecutive joint implementation by DWSD and PERPAMSI. Key milestones during the Master Plan period is planned as follows:

Table S-1 Mater Plan Phasing and Key Milestones

Master Plan Phasing	Year	Key Events in Transition Process	Active Provincial Trainers Maintained (All Modules)	Cumulative Kab/Kota Training Participants (All Modules)
Discussion and Study Period	**2018**	Q1: Signing of Agreement for Study toward COE Program Joint Implementation Q3: Signing of MOU for COE Program Joint Implementation Q3: Setup COE Management Unit and COE PDAM Training Team	282/1	2,449/3
	2019	Q1: Plan of Strengthening PD PERPAMSI as KT implementer	602/2	3,251/4
Joint Operation Period	**2020**	Q1: PERPAMSI gets involved in KT jointly with DWSD	602	4,811/5

	2021	-	602	6,371
Transfer Trial Period	**2022**	Q1: Selected capable PD PERPAMSI starts implementing KT [Q2: Master Plan Review]	602	7,931
	2023	-	602	9,491
Full Transfer Period	**2024**	PERPAMSI starts implementing KT in all provinces	602	11,051
	2025	-	602	12,611
	2026	-	602	14,171
	2027	[Q2: Master Plan Review]	602	15,731

2. Adjusted Goal and Objectives of COE Program

(Section 5.1, Chapter 5)

In order to catch up the current challenges such as provincial level training venue for Kabupaten/Kota Training, lack of quantitative target setting, etc., it is proposed to adjust the original aim, objectives and goal of COE Program as follows:

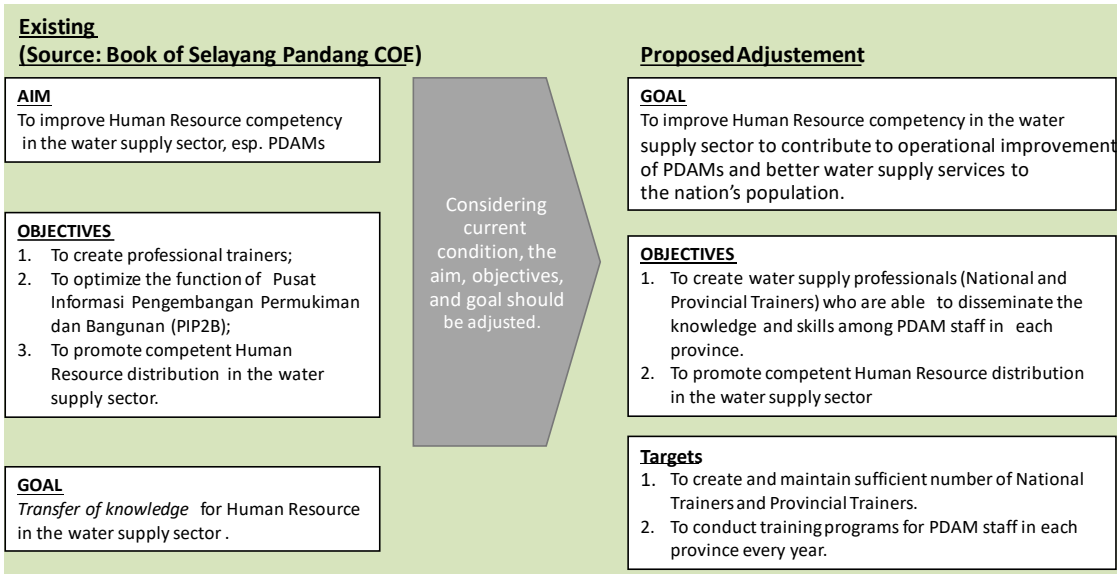


Figure S-1 Adjusted Goal, Objectives and Targets Proposed

3. Numerical Target Setting

(Section 5.2, Chapter 5)

Numerical targets of COE Program are set as follows:

- DWSD will increase the number of Provincial Trainers to at least 86 persons per training module nationwide by 2019 to cover every province with sufficient number of Provincial Trainers for any training module, and maintain them by continuous support for implementation of Provincial Training afterwards.

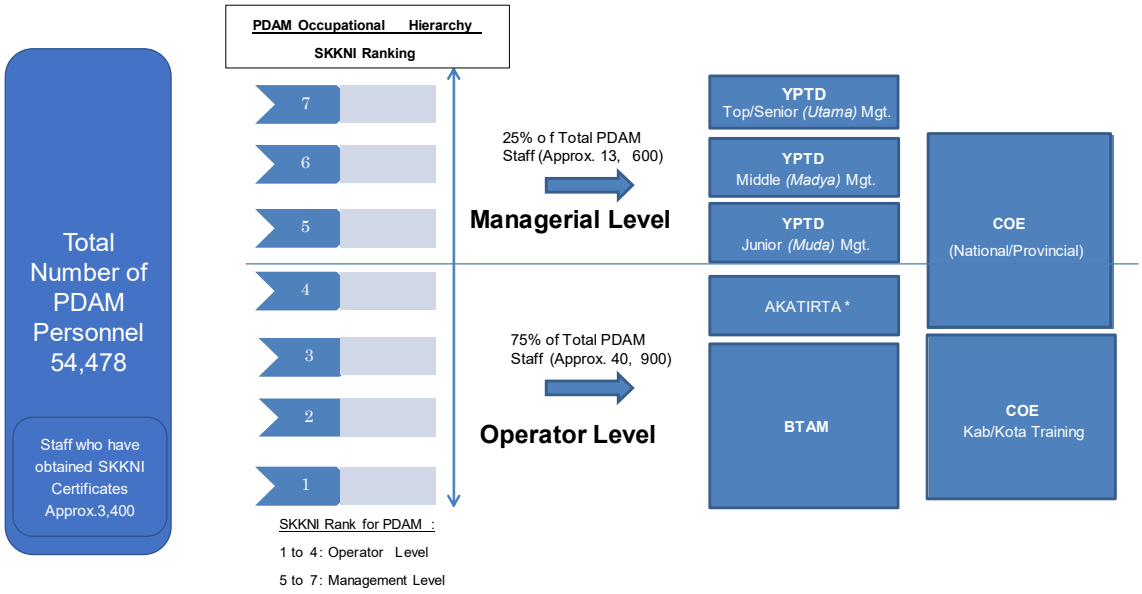
- Kabupaten/Kota Training will be implemented to cover (i) at least one employee of every PDAM for each training module by 2019; and (ii) additional 1,560 employees every year for eight years from 2020 to 2027 in order to reach half of PDAM staff in relevant job positions and levels.

4. Coordination with Other Training Programs

(Section 5.3, Chapter 5)

(1) Target Groups of COE Program, BTAM and YPTD

In terms of coordination with YPTD and BTAM training programs, target groups of the three major training programs shall be defined and demarcated as follows:



Note: AKATIRTA is the vocational education institute and have a distinct nature from other training programs. As the training for PDAM staff, YPTD, BTAM and COE Program are the major three programs for water supply sector in Indonesia.

Figure S-2 Target Group Definition for the Three Major Training Progams

(2) Proposed Demarcation of Training Modules

During the transition period of Kab/Kota Training of COE Program transfer to PERPAMSI following its joint implementation with DWSD, the demarcation among these three programs should be further discussed by comparing each content in detail. The demarcation among these programs currently proposed by the Master Plan is as follows:

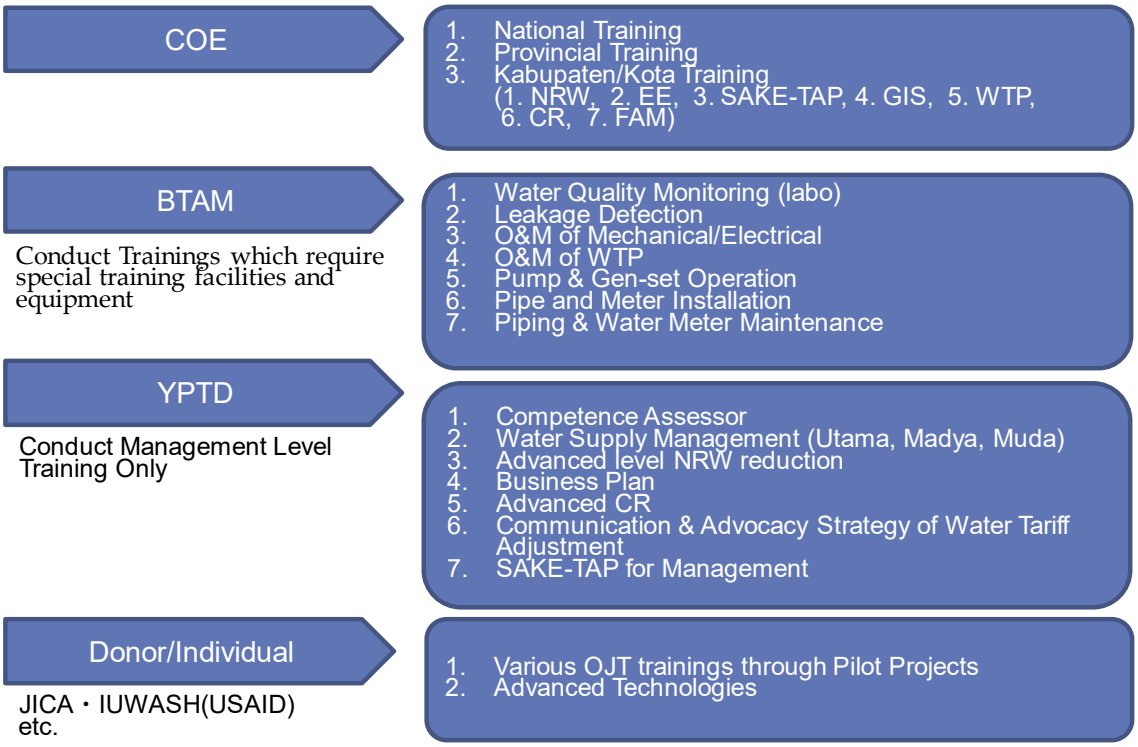


Figure S-3 Proposed Demarcation of Training Modules

5. Future Formation for COE Program Implementation

(Section 5.4, Chapter 5)

The future formation plan for COE Program implementation is illustrated in the following figure 5-4. In the proposed formation, DWSD in cooperation with stakeholder organizations organizes "COE Management Unit". COE Management Unit will have a responsibility for overall implementation of COE Program and monitoring/evaluation of the Program performance. National/Provincial Trainings which will produce provincial trainers will be implemented directly under the control of COE Management Unit.

In the initial phase, the task COE Training Team for PDAM will be carried out by Sanitation Bureau division under PERPAMSI but in the future PERPAMSI will set up "COE PDAM Training Team" within PERPAMSI headquarters. On provincial level PD PERPAMSI implements and controls Kab/Kota Trainings under support and supervision of COE PDAM Training Team.

At the central level, COE Management Unit has responsibilities to secure and maintain the necessary numbers of National and Provincial Trainers. On the other hand, "COE PDAM Training Team" shall support (strengthen) and supervise PD PERPAMSI as executor of Kab/Kota Trainings. PD

PERPAMSI's role will be significant to implement Kab/Kota Trainings at the respective provincial level.

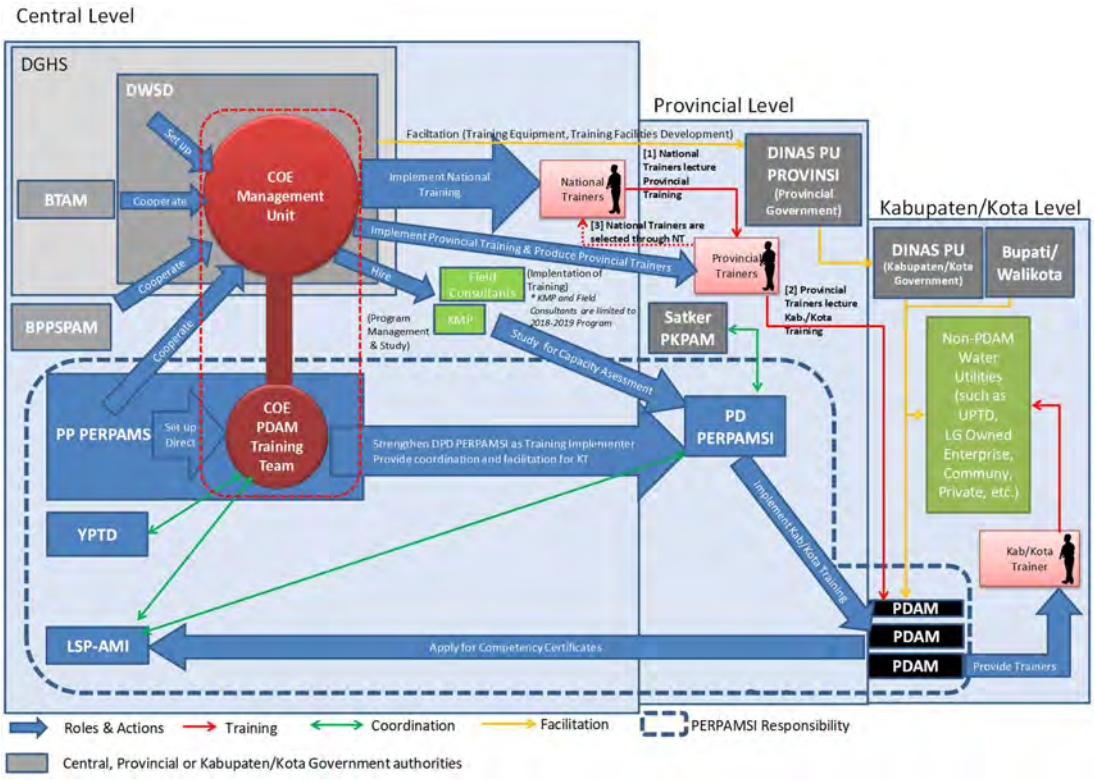


Figure S-4 Future Formation Plan for COE Program Implementation

Supervision and executive management of COE Management Unit will be responsibility of DWSD, such as the appointment of key personnel, funding and budgeting decision, and monitoring and evaluation of the COE Program activities within COE Management Unit. It is proposed that PEPAMSI's responsibilities gradually increase toward the complete transfer of the Kab/Kota Training of COE Program at the end of the present Master Plan period.

The major roles of relevant organizations for future implementation of COE Program are proposed in the following table.

Table S-2 Major Role of the Related Institutions for COE Program Implementation

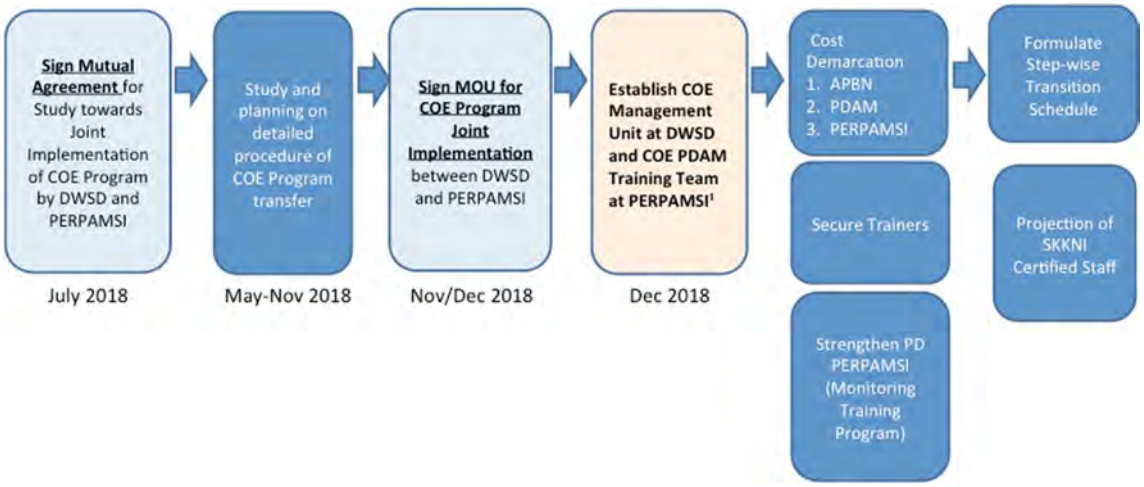
Program Partners	Present COE Program	Future COE Program under Joint Implementation during Transition		
	Current Role and Responsibilities	Expected Role and Responsibilities	Potential Issues	Strategies to Solve the Issues
Central Level				
DGHS	• Supervision of DWSD	• Supervision of DWSD	• Budget constraints	• Proper budget appropriation for HRD programs and facility development
DWSD	• Owner and program organizer (supported by management and field consultant) • Financial source for training activities and practical equipment	• Program organizer • Maintain COE Management Unit • Supervision of program activities • Planning and formulation (mechanism and program material) • Support for program activities • Monitoring and Evaluation of Program (Responsibilities gradually reduced toward the end of transition)	• Budget constraints	• Prepare Master Plan for COE Program for Budget Explanation
Strategic Unit (Under DWSD)	• Financial source for training activities and practical equipment	• Support urgent and under priority programs	• Unsustainable budget	• -
PERPAMSI	• Resources person at Kab/Kota training	• Joint program implementer • Supervision of program activities • Maintain COE PDAM Training Team under Joint Supervision with DWSD • Monitoring and evaluation for PD Perpamsi (Responsibilities gradually increase toward the end of transition)	• Institutional strengthening plan • Coordination with provincial level (PD) • Budget for COE Implementation	• Official MOU between DWSD and PERPAMSI to endorse the transfer of COE Training • Establish Special Unit for COE Training Implementation • Support from DWSD for transition period • Funding options consideration • Encourage PDAMs to implement FCR
BTAM	• Venue of Provincial Training	• Venue of national & provincial trainings • BTAMs should be more dedicated to trainings, which use its well prepared training facilities for advanced technology in future.	• Unsustainable budget • Institutional strengthening plan • Renovation of training equipment and facilities	• Prepare upgrade plan of BTAMs • Seek budget for upgrading
BPPSPAM	None	• Consultation on HRD for PDAM • Collect Key Performance Indicators report to DWSD	-	-
YPTD		• Provide Management Level trainings • Coordination with COE to share Trainers & Training Materials for advanced level trainings	-	-
Provincial Level				
Dinas PU Provinsi **(Provincial Government)**	None	• Inter-district/city matters of COE Program within provincial jurisdiction • Supervision of province-owned water utilities	-	-
Satker PSPAM Provinsi	• Support Kab./Kota training as regional organization of DWSD	• Support Kab/Kota Training • Support monitoring and evaluation	-	-
PD PERPAMSI	None	• Organize Kab/Kota Training • Consultation to select suitable trainees from PDAM • Monitoring and evaluation for PDAM	• Human resources	• Technical assistance for capacity development of PD PERPAMSI and major organizing PDAM by DWSD through local government
Kabupaten/Kota Level				
Bupati/ Walikota	None	• Owner of PDAM • Taking initiative to enhance HRD among water utilities (PDAM, UPTD, Community Groups) under his/her jurisdiction	-	Advocacy to Local Governments to implement FCR on PDAM Tariffs and Local Governments related responsibilities for water service to all communities.
Dinas PU Kabupaten/ Kota **(Kabupaten/ Kota Government)**	-	• Supervision of Kabupaten/Kota-owned PDAM and other water utilities under its jurisdiction • Primary recipient of assistance and support from DWSD and its intermediator to PDAM (technical assistance, facility development, and equipment provision)	-	
PDAM	• Program participants	• As participants, National Trainer, Provincial Trainer, and Kab./Kota Trainer • Improving its performance by implementing what learnt • Encourage staff to apply for Competency Certificate.	• Incentive mechanism • Budget constraint for project implementation	• Government subsidy • WB: NUWAS • IUWASH: Pilot Projects for NRW & EE • Int'l WOPs (JICA Partners Program)

6. Roadmap for Joint Implementation of COE Program with PERPAMSI

(Section 5.5, Chapter 5)

(1) Key Steps for Joint Implementation of COE Program

Key steps for the joint implementation of COE Program with PERPAMSI are illustrated as follows:



* In the initial phase, the task of COE Training Team for PDAM will be carried out by the Sanitation Bureau division, PERPAMSI

Figure S-5 Key Steps towards Transfer of Kab/Kota Training of COE Program to PERPAMSI

(2) Process and Schedule for Kab/Kota Training of COE Program Transfer to PERPAMSI

The figure below illustrates the joint implementation and transfer process anticipated during the Master Plan period from 2018 through 2027. Major events and milestones are summarized also in the table in Section 1 (4) above ("Master Plan Goal and Key Milestones").

During the discussion and study period with gradual involvement of PERPAMSI in COE training implementation, it is a key issue to be tackled how to develop PD PERPAMSI as Kabupaten/Kota Training Implementer. In order to prepare for the transfer of Kab/Kota Training to PERPAMSI and PD PERPAMSI, it is planned that DWSD will provide technical assistance as consulting services of KMP and Field Consultant during the Discussion and Study Period (2018-2019), whose major TOR is proposed as follows:

(i) Assistance for Transfer of Kab/Kota Training of COE Program to PERPAMSI
(ii) Assistance for Capacity Development for PD PERPAMSI
(iii) Assistance for Coordination between COE Program and SKKNI
(iv) Improvement of Monitoring and Evaluation of COE Program

Through the said technical assistance, PERPAMSI and individual PD PERPAMSI's capacity is

carefully assessed and capacity development assistance is provided such as preparation of SOP of Kab/Kota Training, training for PD PERPAMSI officials, etc. Also, the technical assistance will prepare the draft KSB (Mutual Agreement) and PKS (Cooperation Agreement) to be concluded by DWSD and PERPAMSI to determining comprehensive plan of transfer of KT to PERPAMSI including COE PDAM Training Team's organizational and financing plan.

During the Joint Operation Period (2020-2021), the involvement of each PD PERPAMSI in implementation of Kab/Kota Training should be gradually processed depending on the readiness of PD PERPAMSI.

In the Transfer Trial Period (2022 – 2023), the eleven provinces where PD PERPAMSI has leading-runner PDAMs will be candidates for the first group of full transfer of COE training implementation. Then, the full transfer process will be expanded to the rest of provinces gradually starting from 2024.

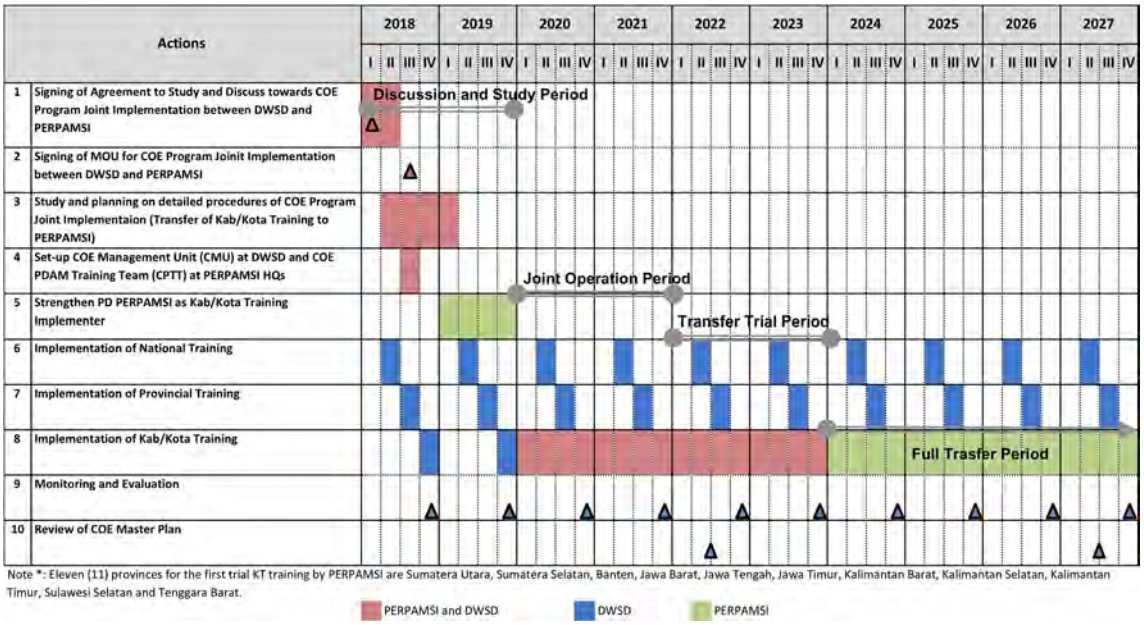


Figure S-6 Outline of Anticipated Processes and Schedule for Kab/Kota Training of COE Program Transfer

(3) Cost Estimation of COE Program Implementation

The following table illustrates the cost estimation for COE Program implementation during the Master Plan period from 2018 through 2027.

Table S-3 Cost Estimation for COE Program Implementation during Master Plan Period

Master Plan Phase	*Discussion and Study*		*Joint Operation*		*Transfer Trial*		*Full Transfer*				Total
Cost Item (billion IDR)	2018 /1	2019 /2	2020	2021	2022	2023	2024	2025	2026	2027	
1 Provincial & National Training	0.6	6.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	15.4
2 Kab/Kota Training	5.0	2.8	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	57.4
3 KMP and Other Consulting Services Including Study/review/advisory for joint implementation	1.8	1.8	-	-	-	-	-	-	-	-	3.6
Total	**7.4**	**11.4**	**7.2**	**7.2**	**7.2**	**7.2**	**7.2**	**7.2**	**7.2**	**7.2**	**76.4**

/1 The 2018 Budget allocated to COE Program comprised of [Field Consultant 1] IDR 2.8 bn for PT (6 training classes) and KT (6 training classes);
[Field Consultant 2] IDR 2.8 bn for KT (6 training classes) in selected PDAMs as well as study and other activities (Pilot WOPs); and [KMP] IDR 1.8 bn for KMP.
It is assumed that the PT costs IDR 0.6 bn and KT costs IDR 5.0 bn in total in 2018.

/2 Funding requirement for 2019: [PT] IDR 6.8 bn as difference of (i) total requirement (IDR 7.4 bn) to spend for 2018-2019 and (ii) the assumption for 2018 (IDR 0.6 bn).
[KT] IDR 2.8 bn as difference of total requirement (IDR 7.8 bn) for 2018-2019 and the assumption for 2018 (IDR 5.0 bn). [KMP] IDR 1.8 bn: author's assumption.

Dit.PSPAM & PERPAMSI Dit.PSPAM PERPAMSI

Assumptions and Estimation

1 2018 - 2019 Period (Discussion and Study Period)

1.1 Provincial Training

1	Required number of Provincial Trainer Candidates to meet Target		1,145 persons	See Section 5.2.1
2	Average cost per Provincial Training participant		6.5 million IDR/person	Assumption
3	**Total Provincial Training Cost to Fulfill the Target by 2019**		**7,443 million IDR**	

1.2 Kab/Kota Training

1	It is assumed that every PDAM has to have at least 1 staff trained in each training module			See Section 5.2.2
2	Total PDAM staff to be trained for 7 modules (net of PDAMs already trained)		1,951 persons	See Table 5.7
3	Average cost per Kab/Kota Training participant		4.0 million IDR/person	Assumption
4	**Total Kab/Kota Training Cost to fulfill the Target by 2019**		**7,804 million IDR**	

2 2020 and onward (Joint Operation ~ Transfer Trial ~ Full Transfer)

2.1 Provincial Training

1	Provincial Trainers required to maintain for each module nationwide		86 persons/module	See Section 5.2.1
2	Assuming it is required to replace/refresh annually:	10%	8.6 persons/module	Assumption
3	Approx. total number of required replacement for 7 modules		60 persons	
4	Rquired Provincial Trainer candidates to be trained Productivity	40%	150 persons	* Equivalent to 10 PT per year
5	Average cost per Provincial Training participant		6.5 million IDR/person	Assumption
6	**Annual Total Provincial Training Cost for Replacement**		**975 million IDR**	

2.2 Kab/Kota Training

1	Total PDAM staff nationwide		54,478 persons	See Figure 5.7
2	Assumption of proportion of operator level personnel	75%	40,859 persons (approx.)	See Figure 5.7
3	Assumption of proportion of personnel relevant to COE	80%	32,687 persons	Assumption
4	KT participants already trained 2012-2017: 1,779	2018-2019: 1,951	3,730 persons in total	
5	Net of personnel relevant to COE modules		28,957 persons	
6	BTAM training participants (500 persons/year * 8 years)		4,000 persons (approx.)	Assumption
7	Net of potential personnel to be trained in COE		24,957 persons	
8	Assuming half of the personnel should be trained in 8 years	50%	12,478 persons	Assumption
9	Annual KT participants		1,560 persons/year	
10	Average cost per Kab/Kota Training participant		4.0 million IDR/person	Assumption
11	**Total Kab/Kota Training Cost to fulfill the Target by 2019**		**6,239 million IDR**	

Note: The table does not contain the expenditure regarding establishment and operational COE PDAM Training Team within PERPAMSI.

(4) Funding Sources for COE Program Implementation

The funding arrangement proposed in the Master Plan is as follows:

- The future cost to maintain necessary numbers of National and Provincial Trainers after the year 2024 and onward should be borne by APBN. The central government should remain involved in COE Program.

- In contrast, the cost for implementing KT in each province should be borne by both PERPAMSI and recipient PDAMs. However, such arrangement should be carefully managed by gradual transition considering the readiness of PERPAMSI as well as the financial affordability of recipient PDAMs. Possible scenarios for funding sources to bear the necessary cost for KT are

as follows:

Scenario 1: Fully Covered by Recipient PDAMs

In this scenario, it is expected that each recipient PDAM will pay the training fee for each KT it actually participates.

Scenario 2: Shared by PERPAMSI Membership Fees and Recipient PDAMs

In this scenario, the increase of PERPAMSI membership fee per PDAM customer is utilized to cover a part of the training cost.

7. Recommendations

(Chapter 6)

(1) Harmonization with Physical Improvement Projects

Knowledge and skills obtained through COE Program should be utilized effectively in actual PDAMs' service improvements. In order to harmonize physical improvement projects and human resource development, DWSD should set up the criteria for selecting PDAMs eligible for such funding schemes of APBN. It is proposed to consider the following indicators to prioritize PDAMs for funding:

- No. of National or Provincial Trainers in the related fields for investment planned
- No. of Kab/Kota Training participants in the related fields for investment planned
- No. of PDAM staff who obtained or applied for competency certification

(2) Collaboration with Other HRD Programs

In the initial phase, Sanitation Bureau division under PERPAMSI or later will be managed by COE Training Team for PDAM, will receive PDAMs' needs on human resource development with the help of PD PERPAMSI and forwarded to COE Management Unit. After receiving and analyzing such training needs from each province, COE Management Unit will select suitable participants for COE Program depending on the actual needs of PDAMs with the consultation from PD PERPAMSI. Furthermore, investment needs from PDAMs will also be received by COE Management Unit from PD PERPAMSI, and will provide guidance to PDAMs to get access to the investment programs or donors' program suitable for such PDAMs (See the figure below).

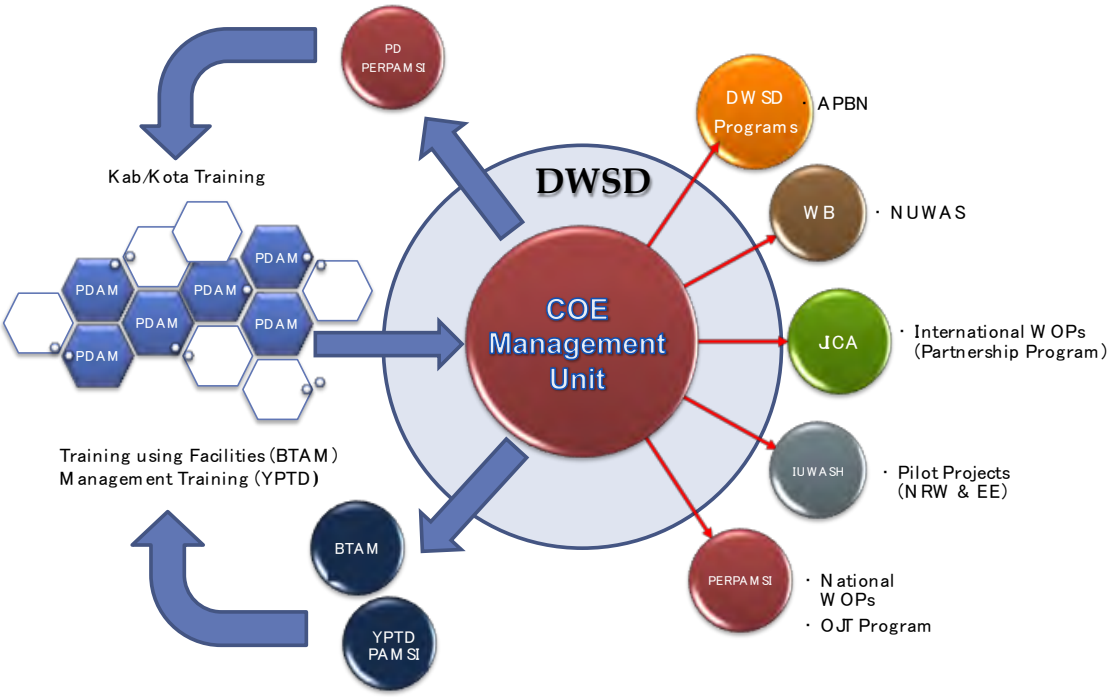


Figure S-7 Concept of Needs Oriented Management Flow for PDAM Improvement Programs

(3) Incentives for PDAMs and PERPAMSI to Participate in COE Program

Below is the summary of identified benefits of the COE Program from the past experience, as well as possible incentives or support that the central government may be able to offer in near future in order to motivate PDAMs to participate in the program.

Qualitative Benefits of COE Program

- More accessible training opportunity through holding Kab/Kota Training at provincial level
- Vast training coverage in terms of areas and number of participants through the cascade method training system
- Promoting mutual cooperation among local PDAMs based on their solidarity in the same province
- Possible opportunity for staff certification though it is necessary to enhance the coordination with LSP-AMI.

Quantitative Effectiveness of COE Program

Some excerpts from JET Baseline Survey Results (March 2016) are as follows:

- Most Kab/Kota Training participants (83% of NRW and 93% of EE) shared obtained knowledge back in their PDAM.
- The participants who bought new equipment to support PDAM improvement is 15% of NRW

participants and 20% of EE participants.

- The participants confirmed that the most common cause of the failure of the application of knowledge from training were "lack of equipment" and "lack of budget" resulting in those who “have improved the way of work” reach 75% of NRW participants and 77% of EE participants.

COE Management Consultants (KMP) conducted the monitoring and evaluation of past Provincial Trainers in 2017, of which salient results are as follows:

- Among interviewed Provincial Trainers, 32% actually implemented their action plan requested to prepare for their home PDAM to implement pilot projects in their specialized field.
- Also, around 30% of respondents shared what they learned in PT with other PDAM staff (32% informal socialization and 25% formal training).

Creating Incentives / Enhancing Motivation for PDAMs

During the course of Master Plan preparation, the following measures are proposed as possible solutions to create incentives for PDAMs to participate in COE Program:

- Enhance PDAM Management’s Understanding of Importance of HRD
- Financial incentives for participation such as (i) Setting the participation in COE Program as a prerequisite for physical support programs (Kota Binaan, NUWAS, etc.); and (ii) rewarding system for National and Provincial Trainers.
- Coordination with Certification Agency for COE participants to have easier access to obtain competency certificates.
- Awarding ceremony for Best Performance and Practice under COE Program

(4) Future Vision

It is envisaged that one day in future the COE Program will become the HRD platform for all water utilities, and serve not only HRD among PDAMs nationwide but also HRD of various implementing SPAM organizer, such as UPTD and community-based organizations. For instance, the Kabupaten/Kota Trainers produced by COE Program could train staff of the community-based water utilities that implement government-funded program like PAMSIMAS to enhance their operational knowledge and skills in selected training modules, such as NRW, WTP and a simplified version of FAM.

(5) Involvement of BPPSPAM as Implementing Agency

Most recently, DWSD considers BPPSPAM should play more substantial role in the future COE Program. This is because the MPWH Regulation No.36/PRT/M/2016 stipulates that BPPSPAM must assist and facilitate water utilities owned by regional and local governments (PDAMs);

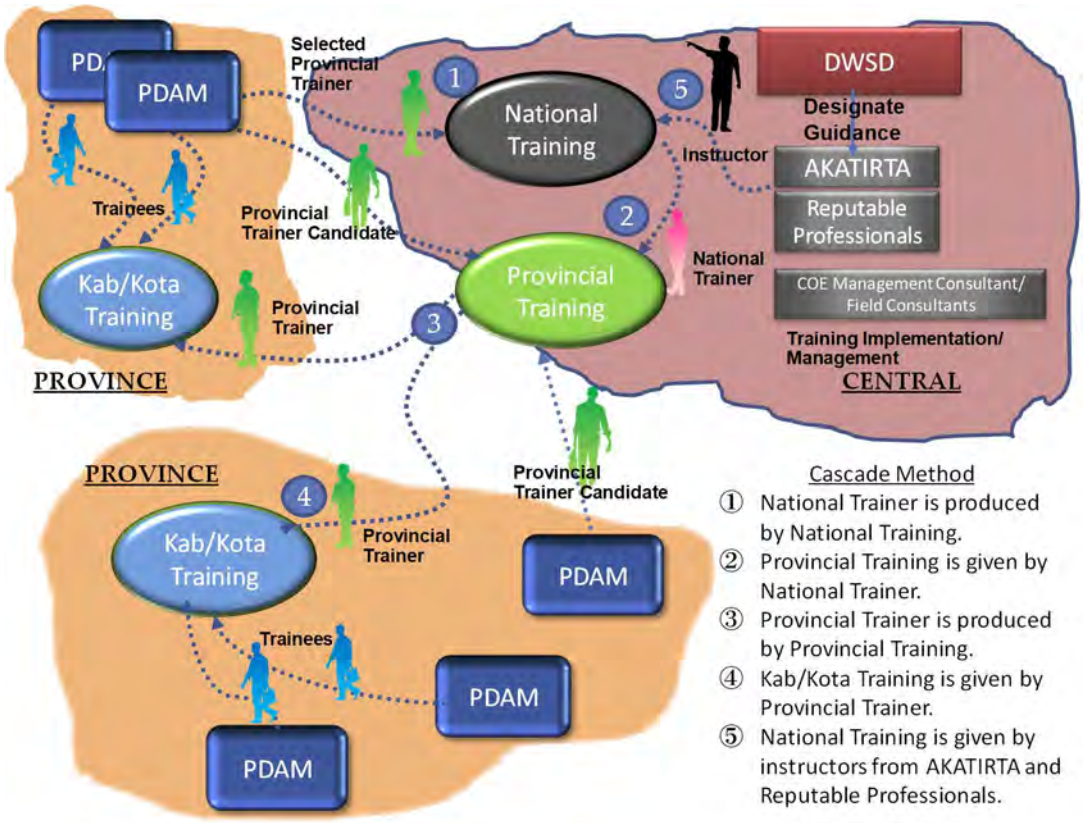
whereas DWSD serves for all types of water utilities. Therefore, the significant change will be necessary in the implementation structure of the present Master Plan. DWSD, PERPAMSI and BPPSPAM will discuss the further revision of the Master Plan in due course.

1 Introduction

1.1 Background

There are approximately four hundred *Perusahaan Daerah Air Minum* (regional Water Supply Companies, or commonly referred to as PDAM) all over the country, and the total number of PDAM staff members exceeds more than fifty four thousands. Apart from PDAMs, water supply service in Indonesia is provided by various types of entities such as state-owned enterprises, local government-owned enterprises, Technical Local Service Implementation Unit (UPTD) of local governments, business entities for own need, and community groups. In accordance with Mid-Term National Development Plan Year 2015-2019 the Government of Indonesia aims for 100% access to drinking water supply service throughout Indonesia in 2019. To achieve this target, one of the stumbling blocks to conquer is a lack of competent PDAM staff.

The Center of Excellence Program (COE Program) is a flagship PDAM staff capacity development program that is held to answer the need of acceleration and distribution of competent PDAM human resources throughout Indonesia. COE Program applies a unique cascade training structure involving PDAM staff as trainers (See Figure 1.1), which is composed of (i) National Trainers who train other PDAM staff to produce Provincial Trainers on central level; and (ii) Provincial Trainers, who got training from National Trainers and provide training to PDAM staff in their respective provinces as *Kabupaten/Kota* (Kab/Kota) Training. This approach aims at massive and speedy dissemination of operational knowledge and technique among PDAMs nationwide.



Source: JET

Figure 1.1 Cascade Method Training Structure of COE Program

COE program was launched in 2012, and has been implemented and managed with the central government budget by Directorate of Water Supply System Development (DWSD) of Directorate General of Human Settlements (DGHS) for six years to date. It is, however, necessary to formulate Master Plan (M/P) of COE Program to improve effectiveness of the Program and to ensure its sustainability since the number of trained PDAM staff remains still as low as around 2,200. M/P will set clear targets of the Program and indicate a road map for future prospects of relevant stakeholders' involvement for its sustainability.

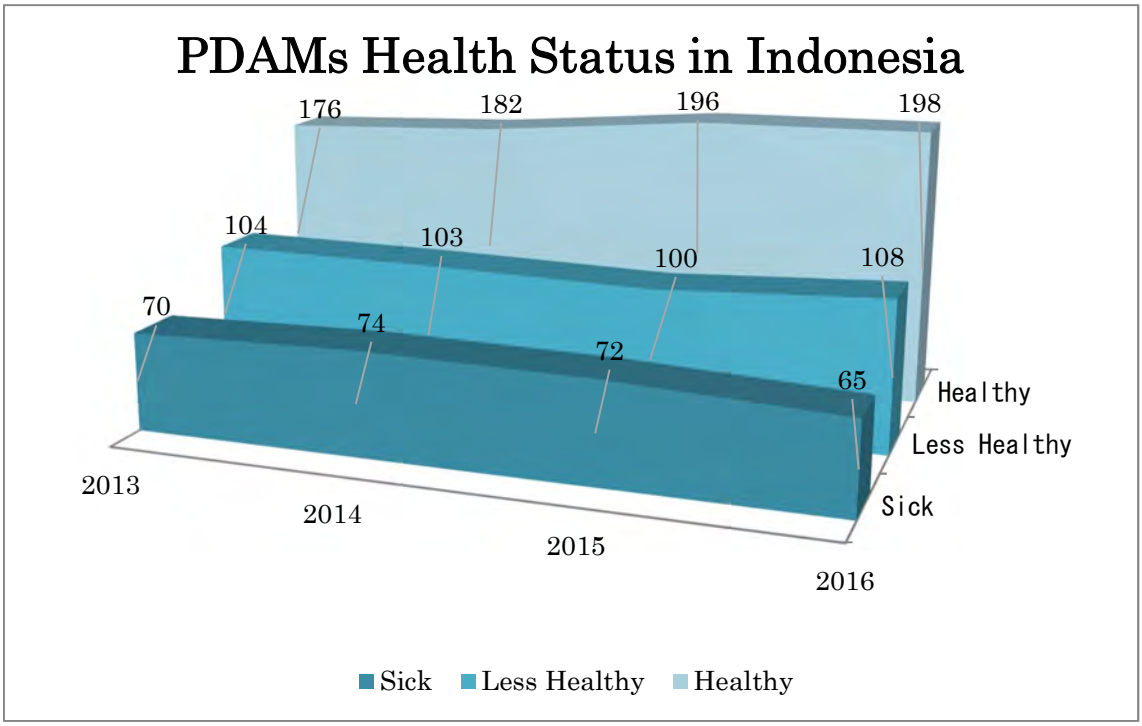
1.2 Objectives of COE Program Master Plan

The objectives of COE Master Plan development is to analyze the current performance and challenges of COE Program, and to enhance COE Program implementation set-up to secure sufficient competent water utilities staff members all over the country.

2 Recent PDAM Performance

2.1 PDAM Health Status

According to Agency for Improvement of Water Supply System Development (BPP SPAM), healthy PDAMs have gradually increased from 176 in 2013 to 198 in 2016. 23 PDAMs improved its status from less healthy to healthy in 2016 while 22 PDAMs degraded its status from healthy to less healthy or sick. Nearly half of the total PDAMs in Indonesia still have the status as less healthy and sick.

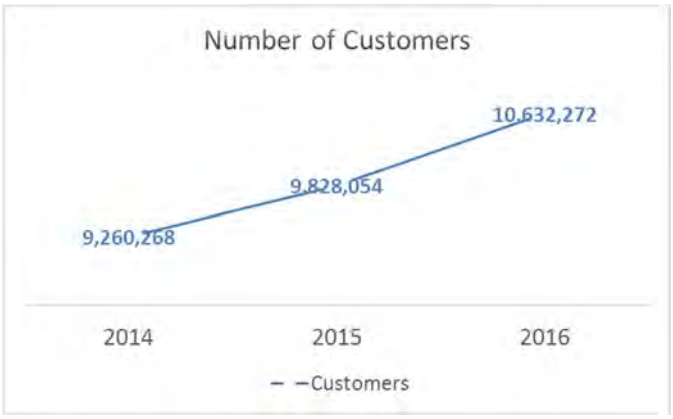


Source: BPPSPAM

Figure 2.1 PDAM Health Status 2013-2016

2.2 House Connections

Number of connected customers is 10.6 million nationwide in 2016, increased 8% from the last year. PDAMs with less than 50,000 house connections are 89% of total, in which the PDAMs with less than 10,000 connections account for 40%.

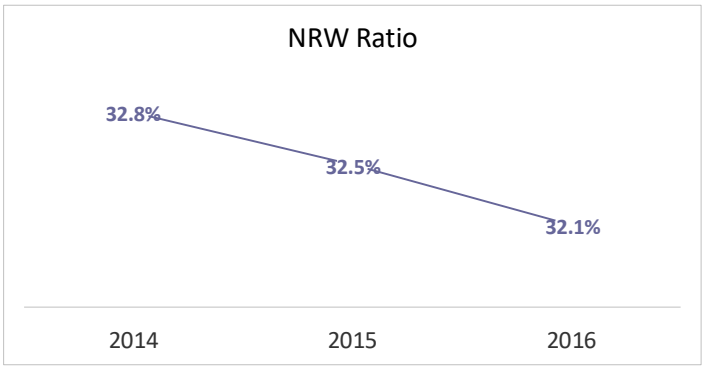


Source: BPP SPAM

Figure 2.2 Number of Customers

2.3 Non-revenue Water (NRW)

In recent three years, the average NRW ratio among PDAMs nationwide has been around 32%. Only 39 PDAMs (11%) has achieved NRW ratio less than 20% which is the standard NRW level in accordance with the guidelines on the water tariff by Ministry of Home Affairs.



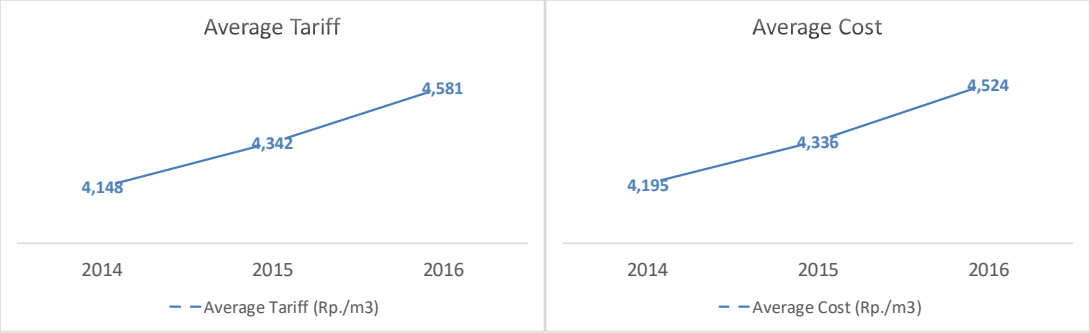
Source: BPP SPAM

Figure 2.3 NRW Ratio

2.4 Average Tariff and Cost

Both average tariff and cost have increased over recent three years. Tariff revenue margin were IDR 7/m^3 in 2015 and by IDR 57/m^3 in 2016. Among total of 371 PDAMs, 110 PDAMs (30%) achieved the full cost recovery tariff[1] level in 2016.

[1] Full cost recovery is defined as the basic cost to develop and operate water supply services, which includes operating cost as well as depreciation cost and financial cost.



Source: BPP SPAM

Figure 2.4 Average Tariff and Cost

2.5 Other Performance Indicators

Other performance indicators are summarized as per the following table.

Table 2.5 PDAM Performance Indicators 2012-2015

Indicator	Unit	All PDAMs average			
		2012	2013	2014	2015
Operating Ratio	-	1.0	1.0	1.0	1.1
Collection Efficiency	%	90.6%	90.1%	91.5%	90.9%
Production Efficiency	%	62.5%	58.7%	59.6%	61.0%
Solvency	%	536%	702%	760%	729%
Tariff Revenue Margin (20% standard NRW base)	Rp./m^3	163	245	132	135
Installed Capacity	m^3/day	21.89	20.82	21.51	22.03
Total Fixed Assets	billion Rp.	13.46	13.84	16.66	17.92
Number of staff per 1000 connections	persons	8.0	8.3	8.0	7.8
Employee average monthly cost	million Rp.	-	3.31	3.62	3.89
Staff training ratio	%	10.70%	11.60%	11.90%	17.20%
Training cost to employee cost ratio	%	0.80%	0.80%	0.80%	0.90%

Source: JET based on BPP SPAM data

3 Current Status of COE Program

3.1 Original Goal and Objectives of COE Program

COE Program has been launched under the following original aim, objectives and goal set in 2012:

AIM
To improve Human Resource competency in the drinking water supply sector, esp. PDAMs.

OBJECTIVES
To create professional trainers;
To optimize the function of *Pusat Informasi Pengembangan Permukiman dan Bangunan* (PIP2B)*;
To promote competent Human Resource distribution in the drinking water supply sector.

GOAL
Transfer of knowledge for Human Resource in the drinking water sector.

Note: PIP2B is "Information Center for Housing and Building Development", i.e. local information center established by DGHS in each province all over the country.

Source: Book of Selayang Pandang COE

Figure 3.1 COE Program Aim, Objectives and Goal

Surrounding implementation conditions of the COE Program have been, however, now changing after years of its implementation, and it might be necessary to be modified as needed to match with actual changes in its implementation conditions. Adjustment of goal and objectives are further discussed in the Master Plan preparation.

3.2 Legal and Regulatory Basis

Legal and regulatory basis related to COE Program are explained as follows;

Law No. 23 Year 2014 on Local Government

The drinking water sector is a governmental affair divided among levels and/or structures of government. The Central Government shall provide coaching and supervision on the implementation of the Local Government Affairs.

Law No. 11 Year 1974 on Waterworks

This law stipulates the following;

- Water and its sources including the natural resources therein are controlled by the State so that

the Government has the authority to regulate, manage, and develop it.

- One of the Government roles in the waterworks is coaching, including regulating and organizing socialization and specific education in the waterworks area.

Government Regulation No. 122 Year 2015 on Drinking Water Supply System

Clause 62 of Chapter IX (Coaching and Supervision) of Government Regulation No.122 stipulates as follows:

(1) The Minister provides coaching the Regional Government in the Implementation of Water Supply, including:
    a. Coordination in meeting the needs of drinking water;
    b. The process of drafting up to the determination of norms, standards, procedures, and criteria;
    c. Guidance, supervision, and consultation;
    d. Technical assistance and program assistance; and
    e. Education and training.

(2) Coaching to BUMN[2], BUMD[3], UPT[4], UPTD[5], Community Organization and Business Entity who fulfill their own needs that implement and organize Drinking Water Supply is implemented by the Minister, Governor and / or Regent/Mayor in accordance with their authority, including:
    a. Assistance in the application of norms, standards, procedures, and criteria;
    b. Supervision guidance, and consultation;
    c. Technical assistance and program assistance; and
    d. Education and training

Regulation of Ministry of Public Works and Housing No. 15/PRT/M/2015 on Organization and Working Procedure of Ministry of Public Works and Housing

One of DWSD's tasks is coaching. In order to implement its task, DWSD carries out function of providing technical guidance (*BIMTEK*).

Regulation of Ministry of Public Works and Housing No. 20/PRT/M/2016 on Organization and Working Procedure of Technical Implementation Unit in Ministry of Public Works and Housing

The task of *Balai Teknik Air Minum* (BTAM: Water Supply Training Center) is to carry out technical guidance (*BIMTEK*) on planning and water supply institutional management empowerment.

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2 *Badan Usaha Milik Negara* (State-owned enterprises)
3 *Badan Usaha Milik Daerah* (local government-owned enterprises)
4 *Unit Pelaksana Teknis* (Technical implementation unit of local government)
5 *Unit Pelaksana Teknis Dinas Daerah* (Technical local service implementation unit)

Regulation of Ministry of Public Works and Housing No. 10/PRT/M/2016 on Indonesian National Work Competency Standards (SKKNI) in the Management of Drinking Water Supply System

The regulation calls for the enforcement of Indonesian National Work Competency Standards (SKKNI) of Water Supply System to be implemented within two years.

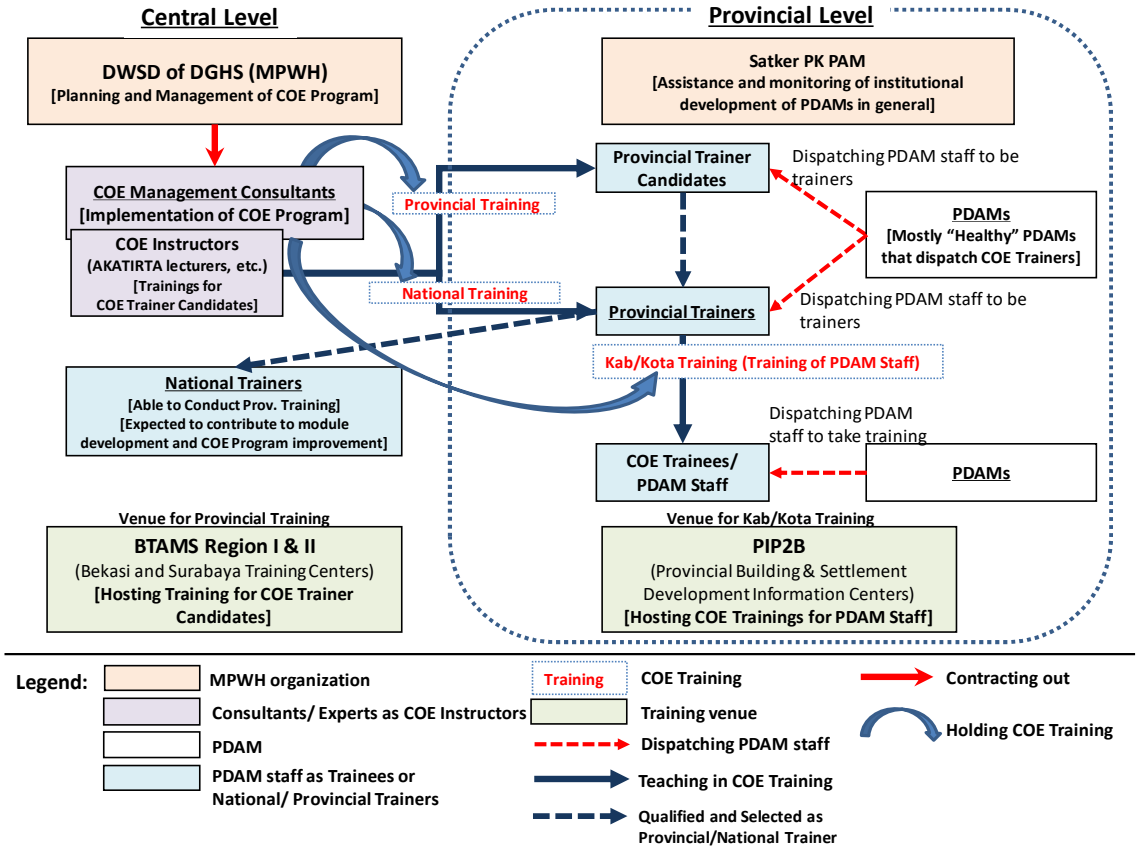
3.3 Program Implementation 2012 -2017

3.3.1 Program Implementation Set-up

COE Program has been operated under the central government's strong initiative since the year 2012. Figure 3.2 illustrates the original implementation set-up of the program since 2012. DWSD is the key organization that plans and manages the program with APBN[6] budget by hiring local consultants who implement the program as "COE Management Consultants".[7] AKATIRTA, reputable professionals and universities also help the program as "COE Instructors" who train National Trainer and Provincial Trainer candidates especially for the initial stages of each training module.

[6] *Anggaran Pendapatan dan Belanja Negara* (National budget)

[7] See Annex 1 for the Scope of Work of the COE Management Consultants in 2017. COE Management Consultant is referred to as *Konsultan Manajemen Pelaksana* (KMP) in Indonesian language.

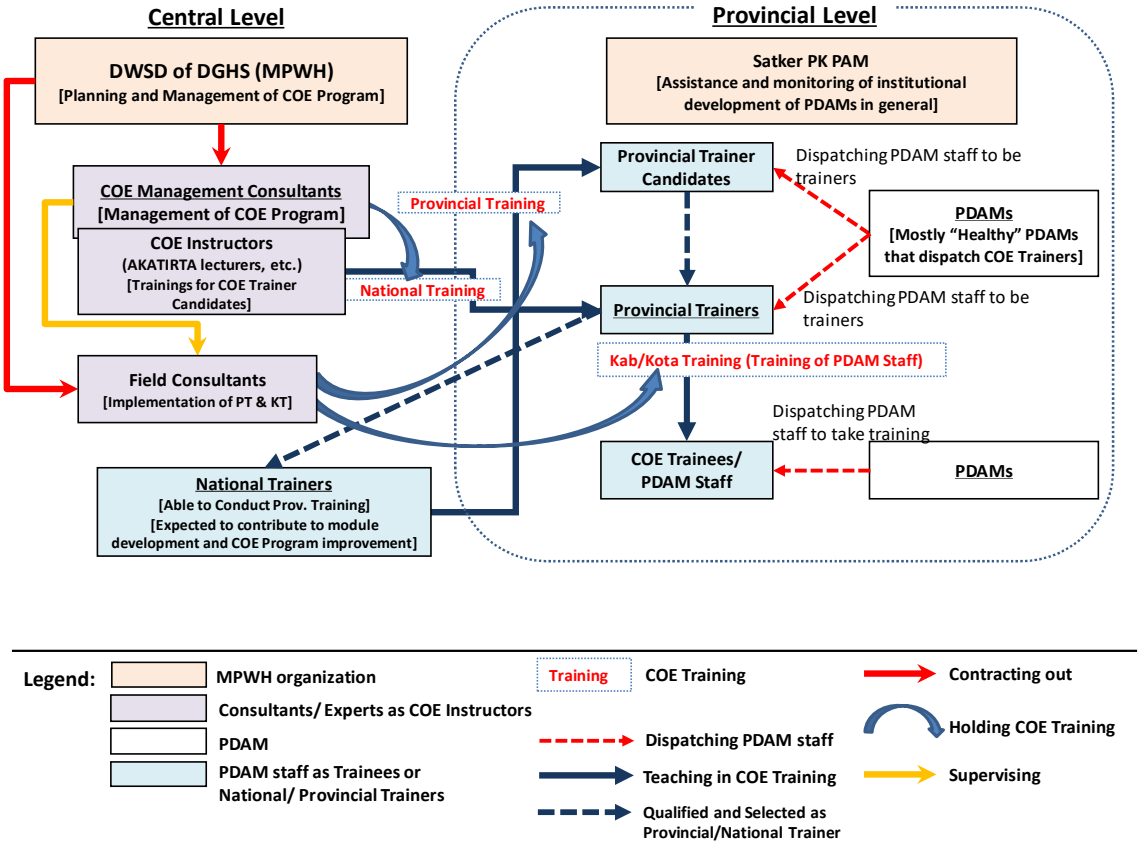


Source: JET

Figure 3.2 Original Setup for COE Program Implementation

COE Program is designed to create Provincial Trainers who can disseminate operational knowledge and skills in each province. Provincial Trainers are then required to train PDAM staff through Kab/Kota Trainings. Among Provincial Trainers, the most competent trainers are selected as National Trainers who train Provincial Trainer candidates. Thus, such cascade training organization structure enables massive dissemination of knowledge and skills to PDAM staff all over the country.

Figure 3.3. Illustrates the most recent set-up for the program implementation. Currently Kab/Kota Trainings are held using meeting rooms in a hotel instead of PIP2B. Likewise on the central level, since BTAM is not available due to its capacity, outside hotel is used as the venue for Provincial Training. Field Consultants have been involved since 2014 to implement COE trainings. Currently, they are assigned to conduct both Provincial and Kab/Kota Training. While Field Consultants conduct the training implementation, COE Management Consultants undertake the supervision and monitoring of Field Consultants and the overall program management.



Source: JET

Figure 3.3 Current Setup for COE Program Implementation

3.3.2 Funding for COE Program

Central government budget for COE Program had been constantly maintained since 2013 until 2016 and disbursed through two channels as shown in Table 3.4; the budget for COE Management Consultants is through DWSD and the budget for field consultants and equipment procurement are through Strategic Unit.

The central government budget is almost the sole funding source for the COE training which is normally conducted as three to five full days of training sessions (See sample training timetable for each training module in Annex 5). For National and Provincial Training, DWSD normally bear (i) instructor/trainer cost, (ii) cost related to training venue, (iii) participant accommodation and per-diem allowance, and (iv) participant transportation. Similar arrangements are made for Kab/Kota Training except for the participant transportation cost which is born by each participating (recipient) PDAM. According to the past cost data from 2014 to 2016, it is estimated that it takes IDR 6.5 million per trainee on average to conduct COE Program training except for the COE Management Consultant fees.

Table 3.4 Central Government Budgets for COE Program 2012 -2017

Year / Source	2012	2013	2014	2015	2016	2017
DWSD	2 Bn	2 Bn	3 Bn	4 Bn	3 Bn	1.5 Bn
Strategic Unit	N/A	19 Bn	19 Bn	49 Bn	16 Bn	2.5 Bn
Total	2 Bn	21 Bn	22 Bn	53 Bn	19 Bn	4 Bn

Note: The budget for year 2015 contains the cost for equipment procurement (Bn: Billion)

Source: JET based on DWSD information

The total budget of APBN input to COE Program amounts to approximately 121 billion IDR. The budget for year 2017, however, has declined drastically due to the constraints of overall APBN in that year.

3.3.3 Training Modules

3.3.3.1 Selection of Training Subjects

COE Program has developed seven training modules covering important subjects which are expected to contribute relatively immediate effects on financial and managerial performance improvements of PDAMs. COE Program has been initiated with the three modules such as NRW Reduction (NRW), Energy Efficiency Improvement and SAK-ETAP (Accounting Standards), and further expanded to cover Water Treatment Plant (WTP), Geographic Information System (GIS), Customer Relations (CR), and Financial Analysis and Management (FAM).

Table 3.5 explains the reasons why these seven subjects are selected for COE Program and the current training module development status.

Table 3.5 Module Development

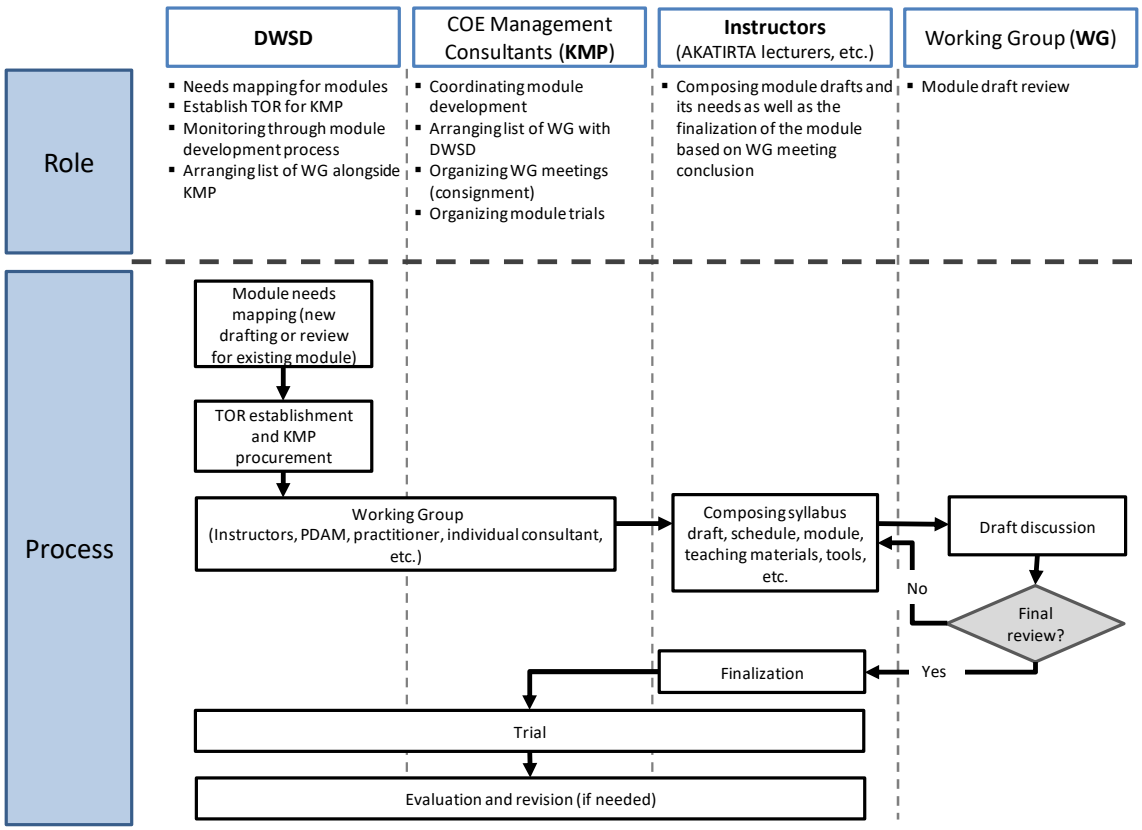
Modules	Reasons to select	Status	Donor's cooperation
NRW	One of the most pressing problems among many PDAMs is high NRW ratio, and NRW reduction directly impacts on revenue increase.	Completed	DWSD's own efforts JICA (revision work)
EE	This affects directly to the operation cost.	Completed	DWSD's own efforts JICA (revision work)
SAK-ETAP	Correct accounting report according to	Completed	DWSD's own efforts

	the new rule is indispensable to evaluate the basic financial performance of PDAMs.		
WTP	One of the pressing problems of inefficient operation is related to the idle capacity of WTP. Operation improvement will help PDAMs to utilize its max. capacity of the facilities.	1st version in 2017	IUWASH (development)
GIS	GIS is very effective tool for water supply management and related to various business areas such as customer data management and asset management	1st version in 2017	IUWASH (development)
CR	CR is directly related to bill collection efficiency and NRW reduction. Handling customer complaints and is the key for service improvement	1st version in 2018	JICA (development)
FAM	Knowledges on financial analysis, planning and management are indispensable to formulate PDAM business plans.	1st version in 2018	JICA (development)

Source: JET

3.3.3.2 Training Module Development Procedure

Module development procedures are explained in Figure 3.6. Working group (WG) is organized for each subject to develop the training module. WG members are composed of PDAM experienced staff, reputable individual professionals and AKATIRTA instructors.



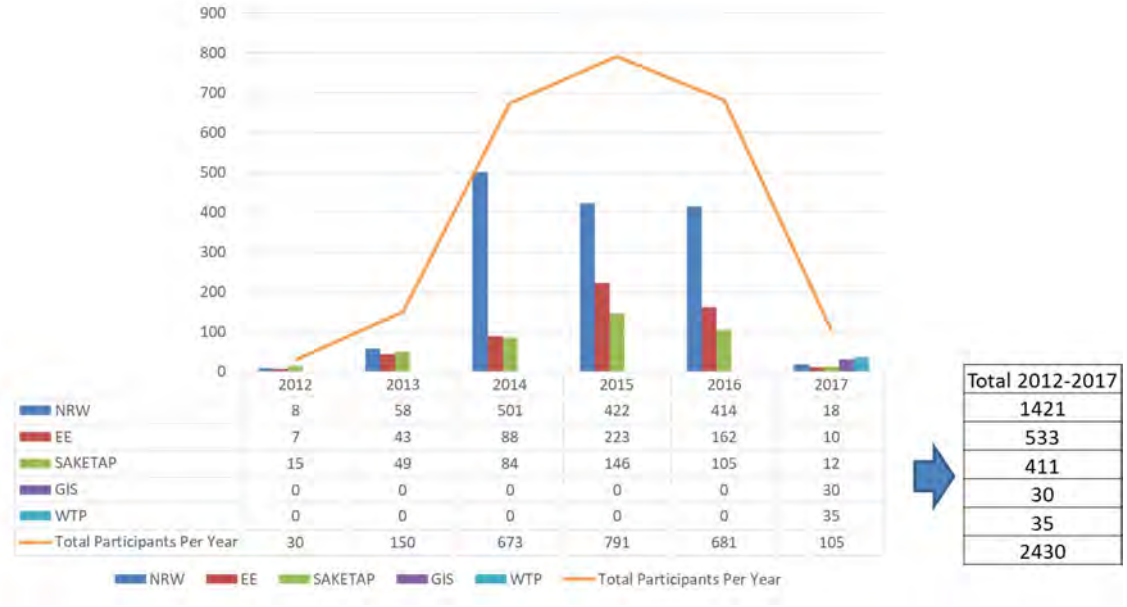
Source: JET

Figure 3.6 COE Program Training Module Development Procedure

3.3.4 Program Achievements

3.3.4.1 Overall PDAM Employees Trained by COE Program

Figure 3.7 shows one of the past efforts of COE Program in terms of PDAM employees trained.

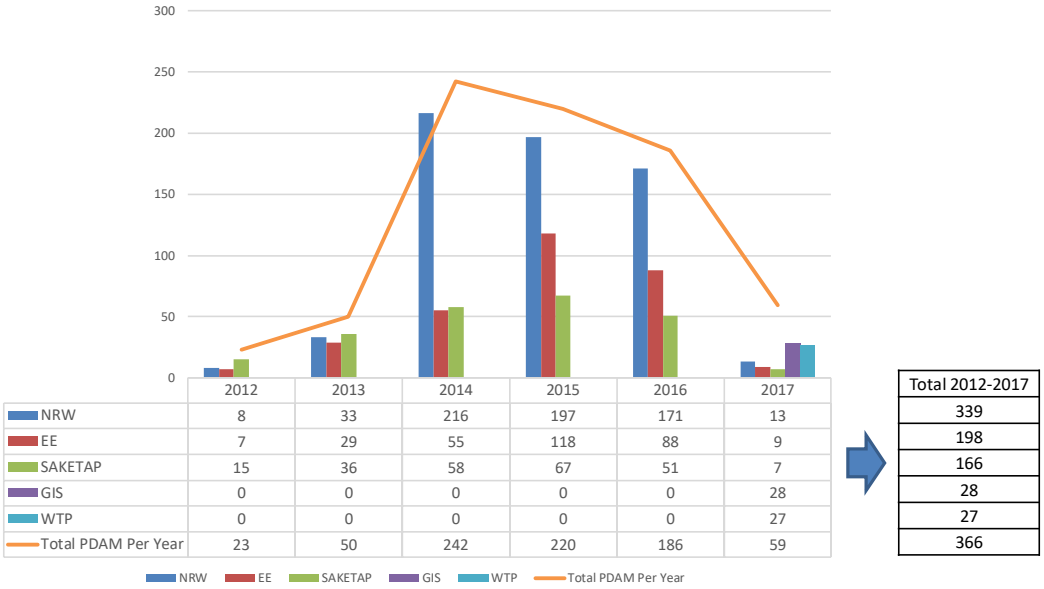


Source: COE Database (DWSD)

Figure 3.7 PDAM Employees Trained by COE Program 2012 – 2017

The number of PDAM employees trained peaked from 2014 to 2016, but largely decreased in 2017 due to the budget constraints of APBN. Throughout the period of 2012-2017, COE Program has trained 2,430 PDAM employees. Among which, a substantial proportion (approximately 60%) of the total participants was allocated to the NRW course because the NRW training module is the most demanded among PDAMs and has the highest number of trainings implemented in COE Program since its commencement in 2012.

The number of PDAMs which participated in any of the five training modules is shown in Figure 3.8, and amounts to 366 PDAMs as of the end of 2017, which corresponds to approximately 95% of the total PDAM number. Among others, NRW module has covered 89% of all the PDAMs.



	2012	2013	2014	2015	2016	2017	Total 2012-2017
NRW	8	33	216	197	171	13	339
EE	7	29	55	118	88	9	198
SAKETAP	15	36	58	67	51	7	166
GIS	0	0	0	0	0	28	28
WTP	0	0	0	0	0	27	27
Total PDAM Per Year	23	50	242	220	186	59	366

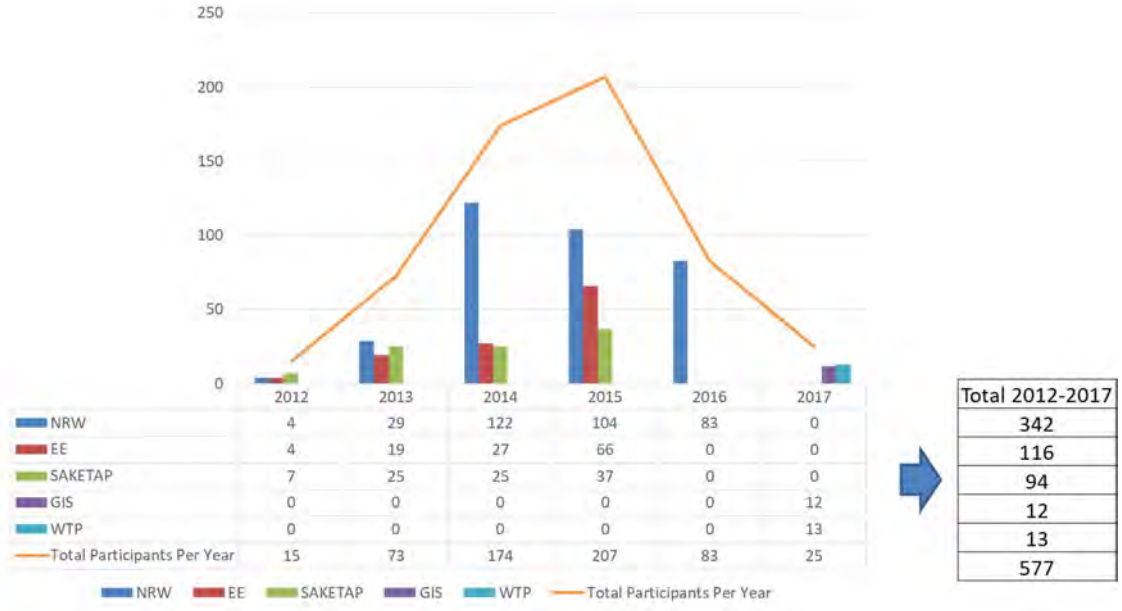
Source: COE Database (DWSD)

Note: The figures of Total PDAMs are different from those simply calculated total in the same column since same PDAMs participated in different modules and different years.

Figure 3.8 PDAM Participated in COE Program 2012 – 2017

3.3.4.2 Creation of National and Provincial Trainers

Out of the total of 34 provinces in Indonesia, nearly all the provinces have participated in the COE Program, except DKI Jakarta. Until 2017, a total of 577 PDAM employees participated in Provincial Training with the highest proportion of participation in the NRW course as shown in Figure 3.9.

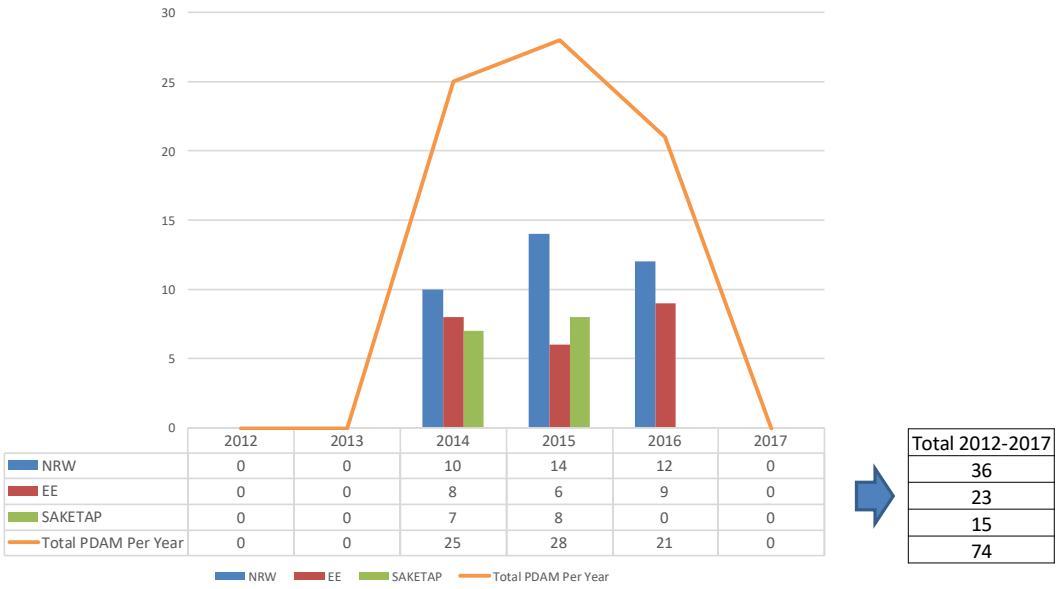


	2012	2013	2014	2015	2016	2017	Total 2012-2017
NRW	4	29	122	104	83	0	342
EE	4	19	27	66	0	0	116
SAKETAP	7	25	25	37	0	0	94
GIS	0	0	0	0	0	12	12
WTP	0	0	0	0	0	13	13
Total Participants Per Year	15	73	174	207	83	25	577

Source: COE Database (DWSD)

Figure 3.9 PDAM Employees Participated in Provincial Training 2012 - 2017

In addition to Provincial Trainers, National Trainers were selected from Provincial Trainers through National Trainings. Figure 3.10 shows the number of participants for National Trainings.

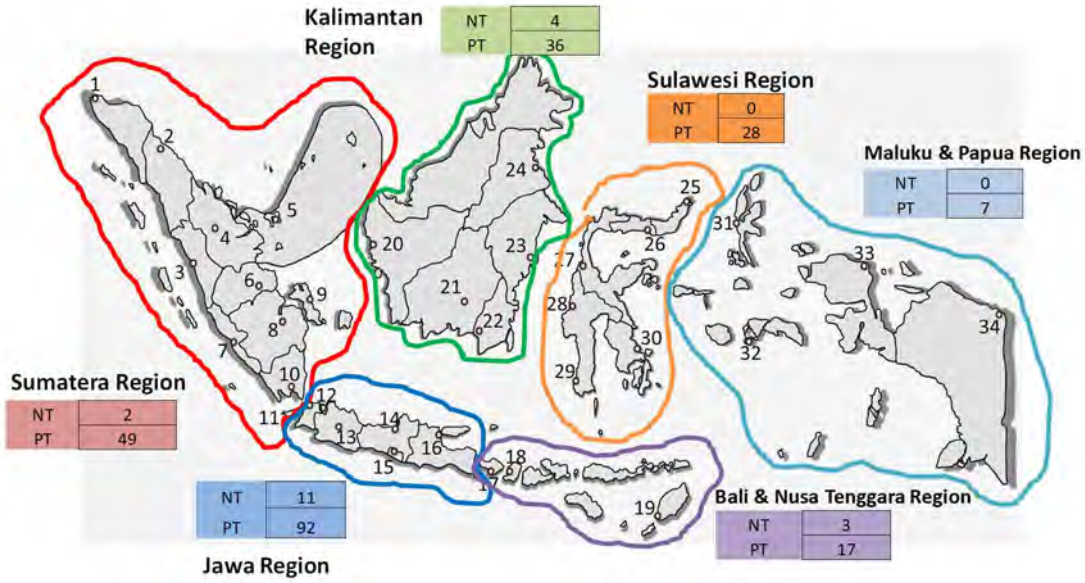


	2012	2013	2014	2015	2016	2017	Total 2012-2017
NRW	0	0	10	14	12	0	36
EE	0	0	8	6	9	0	23
SAKETAP	0	0	7	8	0	0	15
Total PDAM Per Year	0	0	25	28	21	0	74

Source: COE Database (DWSD)

Figure 3.10 Participants to National Training 2012 - 2017

One of the most important concepts of COE Program is to deploy Provincial Trainers across the country to achieve efficient and economical dissemination of managerial and operational knowledges to PDAMs throughout the country. Figure 3.11 and Table 3.12 indicate the present distribution of Provincial Trainers and National Trainers.



Region	No.	Province	Region	No.	Province	Region	No.	Province
Sumatera Region (Wilayah I)	1	ACEH	Jawa Region (Wilayah II)	11	BANTEN	Sulawesi Region (Wilayah III b)	25	NORTH SULAWESI
	2	NORTH SUMATERA		12	TANGERANG		26	GORONTALO
	3	WEST SUMATERA		13	WEST JAWA		27	CENTRAL SULAWESI
	4	RIAU		14	CENTRAL JAWA		28	WEST SULAWESI
	5	RIAU ISLANDS		15	D. I. YOGYAKARTA		29	SOUTH SULAWESI
	6	JAMBI		16	EAST JAWA		30	SOUTHEAST SULAWESI
	7	BENGKULU	Kalimantan Region (Wilayah III a)	20	WEST KALIMANTAN	Bali & Nusa Tenggara Region	17	BALI
	8	SOUTH SUMATERA		21	CENTRAL KALIMANTAN		18	WEST NUSA TENGGARA
	9	BANGKA BELITUNG		22	SOUTH KALIMANTAN		19	EAST NUSA TENGGARA
	10	LAMPUNG		23	EAST KALIMANTAN	Maluku & Papua Region (Wilayah IV b)	31	NORTH MALUKU
				24	NORTH KALIMANTAN		32	MALUKU
							33	WEST PAPUA
							34	PAPUA

Source: JET based on COE Database (DWSD)

Figure 3.11 Distribution of National and Provincial Trainers Produced over the Country

Table 3.12 Number of National and Provincial Trainers by Training Module as of 2017

Wilayah (Region)	Number of Trainers (NT: National Trainers, PT: Provincial Trainers)															
	NRW		EE		SAK-ETAP		GIS		WTP		CR		FAM		Total	
	NT	PT	NT	PT	NT	PT	NT	PT	NT	PT	NT	PT	NT	PT	NT	PT
Wilayah I (Sumatera)	2	33	0	10	0	6	0	0	0	0	0	0	0	0	**2**	**49**
Wilayah II (Jawa)	7	47	3	21	1	13	0	4	0	4	0	2	0	1	**11**	**92**
Wilayah III a (Kalimantan)	4	21	0	8	0	6	0	0	0	0	0	0	0	1	**4**	**36**
Wilayah III b (Sulawesi)	0	18	0	4	0	6	0	0	0	0	0	0	0	0	**0**	**28**
Wilayah IV a (Bali & Nusa Tenggara)	2	7	0	2	1	8	0	0	0	0	0	0	0	0	**3**	**17**
Wilaya IV b (Maluku & Papua)	0	7	0	0	0	0	0	0	0	0	0	0	0	0	**0**	**7**
Total	**15**	**133**	**3**	**45**	**2**	**39**	**0**	**4**	**0**	**4**	**0**	**2**	**0**	**2**	**20**	**229**

Note: Provincial Trainers for CR and FAM were proiduced through Provincial Training conducted in January 2018 but counted as 2017 COE Program training.

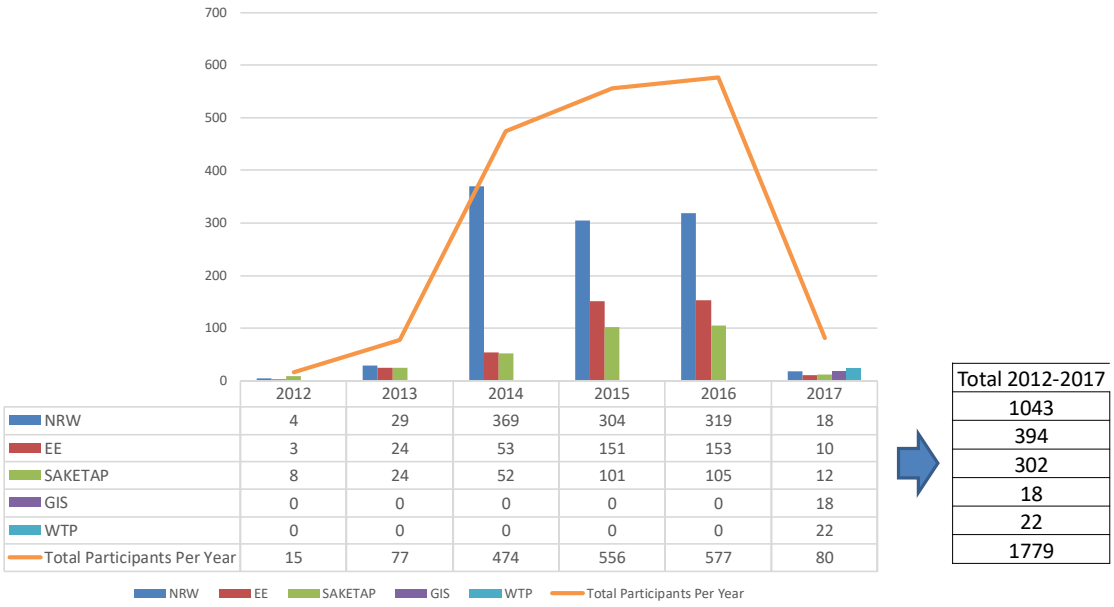
Source: JET based on COE Database (DWSD)

The total of Provincial Trainers produced reaches to 229 for the three modules as of the end of 2017.

For each module, NRW, EE and SAK-ETAP have 133, 45 and 39 Provincial Trainers, respectively. Jawa Region has the highest numbers for all the three modules. Effective distribution of Provincial Trainers is one of important points for the Program's sustainability and further discussed in M/P preparation.

3.3.4.3 Kab/Kota Training

Until 2017, a total of 1,779 PDAM employees participated in Kab/Kota Training with the highest proportion of participation in the NRW course as shown in Figure 3.13.

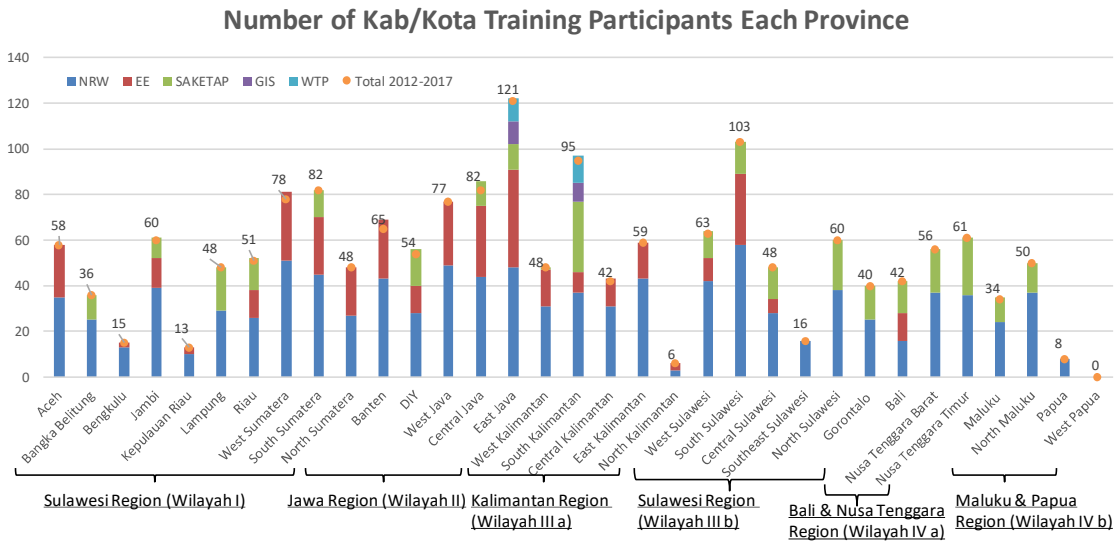


	2012	2013	2014	2015	2016	2017	Total 2012-2017
NRW	4	29	369	304	319	18	1043
EE	3	24	53	151	153	10	394
SAKETAP	8	24	52	101	105	12	302
GIS	0	0	0	0	0	18	18
WTP	0	0	0	0	0	22	22
Total Participants Per Year	15	77	474	556	577	80	1779

Source: COE Database (DWSD)

Figure 3.13 PDAM Employees Participated in Kab/Kota Training 2012 - 2017

The number of Kab/Kota Trainings conducted in each province is summarized for the five training modules in Figure 3.14. For NRW module most of provinces have already received Kab/Kota Trainings more than one time, but for other modules it is implied that further efforts are required in view of equal and even dissemination of knowledges all over the country.



Source: JET based on COE Database (DWSD)

Figure 3.14 Number of Kab/Kota Training Participants in Each Province

3.3.5 Monitoring and Evaluation and Follow-up Activities

3.3.5.1 Monitoring and Evaluation

In the current setup, the monitoring and evaluation activities have been implemented by the COE Management Consultants under supervision of DWSD. In every COE training, questionnaire survey is conducted for trainers and trainees to evaluate the contents, implementation and execution of the training. The results are reported in the Annual Implementation Report. However, activities of the participating PDAM after COE trainings have not been monitored. Moreover, the system lacks the evaluation of overall COE program in addition to the current evaluation based on individual trainings.

During the 2017 program, COE Management Consultants carried out the evaluation of COE program 2012-2016 to cope with this issue. It includes interview survey with PDAMs participating in the past programs in 14 provinces to evaluate the PDAM activities after taking a part in the COE trainings. The evaluation of overall program based on the 2012-2016 data was also conducted.

Major comments provided for the results by the workshop members are as follows:

- The questionnaire results do not show how many PDAMs have implemented what is taught in the COE trainings.
- The results have not described yet the performance of PDAMs after trainings.

3.3.5.2 Training Data Management

In the current setup, primary data regarding each training conducted in COE Program are collected by COE Management Consultants (KMP) through Field Consultants who are responsible to the

actual training implementation. At the end of each program year, COE Management Consultants compile such information as training level (National, Provincial or Kabupaten/Kota), training module, venue, instructors/trainers, participants (trainees), qualified trainer candidates and selected Provincial Trainers, etc. into Annual Implementation Report and submit it to DWSD. As the program has been developed since its commencement in 2012, participating PDAM staff and PDAMs increased significantly as described earlier, it brought about the necessity to establish the COE Program database.

KMP was assigned to construct a database of training participants (trainees) during the COE Program in 2016 responding to their terms of reference (TOR) prepared by DWSD. However, information of the database is limited to only trainees of COE training conducted in the past and does not contain data such as trainees qualified in each Provincial Training, trainers who conducted the training, etc.

On the other hand, as one of sub-activities of the Baseline Survey (2015-2016), JICA Expert Team (JET) also constructed a more comprehensive and improved database to analyze the status of COE Program implementation including the information presented in this Master Plan based on the primary data directly extracted from Annual Implementation Reports. It is recommended that DWSD consider utilizing the database format of the JET version for further use by KMP and Field Consultants. The database by JICA Expert Team will be handed over to DWSD in due course during development of the present Master Plan.

3.3.5.3 Follow-up Activities for Training Alumni

COE Management Consultants (KMP) conduct so-called Centralized Monitoring for Provincial Trainers trained and selected through Provincial Training each year. Before teaching in Kabupaten/Kota Training, the selected Provincial Trainers are invited by KMP for consultation sessions of (i) training simulation to improve their teaching skills and (ii) their proposals for operational improvement activities in their home PDAMs.

Other than the Centralized Monitoring, the current COE Program does not have a follow-up system to monitor the training alumni's operational activities in their home PDAMs after learning in the COE training or refresh their knowledge and skills through a sort of follow-up training program. KMP conducted the monitoring and evaluation survey about Provincial Trainer alumni in 2017 which mainly consist of interviews with them about operational improvement after taking COE training; however, such monitoring activities are only conducted in the 2017 program not systemized as routine activities in KMP's scope of work every year. To improve this weakness, the present

Master Plan proposes a more comprehensive monitoring and evaluation system for COE Program as presented in Section 5.4.2 of Chapter 5 below.

4 Challenges and Analysis of Issues

4.1 Positioning of COE Program

Human resource development activities currently operated in the Indonesian water supply sector are listed in Table 4.1.

Table 4.1 Existing Training Programs in Indonesian Water Supply Sector

Training Organization	Training Program	Main Target Group	Training Capacity	Main Feature	Cost borne by
DWSD	COE Program	Kab/Kota Training:⇒ Operator Level Provincial and National Training:⇒ Mid-management Level	Depends on budget (Approx. 800 participants are trained in one year)	7 Modules（NRW, EE, SAKAETAP, WTP, GIS, CR, FAM） Covers PDAMs whole the country	APBN (Transportation costs are borne by PDAMs)
BTAM	-	Mainly for Operator Level	Approx. 1,000	21 modules. Able to provide training courses which require special facilities such as water quality laboratory, water meter test bench, leakage survey yard, large diameter pipe laying yard, etc.	APBN 3~4 million Rp/person (excluding transportation)
YPTD	-	Main target group is management level personnel (Director, Dept. Head, Section Head) Moreover, specific training for special subject such as NRW is also conducted.	The number of trainees is approx. 700 ～800 per year till 2017. Aiming at 2,000 per year after the year 2018.	15 modules. Ex-PDAM directors and PDAM experienced personnel are instructors, and good reputation for management training. Participants take certification test at the end of the training.	Participant PDAM
AKATIRTA	-	High school graduates and PDAM staff with minimum high school education	The number of yearly graduates is approx. 100. Among which, 60% of them work for PDAMs.	Founded by PERPAMSI. Graduates gain diploma equivalent to Work Competency Level 4. Most of the graduates become PDAM workers.	Own expense
PERPAMSI	National WOPs	PDAM to PDAM	Forty-five (45) WOPs has been conducted since 2011. Pilot projects are compulsory for each WOPs, for example during the periods of 2011-2014 there were twenty-one (21) pilot projects for DMA and about 51 DMAs were established. Until this year, around 700 PDAM personnel have been actively involved.	Upon request of recipient PDAM, PERPAMSI makes matching with mentor PDAM. Capacity development of PDAM staff in the fields of NRW Reduction, Energy Efficiency, Water Quality, Business Plan, and Billing System is conducted through pilot projects.	Costs are usually shared but borne mostly by mentoring PDAM.
	OJT	Staff of small PDAM	Staff of Recipient PDAM is trained by OJT at Mentor PDAM for 1 month. So far since 2014, 108 staff members were trained.	PERPAMSI introduces sick and small PDAM to healthy and large PDAM.	Recipient PDAMs

Source: JET

There are five (5) major training organizations in the water supply sector. Among which, DWSD (COE Program), BTAM and YPTD are the three main contributors in terms of scales of training capacities and achievements. Training modules offered by these three training contributors are further compared below.

COE Program has seven (7) modules, and for each of these seven modules YPTD and BTAM also offer similar titled modules as indicated in Table 4.2.

Table 4.2 Titles of Training Modules Offered by the Three Training Programs

No.	COE	BTAMS	YPTD PAMSI
1	Non Revenue Water Reduction	Water Treatment Plant Planning	Competency Assessors
2	Energy Efficiency	O&M of Water Treatment Plant	Competency Instructor
3	SAK-ETAP	Water Treatment Plant Operation	Junior Level of Water Supply Management
4	Water Treatment Plan Operation	Laboratorium and Water Quality Control	Middle Level of Water Supply Management
5	GIS	Raw Water Unit and Production Unit Operation	Senior Level of Water Supply Management
6	Customer Relation	Comissioning Water Treatment Plant	PDAM Performance Improvement
7	Financial Analysis and Management	Water Quality Control in the Drinking Water Treatment Process	Planning (Business Plan)
8		Transmission and Distribution Network Planning	Project Management
9		Managing Water Loss	Advanced Level of Non Revenue Water Reduction
10		Supervising Piping Network Installation	Communication and Advocacy Strategy of Water Tariff Adjustment
11		Pipe network Planning with GIS-Integrated EPANET Program	Water Treatment Plant
12		Pipe Network Rehabilitation	Communication and Customer Relation for PDAM Excellence Service Improvement
13		Reservoir and Distribution System Operation	PDAM Public Relation and Secretariat
14		Transmision and Distribution Operation and Maintenance	PDAM Excellence Services
15		Operation and Maintenance of Pump and Genset	SAK-ETAP
16		Operation and Maintance of Electirical and Mechanical Equipment	
17		Mechanical and Electrical in Water Supply	
18		Financial Statement with SAK-ETAP	
19		Marketing Development (Customer Relation and Marketing)	
20		Service Excellence	
21		Water Utility Management	

Source: JET prepared according to information from DWSD, BTAM and YPTD

However, these similar titled modules of the three training programs are different mainly in terms of training target groups and training durations. Moreover, major differences of the approaches of the

three training programs are illustrated in Table 4.3.

Table 4.3 Comparison of the Three Major Training Programs

	COE Program	BTAM	YPTD
Training Modules	● 7 modules - Fundamental knowledge and skills for PDAM staff	● 21 modules - Specialized for trainings using special facilities	● 15 modules - Mainly managerial training courses: *Utama, Madya, Muda*
Target Group	● NT/PT: Mid-managerial level ● KT: Operator level → **Promote solidarity and cooperation among local PDAMs by producing Provincial Trainers**	● Mainly Operator level	● Managerial level
Training Venue	● NT/PT: Centralized (JABODETABEK) ● KT: Provincial capitals → **Very accessible to local PDAMs**	● Centralized (BTAM Bekasi)	● Centralized (Jakarta, Malang, etc.)
Training Facilities	● Lectures: Hotels ● Practice: Adjacent PDAMs	● BTAM Facilities → **Suitable for technical practices using M&E workshop, water quality lab, piping yard, etc.**	● Hotels, PDAM, etc.
Certification	● Coordination with Competency Certificate is still underdeveloped	● Has some experience that alumni took competency certificates	● **Participants take certification test at the end of training (Management, NRW)**
Training Cost	● 6.5 million IDR/person* ● APBN except transportation borne by PDAMs	● 3 – 4 million IDR/person* ● APBN except transportation borne by PDAMs	● Fully borne by participant PDAM ● Only motivated PDAMs take trainings at their cost
Incentives for PDAMs to take training	-	-	● **PDAM Management is obliged to take training and certificate** ● **NRW training offers certificate tests**

Note: Training cost of COE Program (6.5 million IDR/person) include hotel accommodation, etc. whereas BTAM training (3 – 4 million IDR/person) has its own accommodation facilities. COE Program also bears consultants for implementation as well as travel cost for Provincial/National Trainers.

Source: JET

The discussion on the three modules has been initiated among DWSD, BTAM and YPTD to coordinate each other in October 2017. In recognition of the respective characteristics, the proposed demarcation of the three programs is discussed in M/P.

4.2 Sustainable Management of COE Program

COE Program has been operated directly by DWSD of DGHS with the central government initiative for six years to date. As explained in Chapter 3.3.2, the funding for COE Program, however, totally depends on APBN but the budget for this Program might not be necessarily maintained constantly to

the required level in the future considering various development needs emerging in the water supply sector and constraints of limited allocation of APBN to PU. Instead, it is necessary to seek for other funding sources as well as to develop a sustainable mechanism for COE Program implementation, which does not rely on the central government budget.

PERPAMSI, which is an established association of PDAMs all over the country, also provides training programs to PDAMs at present. Their approaches are different from those of COE Program. PERPAMSI provides National Twining Program (Water Operator Partnerships: WOPs) and OJT program as explained previously in Table 4.1. The cost for such training programs are borne by the PDAMs.

PERPAMSI has its own branch organization in each province, which is called as PD PERPAMSI. PD PERPAMSI is a kind of network among PDAMs within the same province, and therefore there is a possibility that PERPAMSI can undertake COE Program by organizing these PD PERPAMSIs as the key implementers of Kab/Kota Training of COE Program.

Considering PERPAMSI's missions as stipulated below, it is quite reasonable for PERPAMSI to undertake COE Program and promote the Program in the future.

- Providing excellent service to PERPAMSI members
- Encourage PERPAMSI members in achieving superior performance
- Building a network of partnership / cooperation (networking)
- Facilitating Capacity Building Development
- Provide a positive contribution to all stakeholders
- Achieve good and accountable organizational governance
- Take an active role in preserving the availability of raw water resources

(Source: PERPAMSI website)

More practically, PERPAMSI's roles are defined as follows:

1) Arrangement of government, donor and investor activities with PDAMs;
2) Providing the best solution to improve PDAM performance;
3) Dissemination of professional business principles in PDAM operators; and
4) Motivate PDAMs to improve

PERPAMSI is a professional association for which the general guidance is given by the Ministry of Home Affairs, the technical guidance by MPWH, and the quality standards by the Ministry of Health, respectively. As clearly defined in item 4) above, PERPAMSI is undertaking important roles in

human resource development for all the PDAMs over the country in line with the government guidance and directions for the Indonesian water supply sector development.

However, it has been a key issue to address that good instructors or trainers as well as a training mechanism have not been secured yet at local level to conduct efficient and effective dissemination of knowledge to PDAM staff across the country. Thanks to the central government input to COE Program so far, COE Program has already produced a certain number of Provincial Trainers in each province as described in Section 3.3.4. This effort will encourage the sustainable implementation of Kab/Kota Trainings at provincial level. The roles of PERPAMSI and PD PEPAMSI will be further discussed in the preparation of Master Plan to define their roles in the future COE Program.

4.3 HRD and Improvement of PDAM Performance

The ultimate goal of COE Program is not just to produce Provincial Trainers in each province but to ensure various improvements at actual operation of PDAMs through the enhancement of human resource competency of PDAMs. There is, however, a common constraint among many PDAMs when they tried to apply the knowledge and skills learnt to their own PDAMs after receiving trainings from COE Program. Although this is not only the case for participants to COE Program but also those to other training programs, it is a fact that the training effects are not immediately linked to the actual improvement of PDAM performance in many cases.

One of the main causes is lack of funding for implementing actual improvement work in many PDAMs, but there are also other problems as describe below;

- Participants tend to prefer more advanced technologies although COE Program provides simplified technologies as well, and abandon to try improvement work if equipment required for the advanced technologies is not available.
- Actual improvement work usually requires team work in PDAMs and individual knowledge of participants is not effectively utilized if such a team does not exist.
- Leadership in PDAM is important to encourage COE participants to submit their proposals on improvement works.
- PDAMs need pilot projects as catalyst to apply new knowledge and technologies obtained through COE Program.

As alternative funding sources to cope with such gaps after taking COE training, there are several donors' programs available to help PDAMs to secure necessary funding for their improvement works. World Bank will offer "NUWAS" which provides funding to PDAMs for even small scaled

improvement works if PDAMs can make good proposals. IUWASH also has a program to support PDAMs to carry out pilot projects in the fields of NRW reduction as well as energy efficiency improvement. JICA is also helping to encourage international WOPs between Japanese waterworks and PDAMs, and currently three WOPs are underway. DWSD would facilitate PDAMs participating in COE Program to access those alternative funding sources.

Such harmonization between COE Program and physical improvement projects is very important to not only materialize actual improvements but also maintain technical knowledge and skills obtained through COE Program. This aspect is also considered in Master Plan.

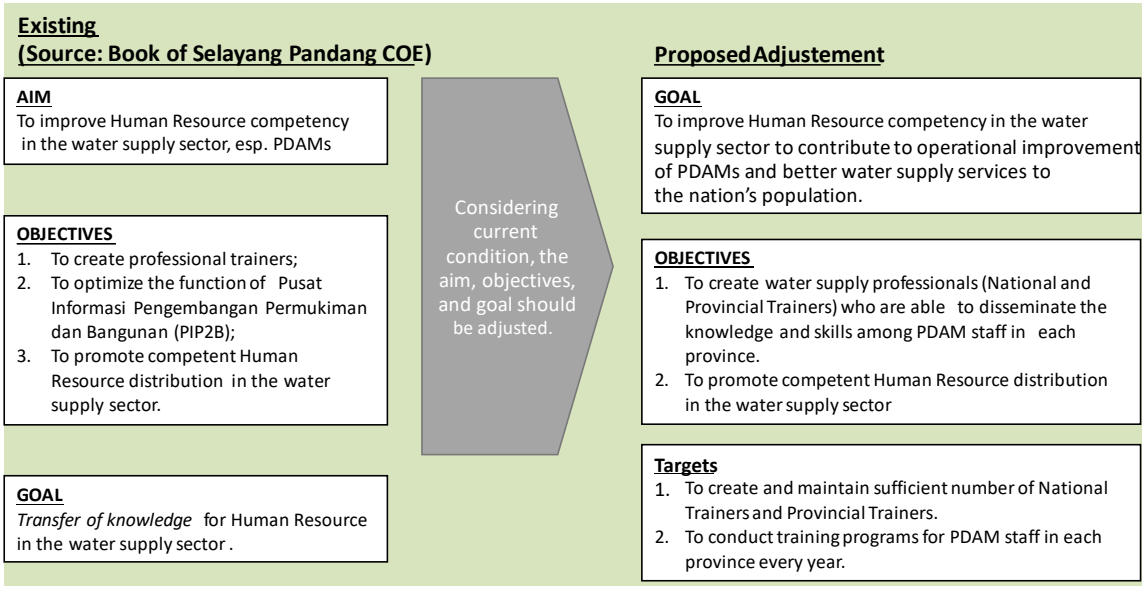
5 Master Plan for COE Program

5.1 Adjusted Goal and Objectives of COE Program

COE Program was commenced in 2012. During the implementation of the Program, circumstances of the Program and expectation to COE Program have been changing as the importance of human resource competency of PDAMs has been becoming more highlighted in the ministerial regulation "PUPR No.10/PRT/2016 on Indonesian National Work Competence Standards (SKKNI) in the Management of Water Supply System", which calls for competency improvement of PDAM staff. It has been recognized that the original goal and objectives should be adjusted due to the following reasons:

1) COE Program originally encouraged the use of PIP2B as training venues since all provinces have PIP2B but most of them were not utilized effectively and kept idle for years. In reality, most of Kab/Kota Trainings recently implemented, however, used hotel meeting rooms for class room lectures. This arrangement is now recognized more advantageous in view of cost saving and time saving with no transportation need between participants' accommodation and PIP2B. Accordingly, in the adjusted objectives the use of PIP2B is not stipulated in the present Master Plan for the COE Program but its use will be decided at the discretion of each PD PERPAMSI (the future Kab/Kota Training Implementer) depending on the readiness and convenience of PIP2B as the training venue for COE Program and cost comparison with/without PIP2B.
2) Quantitative targets are not set in the original aim and goal. It is necessary to set numerical targets to monitor and evaluate effective implementation of the Program.

In order to catch up with such changes, it is proposed to adjust the original aim, objectives and goal of COE Program as shown in Figure 5.1.



Source: JET

Figure 5.1 Adjusted Goal, Objectives and Targets Proposed

5.2 Numerical Target Setting

5.2.1 Target Number of Provincial Trainers

In accordance with the new objectives adjusted in the previous section, the present section estimates the numerical target for Provincial Trainers to be secured in each province, taking into account various factors such as PDAM personnel population, number of PDAMs, etc.

The numerical target setting in this section is performed in the following matter:

(1) Minimum number of Provincial Trainers to be secured in each province

(2) Provincial Trainers to be produced in future

- Since NRW, EE and SAK-ETAP have existing trainers, the minimum number of Provincial Trainers is a net of those existing trainers from (1) above.
- For other modules with no existing trainers, the minimum number of trainers estimated (1) above equals the trainers to be produced in future.

(3) Number of Provincial Trainer candidates to be trained

- It is known from past experience that only certain trainees of Provincial Training are qualified to be Provincial Trainers (The trainer productivity rate is around 40% of total trainees). The number of Provincial Trainer candidates are estimated based on this productivity rate to acquire number of Provincial Training to be trained in future to produce necessary number of trainers.

On the other hand, National Trainers are considered as one of the personal career development goals

among Provincial Trainers so that its numerical target setting is not considered in the present section. It is expected that training of Provincial Trainer candidates and training module development will be implemented by the existing National Trainers and other external experts (instructors) of the relevant expertise. As proposed in Section 5.5.3, it is assumed that the COE Program will hold National Training for one of the seven training modules each year.

(1) Minimum Number of Provincial Trainers for Each Province (All Modules)

The estimated targets are set as the minimum number of Provincial Trainers for each training module in respective provinces. As actual demand for trainers may vary by the training modules, the targets for particular training modules may be increased from the minimum targets estimated below.

Indonesia is composed of 34 provinces, and the number of PDAM personnel in each province varies largely from province to province, ranging from several hundreds to around seven thousand as shown in Table 5.2.

Table 5.2 The Number of PDAM Personnel in Each Province

Wilayah (Region)	Province	No. of PDAM Personnel	Wilayah (Region)	Province	No. of PDAM Personnel
Wilayah I (Sumatera Region)	Aceh	1,296	Wilayah III a (Kalimantan Region)	Kalimantan Barat	953
	Sumatera Utara	4,335		Kalimantan Tengah	865
	Sumatera Barat	1,327		Kalimantan Selatan	1,364
	Riau	578		Kalimantan Timur	2,129
	Kapulauan Riau	220		Kalimantan Utara	326
	Jambi	1,073	Wilayah III b (Sulawesi Region)	Sulawesi Utara	1,011
	Sumatera Selatan	2,112		Sulawesi Barat	193
	Bangka Belitung	241		Sulawesi Tengah	580
	Bengkulu	568		Sulawesi Tenggara	1,041
	Lampung	606		Sulawesi Selatan	3,027
Wilayah II (Jawa Region)	Banten	1,107		Gorontalo	489
	Jawa Barat	6,911	Wilayah IV a (Bali & Nusa Tenggara Region)	Bali	1,978
	Jawa Tengah	6,241		Tenggara Barat	1,101
	D.I. Yogyakarta	815		Tenggara Timur	1,034
	Jawa Timur	7,051	Wilaya IV b (Maluku & Papua Region)	Maluku	384
				Maluku Utara	388
				Papua	254
				Papua Barat	66
Total PDAM Personnel in the Country					51,664

Note: DKI Jakarta is excluded. Source: KINERJA PDAM 2016 (BPPSPAM)

In consideration of geographically dispersed locations of PDAMs all over the country, COE Program is so designed to materialize more effective dissemination of technical knowledge to such PDAMs by deploying several Provincial Trainers in each province. This arrangement is expected to enable more economical and easier access to technical consultation and guidance for PDAMs compared to the conventional centralized training method, and to further contribute to fostering solidarity for technical cooperation among PDAMs in each province. Considering the experiences of the past

Kab./Kota Training implementation, the required minimum number of Provincial Trainers to carry out smoothly Kab/Kota Training is at least two (2) for each training module in each province. (Exemptions are applied for provinces where the number of PDAMs exists less than 5. These are Kapulauan Riau, Kalimantan Utara, Gorontalo, Papua, Papua Barat.)

Moreover, it should be also considered to encourage large PDAMs to share more roles in COE Program. Among approximately 370 existing PDAMs all over the country, there are sixteen (16) very large PDAMs, of which number of customers exceeds 100,000 customers. It is reasonable to say that such large PDAMs should assume important roles as the leading-runner PDAMs to resource both National and Provincial Trainers for COE Program. This is because all of them are categorized in healthy PDAMs and retain, in general, competent engineers in various fields of work. Such leading runner PDAMs, that seem to be able to afford to resource more National Trainers and Provincial Trainers, are listed in Table 5.3.

Table 5.3 List of Leading-runner PDAMs

Wilayah (Region)		PDAM	No. of Customers	No. of Employees	BPPSPAM Score (2016)	National Trainers	Prov. Trainers
Wilayah I (Sumatera)		1) Tirta Nadi (Medan)	472,789	2,015	3.11	0	3
		2) Kota Palembang	257,189	526	3.96	2	6
Wilayah II (Jawa)		1) Kab.Tangerang	340,842	377	3.78	0	6
		2) Kota Bogor	139,412	394	4.26	1	0
		3) Kab. Bekasi	201,467	622	3.67	0	0
		4) Kab. Bogor	119,950	479	4.08	0	0
		5) Kota Bandung	154,859	641	2.86	0	0
		6) Kota Semarang	160,427	519	2.86	0	2
		7) Kab.Sidoarjo	133,191	531	3.35	0	2
		8) Kota Malang	140,320	383	3.81	6	12
		9) Kota Surabaya	536,984	1,271	3.91	0	3
Wilayah III	III a*	1) Kota Banjarmasin	166,261	395	3.65	3	7
		2) Kota Samarinda	137,135	735	3.36	0	2
		3) Kota Pontianak	98,032	263	3.92	1	6
	III b*	1) Kota Makassar	163,657	977	3.11	0	1
Wilayah IV	IV a*	2) Kota Mataram	108,754	249	3.85	0	1
	IV b*	-	-	-	-	0	0
Total			**3,331,269**	**10,377**	**-**	**13**	**51**

Source: BPPSPAM *Kinerja PDAM* (PDAM Performance) 2016

Note: Wilayah III a: Kalimantan Region, Wilayah III b: Sulawesi Region

Wilayah IV a: Bali and Nusa Tenggara Region, Wilayah IV b: Maluku and Papua Region

PAM Jaya is excluded. Kota Pontianak is included though its number is 98,032.

In conclusion of the above understanding it is proposed to set basic conditions for setting the target number of Provincial Trainers to be produced as stated follows:

1) Each province with less than 2,000 PDAM employees should have at least two Provincial Trainers for each module.
2) For provinces with more than 2,000 employees, one Provincial Trainers should be additionally deployed for every additional 1,000 employees.
3) At least one Provincial Trainer should be deployed per five (5) PDAMs in each province.
4) Each of the sixteen (16) large-scaled PDAMs should have at least one National Trainer.

In accordance with the above conditions, Table 5.4 summarizes the target numbers of National Trainers and Provincial Trainers to be secured for each module in each province. However, an exemption is made to Papua Barat Province as its numbers of PDAM and PDAM staff members are very small. Papua Barat Province and Papua Province are combined for setting the target number of Provincial Trainers.

Table 5.4 Target Numbers for National/Provincial Trainers for Each Module to be Secured in Each Province

Wilayah	Province	Total PDAM Staff	No. of PDAMs	Target Number of NT	Target Number of PT	Lead-runner PDAM
Wilayah I	Aceh	1,296	15		3	
	Sumatera Utara	4,335	18	1	4	Tirta Nadi
	Sumatera Barat	1,327	16		3	
	Riau	578	6		2	
	Kapulauan Riau	220	3		1	
	Jambi	1,073	9		2	
	Sumatera Selatan	2,112	13	1	3	Kota Palembang
	Bangka Belitung	241	6		2	
	Bengkulu	568	7		2	
	Lampung	606	8		2	
Wilayah II	Banten	1,107	6	1	2	Kab. Tangerang
	Jawa Barat	6,911	23	4	6	Kota Bogor, Kab. Bogor, Kab. Bukasi, Kota Bandung
	Jawa Tengah	6,241	35	1	6	Kota Semarang
	D.I. Yogyakarta	815	5		2	
	Jawa Timur	7,051	38	3	7	Kota Surabaya, Kota Malang, Kab. Sidoarjo,
Wilayah IIIa	Kalimantan Barat	953	12	1	3	Kota Pontianak
	Kalimantan Tengah	865	14		3	
	Kalimantan Selatan	1,364	12	1	3	Kota Banjarmasin
	Kalimantan Timur	2,129	9	1	3	Kota Samarinda
	Kalimantan Utara	326	5		1	
Wilayah IIIb	Sulawesi Utara	1,011	10		2	
	Sulawesi Barat	193	3		1	
	Sulawesi Tengah	580	8		2	
	Sulawesi Tenggara	1,041	10		2	
	Sulawesi Selatan	3,027	24	1	5	Kota Makassar
	Gorontalo	489	5		1	
Wilayah IVa	Bali	1,978	9		2	
	Tenggara Barat	1,101	8	1	2	Kota Mataram
	Tenggara Timur	1,034	15		3	
Wilaya IVb	Maluku	384	6		2	
	Maluku Utara	388	6		2	
	Papua	254	4		2	
	Papua Barat	66	2			
Total		51,664	370	16	86	

Source: JET prepared with DWSD data.

(2) Provincial Trainers to be produced as net of existing trainers (NRW, EE and SAK-ETAP)

Table 5.5 below further indicates the number of Provincial Trainers to be produced in the future. For the five existing modules, i.e. NRW, EE, SAK-ETAP, GIS and WTP, the required numbers are calculated as shown in the table, respectively, as the balance between the target numbers and the number of Provincial Trainers already produced.

Table 5.5 Required Number of Provincial Trainers to Fulfill the Targets in Each Province for Existing Five Modules (NRW, EE, SAK-ETAP, GIS and WTP)

Wilayah (Region)	Province	Total PDAM Staff	No. of Provincial Trainers																			
			NRW				EE				SAK-ETAP				GIS				WTP			
			PT Trained	PT Produced	Target	Additional PT Needed	PT Trained	PT Produced	Target	Additional PT Needed	PT Trained	PT Produced	Target	Additional PT Needed	PT Trained	PT Produced	Target	Additional PT Needed	PT Trained	PT Produced	Target	Additional PT Needed
Wilayah I (Sumatera)	Aceh	1.296	12	3	3	**0**	4	2	3	**1**	1	0	3	**3**	0	0	3	**3**	1	0	3	**3**
	Sumatera Utara	4.335	15	4	4	**0**	5	3	4	**1**	0	0	4	**4**	0	0	4	**4**	0	0	4	**4**
	Sumatera Barat	1.327	16	7	3	**0**	3	3	3	**0**	0	0	3	**3**	0	0	3	**3**	0	0	3	**3**
	Riau	578	5	1	2	**1**	4	0	2	**2**	9	0	2	**2**	0	0	2	**2**	0	0	2	**2**
	Kapulauan Riau	220	4	2	1	**0**	0	0	1	**1**	0	3	1	**0**	0	0	1	**1**	0	0	1	**1**
	Jambi	1.073	8	4	2	**0**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**
	Sumatera Selatan	2.112	19	5	3	**0**	7	1	3	**2**	7	2	3	**1**	0	0	3	**3**	0	0	3	**3**
	Bangka Belitung	241	3	1	2	**1**	0	0	2	**2**	1	1	2	**1**	0	0	2	**2**	0	0	2	**2**
	Bengkulu	568	4	1	2	**1**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**
	Lampung	606	7	4	2	**0**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**
Wilayah II (Jawa)	Banten	1.107	13	8	2	**0**	3	1	2	**1**	0	0	2	**2**	0	0	2	**2**	1	1	2	**1**
	Jawa Barat	6.911	29	8	6	**0**	12	3	6	**3**	4	1	6	**5**	4	2	6	**4**	5	1	6	**5**
	Jawa Tengah	6.241	20	9	6	**0**	9	3	6	**3**	7	3	6	**3**	3	0	6	**6**	3	2	6	**4**
	D.I. Yogyakarta	815	8	3	2	**0**	3	1	2	**1**	4	2	2	**0**	0	0	2	**2**	1	0	2	**2**
	Jawa Timur	7.051	41	19	7	**0**	25	9	7	**0**	18	5	7	**2**	5	2	7	**5**	3	0	7	**7**
Wilayah III a (Kalimantan)	Kalimantan Barat	953	11	5	3	**0**	5	1	3	**2**	4	1	3	**2**	0	0	3	**3**	0	0	3	**3**
	Kalimantan Tenga	865	10	3	3	**0**	4	2	3	**1**	0	0	3	**3**	0	0	3	**3**	0	0	3	**3**
	Kalimantan Selata	1.364	12	7	3	**0**	6	1	3	**2**	19	6	3	**0**	0	0	3	**3**	0	0	3	**3**
	Kalimantan Timur	2.129	10	4	3	**0**	5	2	3	**1**	0	0	3	**3**	0	0	3	**3**	0	0	3	**3**
	Kalimantan Utara	326	3	0	1	**1**	0	0	1	**1**	0	0	1	**1**	0	0	1	**1**	0	0	1	**1**
Wilayah III b (Sulawesi)	Sulawesi Utara	1.011	8	4	2	**0**	0	0	2	**2**	4	4	2	**0**	0	0	2	**2**	0	0	2	**2**
	Sulawesi Barat	193	5	3	1	**0**	0	0	1	**1**	0	0	1	**1**	0	0	1	**1**	0	0	1	**1**
	Sulawesi Tengah	580	5	3	2	**0**	5	1	2	**1**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**
	Sulawesi Tenggara	1.041	3	2	2	**0**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**
	Sulawesi Selatan	3.027	20	7	5	**0**	9	3	5	**2**	7	3	5	**2**	0	0	5	**5**	0	0	5	**5**
	Gorontalo	489	5	2	1	**0**	0	0	1	**1**	0	0	1	**1**	0	0	1	**1**	0	0	1	**1**
Wilayah IV a (Bali & Nusa Tenggara)	Bali	1.978	8	3	2	**0**	6	2	2	**0**	3	3	2	**0**	0	0	2	**2**	0	0	2	**2**
	Tenggara Barat	1.101	6	3	2	**0**	0	0	2	**2**	5	3	2	**0**	0	0	2	**2**	0	0	2	**2**
	Tenggara Timur	1.034	9	2	3	**1**	0	0	3	**3**	4	2	3	**1**	0	0	3	**3**	0	0	3	**3**
Wilaya IV b (Maluku & Papua)	Maluku	384	5	2	2	**0**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**
	Maluku Utara	388	6	4	2	**0**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**
	Papua	254	5	2	2	**0**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**	0	0	2	**2**
	Papua Barat	66	3	0			0	0			0	0			0	0			0	0		
Total		**51.664**	**338**	**135**	**86**	**5**	**115**	**38**	**86**	**50**	**97**	**39**	**86**	**56**	**12**	**4**	**86**	**82**	**14**	**4**	**86**	**82**

Note: DKI Jakarta is excluded.
Papua and Papua Barat are combined for target setting.

Source: JET

(3) Number of Provincial Trainer Candidates to be Trained (All Modules)

In order to produce the required number of Provincial Trainers, Table 5.6 below explains how many Provincial Trainer candidates should be trained. Based on the past COE Program experiences, the productivity of Provincial Trainers for each module is known as 40%, 33% and 40% for NRW, EE and SAK-ETAP, respectively. Moreover, there are four training modules such as CR, FAM, GIS and WTP. Supposed that the productivity of Provincial Trainers for these new modules is 40%, Provincial Trainer candidates to fulfill the target numbers are estimated as shown in Table 5.6.

Table 5.6 The Numbers of Provincial Trainer Candidates Required to Fulfill the Targets

Training Module	Required Number of additional PTs after 2017	Past Productivity	Required Number of PT candidates to be trained after 2017
NRW	5	40%	13
EE	50	33%	152
SAK-ETAP	56	40%	140
CR	86	40%	215
FAM	86	40%	215
GIS	82	40%	205
WTP	82	40%	205
Total	445	-	1,145

Note: "Past Productivity" means how many percentage of PT candidates trained became PT to date.

Source: JET

(4) Maintaining the Required Number of Provincial Trainers

The target number of Provincial Trainers in Table 5.4 is determined based on the current situation of PDAMs in each Province. The numbers of PDAMs as well as PDAM employees may change in the future as the following possibilities are considered:

- The number of PDAM employees is anticipated to increase in accordance with the expansion of water supply service over the country.
- The number of PDAMs may decrease as small PDAMs may merge each other or absorbed by larger PDAMs in future.

In order to maintain the necessary number of Provincial Trainers in future it is proposed to establish the following rules:

- Once selected as Provincial Trainers these trainers should continue to work as Provincial Trainers for at least ten (10) years.
- DWSD and PERPAMSI should review the target number of Provincial Trainers at least every five (5) years.
- DWSD should provide financial supports to maintain the necessary number of Provincial Trainers by producing supplemental Provincial Trainers in future depending on the need of PERPAMSI.

5.2.2 Indicative Target Number of Kabupaten/Kota Training Trainees

As discussed above, it is crucial for the program to produce and maintain sufficient number of Provincial Trainers in each province to ensure its sustainable operation for long term. On the other hand, implementation of Kab/Kota Training depend very much on the local PDAM needs and training implementation capacity in each province as well as the funding availability. Taking into account the said consideration, the present section attempts to estimate the number of Kab/Kota Training trainees during the Master Plan period from 2018 through 2027 as follows.

(1) Short-term Target (2018-2019)

In the short term, it is proposed that the Kab/Kota Training should be implemented to train at least one employee of each PDAM for each of the existing seven training modules. Table 5.7 presents the estimation of number of Kab/Kota Training participants necessary to cover in this period.

Table 5.7 Estimation of Number of Kab/Kota Training Participants in 2018-2019 Period

Training Module	PDAMs already received KT	PDAMs to be Trained by KT (KT Participants 2018-2019)
NRW	339	48
EE	198	189
SAK-ETAP	166	221
CR	0	387
FAM	0	387
WTP	27	360
GIS	28	359
Total		1,951

Note: The assumption of total PDAMs is 387 (Page 3 of Executive Summary of Kinera PDAM 2016, BPP SPAM).

Source: JET based on DWSD and BPP SPAM information

(2) Mid- and Long-term Target (2020-2027)

For the future implementation of COE Program in medium and long term, the indicative target number of Kab/Kota Training and its participants is estimated as follows:

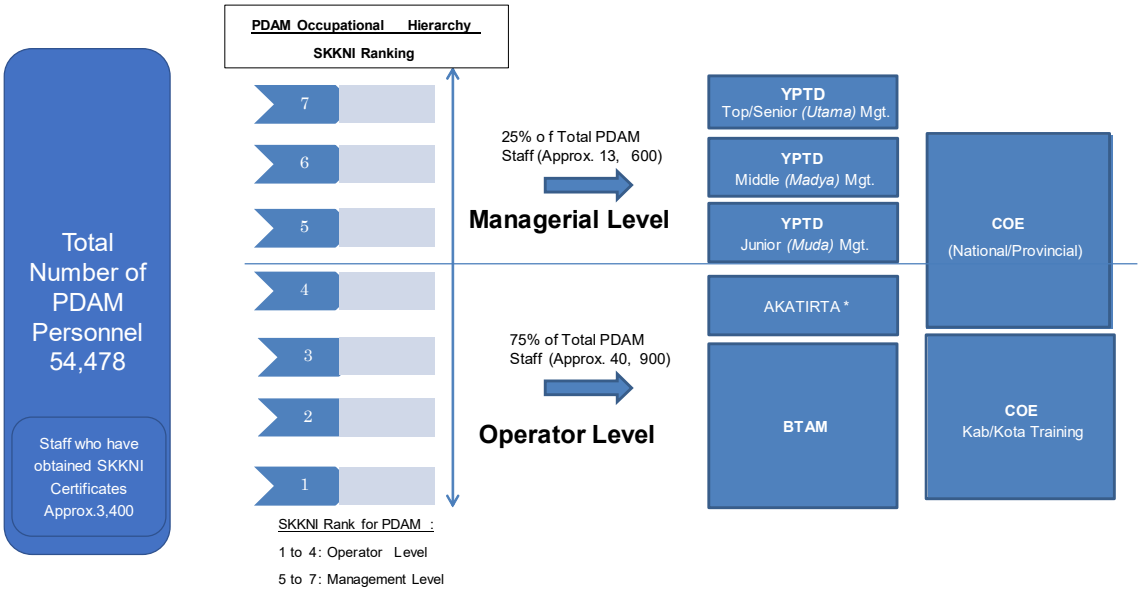
- Among the present PDAM staff nationwide (54,478 persons), it is assumed that 75% (approximately 40,000 persons) is the operator level personnel, i.e. main target for Kab/Kota Training Participants; of which 80% personnel (32,687 persons) has relevance to the existing training module subjects.
- Out of the 32,687 employees who have relevance to the COE training modules, taking into account the Kab/Kota trainees already participated up to 2017 (1,779 persons) and 2018 – 2019 period (1,951 persons), PDAM staff required to be trained from 2020 would be 28,597 persons.
- Assuming the BTAM training program trains 500 persons per year for the 2020 – 2027 period (4,000 persons in total), the required trainees is narrowed down to 24,957 persons.
- Further, assuming a half of the said personnel should be trained for eight years in COE Program, the KT participants target for the 2020-2027 period would be 12,478 persons. This is equivalent to 1,560 participants per year in total nationwide, 46 persons per province annually for each of 34 provinces, and holding around three Kab/Kota Training class of 15 participants per province annually, i.e. KT of one training module would be held around every two years in each province on an average basis.

5.3 Coordination with Other Training Programs

Each training program of the three (COE, BTAM, YPTD) has respective different strengths and

weaknesses as explained in Section 4.1. Cognizant of such differences, coordination among the three and other training programs should be discussed to provide the most effective trainings for various levels of PDAM staff members. The following are the basic concepts proposed for promoting effective provision of trainings to PDAMs:

1) Target groups of the three programs should be defined and demarcated as shown in Figure 5.8.



Note: AKATIRTA is the vocational education institute and have a distinct nature from other training programs. As the training for PDAM staff, YPTD, BTAM and COE Program are the major three programs for water supply sector in Indonesia.

Source: JET

Figure 5.8 Target Group Definition of the Three Major Training Programs

In COE Program, the main target of National and Provincial Training is mainly the mid-managerial level of PDAM staff (SKKNI Rank 4 through 6), and that of Kab/Kota Training is the operator level of PDAM staff (SKKNI Rank 1 through 3). Since the training materials used in the both training levels are the same, it is recommended that those materials (textbook or teacher's manual) should indicate which contents are for the mid-managerial level (SKKNI Rank 4 to 6) and which are for the operator level (SKKNI Rank 1 to 3). Also, it is necessary to review the latest SKKNI and make sure to revise the COE Program modules to cover up to SKKNI Rank 6.

YPTD Program also targets mainly the managerial level. BTAM and COE Kab/Kota Training

mainly target operator level of PDAMs.

2) BTAM should prioritize such training modules that require the use of facilities available in BTAM as both COE Program and YPTD Program do not have such facilities for practical training.
3) YPTD should concentrate on management trainings and advanced trainings for management levels since YPTD reserves high-ranked and experienced ex-PDAM directors with knowledge of related regulations and government institutions as instructors, and its management training is already reputable among PDAMs.

During the transition period of Kab/Kota Training of COE Program transfer to PERPAMSI as discussed in Section 5.4, the demarcation among these training modules should be further discussed by comparing each content in detail. Main points carefully examined for each training module of BTAM and YPTD are indicated in Table 5.9 and Table 5.10 below.

Table 5.9 Discussion Points on BTAM Training Modules

	BTAMS Training Modules	Points to Check and Discuss for Demarcation
1	Water Treatment Plant Planning	These modules should be coverd by BTAMS as various WTP models for practical training are avialable in BTAMS. WTP in COE Program also can cover these subjects but the training in COE Program is given by using actual WTP facilities. Participant PDAMs should select suitable course in consultation with DPD PERPAMSI in future.
2	O&M of Water Treatment Plant	
3	Water Treatment Plant Operation	
4	Laboratory and Water Quality Control	This should be covered by BTAMS as laboratory facilities for training are avaiable.
5	Raw Water Unit and Production Unit Operation	These modules can be covered by WTP in COE Program.
6	Comissioning Water Treatment Plant	
7	Water Quality Control in the Drinking Water Treatment Process	
8	Transmission and Distribution Network Planning	This should be covered by BTAMS as training facilities for hydraulic model are avaiable..
9	Managing Water Loss	This can be covered by NRW in COE Program. But for practical training of leakage detection BTAMS' module is superior in that leakage survey training yard is available in BTAMS. Thus, leakage surveyors training should be provided in BTAMS.
10	Supervising Piping Network Installation	This module should be covered by BTAMS as training field for pipe installation practice is available in BTAMS.
11	Pipe network Planning with GIS-Integrated EPANET Program	Should be checked whether GIS of COE can cover EPANET Program.
12	Pipe Network Rehabilitation	This module should be covered by BTAMS as training field for pipe installation practice is available in BTAMS.
13	Reservoir and Distribution System Operation	This module should be covered by BTAMS as training field for pipe installation practice is available in BTAMS.
14	Transmision and Distribution Operation and Maintenance	This module should be covered by BTAMS as training field for pipe installation practice is available in BTAMS.
15	Operation and Maintenance of Pump and Genset	These modules should be covered by BTAMS as the electric panels and pump sets for practical training are available in BTAMS
16	Operation and Maintance of Electirical and Mechanical Equipment	
17	Mechanical and Electrical in Water Supply	
18	Financial Statement with SAK-ETAP	This can be covered by SAK-ETAP in COE Program.
19	Marketing Development (Customer Relation and Marketing)	This can be covered byCR in COE Program.
20	Service Excellence	This can be covered by Water Supply Management in YPTD.
	Water Utility Management	This can be covered by Water Supply Management in YPTD.

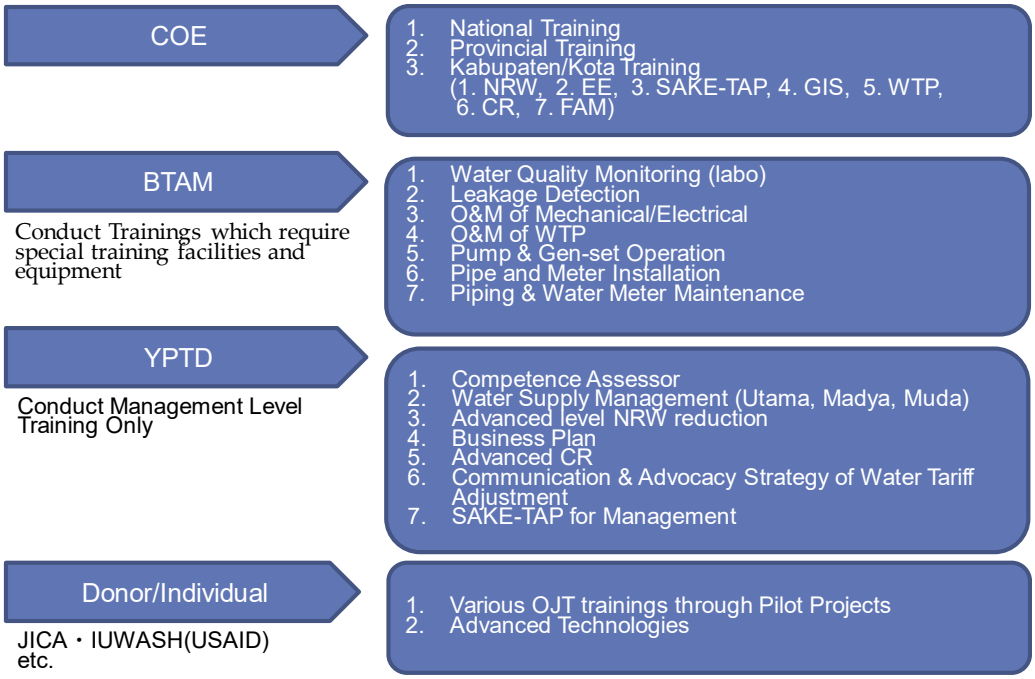
Source: JET based on BTAM information

Table 5.10 Discussion Points on YPTD Training Modules

YPTD PAMSI MODULES		Points to Check and Discuss for Demarcation
1	Competency Assessors	These modules should be covered by YPTD.
2	Competency Instructor	
3	Junior Level of Water Supply Management	These modules should be covered by YPTD.
4	Middle Level of Water Supply Management	
5	Senior Level of Water Supply Management	
6	PDAM Performance Improvement	This should be covered by YPTD.
7	Planning (Business Plan)	This can be covered by FAM in COE Program.
8	Project Management	This should be covered by YPTD.
9	Advanced Level of Non Revenue Water Reduction	This can be covered by NRW in COE Program.
10	Communication and Advocacy Strategy of Water Tariff Adjustment	This should be covered by YPTD.
11	Water Treatment Plant	This can be covered by BTAMS and COE Program.
12	Communication and Customer Relation for PDAM Excellence Service Improvement	This can be covered by CR in COE Program.
13	PDAM Public Relation and Secretariat	This can be covered by CR in COE Program.
14	PDAM Excellence Services	This should be covered by YPTD
15	SAK-ETAP	This can be covered by SAK-ETAP in COE Program

Source: JET based on YPTD information

In consideration of the above concepts the demarcation of training subjects among the three is proposed as shown in Figure 5.11. These three modules are open to all the PDAMs, and PDAM can select any module depending on its need of training. In the future formation of COE Program implementation, it is expected that PD PERPAMSI will advise PDAMs in selecting most suitable training modules among the three training programs depending on the PDAMs' needs.



Source: JET

Figure 5.11 Proposed Demarcation of Training Modules

Moreover, there are other training programs such as Twining, WOPs and OJT supported by PERPAMSI and donor agencies. Interrelationship between COE Program and these training programs is proposed as defined in the following paragraph.

- Twining or WOPs should be conducted for PDAMs which have COE Program participants in the related fields where Twining or WOPs deals with for its effective and successful implementation.
- Mentor PDAMs should have Provincial Trainers or National Trainers of COE Program involved in such Twining (WOPs), so that the consistency between COE Program and Twining (WOPs) can be secured and maintained, and sharing the experiences in actual implementation will also enrich COE Program.

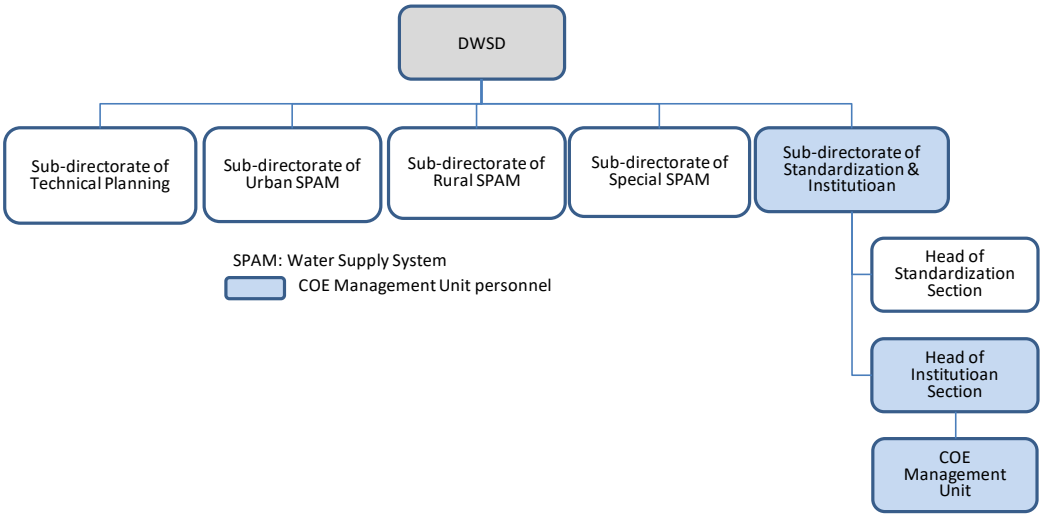
5.4 Future Formation for COE Program Implementation

5.4.1 Future Formation and Role of Relevant Organizations

COE Program has been operated to date under Sub-directorate of Standardization and Institutional of DWSD with several officers assigned from the same Division and local consultants hired for COE management.

It is proposed that Head of Institutional Section of this Sub-directorate would be the person in charge

of planning, management and monitoring/evaluation of COE Program under the direction of Head of Sub-directorate of Standardization and Institutional. Other several staff members to assist the Head are also assigned from Standardization and Institutional. Figure 5.12 shows the position of COE Management Unit within DWSD organization.



Source: JET

Figure 5.12 Position of COE Management Unit within the Existing DWSD Organization

The proposed future formation for overall implementation of COE Program is illustrated in Figure 5.13. In the proposed formation, COE Management Unit will coordinate various stakeholders such as BTAM, BPPSPAM and PERPAMSI. Among others, PERPAMSI is considered to be the key organization as the implementation agency.

Involvement of PERPAMSI in the COE Program especially in the Kabpaten/Kota Training is considered highly important for future development of the program for the following reasons:

- Relevance to PERPAMSI's mission. As seen in the previous chapter, PERPAMSI has the following mission which is relevant to the COE Program's objectives:
  - "Encourage PERPAMSI members in achieving superior performance"
  - "Building network of partnership/cooperation"
  - "Facilitating capacity building development"
- Relevance to PERPAMSI's activities. The COE Program is relevant to the current activities of PERPAMSI:
  - PERPAMSI's WOPs and OJT programs requires recipient PDAM staff to have fundamental knowledge and skills about PDAM operation before they receive technical

assistance through those programs.

- COE Program can offer training opportunities accessible to small- and medium-scale PDAMs on provincial level through the Kabupaten/Kota Training.

- Relevance to PERPAMSI's strength. COE Program will be enhanced by involving PERPAMSI because of its network of PD PERPMASI (PERPAMSI's regional organization in each province) who understand local PDAM needs and capability. Collaboration with PERPAMSI will efficiently promote the cooperation and solidarity among PDAMs to encourage their performance improvement.

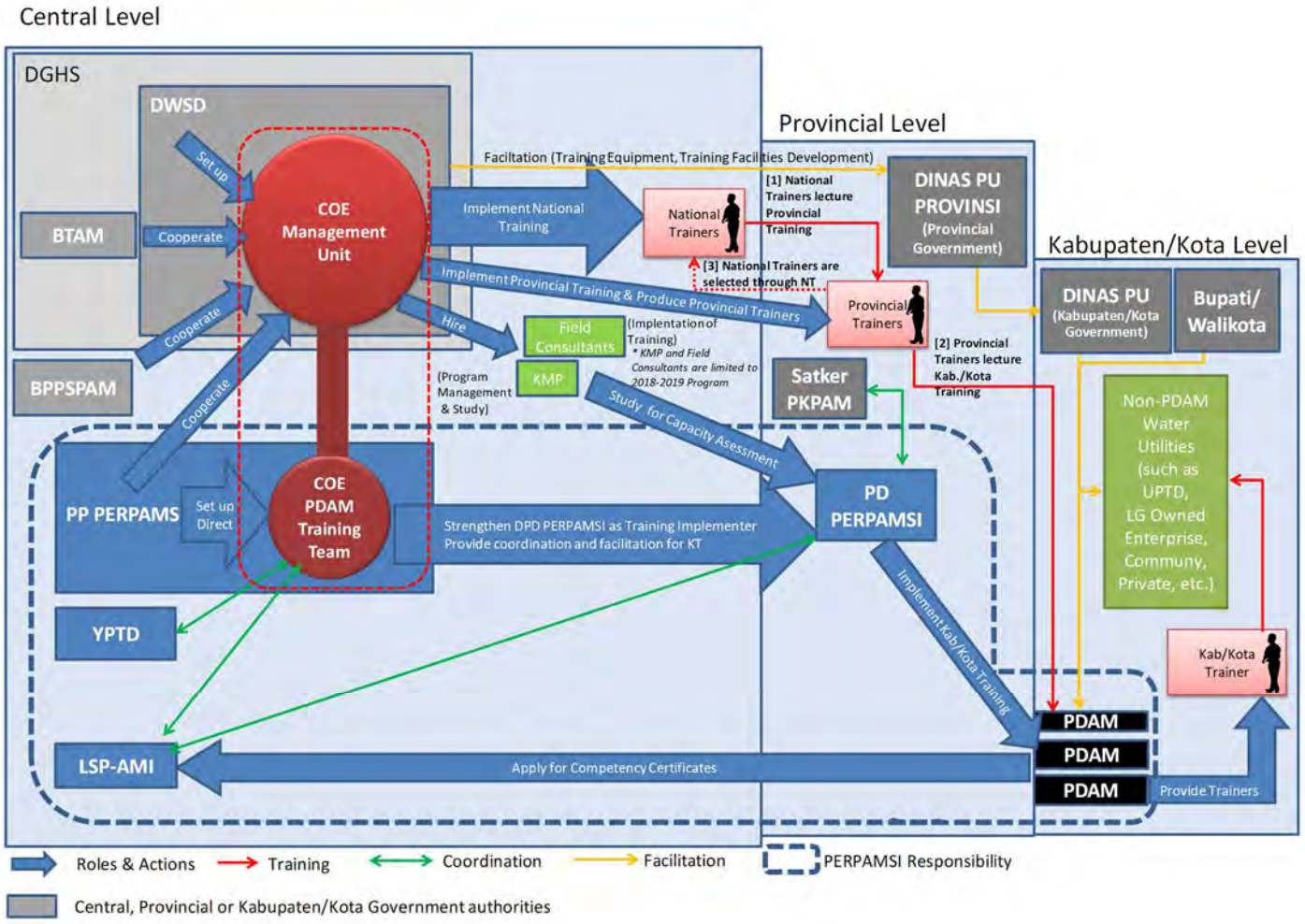


Figure 5.13 Proposed Future Formation for COE Program Implementation

While COE Management Unit will have a responsibility for overall implementation of COE Program and monitoring/evaluation of the Program performance, National/Provincial Trainings will be also implemented directly under the control of COE Management Unit.

In the proposed formation, DWSD in cooperation with stakeholder organizations organizes “COE Management Unit”. COE Management Unit will have a responsibility for overall implementation of COE Program and monitoring/evaluation of the Program performance. National/Provincial Trainings will be implemented directly under the control of COE Management Unit.

In order for the joint implementation of Kab/Kota Training with DWSD, PERPAMSI will set up “COE PDAM Training Team” within PERPAMSI headquarters. On provincial level, Kab/Kota Trainings be implemented by the control of PD PERPAMSI in each province under support supervision of COE PDAM Training Team.

At the central level, COE Management Unit has responsibilities to secure and maintain the necessary numbers of National and Provincial Trainers. On the other hand, PD PERPAMSI’s role will be significant to implement Kab/Kota Trainings at the respective provincial level.

Supervision and executive management of COE Management Unit will be joint responsibility of DWSD and PERPAMSI, such as the appointment of key personnel, funding and budgeting decision, and monitoring and evaluation of the COE Program activities within COE Management Unit. It is proposed that PEPAMSI’s responsibilities gradually increase toward the complete transfer of the training at the end of the present Master Plan period.

The major roles of relevant organizations for future implementation of COE Program are proposed in Table 5.14.

Table 5.14 Major Roles of Relevant Organizations for COE Program Implementation

Program Partners	Present COE Program	Future COE Program under Joint Implementation during Transition		
	Current Role and Responsibilities	Expected Role and Responsibilities	Potential Issues	Strategies to Solve the Issues
Central Level				
DGHS	• Supervision of DWSD	• Supervision of DWSD	• Budget constraints	• Proper budget appropriation for HRD programs and facility development
DWSD	• Owner and program organizer (supported by management and field consultant) • Financial source for training activities and practical equipment	• Program organizer • Maintain COE Management Unit • Supervision of program activities • Planning and formulation (mechanism and program material) • Support for program activities • Monitoring and Evaluation of Program (Responsibilities gradually reduced toward the end of transition)	• Budget constraints	• Prepare Master Plan for COE Program for Budget Explanation
Strategic Unit (Under DWSD)	• Financial source for training activities and practical equipment	• Support urgent and under priority programs	• Unsustainable budget	• -
PERPAMSI	• Resources person at Kab/Kota training	• Joint program implementer • Supervision of program activities • Maintain COE PDAM Training Team under Joint Supervision with DWSD • Monitoring and evaluation for PD Perpamsi (Responsibilities gradually increase toward the end of transition)	• Institutional strengthening plan • Coordination with provincial level (PD) • Budget for COE Implementation	• Official MOU between DWSD and PERPAMSI to endorse the transfer of COE Training • Establish Special Unit for COE Training Implementation • Support from DWSD for transition period • Funding options consideration • Encourage PDAMs to implement FCR
BTAM	• Venue of Provincial Training	• Venue of national & provincial trainings • BTAMs should be more dedicated to trainings, which use its well prepared training facilities for advanced technology in future.	• Unsustainable budget • Institutional strengthening plan • Renovation of training equipment and facilities	• Prepare upgrade plan of BTAMs • Seek budget for upgrading
BPPSPAM	None	• Consultation on HRD for PDAM • Collect Key Performance Indicators report to DWSD	-	-
YPTD		• Provide Management Level trainings • Coordination with COE to share Trainers & Training Materials for advanced level trainings	-	-
Provincial Level				
Dinas PU Provinsi (Provincial Government)	None	• Inter-district/city matters of COE Program within provincial jurisdiction • Supervision of province-owned water utilities	-	-
Satker PSPAM Provinsi	• Support Kab./Kota training as regional organization of DWSD	• Support Kab/Kota Training • Support monitoring and evaluation	-	-
PD PERPAMSI	None	• Organize Kab/Kota Training • Consultation to select suitable trainees from PDAM • Monitoring and evaluation for PDAM	• Human resources	• Technical assistance for capacity development of PD PERPAMSI and major organizing PDAM by DWSD through local government
Kabupaten/Kota Level				
Bupati/ Walikota	None	• Owner of PDAM • Taking initiative to enhance HRD among water utilities (PDAM, UPTD, Community Groups) under his/her jurisdiction	-	Advocacy to Local Governments to implement FCR on PDAM Tariffs and Local Governments related responsibilities for water service to all communities.
Dinas PU Kabupaten/ Kota **(Kabupaten/ Kota Government)**	-	• Supervision of Kabupaten/Kota-owned PDAM and other water utilities under its jurisdiction • Primary recipient of assistance and support from DWSD and its intermediator to PDAM (technical assistance, facility development, and equipment provision)	-	
PDAM	• Program participants	• As participants, National Trainer, Provincial Trainer, and Kab./Kota Trainer • Improving its performance by implementing what learnt • Encourage staff to apply for Competency Certificate.	• Incentive mechanism • Budget constraint for project implementation	• Government subsidy • WB: NUWAS • IUWASH: Pilot Projects for NRW & EE • Int'l WOPs (JICA Partners Program)

Source: JET

5.4.2 Monitoring and Evaluation

DWSD takes primary role of the monitoring and evaluation of the COE program. The data collection for the monitoring and evaluation shall be carried out by COE Management Unit like other implementation work. Annual reporting from COE Management Unit will be reviewed by DWSD in cooperation with BTAM, BPPSPAM and PERPAMSI.

The monitoring and evaluation consists of the following:

(i) Monitoring of COE Program implementation and outcome, conducted mainly through the questionnaire survey upon the implementation of each COE training: (a) training material, (b) trainer/instructor, (c) trainee, (d) execution of training, and (e) PDAM activities after COE trainings

(ii) Evaluation of Overall COE Program, conducted to measure the program's overall achievement in five criteria i.e. (a) relevance, (b) effectiveness, (c) efficiency, (d) impact and (e) sustainability of the program.

The monitoring of COE program implementation and outcome is conducted mainly through questionnaire survey for trainees and trainers. PDAM activities after COE trainings will be surveyed separately through interview with selected trainees from past COE trainings.

The evaluation of overall COE Program will be conducted based on the existing data such as annual results of COE trainings as well as excerpts from the questionnaire survey (See Table 5.15). Detailed monitoring and evaluation plan is proposed as the additional TOR of COE Management Consultants (KMP) for 2018 COE Program (**See Annex 2)**.

Key Performance Indicators to be reviewed annually for the COE Program are as follows:

a. Number of National Trainers (total National Trainers available)
b. Number of Provincial Trainers for each module in each province (Provincial Trainers available for each module in each province)
c. Number of Kab/Kota Training implementation in each province in the year
d. Number of PDAM staff member who applied for competency certificate tests in each province in the year
e. Number of PDAM staff member who get SKKNI certificates in each province in the year
f. Key training ratios: (i) Qualified Provincial Trainers per Provincial Training[8], (ii) Qualified Provincial Trainers per Provincial Trainer candidates (productivity rate)[9], and (iii) training cost per trainees (NT, PT and KT).

[8] Average number of Provincial Trainers qualified in one Provincial Training.
[9] Average percent of qualified Provincial Trainers to total Provincial Training participants (trainees, or Provincial Trainer candidates).

The annual monitoring and evaluation of the COE Program implementation described above will be reflected in the progress review of the COE Master Plan conducted by DWSD in cooperation with PERPAMSI, etc. every year to adjust the activity plan such as number of produced trainers and number of training. Comprehensive review and revision of the COE Master Plan shall be conducted approximately every three to five years during the Master Plan period from 2018 through 2027 as shown in Figure 5.18 of Section 5.5.2 below. DWSD and PERPAMSI will jointly evaluate the Master Plan implementation including review of the existing training modules to assess the necessity for updating.

Table 5.15 Evaluation of Overall COE Program

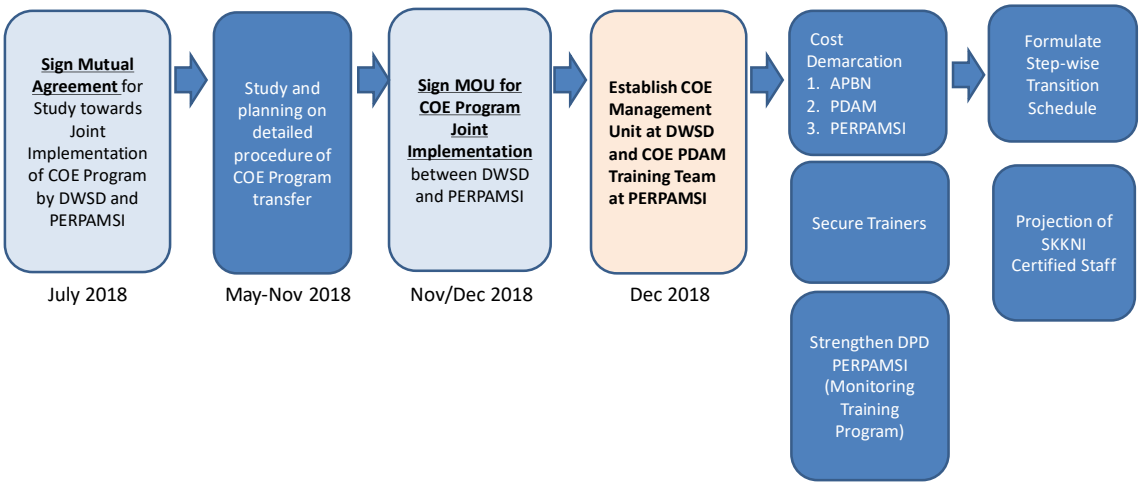
Evaluation Criteria	Indicator	Description	Data Source
(1) Relevance	- Relevance to DWSD's policies and the program goal	- Are overall program activities relevant to MPWH policies and the program goal? (e.g. COE is relevant to Government Regulation PP122/2015)	- MPWH/ Cipta Karya policy documents
(2) Effectiveness	- Comments from PDAM during Socialization prior to training activities - Trainee questionnaire results (Overall training experience, Form 4)	- Does the overall program serve the needs of PDAMs and PDAM staff? (e.g. The average scoring for the overall experience among trainees was ___.) (e.g. Summarized comments from PDAM management during the socialization)	- Socialization results - Trainee questionnaire results
(3) Efficiency	- Number of trainings implemented (plan/ actual) - Number of trainees (plan/actual)	- Were the program activities conducted as planned?	- Annual results of COE trainings
(4) Impact	- Number of "Sehat" PDAMs (- Results of monitoring after trainings (Form 5))	- Number of PDAM evaluated: Healthy (*Sehat*) (___PDAMs) Less Healthy (*Kurang Sehat*) (___PDAMs) Sick (*Sakit*) (___PDAMs) - Number of PDAM staff with Competency Certificate	- BPP SPAM Annual Report "Kinerja PDAM" - LSP-AMI data
(5) Sustainability	- Accumulative number of COE trainers produced (past – present) - Status of budget appropriation for COE Program	- Does the program keep the number of Provincial Trainers as planned? - Budget appropriated to maintain COE Management Unit and COE PDAM Training Team and to implement COE Program training	- Annual results of COE trainings - DWSD and PERPAMSI information

Source: JET

5.5 Roadmap for Joint Implementation of COE Program with PERPAMSI

5.5.1 Key Steps for Joint Implementation of COE Program and PERPAMSI's Roles

Key steps for the joint implementation of COE Program with PERPAMSI are illustrated in Figure 5.16.



Source: JET

Figure 5.16 Key Steps towards Joint Implementation of COE Program to PERPAMSI

Important prerequisite conditions to be agreed between DWSD and PERPAMSI for the joint implementation of COE Program are proposed in the following paragraph:

- The central government budget should be continuously allocated to COE Program to increase the number of Provincial Trainers to reach the target as well as to maintain them for each module in each province.[10]
- PERPAMSI and PD PERPAMSI are expected to implement Kab/Kota Training in each province in future. However, this process should be carefully proceeded in conjunction with analysis of capacity and readiness of PERPAMSI and PD PERPAMSI in each province. It is proposed that DWSD hire KMP to study and assess the capacity of each PD PERPAMSI to carry out Kab/Kota Training implementation should be gradually processed depending on the readiness of PD PERPAMSI.
- The cost for Kab/Kota Training is to be borne by PERPAMSI and PDAMs in future. In order to motivate PDAMs to pay for the training costs, it is necessary to ensure (i) COE training module contents are applicable for competency certificate and PDAM staff are able to obtain certificates after taking COE trainings; (ii) coordination between TUK and PD PERPAMSI is enhanced as

[10] According to the cost estimation Section 5.5.3, the total cost required to produce the target number of Provincial Trainers is approximately 7.4 billion IDR except the cost hiring COE management consultants (KMP). It is also estimated that it will cost around 1.0 billion IDR to maintain the number of Provincial Trainers.

to the certification to COE trainees; and (iii) capacity of TUK and LSP-AMI is strengthened so that the certification is accessible in any provinces nationwide.

- Training equipment already procured for COE Program should be effectively utilized in Kab/Kota Trainings. The central government should make necessary arrangement to facilitate the use of these equipment in cooperation with local governments since the direct transfer of these equipment to any PDAMs is not applicable.

Under the joint implementation, main strategies for transfer of Kab/Kota Training to PERPAMSI are summarized in Table 5.17 together with PERPAMSI's roles and responsibilities.

Table 5.17 Future Roles and Responsibilities of PERPAMSI for Implementing Kab/Kota Training of COE Program

Future Roles and Responsibilities of PERPAMSI for Implementing Kab/Kota Training of COE Program

Strategies			PERPAMSI Responsibilities				Government Responsibilities	
				Roles	Actions	Funding	Central Government (DWSD)	Local Government
A	**Establishment of COE Management Unit in DWSD and Set-up COE PDAM Training Team in PERPAMSI**	COE Management Unit is operated and managed under DWSD with the cooperation of BPPSPAM, BTAM and PERPAMSI. Its office will be located in DWSD. Its main role is to prepare annual operation plan of COE Program, facilitate operation of COE Program, monitor and evaluate the program and provide advices on HRD to PDAMs. PERPAMSI organizes COE PDAM Training Team which is a part of COE Management Unit, and fully dedicated to the implementation of Kab/Kota training in all the provinces.	A1	**Participating in COE Management Unit**	PERPAMSI participates as a member of COE Management Unit (CMU) which is responsible for implementation of training for PDAMs.	-	DWSD sets up COE Management Unit and appoints officials in charge of COE Management Unit.	-
			A2	**Organizing COE PDAM Training Team (CPTT)**	PERPAMSI assigns or recruits a team manager, program facilitators, accountants and database operators for COE PDAM Training Team (CPTT).	100% borne by PERPAMSI	-	-
			A3	**Office Set-up for COE Management Unit with furniture and office equipment**	PERPAMSI secures office space for CPTT in PERPAMSI HQs, and provides furniture and office equipment.	100% borne by PERPAMSI	-	-
			A4	**COE Database Management**	CPTT manages and updates COE Database.	100% borne by PERPAMSI (Data will be granted from DWSD.)	DWSD shares all the COE Database with PERPAMSI.	-
B	**Strengthening DPD PERPAMSI as Kab/Kota Training Implementer**	During "Discussion & Study Period" as defined in Figure 5.16, DWSD will assign local consultants to study the present status and assess the capacity of DPD PERPAMSI in each province for implementation of Kab/Kota training. In addition, availability of training venues, facilities and equipment are also investigated. Based on the results of the study actions required to strengthen DPD PERPAMSI as Kab/Kota training implementer will be identified for each province.	B1	**Assignment of PDAM staff in charge of Kab/Kota Training implementation**	DPD PERPAMSI prepares a special desk for COE Program and assigns PDAM staff in charge of Kab/Kota Training .	100% borne by PERPAMSI and relevant PDAMs	DWSD hires local consultants to study and assess the capacity of DPD PERPMASI to carry out Kab/Kota trainings including training venues, training facilities and equipment.	-
			B2	**Analysis of Training Needs**	DPD PERPAMSI collects and analyzes training needs from PDAMs within the same province.	100% borne by PERPAMSI and relevant PDAMs	-	-
			B3	**Coordination with other government institutions**	DPD PERPAMSI coordinates with other governmental institutions such as Satker, PIP2B, Dinas PU Provinsi, etc. to facilitate the implementation of Kab/Kota training.	-	DWSD facilitate local governments and related institutions to cooperate with DPD PERPAMSI to implement Kab/Kota Training.	-
			B4	**Strengthening/ Optimizing PD PERPAMSI**	PERPAMSI encourages and facilitates PDAMs to organize and strengthen PD PERPAMSI where it has not been established yet or still weak.	100% borne by PERPAMSI and relevant PDAMs	-	-
C	**Step-wise Transfer of Implementation of Kab/Kota Training**	Necessary Provincial Trainers for each province will be produced and maintained continuously in the future by the central government budget through local consultants' contracts under DWSD direction. Eleven provinces where leading-runner PDAMs exist as defined in Table 5.3 should be the first candidates for PERPAMSI operated Kab/Kota Training. In such provinces, DPD PERPAMSI capacities also deemed sufficient to carry out Kab/Kota Training. (It should be confirmed during "Discussion and Study Period".) After that, further transfer of Kab/Kota training will be gradually made to other remaining provinces in the way of step-wise transfer in conjunction with building-up of DPD PERPAMSI for readiness as Kab/Kota training implementer.	C1	**Selection of Training Modules**	DPD PERPAMSI analyzes training needs of PDAMs of each province and select the training modules.	100% borne by PERPAMSI and relevant PDAMs	-	-
			C2	**Determination of Training Time Schedule**	DPD PERPAMSI prepares training time schedule in consultation with provincial trainers and participant PDAMs.		-	
			C3	**Preparation of Training Materials**	CPTT prints and distributes required training textbooks and materials to each DPD PERPAMSI for Kab/Kota Training.	100% borne by PERPAMSI and relevant PDAMs	CMU revises training materials in consultation with National/Provincial trainers and other experts prior to the printing and distribution.	-
			C4	**Preparation of Training Venues in each province.**	DPD PERPAMSI identifies training venues, and prepares necessary arrangements for class-room lecture and field training.	The cost should be shared by APBN through Dinas PU and PDAMs.	DWSD facilitate local governments to develop training facilities and procure training equipment where suitable training facilities and equipment are unavailable.	Where suitable PIP2Bs for Kab/Kota training are available, local governments should facilitate DPD PERPAMSI to utilize these PIP2Bs.
			C5	**Appointment of on-duty Provincial Trainers**	DPD PERPAMSI selects at least two Provincial Trainers to be assigned, and coordinates with their PDAMs to get permission for participation as the trainers.	PERPAMSI should bear the cost	DWSD secures necessary number of Provincial Trainers for each province through implementation of Provincial Training.	-
			C6	**Securing Training Equipment**	DPD PERPAMSI appoints PDAMs which can maintain training equipment, and the appointed PDAM should maintain the equipment ready for Kab/Kota training.	Maintenance cost for the equipment should be borne by the appointed PDAM.	Central Government hands over the existing training equipment to Dinas PU Provinsi.	Dinas PU facilitate DPD PERPAMSI for securing the training equipment.
			C7	**Arrangement of Necessary Logistics**	DPD PERPAMSI arranges other necessary logistics for Kab/Kota training including invitation letters, accommodation, transport, meals, etc.	100% borne by PERPAMSI and relevant PDAMs	DWSD facilitates DPD PERPAMSI for selecting such facilitators through Satker.	Satker facilitates DPD PERPAMSI to select Kab/Kota training facilitators.
D	**Monitoring & Evaluation of Kab/Kota Training**	Monitoring and Evaluation will be carried out at different levels. At local level DPD PERPAMSI should monitor and evaluate directly the performance improvement of PDAMs through interview and field visits, and report to CPTT at the central level. CPTT and CMU will analyze the reports from DPD PERPAMSI from different provinces and prepare annual evaluation report to DWSD and BPPSPAM. As one of the ways to raise motivations of PDAMs to participate in Kab/Kota Training, it is recommended to give the PDAMs which diligently participated in Kab/Kota training the access priority to further improvement programs such as NUWAS, WOPs, etc..	D1	**Monitoring of PDAM's Performance after Kab/Kota Training**	DPD PERPAMSI and on-duty Provincial Trainers monitor the performance of PDAMs which participated in Kab/Kota Training by interviews and field inspection.	100% borne by PERPAMSI and relevant PDAMs	-	-
			D2	**Evaluation Report on Kab/Kota Training implementation**	DPD PERPAMSI and on-duty Provincial Trainers prepare report on Kab/Kota training implementation, and submit the report to CMU, CPTT and participated PDAMs.	100% borne by PERPAMSI and relevant PDAMs	DWSD discuss and analyze the content of the report with CMU.	-
			D3	**Preparation of Annual Evaluation Report**	CPTT and CMU prepares annual evaluation report on Kab/Kota training, and report to DGHS, DWSD and BPPSPAM.	100% borne by PERPAMSI	DWSD discuss and analyze the content of the report with CMU.	-
			D4	**COE Annual Workshop**	CMU and CPTT hold annual workshop for COE Program to report the achievements and award best practice PDAMs during PERPAMSI annual conference.	100% borne by PERPAMSI	-	-
			D5	**Navigation to PDAM Performance Improvements**	CMU and CPTT provide information on various supporting financing facilities and programs available for PDAMs depending on the performance level of PDAM.		DWSD and BPPSPAM also provide consultation to PDAMs how to access to government's and donors' supporting programs.	-
			D6	**Application for Competency Test**	CPTT and DPD PERPAMSI recommend PDAMs to encourage PDAM staff to apply for competency tests after Kab/Kota Training.	100% borne by PDAM	-	-

Note **CMU: COE Management Unit**
CPTT: COE PDAM Training Team

5.5.2 Process and Schedule for Kab/Kota Training of COE Program Transfer to PERPAMSI

Following the signing of agreement between DWSD and PERPAMSI for study towards COE Program joint implementation, the joint implementation and transfer process anticipated are indicated in Figure 5.18. As discussed in the previous sections, DWSD should continue to implement (or provide financial support for) National and Provincial Trainings until the time when the target number of trainers is achieved. Considering the time necessary for setting-up of COE PDAM Training Team at PERPMASI and preparation of PD PERPAMSI it is likely that it needs about six years which is composed of "Study and Discussion Period" (two years), "Joint Operation Period" (two years) for transition period and "Transfer Trial Period" (two years) before "Full Transfer Period" which starts in 2024, i.e. the COE Program transfer to PERPAMSI will complete in 2024.

It is also a key issue to be tackled during the transition period how to develop PD PERPAMSI as Kab/Kota Training implementer. During the transition period Kab/Kota Training should be jointly operated at first, and gradually transferred the roles and responsibilities from DWSD to PERPAMSI.

By strengthening PD PERPAMSI's capacity to manage Kab/Kota Training, it is also expected that PDAMs who participate in COE Program will bear the cost as the SKKNI certificates can be obtained after taking the Kab/Kota training.

Regarding National and Provincial Training, necessary numbers of National and Provincial Trainers should be maintained under the responsibility of DWSD, and the central government should continuously subsidize the cost for producing the supplemental trainers in the future. Therefore, the budget appropriation by DWSD for the National and Provincial Training will be necessary on an yearly basis as well as in the five-year national plan (RPMJN cycle).

The transition illustrated over the Master Plan period is planned in detail as follows:

(1) Discussion and Study Period (2018 – 2019)

In order to prepare for the set up of COE PDAM Training Team within PERPAMSI and gradual transfer of Kab/Kota Training implementation to PERPMASI and PD PERPAMSI, it is planned that DWSD will conduct technical assistance to PERPAMSI by hiring COE Management Consultant (KMP) and Field Consultant, whose major TOR[11] are proposed as follows:

(i) Assistance for Transfer of Kab/Kota Training of COE Program to PERPAMSI

[11] See **Annex 2** for the complete document of the proposed additional TOR for KMP and Field Consultant.

(ii) Assistance for Capacity Development for PD PERPAMSI
(iii) Assistance for Coordination between COE Program and SKKNI
(iv) Improvement of Monitoring and Evaluation of COE Program

Among those TOR, the former two items are designed for preparation of Kab/Kota Training transfer to PERPAMSI and capacity development of PD PERPAMSI.

"Assistance for transfer of Kab/Kota Training to PERPAMSI" consists of (i) Revision of SOP of COE Program for implementation of KT by PERPMASI and (ii) Planning of establishment of COE PDAM Training Team in PERPAMSI. Through these consulting services, the existing SOP of COE Program Training will be modified to be suitable to PERPAMSI and PD PERPAMSI's operation. Also, PERPAMSI's capacity is assessed and the detailed plan of establishment of COE PDAM Training Team within the PERPAMSI headquarters is prepared such as staffing and funding requirement. Based on this plan, the technical assistance will prepare the detailed Memorandum of Understanding (MOU) to be concluded between DWSD and PERPAMSI determining comprehensive plan of transfer of KT to PERPAMSI including COE PDAM Training Team's organizational and financing plan. The MOU is expected to be concluded around the third quarter of 2018 after the discussions among DWSD, PERPAMSI and other stakeholders during the Discussion and Study Period.

"Assistance for Capacity Development for PD PERPAMSI" consists of (i) Survey of status quo of PD PERPAMSI; and (ii) Planning of strengthening PD PERPAMSI as Kab/Kota Training Implementer. Each PD PERPAMSI's organizational capacity as well as conditions of training facilities of its related PDAMs will be carefully assessed to determine its readiness to implement Kab/Kota Training. In order to strengthen capacity of PD PERPAMSI, the technical assistance will propose the transition plan including necessary physical support such as provision of equipment and facility development. To prepare the capacity of PD PERPAMSI, training for PD PERPAMSI officials in implementation of Kab/Kota Training is also planned.

(2) Joint Operation Period (2020-2021)

During the Joint Operation Period (2020-2021), the involvement of each PD PERPAMSI in implementation of Kab/Kota Training should be gradually processed depending on the readiness of PD PERPAMSI.

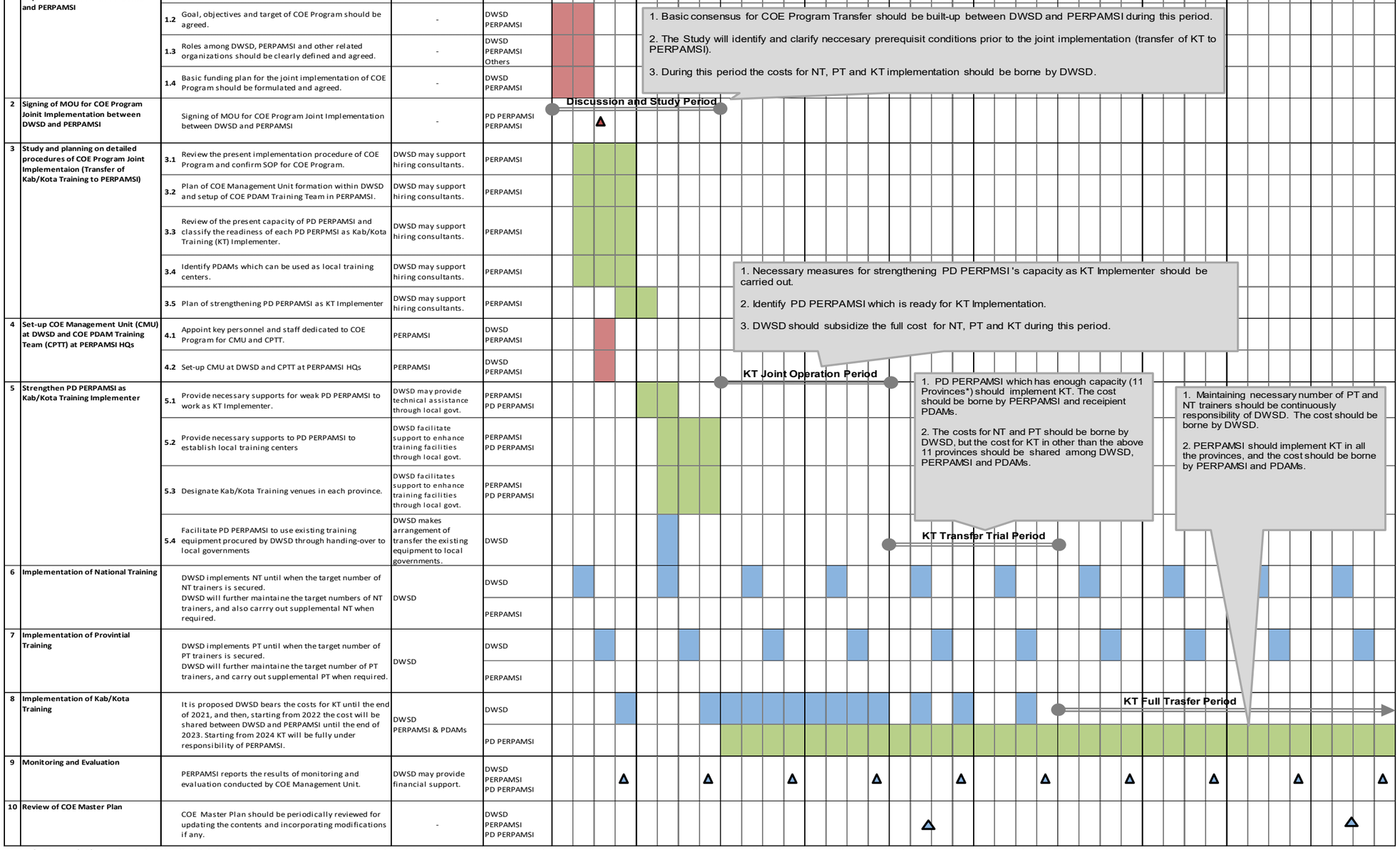
(3) Transfer Trial Period (2022-2023)

In the Transfer Trial Period, the eleven provinces where PD PERPAMSI has leading-runner PDAMs which are identified as shown in Table 5.4 above will be the candidates for the first group of full transfer. Then, the full transfer process will be expanded to the rest of provinces gradually in accordance with the readiness of PD PERPAMSI in respective provinces starting from the year 2024.

(4) Full Transfer Period (2024-2027)

During the last four years of the Master Plan period (2024-2027), it is expected that the whole Kab/Kota Training is fully transferred to PERPAMSI and each PD PERPAMSI will conduct KT upon its local PDAMs' needs.

	Actions		Explanation	Funiding	Organization in Charge	2018				2019				2020				2021				2022				2023				2024				2025				2026				2027			
						I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
1	**Signing of Agreement to Study and Discuss towards COE Program Joint Implementation between DWSD and PERPAMSI**	1.1	Signing of Agreement for Study towards COE Program Joint Implementation between DWSD and PERPAMSI	-	DWSD PERPAMSI																																						
		1.2	Goal, objectives and target of COE Program should be agreed.	-	DWSD PERPAMSI																																						
		1.3	Roles among DWSD, PERPAMSI and other related organizations should be clearly defined and agreed.	-	DWSD PERPAMSI Others																																						
		1.4	Basic funding plan for the joint implementation of COE Program should be formulated and agreed.	-	DWSD PERPAMSI																																						
2	**Signing of MOU for COE Program Joinit Implementation between DWSD and PERPAMSI**		Signing of MOU for COE Program Joint Implementation between DWSD and PERPAMSI	-	PD PERPAMSI PERPAMSI																																						
3	**Study and planning on detailed procedures of COE Program Joint Implementaion (Transfer of Kab/Kota Training to PERPAMSI)**	3.1	Review the present implementation procedure of COE Program and confirm SOP for COE Program.	DWSD may support hiring consultants.	PERPAMSI																																						
		3.2	Plan of COE Management Unit formation within DWSD and setup of COE PDAM Training Team in PERPAMSI.	DWSD may support hiring consultants.	PERPAMSI																																						
		3.3	Review of the present capacity of PD PERPAMSI and classify the readiness of each PD PERPMSI as Kab/Kota Training (KT) Implementer.	DWSD may support hiring consultants.	PERPAMSI																																						
		3.4	Identify PDAMs which can be used as local training centers.	DWSD may support hiring consultants.	PERPAMSI																																						
		3.5	Plan of strengthening PD PERPAMSI as KT Implementer	DWSD may support hiring consultants.	PERPAMSI																																						
4	**Set-up COE Management Unit (CMU) at DWSD and COE PDAM Training Team (CPTT) at PERPAMSI HQs**	4.1	Appoint key personnel and staff dedicated to COE Program for CMU and CPTT.	PERPAMSI	DWSD PERPAMSI																																						
		4.2	Set-up CMU at DWSD and CPTT at PERPAMSI HQs	PERPAMSI	DWSD PERPAMSI																																						
5	**Strengthen PD PERPAMSI as Kab/Kota Training Implementer**	5.1	Provide necessary supports for weak PD PERPAMSI to work as KT Implementer.	DWSD may provide technical assistance through local govt.	PERPAMSI PD PERPAMSI																																						
		5.2	Provide necessary supports to PD PERPAMSI to establish local training centers	DWSD facilitate support to enhance training facilities through local govt.	PERPAMSI PD PERPAMSI																																						
		5.3	Designate Kab/Kota Training venues in each province.	DWSD facilitates support to enhance training facilities through local govt.	PERPAMSI PD PERPAMSI																																						
		5.4	Facilitate PD PERPAMSI to use existing training equipment procured by DWSD through handing-over to local governments	DWSD makes arrangement of transfer the existing equipment to local governments.	DWSD																																						
6	**Implementation of National Training**		DWSD implements NT until when the target number of NT trainers is secured. DWSD will further maintaine the target numbers of NT trainers, and also carrry out supplemental NT when required.	DWSD	DWSD																																						
					PERPAMSI																																						
7	**Implementation of Provintial Training**		DWSD implements PT until when the target number of PT trainers is secured. DWSD will further maintaine the target number of PT trainers, and carry out supplemental PT when required.	DWSD	DWSD																																						
					PERPAMSI																																						
8	**Implementation of Kab/Kota Training**		It is proposed DWSD bears the costs for KT until the end of 2021, and then, starting from 2022 the cost will be shared between DWSD and PERPAMSI until the end of 2023. Starting from 2024 KT will be fully under responsibility of PERPAMSI.	DWSD PERPAMSI & PDAMs	DWSD																																						
					PD PERPAMSI																																						
9	**Monitoring and Evaluation**		PERPAMSI reports the results of monitoring and evaluation conducted by COE Management Unit.	DWSD may provide financial support.	DWSD PERPAMSI PD PERPAMSI																																						
10	**Review of COE Master Plan**		COE Master Plan should be periodically reviewed for updating the contents and incorporating modifications if any.	-	DWSD PERPAMSI PD PERPAMSI																																						



Note *: Eleven (11) provinces for the first trial KT training by PERPAMSI are Sumatera Utara, Sumatera Selatan, Banten, Jawa Barat, Jawa Tengah, Jawa Timur, Kalimantan Barat, Kalimantan Selatan, Kalimantan Timur, Selawasi Selatan and Tenggara Barat.

KT: Kab/Kota Training, PT: Provincial Training, NT: National Training

Figure 5.18 Process and Schedule for Joint Implementation of COE Program by DWSD and PERPAMSI

5.5.3 Cost Estimation of COE Program Implementation

Table 5.19 illustrates the cost estimation for COE Program implementation during the Master Plan period from 2018 through 2027 based on the numerical target setting presented in Section 5.2. The cost estimation below consists of two parts: (i) Discussion and Study Period (2018-2019) and (ii) Transition Period (2020-2023 and onward). The present plan assumes that the required target of Provincial Trainer candidates will be trained during the former period. DWSD considers it is necessary to review the results at the end of the Discussion and Study Period and revise the present plan and cost estimation for the Transition Period.

Table 5.19 Cost Estimation for COE Program Implementation (2018 – 2027)

Master Plan Phase	*Discussion and Study*		*Joint Operation*		*Transfer Trial*		*Full Transfer*				Total
Cost Item (billion IDR)	2018 /1	2019 /2	2020	2021	2022	2023	2024	2025	2026	2027	
1 Provincial & National Training	0.6	6.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	15.4
2 Kab/Kota Training	5.0	2.8	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	57.4
3 KMP and Other Consulting Services Including Study/review/advisory for joint implementation	1.8	1.8	-	-	-	-	-	-	-	-	3.6
Total	**7.4**	**11.4**	**7.2**	**7.2**	**7.2**	**7.2**	**7.2**	**7.2**	**7.2**	**7.2**	**76.4**

/1 The 2018 Budget allocated to COE Program comprised of [Field Consultant 1] IDR 2.8 bn for PT (6 training classes) and KT (6 training classes); [Field Consultant 2] IDR 2.8 bn for KT (6 training classes) in selected PDAMs as well as study and other activities (Pilot WOPs); and [KMP] IDR 1.8 bn for KMP. It is assumed that the PT costs IDR 0.6 bn and KT costs IDR 5.0 bn in total in 2018.

/2 Funding requirement for 2019: [PT] IDR 6.8 bn as difference of (i) total requirement (IDR 7.4 bn) to spend for 2018-2019 and (ii) the assumption for 2018 (IDR 0.6 bn). [KT] IDR 2.8 bn as difference of total requirement (IDR 7.8 bn) for 2018-2019 and the assumption for 2018 (IDR 5.0 bn). [KMP] IDR 1.8 bn: author's assumption.

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Assumptions and Estimation

1 2018 - 2019 Period (Discussion and Study Period)

1.1 Provincial Training

1	Required number of Provincial Trainer Candidates to meet Target		1,145 persons	See Section 5.2.1
2	Average cost per Provincial Training participant		6.5 million IDR/person	Assumption
3	**Total Provincial Training Cost to Fulfill the Target by 2019**		**7,443 million IDR**	

1.2 Kab/Kota Training

1	It is assumed that every PDAM has to have at least 1 staff trained in each training module			See Section 5.2.2
2	Total PDAM staff to be trained for 7 modules (net of PDAMs already trained)		1,951 persons	See Table 5.7
3	Average cost per Kab/Kota Training participant		4.0 million IDR/person	Assumption
4	**Total Kab/Kota Training Cost to fulfill the Target by 2019**		**7,804 million IDR**	

2 2020 and onward (Joint Operation ~ Transfer Trial ~ Full Transfer)

2.1 Provincial Training

1	Provincial Trainers required to maintain for each module nationwide		86 persons/module	See Section 5.2.1
2	Assuming it is required to replace/refresh annually:	10%	8.6 persons/module	Assumption
3	Approx. total number of required replacement for 7 modules		60 persons	
4	Rquired Provincial Trainer candidates to be trained Productivity	40%	150 persons	* Equivalent to 10 PT per year
5	Average cost per Provincial Training participant		6.5 million IDR/person	Assumption
6	**Annual Total Provincial Training Cost for Replacement**		**975** million IDR	

2.2 Kab/Kota Training

1	Total PDAM staff nationwide		54,478 persons	See Figure 5.7
2	Assumption of proportion of operator level personnel	75%	40,859 persons (approx.)	See Figure 5.7
3	Assumption of proportion of personnel relevant to COE	80%	32,687 persons	Assumption
4	KT participants already trained 2012-2017: 1,779	2018-2019: 1,951	3,730 persons in total	
5	Net of personnel relevant to COE modules		28,957 persons	
6	BTAM training participants (500 persons/year * 8 years)		4,000 persons (approx.)	Assumption
7	Net of potential personnel to be trained in COE		24,957 persons	
8	Assuming half of the personnel should be trained in 8 years	50%	12,478 persons	Assumption
9	Annual KT participants		1,560 persons/year	
10	Average cost per Kab/Kota Training participant		4.0 million IDR/person	Assumption
11	**Total Kab/Kota Training Cost to fulfill the Target by 2019**		**6,239 million IDR**	

Note: The table does not contain the expenditure regarding establishment and maintain COE PDAM Training Team within PERPAMSI.

Source: JET estimation based on various sorces

(1) Discussion and Study Period (2018 – 2019)

The conditions for estimating the cost to be borne by the central government are explained below:

COE Management Consultant (KMP) and Field Consultants

- KMP and Field Consultants are necessary to manage National Training and Provincial Training during the Discussion and Study Period from 2018 to 2019 while DWSD should implement NT and PT.
- In addition to the training implementation, it is assumed that study/review consultants will be hired under the KMP or another relevant contract to support PERPAMSI and DWSD to study and review the capacity of PD PERPMSI of each province and formulate plans for strengthening and developing their capacity as Kab/Kota Training implementer. This includes planning of establishment of COE PDAM Training Team in PERPAMSI as well as preparation of detailed MOU to be signed for the official transfer of Kab/Kota Training of COE Program. **See Annex 2 for the proposed TOR of these services.**

Provincial Training

- The cost of Provincial Training is estimated to be 6.5 million IDR per trainee except the cost of hiring COE management consultants (KMP) based on the past average cost data of COE Program from 2014 to 2016. The total cost for Provincial Trainings required for the seven modules to secure the target number of Provincial Trainers (1,146as estimated in Section 5.2) is estimated at approximately 7.4 Billion IDR (See Table 5.17).

Kab/Kota Training

- The central government should provide financial support for implementing Kab/Kota Training until the time when at least one employee of each PDAM can get the Training for each of the seven training modules (See Section 5.2.2). The unit cost for implementing Kab/Kota Training is estimated at 4 million IDR per person and the total cost is calculated to be approximately 6.2 billion IDR as shown in Table 5.17.

Establishment of COE PDAM Training Team

- As described in Section 5.4, PERPAMSI shall establish the COE PDAM Training Team for overall implementation of Kab/Kota Training of COE Program and monitoring/evaluation of the training performance. The team will require certain personnel and organization; however, the present cost estimation does not contain such funding needs. After the agreement of this Master Plan, the study and planning for the Kab/Kota Training transfer should consider the detailed cost estimation along with required personnel needs, etc.

(2) Transition Period (2020-2023 and onward)

Provincial Training

- After the required number of National/Provincial Trainers are produced by 2019 under DWSD implementation with APBN, it will be necessary to conduct NT or PT from 2020 to maintain the number of National and Provincial Trainers as planned over time under the continuous financial support from DWSD (See Section 5.2.1).

Kab/Kota Training

- As described in Section 5.5.2, the implementation of Kab/Kota Training during the transition period from 2020 will be gradually transferred from DWSD to PERPAMSI. On the field level, PD PERPAMSI will conduct the Kab/Kota Training in each province.
- It is estimated that 1,560 PDAM employees must be trained annually (See Section 5.5.2 and Table 5.17). Assuming it takes 4.0 million IDR to training one person in Kab/Kota Training, the annual funding requirement for Kab/Kota Training is estimated at 6.2 billion IDR.

5.5.4 Equipment for COE Training

Training equipment available for the COE training is listed in Table 5.19. DWSD procured sufficient number of each instrument in 2016 to facilitate simultaneous implementation of Kab/Kota Training in different provinces. There is also existing equipment available at BTAM in Bekasi, which can be used for National and Provincial Training. However, the equipment is not sufficient in terms of both varieties and numbers for the implementation of National and Provincial Training at central level. JICA supplemented such equipment for the use at BTAM in 2017.

Availability of sufficient equipment in the course of both NRW and EE training is crucial for effective transfer of practical knowledge and techniques for COE Program trainings. Efficient deployment and arrangement of sufficient training equipment at both central and provincial levels should be planned during “Discussion and Study Period” considering the following points:

- It is recommended that the equipment procured by DWSD be deployed at such PDAMs which have own training centers, several provincial or national trainers, and/or positive policy for human resource development.
- The leading-runner PDAMs, which are defined in the previous section, are also considered suitable PDAMs to manage such equipment.
- Asset transfer among the central government, the local governments and PDAMs should be properly arranged so that the equipment could be utilized effectively in COE Program.

The recommended allocation of number of each available equipment for BTAM and PDAMs in future is presented in Table 5.20. For most equipment, the units procured by DWSD for Kab/Kota Training should be deployed to PDAMs while those procured by JICA should be deployed to BTAM for National and Provincial Training at central level.

Table 5.20 Equipment Available for COE Program Training

	Training Equipment	Existing Equipment			Recommendation	
		COE Program		*Reference*	COE Program	
		2016 DWSD Procurement	2017 JICA Procurement	*Existing at BTAM*	PDAMs	BTAM
NRW Training Equipment						
1	Potable Ultrasonic Flowmeter	**28**	**5**	-	**28**	**5**
2	Data Logger (Pressure)	**30**	**5**	-	**30**	**5**
3	Digital-Type Compact Leak Detector	**-**	**5**	-	**-**	**5**
4	Correlator	**28**	**2**	-	**28**	**2**
5	Conventional Type Leak Detector	**15**	**-**	*16*	**15**	**-**
6	Metal Pipe Locator	**15**	**-**	*6*	**15**	**-**
7	Non-Metal Pipe Locator (sound method)	**15**	**-**	-	**15**	**-**
8	Plastic Pipe and Leak Detector (Electromagnetic Induction Method)/**1**	**-**	**10**	-	**8**	**2**
9	Acoustic Bar	**56**	**-**	*17*	**56**	**-**
10	Acoustic Bar (with electrical amplifier)	**15**	**2**	*3*	**15**	**2**
11	Simple Acoustic Bar (fabricated by simple metal work locally available)/**2**	**-**	**50**	-	**45**	**5**
EE Training Equipment						
1	Power Quality analyzer	28	5	-	**28**	**5**
2	Clamp Meter	15	3	*2*	**15**	**3**
3	Tachometer/Rotation Tester (Stroboscope)	28	2	*3*	**28**	**2**
4	Infrared Thermometer (Infrared Camera/ Thermal Imager)	15	5	-	**15**	**5**

/1 Recommended to deploy 8 units to PDAMs and 2 units to BTAM.
/2 Recommended to deploy 45 units to PDAMs and 5 units to BTAM.

Source: JET based on DWSD information

5.5.5 Training Modules

So far the seven training modules, namely NRW, EE, SAK-ETAP, GIS, WTP, CR and FAM are developed as the COE Program contents. They are considered sufficient as fundamental knowledge and skills applicable to every PDAM and the most relevant to the operational improvement. The present M/P does not anticipate further training module development to increase the training contents and rather suggest to maintain the present module contents. In the evaluation of Master Plan (See Section 5.4.2 and Figure 5.16), the existing module contents will also be reviewed to assess the necessity of further updating and revision.

5.5.6 Funding Sources for COE Program Implementation

Since COE Program has started in 2012, it has been implemented under the full financial support of the central government to date. However, in this Master Plan, a possible funding arrangement is discussed and proposed to shift from the central government's full support to cost sharing principle among the stakeholders in or after the year 2024 as described below:

- The future cost to maintain necessary numbers of National and Provincial Trainers after the year 2024 and onward should be borne by APBN. The central government should remain involved in COE Program, in that National and Provincial Trainers have important roles to disseminate to PDAMs all over the country through COE Program the government's new policy as well as new technical guidance and new regulations (if any) according to the central government's direction.

- In contrast, the cost for implementing Kabupaten/Kota Training (KT) in each province should be borne by both PERPAMSI and recipient PDAMs. However, such arrangement should be carefully managed by gradual transition considering the readiness of PERPAMSI as well as the financial affordability of recipient PDAMs. Possible scenarios for funding sources to bear the necessary cost for KT are discussed below:

(1) Scenario 1: Fully Covered by Recipient PDAMs

In this scenario, it is expected that each recipient PDAM will pay the training fee for each KT it actually participates. This arrangement is ideal based on the beneficiaries-pay principle. Although there is a possibility that "healthy" and large PDAMs are expected to bear KT participation costs, it is concerned that due to financial constraints many of "sick" or "less healthy" PDAMs are reluctant to send trainees to KT. It is, however, premature to apply this principle as there are still many "sick" and "less healthy" PDAMs exist all over the country. Probably it can be discussed when all the PDAMs become healthy in the future. Before proceeding to this scenario, another way of funding should be considered to help such weak PDAMs to participate in KT.

(2) Scenario 2: Shared by PERPAMSI Membership Fees and Recipient PDAMs

In this scenario, the increase of PERPAMSI membership fee per PDAM customer is utilized to cover a part of the training cost.

The number of PDAMs, of which total employees is less than 100, amounts to 199 PDAMs; among which, 142 PDAMS are categorized in "sick" or "less healthy", which is equivalent to 71% of 199 PDAMs. Considering this fact, a special arrangement is proposed to facilitate such small and weak PDAMs to participate in COE Program.

If PERPAMSI can increase its membership fee by only IDR 20 or 30 per connection per month, the annual revenue increase will be estimated at approximately IDR 2.5 or 3.8 Billion, respectively. (There are 10,632,272 customers in total according to the data of BPPSPAM Kinerja PDAM 2016.) If this amount can be utilized especially for COE Program participations of such small and weak PDAMs, this arrangement enables such PDAMs to send at least four or six trainees annually by grant to KT without paying training fees. Instead, large and/or healthy PDAMs are encouraged to afford the training costs by themselves through training fee payments.

It is likely that the proposed arrangement is a kind of cross subsidy between "large and healthy PDAMs" and "small and weak PDAMs", and it is the key to materialize this arrangement whether PERPAMSI can get the consensus of all the member PDAMs.

The "large and healthy PDAMs" are those identified as leading-runner PDAMs as listed in Table 5.3. The total customer number of these sixteen leading-runner PDAMs is 3,331,269, which is equivalent to 34% of the total customers. These sixteen PDAMs will be large contributors for implementing KT all over the country.

For this arrangement, the following consensus should be well established among PERPAMSI member PDAMs.

- PERPAMSI can collect additional membership fee utilized for special purpose of HRD from all the PDAMs by convincing PDAM members about the importance of equal development for human resources of member PDAMs all over the county.
- "Healthy" and large PDAMs should bear KT participation cost at their own expenses in addition to the payment for the membership fees.
- Weak PDAMs such as "sick", "less healthy" or small (less than 10,000 customers) PDAMs are eligible for getting subsidized for participating KT from the special HRD account of PERPAMSI.

In conclusion, the above idea relies largely on the sense of solidarity among PERPAMSI member PDAMs, and the full understanding and contribution of healthy and large PDAMs are indispensable to materialize this concept successfully.

(3) Financial Status of PDAMs and Alternative Funding Sources for Kab/Kota Training

Currently, only around 30% of all PDAMs have achieved the full-cost recovery (FCR). According to PERPAMSI officials, achieving FCR is crucial in order for PDAMs to fully support the Kabupaten/Kota Training cost as estimated above. However, the regulation of Ministry of Home Affairs (No.70 and 71/2016) enforcing the FCR for all PDAMs has enacted only recently and it is uncertain if all PDAMs may become able to achieve FCR shortly.

To cope with the situation, it is suggested that DWSD and PERPAMSI assist PDAMs in improving their cost recovery status; for instance, through setting the preparation of business plan to achieve FCR in accordance with the FAM module as a prerequisite for physical support programs (Kota Binaan, NUWAS, etc.)

In addition, it is proposed to take the following measures to cover training cost borne by PERPAMSI and/or PDAMs:

- Utilizing the existing facilities of PDAMs to reduce training cost compared to the Kab/Kota Training implemented by DWSD
- Seeking for sponsorship by private companies to cover training cost

Moreover, it is suggested that DWSD and PERPAMSI will review the financial status among PDAMs in three to five years of the implementation of the Master Plan to consider revision to the present Master Plan.

5.6 Key Milestones of Master Plan

Based on the aforementioned process and schedule, key milestones to achieve through implementing this Master Plan are presented in Table 5.21.

Table 5.21 Key Milestone of Master Plan

Master Plan Phasing	Year	Key Events in Transition Process	Active Provincial Trainers Maintained (All Modules)	Cumulative Kab/Kota Training Participants (All Modules)
Discussion and Study Period	**2018**	Q1: Signing of Agreement for Study toward COE Program Joint Implementation Q3: Signing of MOU for Kab/Kota Training of COE Program Transfer Q3: Setup COE Management Unit and COE PDAM Training Team	282 /1	2,449 /3
	2019	Q1: Plan of Strengthening PD PERPAMSI as KT implementer	602 /2	3,251 /4
Joint Operation Period	**2020**	Q1: PERPAMSI gets involved in KT jointly with DWSD	602	4,811 /5

	2021	-	602	6,371
Transfer Trial Period	**2022**	Q1: Selected capable PD PERPAMSI starts implementing KT [Q2: Master Plan Review]	602	7,931
	2023	-	602	9,491
Full Transfer Period	**2024**	PERPAMSI starts implementing KT in all provinces	602	11,051
	2025	-	602	12,611
	2026	-	602	14,171
	2027	[Q2: Master Plan Review]	602	15,731

/1 Estimated based on existing Provincial Trainers as of 2016 (270) plus those produced in 2017 COE (8 for CR and FAM) and those produced in 2018 COE (4 for one training module to be decided by DWSD)

/2 Estimated based on the required number of Provincial Trainers per one module (86 persons, See Table 5.4) multiplied by 7 modules.

/3 Estimated based on (i) actual KT participants from 2012 to 2017 (1,779 persons) and (ii) KT trainees (650 persons) estimated from unit cost (IDR 4.0 per person) and budget assumed for KT (IDR 2.6 billion)

/4 Estimated based on (i) estimated cumulative participants as of 2018 (2,449 persons) and (ii) KT trainees (3,251 persons) estimated from total required trainees (1951 persons) in 2018-2019 and estimated trainees (650 persons) in 2019

/5 From 2020 onward: 1,560 PDAM employees will be trained in KT nationwide annually.

Source: JET

5.7 Monitoring and Review of Master Plan

It is proposed that monitoring and review of the Master Plan during the implementation will be conducted in the following way.

5.7.1 Annual Monitoring

Annual monitoring of the Master Plan shall be conducted as described in Section 5.4.2 above. Besides the six key performance indicators proposed, number of the Provincial Trainers maintained in each province and implementation of Provincial Training are important indicators to monitor in order to maintain the sustainability of the COE Program. In this respect, the annual monitoring should review the progress of Provincial and Kabupaten/Kota Training and their budgeting, thereby revise the annual implementation plan for the program activities for the next year.

6 Recommendations

6.1 Sustainable Implementation of COE Program

6.1.1 Financial Sustainability of COE Program

As discussed earlier in Chapter 5, in order to carry out the smooth Joint Implementation of the program with PERPAMSI, it is crucial to ensure the financial sustainability of the program. It is proposed as one of the options in the present Master Plan to increase PERPAMSI membership fee per PDAM customer to cover a part of training cost. For this arrangement, the following consensus should be well established among PERPAMSI member PDAMs:

- PERPAMSI can collect additional membership fee utilized for special purpose of HRD from all the PDAMs by convincing PDAM members about the importance of equal development for human resources of member PDAMs all over the county.
- "Healthy" and large PDAMs should bear KT participation cost at their own expenses in addition to the payment for the membership fees.
- Weak PDAMs such as "sick", "less healthy" or small (less than 10,000 customers) PDAMs are eligible for getting subsidized for participating KT from the special HRD account of PERPAMSI.

6.1.2 Maintaining Required Number of Provincial Trainers

Besides the funding needs, it is crucial for the COE Program to maintain sufficient number of Provincial Trainers in order to ensure its sustainability. As discussed in Chapter 5, it is proposed to establish the following rules for this purpose:

- Once selected as Provincial Trainers, these trainers should continue to work as Provincial Trainers for at least ten (10) years.
- DWSD and PERPAMSI should review the target number of Provincial Trainers at least every five (5) years.
- DWSD should provide financial supports to maintain the necessary number of Provincial Trainers by producing supplemental Provincial Trainers and maintaining their quality in future depending on the need of PERPAMSI.

6.2 Harmonization with Physical Improvement Projects

Knowledge and skills obtained through COE Program should be utilized effectively in actual PDAMs' service improvements. Otherwise, the overall goal of COE Program will never be achieved. PDAM participants to COE Program (including PDAM management officials, National Trainers, Provincial Trainers and Kab/Kota Training participants) should have the same consensus to make their best endeavors to apply their acquired knowledge through COE Program to daily activities of

planning, management, operation and maintenance in their respective PDAMs.

Corresponding to such efforts of PDAMs, the central government is also requested to provide financial supports to encourage their activities towards actual improvements. Most of PDAMs are suffering from lack of funding for investments. But without proper human resources it is difficult for PDAMs to handle investment projects effectively and successfully. Therefore DWSD should select PDAMs who are eligible for financial supports of APBN by checking carefully the PDAMs' commitment of human resource development.

Another funding source other than APBN, NUWAS (National Urban Water Supply Program) by World Bank, will be available starting from the year 2018. NUWAS will offer various funding schemes including grants depending on the status of PDAMs and Local Governments. It is also recommended to consider commitment of PDAMs for human resource development to allocate the available budget from NUWAS.

In order to harmonize physical improvement projects and human resource development DWSD should set up the criteria for selecting PDAMs eligible for such funding schemes of APBN and NUWAS. It is proposed to consider the following indicators to prioritize PDAMs for funding:

- No. of National or Provincial Trainers in the related fields for investment planned
- No. of Kab/Kota Training participants in the related fields for investment planned
- No. of PDAM staff who obtained or applied for competency certification

6.3 Collaboration with Other HRD Programs

There are presently several HRD programs existing other than COE Program in Indonesian water supply sector. COE Management Unit will receive PDAMs' needs on human resource development with the help of PERPAMSI and PD PERPAMSI. After receiving and analyzing such training needs from each province, COE Management Unit will select suitable participants for COE Program depending on the actual needs of PDAMs with the consultation from PD PERPAMSI. COE Management Unit also gives suggestion and recommendations to PDAMs in case that their needs match with other training programs such as BTAM and YPTD better than COE Program. As suggested in Chapter 5, each training provider should maintain their unique training targets and characteristics and improve their own training contents without compete and conflicting with other similar training modules.

Furthermore, investment needs from PDAMs will also be received by COE Management Unit from PD PERPAMSI, and will provide guidance to PDAMs to get access to the investment programs or

donors' program suitable for such PDAMs.

Figure 6.1 illustrates the concept of mechanism for needs oriented management system for various improvement programs including HRD programs and investment programs.

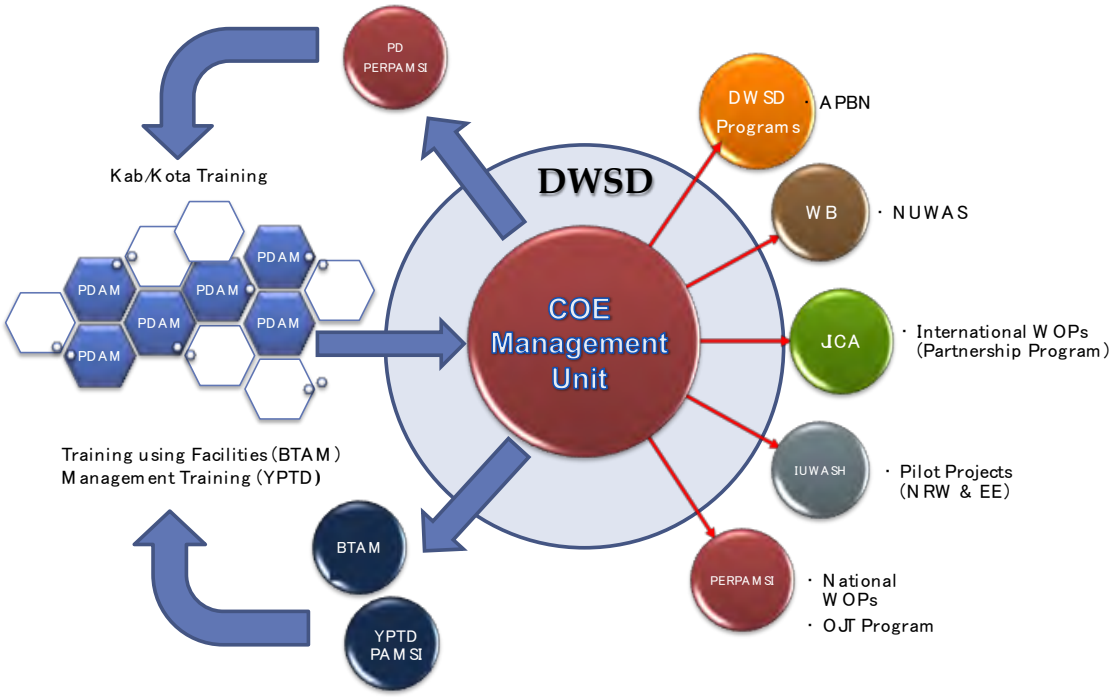


Figure 6.1 Concept of Needs Oriented Overall Management Flow for various PDAM Improvement Programs

Thus, the roles of COE Management Unit and PD PERPAMSI will be significantly important in the field of human resource development in PDAMs, and through its sustainable implementation of COE Program actual improvement of PDAM performances will be ensured in collaboration with other physical improvement programs in the future.

6.4 Incentives for PDAMs and PERPAMSI to Participate in COE Program

One of the keys to success for COE Program and transfer of Kab/Kota Training to PERPAMSI is augmenting continuous demand among PDAMs across Indonesia for accessible HRD opportunity that COE Program can offer through its unique training system. Below is the summary of identified benefits of the COE Program from the past experience, as well as possible incentives or support that the central government may be able to offer in near future in order to motivate PDAMs to participate in the program.

6.4.1 Qualitative Benefits of COE Program

Identified qualitative benefits of the program are as follows:

- More accessible training opportunity through holding Kab/Kota Training at provincial level
- Vast training coverage in terms of areas and number of participants through the cascade method training system
- Promoting mutual cooperation among local PDAMs based on their solidarity in the same province
- Possible opportunity for staff certification though it is necessary to enhance the coordination with LSP-AMI.

6.4.2 Quantitative Effectiveness of COE Program

(1) JET Baseline Survey Results (March 2016): 2014 Kab/Kota Training Results

- Most Kab/Kota Training participants (83% of NRW and 93% of EE) shared obtained knowledge back in their PDAM.
- The participants who bought new equipment to support PDAM improvement is 15% of NRW participants and 20% of EE participants.
- As a failure of obtained knowledge implementation, the most common causes cited by participants are "lack of equipment" and "lack of budget". These limitation factors are major bottleneck for the improvement of PDAM performance. Thus, as stated in Section 6.1 above, the coordination between the physical development programs and COE Program is crucial for successful PDAM operation improvement.
- In terms of the area where limitation of equipment and budget is considered less relevant, those who "have improved the way of work" reach 75% of NRW participants and 77% of EE participants.

Table 6.2 Questionnaire Survey Results (2014 Kab/Kota Training)

Have you implemented the knowledge you obtained at COE course to your PDAM?		Kabupaten/Kota Training participants in 2014			
		NRW		EE	
No		**21**	**13%**	**1**	**3%**
Yes	Sharing to other staff in my PDAM	134	83%	28	93%
	Improve way of working	120	**75%**	23	**77%**
	Buy new equipment to support PDAM improvement	24	**15%**	6	**20%**
	Develop new system	50	31%	11	37%
	Invited by (an)other PDAM(s) to give unofficial training	7	4%	1	3%
	Others	13	8%	0	0%
	Subtotal	**140**	**87%**	**29**	**97%**
Total		**161**	**100%**	**30**	**100%**

Source: JET

(2) KMP Monitoring and Evaluation (2017)

- In the captioned survey KMP conducted interviews with the Provincial Trainers who have lectured in KT. As selected Provincial Trainers, all of them were requested to prepare action plan of their home PDAM to implement pilot projects in their specialized field.
- Among these Provincial Trainers, 32% actually implemented their action plan.
- Also, around 30% of respondents shared what they learned in PT with other PDAM staff (32% informal socialization and 25% formal training).

6.4.3 Creating Incentives / Enhancing Motivation for PDAMs

During the course of Master Plan preparation, the following measures are proposed as possible solutions to create incentives for PDAMs to participate in COE Program:

(1) PDAM Management's Understanding of Importance of HRD

- Although the middle management or operator level staff is trained through COE Program, it is crucial that the PDAM's executive management authority understands the importance of HRD and implementation of what is taught in trainings. Continuous socialization for PDAM executives is essential to increase participation in the program. Not only the socialization events run by DWSD, but also existing opportunities such as PERPAMSI's annual assembly meetings would be utilized to gain such understanding of importance of HRD among PDAM management officials.

(2) Financial Incentives for Participation

- Setting the participation in COE Program as a prerequisite for physical support programs (Kota Binaan, NUWAS, etc.)
- Rewarding system for National and Provincial Trainers

(3) Coordination with Sertification Institution

- Coordination with LSI-AMI and TUKs to facilitate PDAM staff to obtain certificates. In order to increase accessibility to certification, DWSD might assist the assessors to visit other locations than their home TUK to provide certificate examination for COE alumni located in provinces where TUK is not accessible. In this setup, the assessors visit could be 2-3 times a year per location, and COE alumni can pick the schedule when they are available for certification. This can minimize time and distance constraints for certification of PDAM staff after taking COE Program trainings.
- Subsidizing TUKs and/or LSP-AMI to increase TUKs (competency certificate assessing locations) to enhance accessibility

- Subsidizing TUKs and/or LSP-AMI to reduce application cost for PDAM staff

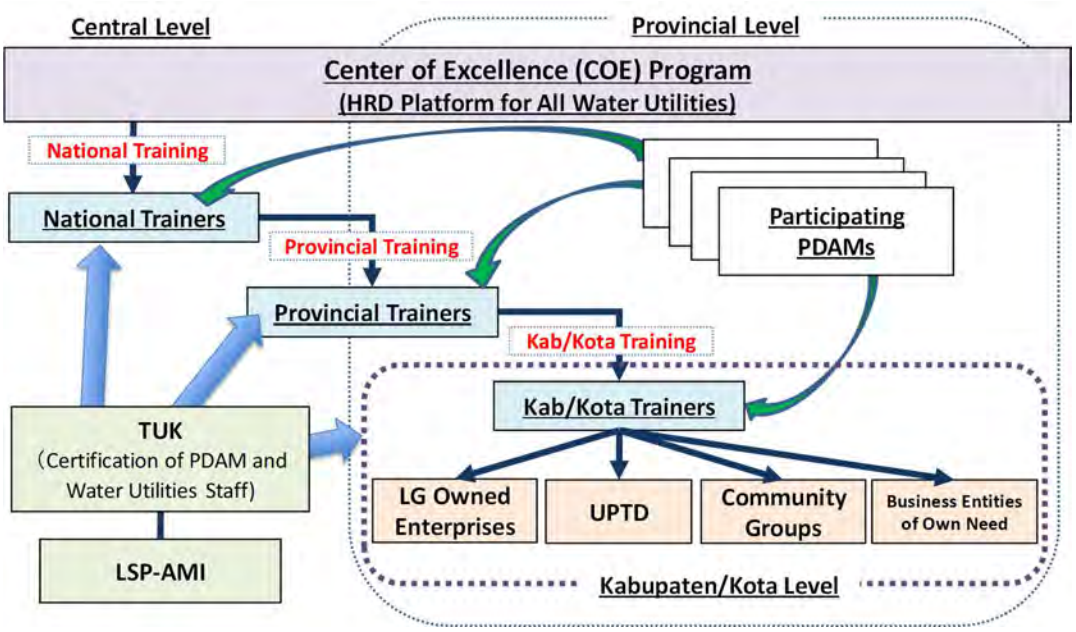
(4) Awarding Ceremony for Best Performance and Practice under COE Program

- Taking an opportunity of annual PERPAMSI nationwide conference it is proposed to award COE Program participants who made distinguished contribution and performance during and/or after COE training.
- The awards are provided for each category of trainers, trainees, PDAMs and PD PERPAMSI. It is expected that such awarding system encourages individuals and organizations involved in COE Program.

6.5 Future Vision

It is envisaged that one day the COE Program will become the HRD platform for all water utilities, and serve not only HRD among PDAMs nationwide but also HRD of various organizations, such as (i) state-owned enterprises, (ii) local government-owned enterprises, (iii) Technical Local Service Implementation Unit (UPTD) of local governments, (iv) business entities for own need, and (v) community groups. To respond to the potential needs among non-PDAM water utilities, it would be required for COE Program to expand its training modules from the existing seven operational areas of PDAM in order to produce capable trainers who can coach those utilities.

Currently in the present setup, COE Program produces Provincial Trainers that can train PDAM staff in Kab/Kota Training in each province so the PDAM staff becomes able to improve their own PDAM's operation. As the program develops further, it is possible in the future for the Kab/Kota Training to produce Kabupaten/Kota Trainers to be mobilized to teach fellow staff of other water utilities in the same Kabupaten/Kota, such as local government-owned enterprises, UPTD of local governments, business entities for own need, and community groups, as the regulatory basis states that all water utilities within province are under supervision of Kabupaten or Kota. For instance, the Kabupaten/Kota Trainers produced by COE Program could train staff of the community-based water utilities that implement government-funded program like PAMSIMAS to enhance their operational knowledge and skills in selected training modules, such as NRW, WTP and a simplified version of FAM (See Figure 6.3).



Source: JET

Figure 6.3 Future Vision of COE Program

Annex 1

Scope of Works for COE Management Consultant FA Year 2017

A. Planning:

1. Program coordination with Sakter PAMS Provinces, PD Perpamsi in provinces, PDAMs, BTAM Bekasi, and other stakeholders.
2. Coordination with COE field consultant.
3. Develop work plan and activities schedule for the COE Program.
4. Arrange schedule and manage each activity stages with field consultant.
5. Discussion of work plan and activities schedule with employer.

B. Implementation

B.1. Consultants:

1. Monitor all activity stages in COE Program implemented by field consultant in 4 provinces.
2. Implement and coordinate the coordination meeting with field consultant.
3. Develop SOP for each activity stages of the COE Program.
4. Organise and monitor Provincial Training for 2 new modules, WTP Operation and GIS.
5. Set participants' criteria for Provincial Training or Kabupaten/Kota Training.
6. Together with field consultant, select qualified provincial trainer candidates who are able to apply Provincial Training result in the Kabupaten/Kota Training.
7. Review and improve existing COE Program information system including participant database.
8. Evaluate COE implementation in the selected 14 provinces specifically towards trainers who joined the training as well as the implication of their involvement in SPAM providers' performance improvement.
9. Evaluate for each COE activities implementation stages (socialization, monitoring, training) to observe the effectiveness of each stages in overall COE activities.
10. Conduct working group meeting to discuss COE evaluation result.
11. Coordinate with JICA team.

C. Completion of Works

1. Develop reports.
2. Develop monitoring and evaluation report.

Annex 2

Additional Terms of Reference (TOR) of Konsultan Manajemen Pelaksana (KMP) and Field Consultants for COE Program in 2018
Related to Implementation of Master Plan for COE Program
(Proposed)

In accordance with the transition plan of the transfer of Kabupaten/Kota Training (Kab/Kota Training, or KT) of COE Program to PERPAMSI stated in the Master Plan, additional TOR for KMP and Field Consultants shall be executed as follows besides the TOR for implementation of 2018 COE Program.

1. Assistance for Transfer of Kab/Kota Training of COE Program to PERPAMSI

1.1 Revision of SOP of COE Program for implementation of Kab/Kota Training by PERPMASI

- Review the present implementation setup and methodology of Kab/Kota Training of COE Program trainings and related activities, as well as the existing Standard Operation Procedure (SOP) of COE Program developed by KMP in 2017 under DWSD supervision.
- Revise the COE Program SOP to be suitable to the implementation by COE PDAM Training Team to be established within PERPAMSI headquarters.

1.2 Planning of establishment of COE PDAM Training Team in PERPAMSI

- Review the present capacity of PERPAMSI headquarters such as personnel, organization, available resources, etc.
- Propose the plan of establishment of COE PDAM Training Team through discussions with PERPAMSI management staff, DWSD and other related organizations.

1.3 Assistance for preparation of Memorandum of Understanding of Transfer of KT of COE Program

- Based on results of the aforementioned activities, prepare the Draft Memorandum of Understanding between and DWSD and PERPAMSI including financing plan of implementation of Kab/Kota Training of COE Program.

2. Assistance for Capacity Development of PD PERPAMSI

2.1 Survey of Status Quo of PD PERPAMSI

- Review the present capacity of PD PERPAMSI across Indonesia (personnel, organization, resources, etc.)
- Classify the readiness of each PD PERPAMSI as Kab/Kota Training Implementer.
- Identify PDAMs in each province which can cooperate with PD PERPAMSI as local training center.

2.2 Planning of Strengthening PD PERPAMSI as Kab/Kota Training Implementer

- Propose the transition plan of PD PERPAMSI to implement Kab/Kota training based on the survey including necessary capacity development and support.
- Preparatory training for PD PERPAMSI officials to prepare for the implementation of Kab/Kota Training during the KT Joint Operation period (2020-2021)

3. Assistance for Coordination between COE Program and SKKNI

- Conduct the survey of the current capacity of LSP-AMI and Tempat Uji Kompetensi across Indonesia such as personnel, organization and financials.
- Through consultation with LSI-AMI and DWSD, propose the plan to facilitate the COE trainees to obtain competency certificates from LSP-AMI by increasing coordination between COE PDAM Training Team of PERPAMSI and LSI-AMI in future.

4. Improvement of Monitoring and Evaluation of COE Program

- Conduct the following monitoring and evaluation of COE Program which consists of (i) "Monitoring of COE Program Implementation Outcome" for individual trainings and (ii) "Annual Evaluation of Overall COE Program", and report the analysis of the results in the COE Program Annual Implementation for DWSD's review.[12]

4.1 Monitoring of COE Program Implementation and Outcome

- Conduct monitoring of COE Program implementation and outcome through the questionnaire survey at the time of each COE training (Forms 1, 2, 3 and 4) and the separate survey of selected trainees from past COE trainings[13] (COE alumni, Form 5) (See Table 1 and Attached Sample Questionnaire Forms 1 to 5)[14].
- In addition to the average scoring and yes/no proportions, KMP will summarize the remarkable comments/ inputs provided from respondents as well as the analysis to be utilized in the next years's COE Program.

Table 1: Questionnaire Forms for Monitoring of COE Program Implementation and Outcome

Questionnaire Form	Subject	Data Source/ Respondent	Data Collection/ Surveyor	Data Processing and Analysis
Form 1	**Training Material**	Trainee (Training participant)	KMP/ Field Consultant (at the time of training implementation)	KMP - Reporting in Annual Implementation Report - Summarizing the questionnaire survey results and analysis
Form 2	**Trainer/ Instructor**	Trainee (Training participant)		
Form 3	**Trainee**	Trainer/ Instructor		
Form 4	**Execution of Training**	Trainee (Training participant)		
Form 5	**PDAM Activities after COE Trainings**	Former Trainee (Training participant)	KMP (Separate survey of selected trainees from past years)	

4.2 Annual Evaluation of Overall COE Program

- Collect the following key performance indicators of COE Program annually:
    a. Number of National Trainers (total National Trainers available)
    b. Number of Provincial Trainers for each module in each province (Provincial Trainers available for each module in each province)
    c. Number of Kab/Kota Training implementation in each province in the year
    d. Number of PDAM staff member who applied for competency certificate tests in each province in the year

[12] See also attached Explanatory Note for the background information of the present Monitoring and Evaluation system.
[13] As for the number of former trainees as the subject for Form 5 survey will be determined based on the budget allowed for the separate survey.
[14] KMP is encouraged to further improve the Questionnaire Forms under consultation with DWSD.

e. Number of PDAM staff member who get competency certificates in each province in the year

f. Key training ratios: (i) Qualified Provincial Trainers per Provincial Training[15], (ii) Qualified Provincial Trainers per Provincial Trainer candidates (productivity rate)[16], and (iii) training cost per trainees (NT, PT and KT).

- Conduct the annual evaluation of overall COE Program based on the existing data such as annual results of COE trainings as well as excerpts from the questionnaire surveys (See Table 2). The target of each criterion shall be set in accordance with the COE Program Master Plan and revised annually under approval of DWSD.

Table 2: Annual Evaluation of Overall COE Program

Evaluation Criteria	Indicator	Description	Data Source	Example of Countermeasures for Inadequate Results
(1) Relevance	- Relevance to DWSD's policies and the program goal	- Are overall program activities relevant to MPWH policies and the program goal? (e.g. COE is relevant to Government Regulation PP122/2015)	- MPWH/ Cipta Karya policy documents	- Revision of program contents and activities
(2) Effectiveness	- Comments from PDAM during Socialization prior to training activities - Trainee questionnaire results (Overall training experience, Form 4)	- Does the overall program serve the needs of PDAMs and PDAM staff? (e.g. The average scoring for the overall experience among trainees was ___.) (e.g. Summarized comments from PDAM management during the socialization)	- Socialization results - Trainee questionnaire results (Overall Training Experience, Form 4)	- Revision of training module contents, textbooks and materials
(3) Efficiency	- Number of trainings implemented (plan/ actual) - Number of trainees (plan/actual)	- Were the program activities conducted as planned?	- Annual results of COE trainings	- Revision of training implementation method such as trainee selection, venue, etc.
(4) Impact	Number of "Sehat" PDAMs (- Results of monitoring after trainings (Form 5))	- Number of PDAM evaluated: Sehat (___PDAMs) Kurang Sehat (___PDAMs) Sakit (___PDAMs) - Number of PDAM staff with Competency Certificate	- BPP SPAM Annual Report "Kinerja PDAM" - LSP-AMI data	- Analysis on causes of inadequate results
(5) Sustainability	Accumulative number of COE trainers produced (past – present) Status of budget appropriation	- Does the program keep the number of Provincial Trainers as planned? - Budget appropriated to maintain COE Management Unit and COE PDAM Training Team and to implement COE Program training	- Annual results of COE trainings - DWSD and PERPAMSI information	- Revision of training implementation method such as trainee selection, venue, etc.

[15] Average number of Provincial Trainers qualified in one Provincial Training.

[16] Average percent of qualified Provincial Trainers to total Provincial Training participants (trainees, or Provincial Trainer candidates).

Attachment to KMP TOR

Explanatory Note on Improvement of Monitoring and Evaluation System for COE Program

1. Introduction

(1) Baseline Survey and Review on COE Program conducted in 2016 by JICE Expert Team indicates that the training program is implemented properly by KMP in general.

(2) However, the Baseline Survey also indicates that their monitoring and evaluation activities are limited and there has not been a clear and established system (PDCA cycle).

(3) Therefore, revision on the terms of reference (TOR) for KMP is necessary to enhance its monitoring and evaluation activities.

2. Issues in the Current Monitoring and Evaluation

(1) In 2017, KMP has implemented monitoring activities on impacts of the COE Program in terms of PDAM activities after taking COE trainings.

(2) Major comments given in the second MONEV meeting in July 2017 are as follows:

i) The indicator that should be used on measuring participant competency after COE program should be clearly defined.

ii) The capability of questionnaire form to fulfill the COE target and goals. The monitoring and evaluation activities should be able to measure the progress and/or the result of objectives and goal achievement.

iii) Data based on questionnaire results still not describe the comparison between before and after condition of PDAM after joining COE program thus the improvement of PDAM performance related with COE program cannot be measured.

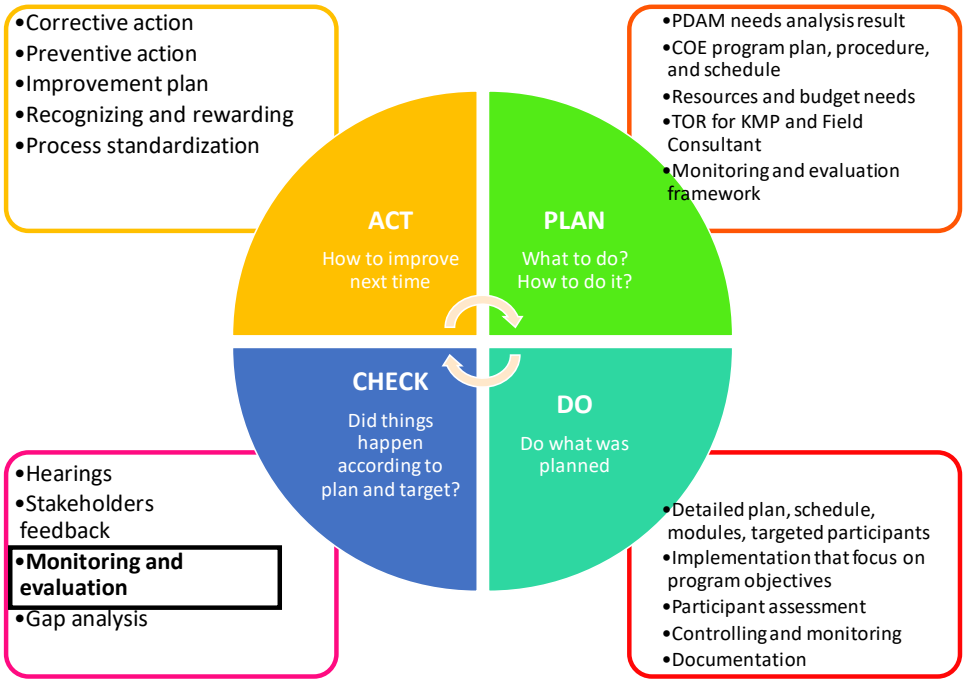
iv) The selection of data processing methods. The data processing methods should be selected in order to objectively measure the effects.

3. Improvement of Monitoring and Evaluation System

3.1 Structure of Monitoring and Evaluation

(1) Plan-Do-Check-Action (PDCA) Cycle

- In the PDCA cycle, the monitoring and evaluation is positioned in the “Check” phase.
- The monitoring and evaluation is conducted to check whether the program activities and outcome has achieved their plan/target, and to appropriately reflect the results into the “Act” phase to improve the COE program activities.



(2) Subjects of Monitoring and Evaluation

- Subjects of monitoring and evaluation must cover all aspects of the program implementation, outcome and impacts.
- Also, the subject should be selected to make it easy to collect relevant data for efficient evaluation activities.
- Data collection, processing and analysis for evaluation will be mainly conducted by KMP and reported to DWSD at the end of annual activities in the form of its Implementation Report.
- The monitoring and evaluation consist of the following:
  - (i) Monitoring of COE Program implementation and outcome, conducted mainly through the questionnaire survey upon the implementation of each COE training
  - (ii) Annual Evaluation of Overall COE Program, conducted yearly to measure the program's overall achievement in five criteria i.e. (a) relevance, (b) effectiveness, (c) efficiency, (d) impact and (e) sustainability.

Sample Questionnaire Forms

Form 1: Questionnaire (Training Material)

Subject: Non-Revenue Water

Location, Date: Jakarta, 1-4 August 2017

No	Material Topic *	Easy to be understood 1 : very easy 2 : easy 3 : difficult 4 : very difficult	Applicable for PDAM Condition 1 : fully applicable 2 : mostly applicable 3 : partly applicable 4 : not applicable	Duration 1 : too long 2 : enough to fully understand the material 3 : enough but more time for discussion will be better 4 : not enough	Supporting Media 1 : too long 2 : enough to fully understand the material 3 : enough but more time for discussion will be better 4 : not enough	Comment/Input for Module Improvement
1	**Topic 1: What can we start before introducing DMA**					
1.1	PDAM readiness to conduct DMA					
2	**Topic 2: Less cost simple approaches for NRW reduction**					
2.1	Prioritized leakage survey planning					
2.2	House to House inspection					
2.3	Updating customer database					
2.4	Production meter survey					
2.5	Non-domestic customer with unusual water usage survey					
2.6	Meter readers enhancement program					
2.7	Service tank inspection					

3	**Topic 3: Preventive measures for NRW reduction**					
3.1	Improvement of House Connection Installation					
3.1.1	Selection of Better Quality Water Meter					
3.1.2	Quality Control of house connection installation					
3.2	Planning Distribution Water Pressure Control for NRW Reduction					

* Topics in the questionnaire shall be reviewed based on the table of contents of each training module.

Additional comment/input (if any):

_____
_____
_____
_____

Name : _____
PDAM : _____
Handphone : _____

Sample Questionnaire Forms

Form 2: Questionnaire (Trainer)

Subject: Non-Revenue Water

Location, Date: Jakarta, 1-4 August 2017

No	Name	Mastery of the Material	Teaching Skills	Knowledge/ Experience	Time Management	Comment/Input for Trainer Improvement
		Scoring: 1: very good 2: good 3: bad 4: very bad				
1	Trainer 1 Mr/Ms. _____					
2	Trainer 2 Mr/Ms. _____					
3	Trainer 3 Mr/Ms. _____					
4	Trainer 4 Mr/Ms. _____					

Sample Questionnaire Forms
Form 3: Questionnaire (Trainee)

Subject: Non-Revenue Water
Location, Date: Jakarta, 1-4 August 2017

No	Name	Pre-Test Result	Activeness	Confident	Discipline	Post-Test Result	Comment/Input for Trainee Improvement
		Scoring: 1: very good 2: good 3: bad 4: very bad					
1	Trainee 1 Mr/Ms. _____						
2	Trainee 2 Mr/Ms. _____						
3	Trainee 3 Mr/Ms. _____						
4	Trainee 4 Mr/Ms. _____						
5	Trainee 5 Mr/Ms. _____						
6	Trainee 6 Mr/Ms. _____						
7	Trainee 7 Mr/Ms. _____						
8	Trainee 8 Mr/Ms. _____						
9	Trainee 9 Mr/Ms. _____						

Sample Questionnaire Forms

Form 4: Questionnaire (Execution of Training)

Subject: Non-Revenue Water

Location, Date: Jakarta, 1-4 August 2017

No	Item	Scoring: 1: very good 2: good 3: bad 4: very bad	Comment/Input for Training Execution Improvement
1	**Overall training experience**		
2	Class room/venue		
3	Composition between theory and practice class		
4	Committee performance		

Additional comment/input (if any):

_____

_____

_____

_____

Name : _____

PDAM : _____

Handphone : _____

Form 5 (1)

DATA ALUMNI BIMTEK COE - NRW

(diisi di Jakarta)

No	Peserta NRW	Keterangan
	Data Alumni COE	
1	Nama	
2	Tempat, tgl lahir	
3	Pendidikan Terakhir	
4	PDAM	
5	No. Telp & HP	
6	Email	
7	Bimtek Kab./Kota	tahun .....
8	Bimtek Provinsi (TOT)	tahun .....
9	Bimtek Nasional	tahun .....
10	Jabatan sebelum Bimtek Provinsi	
11	Jabatan sesudah Bimtek Provinsi	
	PDAM - Tentang NRW	
12	Tingkat Kehilangan Air	2015: ..... 2016: ..... 2017: .....
13	Pembagian Zona	ada / tidak, jumlah .....
14	Tim NRW	ada / tidak, dibentuk tahun .....
15	Neraca Air	dibuat / tidak, rutin ..... (periode)
		manual / pakai program (aplikasi)
16	Keterlibatan alumni di Tim NRW	terlibat/ terlibat sebagian/ tidak sama sekali sebelum / sesudah Bimtek NRW
	Data Pendukung PDAM	(**sumber data BPPSPAM, 2016*)
17	Area pelayanan (%)	
18	Jumlah Pelanggan	
19	Jam Operasi / hari	
20	Struktur Organisasi	
21	Kategori Kinerja	

Form 5 (2)

PROGRAM CENTER OF EXCELLENCE (COE)
PDAM Activities after COE Trainings

A. Education background : *(choose one)*

a. Elementary School b. Junior High-school c. Senior High-school d. Diploma

e. University

B. Have you implemented/used the knowledge you obtained at COE course for anything that could contribute to improve performance of your PDAM?

a. Yes ***(continue to point C)*** b. No ***(continue to point F)***

C. What you have done regarding implementation of COE knowledge? ***(possible for more than 1 answer)*** ***(continue to point D)***

a. sharing to other staffs in my own PDAM who cannot join in COE program

b. improve ways of working (e.g. implementation of NRW categorization, impeller modification, documentation of an application for new investment, etc.)

c. buy new equipment to support PDAM improvement (equipment for NRW or EE or SAKETAP)

d. develop new system based on knowledge obtained at COE course (e.g. develop DMA, develop new accounting system, develop new electrical system, etc.)

e. I was invited by (an)other PDAM(s) to give an unofficial trainings outside COE trainings.

f. Other: *(specify)*

_____

_____

_____

_____

_____

D. Are there any obstacles found on the implementation of COE knowledge?

a. Yes ***(continue to point E)*** b. No ***(continue to point G)***

E. What kind of obstacles is found on the implementation of COE knowledge? ***(possible for more than 1 answer) (continue to point G)***

a. lack of equipment

b. lack of budget

c. lack of human resources

d. lack of support from PDAM management

e. knowledge cannot be applied (not applicable)

f. Other: *(specify)*

_____

F. Why you cannot implement the knowledge you obtained at COE course? What is your obstacle? ***(possible for more than 1 answer) (continue to point G)***

a. lack of equipment

b. lack of budget

c. lack of human resources

d. lack of support from PDAM management

e. knowledge cannot be applied (not applicable)

f. Other: *(specify)*

_____

Day/date	
Time	

No. Questionnaire	
No. Interviewer	
QC	

Annex 3

KESEPAKATAN BERSAMA

ANTARA
DIREKTORAT PENGEMBANGAN SISTEM PENYEDIAAN AIR MINUM,
DIREKTORAT JENDERAL CIPTA KARYA,
KEMENTERIAN PEKERJAAN UMUM DAN PERUMAHAN RAKYAT
DENGAN
PERPAMSI
No :.....

TENTANG

PELATIHAN COE (Centre of Excellence)

Pada hari ini,..... tanggal ....., bertempat di Jakarta, yang bertanda tangan di bahwah ini :

1. (Nama) : Direktur Pengembangan Sistem Penyediaan Air Minum, Direktorat Jenderal Cipta Karya, Kementerian Pekerjaan Umum dan Perumahan Rakyat, berkedudukan dan beralamat di Gedung Cipta Karya Lt.8, Jl. Pattimura No.20, Jakarta 12110, untuk selanjutnya disebut PIHAK KESATU

2. (Nama) : Direktur PERPAMSI, berkedudukan dan beralamat di Graha Perpamsi, Jl. Dewi Sartika No.287, RT.6/RW.5, Jakarta Timur 13630, untuk selanjutnya disebut PIHAK KEDUA

PIHAK KESATU dan PIHAK KEDUA untuk selanjutnya secara bersama-sama disebut PARA PIHAK.

PARA PIHAK masing-masing bertindak dalam kedudukannya sebagaimana tersebut di atas menerangkan terlebih dahulu hal-hal sebagai berikut:

1. Bahwa perlu adanya koordinasi dan sinkronisasi dalam berbagai kegiatan terkait Pelatihan Air Minum dalam hal ini COE;
2. Bahwa perlu peningkatan kapasitas tenaga PDAM dan pengembangan kerja sama di bidang sumber daya manusia antara lain dengan melakukan Pelatihan Air Minum dalam hal ini COE;
3. Bahwa pelaksanan KESEPAKATAN BERSAMA ini memperhatikan kepentingan bersama sesuai peraturan perundang-undangan yang berlaku.

TUJUAN
Pasal 1

Tujuan dari KESEPAKATAN BERSAMA ini adalah untuk mempercepat, meningkatkan dan memperbaiki kapasitas PDAM di seluruh Indonesia melalui peningkatan Sumber Daya Manusia yang memiliki peranan penting dalam melakukan perbaikan dan peningkatan kinerja PDAM.

RUANG LINGKUP
Pasal 2

Ruang lingkup KESEPAKATAN BERSAMA ini meliputi :

a. Persetujuan Masterplan COE 2018 – xxxxx;
b. Penyerahan Pelatihan COE dari PIHAK KESATU kepada PIHAK KEDUA.

PELAKSANAAN
Pasal 3

(1) Pelaksanaan KESEPAKATAN BERSAMA ini diatur dan ditetapkan lebih lanjut dalam MEMORANDUM of UNDERSTANDUNG (MoU) yang merupakan bagian yang tidak terpisahkan dari KESEPAKATAN BERSAMA ini.
(2) Penandatanganan MoU dilakukan dalam jangka waktu 6 (enam) bulan dari tanggal penandatanganan KESEPAKATAN BERSAMA ini.

JANGKA WAKTU
Pasal 4

KESEPAKATAN BERSAMA ini berlaku untuk jangka waktu 6 bulan sejak tanggal ditandatangani oleh PARA PIHAK dan dapat diperpanjang atas persetujuan PARA PIHAK.

PENUTUP
Pasal 5

KESEPAKATAN BERSAMA ini dibuat dalam rangkap 2 (dua) asli dan mempunyai kekuatan hukum yang sama setelah ditandatangani PARA PIHAK.

PIHAK KESATU	PIHAK KEDUA
(Nama)	(Nama)

Annex 4

List of Materials and Equipment Used in COE Training

(1) NRW Training Module

Materials

- Module textbook
- Teaching material for NRW module
- Teaching material for NRW Equipment

Equipment

- PVC Pipe Leakage Detector Goodman Inc D305
- Leak Noise Correlator with Transmit Sensors Gutterman AS620L
- Portable Ultrasonic Flowmeter Ultraflux UF 801P
- Pressure Data Logger Dickson PR125 & A016
- Digital Type Compact Leak Detector Gutterman Aquascope 3
- Accoustic Bar with Electrical Amplifier Sewerin ST04
- Manual Listening Stick Stainless Steel bar

(2) EE Training Module

Materials

- Module textbook
- Teaching material for EE module
- Teaching material for EE Equipment

Equipment

- Power Quality Analyzer
- Clamp Meter
- Techometer
- Infrared Thermometer

(3) CR Training Module

Materials

- Module textbook + PPT inserts
- Session notes (for trainers only)
- Role play and case study scenario

(4) FAM Training Module

Materials

- Module textbook
- Finpro (Financial Projection Excel spreadsheets for case study and exercise)
- Handout Powerpoint (separate from the module)
- Sample business plan for group exercise
- Question and answer of Finpro exercise

Annex 5

Timetables of COE Training

NRW Training Module

Date	**08.00 – 08.45 AM**	**08.45 – 09.30 AM**	**09.30 – 10.30 AM**		**10.45 – 11.30 AM**	**11.30 AM – 00.30 PM**		**01.30 - 02.15 PM**	**02.15 – 03.15 PM**		**03.30 – 04.15 PM**	**04.15 – 05.00 PM**	**05.00 – 05.45 PM**		**09.00 PM – 01.00 AM**
DAY 1	Opening Ceremony	Explanation about Kab/Kota Training + Pre-Test	NRW Introduction	Break Time	NRW Introduction + Test 1	Understanding water loss + Test 2	Break Time	Water balance & margin of error + Test 3	Excercise to calcutate water balance	Break Time				Break Time	
Speaker	committee	committee													
DAY 2	NRW indicator and ILI + Test 4		Water balance Easy Calculation	Break Time	Water balance Easy Calculation + Test 5	Case study exercise about water balance easy calculation	Break Time	Case study exercise about water balance easy calculation	Water loss control strategy	Break Time	Water loss control strategy + Test 6	Methodology of water loss control		Break Time	
Speaker															
DAY 3	DMA establisment		Step Test + Test 7		Leak detection and equipment introduction			Leak detection and equipment introduction			Case study of step test (mini DMA) + night practice preparation				Practice of tracking and localization of water loss

EE Training Module

Date	**08.00 – 08.45 AM**	**08.45 – 09.30 AM**	**09.30 – 10.30 AM**		**10.45 – 11.30 AM**	**11.30 AM – 00.30 PM**		**01.30 - 02.15 PM**	**02.15 – 03.15 PM**		**03.30 – 04.15 PM**	**04.15 – 05.00 PM**	**05.00 – 05.45 PM**		**09.00 PM – 01.00 AM**
DAY 1	Opening Ceremony	Explanation about Kab/Kota Training + Pre-Test	NRW Introduction	Break Time	NRW Introduction + Test 1	Understanding water loss + Test 2	Break Time	Water balance & margin of error + Test 3	Excercise to calcutate water balance	Break Time				Break Time	
Speaker	committee	committee													
DAY 2	NRW indicator and ILI + Test 4		Water balance Easy Calculation		Water balance Easy Calculation + Test 5	Case study exercise about water balance easy calculation		Case study exercise about water balance easy calculation	Water loss control strategy		Water loss control strategy + Test 6	Methodology of water loss control			
Speaker															
DAY 3	DMA establisment		Step Test + Test 7		Leak detection and equipment introduction			Leak detection and equipment introduction			Case study of step test (mini DMA) + night practice preparation				Practice of tracking and localization of water loss

CR Training Module

DAY/TIME	08.00 – 08.45	08.45-09.30		09.30-10.15		10.30-12.00		13.00-14.30		14.45-16.15
Monday	**Opening**	**Explanation + Pre-Test**		Outline of Customer Relation		Customer Data Management		Customer Data Management + Exercise and Simulation		Meter Reading Record Management
Lecturer	-	-		-		-		-		-
Tuesday	Meter Reading Record Management + Exercise and Simulation			Customer Management		Customer Management	I S H O M A	Customer Management + Exercise and Simulation		Marketing
Lecturer	Slamet Raharjo & JET			Slamet Raharjo		Maria Jacobus		Maria Jacobus & JET		JET
Wednesday, 6 December 2017	Marketing + Exercise and Simulation	Dummy Simulation Presentation per Group		CR Performance Evaluation n		CR Performance Evaluation + Exercise and Simulation		Best Practice		**Evaluation + Post-Test**
Lecturer	Tim Pengajar			JET		JET		JET		

Supplemental Document 4

Training Module Development Reports

Ministry of Public Works and Housing
Republic of Indonesia

The Project
on
Strengthening COE (Center of Excellence) Program
for
PDAMs in the Republic of Indonesia

Non Revenue Water Module Development Report

September 2016

Japan International Cooperation Agency

KRI International Corp.
Nihon Suido Consultants Co., Ltd.
Yokohama Water Co., Ltd.

The Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Republic of Indonesia

Non Revenue Water Module Development Report (Draft)

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1. Background and Objectives

1.1 Background

In the response to needs for capacity development of PDAM staffs in an effective manner, Directorate General of Human Settlement (DGHS) of Ministry of Public Works and Housing of Indonesia launched a training program entitled "Center of Excellence (COE)" Program in 2012, which is emphasizes on its unique cascade-method type trainings and knowledge dissemination. As of 2014, the COE Program has been expanded to cover 31 provinces countrywide and the program consists of three modules i.e. Non-Revenue Water (NRW) Reduction, Energy Efficiency and SAK-ETAP (financial accounting standard for unlisted corporations).

In order to support COE program in achieving its purpose to accelerate, enhance, and improve PDAM management restucturing program through the increase in human resource capacity, Japan International Cooperation Agency (JICA) has agreed to enhance the capacity implementation of the COE program for PDAMs, by implementing activities detailed in the Project Design Matrix (PDM) and achieving the expected outputs.

JICA Expert Team for the Project on Strengthening COE Program for PDAMs in the Republic of Indonesia will contribute in improving and revising the existing Non Revenue Water module that has been used in COE Program. Thus, as the first step of module development work, some analysis will be done such as PDAM problem analysis, Existing module analysis and direction for the next module revision. Additionally, the good practice for PDAMs to know some cases where the actual application of training contents to PDAM activities on the field also will be introduced in this report.

1.2 Objectives

According to the Inception Report of The Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Republic of Indonesia in August 2015, one of the objectives of this project are is to improve the existing Non Revenue Water Reduction. Thus, in order to prepare for Non Revenue Water module development work, this report is need to be done.

2. Challenges in PDAM Operation

2.1 PDAM Performances Based on BPPSPAM Data

BPPSPAM as PDAM Performances evaluator, has evaluated several indicators of PDAM performances such as operating ratio, production efficiency, energy cost, maintenance cost, and other indicators. Based on the "PDAM Kinerja 2015" published by BPPSPAM, PDAM performance indicator data are collected and analyzed. Data of the year 2014 performance was collected from 356 PDAMs (93% of all PDAMs in Indonesia). Among all 356 PDAMs, 192 PDAMs are categorized as healthy, 99 are less healthy and 67 are sick.

2.1.1 Installed Capacity

This indicator describes the PDAM designed installed capacity in m^3 / day. This indicators related with PDAM serviceability.

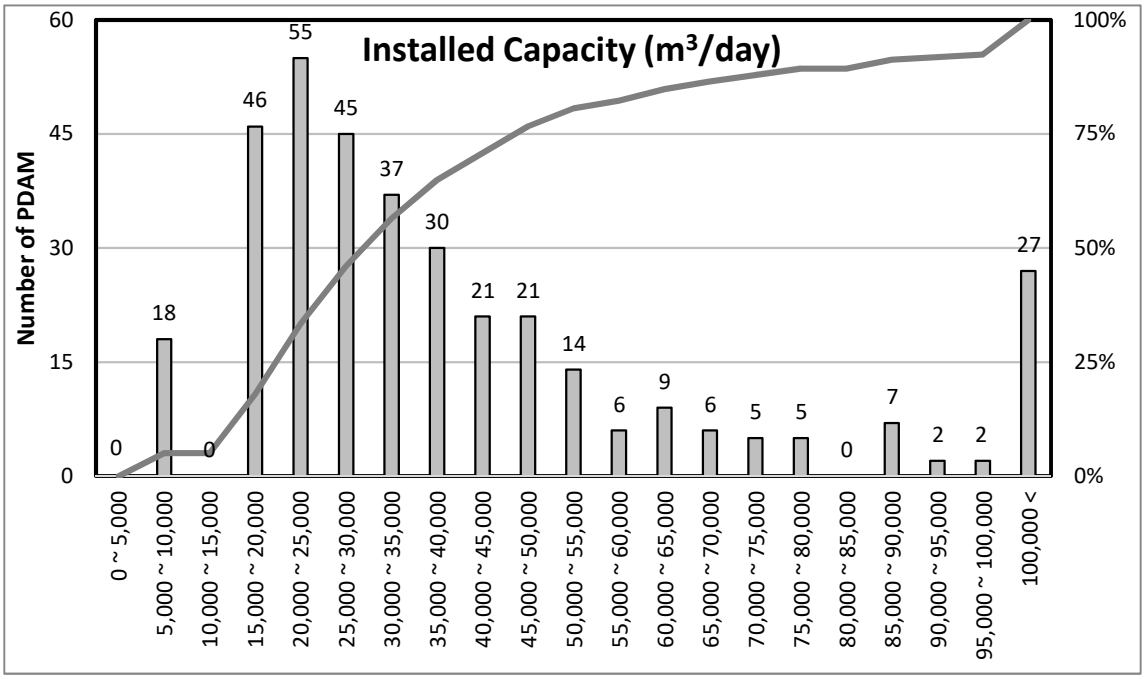

Figure 2.1 PDAM Installed Capacity in 2014

Based on BPPSPAM Data 2014, there are 55 out of 356 PDAMs with Installed Capacity of 20,000 m^3/day – 25,000 m^3/ day. The data shows that mainly PDAMs have low until medium installed capacity. The data trendline of 50% of percentile value of operating ratio from 2011 until 2014 is shown on the graph below.

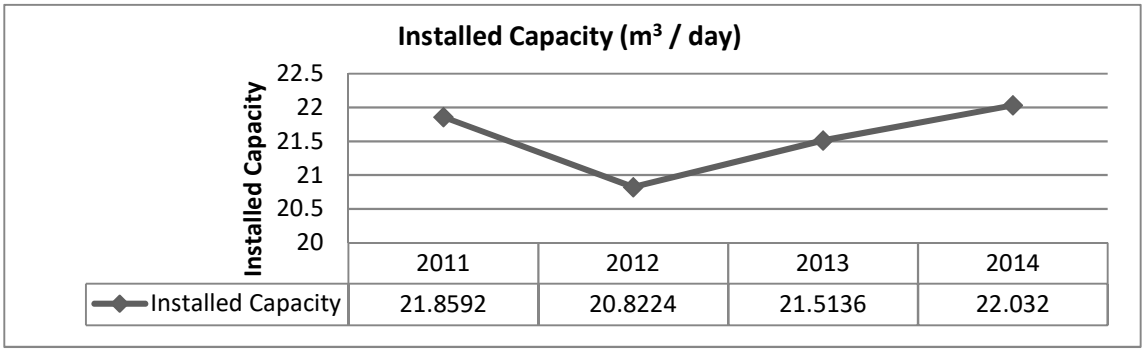

Figure 2.2 Median of PDAM Installed Capacity in 2011-2014

2.1.2 Real Production

This indicator indicates the real water volume that has been produced by PDAM in a year (m^3 / day). This is a capacity utilization indicator of PDAM's water production facilities. This indicator also can be used for measuring PDAM efficiency in utilizing its installed capacity. This indicator is also needed to measure production system efficiency.

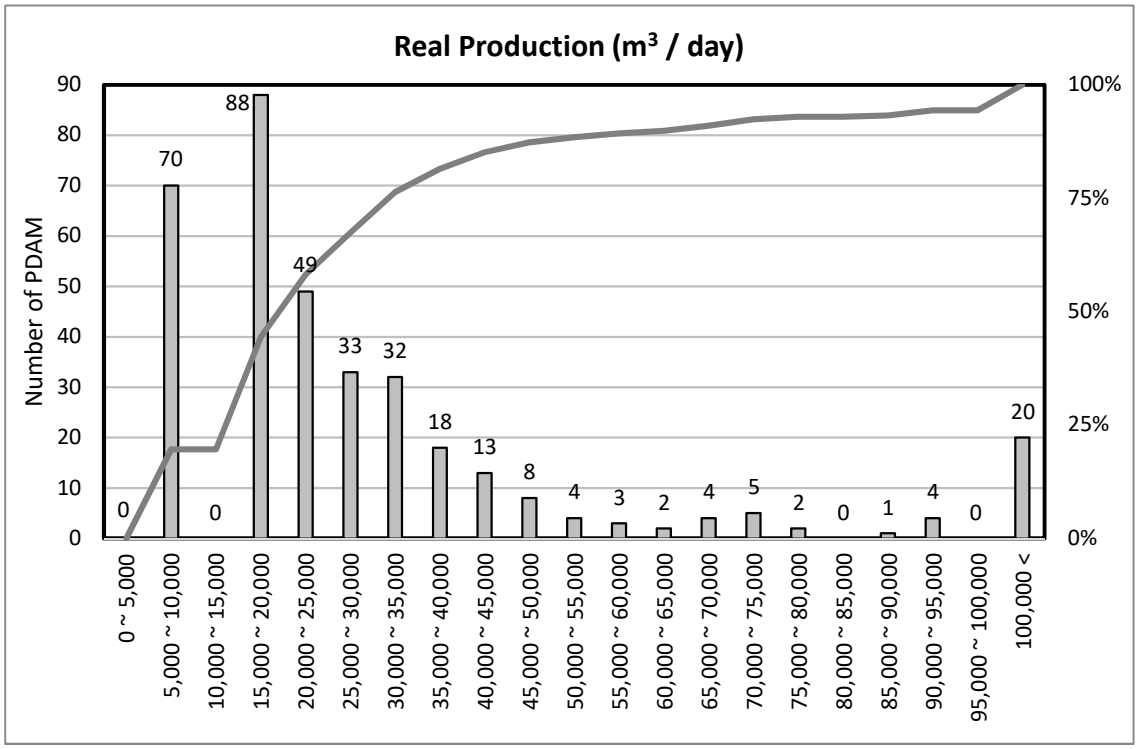

Figure 2.3 PDAM Real Production in 2014

Based on BPPSPAM Data 2014, there are 88 out of 356 evaluated PDAMs with Real production capacity of 15,000 m3 / day – 20,000 m3 / day and 70 out of 356 evaluated PDAMs with real production capacity of 5,000 m3 / day – 10,000 m3 / day which means most of PDAMs real production is categorized as low production. Mean value of PDAM real production throughout Indonesia (based on 2014 data) is 31,737 m3 / day while the median of PDAM production efficiency is 11,448 m3 / day.

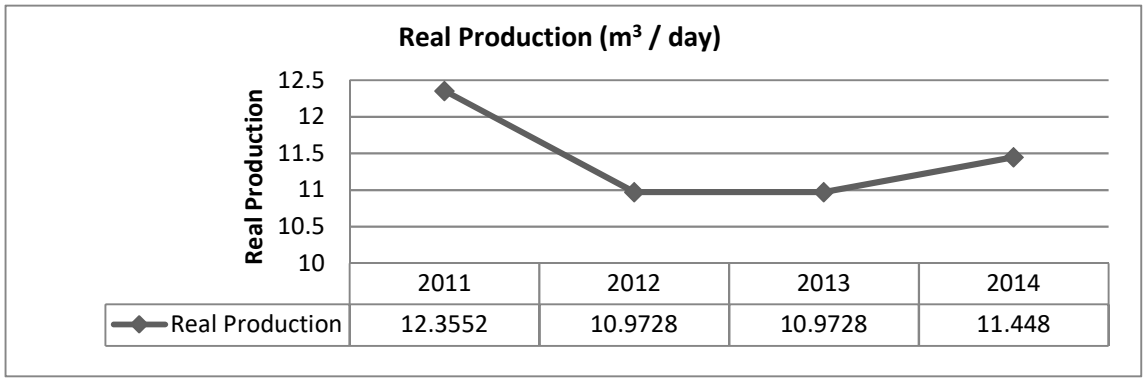

Figure 2.4 Median of PDAM Real Production in 2011 - 2014

From the graph above it was shown that the data trendline of 50% of percentile value of PDAM real production slightly decrease in 2012 and constantly increasing from 2013 until 2014.

2.1.3 Water Quality Satisfaction

This indicator is needed to measure the quality of distributed water from PDAM to the customers. The basic standard used is Indonesian Health Ministerial Decree 492/MENKES/PER/IV/2010. Water quality satisfaction also needed to decribe how far PDAM could handle the demand from its customers with good water quality that up to standard.

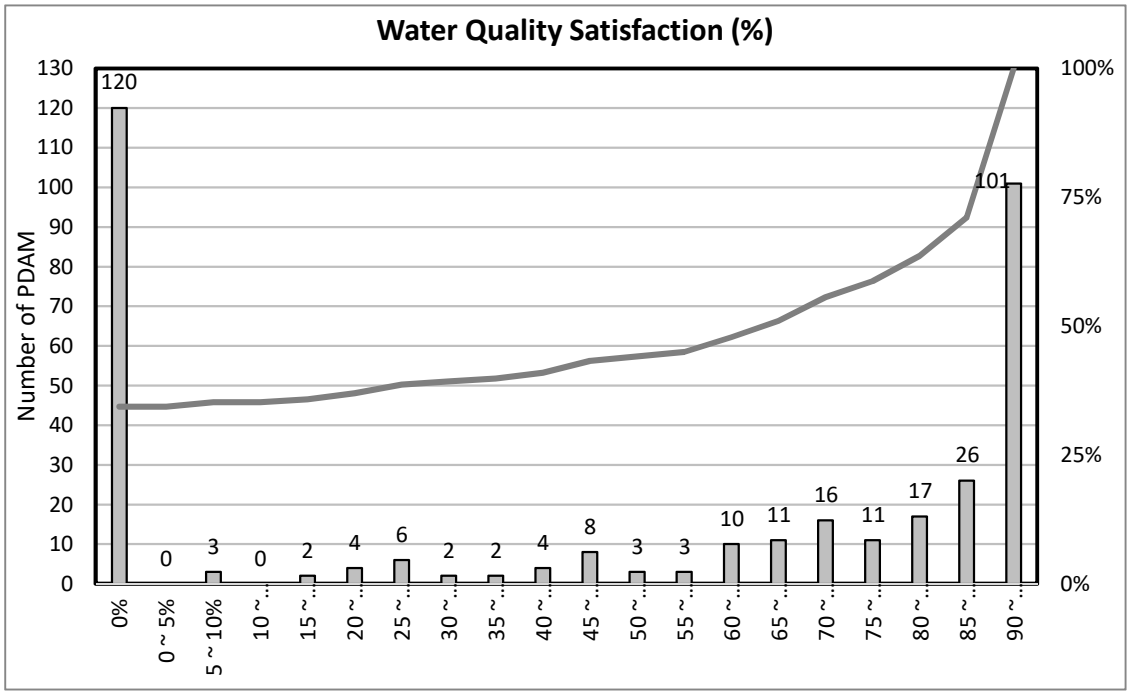

Figure 2.5 Water Quality Satisfaction in 2014

The graph above describes that there significant differences in water quality satisfaction while 120 PDAMs out of 349 evaluated are unable to meet customers satisfaction regarding the distributed water quality while the other 101 PDAMs are able to give the distributed water to customer with quality satisfaction reach more than 90 %.

Based on BPPSPAM Data 2014, mean value of PDAM Water Quality Satisfaction rates throughout Indonesia is 55.3% while the median of PDAM Water Quality Satisfaction rates is 75%.

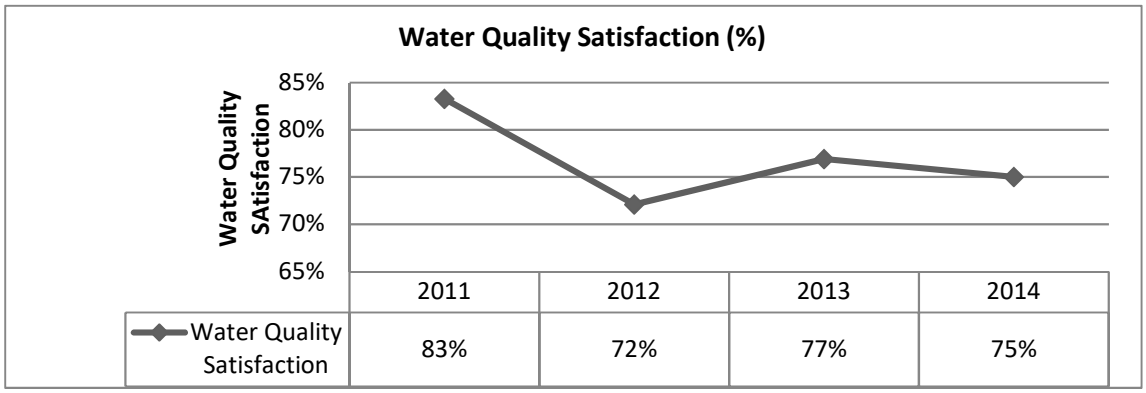

Figure 2.6 Median of Water Quality Satisfaction Rates in 2011 - 2014

The median of water quality satisfaction rates from 2011 until 2014 are shown by the trendline above. From the trendline shown by graph above, the water quality satisfaction has decreased significantly in 2012 and increased in 2013 but however the value goes down in the next year.

2.1.4 Domestic Water Consumption

Domestic water consumption is the one of PDAM service aspect that has been evaluated by BPPSPAM. This indicator is needed to measure customers consumption rate compared to distributed water / month / customer. This indicator also needed to measure average consumption rates of each customer a month on the specific year. This indicator is the one of important tools to predict the consumption demand using basic need approach.

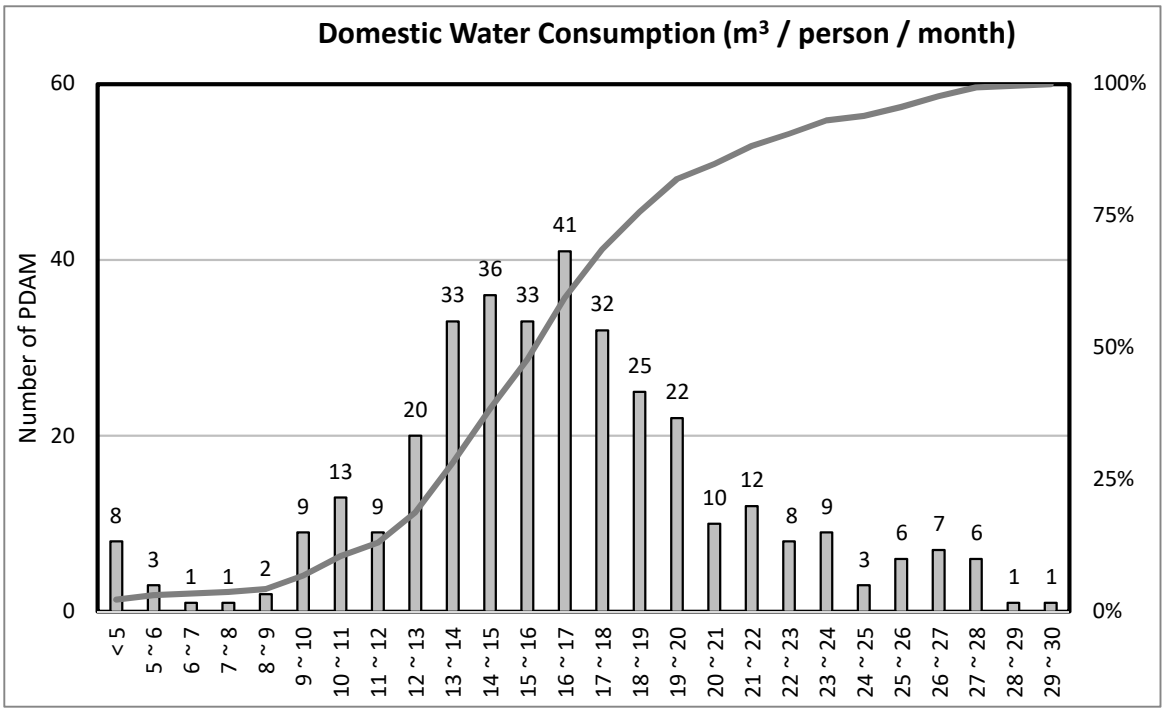

Figure 2.7 PDAM Domestic Water Consumption in 2014

While the mean value of Domestic water Consumption in 2014 is 17.4 m^3 / person / month and the median value of domestic water consumption is 16.4 m^3 / person / month.

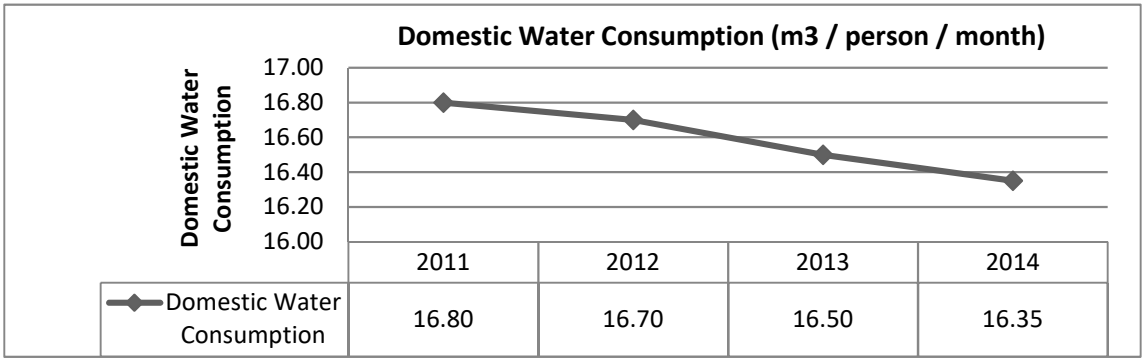

Figure 2.8 Median of Domestic Water Consumption in 2011 – 2014

The trendline of domestic water consumption shows that the median of domestic water consumption is decreasing annualy. The median of domestic water consumption in 2011 is 16.8 m^3 / person / month and in the next three consecutive years the water consumption decrease steadily by approximately 0.1 m^3/ person /month. This phenomenon happened due to increasing water supply demand and the available water resources unable to catch up the demands so that the water consumpted by one customer in one month are decreasing rapidly.

2.1.5 NRW Rates

This indicator is one of service aspect that was evaluated by BPPSPAM. NRW rates is needed to measure water distribution system effciency compared to water sales. NRW rates also describes how far PDAM management capabilities in controlling the revenue water through distribution piping network system.

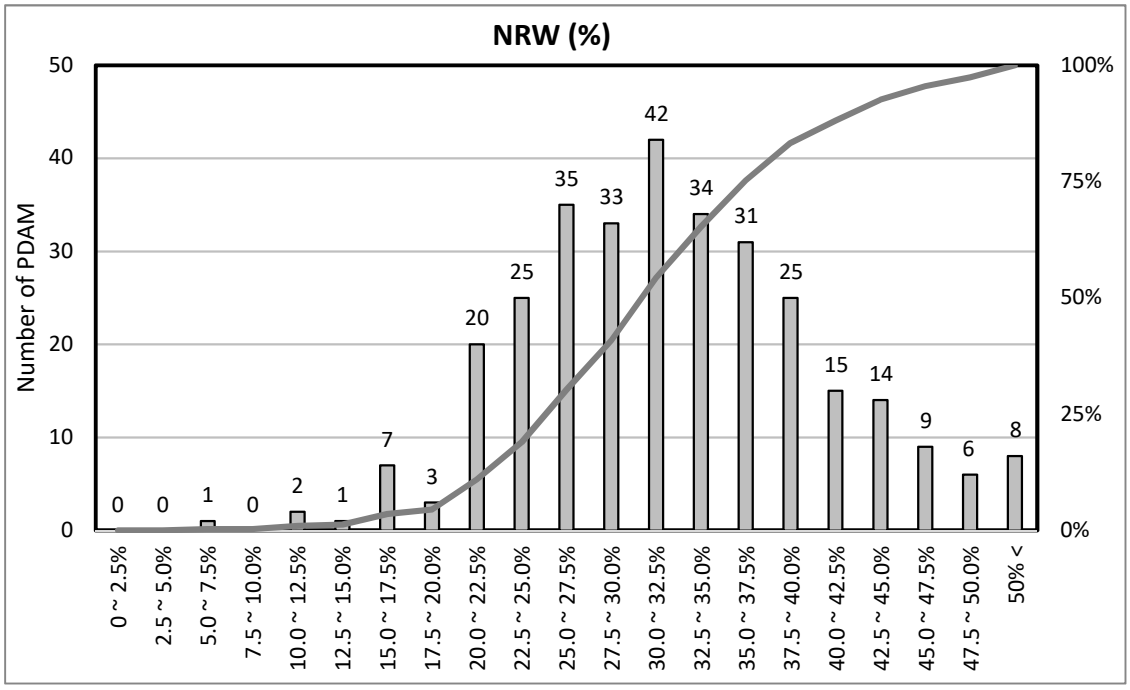

Figure 2.9 PDAM NRW Rates in 2014

The graph above shows that Most of PDAMs have medium NRW rates (20% - 40%). There are 42 PDAMs out of 311 evaluated PDAMs have 30% - 32.5% of NRW rates. Based on BPPSPAM Data in 2014, the mean value of PDAM NRW rates is 33.7% while the median of PDAM NRW rates throughout Indonesia is 30.3%.

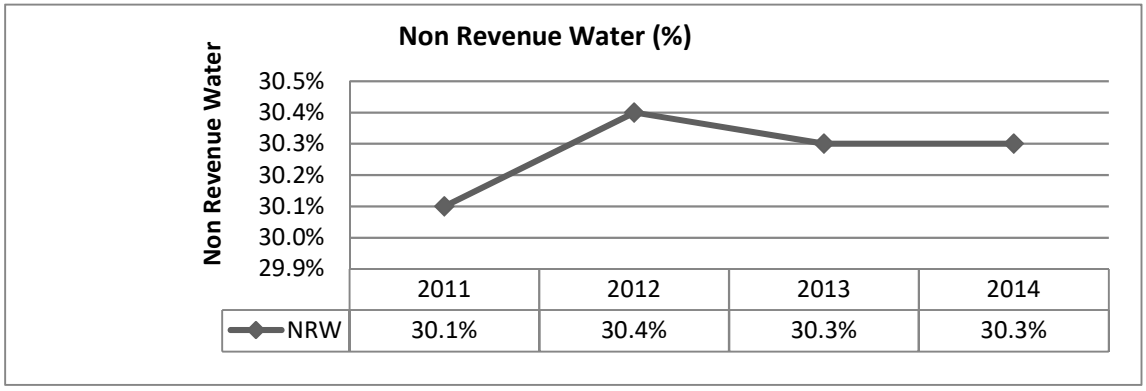

Figure 2.10 Median of PDAM NRW Rates

The graph above shows that the NRW rates in 2011 until 2014 are constantly be in 30.1% - 30.3%. This means, from 2011 until 2014 there's no significant changes of NRW rates. The NRW reduction movement is not introduced in all PDAMs throughout Indonesia. Only several PDAMs that have its own NRW reduction program. In order to reduce NRW rates in PDAM throughout Indonesia, the NRW reduction program should be done by all the PDAMs in Indonesia.

2.1.6 Water Meter Replacement

This indicator needed to measure the customers water meter accuracy. Water meter replacement rates also describes to assess how far PDAM management could do customers water meter replacement appropriate with applied standard so that water meter accuracy is guaranteed.

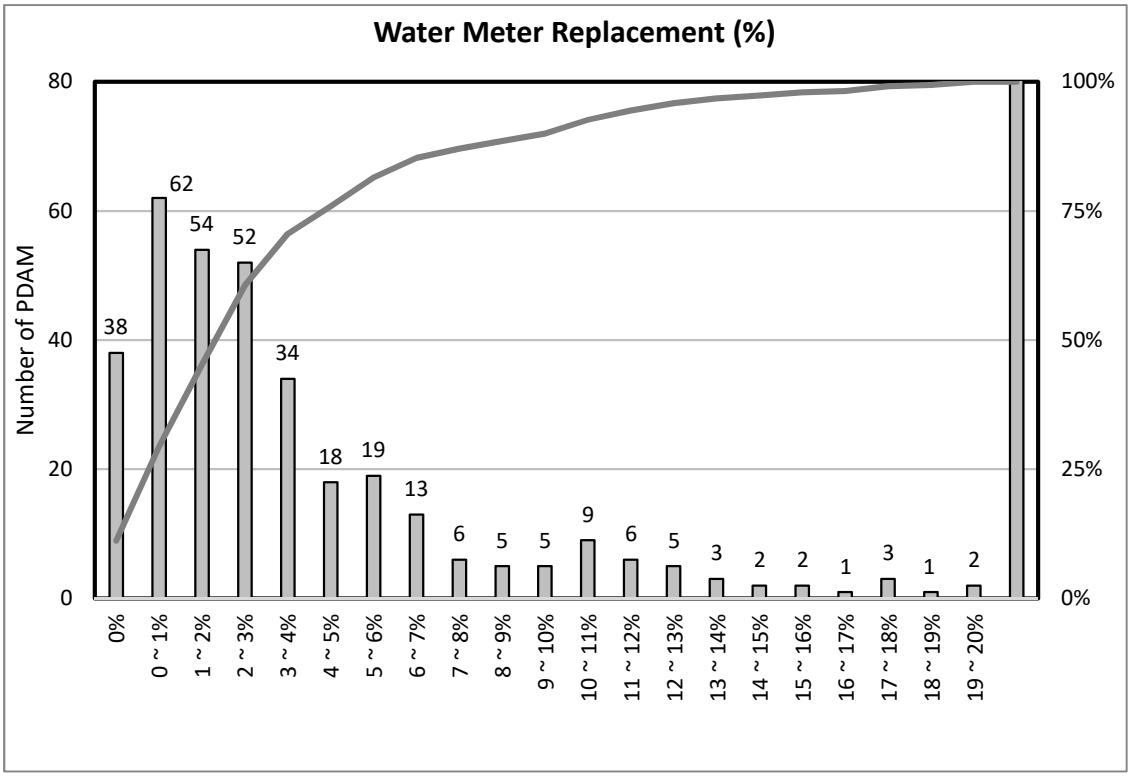

Figure 2.11 PDAM Water Meter Replacement Rates in 2014

The graph above shows that mainly PDAM has 0% - 4% water meter replacement rates. While 62 PDAMs out of 340 evaluated PDAMs has 0-1% water meter replacement rates. This means the PDAM water meter replacement rates throughout Indonesia is really low even near zero which means there is no water meter replacement activity at all.

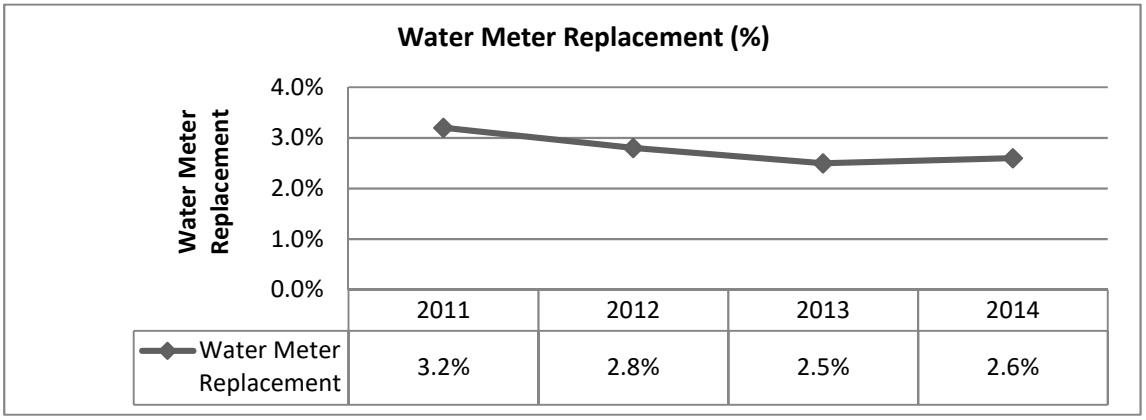

Figure 2.12 Median of PDAM Water Meter Replacement Rates in 2011 - 2014

Based on BPPSPAM Data in 2014, the mean value of PDAM water meter replacement rates in 2014 is 4.5% and the median value of PDAM water replacement rates throughout Indonesia in 2014 is 2.6%.

2.2 PDAM Problems and Challenges Related to Non Revenue Water

2.2.1 JICA Expert Team Baseline Survey

JICA Expert Team conducted baseline survey in 2015, to clarify the operation status of PDAMs relevant to the JICA Technical Cooperation Project on Strengthening COE Program for PDAMs ("the Project") at the time of project commencement

2.2.1.1 Based on Data Analysis

356 PDAMs can be classified according to target province status determined by the Project. Three target provinces selected are South Sulawesi, South Sumatra, and West Java.

Table 2.1 Comparison of PDAM Operation Indicators at Target Provinces

	PDAMs in South Sulawesi	PDAMs in South Sumatra	PDAMs in West Java	PDAMs in other provinces	All PDAMs	Healthy PDAMs	Less Healthy PDAMs	Sick PDAMs
Operation indicators (mean value)								
Operating ratio (ratio)	1.2	1.8	1.0	1.3	1.3	1.0	1.7	1.6
Collection efficiency (%)	81.0%	72.1%	91.0%	87.9%	87.1%	92.1%	84.6%	76.5%
Solvency (%)	1903.0%	19768.0%	613.5%	18054.7%	15930.2%	16974.1%	16215.7%	12372.9%
Complaint resolution level (%)	90.9%	87.2%	95.2%	91.4%	91.5%	94.9%	92.0%	81.3%
Production efficiency (%)	53.4%	47.3%	71.3%	59.9%	59.8%	69.0%	52.8%	43.5%
NRW (%)	30.2%	34.4%	30.5%	34.2%	33.7%	28.5%	36.3%	45.1%
Water meter replacement (%)	2.2%	2.3%	7.7%	4.5%	4.5%	5.7%	3.6%	2.1%
Return on assets (ratio)	-0.03	-0.04	0.03	-0.03	-0.02	0.02	-0.06	-0.09
Energy cost (Rp/m3)	593	506	294	460	460	442	483	477
COE participation rate (%)	2.2%	2.0%	1.0%	1.5%	1.5%	1.4%	2.0%	1.7%
Operation scale (total value)								
Number of PDAMs	23	12	23	298	356	192	99	65
Number of employees (person)	2,794	1,990	6,947	40,225	51,956	38,578	8,508	4,870
Real production (l/sec)	5,311	5,250	15,424	104,784	130,769	115,062	10,576	5,131

Source: Baseline survey PDAM 2014 Data Analysis Reports by JET

Definitions and explanations of PDAM Operation Indicators are as follows:

- **Operating ratio = operation expenses / operation revenue**
  This is to indicate the level of total operating expenditures which generate total operating revenues. Generally this ratio is considered good if it is below 1.
- **Collection efficiency = total revenue of water billing / total water revenue * 100**
  This is to indicate collectibility of billing. Theoretically the collected amount should be recovered from the original bills. Thus, the nearer to 100%, the better.
- **Solvency = total assets / total debts * 100**
  This is to measure PDAM's ability to meet debt obligations. Generally the higher the solvency, the better.
- **Complaint resolution level = num. of completed complaints / num. of complaints * 100**
  This is to indicate capability of complaint-solving. However, there is no established definition of the status of "problem sold". The nearer to 100%, the better.
- **Production efficiency = realization of production in m^3 / installed capacity in m^3 * 100**
  This is a capacity utilization indicator of a PDAM's water production facilities. The nearer to 100%, the better.
- **NRW = (water distribution - revenue water) / water distribution * 100**
  This is the very direct indicator of NRW. The lower, the better.
- **Water meter replacement = num. of replaced water meters in year/total customer * 100**

There is no official requirement for periodical water meter replacement. The quality of water meter also affects this rate. Generally the higher the replacement rate, the better. If water meters are being replaced regularly once in ten years, this indicator will show 10%.

- **Return on assets = net profit after tax / total assets**
  The return on assets (ROA) tells how effectively a PDAM is generating income given its asset base. A higher ratio provides some indication of future growth prospects. But excessively high ROA resulting from increasing net income may indicate that the PDAM is charging its customers more than is required to run the system.
- **Energy cost = energy cost (electricity, diesel, gas, and other fuels) in a year / total production**
  This is a straightforward indicator to show energy costs. The lower, the better. It should be noted however, that every PDAM is subject to different facility mix and geography factors. Thus comparison among different PDAM groups in this indicator has to be done with care.
- **COE participation rate = number of COE program participants from 2012 to 2014 / number of PDAM employees in 2014 * 100**
  Low COE participation rates could be construed good as such PDAMs with low COE participation might be already healthy enough therefore not need the COE input. However we take it naturally that high COE participation rates are good as they represent positive attitude in the PDAM operation.

From table 2.1 it can be concluded that:

(1) Operating ratio

South Sulawesi PDAMs --- Not so good since the average of this PDAM group is 1.2, which exceeds 1.0. The healthy PDAM group maintains the average value of 1.0 for this indicator.

South Sumatra PDAMs --- The average value of 1.8 is considered bad. Even the less healthy PDAM group has the average value of 1.7.

West Java PDAMs --- This is considered good since it is same as the healthy PDAM group.

(2) Collection efficiency

South Sulawesi PDAMs --- Not so good. Its 81.0% is only between the levels of less healthy PDAM group and sick PDAM group. Also in comparison among the three target province groups and the non-target province group, South Sulawesi is only the second worst.

South Sumatra PDAMs --- Bad, because its 72.1% is the worst among all the PDAM groups shown here.

West Java PDAMs --- Good. Its 91.0% is the best among the three target province groups and the non-target province group. However the healthy PDAM groups shows even higher value, 92.1% .

(3) Solvency

"Solvency" of the three target province groups are completely dispersed, being 1,903% (South Sulawesi), 19,768% (South Sumatra), and 613% (West Java). The solvency is considered good if it is higher. However those heights shown in the three target province group already exceeds the level that meaningful explanation is applicable to all constituent PDAMs data. Also the three health status PDAM groups show high level solvency. Presumably many PDAMs have capital injection from local governments as a result of inability to borrow debts, resulting in the high solvency rates in general. This suggests that the high solvency does not necessarily mean PDAM's soundness. Because of the data dispersion and the suspected unnatural representation of indicator, it is

confirmed that “solvency” value is not used for evaluation.

(4) Complaint resolution

South Sulawesi PDAMs --- Not so good. Although its over-90% level may sound good, factually it is lower than the level of the non-targeted province group, all PDAM group, “healthy” PDAM group, and “less healthy” PDAM group.

South Sumatra PDAMs --- Not so good, by the same reason as South Sulawesi.

West Java PDAMs --- Very good. This is the highest among all the groups here, including “healthy” PDAM group.

(5) Production efficiency

South Sulawesi PDAMs --- Not so good. In comparison among the three targeted province PDAM groups and the non-targeted province PDAM group, its 53.4% is only higher than the South Sumatra PDAM group. Compared with the health status PDAM groups, only the less healthy PDAM group has a slightly lower value.

South Sumatra PDAMs --- Bad. Its average value of 47.3% is the lowest among 1.8 is the three targeted province PDAM groups and the non-targeted province PDAM group. Only the sick PDAM group shows the lower average of 43.5%.

West Java PDAMs --- Good. Its average value of 71.3% is better than the other two target province groups and the non-target province group. Also it exceeds the average value of the healthy PDAM group.

(6) NRW

South Sulawesi PDAMs --- Not so good. In general, the NRW rate over 30% is considered unsatisfactory. Although the South Sulawesi’s average is 30.2%, which is the best of the three target province groups and the non-target province group, it is below the average of the healthy PDAM group, which is 28.5%.

South Sumatra PDAMs --- Bad. Its average value of 34.4% is the worst among the three target province groups and the non-target province group. It is however better than the averages of the less healthy PDAM and the sick PDAM groups.

West Java PDAMs --- Not so good, by the same reason as South Sulawesi.

(7) Water meter replacement

South Sulawesi PDAMs --- Bad. It shows the average value of 2.2%, which is the lowest among the three target province groups and the non-target province group. It is only slightly higher than the average of the sick PDAM group.

South Sumatra PDAMs --- Bad. It shows the average value of 2.3%, which is the second lowest among the three target province groups and the non-target province group. It is only slightly higher than the average of the sick PDAM group.

West Java PDAMs --- Very good. This is by far the highest among the three target province groups and the non-target province group. It is even much higher when compared with the average of the healthy PDAM group.

(8) Return on assets

South Sulawesi PDAMs --- Not so good. Its average is negative 0.03. Although this is the second best among the three target province groups and the non-target province group, the negativity means that this PDAM group does not generate income given its asset base. However, when compared with the health status PDAM groups, this value is only worse than the healthy PDAM group.

South Sumatra PDAMs --- Not so good, by the same reason as South Sulawesi PDAMs

West Java PDAMs --- Good. Its average value of 0.03 is the best among the three target province groups and the non-target province group. This is even higher than the healthy PDAM group’s average of 0.02.

(9) Energy cost

South Sulawesi PDAMs --- Very bad. The average of this PDAM group is Rp. 593, far exceeding any of the other group values.

South Sumatra PDAMs --- Bad. Its average value of Rp. 506 is lower than only South Sulawesi. All other groups show a lower value.

West Java PDAMs --- Very good. Its average value of Rp. 294 is much lower than all other groups.

(10) COE participation rate

Prior to this baseline survey point, or during the period 2012-2014, the 356 PDAMs presented in the PDAM performance book 2015, received the COE program input in the form of their staff's participation in the COE training courses. The number of such PDAM staff who participated in the COE course totaled 779. As the total number of staff of the 356 PDAMs was 51,956, the national average of the COE participation rate is computed at 1.5%.

South Sulawesi PDAMs --- Good participation level. Its 2.2% participation rate is higher than that of the national average and also higher than those of the healthy, less healthy, and sick PDAM groups.

South Sumatra PDAMs --- Good participation level. Its 2.0% participation rate is higher than that of the national average and also higher that of healthy PDAM group.

West Java PDAMs --- Bad. Its participation rate is 1.0%, which is the lowest in all the PDAM groups shown here.

2.2.2 Based on JICA Expert Team PDAMs Interview on Target Provinces

Other than baseline survey, JICA Expert Team has also interviewed several PDAMs in several provinces on August 2015 and January 2016

2.2.2.1 South Sulawesi

(1) PDAM Kota Pare pare

The interview with NRW section in Pare Pare shows that Pare Pare still have high NRW rate (around 40%) since the location located in the mountain area and has a vary altitude, the water pressure difference between the highest area (9 bar) and the lowest area (2 bar) is really high. They still cannot do the water pressure control methods due to lack of equipments.

According to Mr. Nasrun Tahir the head of technical division of PDAM Kota Pare pare, that he has to learn by himself how to using the mapping software since there is no training about it. There are no special division for NRW but when doing the leakage detection he form a group which contains sveral staffs from each division.

PDAM Pare Pare has piping detector equipment but they cannot use it properly since there is no training about how to use the equipment. However the pipeline mapping and technical drawing is available.

(2) PDAM Kabupaten Gowa

The production efficiency in PDAM Gowa is 41.7% while the NRW rate is 33.57%. Domestic consumption in this PDAM is about 14.4% from total consumption and the average water tariff is IDR 4,207/m^3

According to Mr. Junaedi, head of transmission and distribution subdivision of PDAM Kabupaten Gowa, three survey for leakage detection done by their team are: pin point survey, coordinate survey, and area survey. The most important survey is area survey since it can detect the whole DMA.

There are 4 DMA location in this PDAM:

(a) Citra Land DMA
(b) Royal Spring Stage 1 and Stage 2 DMA
(c) Anditoro DMA
(d) Pelita Asri Housing DMA

In this PDAM, there's no special division for NRW. They only do the leakage detection if they receive complaints from their customers. There are 11 staffs divides into groups which each group contain 3 staffs. This groups have responsibilities to do the leakage detection.

2.2.2.2 South Sumatera

(1) PDAM Kabupaten Ogan Ilir

PDAM Ogan Ilir was just established on 2006 due to the separation of Kabupaten Ogan Ilir from Kabupaten Ogan Komering Ilir in 2003. Its assets is already used since 1985 (old pipes, old pumps, old equipments, etc). The average water tariffs in this PDAM is IDR 1,100 / m3 while the operational hours is only 8 hours / day. There are 13 WTP (production capacity = 168 liter / second) available in this PDAM and they using chemical methods to do the treatment. The chemical used is Al2¬SO4 (10% dilution rate). There are 5,098 house connections in this PDAM which the service population is around 55,404 persons.

Based on information from Mr. M. Fadly Kurniawan, Head of Subdivision for Distribution and Transmission who has responsibility in managing physical leakage & Panel Pumps Maintenance, the NRW rate in this PDAM is approximately 20% but since there is no distribution water meter, perhaps this data is not accurate. This PDAM have 5098 total connections it is mostly consists of 1500 house connections in Indralaya, 200 connections in Tanjung Sejarau, 700 connections in Tanjung Raja, and another 2878 connections is distributed in other Ogan Ilir region.

Water meter replacement is done every three years. They used national brand water meter (made in Bandung). The average water pressure in distribution pipe is 2 bar while the water pressure in the furthest distribution area is 0.1 bar. This PDAM relying only to pumps since they cannot using the gravity methods. Approximately 5% from total connections is illegal connections. There are 10 leakage points found in Indralaya area / month. The main cause of this leakage are road contruction and underground phone line construction.

This PDAM doesn't have any special division, plan, survey, or schedule for doing the leakage detection. It was become more difficult to avoid water losses because they also don't have any leakage detector.

(2) PDAM Kabupaten Banyuasin

PDAM Kabupaten Banyuasin serves 17,229 house connection in Banyuasin regency which the number of total population served is 101,546 people. The capacity of each pump is 360 liter / second while the real capacity volume is 176 liter / second. The NRW rate is 36% and the water tariffs is IDR 2,452 / m^3. The total number of this PDAM staffs is 152 people.

According to Mr. Surijo, the engineering staff of PDAM Kabupaten Banyuasin, who has responsibilities in managing technical and operational activities in PDAM they already did program for NRW Reduction and the results of this program can be seen in

Sungai Pinang area and Mariana area. Those area has succeed reduce the NRW rate to 20%. The solution to distributed this NRW Reduction method into another area (region) is with staffs transfer and do the internal training about NRW.

The location of leakage point usually found in distribution pipe since the pipe is located under the Trans Sumatera road. The main cause of leakage is huge vehicle traffic load and / or the road construction & rehabilitation proccess. PDAM Kabupaten Banyuasin has 15 WTP which each WTP served by pumps with total capacity is 370 liter / second while the real production volume only 342 liter / second. The number of total house connections served by this PDAM is 23500 connections. Domestic consumption of each house connection is 16.35 m^3 / month. Water meter placement rate is only 0.3%
They don't have distribution water meter and other measurement equipments, the NRW rate is calculated based on the pumps capacity and volume delivered to customers. There are no special team to do the leakage survey and also no schedule plan for water meter replacement, so water meter only replaced if it is broken. The water loss caused by illegal connection is not yet to be found.

Water pressure is being controlled by water pressure gauge. The water pressure in the furthest area is 0.5 bar while in the nearest area is 4 bar – 7 bar. There are special division (distribution and transmission division) who do the pipeline operational and maintenance. This division is consists of 45 people and have responsibilities for arranging the distribution schedule plan and do the monitoring for customer water distribution services. Mainly NRW Reduction methods is constrained by technical problems such as wrong planning of WTP, unclear and inaccurate pipeline design, the lacks of equipments, etc.

2.3 Non Revenue Water Problem Analysis

Based on Based on the previous section, the major problems related to Non Revenue Water in PDAM could be concluded as follows:

(1) Authorized unbilled metered consumption
(2) Authorized unbilled unmetered consumption
(3) Unauthorized consumption
(4) Customer meter inaccuracies and systematic data handling errors
(5) Leakage on transmission and / or distribution pipe and equipment
(6) Leakage on service connection up to customer meter
(7) Leakage and overflows from the utilities storage tank

The problems related with implementation of NRW Knowledge that are learned from COE Program:

(1) Lack of equipment
(2) Lack of budget
(3) Lack of human resources
(4) Lack of support from PDAM management
(5) Knowledge is not applicable
(6) The curriculum is not suitable with participants level
(7) Less cost method to reduce NRW including apparent loss control is not introduced.
(8) NRW preventive method such as pressure control, service connection installation improvement, procurement of better quality water meters and pipe materials is not introduced yet.
(9) Selection rule for training participants and applicable curriculums for different participant level isn't prepared yet.

3. Review of Existing Training Module

3.1 Non Revenue Water Training Module Analysis

2016 NRW text is mainly composed of the following subjects:

(1) Significance of NRW issues and necessity of countermeasures
(2) Definition and understanding of NRW
(3) Water Balance Analysis
(4) Organization of NRW countermeasures and preparation of implementation plan
(5) Countermeasures for physical losses (DMA, Step test,leak detection methods)
(6) Countermeasures for commercial losses (watermeter management, illegal connection, control, etc.)

Table 3.1 NRW Modules Material

Table of Contents	**Book I** • Non Revenue Water Problems • Understanding NRW and Water Losses • Understanding Physical and commercial Leakage • Leakage Vs Pressure • FAVAD • Physical Leakage Handling Program • Physical Leakage Prevention and control • Understanding Nonphysical (Commercial) Water Loss • Source of Non Physical (Commercial) Water Loss • Non Physical (Commercial) • Water Loss Control • Indicator of Non Physical (Commercial/Administrative) Water Loss **Book II** • Understand The Meaning of NRW Control • Water Losses • The Importance Of Controlling Water Losses • Arranging Water Balance (Audit) • Water Balance Calculation • Water Loss Analysis • Implementation Plannning Arrangement To Actively Control NRW • Program Implementation Methods • Team Formation For NRW / Atbr Control • Program Preparation • District Meter Area (Dma) Forming / Zone

	• Arranging Water Balance And Ili Program Initial And Final Calculation • Financial Analysis • The Making of Report Activities **Book III** • Technique In Physical Leakage Control Methods • Network Distribution Component In Leakage Restraining • Zone Forming / District Meter Area • Step Test • The Principal Of Water Loss Restrain With Step Test Methods • Data Needed For Step Test • Prerequirement For Step Test • The Weakness Of Step Test Methods • Step Test Completeness

The revision for NRW modules have been determined by the working committee that consists of DWSD staffs, COE managements consultants, and NRW experts from AKATIRTA. Based on the module review meeting that was conducted on 17-18 September 2015 at Falatehan Hotel Jakarta, the revision will be as follows:

Table 3.2 NRW Modules Revision

General	1. The module contents is expected to aim at reader's systemathics thinking in NRW control through water losses control activities. 2. Eliminate the impression that the contents of the module are based on certain view / concepts, such as: GIS concept, DMA concept, customers water meter concept, PRV concept, etc. Module contents is already universal, material tendency is depend on how the trainers deliver it to the participants (usually it depend on each trainer's experience)
Module	1. Agreeing consignement 1 results abour module correction. 2. Module structure's change a. Displacing water balance material and ILI in Module N-1 to adjust the NRW control steps and based on consideration of theory material grouping. b. Change modul 2 position into modul 3 considering its adjustment with systematical

	thinking analysis in NRW control.
Material Subtantion	1. Correction of principal editorial which has effect to teaching material, such has picture's title, editorial diagram modification, etc. 2. Reducting several material that considered too difficult for training objective such as FAVAD, and investment analysis material. 3. Omitting several ambiguity materials such as understanding of water losses based on supply system, and based on its characteristic. Water losses interpretation that is served is only based on water balance only. 4. Displacing several pictures and tables considering material context. 5. Displacing several material contexts into another more relevant parts such as old version of physical water losses control strategy material lining with 4 pillars physical water losses control strategy. 6. Inserting several water losses control technique that relevant to enriched perception in supporting implementation of 4 pillars physical water losses control strategy and 4 pillars non-physical water losses control strategy.
Schedule / Training Program Guidelines (GBPP)	1. Agreeing the context, order, and time needed for delivering the materials into proposed schedule. 2. Schedule can be made flexibly adjusting with training needs if this module is delivered partially.

Source: NRW Module Review Minutes of Meeting

3.2 Non Revenue Water Training Syllabus

Table 3.3 NRW BINTEK Kabupaten / Kota Syllabus

Monday	Trainer	Tuesday	Trainer	Wednesday	Trainer	Thursday	Trainer
Pre test		NRW and ILI Indicator	Didi Mulyadi	Methodology of water loss control	Didi Mulyadi	Field practice discussion / general discussion	Didi Mulyadi, Ate Mustafa Syaf and Ahmad Rosyid
Introduction to NRW	Didi Mulyadi	NRW and ILI Indicator + test 4	Didi Mulyadi	Methodology of water loss control + test 6	Didi Mulyadi	Field practice discussion / general discussion	Didi Mulyadi, Ate Mustafa Syaf and Ahmad Rosyid
Introduction to NRW + test 1	Didi Mulyadi	WB Easy calculation	Ate Mustafa Syaf	Financial aspect, cost and benefit	Didi Mulyadi	Post test	Didi Mulyadi, Ate Mustafa Syaf and Ahmad Rosyid
Understanding water loss	Didi Mulyadi	WB Easy calculation	Ate Mustafa Syaf	DMA structuring and step test	Ate Mustafa Syaf		
Understanding water loss + test 2	Didi Mulyadi	Case study on water balance and ILI	Ate Mustafa Syaf	DMA structuring and step test + test 7	Ate Mustafa Syaf		
Water balance and margin error	Ate Mustafa Syaf	Case study on water balance and ILI	Ate Mustafa Syaf	Introduction to leak detector tools	Ate Mustafa Syaf		
Water balance calculation exercise (manual)	Ate Mustafa Syaf	Water loss control strategy	Didi Mulyadi	Step test study case (Mini DMA) – PDAM Visit	Ate Mustafa Syaf		
Margin error calculation exercise (manual)	Ate Mustafa Syaf	Water loss control strategy _+test 5	Yakup Efendi	Step test study case (Mini DMA) – PDAM Visit	Ate Mustafa Syaf		

Source: COE Management Consultant

Table 3.4 NRW Provincial Training Syllabus

DATE/TIME	07.30 - 08.15	08.15 - 09.00	09.00 - 10.00		10.15 - 11.15	11.15 - 12.00		12.45 - 13.45	13.45 - 14.30	14.30 - 15.30		15.45 - 16.30	16.30 - 17.15	17.15 - 18.15		22.00 - 01.00
MONDAY 25-Jul-16	**Pretest DISC Questionnaire**	TOT Explanation & Opening	Introduction to NRW Control + test	**RECESS**	Understanding water losses + test	Water Loss Indicator (ILI)	**LUNCH BREAK**	Water Loss Indicator (ILI) + test	Water Balance (Water Audit) + test		**RECESS**	NA Drafting Exercise & Margin Error Manual				
Speaker	Trainer PD	Panitia	Supian		Supian	Supian		Supian	Sapta			Sapta				
TUESDAY 26-Jul-16	Re-test & review	WB Easy Calc. Practice		**RECESS**	WB Easy Calc. Practice	WB Easy Calc. Case Study & NRW Analysis	**LUNCH BREAK**	WB Easy Calc. Case Study & NRW Analysis	NRW Reduction Strategy + test		**RECESS**	Water Loss Control Methods		Zoning and DMA + test		
Speaker		Supian & Sapta			Supian & Sapta	Sapta		Sapta	Supian			Supian		Supian		
WEDNESDAY 27-Jul-16	Re-test & review	Financial Aspect, Benefit & Cost + test		**RECESS**	Program Plan Drafting and Reporting	Step Test	**LUNCH BREAK**	Step Test + test	Leakage detection & Eqquipment Introduction + test	Mini DMA practice and sounding	**RECESS**	Mini DMA practice and sounding		**Trip to practice location**	**RECESS**	Locating and detecting Water loss
Speaker		Sapta			Sapta	Supian		Supian	Sapta	Supian & Sapta		Supian & Sapta				Supian & Sapta
THURSDAY 28-Jul-16			tes ulang **post test** review	**RECESS**	DISC Explanation & Know yourself		**LUNCH BREAK**	BINTEK Purpose and Methods (CBT)	Andragogy	Communication principals: Communication Questionnaire & Effective Communication	**RECESS**	Communication principals: Communication Questionnaire & Effective Communication	Body language & voice expression			
Speaker					Wiwin Hendriani			Wiwin Hendriani	Wiwin Hendriani	Wiwin Hendriani		Wiwin Hendriani	Wiwin Hendriani			
FRIDAY 29-Jul-16		Spontaneus Speaking Practice		**RECESS**	Speaking practice explanation	**LUNCH BREAK & FRIDAY PRAYER**			Speaking practice explanation	Preparing teaching materials & test drafting	**RECESS**	Presentation aid	Presentation preparation for NRW subject			
Speaker		Dewi Retno Suminar			Dewi Retno Suminar				Dewi Retno Suminar	Dewi Retno Suminar		Dewi Retno Suminar	Dewi Retno Suminar			
SATURDAY 30-Jul-16	Micro teaching parctice with NRW subject			**RECESS**	Micro teaching parctice with NRW subject + explanation		**Closing**									
Speaker	Wiwin Hendriani				Wiwin Hendriani											

Source: COE Management Consultant

Table 3.5 NRW National Training Syllabus

DATE / TIME	08.00 – 08.45	08.45 – 09.30	09.30 – 10.15		10.30 – 11.15	11.15 – 12.00		13.00 – 13.45	13.45 – 14.30	14.30 – 15.15		15.45 – 16.30	16.30 – 17.15	17.15 – 18.00
SUNDAY 24 Apr 16							LUNCH BREAK					TOT Explanation	Competency Based Training	"Branding"
Trainer												Committee	Mimi Darya	
MONDAY 25 Apr 16	Opening	Pre-test & Introduction to NRW	Understanding Physical and Commercial Loss		Water Balance and Margin Error		LUNCH BREAK	NRW Indicator and ILI		RECESS		Water Balance, ILI, Margin Error Exercise (Manually)		
Trainer	Committee	Gagak B, ST.			Gagak B, ST.			Gagak B, ST.				Hari Sundana, BE, S.Sos		
TUESDAY 26 Apr 16	WEB Easy Calculation				Water Balance and WEB Easy Calc. Case Study		LUNCH BREAK	Physical and Commercial Loss Control Strategy		Water loss control methods		Water loss control methods	Zoning and DMA	
Trainer	Hari Sundana, BE, S.Sos				Gagak B, ST.			Gagak B, ST.				Gagak B, ST.	Hari Sundana, BE, S.Sos	
WEDNESDAY 27 Apr 16	Financial aspect, benefit, and cost		NRW Control Program Planning and Reporting		Step test and case study		LUNCH BREAK	Leakage detection and Equipment Introduction		Mini DMA Practice		Post Test	Trip to PDAM Kab. Bandung for field practice	
Trainer	Hari Sundana, BE, S.Sos				Gagak B, ST.			Hari Sundana, BE, S.Sos		Gagak B, ST. & Hari Sundana BE, S.Sos		Committee		
THURSDAY 28 Apr 16	KNOW THY SELF				"Know thy self" explanation & Games		LUNCH BREAK	Presentation technique		Audience Introduction (review)		Audience Introduction (review)	Subject and teaching plan preparation	
Trainer	Dr. Soeharini Soepangat, MSc.				Dr. Soeharini Soepangat, MSc.			Dr. Anne Maryani, Dra., M.Sos				Dr. Anne Maryani, Dra., M.Sos		
FRIDAY 29 Apr 16	NRW Micro teaching practice				Teaching practice continued	LUNCH BREAK & FRIDAY PRAYER			Teaching experience sharing session			Evaluation		
Trainer	Dr. Anne Maryani, Dra., M.Sos								Dr. Anne Maryani, Dra., M.Sos			Dr. Anne Maryani, Dra., M.Sos		
SATURDAY 30 Apr 16	Case study and exercise planning		Self Development analysis		Self Development analysis	Final Test Closing								
Trainer	Dr. Anne Maryani, Dra., M.Sos				Committee									

3.3 Comment on Non Revenue Water Syllabus

Based on the syllabus on the previous page, it was known that Non Revenue Water Course for BINTEK Kabupaten / Kota will be held for four days from Monday until Thursday in one week. However, according to JET interview with COE participants, most of them said that the current training length is not enough to understand all the materials.

As for leakage survey related subject, it will be better if in this section participants not only learn about leakage survey methods which rely on DMA and Minimum Night Flow Analysis but also rely on simple evaluation of leakage priority area by dividing distribution area by mesh.

There are no training topics to analyze planning and O&M of distribution networks (e.g. piping network analysis for distribution pressure control)

Some participants commented about the difficulties on implementing the theory that they learned at NRW Training Course. Therefore, in order to make the theories more applicable in their own PDAM, trainers should introduces about how to apply the theories on PDAM current facilities or equipments. The practical tutorial for water balance calculation also should be introduced on the training course in order to facilitate the participants so the theories will be more applicable for them.

In addition to technical theories, human resources management in NRW also need to be introduced. The participants need to be introduced about ho to establish special team for NRW Reduction Program implementation in their own PDAM. For more effective implementation in PDAM, the special team / division for improving Non Revenue Water in PDAM is need to be established.

3.4 Direction for Training Module Revision

Based on JICA Inception Report on August 2015, the curriculum, text and materials, and training guidelines of the Non-revenue Water (NRW) Reduction Module will be improved taking the following approaches and focuses:

(1) Water Balance Analysis
Any NRW reduction activities of PDAMs must start with the water balance analysis. As the first topic in the NRW Reduction Module, the water balance analysis methodology should be taught using the water balance table standardized by International Water Association (IWA) to measure the current revenue water and NRW amount in detail which enables to estimate the possible NRW amount to be reduced through appropriate countermeasures to different water loss categories.

(2) Functions and Activities of NRW Section Staff
Current NRW reduction activities and related institutional setup shall be reviewed for each PDAM. The management executives must fully understand the significance of NRW reduction for their PDAM's financial soundness and success. COE trainees and trainers, therefore, should be able to explain the importance and necessary measures of NRW reduction and leakage detection activities to the PDAM management after taking the trainings. Hence, the training curriculum should include: (i) leakage detection planning, (ii) institutional setup for leakage repairs, (iii) implementation of leakage detection and repairs, (iv) analysis of leakage points, (v) revision of distribution network rehabilitation plan, (vi) review of leakage detection plan, and (vii) budgeting and simplified cost-benefit analysis for the NRW reduction activities.

(3) Establishment of DMA
PDAMs in Indonesia typically do not install many sluice valves on underground pipes so that it is difficult to isolate network segments and establish district meter areas (DMAs). The DMA establishment methodology suitable to PDAMs' current circumstances will be

proposed through review of the existing training materials and site survey in target provinces.

(4) Apparent Losses and Leakage on Service Connections

JICA's past technical cooperation in Indonesia such as "Project for Water Service Improvement in Mamminasata Metropolitan Area in South Sulawesi Province" have often experienced that, besides water leakage, apparent losses e.g. inaccurate meter reading practices significantly prevail among PDAMs, especially in less competent, smaller-scale utilities in rural area; where the improvement of meter reading method and capacity building of meter readers with little financial investment may solve the inaccuracy and apparent losses greatly in certain cases. Likewise, intensive replacement of consumer meters and related works at service connections sometimes contributes to large NRW reduction, implying that the inaccurate metering and leakage on service connections might have had significant share of the whole system losses. Apart from the importance of leakage detection and repairs, these types of NRW and relevant countermeasures should be included in the COE trainings.

(5) Accuracy of Water Distribution through Maintenance of Flow Meters

Accuracy of water distribution measurement would greatly contribute to NRW prevention and reduction. However, existing flow meters are not properly maintained in most PDAMs. The training should include inspection of existing flow meters by equipment such as ultrasonic flow meter, etc.

(6) Piping Network Diagram

It is imperative for a PDAM to properly manage the piping diagram and design documents of its existing network in order to do the maintenance and leakage detection works on a daily basis. The PDAMs which have introduced the digital mapping system, especially, would be able to conduct more efficient replacement planning. The improved training curriculum should introduce the digital mapping system and its effectiveness for NRW management activities.

(7) Customer Database Management

Topics on the customer database management ranges from basic customer information, metering (water consumption) data, and consumer meter database, through revenue management system. Based on the site survey in the target provinces on the existing practice of PDAMs, the database restructuring and improved management will be proposed in the training materials to be developed.

(8) Pipe Network Calculation for Proper Water Pressure

Distribution network diagrams in most PDAMs do not contain elevation data of piping The training module will cover a simplified piping network calculation methodology applying publicly available elevation data (such as Google Map ®) to transmission main network information.

(9) Measurement of Minimum Flow Rate at Night in DMA

Measuring the minimum flow rate at night enables the calculation of basic leakage amount within a district meter area (DMA). The training should cover the methodology of DMA establishment as well as the minimum flow rate measurement.

(10) Water Theft

The site survey will cover prevailing status of illegal connections, water theft by stub-out in Indonesia and PDAMs' common countermeasures and related regulations, which shall be included in the NRW reduction training materials.

(11) Meter Insensitive Water Volume

It is necessary for each PDAM to know its meter replacement interval and examine the degradation of average meter sensitivity in long-term use, which should be taken into account in the water balance analysis. The meter insensitivity in developing countries may sometimes much higher than that of Japan (around 2% on average).

(12) Network Asset Database and Mesh Control
Most PDAMs do not possess GIS-operated distribution network database management. The network asset management applying mesh control would enable effective maintenance as well as lead to transition to more advance digital mapping system in future. For the improved training curriculum, such mesh-controlled distribution network management may be introduced upon necessity among participant PDAMs.

(13) Life Cycle Cost and Cost-Benefit Analysis
The improved training curriculum will introduce the concept of life cycle cost and recommend the application of more durable piping materials with fewer fittings that lead to reduced operation and maintenance cost in the long run.
NRW reduction activities in general require some initial investment which returns long-term revenue increase. Simplified cost-benefit analysis will be introduced in the improved training module to enhance the understanding among participant PDAMs to encourage decision making of PDAM management.

3.5 Conclusion

Further revision of NRW module would be carried out in following direction.

(1) 2016 version covers the definition of NRW and major contents for NRW issues and countermeasures and this version will be utilized as it is. The revision will be made as the additional text covering the following subjects.

(2) The following additional materials will be added on the new module:
   (a) Leakage survey methods which do not rely on DMA and Minimum Night Flow Analysis but rely on simple evaluation of leakage priority area by dividing distribution area by mesh.
   (b) Distribution pressure control
   (c) Service connection installation and leak repair methods
   (d) Introduction of good practices
   (e) Introduction on innovative NRW survey equipment

(3) The revision work will be carried out with working group members through discussion on the draft prepared by JET, so that additional contents is appropriate for the local circumtances of PDAMs.

4. Good Practices

4.1 PDAM Kabupaten Serang

Initially, PDAM Tirta Albantani of Serang District named Serang District PDAM, and has been in operation since 1977. Since establishment, PDAM Tirta Albantani has shown good growth until including the "Healthy" PDAM category in the performance assessment. The number of subscribers is currently around 33,000 people, covers services for 20% of the population of Serang District recorded administratively.

The head office of PDAM is located at the central of Serang City, exactly at Jalan KH. A Khotib. The Office land erects on an area of one (1) hectare, consists of three units of the building include Administration Office Building for General and the Board of Directors, Subscriber Service office and building for Engineering Division. The car park looks fairly wide, can accommodate approximately 40 two (2) wheel vehicles and four (4) wheel vehicles. At the wall of General Administration Office Building where the Director office is posted pictures of PDAM Tirta Albantani activities that have been implemented. Those pictures also record existing drinking water supply system.
Before participating the CoE (Center of Excellence) program, PDAM Tirta Albantani of Serang District has received NRW reduction program aid from the Asian Development Bank (ADB), and has worked together with other parties/donors. Especially after attending some training related to NRW. The form of management commitment to PDAM Tirta Albantani in NRW reduction program is realized by establishing DMA in Pondok Cilegon Indah.

Pondok Cilegon Indah (PCI) is a residential area located in the border of Serang and Cilegon Districts. The needs of drinking water for residents of PCI have been supplied so far by PDAM Tirta Albantani of Serang District with the number of subscriber reaches 870 connections. It should be noted that, the source of drinking water supplied to the PCI originates from the results of PDAM Tirta Albantani production itself, partly purchased by PDAM from PT Sauh Bahtera Samudera. Principal cost of the processed product water sourced from PDAM and PT. Sauh Bahtera Samudera, in fact, very different. Principal price of water production from PT. Sauh Bahtera Samudera in fact, is more expensive when compared to water that comes from PDAM. Though PCI subscribers remain subject to the same tariff rate based on the principal rate of PDAM that much cheaper. So in order not to lose, PDAM Tirta Albantani of Serang District is challenged able to minimize the level of NRW in order to avoid the financial loss.

PCI DMA has a profile as follows: total subscribers 870 connections, 24 hours water flowing, distributed water volume 331,117 m3, while total bill is 194,009 m3, or NRW 137,108 m3 (42%). In the mid 2012 efforts of NRW control were conducted by field research on water loss through observing the flowing of water for 8 hours to master meter and subscribers meter read simultaneously. Results for meter reading and master subscribers meter showed significant differences. Figure of master meter reading showed 258 m3.

While, the summation of the subscribers meter was recorded 144 m3. Obviously there has been a difference between the volume of water between master meter and subscriber meter by 114 m3, equivalent to as much as 44% water loss. The results of study also managed to identify spots of the physical location of leaks (leaky pipes and accessories) on the field amounted to 145 locations. PDAM Tirta Albantani of Serang District.
Assuming the cost of production and distribution of Rp3,860/m3, total loss due to water loss was 114 m3 (the difference between master meter and subscribers meter) reached Rp39,256.2 million per month.

Direct handling of the spots of physical leaks on the field as repair of leak pipes, pipeline accessories, permanently flow disconnection on the subscribers that were already closed but still flowing of water, in fact was only able to reduce the level of NRW by 5% (previously 42% to 37%). In conclusion, the effort to control the activities of NRW in this way seems not yet to generate significant results.

In 2013, along with the replacement of the top management or the Director of PDAM Tirta Al Banteni, H Ahmad Rifai, who previously served as General Administration Manager, now gets a mandate as the top management of PDAM. He formed the NRW reduction team headed by Muslim to continue the NRW reduction program in PCI. This project is equipped by Ultrasonic Flow Meter instrument borrowed from PDAM Tirta Raharja of Bandung District. Field activities for controlling NRW at DMA PCI carried out at night by engaging approximately 50 personnel of PDAM. They were divided into three (3) groups of team, namely: (1) Team for finding pipe physical leak; (2) Tim for reading the subscribers meter and master meter; and (3) Team for measuring the discharge per pipe segment using Ultrasonic Flow Meter.

The fieldwork lasted for 3 consecutive days. In the field, Team 1 focused on the search for physical leakage of water in the pipe by sweeping the pipeline network. If found, the leak was immediately repaired. Meanwhile, Team 2 was in the charge of reading the master and subscribers meter at almost the same time. The last team 3, then conducted discharge measurements using Ultrasonic Flow Meter on the entire pipeline. Illustration of discharge measurements using Ultrasonic Flow Meter can be seen in the figure below.

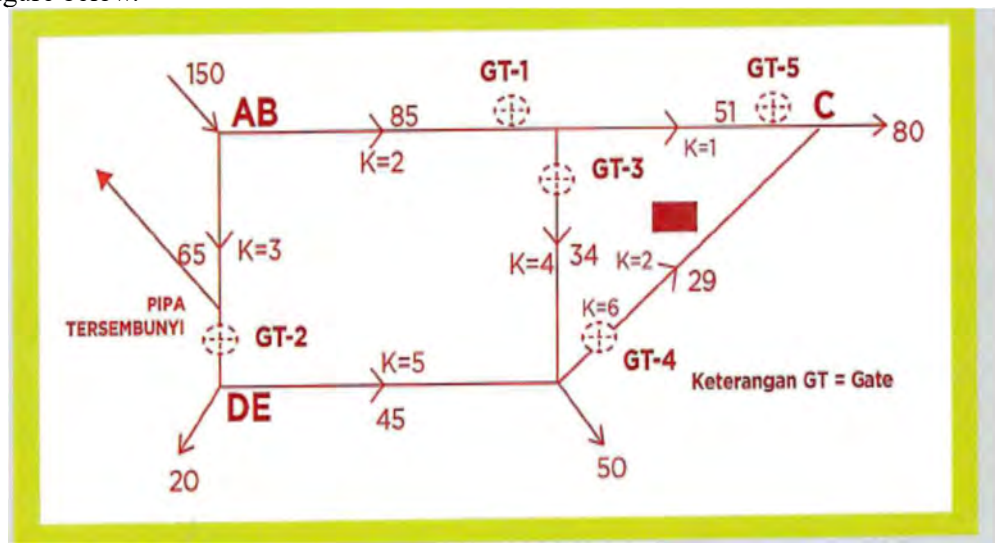

Figure 4.1 Illustration of discharge measurements using Ultrasonic Flow Meter

The initial step of measurements started from the input on the pipeline-1 after the master meter, then sequentially measured at the ends of the pipe as per direction of the pipe flow-k3, pipe-k2, pipe-k3 and so on until the pipe-k6. On the segment k3 there is an unknown pipe connection. Debit measurement results found any irregularity in k3 pipeline segment by closing the gate valve gate valve 1 and 2, the flowing water debit does not meet the rules of mass conservation (entry and exit debits are the same).

In PDAM assumption, the flowing debit that should occur in pipe k2 and k3 was X It/ sec according to the number of subscribers. However, the reality occurs in the field is 3X It/sec. Therefore, detailed observation was conducted on the debit measurements per segment on pipe k2 and k3. From this observation found a hidden pipe connection. This is one of the NRW causes undetected previously. As a result of the hidden pipe connection the NRW cannot be controlled, since the DMA is not closed. Therefore, the pipe connection is directly disconnected by PDAM.

The next action is to observe the volume of water for 8 hours by comparing the volume of water on the master meter with the summation of the subscribers meter. As a result, the master meter figure reached 245 m3, while the summation of the subscribers meter stopped at 179 m3. There is a difference of 66 m3 which causing NRW figure is at 26%, or drop 11 points from 37% to 26%. Potential water saved is 11% or 23 m3 per 8 hours. This is equivalent to 2,070 m3 per month or 24,840 m3 per year. Assuming the costs of production and distribution are Rp3,860/m3, the losses that can be avoided by PDAM during the year amounting to no less than Rp95,882.4 million.

With reference to the success of lowering NRW DMA PCI, the PDAM Tirta Albantani management plans to do the same for other DMA. The success also makes the top management welcomes enthusiastically for next technical guidance offered, i.e. the CoE program of NRW sector in 2014. At the provincial level, Saifun Nufus was sent to represent PDAM Tirta Albantani of Serang District to attend the CoE program training. While for the city/district Bimtek (technical guidance) program, two staffs were sent, i.e. Pendi and Iwan Irawan to attend the training. A year later, exactly in 2015, Saifun Nufus as CoE program alumnus in provincial level NRW sector was reappointed by PDAM to follow other technical guidance at the provincial level, and qualified as a coach or trainer for city/district level. The management of PDAM then designated him as alumnus of CoE to develop NRW reduction efforts in DMA Bojonegara. Currently, efforts of reducing Bojonegara NRW are under implementation phase.

Learning from NRW control efforts at DMA Pondok Cilegon Indah shows that the Ultra Sonic Flowmeter (UFM) device helps saving potential water which not sold previously. The graph alongside shows a comparison of the percentage of revenue loss due to NRW. Control NRW without UFM indeed reduces the number of NRW, i.e. from 42% to 37%, thus saving the potential loss of revenue around Rp39 million per month. However, the results of controlling NRW using a help of UFM increasingly lower the figures of NRW from 37% to 26%.

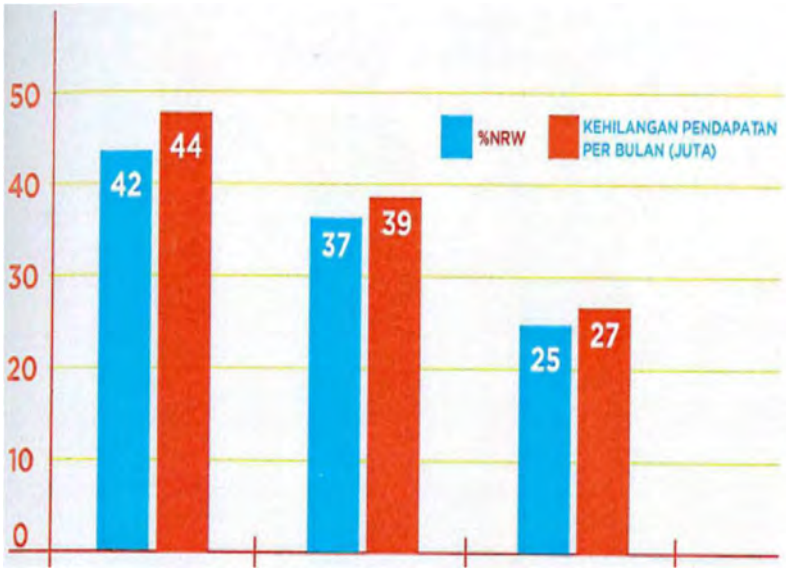

Figure 4.2 NRW Rates Comparison

Not quick satisfied, that's the important learning obtained from the team hard-working of PDAM Tirta Albantani of Serang District in addressing the water crisis in the region. Not halting with the usual procedure, the management seeks to cope with various equipments, if necessary borrows a modern device of the other party in order to get the most optimal solution. The results are not very disappointing, so it's not wasted if PDAM Tirta Albantani of Serang District can retain the "Healthy" PDAM predicate.

4.2 PDAM Kabupaten Kampar

PDAM Tirta Kampar was established in 1988 as Clean Water Supply Facility Project (Proyek Sarana Penyediaan Air Bersih - PSAB) of Kampar District based on the decision of the Minister of Public Works No. 16/Kpts/1988 dated January 11, 1988. In 1992, the management was handed over by the Department of Public Works to the Government of Riau Province, which was then submitted to the Regional Government of Kampar District under the Governor Decree No. Kpts/11/1/1993 dated January 9, 1993 and Regional Regulation of Kampar District No. 8 of 1992, the Regional Water Company (PDAM) Tirta Kampar was established.

The number of PDAM Tirta Kampar subscribers has ups and downs in the last five years. The highest number of subscriber achieved in 2014 with 5,684 subscribers. In that year, PDAM Tirta Kampar got 1,022 new subscribers. Fluctuation occurs because of the new connection, disconnection and reconnection. In 2015, the number of PDAM Tirta Kampar subscribers was targeted increasing 400 subscribers. The ahieved number until June 2015 was 179 new subscribers.

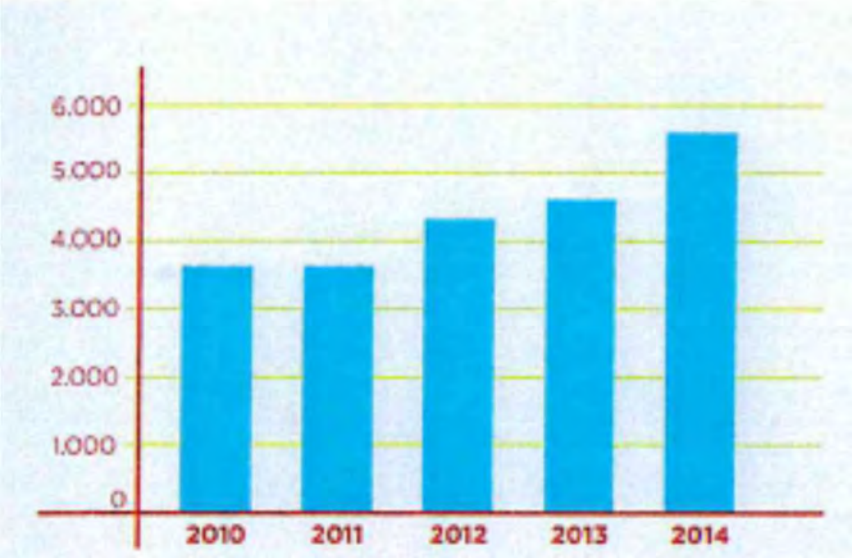

Figure 4.3 Number of PDAM Tirta Kampar Subscriber in Chart of 2010-2014

To serve subscribers with the numbers nearly reach 6,000 SRs, PDAM Tirta Kampar has seven service units and one branch. Those seven service units include Air Tiris, T. Buluh, Kuok/Salo, Tambang, Kampar Timur, Bangkinang Seberang, and Kampar Kiri. Meanwhile, the branch is located in the Bangkinang City. Throughout the service unit and one branch there are eight units of water treatment plants (Instalasi Pengolahan Air - IPA). One IPA unit is located Bangkinang City, while seven other IPA managed by the service units. The biggest IPA is Bankinang City IPA draining the water to the subscribers by means of gravity and pumps.

Production level of Bangkinang IPA is about 1 million m^3 per year. Inside, there are three reservoir units: one reservoir unit serves without the pump, while the two other units equipped by pump to drain the water to the subscriber. Reservoir unit without pump works using gravity and flowed to household subscribers in urban for 24 hours. While the reservoir with pump draining water only from morning until 12:00 pm to the subscriber. Generally, subscribers served by two reservoir consist of office. They are "forced" to accept the service with a specific schedule. Among the eight IPA units owned by PDAM Tirta Kampar, one unit treats the water coming from Kuok IPA spring. While other seven IPA units treat surface water, water from River Kampar.

Each year, approximately 1.3 million - 1.6 million m^3 of clean water is successfully distributed to the subscribers. Partially is lost due to physical leakage and physical loss. This water loss that is in the last five years to contributes to the level of NRW above 25%.

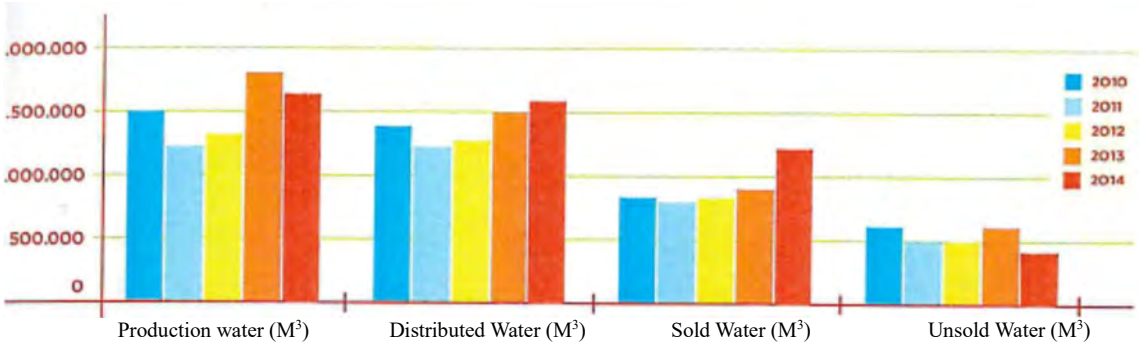

Figure 4.4 Water Balance Chart of PDAM Tirta Kampar in 2010-2014

In 2014, the Directorate of Drinking Water Supply System Development, Ministry of Public Works dan Public Housing organized the training program for Professional Human Resources Competency Enhancement in Drinking Water Sector through Center Of Excellent-CoE). Management PDAM Tirta Riau Kampar of the Kampar District then sent the staffs to participate. In the field of NRW, the management sent Mulyono (Head of Engineering, PDAM Tirta Kampar). While, L. Mitra (Salo Unit Head of PDAM Tirta Kampar) attended the Training of Trainers (TOT, now is called Technical Guidance at Provincial) at the Drinking Water Engineering and Sanitation Institute of Region I (Bekasi), Directorate General of Human Settlements, Ministry of Public Works and Public Housing.

After completing the training, Mitra proposed establishing the District Meter Area (DMA). The proposal is a follow-up form of training applications in the field and addressed to the Director of PDAM Tirta Kampar, M. Rusdi. This establishment of the DMA will be one part of the effort to control NRW.
Unfortunately, the PDAM has not held a blue report in terms of profit. Finance in cash is arguably unavailable. However, cost constraints do not make Rusdi as leader rejects the proposal. Proposal for DMA establishment is approved, it's just that the scale should be adjusted to the financial condition. Rusdi then invited Mitra to create small-scale DMA. The choice fell on a residential complex served by PDAM Tirta Kampar, Salo Unit. On July 2014, the team started to create DMA under the direct leader of L. Mitra.

Cost for creation of Salon Unit DMA requires only Rp1,050,000,- The expenditure includes master water meter accessories (Rp300,000,-), the overtime cost for DMA testing (Rp350,000), and meal while working (Rp400,000,-). In DMA in which there is a 70 SRs are installed to one master water meter unit with 2 inches size.
Incidentally, there are still some stock, from procurement in 2012. Valve is not installed, because the valve at the site is already complete. Furthermore, DMA is managed by joint synergism with Subscriber Relations Section and Finance Section both to control leakage and in the recording of water balance. Salon Unit DMA creation in fact proved the products. Prior to the DMA, it is unknown how the subscriber meter water condition, water pressure, and the points of leakage in the area.

After DMA is created, the subscriber meter water damage and leaks can be detected. In DMA tests, 10 units of the damaged subscriber water meter were found, because they did not withstand the increased water pressure. All are immediately replaced. This incident opens the eyes: from now, it can be tracked which water meter that should be replaced to prevent non-physical water loss.
In addition, there are also three point of physical leakage found at the connection pipe of distribution. Leakage due to broken pipe was not found because the age of the pipe in the area is still "new". Of

DMA tests, water theft was also not found. Water pressure after being increased was also not known the exact figures due to manometer indeed was not installed.

However, the relative increase in water pressure can be perceived. If the DMA is not created and the DMA test is conducted, the leak will continue to occur and the water meter damage is not found. Water that should be of the PDAM revenue will also be absorbed back into the ground.
DMA establishment for Salo Unit is only a part of the NRW control activities in PDAM Tirta Kampar. There are still other activities that ultimately lead to control of NRW through the efforts of technical and non-technical to control the level of NRW.

From the technical aspect, the NRW control level is done by three steps. First, the leak is handled quickly. Once there is a leak, immediately handled, regardless day or night—especially when dealing with pipe ¾ service pipe leaks, however, if a leak occurs in a large sized distribution pipes and just known afternoon by evening, then repair will be made in the morning. For this handling, distribution and subscriber relations sections work synergistically. Reports of leaks can be indeed from anyone, not just from subscribers. However, the execution of repair is done by the distribution section.

Second, the replacement of old pipes. Replacement is intensively carried out since 2012. So far, the replacement has been carried out along 6 km in Bangkinang Branch. Pipe types of Gl, galvanized have been entirely replaced. Those pipes are replaced by HDPE and PVC ones. As a result, with this pipe water pressure level in the subscriber seems good, leakage is also reduced. On the other units, replacements of pipe are done because those pipes are still relatively new.

Third, replace the old/damaged water meter of the subscribers. Throughout 2014, in entire service areas of PDAM Tirta Kampar have been done 231 replacements of the subscribers water meter at five branches/units.
Details are Bangkinang (116 units), Salo (30 units), Tambang (20 units), Teratak Buluh (38 units), and Kampar Timur (20 units).

Of the non-technical aspect, the NRW level control is carried out by the administrative system reform. One of the reforms done is replacement of meter recording method from manual into digital using android application. This replacement is done since the beginning of 2014. According to Muchlis Efendi, Head of Finance Division of PDAM Tirta Kampar, this change contributes to the increase (figure) of water sale. The increase reached 30%.

From the data, it appears that the level of NRW at PDAM Tirta Kampar tends to decrease. While, in 2015 the average level of NRW at PDAM Tirta Kampar until July 2015 was at 26.16%.
In addition to controlling NRW, there are other strategies that are used to improve the performance of PDAM Tirta Kampar. One of this year's work programs is to increase the number of subscribers. The way to reach is to simplify the procedure of becoming a subscriber. Simply to submit a photocopy of ID card (KTP) and telephone number, and pay the Rp700,000,- connection. The survey will be conducted immediately after those three requirements are submitted. Asnedi ensured, within two days, the connection pipes should have been installed.

In addition, in February 2015 the classification of subscribers came into force with the implementation of progressive tariff. The more water consumed, the more expensive tariff is charged. it is expected that, with this classification, an improvement of income arising that does not directly help repair status PDAM performance.*

The rise and fall of PDAM Tirta Riau Kampar of the Kampar District, in improving performance thereto, indeed needs to be appreciated. Because, within the limitations, PDAM Tirta Kampar never

ceased p to make various breakthroughs,
and practice the knowledge gained. Performance status that has not been classified as healthy even whips them to the more hard-working. All the opportunities explored, starting from establishing small-scaled DMA, the use of digital applications for water meter registration to improved service to subscribers and the application of progressive tariff through subscriber classification. In the near future, we all will witness changes in the performance status of PDAM Tirta Kampar of the Kampar District, Riau to be the “Healthy” management predicate (000).

4.3 PDAM Kabupaten Lima Puluh Kota

PDAM of Lima Puluh Kota District was established bearing the name of Drinking Water Management Agency (Badan Pengelola Air Minum - BPAM) under Directorate of Clean Water, Directorate General of Human Settlements, Department of Public Works. Its Status changes into the Regional Water Company of Lima Puluh Kota District under the Public Works Minister Decree No.059 / KPTS / CK / 11/1990, dated February 3, 1990. Furthermore, the establishment of the company was stipulated under the Regional Regulation (Perda) No. 16 of 1992 dated September 18, 1992.

Until September 2015, PDAM has owned 8 service units serving 11 sub-districts or 76 nagari (administrative units). If seen from total population, its service coverage is at the range of 7.93%. All subscribers served during the 24 hours but with the various pressures from hour to hour. At the subscriber level, the water pressure average ranging from 0-2 bar.

Table 4.1 PDAM Lima Puluh Kota Service Units

No.	Name of Service Unit	Sub-District
1.	Tanjung Pati	Harau
2.	Dangung-Dangung	Guguk and Mungka
3.	Pangkalan	Pangkalan Koto Baru
4.	Simpang IV	Luhak and Situjuh Limo Nogori
5.	Batu Hampar	Akabiluru
6.	Muara Paiti	Kapur IX
7.	Simalanggang	Payakumbuh
8.	Suliki	Suliki and Bukit Barisan

In 2014 the subscribers of PDAM Lima Puluh Kota were 5,462 household connections (sambungan rumah - SR). Approximately 82.11% of the amount is a household category subscriber.
To serve all subscribers, PDAM of Kabupaten Lima Puluh Kota District holds 5 full units of Water Treatment Plant (Instalasi Pengolahan Air - IPA), 2 units of Plain Water Treatment Plant (Instalasi Pengolahan Air Sederhana – IPAS), plus 5 units of Quick Sand Filter (Saringan Pasir Cepat - SPC). The total production capacity of those IPAs is 150 l/sec. The volume of water as it partly lost on the way to the subscriber due to various reasons.

Armed with the results of NRW control training attended by four staffs, the management of PDAM Lima Puluh Kota finally decided to try making DMA and practicing NRW control activities correctly. This decision departs from the proposals made by the staffs who have participate in the technical guidance of NRW.
Prior to establishment of DMA, management formed NRW team of eight people, consisting of a head nominated as the location of DMA, namely Pulutan Permai Housing. Unit of the complex and division head at PDAM Lima Puluh Kota. Formation of the team is done by decree of Director (No?). The team then conducted an inventory in this housing site classified as low-income housing with an area of 1.5 ha with a flat topography. In this complex there are 67 SRs.

Housing complex that has been served by 24 hours service selected at least five reasons. These five reasons are: (1) Its location in the form of housing, so that the controlling will be easier to do; (2) The distribution network in the housing using a closed model to facilitate the search in the event of leakage; (3) The number of subscribers is less than 100. With such number total human resources required for control thereto is simply one person; (4) The existence and condition of the subscriber water meter is easily monitored; and (5) Residents of the complex do not have an alternative source of water other than PDAM, so that continuity of water consumption of PDAM is more guaranteed.

Once the target location is set, the PDAM team moved quickly. Data that were inventoried at Pulutan Permai Housing among other included the network system, the number of subscribers, and the subscriber's water consumption patterns. Inventory is also made to the subscriber water meter conditions. From this activity is known that the subscriber water meter unit in a damaged condition, including two water meter units of the subscribers are in "buried" state. Upon these findings, the technical team of PDAM Lima Puluh Kota takes appropriate action. Subscribers' water meter is replaced, and embedded water meters of the subscribers lifted to the surface.

Concerning the network system, Pulutan Permai housing network holds a closed pattern (loop). However, it has appeared presumption about any reverse flow in the network. Another pipe search leading to the residential network is done, but it fails to find out. To make sure, the team then consults with the Public Works Department staff involved in the planning and execution of the pipe network installation in the housing. Of the person concerned, it can be ensured that the water flow to the Pulutan Permai Housing only comes from one source. That is, there is no inlet pipes other than current existing ones.

In order to determine the location of the master water meters parent installation, gate valve, and manometer, the team then examined General Spatial Plan in the housing area. From there, it is known the present of the road construction plan on the empty land. On the empty land there is also possible houses that will be built outside the housing complex. Then, a point of area is chosen near the road that will be built around an empty area that is likely to be filled in full with settlements outside the complex. Thus, when the houses were built, drinking water pipes can still be included in the DMA to be created.

Armed with the inventory data, the analysis was performed. As a result, Pulutan Permai housing allows to be used as the location of DMA. In March 2015, the construction of DMA was done.

On the specified point, then a master valve is installed and master water meter with 2-inch diameter pipe, and a manometer. All costs derived from PDAM Lima Puluh Kota itself. Waiting for the disbursement of the budget, or national level aid funds are not necessary. In the principle of management, the most important is the tool expenditure can be accounted for. Implementation of the installation is also done by the technical staffs of PDAM Lima Puluh Kota. In order to carry out monitoring activities in the DMA, a staff who have participated the provincial level training of CoE 2015 technical guidance is appointed, namely Noviardi.

Cost of establishing DMA spent Rp12.101 million. Such cost is used to purchase a gate valve 50 (2 units), flange spigot PVC 50 (6 units), packing 50 (6 units), nut-bolts (24 units), master water meter 50 (1 unit), manometer (1 unit), saddle clam 50 x V2 (1 unit), gip pipe (1 m), and head flashlight (3 units).

The formation of DMA is then followed up with activities to reduce water loss in this location. Such activities include searching point of leak, illegal connections, damaged or unknown water meter of subscriber. This is evidence of the PDAM seriousness in the prevention of water losses.

From those activities, three points of leak and three points of illegal connection were found. On these findings, such points of leak were immediately repaired. Illegal connections were also immediately terminated. Illegal connection is actually categorized unlawful. However, for this once, subscribers whose connections are illegally connected not penalized, because the persons concerned do not know exactly how the illegal connection that could happen.

In the first three months, the level of NRW at DMA decreased from 40.12% to 16.08%. Unfortunately, this decline did not continue in the fourth month. In the fourth month the NRW level actually increased to 26.97%. (This are setback data. Weakening the article as a whole. Want to be displayed or deleted it? Because there was no further explanation justifying why in the 4th month its NRW level increased to 26.97%).

According Noviardi, a monitoring staff of activities at DMA, there was an increase of water pressure in DMA locations of Pulutan Permai Complex when compared with the water pressure before DMA was attached. If previous pressure in the area is only 2 bars, after the DMA established the water pressure can be increased to 2.5 bars.

This success brings out the plan to expand the establishment of DMA to other service areas. Armed with the experience of establishing a small-scale DMA, application of NRW activities on a larger scale would no longer be difficult. According Zulfikri, Director of Engineering Division, PDAM Lima Puluh Kota will establish eight DMA zones in the next four years.

Most planned to be in housing complexes at Tanjung Pati. The consideration is that the cost of establishing DMA in the residential complex is not too expensive. Currently is still in the process of assessment about which residential complex the DMA will be established. To be sure, every two years, two DMAs are targeted to be established.

It is clear that successful development of DMA in Pulutan Permai Housing cannot be separated from the quality of PDAM Human Resources of Lima Puluh Kota. In all the limitations, the employee of PDAM Limpa Puluh Kota never seemed to stop to improve themselves. Limited knowledge and skills that do not make them stop learning. Therefore, every chance of training, they will capture the opportunity.

In 2014 for example, PDAM Lima Puluh Kota sent Rudi Alfie and Tarmizi, both technical field staff, to follow the technical guidance of NRW on the training program for Professional Human Resources Competency Enhancement in Drinking Water Sector through Center Of Excellent-CoE) pattern in Padang. The training was organized by the Directorate of Water Supply System Development, Directorate General of Human Settlements, Ministry of Public Works and Public Housing of the Republic Indonesia (Ministry of Public Works and PRI).

In the same year, two other technical staffs sent to participate the training in the same division on the regular technical guidance of the Drinking Water Engineering and Sanitation Institute of Region I (Bekasi), Directorate General of Human Settlements, Ministry of Public Works and Housing of the Republic Indonesia (Ministry of Public Works and PRI). Thus, Lima Puluh Kota has held four staffs who have adequate knowledge about NRW. In their midst various NRW control solution can be realized into the reality.

PDAM Lima Puluh Kota gives examples of self-reliance initiative in solving problems. Knowledge obtained from training or technical guidance, directly practiced in accordance with the conditions in the field. By prioritizing services first for drinking water subscribers—which is an urgent need for anyone—PDAM Lima Puluh Kota is bold to bear the financial consequences of the initiative. Of course, this action taken is not the origin of bold, but based on consideration of the certainty of legal liability in the future. Investment value of PDAM Lima Puluh Kota, if stated in Rupiah, may not amount to much. However, their social investments, by prioritizing the needs of clean water for subscribers, and intention to increase the quality of service, has a truly priceless value.

Ministry of Public Works and Housing
Republic of Indonesia

The Project
on
Strengthening COE (Center of Excellence) Program
for
PDAMs in the Republic of Indonesia

Energy Efficiency Module Development Report

June 2016

Japan International Cooperation Agency

KRI International Corp.
Nihon Suido Consultants Co., Ltd.
Yokohama Water Co., Ltd.

The Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Republic of Indonesia

Energy Efficiency Module Development Report (Draft)

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1. Background and Objectives

1.1 Background

Based on BPPSPAM evaluation, there are 166 (46%) out of 356 PDAMs (93% of all PDAMs in Indonesia) that are categorized as “sick” or “unhealthy” in 2015. This situation occurred due to a limited amount of human resource capacity that they are unable to conduct operation improvement on a self-help basis or even with the central government assistance to achieve financial soundness.

In the response to such needs for capacity development of PDAM staffs in an effective manner, Directorate General of Human Settlement (DGHS) of Ministry of Public Works and Housing of Indonesia launched a training program entitled “Center of Excellence (COE)” Program in 2012, which is emphasizes on its unique cascade-method type trainings and knowledge dissemination. As of 2014, the COE Program has been expanded to cover 31 provinces countrywide and the program consists of three modules i.e. Non-Revenue Water (NRW) Reduction, Energy Efficiency and SAK-ETAP (financial accounting standard for unlisted corporations).

In order to support COE program in achieving its purpose to accelerate, enhance, and improve PDAM management restucturing program through the increase in human resource capacity, Japan International Cooperation Agency (JICA) has agreed to enhance the capacity implementation of the COE program for PDAMs, by implementing activities detailed in the Project Design Matrix (PDM) and achieving the expected outputs.

Energy Efficiency as one of the course that has been taught on COE program has a significant role in improving PDAM performance. Mainly, the “unhealthy” or “sick” PDAM has problem related with Inefficient Energy use such as inefficient pumps selection, idle machinery, high electricity cost, etc.

JICA Expert Team for the Project on Strengthening COE Program for PDAMs in the Republic of Indonesia will contribute in improving and revising the existing Energy Efficiency Module. As the first step of module development work, some analysis will be done such as PDAM problem analysis, Existing module analysis and direction for the next module revision. Additionally, the good practice for PDAMs to know some cases where the actual application of training contents to PDAM activities on the field also will be introduced in this report.

1.2 Objectives

According to the Inception Report of The Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Republic of Indonesia in August 2015, the objectives of this project are as follows:

(1) To strengthen the quality management of COE program
(2) To enhance the implementation capacity of the COE program for PDAMs in the Directorate General of Human Setttlement of Indonesia
(3) To improve the existing NRW Reduction and Energy Efficiency Modules
(4) To develop new modules namely “Customer Relations” and “Financial Analysis and Management”

However, the main objective of this report is to prepare energy efficiency module development work.

2. Challenges in PDAM Operation

2.1 PDAM Performance Based on BPPSPAM Data

BPPSPAM as PDAM Performances evaluator, has evaluated several indicators of PDAM performances such as operating ratio, production efficiency, energy cost, maintenance cost, and other indicators. Based on the "PDAM Kinerja 2015" published by BPPSPAM, PDAM performance indicator data are collected and analyzed. Data of the year 2014 performance was collected from 356 PDAMs (93% of all PDAMs in Indonesia). Among all 356 PDAMs, 192 PDAMs are categorized as healthy, 99 are less healthy and 67 are sick.

2.1.1 Operating Ratio

Operating Ratio is the ratio on operational cost and operational revenue. Operating Ratio indicates how far PDAM management can do the operational cost control and how far PDAM management can try to increase its income in order to earn enough revenues to cover operational cost.
Based on BPPSPAM Data 2014, there are 89 out of 356 PDAMs with operating ratio of 1.0 – 1.1. The data shows that those PDAMs have a poor performance according to this indicator (Generally, this ratio is considered good only and only if it is below 1.0)

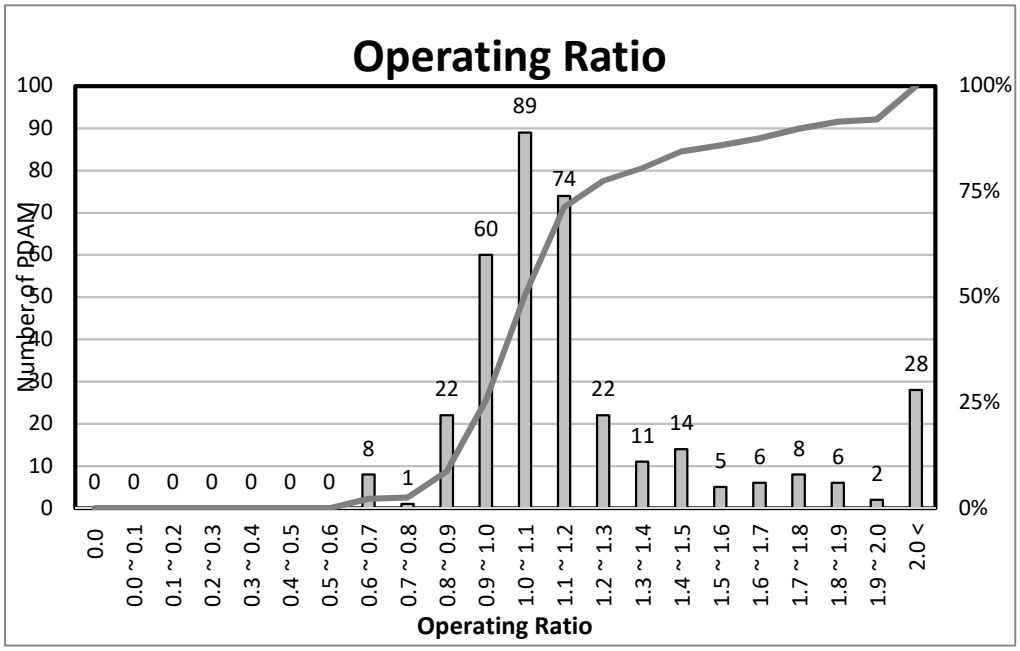


Figure 1. PDAM Operating Ratio in 2014

The data trendline of 50% of percentile value of operating ratio from 2011 until 2014 is shown on the graph below.

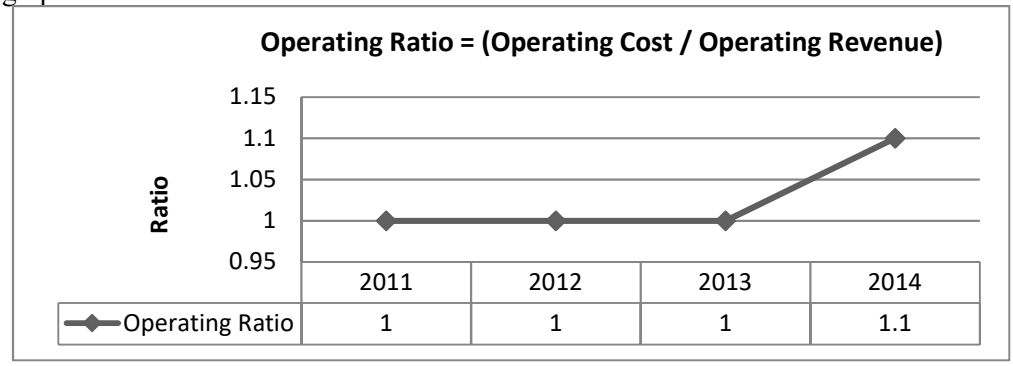


Figure 2. Median of PDAM Operating Ratio in 2011 - 2014

Operating ratio increases into 1.1 in 2014. From the graph, it can be concluded that the operating revenue often have similar amount with the operating cost (operating ratio = 1.0) and in 2014, the operating revenue is even lower than the operating cost.

2.1.2 Production Efficiency

The other indicator needed to assess PDAM performance is production efficiency. This is a capacity utilization indicator of PDAM's water production facilities. Production Efficiency is the indicator that shows how efficient PDAM in utilizing its installed capacity. This indicator is also needed to measure production system efficiency. Production efficiency equals to the ratio between real production and design capacity. 100% of production effiency means PDAM real production is the same with its maximum design capacity, which means no surplus to product treated water, however based on BPPSPAM Data 2014, there are 34 out of 356 evaluated PDAMs with production efficiency of 40% – 45% which means inefficient production. Mean value of PDAM production efficiency throughout Indonesia (based on 2014 data) is 59.8% while the median of PDAM production efficiency is 61.0%.

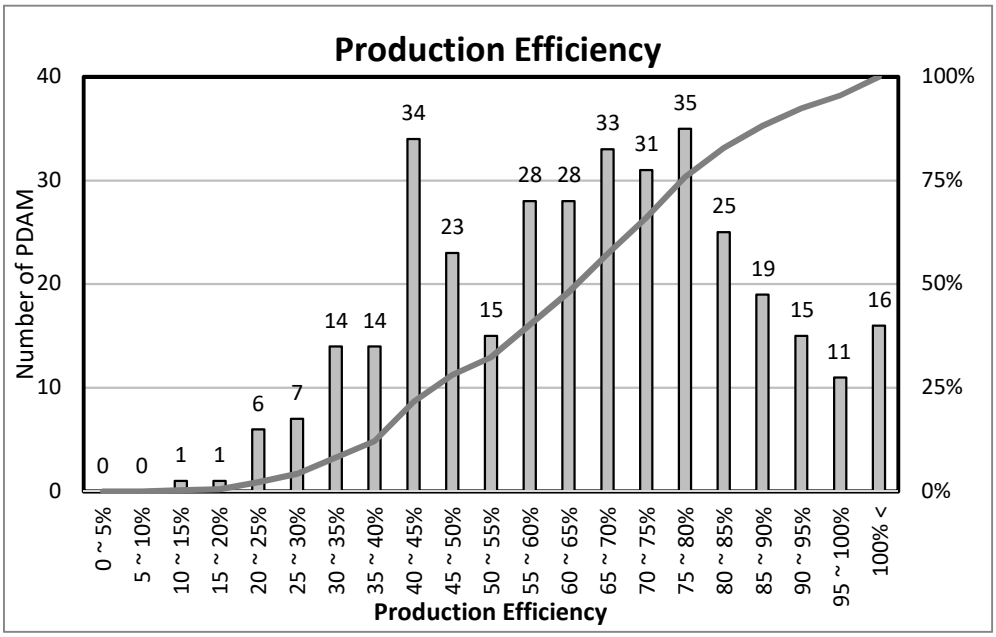


Figure 3. PDAM Production Efficiency in 2014

The data trendline of 50% of percentile value of production efficiency from 2011 until 2014 is shown on the graph below.

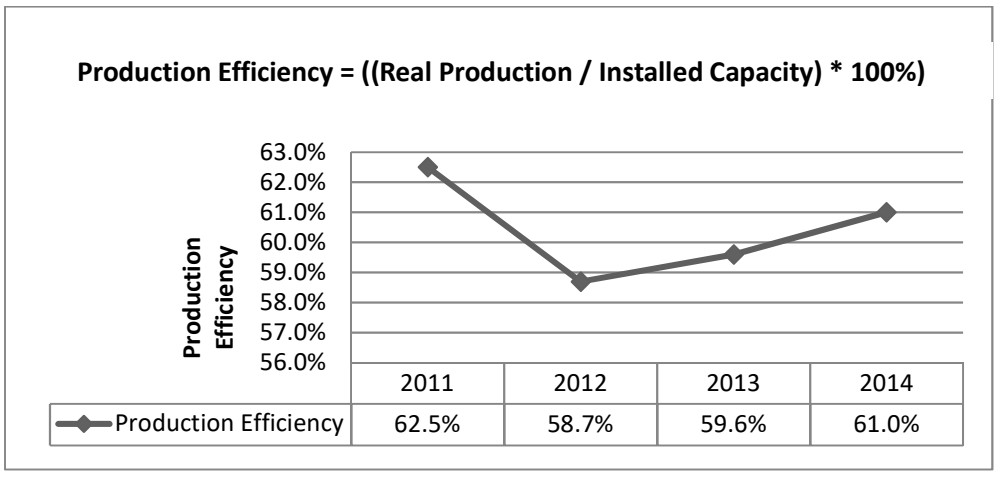


Figure 4. Median of PDAM Production Efficiency in 2011 - 2014

In general, the number of real production is far below the number of installed capacity. From the graph it can be concluded that the production efficiency is very low. In conclusion, at most PDAMs can only utilize half of its maximum capacity (real production / installed capacity near 50%). Even the production efficiency increased in 2014 (61%), the actual performance was still not better than that had been achieved in 2012 (62.5%)

2.1.3 Energy Cost

This indicator shows how much energy needed for PDAM to produce 1 (one) m^3 water. Energy cost value in this graph is from the energy cost such as from electricity, diesel, gas, and other fuels in a year / total production needed to run the machinery. This is a straightforward indicator to show energy costs in which the lower number shows the better condition. It is important to note that every PDAM is subject to different facility mixture and geography factors.

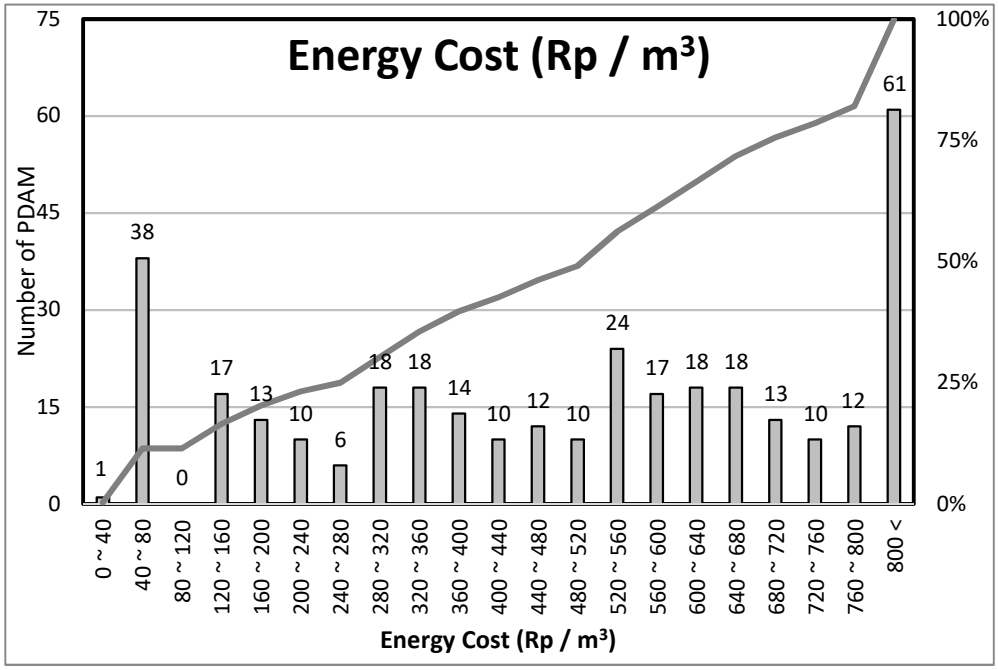


Figure 5. Energy Cost

Based on BPPSPAM Data 2014, mean value of PDAM energy cost throughout Indonesia is Rp. 460 / m^3 while the median of PDAM energy cost is Rp. 448 / m^3. It is also shown that 61 out of 340 evaluated PDAMs have energy cost more than Rp 800 / m^3 which suggests the fact that those PDAMs still have high energy costs compared to other PDAMs.

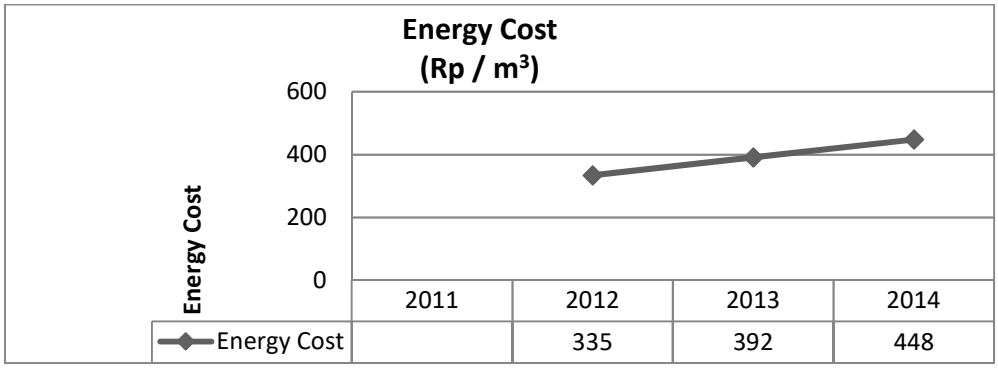


Figure 6. Median of PDAM Energy Cost in 2011 – 2014

From the data trend in 2011 – 2014 that is shown by previous graph, it can be concluded that PDAM energy cost is increasing steadily each year.

2.1.4 Maintenance Cost

The definition of maintenance cost in this section is the maintenance cost that needs to be paid by PDAM in 1 (one) year. This indicator also indirectly shows how efficient PDAM in using its equipments.

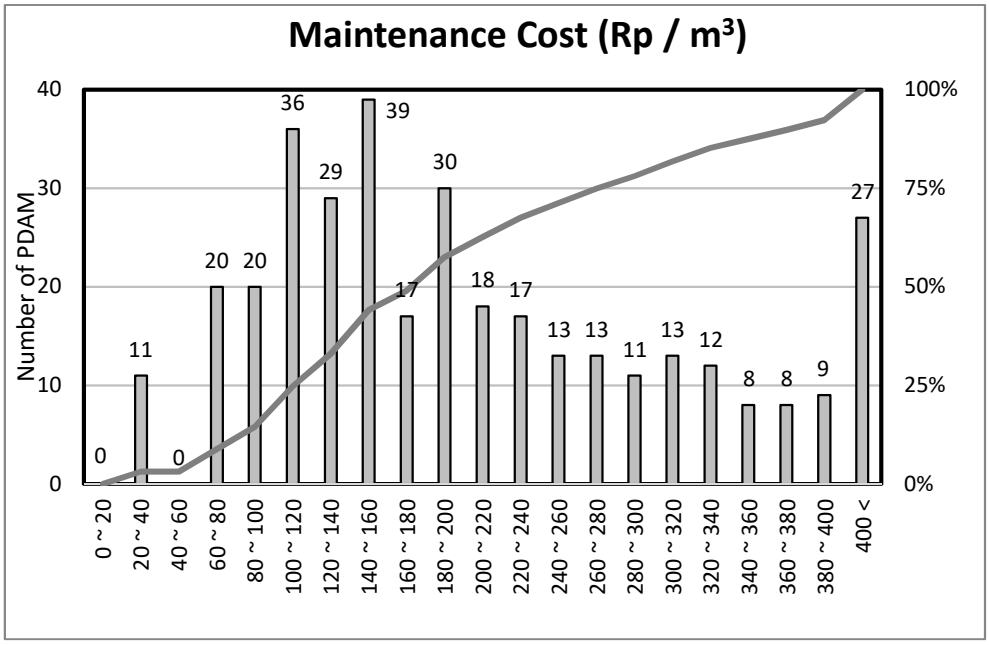


Figure 7. PDAM Maintenance Cost in 2014

Based on BPPSPAM Data 2014, 39 out of 351 evaluated PDAMs have maintenance cost of Rp 140 - 160 / m^3. There are also 27 PDAMs that have maintenance cost more than Rp 400 / m^3 of water produced. It can be concluded that those PDAMs still have high maintenance costs compared to other PDAMs.

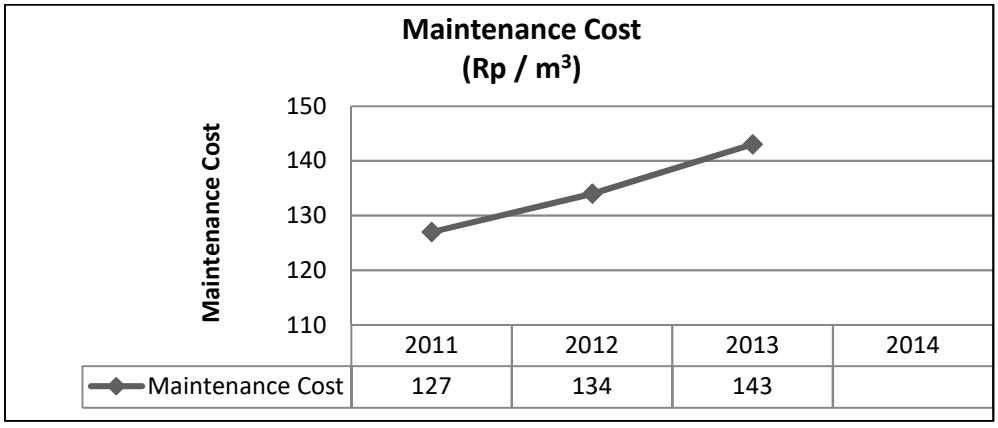


Figure 8. Median of PDAM Maintenance Cost in 2011 – 2014

From the data trend in 2011 – 2014 that is shown by the graph above, it is indicated that PDAM maintenance cost is increasing steadily each year.

From those previous indicators, it is shown that PDAM performances throughout Indonesia have not reached the good state. Therefore, an applicable and suitable efficiency energy method is needed especially for small PDAMs with low budget.

2.2 PDAM Problems and Challenges Related to Energy Efficiency

2.2.1 JICA Expert Team Baseline Survey

JICA Expert Team conducted baseline survey in 2015, to clarify the operation status of PDAMs relevant to the JICA Technical Cooperation Project on Strengthening COE Program for PDAMs ("the Project") at the time of project commencement.

2.2.1.1 Based on Data Analysis

356 PDAMs can be classified according to target province status determined by the Project. Three target provinces selected are South Sulawesi, South Sumatra, and West Java.

Table 1. Comparison of PDAM Operation Indicators at Target Provinces

	PDAMs in South Sulawesi	PDAMs in South Sumatra	PDAMs in West Java	PDAMs in other provinces	All PDAMs	Healthy PDAMs	Less Healthy PDAMs	Sick PDAMs
Operation indicators (mean value)								
Operating ratio (ratio)	1.2	1.8	1.0	1.3	1.3	1.0	1.7	1.6
Collection efficiency (%)	81.0%	72.1%	91.0%	87.9%	87.1%	92.1%	84.6%	76.5%
Solvency (%)	1903.0%	19768.0%	613.5%	18054.7%	15930.2%	16974.1%	16215.7%	12372.9%
Complaint resolution level (%)	90.9%	87.2%	95.2%	91.4%	91.5%	94.9%	92.0%	81.3%
Production efficiency (%)	53.4%	47.3%	71.3%	59.9%	59.8%	69.0%	52.8%	43.5%
NRW (%)	30.2%	34.4%	30.5%	34.2%	33.7%	28.5%	36.3%	45.1%
Water meter replacement (%)	2.2%	2.3%	7.7%	4.5%	4.5%	5.7%	3.6%	2.1%
Return on assets (ratio)	-0.03	-0.04	0.03	-0.03	-0.02	0.02	-0.06	-0.09
Energy cost (Rp/m3)	593	506	294	460	460	442	483	477
COE participation rate (%)	2.2%	2.0%	1.0%	1.5%	1.5%	1.4%	2.0%	1.7%
Operation scale (total value)								
Number of PDAMs	23	12	23	298	356	192	99	65
Number of employees (person)	2,794	1,990	6,947	40,225	51,956	38,578	8,508	4,870
Real production (l/sec)	5,311	5,250	15,424	104,784	130,769	115,062	10,576	5,131

Source: Baseline survey PDAM 2014 Data Analysis Reports by JET

Definitions and explanations of PDAM Operation Indicators are as follows:

(1) Operating ratio = operation expenses / operation revenue
This is to indicate the level of total operating expenditures which generate total operating revenues. Generally this ratio is considered good if it is below 1.

(2) Production efficiency = realization of production in m^3 / installed capacity in m^3 * 100
This is a capacity utilization indicator of a PDAM's water production facilities. The nearer to 100%, the better.

(3) Energy cost = energy cost (electricity, diesel, gas, and other fuels) in a year / total production
This is a straightforward indicator to show energy costs. The lower, the better. It should be noted however, that every PDAM is subject to different facility mix and geography factors. Thus comparison among different PDAM groups in this indicator has to be done with care.

(4) COE participation rate = number of COE program participants from 2012 to 2014 / number of PDAM employees in 2014 * 100
Low COE participation rates could be construed good as such PDAMs with low COE participation might be already healthy enough therefore not need the COE input. However we take it naturally that high COE participation rates are good as they represent positive attitude in the PDAM operation.

From Table 1., it can be concluded that:

(1) Operating ratio

- South Sulawesi PDAMs --- Very good since the average of this PDAM group is 1.2, which exceeds 1.0. The healthy PDAM group maintains the average value of 1.0 for this indicator.
- South Sumatra PDAMs --- The average value of 1.8 is considered poor. Even the less healthy PDAM group has the average value of 1.7.
- West Java PDAMs --- This is considered good since it has the same average value as the healthy PDAM group.

(2) Production efficiency

- South Sulawesi PDAMs --- Poor. In comparison among the three targeted province PDAM groups and the non-targeted province PDAM group, its 53.4% percentage is only higher than the South Sumatra PDAM group. Compared with the health status PDAM groups, only the less healthy PDAM group has a slightly lower value.
- South Sumatra PDAMs --- Poor. Its average value of 47.3% is the lowest among the three targeted province PDAM groups and the non-targeted province PDAM group. Only the sick PDAM group shows the lower average of 43.5%.
- West Java PDAMs --- Good. Its average value of 71.3% is better than the other two target province groups and the non-targeted province group. Also it exceeds the average value of the healthy PDAM group.

(3) Energy cost

- South Sulawesi PDAMs --- Very poor. The average of this PDAM group is Rp. 593, far exceeds any of the other group values.
- South Sumatra PDAMs --- Poor. Its average value of Rp. 506 is only lower than South Sulawesi. All other groups show a lower value.
- West Java PDAMs --- Very good. Its average value of Rp. 294 is much lower than all other groups.

(4) COE participation rate

- Prior to this baseline survey point or during the period of 2012-2014, the 356 PDAMs presented in the PDAM performance book 2015, received the COE program input in the form of their staff's participation in the COE training courses. In total, the number of such PDAM staffs who participated in the COE course is 779. With the total number of staff of the 356 PDAMs is on 51,956, the national average of the COE participation rate is at 1.5%.
- South Sulawesi PDAMs --- Good participation level. Its 2.2% participation rate is higher than that of the national average and also higher than those of the healthy, less healthy, and sick PDAM groups.
- South Sumatra PDAMs --- Good participation level. Its 2.0% participation rate is higher than that of the national average and also higher that of healthy PDAM group.
- West Java PDAMs --- Poor. Its participation rate is 1.0%, which is the lowest in all the PDAM groups shown here.

2.2.1.2 Based on Interview with COE Participants

Based on the COE Participants interview results, energy problem that often faced by respondents's PDAM are divided into the following categories:

(1) Cost related problems:

- High monthly electricity bill.
- High extra charge (fine) on monthly electricity bill due to low power factor.

(2) Pump system and other equipments related problems:

- Pump system are often disrupted (tripped).
- Attempts on pump merging due to higher demand level is not successful yet.
- Replaced pump is unable to solve the service issues.
- Despite the installment of booster pump, the pressure in some area is still low.
- Pressure in some service area is too high.
- PDAM Management is unable to identify whether pump system is inefficient or efficient.
- PDAM does not know what they should do with their pumps and its installation
- Concrete bases and anchor bolts for pumps and electric motors are not in good condition
- Layout cables, measuring tools, and other instruments in the panel relay station is in disheveled condition (untidy)
- Starting method of electric motor is still a full-voltage starting system
- Power factor compensation units are not set in pumping stations.
- Accessories such as flow control valves and pressure gauges in pump system arrangement does not yet reflect the efficient hydraulic system.
- Measuring tools and pump / network safety instruments does not yet exist / complete / function well.
- Some instruments such as power-factor meter have not been well utilized yet because PDAM does not yet understand about the function of the instruments.
- Flow meter is not installed in pumping stations.

(3) Whole water supply system planning related problems:

- Transmission / distribution networks are not analyzed by pipe network analysis software such as EPANET
- Pumping system planning is bad
- There is no technical drawing of whole piping system
- Inefficient equipments installation that causes wasteful energy
- Layout of cables, measuring tools, and other instruments in the panel or relay station is in disheveled condition (untidy/disorganized).
- PDAM does not know how to improve energy efficiency in their existing equipments

(4) Electricity related problems:

- Electricity supply problem from PLN (power outage, limited supply, unstable voltage, etc.)

(5) Problems related with Implementation of Energy Efficiency knowledge that are learned from COE program:

- Lack of equipment
- Lack of budget
- Lack of human resources
- Lack of support from PDAM management
- Knowledge is not applicable
- The curriculum is not suitable with participants level
- EE issues from the viewpoints of entire water supply system is not included
- Approaches on how to improve EE in the entire water supply system are not introduced yet unit based improvements are included

2.2.2 Based on JICA Expert Team PDAMs Interview at Target Provinces

Other than baseline survey, JICA Expert Team has also interviewed several PDAMs in several provinces on August 2015 and January 2016.

2.2.2.1 South Sulawesi

(1) PDAM Kota Pare-pare

The EE interview shows that PDAM Kota Pare Pare does not have special equipment to reduce the power factor (power factor compensation units). There are extra charge (fine) in several months due to low power factor. Any record and calculation is also done manually since there are no computerization system in this PDAM.

Regarding the COE program, according to Mr. Wahid, the head of production and treatment subdivision of PDAM Kota Pare-pare who has participated on TOT in 2013, the knowledge that he gained at TOT had given him a deeper insight on performing his job. However, not all the equipment shown at the TOT correlates and applicable in PDAM Kota Pare-pare.

(2) PDAM Kabupaten Gowa

Based on interview results with Mr. Muttazam, the head of technical subdivision of IKK Manuju PDAM Kabupaten Gowa who has participated on TOT at Surabaya in 2015, from the COE training he learned new technology about impeller modification yet that the training length is not enough for him to understand the module because the materials are new to him.

The biggest energy efficiency problem in PDAM Kabupaten Gowa is that there is no power factor compensation units available. Due to this condition, monthly cost for power consumption is very high.


Figure 9. Interview and Meeting with PDAM Kota Pare Pare and PDAM Kab. Gowa

2.2.2.2 South Sumatera

(1) PDAM Kabupaten Ogan Ilir

According to Mr. Bahrul Hasan the head of Rambutan WTP in PDAM Kabupaten Ogan Ilir who has participated in BINTEK Palembang in 2012, the theories that he learned in BINTEK is not applicable because they currently do not have the equipments.

He also suggested the EE related problems that they have faced are as follows:

- since 2008 until 2013 they had used almost IDR 100.000.000,- / year only for maintenance cost and for replacing old pumps.
- They do not have any laboratory, speed control, or EE equipments.
- There are no water flows installed in every WTP unit (Total = 13 WTP).
- The pressure gauge is approximately 2 bar where total head pumps for distribution is about 40 m - 60 m and for intake is about 25 m – 35 m.
- The technical drawing of pipeline network is available although it was not complete yet.

(2) PDAM Kabupaten Banyuasin

Based on the interview with Mr. Hakim Mawar, the head production division of PDAM Kabupaten Banyuasin, who has participated in BINTEK that was held in Palembang in 2012, the EE module is good enough and is easy to understand.

As for the biggest EE related problems in PDAM Kabupaten Banyuasin he suggested as follows:

- PDAM Kabupaten Banyuasin does not have capacitor bank, inverter, power analyzer, clamp meter, and speed meter.
- They don't have special methods for pumps selecting because all pumps are provided by Cipta Karya.
- The power voltage capacity in each WTP is below 380 Volt.
- There is power surcharge that usually happened during peak hour.

Figure 10. Interview and Meeting with PDAM Kab. Ogan Ilir and PDAM Kab.Banyuasin

2.2.2.3 Special Region of Yogyakarta

(1) PDAM Kabupaten Bantul

Based on an interview with Mr. Amiranto, the head of production and quality control division of PDAM Kabupaten Bantul, who had became trainer and taught at BINTEK, he testified that they bought and installed capacitor bank for increasing cos Θ from 0.5 to 0.94 in order to reduce electricity bills. In November 2015 this PDAM succeed to reduce its electricity bills up to 15 – 20 million rupiah which is lower than the previous month.

According to Mr. Amiranto, the weaknesses of COE program are as follows:

- The theory implementation on the field is difficult.
- A lot of participants that were sent by PDAM do not have suitable academic background for COE training. Sometimes, they found administration staff with non technical background participated on EE

Figure 11. Interview and Meeting with PDAM Kab. Bantul

2.3 Energy Efficiency Problem Analysis

Based on the previous section (point 2.2), the major problems related to Energy Efficiency in PDAM could be concluded as follows:

(1) High Electricity Cost
(2) Inefficient Pump system
(3) Bad Planning
(4) Incompatible EE curriculum with participants level, background, and existing technology available in their own PDAM

Those afore mentioned problems should be analyzed in order to find the most suitable and applicable solution.

(1) Cost Related Problem

Based on PDAM statistical data, electricity cost in PDAM mainly reach 55% of total production cost or 25% of basic production cost due to high electricity consumption more than 0.4 kWH / m^3.

COE as comprehensive training for PDAM staffs considers this important matters and adding objective for PDAM staffs to understand the terminologies and the steps required for energy efficiency enhancement efforts and to understand the applicable PLN's electricity tariff and how to circumvent it.

(2) Inffecient Pump System

As for pump system related matters such as tripped pumps, low pressure, and bad pumps installation, an appropriate pump selection and operation methods in terms of the energy efficiency of the whole system should be introduced including pump selection and modification. Thus, EE contents should deal with more pump selection and revolution on speed control. Theoretical training on EE for pumping unit and electrical facilities should be explained in more details. The approaches on how to improve the existing pumps or equipment also need to be included.

(3) Bad Planning

Inefficient transmission and distribution system due to bad planning often becomes causing factor of energy waste and low production efficiency in PDAM. To cope with that, water transmission and distribution system plan for improving energy efficiency have to be explained in more details. Not only planning in transmission and distribution system, but also pumping system planning needed for better energy efficiency. EE issues form the viewpoints of the entire water supply system also need to be included on this module. Approaches for improving EE in the entire water supply system also needed to be introduced and not only on unit based improvements so the whole system can be planned comprehensively.

(4) Incompatible EE curriculum with participants level, background, and existing technology available in their own PDAM

Based on the interview results, most of the contents are quite comprehensive for engineers but it needs some adjustment for operators. EE curriculum should be well prepared based on the levels of training participants in order to achieve its objectives.

3. Review of Existing Training Module

3.1 Energy Efficiency Training Modules Analysis

The basic concept in EE training modules is to reduce PDAM energy use in order to reduce the energy cost as low as possible without affecting its production efficiency which means the PDAM can utilize its maximum production capacity.

Table 2. EE Modules Material

Table of Contents	**Book I**
	• National Energy Efficiency
	  • Energy Management Problems in PDAM
	  • General problems in PDAMs
	  • Problems in Production System
	  • Human Resource Problems
	  • Operational and Maintenance Problems
	  • Energy Management Problems
	  • Potential Energy Losses in PDAMs
	  • Problems in Investment Expenditure
	• Energy Efficiency Audit in PDAMs
	• Steps in Energy Efficiency
	• Theoretical Understanding on Energy Efficiency Audit Implementation
	• Sample of Energy Efficiency Measurement and Calculation
	• Exercise Sheet for Energy Efficiency Calculation
	
	Book II
	• Common Problems in Pumping System
	  • Underperforming Pumps
	  • Diminishing Pump Performance
	  • Tripping Due to Disproportionate Pumps Incorporation
	  • Users that Have Never Formed Pumping System Planning
	  • Users that Have Never Measured/Understood Pumping System Performance Value
	• Pumping System Planning
	• Pumping System Operation
	• Exercise Sheet for Pumping System Calculation
	
	Book III
	• Characteristics of Electric Motor and Pumps
	  • Electric Power Supply
	  • Electric Motor Power
	  • Pump Data
	• PLN Electricity Tariff
	• Power Factor
	• Electricity Measuring Tools
	Exercise Sheet for Power Factor Calculation

The revision for EE modules have been determined by the working committee that consists of DWSD staffs, COE managements consultants, and EE experts from AKATIRTA. Based on the module review meeting that was conducted on 17-18 September 2015 at Falatehan Hotel Jakarta, the revision will be as follows:

Table 3. EE Module Revision

DESCRIPTION	INPUT
Chapter 1: Energy Efficiency in PDAM	• Updates on PDAM performance status based on PDAM Performance Status 2014 released by BPPSPAM • In page I-12 "Steps (how PDAM addresses) in controlling energy usage for pump system operation" will be grouped based on 'case' and 'steps'
Chapter 2: Basic Theories of Electricity	In subchapter 2.5 Meter Measurement Tools: • Variety of tools will be explained in Chapter I • The instruction on how to use the tools are explained in Chapter 9 (Introduction to measurement tools)
Chapter 3: Basic Theories of Hydraulic	• Measurement units for pipe diameter that initially used (m) now changed to (m^2) • The terms "Pumping Flow" replaced with "Flow with a Pump System"
Chapter 4: Steps for Energy Efficiency	• In steps for energy efficiency an addition of "Pumping Hours Control Setting" will be added • Brief explanation on feasibility study (in flow chart methodology of energy audit) • Subchapter "Evaluation" will be changed to "Monitoring and Evaluation" with added explanation on monitoring
Chapter 5: PLN Electricity Tariff Assessment	• The most recent PLN tariff regulation is the ESDM Ministerial Decree No. 31 Year 2014 in replacement of ESDM Ministerial Decree No. 19 Year 2014 • Tariff categorization is revised according to ESDM Ministerial Decree No. 31 Year 2014: – Type of Business to: (B1/TR, B2/TR, B3/TM) – Type of Government Consumption & Street Light to (P1/TR, P2/TM, P3/TR) – Type of Special Service to: (L/TR, TM, TT) • WBP is changed to 18.00 until 22.00 hours • LWBP is changed to 22.00 until 18.00 hours
Chapter 6: Measuring System Performance	• SEC value parameter now added with kW/m^3 units ($400W/m^3$ adding 0,4 kW/m^3) • The formula for total efficiency (p. VI-7) now added with "x 100%"
Chapter 7: Selecting Pump	• More definition on accompanying pump and replacement pump (substitute) • Excel exercise will be given colors on column that are going to be filled
Chapter 8: Proposal and Energy Efficiency Program Report	• Steps on how to compose a proposal based on PDAM study case will be added • Explanation on the importance of composing a proposal for PDAM
Chapter 9: HSE and Introduction to Energy Efficiency Measurement Tools	• A less general explanation on HSE with a focused insight on electricity-related working environment • Explanation of HSE with illustration and APD & hazard symbols that are related with work activities • Measurement tools are described in general, the brands of the tools are not to be included • **HSE materials and Introduction to Tools will be separated into two different chapters**

DESCRIPTION	INPUT
	- HSE to Chapter 9 - Introduction to Measurement Tools to Chapter 10
Chapter 10: Field Exercise and PDAM Visit	• This chapter will be separated from the module and the handout will not be made. • Is going to be included as additional part (including working sheet for exercise) as a separate book in a shape of a leaflet (pocket book)
General	• Module EE will consist of 2 books: - Book 1: Learning material with exercises - Book 2: Session Notes and Handout - Exercises are included in each material per chapter (not separated from subject) - General index on terminology definition for the terms used in the modules will be included - Table and graphics sources will be included on each table / graphics - A "clinic" out of lesson hours will be made available for ± 1-1/5 hours (on the second day) → will be included in the schedule

Source: EE Module Review Minutes of Meeting (17-18 September 2015)

3.2 Energy Efficiency Training Syllabus

The syllabus of Energy Efficiency Course in COE training is shown on Table 4, Table 5, and Table 6.

Table 4. BINTEK Kab / Kota Energy Efficiency Course Syllabus

Day / Hour	08.00-08.45	08.45-09.30	09.30-10.30		10.45-11.30	11.30-12.30		13.30-14.15	14.15-15.15		15.30-16.15	16.15-17.15
MONDAY	Opening	Explanation for BINTEK and Pretest	Concepts, mechanism and regulation on energy efficiency + test 1	Recess	Energy Problems in PDAM	Energy Efficiency Audit	Recess	Energy Efficiency Audit + test 2	Efficiency Energy Opportunities	Recess	Efficiency Energy Opportunities + test 3	Introduction to Hydraulic + test 4
Speaker	Committee	Committee	Arip Ansori		Yusuf Irawan	Yakup Efendi		Yakup Efendi	Irawan Yusuf		Irawan Yusuf	Arip Ansori
TUESDAY	Selection and Calculation of Pump Performance	Operation and Modification of ME Equipments	Operation and Modification of ME Equipments + test 5		Basic Understanding on Electricity and Electric Motors	PLN (National Electricity Provider) Tariff Categorization Assessment + test 6		Calculation and Reparation of Power Factor + test 7			Analytical and Investment Calculation + test 8	Introduction to Efficiency Energy Tools
Speaker	Yakup Effendi	Arip Ansori			Yakub Effendi	Yusuf Irawan		Arip Ansori			Arip Ansori	Yakub Effendi
WEDNESDAY	Energy Efficiency Analysis Excercise (PDAM Visit)				Energy Efficiency Analysis Excercise (PDAM Visit)			Energy Efficiency Analysis Excercise (PDAM Visit)			Calculation of Exercise Results (energy efficiency pump)	
Speaker	Yusuf Irawan, Yakup Efendi, Arip Ansori				Yusuf Irawan, Yakup Efendi, Arip Ansori			Yusuf Irawan, Yakup Efendi, Arip Ansori			Yusuf Irawan, Yakup Efendi, Arip Ansor	
THURSDAY	Simple EE Audit	Simple EE Audit	Post Test and Final Evaluation		**Closing**							
Speaker	Yusuf Irawan, Yakup Efendi, Arip Ansori				Committee							

Source: COE Management Consultants

Table 5. Provincial TOT Training Energy Efficiency Course Syllabus

Date / Time	07.45 - 08.30	08.30 - 09.15	09.15 - 10.00	10.00 - 10.30	10.30 - 11.15	11.15 - 12.00	12.00 - 13.00	13.00 -13.45	13.45 - 14.30	14.30 - 14.45	14.45 - 15.30	15.30 - 16.15	16.15 - 17.00	17.00 - 17.45
MONDAY	Opening	Introduction to TOT & Pre Test	EE Mechanism Concept and Regulation	Recess	Energy Problems in PDAM	Energy Efficiency Audit	Lunch Break	Energy Efficiency Audit	Energy Efficiency Opportunities	Recess	Energy Efficiency Opportunities	Basic Theories of Hydraulic	Selection and Calculation of Pump Performance	
25-May-16														
Trainer		Ms. Mimi Darya	Mr. Peni		Mr. Peni	Mr. Hasan		Mr. Hasan	Mr. Peni		Mr. Peni	Mr. Hasan	Mr. Hasan	
TUESDAY	Operation and Modification of ME Equipments		Basic Understanding on Electricity and Electric Motors		Calculation and Reparation of Power Factor			PLN Tariff Categorization on Assessment			Analytical Calculation and Investment	Introduction to EE Equipments	EE Program Proposal and Report	Post Test
26-May-16														
Trainer	Mr. Hasan		Mr. Hasan								Mr. Hasan		Mr. Peni	
WEDNESDAY	Energy Efficiency Analysis Exercise (PDAM Visit)				Energy Efficiency Analysis Exercise (PDAM Visit)			Energy Efficiency Analysis Exercise (PDAM Visit)			Energy Efficiency Analysis Exercise (PDAM Visit)	Discussion of Exercise Results	Going back to Surabaya	
27-May-16														
Trainer	Mr. Peni & PDAM Kota Malang				Mr. Peni & PDAM Kota Malang			Mr. Peni & PDAM Kota Malang			Mr. Peni & PDAM Kota Malang			
THURSDAY	Introduction to Self Potential and Self Analysis (DISC Test) and Discussion				Effective Communication	Body Language		Teaching Preparation & Making Test	Voice Expression		Communication Principals	Training Purposes and Methods	Andragogi	
28-May-16														
Trainer	Mr. Afif Kurniawan (UNAIR)				Ms. I. Wiwin Hendriani (UNAIR)			Ms. Mimi Darya	Mr. Afif Kurniawan (UNAIR)		Mr. Afif Kurniawan (UNAIR)	Mr. Dimas Aryo W. (UNAIR)		
FRIDAY	Presentation Skills (Public Speaking Preparation)	Speaking Practice (recorded)			Speaking Practice (recorded)	Lunch Break & Friday Prayer			Video Screenings and Discussion		Presentation Skills (Audience Introduction)	Presentation Skills (Teaching Aid and Delivery of Presentation)	Psychology Questionnaire	
29-May-16														
Trainer	Ms. I. Wiwin Hendriani (UNAIR)	Mr. Afif Kurniawan (UNAIR)			Mr. Afif Kurniawan (UNAIR)				Mr. Afif Kurniawan (UNAIR)		Mr. Dimas Aryo W (UNAIR)		Ms. Dewi Retno	
SATURDAY	EE Topic Teaching Exercise (Micro Teaching)				Micro Teaching Discussion	Closing	Lunch Break							
30-May-16					Final Test									
Trainer	Mr. Afif Kurniawan (UNAIR)													

Source: BTAMS Region 2 Surabaya

Table 6. National Training Energy Efficiency Course Syllabus

Date / Time	08.00 - 08.45	08.45 - 09.30	09.30 - 10.15	10.15 - 10.30	10.30 - 11.15	11.15 - 12.00	12.00 - 13.00	13.00 -13.45	13.45 - 14.30	14.30 - 15.15	15.15 - 15.45	15.45 - 16.30	16.30 - 17.15	17.15 - 18.00
SUNDAY 24-Apr-16							**Check-in and Lunch**					TOT Introduction	Competence Based Training	"Branding"
Trainer												Committee	Mimi Darya	
MONDAY 25-Apr-16	Opening	Pre-test and Efficiency Energy in PDAM	Basic Theories of Electricity		Basic Theories of Hidraulics			Steps for Energy Efficiency		PLN Electricity Policy		Measuring System Performance		Selecting Pump
Trainer	Committee	Rahardjono, S	Prijono, ST	**Recess**	Prijono, ST			Rahardjono, ST		Rahardjono, ST		Prijono, ST		Prijono, ST
TUESDAY 26-Apr-16	Operation, Maintenance, and Modification of Pump System				Energy Efficiency Analysis (Technical and Financial)		**Lunch Break**	Energy Efficiency Report and Proposal		Introduction to Energy Efficiency Audit Measurement Tools	**Recess**	Case Study and Problems Handling on The Field		
Trainer	Rahardjono, ST				Prijono, ST			Rahardjono, ST		Rahardjono, ST		Prijono, ST		
WEDNESDAY 27-Apr-16	PDAM Visit				PDAM Visit			PDAM Visit				Discussion of Measurement Results in the Field		
Trainer	PDAM Kabupaten Bogor											Prijono, ST and Raharjdjono		
THURSDAY 28-Apr-16	KNOW THY SELF : Learning Style and Communication Style			**Recess**	"Know Thy Self" Discussion: Teaching Power and Games		**Lunch Break**	Teaching Aids & Presentation Technique		Audience Introduction (review)		Audience Introduction (review)	Material Preparation & Making Lesson Plan	
Trainer	Dr. Soeharini Soepangat, MSc				Dr. Soeharini Soepangat, MSc			Dr. O. Hasbiansyah, Drs., M.Si				Dr. O. Hasbiansyah, Drs., M.Si		
FRIDAY 29-Apr-16	Teaching Practice (Micro Teaching)				Teaching Practice (Micro Teaching)	**Lunch Break & Friday Prayer**			Teaching Experience in Provinces Discussion			Assessment of Learning Outcomes	Post Test	
Trainer	Dr. O. Hasbiansyah, Drs., M.Si								Dr. O. Hasbiansyah, Drs., M.Si					
SATURDAY 30-Apr-16	Exercise Planning & Case Study		Self Development Questionnaire Function and its Analysis	**Recess**	Self Development Questionnaire Function and its Analysis	Closing	**Check-out**							
Trainer	Dr. O. Hasbiansyah, Drs., M.Si					Committee								

Source: COE Management Consultant

3.3 Comments on Energy Efficiency Course Syllabus

Based on the syllabus on the previous page, it was known that Energy Efficiency Course will be held for four days from Monday until Thursday in one week. However, according to JET interview with COE participants, most of them said that the current training length is not enough to understand all the materials. Especially for complicated materials such as hydraulic, pump calculation, and electricity related materials.

As for "Selection and Calculation of Pump Performance" subject, it will be better if in this section participants not only learn about selecting and calculating pump but also learn about how to improve the performance of existing pump that available in their own PDAM so the participants who comes from small PDAM can improve their own pump without additional budget.

There are no training topics to analyze planning and O&M of distribution networks (e.g. piping network analysis), on a point of view of the energy efficiency of the whole water supply system available in the syllabus.[2]

Not only the efficiency of individual process such as pumps & ME Equipment, the advanced level of EE course should put more emphasis on the Energy Efficiency in the whole water supply system including water supply planning, etc. Furthermore, participants should know how to do the water transmission and supply planning. Thus the subjects related to planning such as design of transmission & supply pipes, diagnosis of existing system using EPANET software, and planning of transmission and supply system improvement should be introduced in the training.

Some participants commented about the difficulties on implementing the theory that they learned at EE Training Course. Therefore, in order to make the theories more applicable in their own PDAM, trainers should introduces about how to apply the theories on PDAM current facilities or equipments. For example, in "Pump Modification" section it has to be suitable with the common pumps that are used by the participants's PDAM. The practical tutorial for pump selection, calculation, and modification also should be introduced on the training course in order to facilitate the participants so the theories will be more applicable for them.

One of classical problems related to Energy Efficiency is Equipments Maintenance. Besides Operational cost, PDAM also spends most of their money on Equipment Maintenance and Repairment cost. The current syllabus for Energy Efficiency only focused on pump selection and calculation, ME equipment operation and modification, and basic electric motors concept. It is suggested that besides those subjects that was mentioned before, trainers also introduce about the concept of Pump and ME Equipments Maintenance to the participants, such as: how to do the regular equipments maintenance more efficiently, costless, and easier.
ME Equipment and pump repairment methods also need to be introduced in the training so that PDAM can save more budget on pump and ME equipments. They do not need to purchase new equipment if it is broken, the staffs who has learned the repairment methods can repair the equipments so they can use the existing equipments longer.
According to the syllabus, the field visit will be held on the 3rd day (Wednesday). Energy efficiency analysis exercise will be done in the designated PDAM. It was suggested that the case study on electricity cost and capital investment should have been included in this subject.

In addition to technical theories, human resources management in EE also need to be introduced. The participants need to be introduced about ho to establish special team for EE implementation in their own PDAM. For more effective implementation in PDAM, the special team / division for improving Energy Efficiency in PDAM is need to be established.

3.4 Direction for Training Module Revision

Further revision will be made in the following direction:

(1) 2016 version will be utilized as it is, and appropriate pump selection and operation methods in terms of the energy efficiency of the whole system will be introduced.
(2) The following subjects will be added.
- Water transmission and distribution system plan to improve energy efficiency
- Pumping system planning for better energy efficiency

3.5 Conclusion

According to the previous sections, data analysis, and Baseline Survey Reports which JICA Expert Team presented on Join Coordinating Commitee (JCC) Meeting held on March 2016, it can be concluded that:

(1) EE contents should deal with more pump selection and revolution speed control.
(2) Revised 2016 EE Text focusses on EE theoretical training for pumping unit and electrical facilities.
(3) Most of the contents are comprehensive for engineers but it needs few adjustment for operators.

Challenges on the existing module is summarized as follows :

(1) EE curriculum should be prepared considering the levels of training participants.
(2) EE issues from the viewpoints of the entire water supply system is not included.
(3) Approaches to improve EE in the entire water supply system are not introduced but unit based improvements are included.
(4) The approaches on how to improve the existing equipments are not included.

4. Good Practices

4.1 PDAM Kota Malang Case

Since 2006, PDAM Malang City have attempted to reduce the energy cost. As the first step, PDAM Malang City conducted an identification and an evaluation upon its mechanical and electrical equipment. This step was an effort to introduce the gauge of big energy consumption and other technical matters that influence the energy consumption, such as follows:

(1) Pump Operation Hour Control

In order to handle peak hour tariff, PDAM Malang City arranged the operation of maximum Wendit Pump out of the peak load time (Luar Waktu Beban Puncak – LWBP) to fill Monjolangu and Buring Reservoir. In BWP, the pump was turned off. Afterwards, Monjolangu and Buring Reservoir sent water to subscribers using gravity force. This step became a successful setting for pump operation schedule in lowering electric consumption cost as much as 72% as seen in the following graphic.

(2) Bank Capacitor Installation

PDAM Malang City conducted an installation of bank capacitor in some pump motors to save energy and eliminating KVAR penalty. Previously, bank capacitor installation in the Monjolangu pump room had the capacity factor of (cos) < 0.8, thus PLN charged KVARH penalty.

(3) Pump Modification

There was an obstacle in the pumping system to Monjolangu service area. The existing pump operation had an over capacity compared to subscribers' actual need. Should this system is still operating, PDAM would undergo losses due to energy wastefulness.

(4) Reservoir Optimization

Reservoir optimization was intended to minimize the use of the pump and to maximize the water supply using gravity. The scenario was started by pumping untreated water from Wendit to Buring Reservoir that has a quite high elevation. Next, the water would be distributed by way of gravity to the subscribers and was controlled using Pressure Relief Valve (PRV). The observation toward water level in Buring Reservoir was done by using tendon monitoring tool read in a real time manner.

(5) EE Program Integration with NRW

The management of NRW control actively participated in EE program in PDAM Malang City by using PRV on certain DMA through a position setting of HIGH and LOW pressure. When PRV worked on minimum hour, the water was kept in the reservoir. On the peak hour, the water was distributed without using the pump.

(6) Monitoring Pump Operation and Maintenance

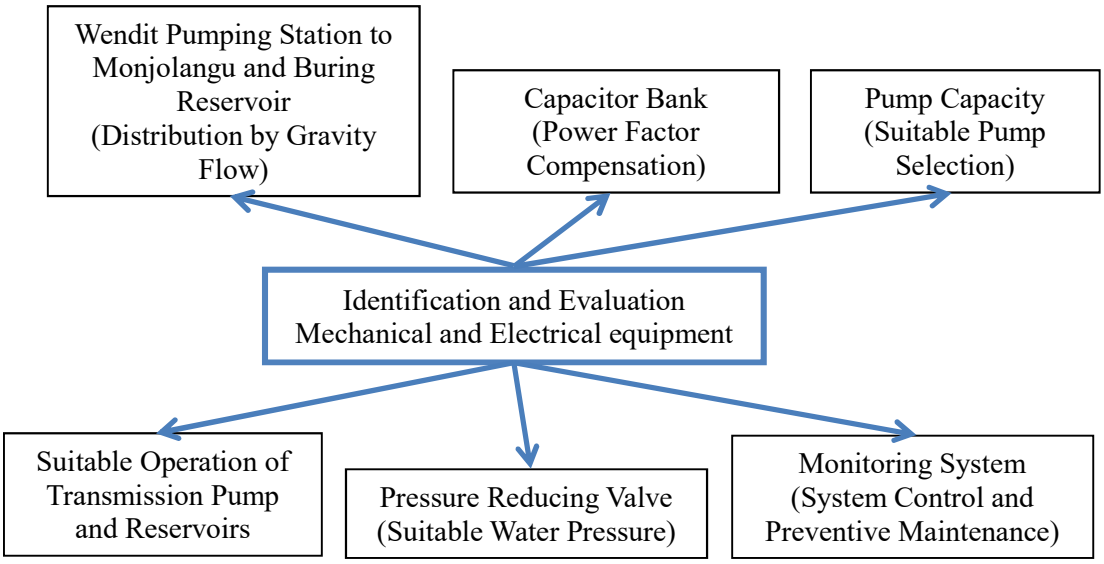
The pumps operation and maintenance were monitored periodically and through online system in order to find out if there was any abnormal condition on its ME system.

The operational and maintenance monitoring activities are as follows :

- Oil replacement for Vertical Turbine of the Pump.
- Maintenance (treatment) of Transformer Oil.
- Maintenance for the network of transmission pipes

Summary

The first step in energy efficiency program for the pumping system needs M & E identification, along with the piping transmission and distribution system to formulate the best strategy.



4.2 PDAM Kabupaten Tangerang

In PDAM Tangerang District, at first, all drainage systems, either production or distribution, used pump with a high cost for the energy. Every three months, tariff for PLN electricity increased. Ironically, tariff for PDAM water adjusted its increase every 3-4 years. This high electricity cost became a task for PDAM management.

The situation begun to change when the position of Divisional Head of Distribution was passed to Baya Pangiluan Hatta ST. He was an alumni of COE's National Technical Guidance in 2014. He strived to settle the problem in flowing water to Duta Garden, since it had become his responsibility. After considering some matters, Mr. Hatta settled the said problem by formulating the following stages:

(1) Stage – 1: Preparation Activity

Based on the field condition that showed a less sufficient water pressure to Duta Garden, it is essential to find a solution in order to increase the pressure. There are two options, namely (1) Booster Pump and (2) Inline Pump. With Booster Pump, it takes a large area, high cost, and also much time for constructing due to the involvement of civil and construction work. Clearly, this option is inefficient. Considering the aspect of area, cost, and time spent to provide it. Thus, the second alternative is chosen. By using Inline Pump, it takes a very small area, relatively low cost, and a short time to install.

Inline Pump contributes to the most appropriate solution, giving high pump efficiency and energy saving for the following characteristics: (1) minimum vibration; (2) smooth bump on the pump; and (3) electricity save. By comparing the product catalogue of Inline Pump, the chosen Inline Pump has 2 bar head or 20 meter. 20 bar head was chosen based on the result of hydraulic simulation using EPANET. The chosen Inline Pump is a type that directly installed with automatic and manual drive speed variable.

(2) Stage – 2: Inline Pump Operation

On the contrary, in the evening there are no complaints from the subscribers that are located before the Inline Pump location. However, the water distribution to the subscribers in Duta Garden were not optimally handled yet. It could be summarized that the water conductive system at night was safer because it gave no impacts or disturbed the subscribers outside Duta Garden. But, there is yet another obstacle to be solved, it is that the water was still not optimally distributed to the subscribers in Duta Garden.

(3) Stage – 3: Dividing Service Hour

From the result of temporary operation, it can be concluded that the safest water distribution that does not interrupt other subscribers outside Duta Garden was to perform in the evening. In order to get optimum result, which is to be enjoyed by all subscribers, it is essential to arrange the schedule of water distribution and to take other actions from the community. Therefore, before deciding the distribution schedule, PDAM Tangerang District also conducted an active socialization to the residents, either through RW (Rukun Warga/ Community Association) or to directly meet the residents.

Within the socialization process, PDAM Tangerang District also demand the residents' willingness not to use suction pump. PDAM Tangerang District could guarantee a smooth water distribution in exchange. After having residents' agreement PDAM Tangerang District continued a trial of water distribution. During the trial process at night, from 20:00 until 04:00 WIB, the water flow was still not evenly distributed. Thus, PDAM team divided Duta Garden into two service areas. Area 1 served 217 subscribers, and Area 2 served 650 subscribers. The operation hour was also divided. For Area 1, it started from 20:00 until 23:00 WIB, or 3 hours of operation. Meanwhile, Area 2 started from 23:00 until 04:00 WIB (5 hours of operation). In fact, with this kind of distribution system, the water would be distributed evenly and smoothly. All subscribers in Duta Garden will get their water.

(4) Stage – 4: Calculating Technical and Financial Benefit

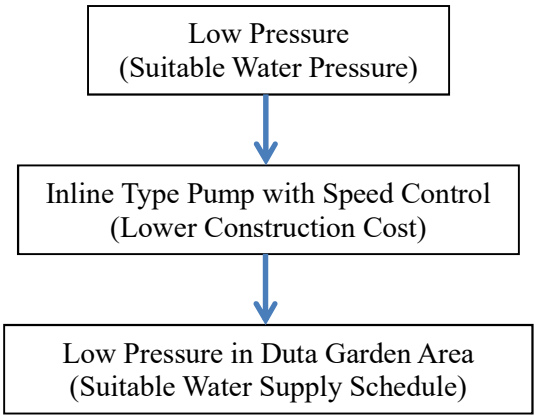
From technical aspect, the benefit taken from the installation of Inline Pump is an evenly distributed water pressure for the subscribers in Duta Garden. Continuously, an average debit coming was 22 lt/sec. Before the installation of Inline Pump, the water consumption of Duta Garden was only 12 lt/sec. After installing Inline Pump, the water consumption increased up to 58%, or 19 lt/sec, with 8 hours of operation per day.

From financial aspect, the benefit taken by PDAM Tangerang District is the increasing of monthly income. With average tariff in the amount of Rp 3,500/m3, the previous income of Rp 108,864,000 increased significantly to Rp 172,368,000, or a Rp 63,504,000 increase. Mr. Hatta stated that the investment from the installation of Inline Pump cost about Rp 200 million. With such increase in the revenue, the investment could return in only 4 months.

The success obtained by PDAM Tangerang District is the success from technical and financial aspect. Owing to the hard work of PDAM team and mutual cooperation with the community, the problem of uneven clean water distribution for 12 years can be solved eventually. Furthermore, the benefit calculation showed that the investment spent could be returned in a short time. However, the actual precious gain is the guarantee in providing services for the subscribers in the future. Complaints that turned into appreciation from the subscribers upon the hard work done by PDAM Tangerang District team truly became the most important achievement.

Summary

Pumps selection and operation is one of the most important factors in achieving energy efficiency on whole water supply system in PDAM.



4.3 PDAM Kota Bekasi

Drinking water flowing system in PDAM Tirta Patriot Bekasi City entirely use the pumping, either in production or distribution unit. The electrical capacity entirely installed reached 865 KVA, which was used for operating 4 (four) untreated water pump units, 7 (seven) distribution pumps, as well as other electrical needs.

Stepping on the seventh year, in 2013, PDAM Tirta Patriot of Bekasi City attempted to decrease the electricity cost. Understandably, the electricity component took a quite significant operational cost, which was 20% from the whole operational cost. Indeed, every 3 months, the tariff would increase. PDAM then tried to settle such condition through a trial of Variable Speed Drive (VSD) installation. Before VSD Ampere meter was installed, the intake pump took the electrical capacity as much as 90 Ampere, while the distribution pump was about 450 Ampere.
Total water volume distributed to the subscribers during 2012 was 10,650,528 m^3. Meanwhile, electricity cost had spent the fund as much as Rp 3,098,726,352. The average operational cost of electrical energy for distributing 1 m^3 water was Rp 291 (electricity cost = Rp 291/m^3). In 2013, the volume of distributed water increased into 6.4% or 11,329,632 m3 with the electricity cost of Rp 3,619,139,800. It means that there is an increase up to 17%. Therefore, the electricity cost for distributed water per m^3 reached Rp 319 (electricity cost = Rp 319/m^3).

During 2013, the electrical tariff from PLN increased as much as 5% every 3 months on April, August, and October with the following details:

Table 7. PLN Electrical Tariff in 2013

	Non-Peak Load Time (Luar Waktu Beban Puncak – LWBP)	Peak Load Time (Waktu Beban Puncak – WBP)	KVARH (Kilo Volt Ampere Reactive Hour)
January – March	Rp 880/kWh	Rp 1,320/kWh	Rp 963/kWh
April – July	Rp 925/kWh	Rp 1,388/kWh	Rp 1,013/kWh
August – September	Rp 975/kWh	Rp 1,463/kWh	Rp 1,067/kWh
October – December	Rp 1.020/kWh	Rp 1,530/kWh	Rp 1,117/kWh

Source: COE Best Practices Books

Due to the increasing operational cost of electricity, in the beginning of January 2013, PDAM Tirta Patriot conducted an installation of Variable Speed Drive (VSD) on intake pump system and distribution pump. The cost for installing VSD was Rp 300 million and is entirely funded by internal fund of PDAM Tirta Patriot Bekasi City.
PDAM technical data showed that after VSD installation, a decrease in ampere occurred. Within

the use of intake pump, the ampere decreased from 90 to 50 ampere. Meanwhile, for distribution pump, the decrease was from 450 to be 275 ampere. By using the following formulation:

$$Vp = \sqrt{3} * Volt * Amp * Cos\varphi$$

Thus, the comparison of electrical energy consumption shall be as follow:

(1) Intake Pump
- Before VSD = 1.73 x 380 x 90 x 0.87 = 51,475 W = 51.475 kW x 24 hours x 30 days = 37,062 kW/(Month)
- After VSD = 1.73 x 380 x 50 x 0.87 = 28,600 W = 28.6 kW x 24 hours x 30 days = 20,592 kW/(Month)
- Difference of Power Efficiency (44%) = 16,470 kW/(Month)

(2) Distribution Pump
- Pre-VSD = 1.73 x 380 x 459 x 0.87 = 262,520 W = 262.520 kW x 24 hours x 30 days = 189,014 kW
- Post-VSD = 1.73 x 380 x 275 x 0.87 = 157,282 W = 157.282 kW x 24 hours x 30 days = 113,243 kW
- Difference of Power Efficiency (40%) = 75,771 kW

From technical aspect, the power efficiency upon intake pump and distribution pump could save up to 92,241 kW. It brought a great impact on the economic benefit.
The benefit of economic aspect from VSD installation is calculated by comparing the saving of electricity payment by apple to apple way, namely by using the same electricity tariff in 2012 and 2013. As previously stated, in 2012, the electricity cost was Rp 291/m^3. By using the same electricity tariff in 2012, the electricity cost in 2013 almost reached 3 billion, or in exact, Rp 2,895,311,840. If the amount of distributed water cubication was 11,329,632 m^3, the energy cost per m^3 was Rp 255 (electricity cost = Rp 255/m^3).

Economically, the use of VSD was proven to successfully give the efficiency in operational cost decrease for electrical energy as much as 12% per year, which was obtained from the calculation of electricity cost difference per m^3, namely (291 – 255) : 291/year. Its saving had reached Rp 203,414,512 per year. The investment for VSD procurement and installation has a payback period less than 2 years or about 18 months. The average power efficiency for intake and distribution pump reached 41%.

The success of electrical efficiency as a component of this operational cost cannot be separated from the effort and hard work done by PDAM Tirta Patriot Bekasi City team, Director of Technical Division, Tjetjep Achmadi. His commitment in sustainably reducing the operational cost of technical aspect through NRW and EE decrease is proven to be highly serious. His policy is to appoint 3 staffs from PDAM Tirta Patriot Bekasi City for participating in Center of Excellent (COE) program in the form of counseling and technical in province level (2015). Two staffs, namely Ferry Ichsan Muharom and Syafrin Tarmizi, were assigned to participate in NRW. Meanwhile, another staff, namely Iwan Sophian, participated in EE. In daily routines, Iwan Sophian was Sub-divisional Head of M/E in Production Unit that related directly with any efforts of electrical energy reduction. His participation in COE training certainly supported the continuity of VSD installation program in dosing pumps and others.

Summary
An important lesson that can be taken from what experienced by PDAM Tirta Patriot of Bekasi City is from energy efficiency that they did upon electrical consumption. Provided with Variable Speed Driver (VSD) tool, PDAM Tirta Patriot Bekasi City succeeded to optimize the efficiency of electrical capacity up to 41%. The saving done was quite significant in reducing operational cost,

in which the previous electrical component took its portion of 20% from the whole cost. Furthermore, VSD became a smart solution when the increase in electricity tariff occurred periodically, whereas tariff of clean water for the subscribers might not. Certainly, follow the dynamic increase in electricity tariff. This step might be able to inspire another PDAM that is still struggling in achieving a “Healthy” predicate.

Speed Control System
(Suitable Pump Operation)

Ministry of Public Works and Housing
Republic of Indonesia

The Project
on
Strengthening the COE (Center of Excellence) Program
for
PDAMs in the Republic of Indonesia

Customer Relation Module Development Report

June 2016

Japan International Cooperation Agency

KRI International Corp.
Nihon Suido Consultants Co., Ltd.
Yokohama Water Co., Ltd.

The Project on Strengthening the COE (Center of Excellence) Program for PDAMs in the Republic of Indonesia

Customer Relation Module Development Report

(Draft)

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1. Background and Objectives

1.1. Background

The COE (Center of Excellence) is a human resource capacity building program established by DWSD in 2012. Since its commencement in 2012, the COE Program has 3 training modules: (i) Non Revenue Water, (ii) Energy Efficiency and (iii) SAK-ETAP. However, during the course of time, DWSD felt the need to expand the coverage of the COE Program in order to enhance PDAM operation and facilitate comprehensive improvement.

In 2015, JICA Expert Team (JET) was dispatched to give technical assistance to strengthen the COE Program. Along with that some output of the project is set, such as improvement of the current modules and development of two new training module by JET which are. (i) Financial Analysis and Management and (ii) Customer Relation (CR).

The Customer Relation module is developed to establish, improve and strengthen the system of customer relation management. The customer relation management is related to water bill collection efficiency and it is one of the least cost measures to improve PDAM financial condition and hence, comprehensive improvement for PDAM operation and its service.

In the module, JET will elaborate a broader understanding of Customer Relation such as customer information, customer management for NRW reduction, water bill collection, complaint response and management, mapping and GIS, public relations and awareness building activities.

1.2. Objectives

Returning to the background of the Customer Relation module development, the objectives is as follow:

1. To identify the current condition of visited PDAM as well as the existing customer relation system.
2. To analysis data findings related to the customer relation aspects for the module development.
3. To estimate the development process of the Customer Relation Module.

2. Challenges in PDAM Operation

2.1. PDAM Performance Based on BPPSPAM Data

Based on the BPPSPAM PDAM Performance Book, there are several indicators related with Customer Relation aspects. Such as service ratio, customer growth, number of staff per 1000 connection, collection efficiency, complaint resolution level and water meter replacement. These indicators will be breakdown in order to analyze PDAM performance.

2.1.1. Service Ratio

By 2015, the total number of customers is around 9 million compare to the total population in administrative area of 232 million inhabitants. This indicator shows the coverage of PDAM service by comparing the total population of the area with the actual number of population served. In this indicator, a healthy ratio should be approximately above 40% of coverage. However, the data shows that 184 out of 356 PDAMs that have low service ratio under 40% which can be affected by many factors, such as the merge of several PDAMs, new administrative area yet to be covered, etc.

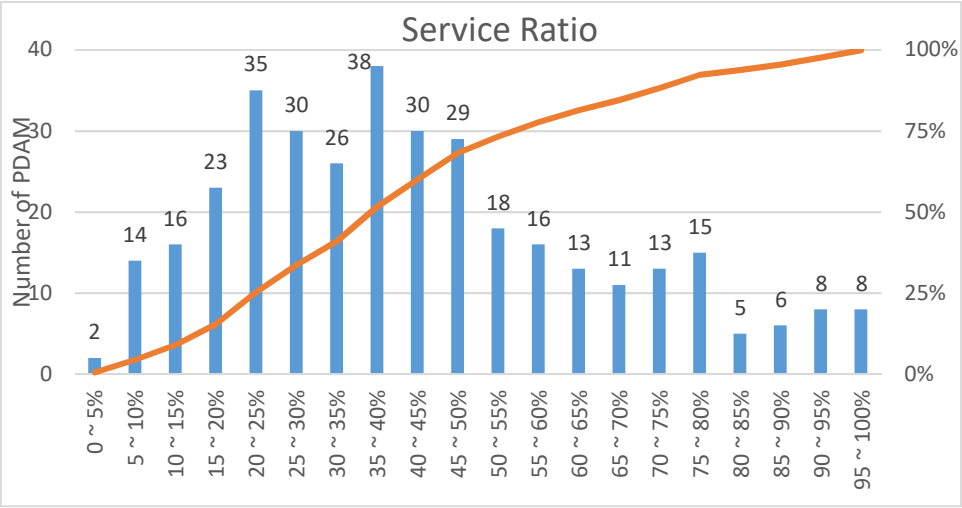


Figure 1. PDAM Service Ratio in 2014

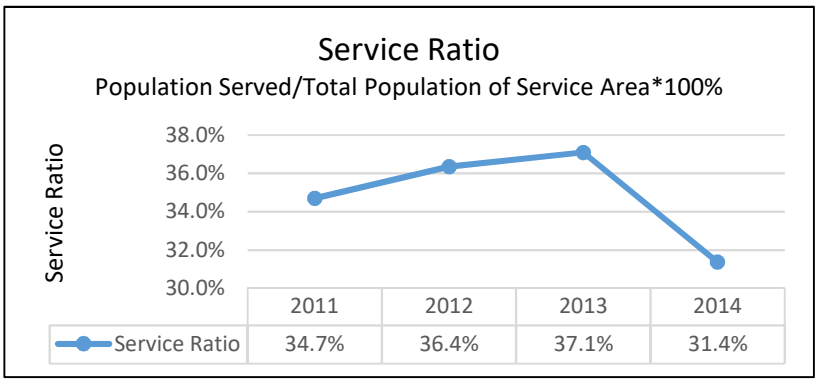


Figure 2. Median of PDAM Service Ratio in 2011-2014

In the data trend above which comprises 50% of percentile value service ratio, it can be seen

that there were increase of service ratio during the course of 2011-2013. However, in the 2014, the service ratio median drops as much as 5.7% showing the service ratio as much as 31.4% from the total population.

2.1.2. Customers Growth

The customer growth is a performance indicator indirectly depicting the effect of PDAM activities and management efforts in increasing its number of customers. A well performing PDAM should score above 6% to show favourable growth in terms of customer increase. In the graph below, it is shown that 219 out of total 341 PDAMs (64,2%) that there is a slight increase in customer growth.

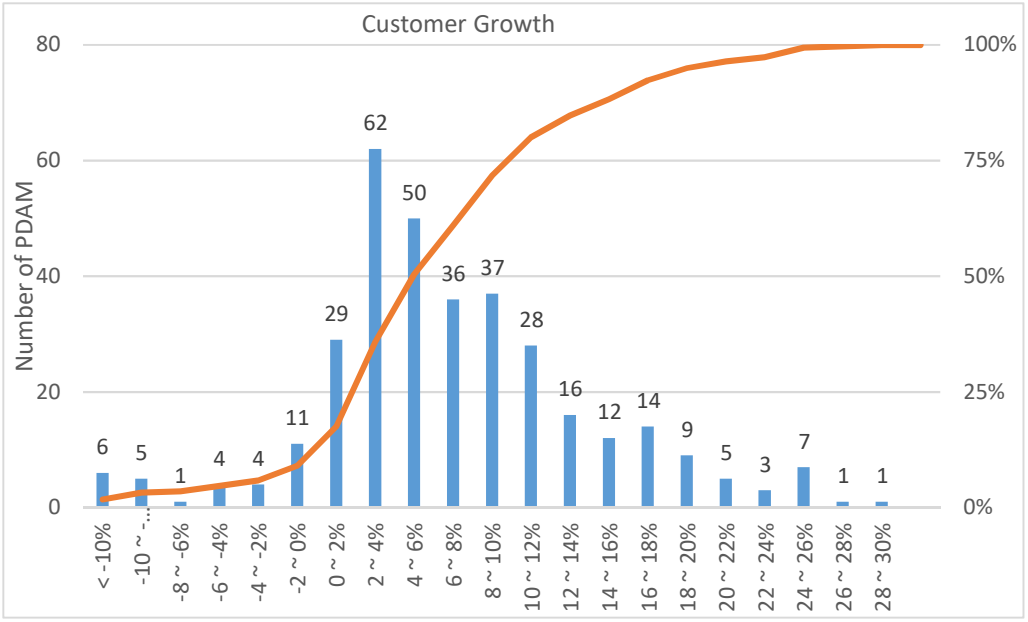


Figure 3. PDAM Customer Growth in 2014

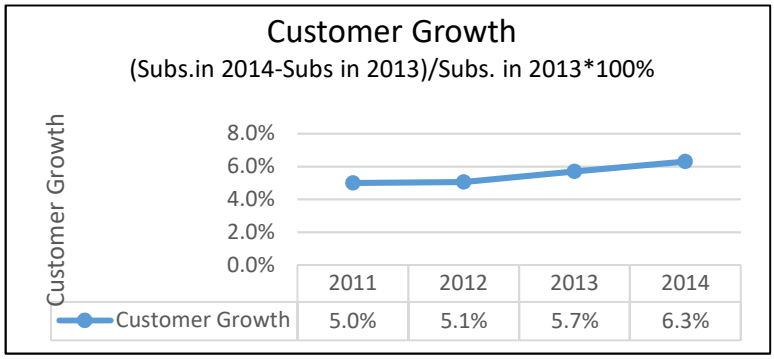


Figure 4. Median of PDAM Customer Growth in 2011-2014

In the data trend line below on 50% of percentile value of the customer growth, in can be concluded that there has been gradual increase of customer year by year. However, the mean is slightly above the median value which is 9%. The data suggest that although the median value is lower than the mean value, there has been improvement of either PDAM promotion

and community awareness to subscribe PDAM water over time or community awareness of water subscription in PDAMs.

2.1.3. Number of Staff per 1000 Connections

The ratio between PDAM staff per 1000 connection is used to measure the efficiency of employee efficiency against customer. The standard of this indicator is considered efficient if the ratio is less than 10 (PDAM Kota) and 12 (PDAM Kabupaten). The efficiency of the staff shows whether or not PDAM activities are carried out effectively for the customer. Positively, 298 out of 342 PDAMs are generally efficient.

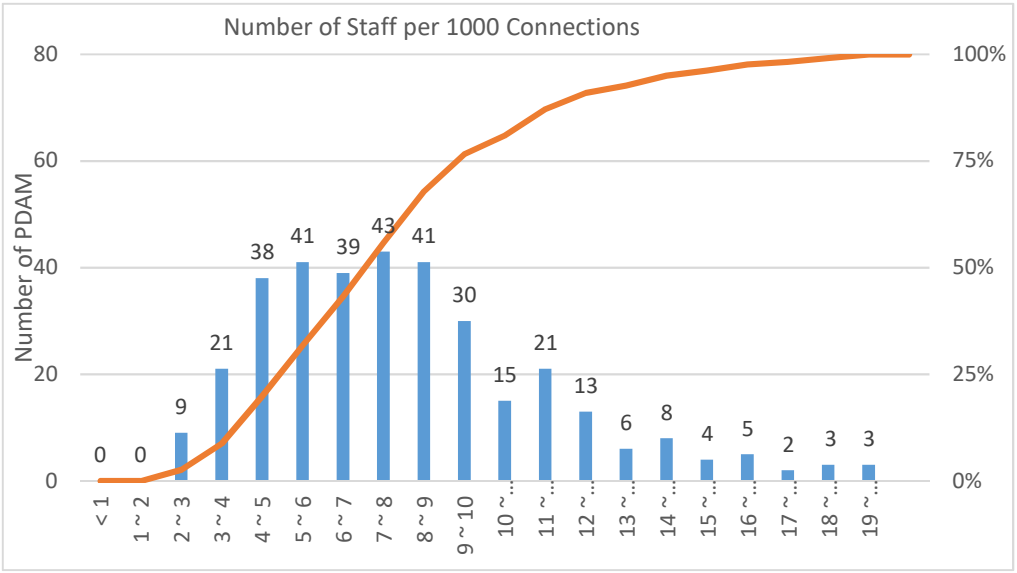


Figure 5. PDAM Staff per 1000 Connections in 2014

Based on median data of the indicator, the average ratio is 8.9. This number means that there are 8-9 PDAM staff per 1000 connections. However, according to the trend line in 2014, there has been a slight decrease to 7.8, continuing the decrease from 2012 which means the ratio has steadily become more efficient. Conclusively the efficiency rate of PDAM staff is corresponding with the increasing customer growth.

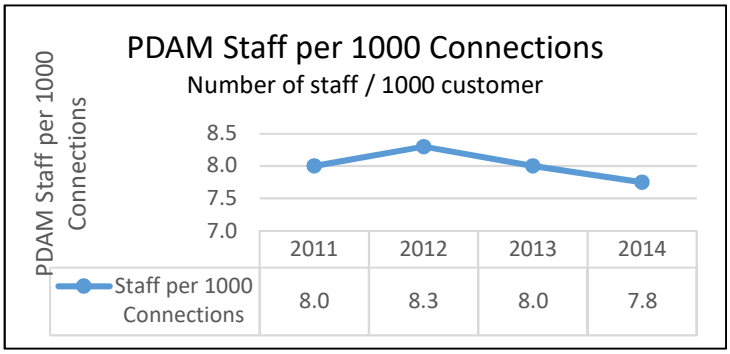


Figure 6. Median of PDAM Staff Ratio per 1000 Connections in 2011-2014

2.1.4. Collection Efficiency

Collection efficiency is an aspect to reflect collectability of the billing to show payment amount based on the number of billing. However, this indicator can also reflect PDAM efforts in outreaching its customer to pay their subscription fee. Thus, the collection efficiency can be seen in the graph below.

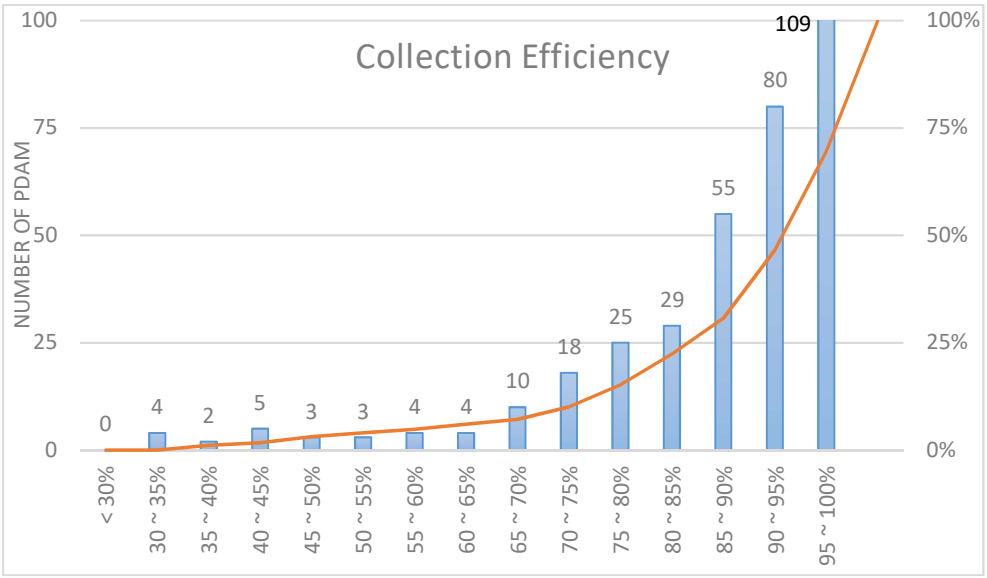


Figure 7. Collection Efficiency in 2014

The graph shows that 273 out of 348 PDAMs has an ideal rate of collection efficiency above 80%. Furthermore, the below 50% percentile shows that the median data is above 90% although it was declining slightly in 2014. The changes in 2014 can be affected by the customer growth. Despite the effectiveness of employee ratio per 1000 customers, there might be some impact in the collection efficiency.

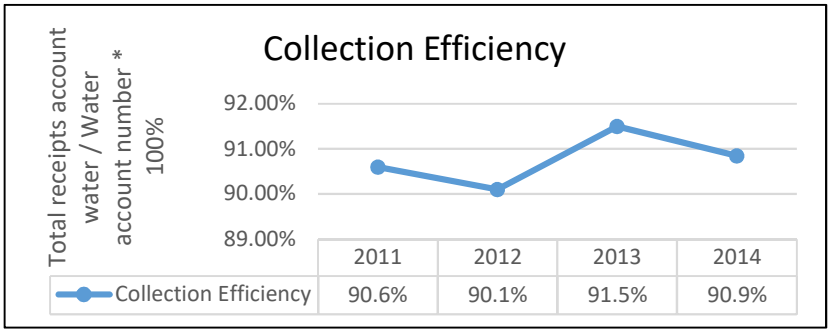


Figure 8. Median of Collection Efficiency in 2011-2014

2.1.5. Complaint Resolution Level

The definition of complain resolution level is to depict PDAM management activity level in managing complaint regarding water and other PDAM related issues whether from customers or non-customers. According to the graph below, numerous PDAM have a good score in complaint resolution. It is shown that 198 PDAMs are concentrated in 100% complaint

resolution level. Out of 354 PDAMs, there are 80% PDAMs that has a good level of complain resolution. Generally, the mean data of the complaint resolution level is 91,5% slightly lower than the median data as seen above. Conclusively, the data trend above indicated that the complaint resolution level is consistent from 2011-2014 and that the PDAM can resolve complaints well.

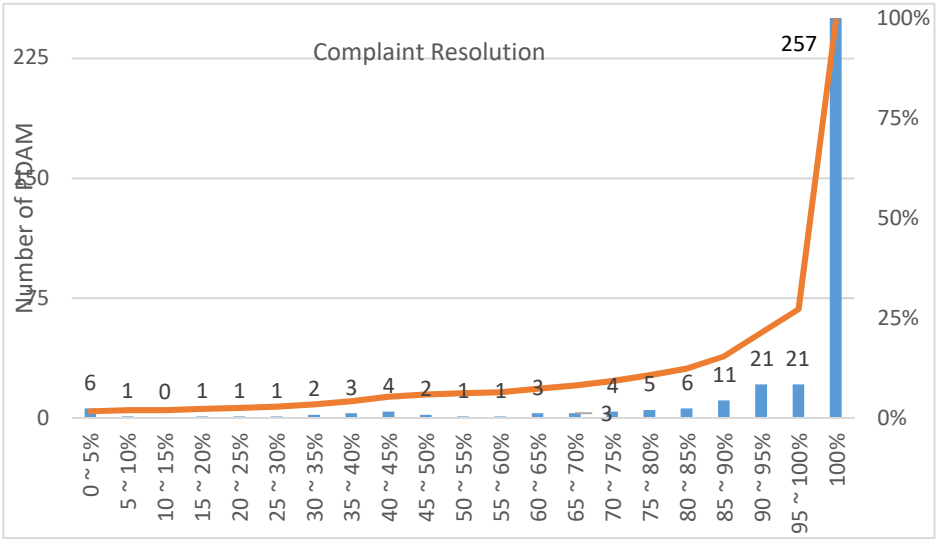


Figure 9. PDAM Complaint Resolution Level in 2014

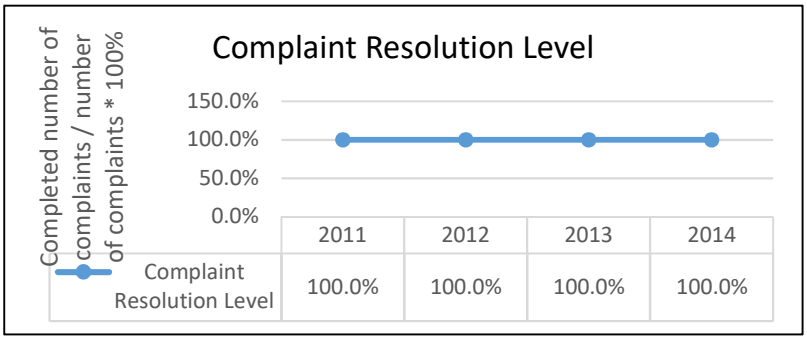


Figure 10. Median of PDAM Complaint Resolution Level in 2011-2014

2.2. PDAM Problems and Challenges Related to Customer Relation

Aside of BPPSPAM Data, JICA Expert Team also collected some information based on PDAM Visit from August to November. Some information is also supported by Baseline Survey result conducted in the late 2015. Some problems and challenges based on three regions are as below.

2.2.1. Based on Baseline Survey Data Analysis

The categorization of PDAM performance is generally divided to 3 categories, i.e. healthy, less healthy and sick. Out of total 356 PDAMs, the data are then grouped based on the project's target provinces which are South Sulawesi, South Sumatera and West Java.

Table 1. Comparison of Performance Indicators in Target Province

	PDAMs in South Sulawesi	PDAMs in South Sumatra	PDAMs in West Java	PDAMs in other provinces	All PDAMs	Healthy PDAMs	Less Healthy PDAMs	Sick PDAMs
Operation indicators (mean value)								
Operating ratio (ratio)	1.2	1.8	1.0	1.3	1.3	1.0	1.7	1.6
Collection efficiency (%)	81.0%	72.1%	91.0%	87.9%	87.1%	92.1%	84.6%	76.5%
Solvency (%)	1903.0%	19768.0%	613.5%	18054.7%	15930.2%	16974.1%	16215.7%	12372.9%
Complaint resolution level (%)	90.9%	87.2%	95.2%	91.4%	91.5%	94.9%	92.0%	81.3%
Production efficiency (%)	53.4%	47.3%	71.3%	59.9%	59.8%	69.0%	52.8%	43.5%
NRW (%)	30.2%	34.4%	30.5%	34.2%	33.7%	28.5%	36.3%	45.1%
Water meter replacement (%)	2.2%	2.3%	7.7%	4.5%	4.5%	5.7%	3.6%	2.1%
Return on assets (ratio)	-0.03	-0.04	0.03	-0.03	-0.02	0.02	-0.06	-0.09
Energy cost (Rp/m3)	593	506	294	460	460	442	483	477
COE participation rate (%)	2.2%	2.0%	1.0%	1.5%	1.5%	1.4%	2.0%	1.7%
Operation scale (total value)								
Number of PDAMs	23	12	23	298	356	192	99	65
Number of employees (person)	2,794	1,990	6,947	40,225	51,956	38,578	8,508	4,870
Real production (l/sec)	5,311	5,250	15,424	104,784	130,769	115,062	10,576	5,131

Source: Baseline Survey PDAM 2014 Data Analysis

From the above table, there are two main indicators in relation with Customer Relation module which are collection efficiency and complaint resolution level. However, to determine further the problems and challenges in PDAM operation, the analysis will include indicators such as water meter replacement and COE participation rate. Below are the conclusions:

(1) Collection efficiency

- South Sulawesi PDAMs --- Not so good. Its 81.0% is only between the levels of less healthy PDAM group and sick PDAM group. Also in comparison among the three target province groups and the non-target province group, South Sulawesi is only the second worst.
- South Sumatra PDAMs --- Bad, because its 72.1% is the worst among all the PDAM groups shown here.
- West Java PDAMs --- Good. Its 91.0% is the best among the three target province groups and the non-target province group. However, the healthy PDAM groups shows even higher value, 92.1%.

(2) Complaint resolution

- South Sulawesi PDAMs --- Not so good. Although its over-90% level may sound good, factually it is lower than the level of the non-targeted province group, all PDAM group, "healthy" PDAM group, and "less healthy" PDAM group.
- South Sumatra PDAMs --- Not so good, by the same reason as South Sulawesi.

- West Java PDAMs --- Very good. This is the highest among all the groups here, including "healthy" PDAM group.

(3) COE participation rate

- Prior to this baseline survey point, or during the period 2012-2014, the 356 PDAMs presented in the PDAM performance book 2015, received the COE program input in the form of their staff's participation in the COE training courses. The number of such PDAM staff who participated in the COE course totalled 779. As the total number of staff of the 356 PDAMs was 51,956, the national average of the COE participation rate is computed at 1.5%.
- South Sulawesi PDAMs --- Good participation level. Its 2.2% participation rate is higher than that of the national average and also higher than those of the healthy, less healthy, and sick PDAM groups.
- South Sumatra PDAMs --- Good participation level. Its 2.0% participation rate is higher than that of the national average and also higher that of healthy PDAM group.
- West Java PDAMs --- Bad. Its participation rate is 1.0%, which is the lowest in all the PDAM groups shown here.

Beside main indicator data analysis, some points made in JICA Expert Team's Baseline Survey and COE Program Report are as follows.

- Most of PDAM have introduced customer management software such as Bimasakti and SiKompak.
- These systems are utilized for mainly for water billing by preparing and issuing bills, issuing and recording uncollected water bills, recording arrear and negotiation history, recording disconnection and reconnection. Thus, most PDAMs have such a customer management system for billing and collection.
- Regarding handling of customer complaints, complaints data are collected and categorized into such problems as supply interruption, pressure and flow problems, water quality problems. However, area-wise analysis of complaints data and the analysis of causes of complaints are not realized yet so as to reflect on the future improvement plan of water supply system.
- Among medium-sized or small sized PDAMs surveyed, most PDAMs have not yet introduced GIS. However, most PDAMs are keen to introduce GIS in the future so that pipeline data and customer data could be liked on GIS, which enables PDAMs to provide customers with daily operation information on water supply interruption, water pressure, etc.

2.2.2. Based on PDAM Visit

Other than the baseline survey, some data findings are found during JICA Expert Team's PDAM visit in several provinces starting from August-November 2015.

2.2.2.1. South Sulawesi Province

(1) PDAM Kota Parepare

PDAM Parepare was the recipient of "JICA Technical Cooperation Project for Water Service Improvement in Mamminasata Metropolitan Are in South Sulawesi Province (2009-2012) and is one of the healthy PDAM in South Sulawesi, improving its condition since 2013. PDAM Kota Parepare can be considered a small PDAM with less than 20,000 connections. Some CR-related characteristics:

- PDAM Parepare uses Sistem Bimasakti.

- Customer database and complaint data are processed as reports that are then categorized based on Kota Parepare's customer categorization.
- They have a dedicated call center, SMS center and in-office complaint management and customer service for customer relation.
- Customer satisfaction survey have been conducted several times with the assistance of NGOs and university students.

(2) PDAM Kabupaten Gowa

PDAM Kabupaten Gowa is a healthy PDAM since 2013 with increasing performance indicator score year to year. Its characteristics are listed below.

- The status is healthy, the service coverage by 2014 is only 43.4% yet customer growth is as high as 17.43%. Total connection is around 28,000.
- Uses Sistem Bimasakti software but enhanced with another system called "SiKompak My SQL". The system has integrated customer (administration), billing and payment, (finance) as well as water meter information (technical).
- The system is not yet connected to GIS.
- Utilizes billing paper as their information paper.

2.2.2.2. South Sumatera Province

(3) PDAM Kabupaten Ogan Ilir

According to the information gathered from Mr. Abuyamin as the head of Customer Subdivision in the visit to PDAM Kab. Ogan Ilir, some problems and characteristics are listed below.

- PDAM Kab. Ogan Ilir is less healthy PDAM with 22.5% service coverage.
- There are 3 people in charge of the customer subdivision, 2 of them focused on complaint resolution and management.
- Utilizes Sistem Bimasakti. However, they use the older version which is not yet integrated with water meter and they have to check water meter status manually.
- The database system is offline, furthermore only 1 person can operate computer.
- In order to pay their water bill, the customer have to pay at the PDAM office.
- There are no public relation or information activities.

(4) PDAM Kabupaten Banyuasin Tirta Batu Betuah

Based on JET visit to PDAM Kab. Banyasin, some characteristics are listed below.

- The system used in PDAM Kab. Banyuasin is different from abovementioned PDAM as they use e-PDAM. The e-PDAM can be accessed directly from Android-OS smartphone and encompasses integrated information system for PDAMs.
- There is no standardization nor synchronization of data input process between PDAM Kab. Banyuasin's units and branches so they have to synchronized everything in the end of the month.
- There are currently no information paper and public relation activities as they think that if people want to subscribe to PDAM services, they will subscribe eventually.

2.2.2.3. Jabodetabek Region

(5) PDAM Kota Bekasi

Based on JET's interview with Ms. Virginia, the characteristics of customer relation system in PDAM Kota Bekasi are as below.

- The customer relation division was newly established as when the total connection was less than 20,000 the customer relation function was merged with general affairs.
- The customer relation office is divided to information and complaint section. The work covers (i) marketing and service, (ii) customer accounts and (iii) electronic data processing.
- PDAM Kota Bekasi utilizes a *Koperasi Karyawan* (employee organization) consisting of subcontracted staff to assist them in home-visit activities such as for meter reading and water charge collection.
- The database in PDAM Kota Bekasi is already integrated with other division information. However, data update is s done manually.
- Complaint are analysed based on types of complaint and reported in monthly basis.
- Payment system can be done through ATMs, post office and a community based payment collector called "*Forum Kolektor". Forum Kolektor* is formed to accommodate both busy PDAM officers and customers through the help of local community volunteering to assist PDAM.
- PR activities are done by cooperating with local government and donor such as IUWASH. PDAM Kota Bekasi also utilizes their own website, issue their own magazine and outreach communities with the assistance of *Forum Kolektor.*
- The Customer Relation office said they do not have an SOP and still have limited operation hours for call-center.

(6) PDAM Kabupaten Lebak

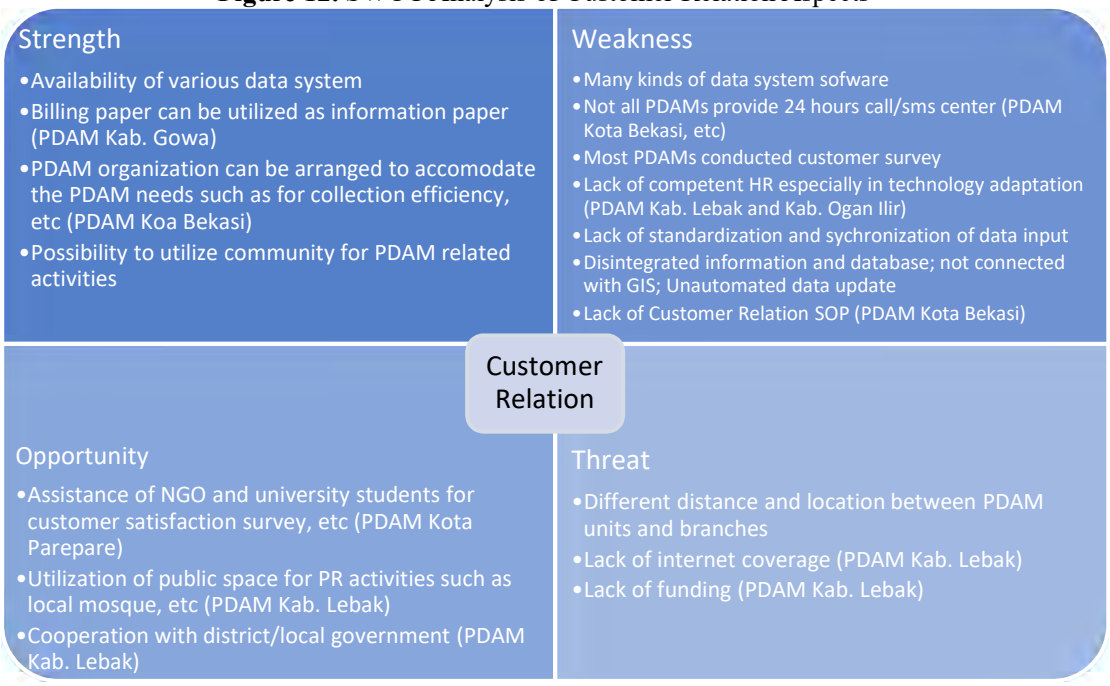
According to some information gathered from JET's interview with Mr. Masri as the director and Mr. Djumhana as the head of customer service subdivision. Listed problems and characteristic are as follow.

- PDAM Kab. Lebak has 5 units aside of its head office with the farthest location of the unit as far as 120 kilometres away and some areas cannot access the internet.
- Database utilizes XLS file since 2006 and enhanced with Billing System Online (BSO). Some information still use paper-ledger and data transfer relies on office network if not, manual transfer through flash disk.
- The information between division are separated and are not integrated.
- Limited knowledge on IT and CR operation, difficulty in keeping up with technology in system information.
- Lack of funding.
- Call center and SMS center are available 24/7. Complaint information are compiled per month and categorized based on the type of the problem, duration and the frequency of occurrence of the problem.
- Public relation and information activities are done through district government, local newspaper, mosque announcement and PDAM mobile tank.

2.3. Customer Relation Analysis

2.3.1. Customer Relation SWOT Analysis

Figure 12. SWOT Analysis of Customer Relation Aspects



Based on above problem analysis and some mapping of strength, weaknesses, opportunity and threat. Every PDAMs have their own advantage and disadvantage. An advantage from certain PDAM may be replicated in other PDAMs as a form of good practice. Further problem analysis based on the SWOT mapping are concluded as follows.

2.3.2. Customer Relation Problem Analysis

(1) Difficulty to make an online system for existing database, limited knowledge on IT development and CR-related activities.

Some PDAM employees especially those from outside Java and in an Kabupaten area are lacking computer literacy. Not only that, sometimes internet connection does not cover that are as well. Therefore, a user-friendly customer management software combined with a good human resource training to adapt with the software is required. Through the COE training, human resource capacity can be enhanced especially in understanding technology.

(2) Unautomated data input and recapitulation; existing information are not integrated

Most customer information data are input manually without an unautomated system to update data so the final database can only be seen in the end of the month. Aside of that, most information between division are separated and seldom presented in a comprehensive database. The CR module can give knowledge and how to integrate separate information in to a single database.

(3) Lack of standardization of data input process and lack of SOP

There is no actual standardization of information or data collection between one PDAM unit and other unit. Until now, most PDAM also lack SOP for customer relation management work. The CR module and COE training should formulate an example of a standardize data input as a reference and include a know-how to formulate Customer Relation SOP for PDAMs.

(4) Lack PDAM resources to conduct customer satisfaction survey

Customer satisfaction survey is important to reflect the opinion of population within the service area. This survey should be conducted for time to time to reflect PDAM service, weaknesses and the improvement required so PDAM can also determine its work plan. However, not many PDAM have resources i.e. time, human resource, equipment and funding to conduct the survey. Thus, the module for Customer Relation may provide strategies on how to arrange external resources to conduct the survey which has been done by several PDAMs.

(5) Difficulties to organize public relation or information activities

Some PDAM have organized public relation activities in public area such as local mosque, etc. in cooperation with NGOs and local/district government. Information paper can sometimes be utilized in billing paper as well. However, not all PDAM have public relational and information activities. CR curriculum should elaborate public relation and information activities for PDAM

3. Good Practices

3.1. PDAM Kota Bekasi

PDAM Kota Bekasi is one of the healthy PDAM with generally improving performance. Even though the customer relation division is just recently formed before previously merged with general affairs, they have carried out good practices in Customer Relation-related activities despite admitting that they lack SOP. Some activities are as follows:

(i) **Utilizing organization structure**. PDAM Kota Bekasi's customer relation office is quite comprehensive comprising marketing, service, customer account management and electronic data processing. PDAM Kota Bekasi have utilized outsourced resources called *Koperasi Karyawan* that are actually subcontracted staff to assist them in home-visit activities such as for meter reading and water charge collection.

(ii) **Community-based group**. PDAM Kota Bekasi also involved their service community in some PDAM activities. For example, a community-based payment collector called "*Forum Kolektor". Forum Kolektor* is formed to fill in the gap between busy PDAM officers and situation such as when PDAM officers already tried to do house-visit but the customer is not at home. Therefore, assistance from community-based group is very helpful.

Summary

PDAM human resource allocation sometimes face constraint either due to small number of employees, difficulties to arrange time, etc. However, by utilizing subcontracted staff (if funding supports) and community-based groups are effective to solve this issue.

3.2. PDAM Kabupaten Lebak

PDAM Kabulaten Lebak has improved from its less healthy status in 2013 to healthy in 2014. Despite admitting to funding problem and some of its units are located in areas that are not covered with internet access, they have conducted good practices that can be replicated more easily.

(i) **Database used in this PDAMs are XLS** based due to limited knowledge on IT and CR operation. These data input are supported with paper-ledger book. However, the office can manage the data based on SIRO (*Online Account Information System*) for Customer relation and administration purpose while SISKA (*Accounting Information System*) for financial and accounting purposes.

(ii) **Public relation and information activities** are implemented from time to time by PDAM Kab. Lebak. The activities are carried out either independently or by cooperating with local government and or district government. Sometimes, they also advertise their service-related information in local newspaper or by giving announcement in local

mosque after praying. Sometimes, they also utilize their mobile tank to promote and give announcement.

Summary

PDAM can overcome its shortage by maximizing its resources. Public Relation activities can be done with minimum or even zero funding by cooperating with government or doing it in public space such as mosque and with PDAM mobile tank.

4. Customer Relation Module

4.1. Overview

The training module development will be carried out by following the process below:

- Module improvement proposal is elaborated by JICA Expert Team through reviewing the existing module documents, i.e. curriculum, textbooks, trainer guidance and other materials.
- Questionnaire and field surveys to see PDAMs' application of the training contents to their daily operation and issues derived from the application. The field survey also intends to reveal the challenges and best practices experienced by PDAMs in respective operational subjects.
- Module development will be determined through discussions in the Working Group.

New Module Development	
Customer Relations	- Customer relations management has direct connection with the water bill collection efficiecny of a PDAM and may be one of the least cost measures to improve its financial conditions. - The module should cover broad range of topics such as customer database, bill collection, complaint response, public relations and awareness building activities.

Table 2. Module Development Orientation
Source: JICA Expert Team based on Detailed Planning Survey report

The Detailed Planning Survey results suggest the module development orientations as seen below which will be effectively utilized in the Working Group discussions and JICA Expert Team's proposal for improvements by completing three steps which are:

(1) Refining concept of "Customer Relations" and its application to new module development

The term "Customer Relations" has broad sense in general, and it is not common that such concept is clearly understood among PDAM staff. Therefore, it is necessary to grasp the understanding of PDAM staff (Provincial Trainer candidates) first on what is "customer relations", and review their PDAMs' current management status on related activities. JICA Expert Team will refine the concept of "customer relations" in the context of water utility operation in Indonesia, and develop the new training module clearly materialize such concept and objectives behind those activities.

Customer management in water supply business is managed by the database which contains all the information about the customer. By the statistical analysis of the database (Water usage characteristics / Complaint analysis / Analysis of regional characteristics), the database for all subscribers in the PDAM becomes the analysis tool to support improvement and measures determination of the water business operations of PDAM. The database system is also utilized to support the PDAM's daily operation such as water charge calculation to issue water bills for its customers.

JICA Expert Team will conduct the site survey and review the current status of PDAM in customer relations management, e.g. development status of customer management database, database items, its usage, billing and payment system, linkage with GIS data and piping network mapping data, public relations activities, etc.

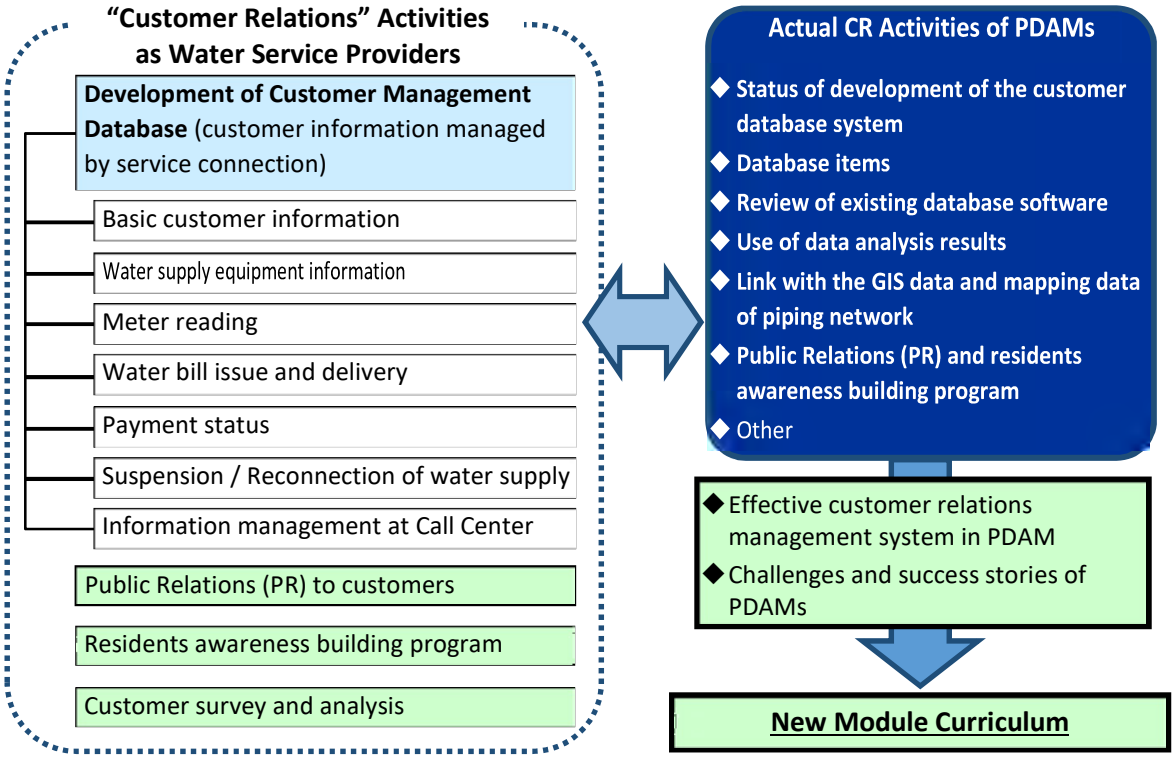
Also, JICA Expert Team will collect actual customer relations management cases among PDAMs to analyze their challenges, lessons and good practices.

Based on the information collected during the site survey, the training module contents will be

developed to present desirable public relations management and activities suitable to the business scale of a PDAM from inexpensive minimum system applying spreadsheet application such as Microsoft Excel, to sophisticated commercial system like Relational Database Management Systems (RDBMS). Such classification will be made primarily based on number of served population of PDAMs, for instance, by three categories such as (i) up to 5,000 habitants; (ii) 5,000 – 50,000 habitants, and (iii) over 50,000 habitants.

(2) Training contents, curriculum, materials and trainer guidance development

Training curriculum, materials and the trainer guidance will be developed following the existing format for other modules. Main part of customer relations management is database creation and statistical analysis. With regard to the usage of commercially available software in the trainings, JICA Expert Team will discuss with Working Group whether it should be taught in the COE trainings. According to PERPAMSI, currently there are 383 PDAMs across the country and their business scale and operational status are greatly different. As mentioned above, the training contents will be classified into three categories by PDAMs' number of connections and provide customer management solutions applicable to smaller-scale PDAMs.



(Source: JICA Expert Team)

Figure 12. Concept of Customer Relations and Module Development Flow

(3) Follow-up on PDAM improvement after training and post-training activities

- Introduction of "Customer Relations" is expected to contribute to the financial conditions of PDAMs through collection efficiency improvement with relatively lower cost.
- Through the customer relation module, the project encourages the organizing of public relations activities such as awareness building and understanding on operational and managerial improvement among PDAM executive management and policy makers in local governments.

4.2. Module Outline and Development

Envisaged contents of the new module will include (i) Information of water meters, (ii) Meter reading data, (iii) Water bill calculation and delivery operation, (iv) Payment status, (v) Disconnections and reconnections, (vi) Information management at call center, (vii) Public relations activities, (viii) Residents awareness building program, (ix) Customer survey and its analysis, and (x) Meter inspection with details as following:

4.2.1. Customer Management

(i) Customer Database Management

Topics on the customer database management ranges from basic customer information, metering (water consumption) data, and consumer meter database, through revenue management system. Based on the site survey in the target provinces on the existing practice of PDAMs, the database restructuring and improved management will be proposed in the training materials to be developed.

On the site survey, JICA Expert Team will investigate the following for each PDAM visited:

- Development status of customer management database system and its database items
- User reviews on the database system software and analysis tools
- Data analysis results of database and its usage
- Linkage to the GIS data and mapping data of piping network

Effective customer management database system suitable to PDAMs will be considered though the analysis of the collected information.

(ii) Water Theft

The site survey will cover prevailing status of illegal connections, water theft by stub-out in Indonesia and PDAMs' common countermeasures and related regulations, which shall be included in the NRW reduction training materials.

4.2.2. Customer Relation

(i) Customer Relation Management and Activities

JICA Expert Team will discuss with the Working Group on their understanding of "Customer Relations" and "Customer Services" as well as give lectures on customer management system and customer relations activities of Japanese water service providers for the Working Group members to fully understand such concept.

With respect to Public Relations and residents' awareness programs, JICA Expert Team will study PDAM's coordination between customer service and customer management.

4.3. Working Group Discussion on New Module Contents

JICA Expert Team will discuss with the Working Group on the curriculum and contents of new module based on the site survey results. The recommended customer relations management systems will be classified into several categories depending on the business scale of a PDAM, from inexpensive minimum system to most sophisticated one; for example, three categories consisting of (i) up to 5,000 connections, (ii) 5,000 to 50,000 connections, and (iii) over 50,000 connections.

4.3.1. Development of Curriculum, Training Materials and Trainer Guidance

It is planned that the training duration for CR module will be 2-3 days. The draft of JICA Expert Team's proposed content of curriculum's topics and subtopics in Customer Relation module can be seen as follows.

Table 3. Proposed Contents for New Modules

Training Topics	Contents
Customer information	・ Development and usage of customer database ・ Analysis of customer database
Customer management for NRW reduction	・ Customer meter reading (training for meter readers, meter intangible flow, etc.)
Water bill collection	・ Water bill collection: response to unpaid bills, etc.
Complaint response and management	・ Call center/ customer center ・ Development of action flow for complaint response
Mapping and GIS	・ GIS, Water pressure map, water quality map, etc.
Public awareness activities and Public relation	・ Event/ campaign for water saving, etc. ・ Public events in communities/ schools

(Source: Baseline Survey and COE Program Review)

4.4. Conclusion

Based on the previous sections and data analysis it can be concluded that:

(1) CR contents will cover the importance of customer data management and PR activities.

(2) A synchronized perception about customer relation aspects and activities should be enhanced and formulated in the module.

(3) Samples of good practices and strength in other PDAM can be replicated by other PDAMs to attain improvement with minimum funding expenses.

(4) A linkage with GIS topics in the form of basic understanding can be useful for PDAM operators.

(5) Customer relation aspects has to be more noticed because it is one of the low-cost measures that can be elaborated with NRW reduction activities such as with meter intangible flow, meter replacement, public relations and collection effectivity, measures to illegal connection, etc.

Ministry of Public Works and Housing

Republic of Indonesia

The Project

on

Strengthening the COE (Center of Excellence) Program

for

PDAMs in the Republic of Indonesia

Financial Analysis and Management Module Development Report

(Report on Debt Restructuring and Good Practice in Financial Analysis and Management of PDAM)

August 2016

Japan International Cooperation Agency

KRI International Corp.

Nihon Suido Consultants Co., Ltd.

Yokohama Water Co., Ltd.

Report on Debt Restructuring and Good Practice in Financial Analysis and Management of PDAM

Table of Contents

CHAPTER I DEBT RESTRUCTURING OF PDAM

1. Introduction

This chapter highlights debt restructuring situation of PDAMs in June 2016. The data collecting work to compile this report was conducted in May and June 2016 by the Japanese Expert Team (JET), which is formed under a JICA-financed technical assistance program, as part of preparation of the Financial Analysis and Management (FAM) module. The FAM module is scheduled to start in 2017, under a training program named "Center of Excellence (COE)" Program. The COE Program is characterized by its unique cascade-method type trainings and knowledge dissemination, which has been implemented in response to needs for capacity development of PDAMs.

The investigation of debt restructuring situation of PDAMs is related to the FAM module in the context of effectiveness of PDAM's business plan. This is because PDAM business plans in general have been prepared as a necessary condition of PDAMs' financial improvements which can be represented by debt restructuring. Since the business plan preparation will be a core component of the FAM module training material, the effectiveness of business plans in PDAMs' debt restructuring should be verified for the training material to be deemed appropriate.

2. Debt Restructuring Situations of PDAM

2.1 Progress of Debt Restructuring

(1) 1978 to the 1990s

PDAMs' debts to the central government had been accumulated from 1978 to the 1990s. Subsidiary loan agreement (SLA) was the prevailing modality of PDAMs' debts in investment financing as SLA provided the lowest interest rate with a long grace period and the longest tenor. Other forms of debt include Investment Fund Account Loan and Regional Development Account Loan. At the beginning of the 2000s, a total of 205 PDAMs were heavily indebted. The number of PDAMs grew from about 300 in the 1990s to 386 in 2015.

(2) Year 2005

In 2005, the number of those indebted PDAMs slightly decreased from to 205 to 191. At that point of time the total debts on the PDAM books amounted to Rp 6.1 trillion, including un-repaid principals, unpaid interests and penalties. To save those indebted PDAMs by debt restructuring, the MOF Regulation 107/PMK.06/2005 was promulgated in 2005, providing the PDAMs with a range of rescue measures which included the following.

- Rescheduling of payment of principal, interest, administration fee, fine and commitment fee
- Change of loan conditions such as interest rate and administration fee
- Write –off of debt

The implementation guidelines and technical rules to apply for those debt restructuring alternatives were stipulated in the MOF Circular of Director General of State Treasury Per-53/PB/2006. Under this regulation, indebted PDAMs were obliged to submit a restructuring request to MOF so that MOF could evaluate and rescue them. The restructuring request was supposed to contain the following information.

- Audited financial statements (income statement, cashflow statement, and balance sheet) of the last three years
- Performance assessment result of the last one year
- Corporate work and budget plan/ cost budgeting plan of the last one year
- Financial Recovery Action Plan (FRAP) which was approved by relevant local government
- Commitment letter of FRAP achievement

FRAP consisted of (i) summary of PDAM condition, (ii) problem analysis and solution plan, (iii) investment plan and financing, and (iv) financial projection during loan repayment period. FRAP assumed the debt restructuring period as five years at the longest. Therefore FRAP is considered similar to what we usually call "five-year business plan".

(3) Year 2008

The result of PDAM rescues by means of the MOF Regulation 107/PMK.06/2005 turned out to be a little success. Out of the 191 indebted PDAMs, a total of 15 PDAMs could repay their debts for themselves by 2008, without petitioning debt restructuring to MOF. The remaining 176 PDAMs were still left indebted, without completing debt restructuring in 2008. To stimulate the lackluster progress, another MOF Regulation was promulgated, which was the MOF Regulation 120/PMK.05/2008. Debt restructuring methods stipulated in this regulation were as follows. They had been somewhat modified from ones shown in the predecessor regulation.

- Write-off of non-principal debts such as unpaid interest, administration fee, fine and commitment fee
- Debt equity swap of outstanding non-principal debts
- Rescheduling of repayment of principal debts

All PDAMs with debts from the central government or related sources were obliged to apply for debt restructuring under the Regulation 120/PMK.05/2008. Those indebted PDAMs were also requested to fulfill the following conditions in the debt restructuring application.

- Setting cost-recovering tariffs, which are higher than the basic production costs
- Governance target in appointment of managing directors with predetermined criteria
- Five-year business plan endorsed by the head of local government

Main contents of the five-year business plan defined in this regulation are as follows:

1. Current PDAM Condition
   1.1 General Data
   1.2 Technical Aspect
   1.3 Management Aspect
   1.4 Financial Aspect
2. Problems, Causes of problems, and Corrective Action Plan
   2.1 Technical Aspect
   2.2 Management Aspect
   2.3 Financial Aspect
   2.4 Investment Need and Funding Sources
3. Proposal of Rescheduling of Basic Outstanding Debt
4. Achievement Target Plan per Year

(4) Year 2012

The MOF Regulation120/PMK.05/2008 intended to further encourage the debt restructuring by modifying the requirements for debt restructuring application that were stipulated in the predecessor MOF regulation. But the effect of this regulation was still lackluster. Out of the indebted 176 PDAMs, a total of seven PDAMs opted to repay their debts without relying on the debt restructuring schemes proposed by the MOF regulation. The remaining 169 PDAMs did not complete or not apply for the debt restructuring, so that they were left still indebted. To boost the debt restructuring of the 169 indebted PDAMs, another MOF regulation was issued in 2012, which was the MOF Regulation 14/PMK.05/2012. The required documents for the debt restructuring program stipulated in this regulation were as follows.

- Five-year business plan endorsed by the head of local government
- Audited financial statements of the latest year
- Performance audit report by the Financial and Development Supervisory Board (BPKP)/Public Accountant
- Corporate work and budget plan/ cost budgeting plan of the last one year
- Commitment letter by local government

A clear difference between the MOF Regulation114/PMK.05/2012 and the previous Regulation 120/PMK.05/2008 was obligation of indebted PDAMs in applying for debt restructuring. Under the previous regulation, indebted PDAM could opt either for applying for debt restructuring or for not applying. Despite apparent benefit of the debt restructuring scheme supported by MOF, many PDAMs did not apply for debt restructuring program due to high hurdles associated with the debt restructuring application, like commitment of tariff increase in the immediate future. Under the

MOF Regulation114/PMK.05/2012, those PDAMs which did not apply for debt restructuring had to repay all the debts to the central government within three months of a cut-off date. Those PDAMs which neither applied for debt restructuring nor repaid the debts, had to follow settlement judged by PUPN (State Debts and Claims Committee). Also, in the event of PDAM's noncompliance with debt repayment, the central government was authorized to offset the unpaid amounts against allocation of funds from the central government to local governments.

The MOF Regulation 114/PMK.05/2012 mitigated requirements for the debt restructuring application from those stipulated in the previous regulation. Such mitigated requirements included (i) target of full cost recovery achievement, (ii) timing of fit and proper tests for managing directors, and (iii) approval process of business plan.

(5) Year 2015

Development of debt restructuring of the 169 indebted PDAMs are summarized in Table 1. A total of 44 PDAMs had debt restructuring settlement one way or the other. Meanwhile the remaining 125 PDAMs still had bad debts.

Table 1 PDAM Debt Restructuring Status in 2015

No. of PDAMs	Debt Restructuring Status
3	Debts were taken over by the local governments, which in turn, paid to MOF
28	Debts were settled by PUPN and later written-off. To execute the debt restructuring, a minister decision was issued as the MOF Decision 805/KMK.05/2015
9	Debt write-offs were already decided by the Minister as the Minister letter MK S-589/MK.05/2015, but still waiting for approval from the President since each 9 PDAM is indebted Rp 10 million to Rp 100 million.
3	Debts were paid by the PDAMs.
1	Debt restructuring was exempted as the PDAM (Jakarta water) was 51% owned by the private sector.
125	Debt restructuring was incomplete. Unpaid debts would be written off according to a new or revised MOF regulation.

Within those 125 PDAMs with unpaid debts, there were three levels of progress in terms of preparedness for the debt restructuring. They are shown in Table 2.

Table 2 Level of Progress in PDAM Debt Restructuring in 2015

No. of PDAMs	Debt restructuring level
62	Those PDAMs had submitted the debt restructuring plan to MOF and their outstanding debts were judged as bad debts.
38	Those PDAMs already obtained the state receivable settlement approval, but not obtained the absolute write-off decision.
25	Those PDAMs had not submitted the debt restructuring plan to MOF or paid outstanding debts. As a result their debt restructurings were subject to decisions of PUPN.

(6) Year 2016

To accelerate the debt restructuring process of the 125 PDAMs with unsolved debts, the MOF Regulation 31/PMK.05/2016 has been issued. The following two schemes of debt restructuring are provided for in this regulation.

1. Write-off of non-principal debts is allowable for PDAMs which can repay principal debts.
2. Debt/equity swap of principal debts and/or non-principal debts is allowable for PDAMs which cannot repay principal debts.

Amounts of outstanding debts of the 125 PDAMs were reviewed through joint verification of local governments and the Financial and Development Supervisory Board (BPKP), as at 30 June 2015. Classification of debt restructuring schemes and the number of PDAMs which fall under each scheme are summarized in Table 3. The amounts of outstanding debts or debt restructuring requirement according to the scheme alternatives and debt types are summarized in Table 4.

Table 3 PDAM Debt Restructuring Schemes

No. of PDAMs	Debt restructuring scheme
17	Scheme 1 (write-off) is applicable. According to the criteria stipulated in the Regulation 31/PMK.05/2016, a total of 17 PDAMs are evaluated to be capable of repaying principal debts, but incapable of repaying non-principal debts.
107	Scheme 2 (debt/equity swap) is applicable. These PDAMs are evaluated to be incapable of repaying neither principal nor non-principal debts.
2 (split from 1)	Neither scheme 1 nor 2 is applicable. There is one PDAM which has been split into two PDAMs due to service area expansion. Local governments which own respective PDAMs will take over the PDAMs' debts. Thus there will be no needs of debt restructuring.

Table 4 Outstanding Balance of PDAM Debts

Debt restructuring scheme	No. of PDAMs	Principal (Rp billion)	Non-principal (Rp billion)	Total debts (Rp billion)
1. Write-off of non-principal debts	17	0	278	278
2. Debt/equity swap	107	883	3,029	3,912
3. No need of debt restructuring	2	14	36	51
Total	126	898	3,344	4,241

The scheme 1 (write-off of non-principal debts) is applicable to the case where an indebted PDAM has non-principal debts of Rp 100 billion or less. Also the applicants PDAM have to repay actually all of their principal debts, regardless of the amounts, by 26 February 2016. Because of these criteria, the number of PDAMs which fall under the debt restructuring scheme 1 is relatively small, being 17. The total debt amount corresponding to the scheme 1 too is relatively small, which is Rp 278 billion.

All other indebted PDAMs which do not satisfy conditions of "less than Rp 100 billion outstanding non-principal debt" and "commitment of repaying the principal debt", are basically subject to the scheme 2. Hence the number of PDAMs and the total debt amount under the scheme 2 become rather big, which are 107 and Rp 3.9 trillion respectively. The Rp 3.9 trillion debt comprises the principal debt worth Rp 0.9 trillion and non-principal debts worth Rp 3 trillion.

According to a requirement provided in the MOF Regulation 31/PMK.05/2016, PDAMs whose debts will be restructured have to submit the state receivables settlement request to MOF. Additional evaluation documents, including business plan, need not be prepared anew.

Based on the verified debt amounts, the central government will allocate funds to write off Rp 4.2 trillion worth debts. The fund allocation will be proposed as inclusion in Revised State Revenue and Expenditure Budget (APBN-P) 2016. If this is approved, the APBN-P funds will be granted to the relevant local governments. The budgeting process will be approved as an MOF Regulation/ Director General Circular. Apparently the process of writing off PDAMs' bad debts nears the final stage. Most of Rp. 4.2 trillion worth bad debts that are kept on the books of the 124 PDAMs is expected to be cleared by 2017.

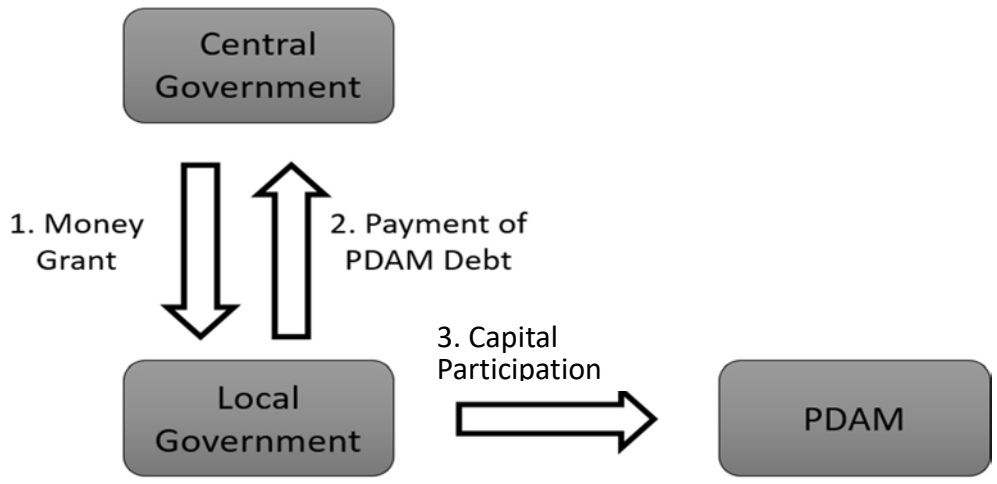
2.2 Debt/Equity Swap

The MOF Regulation 31/PMK.05/2016 has been issued to put an end to a series of MOF regulations to write off the PDAMs' bad debts, which have been accumulated since the 1970s. The PDAMs' bad debts amounted to Rp 6.1 trillion in 2005 and they are now reduced to Rp 4.2 trillion. The debt/equity swap will be used to clear most of these existing debts.

A debt/equity swap is a refinancing transaction where a debt holder obtains an equity position in exchange for cancellation of the debt. The debt/equity swap is generally executed to help an insolvent company to continue to operate since such troubled company cannot pay its debts usually. In other cases, a company has to maintain certain debt/equity ratios, and inviting debt holders to swap their debts for equity so that the company can adjust that balance. The debt/equity ratio is often part of financing requirements imposed by lenders.

In the case of the PDAM debt/equity swap, the objective is naturally to save the insolvent PDAMs. The PDAM debt/equity swap scheme follows roughly three steps. Those steps are depicted in Figure 1.

Figure 1 Debt/Equity Swap Process



The first step is that the central government gives money grant to a local government, which is budgeted in APBN-P 2016. Secondly, the local government's receipt of grant and payment of PDAM debt to the central government take place by the same amount. The local government repays the PDAM debts to the central government on behalf of the PDAM. The grant process and the payment of PDAM debts are executed simultaneously, thus there is no movement of money. Thirdly the local government executes receivable conversion by way of capital participation in PDAM equity. The PDAM's bad debts will be written off from the books when these accounting transactions are properly recorded.

2.3 Accounting and Tax Issues

It should be noted that there are two types of writ-off. Referring to the MOF Regulation 31/PMK.05/2016,Chapter I article 1 (point 9 and 10), those two write-offs are defined as follows:

1. Conditional write-off is a write-off/ elimination of debts from the central government book record without eliminating state collectible right to PDAM receivables.

2. Absolute write-off is a write-off by which state collectible right to PDAM receivables is eliminated from the central government book record so that there is no more state collectible right to PDAM receivables.

The restructuring of PDAM debts should be considered impacting to accounting treatment and tax implication to PDAM as a company, due to the following conditions:

1. Absolute write-off in accounting perspective will be recognized as current income to PDAM, or correction of retained earnings which should be supported by a certain regulation. If recognized as income to PDAM, normally it will entail corporate tax, otherwise the tax will be exempted on condition that there is a tax exemption regulation.

2. Debt equity swap without tax implication

3. If there are any PDAMs already subject to settlement by PUPN, PUPN will intensively collect debts without any penalty, tax and interest.

3. Commercial Borrowings

A new regulatory framework was put in place in 2009 as Presidential Regulation (Perpres) 29/2009, in order to explore new and large sources of water investment financing for PDAMs.

Perpres 29/2009 provided for the central government to give loan guarantees and interest subsidies for commercial borrowings by PDAMs. It was stipulated that the central government should guarantee 40 percent of a commercial loan extended to a PDAM. Furthermore local governments were required to guarantee 30 percent, with the lending bank taking the risk on the 30 percent balance. The central government was also required to subsidize an interest rate of up to five percentage points.

In the case of PDAMs with no debts to the central government, the following conditions had to be met to obtain the stipulated government guarantees.

- Performance audit result Financial and Development Supervisory Board shows assessment of "healthy" PDAM.
- PDAM has determined to observe the average water rate that is bigger than the average production cost, resulting in the full cost recovery.

If a PDAM still had debt to the central government, the PDAM had to fulfill requirements of debt restructuring program that had been already settled with MOF.

The guarantee mechanism for PDAMs' borrowings under Perpres 29/2009 was valid until the end of 2014. The result of the perpres indicated by the number of loans actually extended, and their amounts are summarized in Table 5. To date a total of Rp 328 billion worth loans has been extended to 11 PDAMs.

Table 5 Commercial Borrowings under Perpres 29/2009 Scheme

PDAM	Loan amount (Rp million)	Bank	Government guarantee date
Bogor (regency)	24,312	BRI	12 Dec. 2011
Ciamis (regency)	14,700	BJB	12 Dec. 2011
Lombok Timur (regency)*	11,175	BNI	12 Dec. 2011
Malang (city)	44,974	BNI	3 Dec. 2012
Banjarmasin (city)	110,000	BPD Kalsel	25 Feb. 2013
Denpasar (city)	32,350	BPD Bali	No info
Palopo (city)	17,295	BRI	No info
Cilacap (regency)*	8,126	BPD Jateng	No info
Giri Menang Mataram	45,000	BPD Bali, BPD Kalsel, NTB	No info
Buleleng (regency)	3,500	BPD Bali	No info
Banyumas (regency)*	16,932	BPD Jateng	No info
Total	328,364		

* One of 20 selected PDAMs to which IndII program assisted to prepare the loan application.

Due to slow-paced debt restructuring progress, not many PDAMs had been applying for Perpres 29/2009 borrowing. Only the most credit worthy PDAMs without debts and with good institutional capacity could qualify for commercial loan under Perpres 29/2009 scheme.

Compiling the application documents needed considerably high-level technical assistance form donor programs and/or outside consultant input. Under AusAID cooperation, the Indonesia Infrastructure Initiative (IndII) provided technical assistance to 20 PDAMs. Templates for the loan application were developed in a form of toolkit. As a result of the assistance by IndII program, three PDAMs succeeded in obtaining loans from commercial banks.

Perpres 29/2009 is expected to be updated in 2016 so that the commercial borrowing will become a steadier source of funds for PDAMs' capital investments.

4. Conclusions and Recommendations

The following conclusions can be drawn in a context of relationship between the progress of PDAMs' financing improvement (debt restructuring and commercial borrowing) and the position of business plan.

- PDAMs' debt restructurings such as write-off of bad debts and debt/equity swaps, are now nearing completion. The debts are expected to be cleared by 2017.
- PDAMs' commercial borrowings are yet to be explored. After seven years from promulgation of the relevant MOF regulation, only a limited number of PDAMs have obtained commercial loans.
- Business plan will be needed in both debt restructuring and commercial borrowing. As for debt restructuring, although the completion of settlement is near, annual performance monitoring is still required where business plan serves as an evidence of good and reliable performance. Business plan is also examined as such evidence, when an application of commercial loan is evaluated.
- So far most of business plans have been prepared with assistance by donor programs and/or input of outside consultant works. There have been few cases where a PDAM can prepare the business plan for itself. While update of business plan becomes increasingly necessary, possibility of a PDAM's receiving donor assistance and/or consultant input to compile its business plan diminishes due to budgetary constraint.

Based on the above conclusions, it is considered that PDAM's self-preparation of its business plan should be placed in the center of FAM module training. As to the implementation of FAM module training focusing on the business plan preparation, we recommend the following.

- Learning of basic knowledge in business plan preparation should be prioritized over obtention of advanced or detailed knowledge. This is due to limitations of the module learning such as training duration, acceptance capacity of trainer side, learning capacity of trainee side, allocable budget, etc.
- In the case of first-time business plan preparation or major update from the original business plan where extensive data collection and scrupulous data examination are required, a PDAM could still seek donor assistance or outside consultant input since the PDAM may not have become capable of performing such task even if it has attended FAM module training.

CHAPTER II GOOD PRACTICE IN FINANCIAL ANALYSIS AND MANAGEMENT OF PDAM

1. Introduction

This chapter focuses on PDAM good practice in financial analysis and management (FAM) area.

1.1 Background

In order to accelerate the drinking water supply to achieve the Millennium Development Goals (MDG) the government has made a policy by issuing Presidential Regulation (PERPRES) 29 year 2009 regarding "provision of guarantee and interest subsidy by central government in conjunction with acceleration of drinking water supply". The purpose of PERPRES 29 year 2009 is to fund PDAMs investment through commercial loans extended from banks. As stipulated in PERPRES 29 year 2009, article G sub-article 1, one of the requirements in applying for an investment loan is "Healthy" PDAM. The criteria of "Healthy" PDAM refers to PDAM performance book 2015 published by Badan Pendukung Pengembangan Sistem Penyediaan Air Minum (BPPSPAM). As a result of the PERPRES 29 year 2009, according to MOF, a total of 11 PDAMs have obtained investment loans by 2016. Those PDAMs can be regarded as practitioners of good financial performance.

1.2 Institution and Program Related with Improvement of Water Supply Performance

In order to overcome financial and operational problems of PDAMs, the following institutions have been established:

a. BPPSPAM is an Agency that was established based on the stipulation of PP No.16 year 2005. BPPSPAM was established by the Ministry of Public Works & Public Housing (PU) with the purpose to improve efficiency, service scope, management and quality of drinking water service and accessible safe drinking water by the community, and to achieve balance between consumer and drinking water service provider.

b. INDII (Indonesia Infrastructure Initiative) is a program funded by Australian Government (AUSAID) to Indonesian Government in the form of technical assistance to encourage "healthy" PDAM to use facility of PERPRES 29 year 2009 through "Project for Financial reform of 20 PDAMs" program. INDII targets 20 PDAMs by providing technical assistance in preparing business plan using business plan toolkit which prepared by INDII Team. It is hoped that with the business plan PDAM can apply for loan from national banks and obtain funding in accordance to the purpose of PERPRES 29 year 2009. Out of the 20 PDAMs assisted under the INDII program, a total of three PDAMs obtained investment loans.

c. Center of Excellence Program is a training program for PDAM staff throughout Indonesia through the application of the cascade method which enables extensive distribution of operational and technical knowledge between PDAM nationally. Ever since its initiation in 2012, COE has been executed through three training modules, which are Non-Revenue Water Reduction, Energy Efficiency and SAK-ETAP. These three modules are specially prepared to enable the training participants to obtain powerful knowledge and skill in facing specific problems in PDAMs. Apart from the existing modules, it was decided to develop other modules, one of which was Financial Analysis Management (FAM). The Japanese Expert Team (JET) under a technical cooperation program sponsored by JICA, is conducting the development of FAM module.

1.3 Research Objective

In order to obtain a general picture of good practitioner PDAMs, the Japanese Expert Team (JET) conducted research on the selected PDAMs as follows.

- The objective of research is to know success factor of PDAMs and nature of problems and constraints facing the selected PDAMs in preparing a Business Plan especially for obtaining loan from the bank.
- Scope of research
  - To confirm effectiveness of Business Plan for PDAM.
  - To find out internal control and key performance indicator of PDAM.
  - To know ways for obtaining loan from the bank.
  - To know bank's vision in approving PDAM investment loan in general.
- The result of research can be considered as a part of material for preparation of Financial Analysis Management (FAM) Module.

1.4 Approach and Methodology

Research was executed through data collection from May-July 2016 to identify the success factors and problems, the following are data collection method:

a. Primary data and information, was undertaken by direct interview of the authorized officer of the related company:
b. Secondary data and information was collected from internet search:

In accordance with required data for preparing a report, a field survey was undertaken to obtain data covering the following activities:

a. Institutional survey by visiting the institution, this being data collection and documentation from related institution
   - Indonesia Infrastructure Initiative (INDII)
   - Ministry of Finance (MOF)
   - PDAM Banyumas
   - PDAM Cilacap
   - Bank Jateng-Cilacap Branch
b. Interviews were undertaken with related officer from MOF, PDAMs, and Bank
c. An information technology survey by accessing the website of Government Agency
   - PERPRES 29 year 2009 Provision of guarantee and Interest Subsidy by Central Government in conjunction with Acceleration of Drinking Water Supply.
   - PERMENKEU 229/PMK.01/2009 regarding Procedure for Execution of Granting Guarantee and Interest Subsidy by the Central government in Conjunction with Acceleration of Drinking Water Supply.
   - PERMENKEU 91/PMK.011/2011 regarding Amendment of Ministry of Finance Regulation Number 229/PMK.01/2009 regarding Procedure for Execution of Granting Guarantee and Interest Subsidy by the Central Government in Conjunction with Acceleration of Drinking Water Supply.

In conducting the research, the related institutions as mentioned above are generally cooperative, but some of the bank information might be restricted for public. Data and information which were provided by MOF were very useful and reliable.

1.5 Selected PDAMs and Bank

Objects of the research can be good practitioner PDAMs, plus banks which actually provided loans to PDAMs. The selection process is as follows.

a. It was known that a total of 11 PDAMs obtained commercial loans. The 11 PDAMs included the following three PDAMs which were assisted under INDII Program:
   - PDAM Tirta Wijaya – Kab. Cilacap
   - PDAM Tirta Satria – Kab. Banyumas
   - PDAM Kab. Lombok Timur
b. JET could obtain part of the information and data of the three PDAMs from INDII
c. An interview was conducted with MOF on 2nd June 2016.
d. Based on point a, b, c above, JET chose PDAM Banyumas and PDAM Cilacap
e. Based on the recommendation from the PDAMs, JET conducted an interview with Bank Jateng.

2. Good Practice

In this report, the good practitioner PDAMs can be defined as PDAMs that are successful in obtaining investment loans as a result of preparation of Business Plan, and effectiveness of working procedure to apply for bank loans.

2.1 PDAM Tirta Satria – Kab. Banyumas

PDAM Banyumas was established in 1975, based on Kab. Banyumas Regional Regulation (PERDA) no. 5 year 1974 dated September 30, 1974 and Banyumas Regent Decree No.25/1/2/KDH dated January 2, 1974. In 2014, based on Kab. Banyumas Regional Regulation No.22 year 2014 dated November 22, 2014, PDAM Kab. Banyumas becomes PDAM Tirta Satria.

Since the year 2005, PDAM performance has been "Good" or "Healthy", the rating "Good" for the year 2005 based on KEPMEN OTDA No. 47/1999. Starting from 2006 up to 2014 the rating is "Healthy" based on BPPSPAM evaluation.

Financial problem in PDAM usually arises when approved tariff increase is not in compliance with the proposed tariff, for example: PDAM proposed tariff increase of 15%, but The Regent approved a 10% increase. The 5% difference is allocated for investment or improvement of PDAM. This condition will cause delay in the investment or improvement. In this case, PDAM could not meet the point of view of Local Government that is serving the public, because PDAM is not able to finance the cost of improvement or investment of new water supply system.

Alternative funding sources for improvement or investment is a Bank loan, the government gave the facility to PDAM by issuing PERPRES 29 year 2009, then PDAM used the facility and was able to receive Bank loan from Bank Jateng.

Total bank loan amounts Rp 16.932 billion, loan period is 10 years with 24 months grace period, signing date in 2014 and installment starts in 2017. The interest rate of the loan is using BI rate, which evaluates every 6 months. The loan is used for optimization of primary distribution network in several areas.

Terms of PERPRES 29 Year 2009 among others for "Healthy" PDAM, the government also provides other conditions to use the facilities that PDAM has to submit Business Plan. In preparing a Business Plan for year 2011-2015, PDAM is assisted by INDII consultant. Then PDAM updated the Business plan for year 2014-2018, in preparing this Business Plan PDAM also consulted the consultant.

Advantages of Business Plan for PDAM are as follows:

- Decision making, thus PDAM knows what should be decided such as investment or improvement.
- Arranging the scale of priority of what is necessary or needs of PDAM, example from a Human Resource Department of PDAM need to add personal skills or add new personnel.
- Projection for new SPAM and development of infrastructure.
- For control and monitoring PDAM performance.

Obstacles faced by PDAM in preparing Business Plan are as follows:

- Human resources, in this case is knowledge of human resources; especially analytical ability for counting Internal Rate of Return (IRR), Net Present Value (NPV) and financial projection, especially to make assumptions.
- Assets Management including revaluation of assets that have not been adequate.

- Tariff policy needs approval from the Regent, therefore PDAM cannot directly apply the tariff, which had been calculated in the business plan.
- The available system is not integrated yet for technical, accounting and finance, however the integrated system is needed to enable PDAM to improve and increase the services and quality.
- Monitoring and evaluation are stagnant, so PDAM does not have feedback.

To overcome the obstacles above, PDAM expectation are as follows:
- PDAM staff needs assistance to make Business Plan, especially in setting an assumption for Financial Projection, and if there is assistance, PDAM can learn a lot and intensively, then PDAM staff gain better understanding and knowledge.
- PDAM also need assistance in Assets Management, such as Asset Revaluation.

PDAM's Success factors:
- Since year 2005 able to maintain good or healthy performance,
- Good relation with the Local Government, and
- Obtained a loan from the bank.

PDAM always consults with the Local Government before taking an action and reporting if something happens in PDAM, example are as follows:
- In 2003, PDAM faced liquidity problem, accordingly could not pay the ADB loan. Then PDAM consulted the situation to The Regent, and The Regent paid the loan through APBD.
- In terms of selecting a bank, PDAM consults with The Regent, and The Regent suggested to appoint Bank Jateng, then PDAM follows the suggestion. The Incidentally Bank Jateng procedure is easier than BRI or BNI.

PDAM always followed the bank regulation and tried to pay the installment punctually, therefore PDAM could gain trust from the bank.

2.2 PDAM Tirta Wijaya – Kab. Cilacap

In the year 1975, The Indonesian Government worked together with Scott & Furphy Eng. Pty, Australia to create a Clean Water Planning in Cilacap Regency. Year 1983, the status changed into BPAM through KEPMEN PU No.45/KPTS/CK/1983. Year 1989, based on PERDA No. 10 year 1989, BPAM changed to PDAM Kab. Cilacap. In year 1992, absolute handover of asset from Central Government to Cilacap Regency Government for PDAM Management. In 2013 PDAM Kab. Cilacap changed name into PDAM Tirta Wijaya.

From the year 2009 up to 2015 PDAM obtained "Healthy" performance status from BPPSPAM. For the year 2015, PDAM has not received the report from BPPSPAM, but already knows the result.

The policy to increase or adjust tariff is not the problem for PDAM, almost every tariff increase proposed by PDAM is approved by the Regent. The problem of PDAM, when the sea is at the tide, then PDAM needs more storage to hold the clean water.

To obtain other funding sources, with PDAM's own initiative to use the PDAM facility of PERPRES 29 Year 2009, due to a requirement in the PERPRES, PDAM needs to submit a Business Plan. Thus PDAM Cilacap prepared the Business Plan year 2011-2015, with assistance from INDII consultant, then updated by themselves for year 2014-2018.

After that, PDAM Cilacap obtained funding to finance settler, filter, and Clean Water Storage (CWS) from Bank Jateng. Total loan amounts to Rp 8.126 billion. The loan period is 10 years, and ending period is 2026. The rate of the loan is using BI rate, which evaluates in every 6 months.

Advantages of Business Plan for PDAM are as follows:

- Decision making, thus PDAM knows what should be decided such as investment or improvement.
- Determining the scale of priority of PDAM needs
- Projection for new water supply system and rehabilitation or improvement of existing infrastructure.
- For control and monitoring of PDAM performance.

Obstacles faced by PDAM in processing Business Plan are as follows:

- Insufficiency of knowledge and capability of human resources; especially analytical ability for counting Internal Rate of Return (IRR), Net Present Value (NPV) and financial projection, especially to make assumptions.
- Assets Management including revaluation of assets that is not adequate, especially to know the present value of fixed assets such as networks, because of PDAM decision making to improve or add new networks.

To overcome the obstacles above, PDAM expectation are as follows:

- Besides training for PDAM employees, PDAM needs assistance from other parties to help PDAM in preparing Business Plan and Financial Projection especially for setting assumption and to improve analytical ability. Therefore, by assistance from other parties, PDAM can learn intensively about Business Plan, also Financial Projection.
- Period for assistance is approximately 1 month, after that PDAM only consults with the other parties.

PDAM's success factors in keeping performance and obtain a loan from the bank is maintaining good relations with the Government and the Bank.

With the government, PDAM always consulted before executing an action and submitted a report to the Regent.

To the bank, PDAM always followed the rules, trying to be punctual in paying the installment so the bank could trust PDAM

3. Lending Bank

Bank Jateng is selected as a sample of lending bank. They extended loans to PDAM Kab. Banyumas and PDAM Kab. Cilacap. JET could interview with the Cilacap Branch of Bank Jateng. It is noted that the following matters were consideration for the bank in accepting PDAM loan proposal:

- The PDAM is eligible for obtaining the loan by one of the requirements that is to submit Business Plan.
- The PDAM is promising, because of profitability and has good solvency. By analyzing PDAM Business Plan such as: solvency ratios, profitability ratios, and collection period, are points of consideration for the bank to accept the loan.
- The PDAM customers mostly are industries, thus can be considered more profitable and low probability for uncollected receivables.
- The PDAM is a cooperative and trustworthy debtor.
- PDAM financial performance based on BPKP or Public Accountant's performance audit obtained “Healthy” status.
- Guarantee from government (Central and Local Government) which is credited mandatory Perpres 29/2009. Before the guarantee is released, there is Verification by the Committee, one of which members is the Directorate General of Cipta Karya, who has knowledge regarding technical aspects.

4. Conclusions

Business Plan is needed as company guidance, especially for a PDAM to improve or maintain the healthy performance.

- Since the PERPRES 29 year 2009 was issued, a total of 11 PDAMs obtained loans, which required that the PDAMs must have “Healthy” status and prepare a Business Plan. This can be an example for other PDAMs to obtain loans.
- Having Business Plan is not only a requirement to obtain loans, but also a means for PDAM to make a decision, monitor and evaluate performance, and determine the scale of priorities and activities.

It is confirmed that PDAM Kab. Banyumas and PDAM Kab. Cilacap are examples of good practitioner PDAM based on the following findings.

- Business plan preparation capability is one of the indicators for improvement of PDAMs, especially in Financial Analysis and Management area.
- PDAMs need to improve human resource capability in the financial field, especially for calculating and analyzing Internal Rate Return (IRR), Net Present Value (NPV) and determining assumption for financial projection preparation.
- PDAMs need to increase human resource capability in a technical field, especially for decision making to improve or add new networks.
- Based on the regulation, local governments have to prepare a strategic plan. As PDAMs belong to local governments, Business Plan is necessary also for the strategic planning.

Supplemental Document 5

Training Module Implementation Reports

Ministry of Public Works and Housing
Republic of Indonesia

The Project
on
Strengthening COE (Center of Excellence) Program
for
PDAMs in the Republic of Indonesia

Training Module Implementation Report

Non-revenue Water Reduction (NRW)

May 2018

JICA Expert Team

The Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Republic of Indonesia

Training Module Implementation Report (NRW)

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*** The following Annexes except Annex 1 (Training Curriculum) are omitted in the Project Completion Report.**

1. Introduction

"JICA Technical Cooperation Project on Strengthening COE Program for PDAMs in Indonesia" (JICA Project) was launched in August 2015 with its project purpose of enhancement of the implementation capacity of Directorate General of Human Settlment (DGHS) regarding the COE program. Aiming at fulfilling this purpose, Directorate of Water Supply System Development (DWSD) of DGHS and JICA Expert Team (JET) have been engaged in a number of activities. One of the major outputs planned is the development and revision of the four training modules for COE Program.

The present report comprehensively explains the project activities carried out regarding the revision of Non-revenue Water Reduction (NRW) module as one of the four subject training modules; and seeks for DWSD's final approval of the relevant training curriculum, training materials and trainer's manuals, as determined by the Project Design Matrix agreed between DWSD and JICA through their Minutes of Meeting dated 13 June 2017.

2. Training Module Contents and Output

According to the Inception Report of The Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Republic of Indonesia in August 2015, one of the objectives of this project is to improve the existing Non-Revenue Water Reduction training module for CoE Program. The developed NRW training module consists of: (i) training curriculum, (ii) training materials, and (iii) trainer's manuals.

3. Training Module Development Process

3.1. Precedent and Preparatory Works

3.1.1. Existing NRW Module Developed by DWSD before JICA Project

The existing 2016 NRW module consists of 3 (three) books. The contents of the module are mainly composed of the following subjects:

- The significance of NRW issues and necessity of countermeasures
- Definition and understanding of NRW
- Water Balance Analysis
- Organization of NRW countermeasures and preparation of the implementation plan
- Countermeasures for physical losses (DMA, Step test, leak detection methods)
- Countermeasures for commercial losses (water meter management, illegal connection, control, etc.)

Table of contents of 2016 NRW existing module can be seen in Table 1.

Table 1. Table of Contents of NRW Existing Module

Book I

- General
- Non-Revenue Water Problems
- Importance of Water Loss Control
- Understanding Water Loss
- Water Balance Drafting (Water Audit)

Book II

- Preface
- Arranging NRW Reduction Program Plan
- Conclusion

Book III

- Preface
- Physical Losses Control Technique
- Non-Physical Losses (Commercial Losses) Control Technique

Source: NRW Module, 2016

The previous development works of the existing 2016 NRW module is conducted by DWSD before JICA Project as follows. Based on the original NRW module developed in 2012, DWSD conducted module review meeting to discuss about the existing module 2 (two) times, which took place on July 6, 2015, and September 17, 2015. The meeting was attended by WG members. The detailed meeting can be seen in **Annex 5 – MOM of NRW Minutes of Module Review Meeting 1 and 2**.

Based on the module review meeting that was conducted on 17-18 September 2015 at Falatehan Hotel Jakarta, the main revision was made as follows:

Table 2. NRW Modules Revision Based Module Review Meeting

General	1. The module contents are expected to aim at reader's systematics thinking in NRW control through water losses control activities. 2. Eliminate the impression that the contents of the module are based on certain view/concepts, such as GIS concept, DMA concept, customers water meter concept, PRV concept, etc.

	Module contents are already universal, material tendency is depend on how the trainers deliver it to the participants (usually it depend on each trainer's experience)
Module	1. Agreeing consignement 1 results abour module correction. 2. Module structure's change a. Displacing water balance material and ILI in Module N-1 to adjust the NRW control steps and based on consideration of theory material grouping. b. Change modul 2 position into modul 3 considering its adjustment with systematical thinking analysis in NRW control.
Material Subtantion	1. Correction of principal editorial which has effect to teaching material, such has picture's title, editorial diagram modification, etc. 2. Reducting several material that considered too difficult for training objective such as FAVAD, and investment analysis material. 3. Omitting several ambiguity materials such as understanding of water losses based on supply system, and based on its characteristic. Water losses interpretation that is served is only based on water balance only. 4. Displacing several pictures and tables considering material context. 5. Displacing several material contexts into another more relevant parts such as old version of physical water losses control strategy material lining with 4 pillars physical water losses control strategy. 6. Inserting several water losses control technique that relevant to enriched perception in supporting implementation of 4 pillars physical water losses control strategy and 4 pillars non-physical water losses control strategy.
Schedule / Training Program Guidelines (GBPP)	1. Agreeing the context, order, and time needed for delivering the materials into proposed schedule. 2. Schedule can be made flexibly adjusting with training needs if this module is delivered partially.

Source: NRW Module Review Minutes of Meeting

3.1.2. Review of Existing Module by JICA Expert Team

3.1.2.1. JICA Expert Team Baseline Survey

In order to know the PDAM Problems and challenges related to Non-Revenue Water, JICA Expert Team conducted the baseline survey in 2015, to clarify the operation status of PDAMs relevant to the JICA Technical Cooperation Project on Strengthening COE Program for PDAMs ("the Project") at the time of project commencement.

Based on Data Analysis, in general, the NRW rate is over 30%. It is considered unsatisfactory. Other than baseline survey, JICA Expert Team has also interviewed several PDAMs in several

provinces on August 2015 and January 2016. The selected provinces are South Sulawesi (PDAM Kota Pare pare and PDAM Kabupaten Gowa) and South Sumatera (PDAM Kabupaten Ogan Ilir and PDAM Kabupaten Banyuasin). The NRW rate in PDAM Pare-pare and PDAM Gowa are considered high, around 40% and 33,57% respectively. The detailed result can be seen in NRW Module Development Report (See **Annex 6**).

Based on JET baseline survey, the major problems related to Non-Revenue Water in PDAM could be concluded as follows:

- Authorized unbilled metered consumption
- Authorized unbilled unmetered consumption
- Unauthorized consumption
- Customer meter inaccuracies and systematic data handling errors
- Leakage on transmission and/or distribution pipe and equipment
- Leakage on service connection up to customer meter
- Leakage and overflows from the utility storage tank

The problems related with the implementation of NRW Knowledge that is learned from COE Program:

- Lack of equipment
- Lack of budget
- Lack of human resources
- Lack of support from PDAM management
- Knowledge is not applicable
- The curriculum is not suitable for participants level
- Less cost method to reduce NRW including apparent loss control is not introduced.
- NRW preventive method such as pressure control, service connection installation improvement, procurement of better quality water meters and pipe materials is not introduced yet.
- Selection rule for training participants and applicable curriculums for different participant level isn't prepared yet.

3.1.2.2. Direction for Training Module Revision

Based on JICA Inception Report on August 2015, the curriculum, text, and materials, and training guidelines of the Non-revenue Water (NRW) Reduction Module will be improved taking the following approaches and focuses:

- Water Balance Analysis

Any NRW reduction activities of PDAMs must start with the water balance analysis. As the first topic in the NRW Reduction Module, the water balance analysis methodology

should be taught using the water balance table standardized by International Water Association (IWA) to measure the current revenue water and NRW amount in detail which enables to estimate the possible NRW amount to be reduced through appropriate countermeasures to different water loss categories.

- Functions and Activities of NRW Section Staff

Current NRW reduction activities and related institutional setup shall be reviewed for each PDAM. The management executives must fully understand the significance of NRW reduction for their PDAM's financial soundness and success. COE trainees and trainers, therefore, should be able to explain the importance and necessary measures of NRW reduction and leakage detection activities to the PDAM management after taking the training. Hence, the training curriculum should include: (i) leakage detection planning, (ii) institutional setup for leakage repairs, (iii) implementation of leakage detection and repairs, (iv) analysis of leakage points, (v) revision of distribution network rehabilitation plan, (vi) review of leakage detection plan, and (vii) budgeting and simplified cost-benefit analysis for the NRW reduction activities.

- Establishment of DMA

PDAMs in Indonesia typically do not install many boundary valves on underground pipes so that it is difficult to isolate network segments and establish district meter areas (DMAs). The DMA establishment methodology suitable to PDAMs' current circumstances will be proposed through review of the existing training materials and site survey in target provinces.

- Apparent Losses and Leakage on Service Connections

JICA's past technical cooperation in Indonesia such as "Project for Water Service Improvement in Mamminasata Metropolitan Area in South Sulawesi Province" has often experienced that, besides water leakage, apparent losses e.g. inaccurate meter reading practices significantly prevail among PDAMs, especially in less competent, smaller-scale utilities in rural area; where the improvement of meter reading method and capacity building of meter readers with little financial investment may solve the inaccuracy and apparent losses greatly in certain cases. Likewise, intensive replacement of consumer meters and related works at service connections sometimes contributes to large NRW reduction, implying that the inaccurate metering and leakage on service connections might have had a significant share of the whole system losses. Apart from the importance of leakage detection and repairs, these types of NRW and relevant countermeasures should be included in the COE trainings.

- The accuracy of Water Distribution through Maintenance of Flow Meters

The accuracy of water distribution measurement would greatly contribute to NRW prevention and reduction. However, existing flow meters are not properly maintained in most PDAMs. The training should include inspection of existing flow meters by equipment such as ultrasonic flow meter, etc.

- Piping Network Diagram

It is imperative for a PDAM to properly manage the piping diagram and design documents of its existing network in order to do the maintenance and leakage detection works on a daily basis. The PDAMs which have introduced the digital mapping system, especially, would be able to conduct more efficient replacement planning. The improved training curriculum should introduce the digital mapping system and its effectiveness for NRW management activities.

- Customer Database Management

Topics on the customer database management range from basic customer information, metering (water consumption) data, and consumer meter database, through revenue management system. Based on the site survey in the target provinces on the existing practice of PDAMs, the database restructuring and improved management will be proposed in the training materials to be developed.

- Pipe Network Calculation for Proper Water Pressure

Distribution network diagrams in most PDAMs do not contain elevation data of piping The training module will cover a simplified piping network calculation methodology applying publicly available elevation data (such as Google Map ®) to transmission main network information.

- Measurement of Minimum Flow Rate at Night in DMA

Measuring the minimum flow rate at night enables the calculation of basic leakage amount within a district metered area (DMA). The training should cover the methodology of DMA establishment as well as the minimum flow rate measurement.

- Water Theft

The site survey will cover the prevailing status of illegal connections, water theft by stub-out in Indonesia and PDAMs' common countermeasures and related regulations, which shall be included in the NRW reduction training materials.

- Meter Insensitive Water Volume

It is necessary for each PDAM to know its meter replacement interval and examine the degradation of average meter sensitivity in long-term use, which should be taken into

account in the water balance analysis. The meter insensitivity in developing countries may sometimes much higher than that of Japan (around 2% on average).

- Network Asset Database and Mesh Control

Most PDAMs do not possess GIS-operated distribution network database management. The network asset management applying mesh control would enable effective maintenance as well as lead to the transition to more advanced digital mapping system in future. For the improved training curriculum, such mesh-controlled distribution network management may be introduced upon necessity among participant PDAMs.

- Life Cycle Cost and Cost-Benefit Analysis

The improved training curriculum will introduce the concept of life cycle cost and recommend the application of more durable piping materials with fewer fittings that lead to reduced operation and maintenance cost in the long run.

NRW reduction activities, in general, require some initial investment which returns long-term revenue increase. The simplified cost-benefit analysis will be introduced in the improved training module to enhance the understanding among participant PDAMs to encourage decision making of PDAM management.

Further revision of NRW module would be carried out in the following direction:

- 2016 version covers the definition of NRW and major contents for NRW issues and countermeasures and this version will be utilized as it is. The revision will be made as the additional text covering the following subjects.
- The following additional materials will be added to the new module:

(a) Leakage survey methods which do not rely on DMA and Minimum Night Flow Analysis but rely on a simple evaluation of leakage priority area by dividing distribution area by mesh.
(b) Distribution pressure control
(c) Service connection installation and leak repair methods
(d) Introduction of good practices
(e) Introduction to innovative NRW survey equipment

The revision work will be carried out with working group members through discussion on the draft prepared by JET so that additional contents are appropriate for the local circumstances of PDAMs.

3.2. Formation of Working Group

As seen above, formerly before the JICA Project activities from 2015, DWSD had formed and mandated the NRW Working Group (WG) to develop of the original NRW training module for COE Program since the program's commencement in 2012. The NRW WG consists of Indonesian experts of the field such as DWSD staff, COE Management Consultant (KMP), experienced PDAM staff such as National Trainers, reputable individual professional practitioners such as consulting experts of other donor programs, and AKARTIRTA lecturers, etc. some of whom acted as the draft writers of the module and the instructors for National and Provincial Trainings. The WG had functioned to discuss and determine all the details of the training curriculum, textbook, and materials.

Since the JICA Project's intervention to the NRW module was limited to the revision work, upon the commencement of JICA Project in 2015 it was agreed with DWSD to utilize the existing WG to improve the training module contents.

In September 2016, the first NRW WG discussion meeting took place through DWSD's invitation to the existing WG members (See **Annex 4 - Invitation Letter form DWSD**).

3.3. Module Development and Working Group Discussions

3.3.1. Working Group Meeting 1

The first NRW working group meeting was held on 26 September 2016 in Veranda Hotel Jakarta and chaired by Mr. Hilwan, Head of Sub Directorate of Standardization and Institutional of DWSD. It was attended by representatives of DWSD, COE Management Consultants, JICA Expert Team, and NRW Working Group Members. List of NRW working group members who attended the meeting can be seen in Table 3.

Table 3. List of NRW Working Group Member in The First WG Meeting

No.	Name	Institution
1.	Achmad Rosyid	Water Supply Expert
2.	Hernadi Setiono	IUWASH
3.	Tanobaya	Water Supply Expert
4.	Hari Sundana	PDAM Kabupaten Bandung
5.	Supian	PDAM Kota Banjarmasin
6.	Nanis Setiari	PDAM Kota Malang

7.	Suhadi	BTAM Bekasi

Source: MoM WG 1 of JET, 2016

The agenda of WG meeting 1 is consists of (a) Brief overview of PDAM Operational Problems; (b) Modules Development Process Explanation; (c) Overview and Review on The Existing Module; (d) Additional Material Introduction and Discussion; (e) Open discussion about How to Use The additional Material in COE Training and Training Curriculum Modification and Adjustment Regarding Additional Material; and (f) Forthcoming Events / Activities Plan. The detail agenda and documentation can be seen in **Annex 5 – MOM of NRW WG Meeting 1** and **Annex 7- Documentation of WG Meeting**.

JET proposed the content for the additional material of NRW module. The main purposes of additional materials proposed by JICA Expert Team are:

- To make self-assessment of PDAM fundamental capacity for NRW reduction
- To navigate how less-healthy of sick PDAMs can start with NRW reduction activities
- To introduce less cost approaches for NRW reduction
- To provide hints or practical knowledge for better performance
- To introduce new leakage survey equipment

The proposed content and the result of the discussion on the proposed additional material can be seen in Table 4.

Table 4. Discussion Result on the Proposed Additional Material for NRW Module

Proposed Contents	WG & DWSD Approval	Treatment / Decision / Remarks
1. What Can We Start for NRW Reduction Before Introducing DMA	Approved	1. JET agrees if part 1.1 and 1.2 are introduced after the theory of DMA (on existing module) is explained.
1.1. Self-assessment of PDAM Capacity for NRW Reduction	Approved	2. 5 points of PDAM self-assessment are approved by WG members.
1.2. Importance of Preparation of Pipe Network Drawing	Approved	3. The suitable title should be considered.
2. Less Cost Simple Approaches for NRW Reduction	Approved	1. Information about manual listening stick will be elaborated more in NRW reduction strategy subject (in the existing module).
2.1. House to House Customer Survey	Approved	2. WG members suggest adding material about how to do water meter calibration. That topic already explained in the existing module however the elaboration is still only the theory, not the methodology.
2.2. Updating Customer Database	Approved	
2.3. Production Meter Survey	Approved	
2.4. Special Customer Survey	Approved	3. As for the leakage survey form sample, Nakanosono-san can provide the samples that are used in Yokohama waterworks.
2.5. Meter Readers Enhancement Program	Approved	
2.6. Prioritized Leakage Survey Planning	Approved	
3. Preventive Measures for NRW Reduction	Approved	1. This part will be added as best practice / additional knowledge.
3.1. Improvement of House Connection Installation	Approved	2. The licensing system should be introduced as additional knowledge instead of the main subject since PDAMs still not have enough capabilities. So instead of emphasizing on licensing, we should emphasize on the quality control process itself.
3.1.1. Selection of Better Quality Water Meter	Approved	3. The subject about pipe installation and pipe material selection is still not explained yet in the existing module.
3.1.2. Quality Control of House Connection Installation	Approved	4. This subject can be added and developed more on the next NRW module.
3.2. Planning Distribution Water Pressure Control for NRW	Approved	5. Part 3.2 should focus on requirements to do water pressure control and how to make distribution pattern.
4. Advanced Leak Detection Method	Approved	1. This part will be added as additional knowledge on new separated module / additional module.

Source: JET, 2016

Training Curriculum Modification and Adjustment Regarding Additional Material which has been approved at the meeting, include:

- WG members agree to add 2 lesson hours (1 lesson hour = 55minutes) for additional materials proposed by JET. However, the detail discussion will be done in the next WG in January 2017;
- The discussion about the completion process of the new module, the depth of materials, and in what subject should the materials be added will be done on the next WG;
- Modified Training Schedule and classes will be discussed further on the next WG;
- JET will make additional/supplemental module draft and COE management consultant will determine the methods of how the material proposed by JET will be taught on the COE training; and
- The next WG is planned on mid of January 2017, after that the materials will be synchronized with the existing module (planned for mid-January 2017 until February 2017). WG members will do the detail discussion before equipment training (planned on March 2017) also the termination of COE management consultant contract and re-contract of new COE management consultant should be considered.

3.3.2. Working Group Meeting 2

The second NRW working group meeting was held on March 22, 2017, in Falatehan Hotel Jakarta and chaired by Mr. Hilwan, Head of Sub Directorate of Standardization and Institutional of DWSD. It was attended by representatives of DWSD, COE Management Consultant, JICA Expert Team, and NRW Working Group Members. List of NRW working group members who attended the second WG meeting can be seen in Table 5.

Table 5. List of NRW Working Group Member in The Second WG Meeting

No.	Name	Institution
1.	Achmad Rosyid	Water Supply Expert
2.	Tanobaya	Water Supply Expert
3.	Hari Sundana	PDAM Kabupaten Bandung
4.	Supian	PDAM Kota Banjarmasin
5.	Nanis Setiari	PDAM Kota Malang
6.	Suhadi	BTAM Bekasi

Source: MoM WG 2 of JET, 2017

The agenda is consists of (a) Brief Review of Previous Working Group Meeting; (b) Additional material content and syllabus, additional module chapter and subtopics arrangement based on previous WG; (c) NRW schedule and syllabus arrangement based on previous WG; (d) How to use the additional material in COE training; (e) Training curriculum modification and

adjustment regarding additional material based on previous WG; and (f) Forthcoming Events / Activities Plan. The detail agenda and documentation can be seen in **Annex 5 – MOM of NRW Working Group Meeting 2** and **Annex 7- Documentation of WG Meeting**.

The result of the discussion on the proposed additional material can be seen in Table 6.

Table 6. Discussion Result on the Proposed Additional Material for NRW Module

Proposed Contents	WG and DWSD Approval	Treatment / Decision / Remarks
1. What Can We Start for NRW Reduction Before Introducing DMA	Approved	1. Part 1 will be inserted on existing module book 3 chapter 2.2 2. Part 1 title will be changed into What Can We Start before Introducing DMA 3. The paragraph that explained about "important preconditions before introducing DMA approach into PDAM" will be deleted because it's already explained in the existing module 4. Table 1 will be explained more detail by adding "notes or recommendation" columns 5. The title of point 4 and 5 in table 1 will be adjusted 6. Part 1.2 will becomes one with part 1.1
1.1. PDAM Readiness To Conduct DMA	Approved	
1.2. Importance of Preparation of Pipe Network Drawing	Approved	
2. Less Cost Simple Approaches for NRW Reduction	Approved	1. A short explanation about why these methods are less costly than DMA will be added 2. The explanation of service tank will be added 3. The order of paragraph of part 2.1 should be adjusted. Before explaining about customer survey, it is advisable if the consideration of customer criteria that becomes priority should be explained 4. The title of part 2.1 will be changed into "House to House Inspection" 5. Part 2.4 Special Customer Survey, the title should be adjusted because the definition of Special Customer in Permendagri Regulation is different with the definition of Special Customer in this part Based on WG members suggestion, the title will be changed into "Non-domestic Customer with Unusual Water Usage Survey" 6. The actual condition in PDAM is the task of water meter reader is only to read the meter and checking the condition of the water meter. 7. Part 2.5 Meter Readers Enhancement Program will be inserted on existing module book 3 chapter 3.2.1 8. Part 2.6 Prioritized Leakage Survey Planning will be positioned before "House to House Survey"
2.1. House to House Customer Survey	Approved	
2.2. Updating Customer Database	Approved	
2.3. Production Meter Survey	Approved	
2.4. Special Customer Survey	Approved	
2.5. Meter Readers Enhancement Program	Approved	
2.6. Prioritized Leakage Survey Planning	Approved	
3. Preventive Measures for NRW Reduction	Approved	1. Part 3.1 Improvement of House Connection Installation, will be inserted to book 1 chapter 4.2 on D sections
3.1. Improvement of House Connection Installation	Approved	
3.1.1. Selection of Better Quality Water Meter	Approved	

3.1.2. Quality Control of House Connection Installation 3.2. Planning Distribution Water Pressure Control for NRW Reduction	Approved Approved	2. Part 3.2 Planning Distribution Water Pressure Control will be inserted into existing module that explained about water pressure control (Book 1 chapter 4.2 on B section)
4. Advanced Leak Detection Method	Approved	No comments/remarks available regarding this part

Source: JET, 2017

3.4. Draft Final Module for Training Implementation

Based on the 2nd working group meeting that was conducted on March 22, 2017, at Falatehan Hotel Jakarta, the further activities schedule as follows:

- The discussion about the completion process of the new module, curriculum adjustment, and allocation time needed for additional materials would be done via e-mail. JET will send the draft of additional materials before June 2017.
- JET would make additional/supplemental module draft and COE management consultant would determine the methods of how the material proposed by JET would be taught on the COE training.

JET sent the draft of additional materials to working group member and few of them gave feedback. See comments from NRW WG member after WG meeting 2 as seen in **Annex 5 – Comments from NRW WG Members after WG 2.**

JET did the revision of NRW additional module according to the final comments, including inserting the additional module into the existing module. The checklist of NRW additional module development based on WG meeting 2 can be seen in Table 7.

DWSD agree to conduct the trial training and Kabupaten/Kota Training in 2017 for NRW subject using the developed module. Further explanation of training implementation is in section 4.

Table 7. NRW Module Development Check List

Proposed Contents	WG and DWSD Approval		Treatment / Decision / Remarks	Check List
Part 1 What Can We Start for NRW Reduction Before Introducing DMA	Approved	1	Part 1 will be inserted on existing module book 3 chapter 2.2	√
Part 1.1 PDAM Readiness To Conduct DMA	Approved	2	Part 1 title will be changed into What Can We Start before Introducing DMA	√
Part 1.2 Importance of Preparation of Pipe Network Drawing	Approved	3	The paragraph that explained about "important preconditions before introducing DMA approach into PDAM" will be deleted because it's already explained in the existing module	√
		4	Table 1 will be explained more detail by adding "notes or recommendation" columns	√
		5	The title of point 4 and 5 in table 1 will be adjusted	√
		6	Part 1.2 will becomes one with part 1.1	Should still be a title
Part 2. Less Cost Simple Approaches for NRW Reduction	Approved	1	Short explanation about why these methods are less costly than DMA will be added	Based on consideration, this is not necessary
Part 2.1 House to House Customer Survey	Approved	2	The explanation of service tank will be added	√
Part 2.2 Updating Customer Database	Approved	3	The order of paragraph of part 2.1 should be adjusted. Before explain about customer survey, it is advisable if the consideration of customer criteria that becomes priority should be explained	Based on consideration, this is not necessary
Part 2.3 Production Meter Survey	Approved	4	The title of part 2.1 will be changed into "House to House Inspection"	√
Part 2.4 Special Customer Survey	Approved	5	Part 2.4 Special Customer Survey, title should be adjusted because the definition of Special Customer in Permendagri Regulation is different with the definition of Special Customer in this part Based on WG members suggestion, the title will be changed into "Non-domestic Customer with Unusual Water Usage Survey"	√
Part 2.5 Meter Readers Enhancement Program	Approved	6	The actual condition in PDAM is the task of water meter reader is only to read the meter and checking the condition of water meter.	Based on consideration, this is not necessary
Part 2.6 Prioritisized Leakage Survey Planning	Approved	7	Part 2.5 Meter Readers Enhancement Program will be inserted on existing module book 3 chapter 3.2.1	√
		8	Part 2.6 Prioritisized Leakage Survey Planning will be positioned before "House to House Survey"	√
Part 3. Preventive Measures for NRW Reduction	Approved	1	Part 3.1 Improvement of House Connection Installation, will be inserted to book 1 chapter 4.2 on D sections	Can not be done, because it is different
Part 3.1 Improvement of House Connection Installation	Approved	2	Part 3.2 Planning Distribution Water Pressure Control will be inserted into existing module that explained about water pressure control (Book 1 chapter 4.2 on B section)	√
3.1.1 Selection of Better Quality Water Meter	Approved			
3.1.2 Quality Control of House Connection Installation	Approved			
Part 3.2 Planning Distribution Water Pressure Control for NRW Reduction	Approved			
Part 4. Advanced Leak Detection Method	Approved	1	No comments / remarks available regarding this part	Becomes Part 2.5 on existing module book 2

4. Training Implementation of Revised Module

4.1. Summary

Trainings to implement the revised NRW module were held 3 times in 2017. The first training implementation was trial training. The training using the additional module developed by the working group with supervised by JET. Afterward, Kab/Kota Training in Kota Padang and Kota Manado were conducted in October 2018.

Table 8. Training Implementation of NRW Revised Module Training	Date	Venue	Trainers	Implementer	Participant	Material Content
Trial Training	August 1-4, 2017	Best Western Hotel Cawang, Jakarta	- WG member	DWSD using self-managed fund	Selected National/Provincial Trainers	NRW Additional Module
Kab/Kota Training	October 3-6, 2017	Rocky Plaza Hotel Padang, West Sumatera	- Trial training participant - Provincial trainer	DWSD through COE Field Consultant (KP)	PDAM staff in West Sumatera	Full revised module (additional module inserted into existing module)
	October 17-20, 2017	Whiz Prime Hotel, Manado	- WG member - Trial training participant - Provincial trainer		PDAM staff in Gorontalo & North Sulawesi	

Source: JET, 2018

4.2. Trial Training for Provincial Trainers

Trial training for NRW modules was conducted by DWSD using their self-managed fund. Before the implementation of trial training, coordination meeting was held between DWSD and JET (See **Annex 5**). Several things were prepared for NRW trial training as follow:

- Participant list provided by DWSD.
- Fixed schedule.
- Pre-test, post-test, and daily test question prepared by JET.
- Teaching materials prepared by JET
- WG member to become supporting trainers in trial training were selected by DWSD.

4.2.1. Time and Place

NRW Trial Training was held on August 1 – 4, 2017 at Best Western Hotel Cawang. It was attended by representatives of DSWS, JICA Expert Team, NRW supporting trainers, participants, and COE Management Consultant.

4.2.2. Trainers and Trainees

NRW trial training trainers are selected working group member which consist of PDAM experienced staff, reputable individual professionals, and AKARTIRTA instructor. The selected WG members are considered primary recipients of technical transfer from JICA Expert Team and will continue disseminating and updating the developed module after JICA Project. The list of NRW Trainers can be seen in Table 8.

Table 9. List of NRW Trainers in Trial Training

No.	Name	Institution
1.	Hernadi S	IUWASH PLUS
2.	Hari Sundana	PDAM Kab. Bandung
3.	Ir. Ahmad Rosyid	Water Supply Expert
4.	Gagak Bhaskoro	AKATIRTA Magelang

Source: JET, 2017

The participants of trial training for NRW module consisted of 9 (nine) persons who are PDAM staff as shown in Table 9.

Table 10. List of NRW Participants in Trial Training

No.	Name	Institution
1.	Ali Rachman	PDAM Kota Samarinda

2.	Tezar Rakhman	PDAM Kab. Tangerang
3.	Ale Mustofa	PDAM Kab. Bandung
4.	Dhani Lukman	PDAM Kab. Bandung
5.	Jamaris	PDAM Kota Padang
6.	Nanis Setiari	PDAM Kota Malang
7.	Heny Wijayanti	PDAM Kota Semarang
8.	Buwono Dwi Jatmiko	PDAM Kab. Semarang
9.	Ihdar	PDAM Kota Makassar

Source: JET, 2017

4.2.3. Training Implementation

The training was opened with opening remarks from Director of DWSD who was represented by Dian Prasetyawati, ST. MT, M.Sc as Section head of Standardization of DWSD. Then continued with a brief summary of revised parts of NRW and EE modules by Ms. Laksmi Darya, also the introduction of JICA's Expert Team and working group members by Mr. Yoshiaki Yokota. The first day was closed with a pre-test for the participants.

On the second day, participants were given materials regarding NRW additional module by trainers. The agenda and materials division can be seen in Table 10.

Table 11. The Division of Teaching Materials in Trial Training

No.	Materials	Trainer
1.	What Can We Start Before Introducing DMA	Hernadi S
2.	Less Cost Simple Approaches for NRW Reduction	Hari Sundana
3.	Preventive Measures for NRW Reduction	Ahmad Rosyid

Source: JET, 2017

On the third day, the equipment training was conducted in PDAM Kota Bekasi. Before the equipment training begins, Mr. Tjetjep Achmadi as technical director of PDAM Kota Bekasi gives opening remarks.

The explanation of the basic application of equipment, equipment principle, and function of all NRW equipment procured were explained by Mr. Gagak Bhaskoro and Mr. Hari Sundana. After that, practical training of NRW Equipments was conducted with mentoring from JICA expert, Mr. Gagak, Mr. Hari, and vendors.

On the fourth day the presentation was done by participants. They explained about basic application, principle, and function of all NRW Equipment. Then continued with post-test and closing ceremony. The trial training was closed with closing remarks from Director of DWSD who was represented by Ms. Tiasti Wening from Sub Directorate of Standardization and Institutional of DWSD.

The detail agenda and documentation can be seen in **Annex 5 – MOM of Trial Training** and **Annex 7- Documentation of Trial Training**.

4.3. Kabupaten/Kota Training

2017 Kabupaten/Kota Training for NRW module were held in 2 cities, i.e Kota Padang and Kota Manado. These trainings were conducted by DWSD through COE Field Consultant (KP). The objective of COE training is to produce alumni that can apply their acquired knowledge in their PDAM. Therefore, Kabupaten/Kota training in those two cities will utilize the provincial training alumni as the trainers.

4.3.1. Kabupaten/Kota Training in Kota Padang

4.3.1.1. Date and Place

Kab/Kota Training in Kota Padang was conducted for 4 (four) days from October 3 – 6, 2017 at Rocky Plaza Hotel Padang, West Sumatera. The training was attended by representative of DWSD, JICA Expert Team, Trainers, Participants, COE Management Consultant, and COE Field Consultant.

4.3.1.2. Trainers and Trainees

NRW trainers for this Kab/Kota training can be seen in Table 11. Ms. Nanis is the main trainer, while Mr. Jamaris and Mr. Tomi are the supporting trainers. Ms. Nani and Mr. Jamaris are the participants of NRW Module Trial Training in August 2017, while Mr. Tomi is a Provincial Trainers.

Table 12. List of NRW Trainers in Kabupaten/Kota Training in Kota Padang

No.	Name	Institution
1.	Nanis Setiari	PDAM Kota Malang
2.	Jamaris	PDAM Kota Padang
3.	Tomi Wirawan	PDAM Kota Padang

Source: COE Management Consultant, 2017

The participants of NRW module consisted of 11 (eleven) persons form PDAM within West Sumatera Area as shown in Table 12.

Table 13. List of NRW Participantss in Kabupaten/Kota Training in Kota Padang

No.	Name	Institution
1.	Emrizal	PDAM Kab. Limah Puluh Kota
2.	Demilsyah	PDAM Kab. Sijunjung
3.	Irvan Adhika Putra	PDAM Kota Bukittinggi
4.	Sukirno	PDAM Kota Sawahlunto
5.	Lassoding	PDAM Kota Sawahlunto
6.	Aan De Sophan	PDAM Kota Solok
7.	Andhika Prasetya	PDAM Kab. Solok
8.	Hafinal Furqan	PDAM Kota Padang Panjang
9.	Erdi Damri	PDAM Kab. Pasaman Barat
10.	Jasrial	PDAM Kab. Pasaman Barat
11.	Marjoni Hartono	PDAM Kab. Tanah Datar
12.	Randa Lafelan	PDAM Kab. Padang Pariaman

Source: COE Management Consultant, 2017

4.3.1.3. Training Implementation

Kab/Kota Training for Non-Revenue Water (NRW) module was opened with the opening remarks from Director of DWSD who was represented by Ms. Ir. Susi MDS Simanjuntak, MT as Head of Sub Directorate of Standardization and Institutional of DWSD. The opening ceremony continued with committee report by Mr. Agus as a co-team leader from COE Field Consultant, followed by an explanation about Kabupaten/Kota Training.

After the opening ceremony, learning activities were done for three days according to the timetable in Table 13. The training was begun with a pre-test and ended with a post-test on the third day.

Equipment training was conducted on the third day. In the morning session, participants were explained about step test and leakage detection equipment. After that, they conducted step test and equipment training in mini DMA. Types of equipment they used were PVC Pipe Leakage Detector D305, Leak Noise Correlator with Transmit Sensors AS620L, Portable Ultrasonic Flowmeter, Pressure Data Logger, Digital Type Compact Leak Detector Aquascope 3, and Acoustic Bar with Electrical Amplifier. Explanation of this material continued by Mr. Ide who explained about Manual Listening Stick.
In the night, the participants went to PDAM Kota Padang's DMA which located in Belimbing area. Participants were divided into 2 (two) groups to practiced of tracking and localization of water loss using NRW equipment. By used Ultrasonic flow meter, Transmit Sensors AS620L, PVC Pipe Leakage Detector D305, and Leak Detector Aquascope 3, they could find the suspected leak point.

On the forth day the discussion of field result and presentation was done by participants. Then continued with post-test and closing ceremony. The detail agenda and documentation can be seen in **Annex 5 – MOM of Kab/Kota Training Padang** and **Annex 7- Documentation of Kab/Kota Training Padang**.

Table 14. Schedule of Kabupaten/Kota Training for NRW Module in Kota Padang

Date/Time	08.00-08.45	08.45-09.30	09.30-10.30		10.45-11.30	11.30-12.30		13.30-14.15	14.15-15.15		15.30-16.15	16.15-17.00	17.00-17.45		21.00-01.00
Tuesday Oct 3, 2017	Opening Ceremony	Explanation about Kab/Kota Training + Pre-Test	NRW Introduction		NRW Introduction + Test 1	Understanding water loss + Test 2		Water balance & margin of error + Test 3	Excercise to calcutate water balance (manual)		Excercise to calcutate water balance (manual)				
Speaker	committee	committee	Nanis Setiari		Nanis Setiari	Jamaris		Nanis Setiari	Nanis Setiari		Nanis Setiari				
Wednesday Oct 4, 2017	NRW indicator and ILI + Test 4		Water balance Easy Calculation		Water balance Easy Calculation + Test 5	Case study exercise about water balance easy calculation		Case study exercise about water balance easy calculation	Water loss control strategy		Water loss control strategy + Test 6	Methodology of water loss control			
Speaker	Tomi Wirawan		Jamaris		Jamaris	All Trainers		ALL Trainers	Nanis Setiari		Nanis Setiari	Tomi Wirawan			
Thursday Oct 5, 2017	DMA establisment		Step Test + Test 7		Leak detection and equipment introduction			Leak detection and equipment introduction			Case study of step test (mini DMA) + night practice preparation				Practice tracking and localization of water loss (go to PDAM)
Speaker	Jamaris		Tomi Wirawan		All Trainers + JICA Expert Team			All Trainers + JICA Expert Team			All Trainers				ALL Trainers
Friday Oct 6, 2017	Discussion of field visit result + Post Test				Closing Ceremony										
Speaker	All Trainers				committee										

Source: COE Management Consultant, 2017

4.3.2. Kabupaten/Kota Training in Kota Manado

4.3.2.1. Date and Place

Kab/Kota Training in Kota Manado was conducted for 4 (four) days from October 17 – 20, 2017 at Whiz Prime Hotel Manado. The training was attended by representative of DWSD, JICA Expert Team, Trainers, Participants, COE Management Consultant, and COE Field Consultant.

4.3.2.2. Trainers and Trainees

NRW trainers for this Kab/Kota training in Kota Manado can be seen in Table 14. Mr. Hari Sundana is the main trainer, while Mr. Ihdar and Mr. Raymond are the supporting trainers.

Table 15. List of NRW Trainers in Kabupaten/Kota Training in Kota Manado

No.	Name	Institution
1.	Hari Sundana	PDAM Kab. Bandung
2.	Raymond	PDAM Kota Bitung
3.	Ihdar	PDAM Kota Makassar

Source: COE Management Consultant, 2017

The participants of NRW module consisted of 7 (seven) persons form PDAM within North Sulawesi and Gorontalo Area as shown in Table 15.

Table 16. List of NRW Participants in Kabupaten/Kota Training in Kota Manado

No.	Name	Institution
1.	Novi N Wagiu	PDAM Kab. Minahasa Utara
2.	Julius Umboh	PDAM Kab. Minahasa Utara
3.	Viandany Zulvian Muslim	PDAM Kota Bitung
4.	I Wayan Widana	PDAM Kab. Boalemo
5.	Jelly Hesty Lambey	PDAM Kota Bitung
6.	Ronny Katty	PDAM Kota Bitung
7.	Dea Susanti Himam	PDAM Kab. Bone Bolango

Source: COE Management Consultant, 2017

After the opening ceremony an explanation about Kab/Kota Training, learning activities were done for three days according to the timetable in Table 16. The training was begun with a pre-test and ended with a post-test on the third day.

Equipment training was conducted on the third day. In the morning session, participants were explained about step test and leakage detection equipment. After that, they conducted step test and equipment training in mini DMA. Types of equipment they used were PVC Pipe Leakage Detector D305, Leak Noise Correlator with Transmit Sensors AS620L, Portable Ultrasonic Flowmeter, Pressure Data Logger, Digital Type Compact Leak Detector Aquascope 3, and Acoustic Bar with Electrical Amplifier. Explanation of this material continued by Mr. Ide who explained about Manual Listening Stick.

In the night, the participants went to PDAM Bitung's DMA. Participants were divided into 2 (two) groups to practiced of tracking and localization of water loss using NRW equipment. By used Ultrasonic flow meter, Transmit Sensors AS620L, and Leak Detector Aquascope 3, they could find the suspected leak point.

On the fourth day the discussion of field result and presentation was done by participants. Then continued with post-test and closing ceremony. The detailed agenda and documentation can be seen in **Annex 5 – MOM of Kab/Kota Training Manado** and **Annex 7 – Documentation of Kab/Kota Training Manado.**

Table 17. Schedule of Kabupaten/Kota Training for NRW Module in Kota Manado

Date/Time	08.00-08.45	08.45-09.30	09.30-10.30		10.45-11.30	11.30-12.30		13.30-14.15	14.15-15.15		15.30-16.15	16.15-17.00	17.00-17.45		21.00-01.00
Tuesday Oct 17, 2017	Opening Ceremony	Explanation about Kab/Kota Training + Pre-Test	NRW Introduction		NRW Introduction + Test 1	Understanding water loss + Test 2		Water balance & margin of error + Test 3	Excercise to calcutate water balance (manual)		Excercise to calcutate water balance (manual)				
Speaker	committee	committee	Raymond		Raymond	Raymond		Ihdar	Ihdar		Ihdar				
Wednesday Oct 18, 2017	NRW indicator and ILI + Test 4		Water balance Easy Calculation		Water balance Easy Calculation + Test 5	Case study exercise about water balance easy calculation		Case study exercise about water balance easy calculation	Water loss control strategy		Water loss control strategy + Test 6	Methodology of water loss control			
Speaker	Hari Sundana		Hari Sundana	Break	Hari Sundana	Hari Sundana	Lunch Break	Hari Sundana	Raymond	Break	Raymond	Ihdar			
Thursday Oct 19, 2017	DMA establisment		Step Test + Test 7		Leak detection and equipment introduction			Case Study of Step Test (Mini DMA)			Night practice preparation			Break	Practice tracking and localization of water loss (go to PDAM)
Speaker	Raymond		Ihdar		Jica Expert Team + Hari Sundana			All Trainers			All Trainers				ALL Trainers
Friday Oct 20, 2017	Discussion of field visit result + Post Test				Closing Ceremony										
Speaker	All Trainers				committee										

Source: COE Management Consultant, 2017

5. Monitoring and Evaluation of Training Implementation

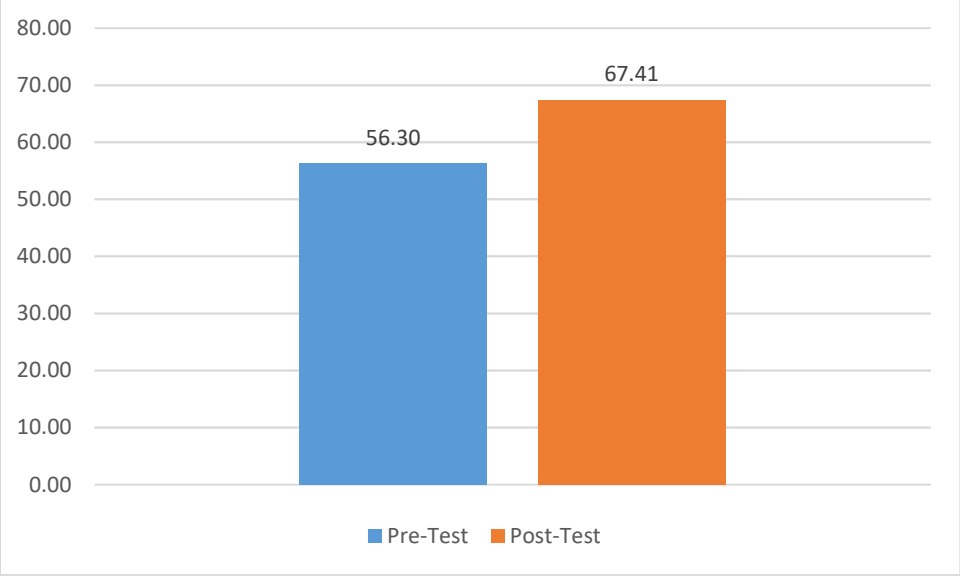
Monitoring and evaluation were held every training implementation. In trial training, participant evaluation was conducted by DWSD, while module content evaluation was done by JET. On the other hand, monitoring and evaluation of Kab/Kota Training in Kota Padang and Kota Manado were done by COE Management Consultant (KMP). There are 3 evaluation, namely (i) participant evaluation, (ii) trainers evaluation, and (iii) training content evaluation.

5.1. Monitoring and Evaluation of Trial Training

5.1.1. Participant Evaluation

The result of pre-test and post-test score of the participant can be seen in Figure 1. From the graph can be seen that there is an increase in the average score test of participants. The average score increases from 56,30 to 67,41.

Figure 1. Participant Evaluation of Trial Training



Source: JET based on DWSD Data, 2017

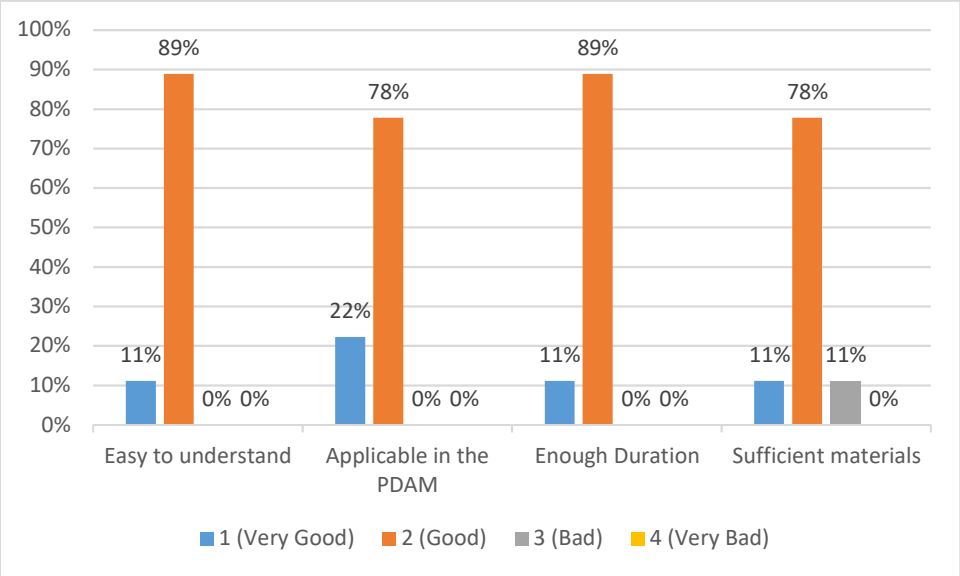
The detail result of participant evaluation can be seen in **Annex 8 - Monitoring and Evaluation of Trial Training**.

5.1.2. Module Content Evaluation

The module content evaluation was conducted by JET. Questionnaires distribute to participants during trial training, so that participants can assess the module content. Score 1 stands for highest satisfaction level, while score 4 is the less satisfaction level. Module content evaluation

scores average 1,87 out of 4, which means "good". The result can be seen in Figure 2. The detail result of module content evaluation can be seen in **Annex 8 - Monitoring and Evaluation of Trial Training**.

Figure 2. Module Content Evaluation of Trial Training



Source: JET, 2017

From the graph above concluded that:

- 11% of participants considered that NRW module is very easy to understand, while 89% of participants considered that it is easy to understand.
- 22% of participants considered that NRW module is very applicable in their PDAM, while 78% of them considered that it is applicable in the PDAM
- 11% of the participants considered that the training duration is appropriate, while 89% of them considered that the duration is enough
- 11% of participant considered that module materials are very sufficient, 78% of the considered that module materials are sufficient, while the rest considered that module materials are less sufficient.

5.2. Monitoring and Evaluation of Kabupaten/Kota Training in Kota Padang

The monitoring and evaluation were conducted by management consultant (KMP) consist of participant evaluation, trainers evaluation, and training content evaluation. According to COE Management Consultant, trainers and training content evaluation value between 8 – 10 is categorized as 'good'. The detail evaluation can be seen in **Annex 8 - Monitoring and Evaluation of Kab/Kota Training in Padang**. The explanation of the evaluation result as follows:

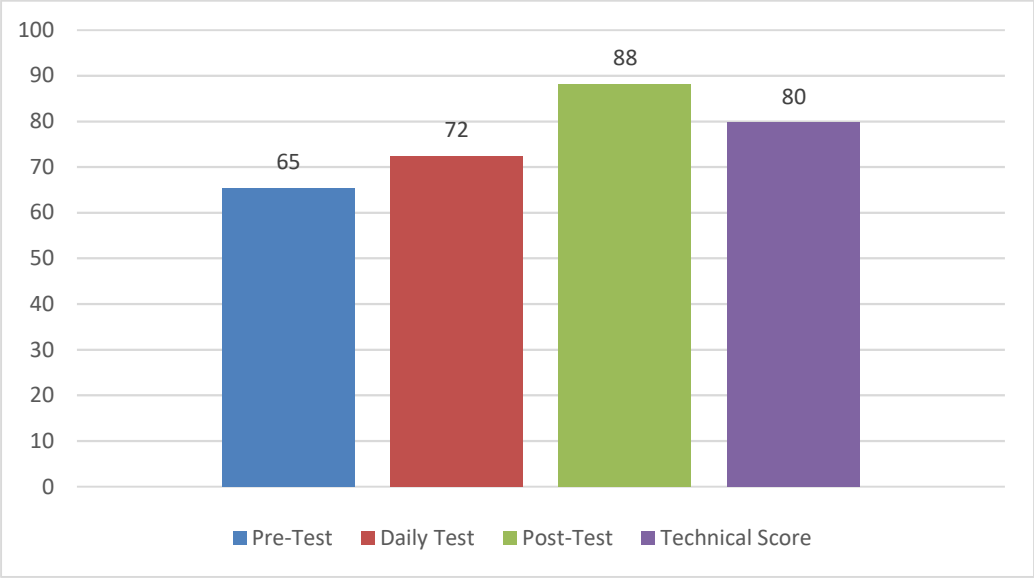
5.2.1. Participant Evaluation

The result of participants assessment can be seen in Figure 3. There are 4 (four) assessment to the participants, namely: Pre-test score, post-test score, test score, and technical score. The technical score is calculation result from the following formula:

Average total score = (2 Post test + Average Daily Test + Average Liveliness Score + Average Practice Score)/5

The value shown in Figure 3 is the mean value. There is an increasement in the average score of pre-test to post-test. The score increases from from 65 to 88.

Figure 3. Participant Evaluation of Kab/Kota Training in Kota Padang



Source: Processed JET based on KMP Report, 2017

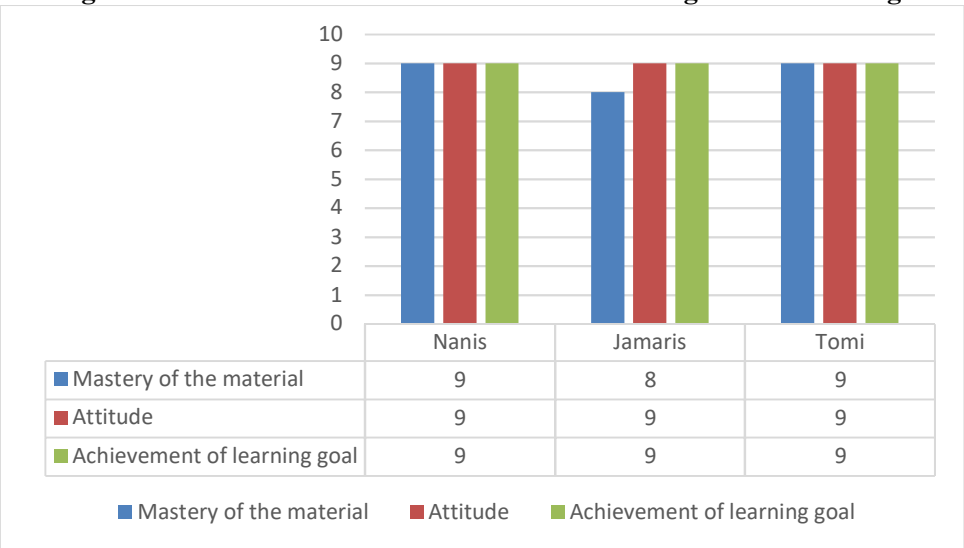
5.2.2. Trainer Evaluation

The result of trainers assessment can be seen in Figure 4. There are 3 (three) assessment to the trainers, namely:

- mastery of the material was assessed based on time, sequence, tools/media, and method,
- the attitude was assessed based on the language, voice, motivation, question and answer, and discussion; and
- achievement of learning goal was assessed based on understanding the exercise and test.

From the three trainers, Ms. Nanis and Mr. Tomi got the highest score, followed by Mr. Jamaris.

Figure 4. Trainer Evaluation of Kab/Kota Training in Kota Padang



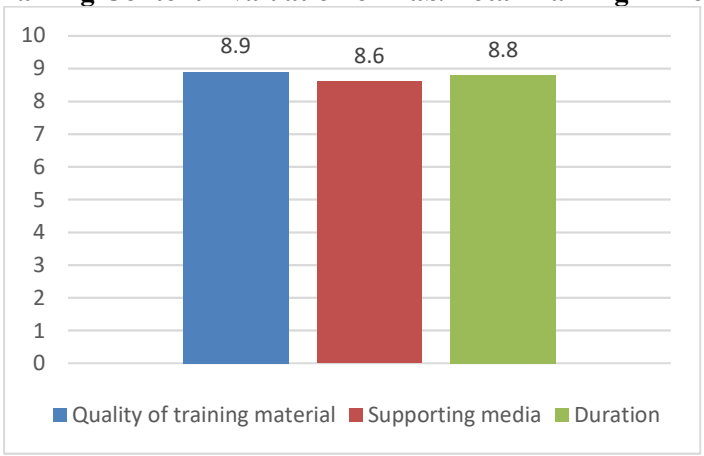
Source: Processed JET based on KMP Report, 2017

5.2.3. Training Content Evaluation

The result of training content assessment can be seen in Figure 5. There are 3 (three) assessment to the content, namely:

- quality of training material was assessed based on the objectives, the chapter and sub-chapter, the guidance, and the font;
- supporting media was assessed based on figures, tables, quiz, and exercise; and
- duration was assessed based on learning objective achievement.

Figure 5. Training Content Evaluation of Kab/Kota Training in Kota Padang



Source: Processed JET based on KMP Report, 2017

5.3. Monitoring and Evaluation of Kabupaten/Kota Training in Kota Manado

The monitoring and evaluation of Kab/Kota Training in Manado also were conducted by KMP. These consist of participant evaluation, trainers evaluation, and training content evaluation. According to KMP, trainers and training content evaluation value between 8 – 10 is categorized as 'good'. The detail evaluation can be seen in **Annex 8 - Monitoring and Evaluation of Kab/Kota Training in Manado**. The explanation of the evaluation result as follows:

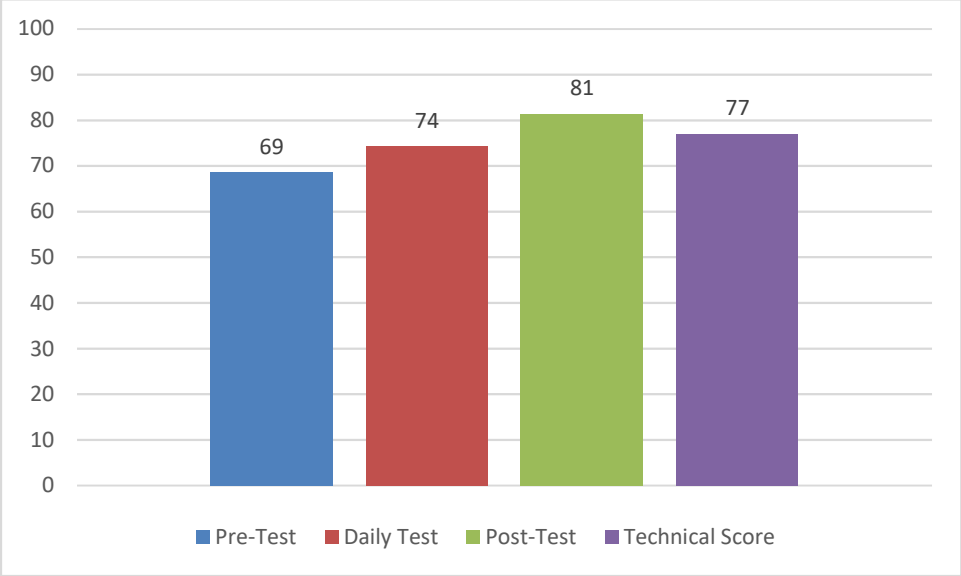
5.3.1. Participant Evaluation

The result of participants assessment can be seen in Figure 6. There are 4 (four) assessment to the participants, namely: Pre-test score, post-test score, test score, and technical score. The technical score is calculation result from the following formula:

Average total score = (2 Post test + Average Daily Test + Average Liveliness Scorea + Average Practice Score)/5

The value shown in Figure 6 is the average value. There is an increasement in the average score of pre-test to post-test. The score increases from from 69 to 81.

Figure 6. Participant Evaluation of Kab/Kota Training in Kota Manado



Source: Processed JET based on KMP Report, 2017

5.3.2. Trainer Evaluation

The result of trainers assessment can be seen in Figure 7. There are 3 (three) assessment to the trainers, namely:

- mastery of the material was assessed based on time, sequence, tools/media, and method,
- the attitude was assessed based on the language, voice, motivation, question and answer, and discussion; and
- achievement of learning goal was assessed based on understanding the exercise and test.

From the three trainers, Ms. Hari Sundana got the highest score, followed by Mr. Ihdar and Mr. Raymond who got the same score.

Figure 7. Trainer Evaluation of Kab/Kota Training in Kota Manado

	Hari Sundana	Ihdar	Raymond
Mastery of the material	9	8.3	8.3
Attitude	9	8.3	8.3
Achievement of learning goal	9	8.3	8.3

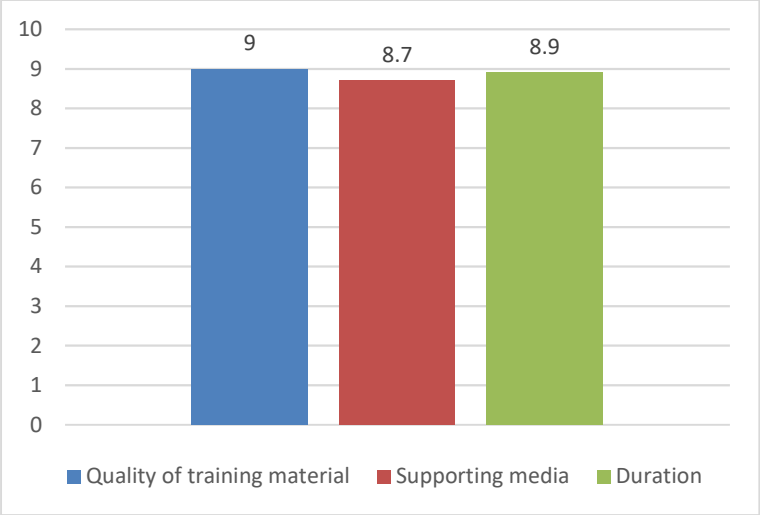
Source: Processed JET based on KMP Report, 2017

5.3.3. Training Content Evaluation

The result of training content assessment can be seen in Figure 8. There are 3 (three) assessment to the content, namely:

- quality of training material was assessed based on the objectives, the chapter and sub-chapter, the guidance, and the font;
- supporting media was assessed based on figures, tables, quiz, and exercise; and
- duration was assessed based on learning objective achievement.

Figure 8. Training Content Evaluation of Kab/Kota Training in Kota Manado



Source: Processed JET based on KMP Report, 2017

6. Finalization of Training Module after Training Implementation

NRW revised training module has been used in 3 training in 2017, i.e. trial training, Kab/Kota Training in Kota Padang, and Kab/Kota Training in Kota Manado. Based on the results of the evaluation conducted on the participant, the trainer, the module content, the training results are stated well. Therefore DWSD and WG members do not provide any further revision to the module content.

Finalization of training module after training implementation are making of the information sheet, combining session notes of existing module and additional module, check on writing, module template, and cover template.

7. Conclusion and Recommendations

7.1. Conclusion

In developing this revised module, JET has followed directives from DWSD in terms of revised module content, WG member establishment, and training implementation. JET has also reviewed the contents of existing module and conducted the discussion with WG members. The revised module has been used as teaching material on trial training, Kab/Kota Training in Kota Padang, and Kab/Kota Training in Manado. The evaluation results of those trainings are good. It can be concluded that the NRW revised training modules is appropriate and can be used for the next trainings.

7.2. Recommendation

The revised NRW Module has been developed by Working Group and JET and has been evaluated from the participants through the trial training and two Kab/Kota trainings. That is just the material has reached to the certain level for PDAM's training. However, some periodical improvement of the Module should be continued by the working group members depending on the review for the series of future Kab/Kota training. JET recommends to review and revise the module through the similar process in every around 5 years. In addition to that, JET's recommendation for further revision as follow:

1) Reconsideration for the arrangement of chapters
   There are so many contents in the materials of NRW Module. Some contents come across in various chapters. Accordingly, the WG members should keep items tidy and in order for easy understanding for the participants. Furthermore, the function of COE Project will be transferred to PERPAMSI in the near future. It will be required to prepare new materials in cooperation with PERPAMSI.

2) Re-edition of the manuals for the providing equipment
   All provided equipment by JICA has manuals written in English and Indonesian. However, those manuals are difficult to understand each procedure for inexperienced person. Easy understanding manuals should be arranged by the WG.

3) Presentation from participants
   There is a case study session in the present program. JET proposes to add a presentation session of water utility's problem or activity regarding to NRW. Participants discuss each other and share concluded solution.

4) Follow-up evaluation
   The present evaluation of training comprehension is assessed by pre-test and post-test. I propose to add a follow-up evaluation. All participants who attend the training program should send an activity report to COE after training as a matter of duty. The report will be consisted of their activities based on the knowledge from the training. The reports will be used as a case study at the next training program.

ANNEX 1

PROGRAM PENINGKATAN KOMPETENSI SUMBER DAYA MANUSIA (SDM) PROFESIONAL BIDANG AIR MINUM MELALUI POLA *CENTER OF EXCELLENCE* (COE)

Pelatihan : Pengendalian *Non Revenue Water* (NRW)	Kode : N-1
Topik : *Non Revenue Water* (NRW)	Edisi : Oktober 2017
Tujuan Pelatihan	Setelah menyelesaikan pelatihan ini, peserta diharapkan mengetahui dan mampu untuk: 1. Memahami Kompenen Air Tak Berekening (AtbR) atau *Non Revenue Water* (NRW) 2. Memahami Perbedaan NRW, Kehilangan Air, dan Kebocoran 3. Memahami Permasalahan umum NRW 4. Memahami Kehilangan Air Fisik 5. Memahami Kehilangan Air Non-Fisik 6. Memahami Neraca Air dan *Margin Error*
Sasaran Peserta	1. Staf/operator penyelenggara SPAM bidang perencanaan, distribusi, produksi, NRW, dan bagian yang terkait dengan penurunan kebocoran 2. Kepala Seksi, Kepala Bagian (setara atau lebih tinggi)
Isi Modul	1. Permasalahan NRW 2. Arti Penting Pengendalian Kehilangan Air 3. Memahami Kehilangan Air - Kehilangan Air Fisik - Indikator Kinerja Pengendalian Kehilangan Air Fisik - *Infrastructure Leakage Index* (ILI) - Kehilangan Air Non-Fisik - Indikator Kebocoran Non-Fisik 4. Penyusunan Neraca Air (Audit Air) - Neraca Air - *Maargin Error* (Deviasi Data)
Durasi	8 JP teori – 2 JP praktik
Susunan Acara	Sesi 1: Pengantar NRW (Permasalahan NRW) (teori – 2 JP) Sesi 2: Memahami Kehilangan Air (Fisik dan Non-Fisik) (teori - 1 JP) Sesi 3: Neraca Air dan Margin Error (teori – 1 JP) (praktik di kelas – 2 JP) Sesi 4: Indikator NRW dan ILI (teori – 2 JP) Sesi 5: Strategi Pengendalian Kehilangan Air (Fisik dan Non Fisik) (teori – 2 JP)
Materi (Kelas)	• *Sesion Notes* bagi pembina • Presentasi *Powerpoint* • Modul • Panduan dan naskah latihan dan simulasi • *Handout* untuk peserta
Materi (Lapangan)	-
Tindak Lanjut	• Tugas Lapangan • Pengawasan
Evaluasi	• *Pre-test* dan *post-test* • Kuis singkat usai tiap sesi

	• Kuis harian • Akhir pelatihan: ujian akhir + umpan balik peserta • Setelah *training*: kunjungan/kuesioner dan/atau pelatihan ulang

PROGRAM PENINGKATAN KOMPETENSI SUMBER DAYA MANUSIA (SDM) PROFESIONAL BIDANG AIR MINUM MELALUI POLA *CENTER OF EXCELLENCE* (COE)

Pelatihan : Pengendalian *Non Revenue Water* (NRW)	Kode : N-2
Topik : Metode Pengendalian Kehilangan Air	Edisi : Oktober 2017

Tujuan Pelatihan	Setelah menyelesaikan pelatihan ini, peserta diharapkan mengetahui dan mampu untuk: 7. Memahami Metodologi Pengendalian NRW 8. Memahami Neraca Air (*Water Balance*) 9. Memahami Analisis Kehilangan Air (ILI) 10. Memahami Perencanaan *District Metered Area* (DMA)
Sasaran Peserta	3. Staf/operator penyelenggara SPAM bidang perencanaan, distribusi, produksi, NRW, dan bagian yang terkait dengan penurunan kebocoran 4. Kepala Seksi, Kepala Bagian (setara atau lebih tinggi)
Isi Modul	5. Menyusun Rencana Tata Laksana Pengendalian NRW - Metodologi Pengendalian NRW - Neraca Air - *Infrastructure Leakage Index* (ILI) - Analisis Finansial / Keuangan
Durasi	6 JP teori – 2 JP praktik
Susunan Acara	Sesi 6: Metode Pengendalian Kehilangan Air (teori *Water Balance* – 2 JP) (Latihan Studi Kasus *Water Balance* – 2 JP) (teori Metodologi Pengendalian Kehilangan Air – 2 JP) Sesi 7: Merencanakan *District Metered Area* (DMA) (teori - 2 JP) Sesi 8: Aspek Keuangan (Manfaat dan Biaya)
Materi (Kelas)	• *Sesion Notes* bagi pembina • Presentasi *Powerpoint* • Modul • Panduan dan naskah latihan dan simulasi • *Handout* untuk peserta
Materi (Lapangan)	-
Tindak Lanjut	• Tugas Lapangan • Pengawasan
Evaluasi	• *Pre-test* dan *post-test* • Kuis singkat usai tiap sesi • Kuis harian • Akhir pelatihan: ujian akhir + umpan balik peserta • Setelah *training*: kunjungan/kuesioner dan/atau pelatihan ulang

PROGRAM PENINGKATAN KOMPETENSI SUMBER DAYA MANUSIA (SDM) PROFESIONAL BIDANG AIR MINUM MELALUI POLA *CENTER OF EXCELLENCE* (COE)

Pelatihan : Pengendalian *Non Revenue Water* (NRW)	Kode : N-3
Topik : Teknik Deteksi Kehilangan Air Fisik	Edisi : Oktober 2017

Tujuan Pelatihan	Setelah menyelesaikan pelatihan ini, peserta diharapkan mengetahui dan mampu untuk: 11. Memahami Teknik Penanggulangan Kehilangan Air Fisik 12. Mengetahui Cara Membentuk DMA, Step Test, Sounding, dan Repair Kebocoran Fisik 13. Memahami Teknik Pengendalian Kehilangan Air Non-Fisik 14. Memahami Upaya-upaya Penurunan NRW Sederhana yang Hemat Biaya 15. Memahami Langkah Pencegahan Kebocoran Guna Menurunkan NRW
Sasaran Peserta	5. Staf/operator penyelenggara SPAM bidang perencanaan, distribusi, produksi, NRW, dan bagian yang terkait dengan penurunan kebocoran 6. Kepala Seksi, Kepala Bagian (setara atau lebih tinggi)
Isi Modul	6. Teknik Penanggulangan Kehilangan Air Fisik - Pembentukan DMA - Step Test - Deteksi Kebocoran Fisik (*Leak Colleration* dan *Sounding*) - Peralatan Deteksi Kebocoran Lanjutan - Repair 7. Teknik Pengendalian Kehilangan Air Non-Fisik 8. Upaya-upaya Penurunan NRW Sederhana yang Hemat Biaya 9. Langkah Pencegahan Kebocoran Guna Menurunkan NRW
Durasi	4 JP teori – 7 JP praktik
Susunan Acara	Sesi 9: Step Test (teori – 1 JP) (praktik di kelas – 2 JP) (praktik di lapangan – 5 JP dengan Topik 10) Sesi 2: Deteksi Kebocoran (*sounding*) dan Pengenalan Alat Deteksi Kebocoran Lanjutan (teori – 1 JP) Diskusi Hasil Praktik Lapangan (2 JP)
Materi (Kelas)	• *Sesion Notes* bagi pembina • Presentasi *Powerpoint* • Modul • Panduan dan naskah latihan dan simulasi • *Handout* untuk peserta
Materi (Lapangan)	• Step Test

	Bahan: Buku N-3 • Deteksi Kebocoran dan Alat Deteksi Kebocoran Lanjutan Bahan: Buku N-3
Tindak Lanjut	• Tugas Lapangan • Pengawasan
Evaluasi	• *Pre-test* dan *post-test* • Kuis singkat usai tiap sesi • Kuis harian • Akhir pelatihan: ujian akhir + umpan balik peserta • Setelah *training*: kunjungan/kuesioner dan/atau pelatihan ulang

SCHEDULE OF KABUPATEN/KOTA TRAINING FOR NRW MODULE
Kota Manado, October 17 - 20, 2017

Date/Time	**08.00-08.45**	**08.45-09.30**	**09.30-10.30**		**10.45-11.30**	**11.30-12.30**		**13.30-14.15**	**14.15-15.15**		**15.30-16.15**	**16.15-17.00**	**17.00-17.45**		**21.00-01.00**
Tuesday Oct 17, 2017	Opening Ceremony	Explanation about Kab/Kota Training + Pre-Test	NRW Introduction		NRW Introduction + Test 1	Understanding water loss + Test 2		Water balance & margin of error + Test 3	Excercise to calcutate water balance (manual)		Excercise to calcutate water balance (manual)				
Speaker	committee	committee	Raymond		Raymond	Raymond		Ihdar	Ihdar		Ihdar				
Wednesday Oct 18, 2017	NRW indicator and ILI + Test 4		Water balance Easy Calculation		Water balance Easy Calculation + Test 5	Case study exercise about water balance easy calculation		Case study exercise about water balance easy calculation	Water loss control strategy		Water loss control strategy + Test 6	Methodology of water loss control			
Speaker	Hari Sundana		Hari Sundana	Break	Hari Sundana	Hari Sundana	Lunch Break	Hari Sundana	Raymond	Break	Raymond	Ihdar			
Thursday Oct 19, 2017	DMA establisment		Step Test + Test 7		Leak detection and equipment introduction			Case Study of Step Test (Mini DMA)			Night practice preparation			Break	Practice tracking and localization of water loss (go to PDAM)
Speaker	Raymond		Ihdar		Jica Expert Team + Hari Sundana			All Trainers			All Trainers				ALL Trainers
Friday Oct 20, 2017	Discussion of field visit result + Post Test				Closing Ceremony										
Speaker	All Trainers				committee										

Ministry of Public Works and Housing
Republic of Indonesia

The Project
on
Strengthening COE (Center of Excellence) Program
for
PDAMs in the Republic of Indonesia

Training Module Implementation Report

Energy Efficiency (EE)

May 2018

JICA Expert Team

The Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Republic of Indonesia

Training Module Implementation Report

(EE)

Table of Contents

*** The following Annexes except Annex 1 (Training Curriculum) are omitted in the Project Completion Report.**

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1. Introduction

"JICA Technical Cooperation Project on Strengthening COE Program for PDAMs in Indonesia" (JICA Project) was launched in August 2015 with its project purpose of enhancement of the implementation capacity of Directorate General of Humansettlment (DGHS) regarding the COE program. Aiming at fulfilling this purpose, Directorate of Water Supply System Development (DWSD) of DGHS and JICA Expert Team (JET) have been engaged in a number of activities. One of the major outputs planned is the development and revision of the four training modules for COE Program.

The present report comprehensively explains the project activities carried out regarding the revision of Energy Efficiency (EE) module as one of the four subject training modules; and seeks for DWSD's final approval of the relevant training curriculum, training materials and trainer's manuals, as determined by the Project Design Matrix agreed between DWSD and JICA through their Minutes of Meeting dated 13 June 2017.

2. Training Module Contents and Output

According to the Inception Report of The Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Republic of Indonesia in August 2015, one of the objective of this project is to improve the existing Energy Efficiency (EE) training module for CoE Program. The developed EE training module consists of: (i) training curriculum, (ii) training materials, and (iii) trainer's manuals.

3. Training Module Development Process

3.1. Precedent and Preparatory Works

3.1.1. Existing EE Module Developed by DWSD before JICA Project

The basic concept in EE training modules is to reduce PDAM energy use in order to reduce the energy cost as low as possible without affecting its production efficiency which means the PDAM can utilize its maximum production capacity. The contents of the existing module can be seen on Table 1.

Table 1. Table of Contents of EE Existing Module

• Energy Efficiency in PDAM

- The Basic Theory of Electricity
- The Basic Theory of Hydraulics
- Steps for Energy Efficiency
- Review of PLN Electricity Tariff
- Measuring System Performance
- Selecting Pump
- Proposal and Report of Energy Efficiency Program
- Occupational Health and Safety and the Introduction of Energy Efficiency Equipment
- Field Exercise and PDAM Visit

Source: EE Module, 2016

The previous development works of the existing EE module is condcuted by DWSD before JICA Project as follows. The revision for EE modules have been determined by the working committee that consists of DWSD staffs, COE managements consultants, and EE experts from AKATIRTA. Based on the module review meeting that was conducted on September 17-18, 2015 at Falatehan Hotel Jakarta, the revision will be as seen in Table 2. The detailed meeting can be seen in **Annex 5 – MOM of EE Minutes of Module Review Meeting**.

Table 2. EE Modules Revision Based Module Review Meeting

Description	Input
Chapter 1: Energy Efficiency in PDAM	• Updates on PDAM performance status based on PDAM Performance Status 2014 released by BPPSPAM • In page I-12 "Steps (how PDAM addresses) in controlling energy usage for pump system operation" will be grouped based on 'case' and 'steps'
Chapter 2: Basic Theories of Electricity	In subchapter 2.5 Meter Measurement Tools: • Variety of tools will be explained in Chapter I • The instruction on how to use the tools are explained in Chapter 9 (Introduction to measurement tools)
Chapter 3: Basic Theories of Hydraulic	• Measurement units for pipe diameter that initially used (m) now changed to (m^2) • The terms "Pumping Flow" replaced with "Flow with a Pump System"
Chapter 4: Steps for Energy Efficiency	• In steps for energy efficiency an addition of "Pumping Hours Control Setting" will be added • Brief explanation on feasibility study (in flow chart methodology of energy audit) • Subchapter "Evaluation" will be changed to "Monitoring and Evaluation" with added explanation on monitoring

Chapter 5: Review of PLN Electricity Tariff	• The most recent PLN tariff regulation is the ESDM Ministerial Decree No. 31 Year 2014 in replacement of ESDM Ministerial Decree No. 19 Year 2014 • Tariff categorization is revised according to ESDM Ministerial Decree No. 31 Year 2014: - Type of Business to: (B1/TR, B2/TR, B3/TM) - Type of Government Consumption & Street Light to (P1/TR, P2/TM, P3/TR) - Type of Special Service to: (L/TR, TM, TT) • WBP is changed to 18.00 until 22.00 hours • LWBP is changed to 22.00 until 18.00 hours
Chapter 6: Measuring System Performance	• SEC value parameter now added with kW/m^3 units ($400W/m^3$ adding 0,4 kW/m^3) • The formula for total efficiency (p. VI-7) now added with "x 100%"
Chapter 7: Selecting Pump	• More definition on accompanying pump and replacement pump (substitute) • Excel exercise will be given colors on column that are going to be filled
Chapter 8: Proposal and Report of Energy Efficiency Program	• Steps on how to compose a proposal based on PDAM study case will be added • Explanation on the importance of composing a proposal for PDAM
Chapter 9: Occupational Health and Safety and the Introduction of Energy Efficiency Equipment	• A less general explanation on HSE with a focused insight on electricity-related working environment • Explanation of HSE with illustration and APD & hazard symbols that are related with work activities • Measurement tools are described in general, the brands of the tools are not to be included • HSE materials and Introduction to Tools will be separated into two different chapters - HSE to Chapter 9 - Introduction to Measurement Tools to Chapter 10
Chapter 10: Field Exercise and PDAM Visit	• This chapter will be separated from the module and the handout will not be made. • Is going to be included as additional part (including working sheet for exercise) as a separate book in a shape of a leaflet (pocket book)
General	• Module EE will consist of 2 books: - Book 1: Learning material with exercises - Book 2: Session Notes and Handout - Exercises are included in each material per chapter (not separated from subject)

	- General index on terminology definition for the terms used in the modules will be included - Table and graphics sources will be included on each table / graphics - A "clinic" out of lesson hours will be made available for ± 1-1/5 hours (on the second day) → will be included in the schedule

Source: EE Module Review Minutes of Meeting

3.1.2. Review of Existing Module by JICA Expert Team

3.1.2.1. JICA Expert Team Baseline Survey

In order to know the PDAM Problems and challenges related to Energy Efficiency, JICA Expert Team conducted baseline survey in 2015, to clarify the operation status of PDAMs relevant to the JICA Technical Cooperation Project on Strengthening COE Program for PDAMs ("the Project") at the time of project commencement. The detailed result can be seen in EE Module Development Report (See **Annex 6**).

Based on JET baseline survey, the major problems related to Energy Efficiency in PDAM could be concluded as follows:

- High Electricity Cost
- Inefficient Pump system
- Bad Planning
- Incompatible EE curriculum with participants level, background, and existing technology available in their own PDAM

Those aforementioned problems should be analyzed in order to find the most suitable and applicable solution.

(1) Cost Related Problem

Based on PDAM statistical data, electricity cost in PDAM mainly reach 55% of total production cost or 25% of basic production cost due to high electricity consumption more than 0.4 kWH / m^3.

COE as comprehensive training for PDAM staffs considers this important matters and adding objective for PDAM staffs to understand the terminologies and the steps required for energy efficiency enhancement efforts and to understand the applicable PLN's electricity tariff and how to circumvent it.

(2) Inffecient Pump System

As for pump system related matters such as tripped pumps, low pressure, and bad pumps installation, an appropriate pump selection and operation methods in terms of the energy efficiency of the whole system should be introduced including pump selection and modification. Thus, EE contents should deal with more pump selection and revolution on speed control. Theoretical training on EE for pumping unit and electrical facilities should be explained in more details. The approaches on how to improve the existing pumps or equipment also need to be included.

(3) Bad Planning

Inefficient transmission and distribution system due to bad planning often becomes causing factor of energy waste and low production efficiency in PDAM. To cope with that, water transmission and distribution system plan for improving energy efficiency have to be explained in more details. Not only planning in transmission and distribution system, but also pumping system planning needed for better energy efficiency. EE issues form the viewpoints of the entire water supply system also need to be included on this module. Approaches for improving EE in the entire water supply system also needed to be introduced and not only on unit based improvements so the whole system can be planned comprehensively.

(4) Incompatible EE curriculum with participants level, background, and existing technology available in their own PDAM

Based on the interview results, most of the contents are quite comprehensive for engineers but it needs some adjustment for operators. EE curriculum should be well prepared based on the levels of training participants in order to achieve its objectives.

3.1.2.2. Direction for Training Module Revision

Further revision will be made in the following direction:

- 2016 version will be utilized as it is, and appropriate pump selection and operation methods in terms of the energy efficiency of the whole system will be introduced.
- The following subjects will be added.
  - Water transmission and distribution system plan to improve energy efficiency
  - Pumping system planning for better energy efficiency

3.2. Formation of Working Group

As seen above, formerly before the JICA Project activities from 2015, DWSD had formed and mandated the EE Working Group (WG) to develop of the original EE training module for COE Program since the program's commencement in 2012. The EE WG consists of Indonesian experts of the field such as DWSD staff, COE Management Consultant (KMP), experienced PDAM staff such as National Trainers, reputable individual professional practitioners such as consulting experts of other donor programs, and AKARTIRTA lecturers, etc. some of whom acted as the draft writers of the module and the instructors for National and Provincial Trainings. The WG had functioned to discuss and determine all the details of the training curriculum, textbook and materials.

Since the JICA Project's intervention to the EE module was limited to the revision work, upon the commencement of JICA Project in 2015 it was agreed with DWSD to utilize the existing WG to improve the training module contents.

In June 2016, the first EE WG discussion meeting took place through DWSD's invitation to the existing WG members (See Annex 4 - Invitation Letter form DWSD).

3.3. Module Development and Working Group Discussions

3.3.1. Working Group Meeting 1

The first EE working group meeting was held on June 23-24, 2016 in Veranda Hotel Jakarta and chaired by Mr. Hilwan, Head of Sub Directorate of Standardizaton and Institutional of DWSD. It was attended by representatives of DWSD, COE Management Consultants, JICA Expert Team, and EE Working Group Members. List of EE working group members who attended the meeting can be seen in Table 3.

Table 3. List of EE Working Group Member in The First WG Meeting

No.	Name	Institution
1.	Prijono	AKATIRTA Magelang
2.	Rahardjono	PDAM Kota Malang
3.	Dedi Setiawan	PDAM Kota Malang
4.	Hasan Farurodzy	PDAM Kota Bogor
5.	Peni Pintarto	PDAM Kabupaten Jember
6.	Fathurrahman	PDAM Kota Aceh

7.	Suhadi	BTAM

Source: MoM EE WG Meeting 1 of JET, 2016

This meeting have been held for two days. The agenda for the first day (23 June 2016) is: (a) Brief overview of PDAM Operational Problems; (b) Modules Development Process Explanation; (c) Overview and Review on The 2016 Modules Revised in 2015; and (d) Additional Material Introduction and Discussion.

Meanwhile the agenda for the second day is: (a) Open discussion about How to Use The additional Material in COE Training and Training Curriculum Modification and Adjustment Regarding Additional Material; and (b) Forthcoming Events / Activities Plan.

The basic concept of EE module development process is JET will not change the existing material instead JET will put the additional material to the new additional module compiled by JET. So JET will make new separate new module that consists of the additional material (the collaboration between EE and NRW and EPANET). JET will make sure the material will be aligned together with the existing EE material by doing the cooperative works with EE working group members simultaneously.

The detail discussion result and documentation can be seen in **Annex 5 – MOM of EE WG Meeting 1** and **Annex 7- Documentation of WG Meeting**.

3.3.2. Working Group Meeting 2

The second EE working group meeting was held on March 20, 2017 in Veranda Hotel Jakarta and chaired by Mr. Hilwan, Head of Sub Directorate of Standardizaton and Institutional of DWSD. It was attended by representatives of DWSD, COE Management Consultant, JICA Expert Team, and EE Working Group Members. List of EE working group members who attended the second WG meeting can be seen in Table 4.

Table 4. List of EE Working Group Member in The Second WG Meeting

No.	Name	Institution
1.	Prijono	AKATIRTA Magelang
2.	Rahardjono	PDAM Kota Malang
3.	Dedi Setiawan	PDAM Kota Malang

4.	Hasan Farurodzy	PDAM Kota Bogor
5.	Risdom	PDAM Kota Medan

Source: MoM EE WG Meeting 2 of JET, 2017

The agenda is: (a) Explanation on the objectives and background of the supplemental materials for EE module; (b) Brief overview of Previous WG Results; (c) Overview and Review on The 2016 Modules Revised in 2015; and (d) Additional Material Introduction and Discussion; (d) How to Use the Additional Material in COE Training; (e) Training Curriculum Modification and Adjustment Regarding Additional Materials.

Table 5. EE Additional Material Proposed by JET

Part-1 Background, Objectives and Benefits
- 1.1 Background
- 1.2 Objective
- 1.3 Benefits of efficient pumping systems

Part 2 How Can We Start for Improvement of Energy Efficiency (EE)
- 2.1 Self-Assessment of the existing facilities for Improvement of EE
- 2.2 What is your opportunity?
  - Solution 1: Improve the efficiency of your existing system
  - Solution 2: Design a new system

Part 3 Solution 1 – Improve the efficiency of your existing system
- 3.1 Common problems and measures to improve efficiency
- 3.2 Assess your existing pumping system

Part 4 Solution 2 – Design a new system
- 4.1 Step 1: Assess production equipment and minimize pumping needs
- 4.2 Step 2: Design with a whole-system approach
- 4.3 Step 3: Design efficient pump stations
- 4.4 Step 4: Select efficient pumping components
  - Example: Controlling number of pumping unit
- 4.5 Summary of design considerations for pumping systems

Part 5 Further Improvement of Energy Efficiency and Operation Cost
- 5.1 Other Improvement planning of Energy Efficiency
- 5.2 Reduction of operation cost
- 5.3 Other aspect to be considered : NRW – EE
- 5.4 Spiral of monitoring, evaluation and improvement

Source: MoM EE WG Meeting 2 of JET, 2017

Notes:

- The title of the additional material is “Practical and Simplified Approach to Improvement of Energy Efficiency”. This has benn changed from the previous one “The collaboration between EE and NRW and EPANET” since it seemed rather complicated to tackle these weighty themes simultaneously in the limited period of time.
- Contents of the materials (part-1 to part-5) have been rearranged to conform with necessity of present status of PDAM acquiring practical skills for EE improvement.

There are four big points that suggested by working group members to be added as additional materials for Energy Efficiency Module for COE.

- As for "Further Improvement of Energy Efficiency" subject it is better if JET introduce case study or best practice in Japan about how to Improve Energy Efficiency
- Study case or best practice in Japan or other countries about How to do Energy Audit step by step from data preparation until recommendation. Also introduce the Energy audit simple methods for small PDAM.
- How to Reduce Operational Cost and Energy Cost by theoretical and give example based on JET experiences in Japan or in other countries.
- Case study and practical knowledge of VSD.
- Due to limited time, the additional materials will get 45 minutes (1 lesson hour) for allocation time in the last training day.
- The additional materials will be added as separated module because the contents mostly consists of best practice or case study.

The detail discussion result and documentation can be seen in **Annex 5 – MOM of EE Working Group Meeting 2 and Annex 7- Documentation of WG Meeting**.

3.4. Draft Final Module for Training Implementation

JET did the revision of EE additional module according to the final comments form WG member in 2nd WG meeting by adding case study and best practice in Japan about how to Improve Energy Efficiency. The case studies are inserted into the attachment, as follows:

- Summary of Feasibility Study for Energy Efficiency
- Summary of Final report, "Energy Saving at Phnom Penh Water Supply Authority (Cambodia) by Improving Efficiency of Water Treatment Plants"
- Reference: Program for Energy Conservation through Upgrading Water Supply Network in the Hashemite Kingdom of Jordan

DWSD agree to conduct the trial training and Kabupaten/Kota Training in 2017 for EE subject using the developed module. Further explanation of training implementation is in section 4.

4. Training Implementation of Revised Module

4.1. Summary

The training implementation of revised EE module were held 3 times in 2017. The first training implementation was trial training. The training using the additional module

developed by working group with supervised by JET. Afterward, Kab/Kota Training in Kota Padang was conducted in October 2018.

Table 6. Training Implementation of EE Additional Module Training

Training	Date	Venue	Trainers	Implementer	Participant	Material Content
Trial Training	August 1-4, 2017	Best Western Hotel Cawang, Jakarta	- WG member	DWSD using self-managed fund	Selected National/Provincial Trainers	EEAdditional Module
Kab/Kota Training	October 3-6, 2017	Rocky Plaza Hotel Padang, West Sumatera	- Trial training participant - Provincial trainer	DWSD through COE Field Consultant (KP)	PDAM staff in West Sumatera	- Existing module - Additional module

Source: JET, 2018

4.2. Trial Training for Provincial Trainers

Trial training for EE modules was conducted by DWSD using their self-managed fund. Before the implementation of trial training, several coordination meeting were held between DWSD and JET (See **Annex 5**). Several things were prepared for EE trial training as follow:

- Participant list provided by DWSD.
- Fixed schedule.
- Pre-test, post-test, and daily test question prepared by JET.
- Teaching materials prepared by JET
- WG member to become supporting trainers in trial training were selected by DWSD.

4.2.1. Time and Place

EE Trial Training was held on August 1 – 4, 2017 at Best Western Hotel Cawang. It was attended by representatives of DSWS, JICA Expert Team, EE supporting trainers, participants, and COE Management Consultant.

4.2.2. Trainers and Trainees

EE trial training trainers are selected working group member which consist of PDAM experienced staff, reputable individual professionals, and AKARTIRTA instructor. The selected WG members are considered primary recipients of technical transfer from JICA

Expert Team and will continue disseminating and updating the developed module after JICA Project. The list of EE Trainers can be seen in Table 7.

Table 7. List of EE Trainers in Trial Training

No.	Name	Institution
1.	Rahardjono	PDAM Kota Malang
2.	Dedi Setiawan	PDAM Kota Malang
3.	Prijono	AKATIRTA Magelang

Source: JET, 2017

The participants of trial training for EE module consisted of 9 (nine) persons who are PDAM staff as shown in Table 8.

Table 8. List of EE Participantss in Trial Tarining

No.	Name	Institution
1.	Gusta Alexsnery	PDAM Kota Payakumbuh
2.	Mardi	PDAM Kab. Jombang
3.	Rifai	PDAM Bondowoso
4.	Wargo Toyetno	PDAM Pontianak
5.	Ardhian Bagus	PDAM Kab. Grobogan
6.	Eko Winarno	PDAM Purworejo
7.	Gusri Syafrizal	PDAM Kota Solok
8.	Zulfikri	PDAM Pasbar
9.	Mukhsin	PDAM Malang

Source: JET, 2017

4.2.3. Training Implementation

The training was opened with opening remarks from Director of DWSD who was represented by Dian Prasetyawati, ST. MT, M.Sc as Section head of Standardization of DWSD. Then continued with brief summary of revised parts of NRW and EE modules by Ms. Laksmi Darya, also introduction of JICA's Expert Team and working group menbers by Mr. Yoshiaki Yokota. The first day was closed with pre-test for the participants.

On the second day, participants were given materials regarding EE additional module by trainers. The agenda and materials division can be seen in Table 9.

Table 9. The Division of Teaching Materials in Trial Training

Agenda	Speaker / Trainer
1. Background, Objectives and Benefits 2. How Can We Start for Improvement of Energy Efficiency (EE)	Mr. Rahardjono, ST
3. Solution 1 – Improve the efficiency of your existing system 4. Solution 2 – Design a new system 5. Further Improvement of Energy Efficiency and Operation Cost	Mr. Dedi Setiawan, ST
6. Case Study	Mr. Yuichi Matsumoto

Source: JET, 2017

On the third day, the equipment training was conducted in PDAM Kota Bekasi. Before the equipment training begins, Mr. Tjetjep Achmadi as technical director of PDAM Kota Bekasi gives an opening remarks.

The explanation of basic application of equipment, equipment principle, and function of all EE equipments procured were explained by Mr. Priyono. After that, practical training of EE Equipments was conducted with mentoring from JICA expert, Mr. Priyono, and vendors.

On the forth day the presentation was done by participants. They explained about basic application, principle, and function of all EE Equipments. Then continued with post-test and closing ceremony. The trial training was closed with closing remarks from Director of DWSD who was represented by Ms. Tiasti Wening from Sub Directorate of Standardization and Institutional of DWSD. The detail agenda and documentaion can be seen in **Annex 5 – MOM of Trial Training** and **Annex 7- Documentation of Trial Training**.

4.3. Kabupaten/Kota Training

2017 Kabupaten/Kota Training for EE module were held in Kota Padang. This training was conducted by DWSD through COE Field Consultant (KP). The objective of COE training is to produce alumni that can apply their acquired knowledge in their PDAM. Therefore, Kabupaten/Kota training will utilize the provincial training alumni as the trainers.

4.3.1.1. Date and Place

Kab/Kota Training in Kota Padang was conducted for 4 (four) days from October 3 – 6, 2017 at Rocky Plaza Hotel Padang, West Sumatera. The training was attended by representative of DWSD, JICA Expert Team, Trainers, Participants, COE Management Consultant, and COE Field Consultant.

4.3.1.2. Trainers and Trainees

EE trainers for this Kab/Kota training can be seen in Table 10. Ms. Prijono is the main trainer, while Mr. Gusri and Mr. Zulfikri are the supporting trainers. Mr. Gusri and Mr. Zulfikri are the participants of EE Module Trial Training in August 2017.

Table 10. List of EE Trainers in Kabupaten/Kota Training in Kota Padang

No.	Name	Institution
1.	Prijono	AKATIRTA Magelang
2.	Gusri	PDAM Kota Solok
3.	Zulfikri	PDAM Kab. Pasaman Barat

Source: COE Management Consultant, 2017

The participants of EE module consisted of 10 (ten) persons form PDAM within West Sumatera Area as shown in Table 11.

Table 11. List of EE Participantss in Kabupaten/Kota Training in Kota Padang

No.	Name	Institution
1.	Mhd. Azmi	PDAM Kota Bukittinggi
2.	Rudi Eryanto	PDAM Kota Sawahlunto
3.	Gusrianto	PDAM Kota Solok
4.	Ramon Sikumbang	PDAM Kota Padang Panjang
5.	Satria Emizola	PDAM Kab. Pasaman Barat
6.	Yondra Suryadi	PDAM Kab. Pasaman
7.	Diky Bestari	PDAM Kab. Tanah Datar
8.	Syafaruddin	PDAM Kab. Tanah Datar
9.	Maswir	PDAM Kab. Agam
10.	Ronaldo Kurniawan	PDAM Kab. Padang Pariaman

Source: COE Management Consultant, 2017

4.3.1.3. Training Implementation

Kab/Kota Training for Energy Efficiency (EE) module was opened with the opening remarks from Director of DWSD who was represented by Ms. Ir. Susi MDS Simanjuntak, MT as Head of Sub Directorate of Standardization and Institutional of DWSD..

After opening ceremony, learning activities were done for three days according to the timetable in Table 12. The training was begun with a pre-test and ended with a post test on the third day.

Equipment training was conducted on the third day. In the morning session, participants were explained about EE equipment, such as power quality analyzer, clamp meter, tachometer, and infrated thermometer. After that, participant did field practice to use the equipment.

On the fourth day the discussion of field result and presentation was done by participants. Then continued with post-test and closing ceremony. The detail agenda and documentation can be seen in **Annex 5 – MOM of Kab/Kota Training Padang** and **Annex 7- Documentation of Kab/Kota Training Padang**.

Table 12. Schedule of Kabupaten/Kota Training for EE Module in Kota Padang

Date/Time	08.00-08.45	08.45-09.30	09.30-10.30		10.45-11..30	11.30-12.30		13.30-14.15	14.15-15.15		15.30-16.15	15.15-17.15
Tuesday October 3,2017	**Opening Ceremony**	Explanation about Kab/Kota Training + Pre-Test	Energy Efficiency in PDAM		Energy Efficiency in PDAM + Test 1	Basic theory of electricity		Basic theory of electricity + Test 2	Basic theory of hydraulics		Basic theory of hydraulics + Test 3	
Speaker	Committee	Committee	Prijono		Prijono	Prijono		Prijono	Gusri		Gusri	
Wednesday October 4,2017	Energy Efficiency Steps + Test 4		Electricity tariff study	**BREAK**	Electricity tariff study + Test 5	Measure system performance	**BREAK**	Measure system performance + Test 6	Selecting pump	**BREAK**	Selecting pump + Test 7	Occupational Health and Safety
Speaker	Zulfikri		Zulfikri		Zulfikri	Gusri		Gusri	Zulfikri		Zulfikri	Prijono
Thursday October 5,2017	Introduction of Energy Efficiency Equipment (theory and practice)				Introduction of Energy Efficiency Equipment + Test 8	Field visit and practice		Field visit and practice			Field visit and practice	
Speaker	ALL + JICA				ALL + JICA	ALL + JICA		ALL			ALL	
Friday October 6,2017	Discussion of field visit and practice result + Post Test				**Closing Ceremony**							
Speaker	ALL				Committee							

Source: COE Management Consultant, 2017

5. Monitoring and Evaluation of Training Implementation

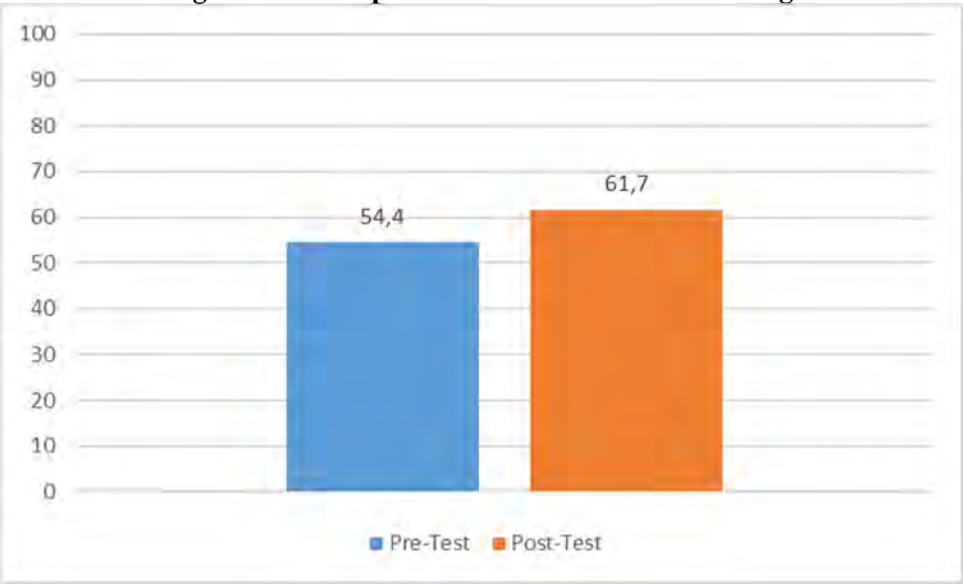
Montioring and evaluation was held every training implementation. In trial training, participant evaluation was conducted by DWSD, while module content evaluation was done by JET. On the other hand, monitoring and evaluation of Kab/Kota Training in Kota Padang were done by COE Management Consultant (KMP). There are 3 evaluation, namely (i) participant evaluation, (ii) trainers evaluation, and (iii) training content evaluation.

5.1. Monitoring and Evaluation of Trial Training

5.1.1. Participant Evaluation

The result of pre-test and post test score of participant can be seen in the Figure 1. From the graph can be seen that there is an increase in the average score test of participants.

Figure 1. Participant Evaluation of Trial Training



Source: JET based on DWSD Data, 2017

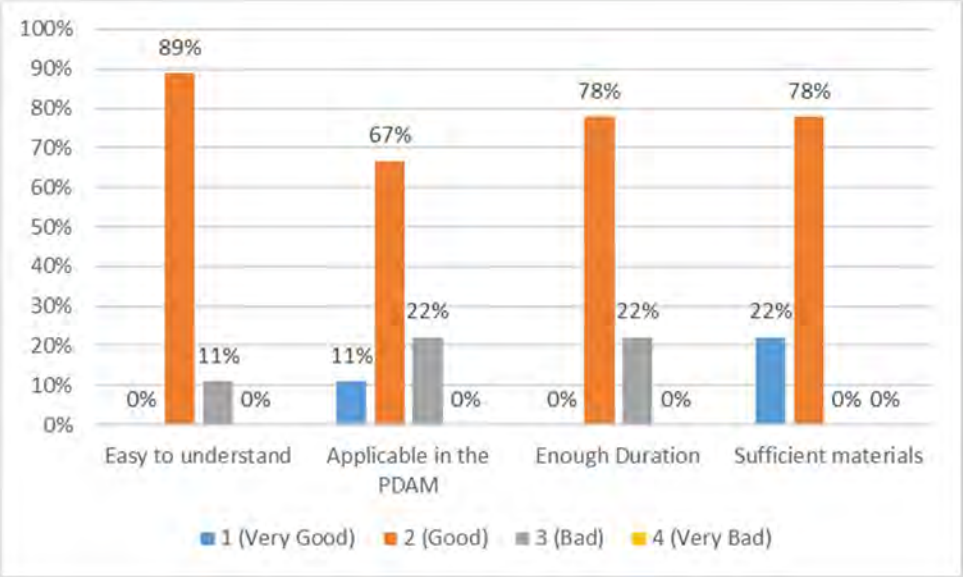
The detail result of participant evaluation can bee seen in **Annex 8 - Monitoring and Evaluation of Trial Training**.

5.1.2. Module Content Evaluation

The module content evaluation was conducted by JET. Questionnaires distributes to participants during trial training, so that participants can assess the module content. Score 1 stands for highest satisfaction level, while score 4 is the less satisfaction level. Module content evaluation scores average 2 out of 4, which means “good”. The result can be seen in

Figure 2. The detail result of module content evaluation can bee seen in **Annex 8 - Monitoring and Evaluation of Trial Training**.

Figure 2. Module Content Evaluation of Trial Training



Source: JET, 2017

From the graph above concluded that:

- 89% of participants considered that EE module is easy to understand, while 11% of participants considered that it is less easy to understand.
- 11% of participants considered that EE module is very applicable in their PDAM, 67% of them considered that it is applicable in the PDAM, while 22% of participants considered that it is less applicable in the PDAM.
- 78% of the participants considered that the training duration is enough, while 22% of them condisered that the duration is not enough.
- 22% of participant considered that module materials are very sufficient, while 78% of the considered that module materials are sufficient.

5.2. Monitoring and Evaluation of Kabupaten/Kota Training in Kota Padang

The monitoring and evaluation was conducted by management consultant (KMP) consist of participant evaluation, trainers evaluation, and training content evaluation. According to COE Management Consultant, trainers and training content evaluation value between 8 – 10 is categorized as 'good'. The detail evaluation can bee seen in **Annex 8 - Monitoring and Evaluation of Kab/Kota Training in Padang**. The explanation of the evaluation result as follows:

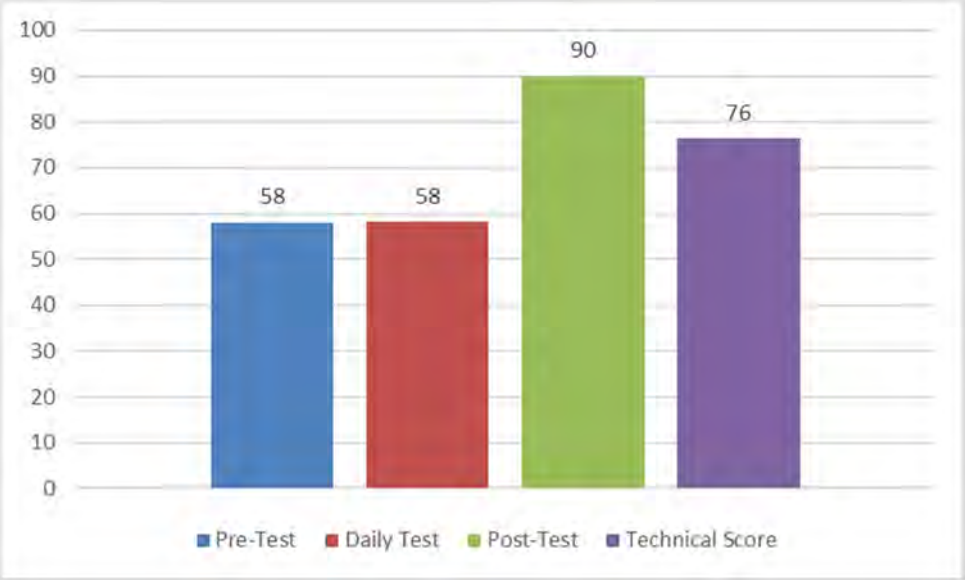
5.2.1. Participant Evaluation

The result of participants assessment can be seen in the Figure 3. There are 4 (four) assessment to the participants, namely: Pre-test score, pos-test score, test score, and technical score. The technical score is calculation result from the following formula:

Average total score = (2 Post test + Average Daily Test + Average Liveliness Score + Average Practice Score)/5

The value shown in Figure 3 is the mean value. There is an increasement in the average score of pre-test to post-test. The score is increase from from 58 to 90.

Figure 3. Participant Evaluation of Kab/Kota Training in Kota Padang



Source: Processed JET based on KMP Report, 2017

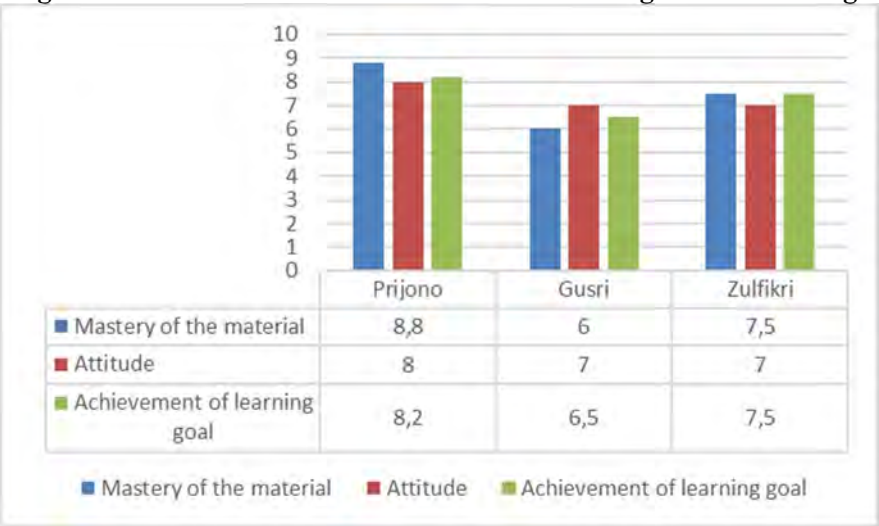
5.2.2. Trainer Evaluation

The result of trainers assessment can be seen in the Figure 4. There are 3 (three) assessment to the trainers, namely:

- mastery of the material was assessed based on time, sequence, tools/media, and method,
- attitude was assessed based on the language, voice, motivation, question and answer, and discussion; and
- achievement of learning goal was assessed based on understanding the exercise and test.

From the three trainers, Mr. Projono got the highest score, followed by Mr.Zulfikri and Mr. Gusri respectively.

Figure 4. Trainer Evaluation of Kab/Kota Training in Kota Padang



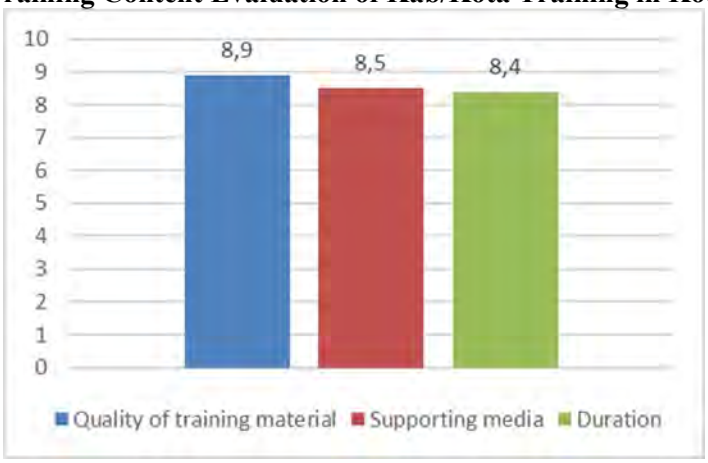
Source: Processed JET based on KMP Report, 2017

5.2.3. Training Content Evaluation

The result of training content assessment can be seen in the Figure 5. There are 3 (three) assessment to the content, namely:

- quality of training material was assessed based on the objectives, the chapter and sub-chapter, the guidance, and the font;
- supporting media was assessed based on figures, tables, quiz, and exercise; and
- duration was assessed based on learning objective achievement.

Figure 5. Training Content Evaluation of Kab/Kota Training in Kota Padang



Source: Processed JET based on KMP Report, 2017

6. Finalization of Training Module after Training Implementation

EE additional training module has been used in 2 training in 2017, i.e. trial training and Kab/Kota Training in Kota Padang. Based on the results of evaluation conducted on the

participant, the trainer, the module content, the training results are stated well. However, WG member suggested to insert additional module into existing moudule. So, after Kab/Kota Training, JET did discussion on merging these modules with some WG member, i.e. Mr. Rahardjono and Mr. Dedi Setiawan via email and also on January 26, 2018, JET and those WG members held a direct discussion to finalize EE module. The results of the discussion are as follows:

- EE additional module compiled by JET have been inserted into the existing module
- New module has been through editing and correction in accordance with the discussion result.

The detail result can be seen in **Annex 5 – MoM Finalization of EE Module**.

Finalization of training module after the discussion on Jenuary 26, 2018 are making of information sheet, combining session notes of existing module and additional module, check on writing, module template, and cover template.

7. Conclusion and Recommendations

7.1. Conclusion

In developing this revised module, JET has followed directives from DWSD in terms of revised module content, WG member estabishment, and training implementation. JET has also reviewed the contents of existing module and conducted discussion with WG members. The revised module has been used as teaching material on trial training, Kab/Kota Training in Kota Padang, and Kab/Kota Trainin in Manado. The evaluation results of those trainings are good. It can be concluded that the EE revised training modules is appropriate and can be use for the nex trainings.

7.2. Recommendation

By looking at the results of the questionnaire, it can also be concluded that this training program is very useful. This program is therefore recommended to be sustainable. The sustainability of this program should be supported by the number of coaches who are competent and a good training institutions. Therefore, in order for this program to become a sustainable program, there are several things that can be a recommendation that is :

1. JET recommends to review and revise the module through similar process periodically (i.e in every around 5 years).

2. Suggested Training time is added, because the training material is very much, so with the added time of training expected participants will be able to absorb the material better.
3. Post test to the participants is very good, but because the number of trainers is still small and still needed a lot of trainers, finding new trainers is also important, therefore it is suggested in addition to post test, after training it is advisable to hold a session for recruitment process to find the trainer, both trainers within the PDAM environment and for trainers in the District / City, Province or nationally
4. Since this program is very useful for improving technical and management skills for PDAMs, it is recommended that this training program be replicable, there should be an agency in the Management of this training.
5. Besides there is an institution that takes care of this training, it is suggested that this training program can become standard competence and certified officially nationally.
6. In general, EE consists of rather practical knowledge which can be applicable to daily operation and/or maintenence of the water supply systems. Furthermore, in order to achieve a partcular effect, awareness of EE management should be raisen through the program.
7. In other words, there will be opprtunities to utilize their acquired skills such as usage of measuring instruments, collection and analysis of observed data including visualization, planning for EE improvement of both the existing and new construction facilitis at every stage in the field.
8. The consequence of the above efforts and activities through the program should be fed back to future revised module for further improvement.

ANNEX 1

PROGRAM PENINGKATAN KOMPETENSI
SUMBER DAYA MANUSIA (SDM)
PROFESIONAL BIDANG AIR MINUM MELALUI
POLA *CENTER OF EXCELLENCE* (COE)

Pelatihan : Efisiensi Energi	Kode : EE-1
Topik : Efisiensi Energi	Edisi : Januari 2018

Tujuan Pelatihan	Setelah menyelesaikan pelatihan ini, peserta diharapkan mengetahui dan mampu untuk: "Meningkatkan pengetahuan dan ketrampilan dalam melakukan langkah – langkah peningkatan efisiensi energi"
Sasaran Peserta	1. Kepala seksi dan Supervisor (setara atau lebih tinggi) di bidang produksi, mekanikal/elektrikal maupun bagian yang terkait dengan upaya peningkatan efisiensi energi. 2. Staf/operator) di bidang mekanikal/elektrikal maupun bidang yang terkait dengan upaya peningkatan efisiensi energi
Syarat peserta	1. Mampu mengoperasikan microsoft office 2. Pengalaman minimum 2 tahun bekerja di PDAM 3. Bekerja dibagian perencanaan, mekanikal/elektrikal, maupun bagian-bagian lain yang terkait dengan upaya peningkatan efisiensi energi
Isi Modul	1. Bab 1 : Efisiensi Energi di PDAM 2. Bab 2 : Teori Dasar Listrik 3. Bab 3 : Teori Dasar Hidrolika 4. Bab 4 : Langkah Efisiensi Energi 5. Bab 5 : Kajian Tarif Listrik PLN 6. Bab 6 : Mengukur Kinerja Sistem 7. Bab 7 : Memilih Pompa 8. Bab 8 : Peluang untuk Efisiensi Energi 9. Bab 9 : Proposal dan Laporan Program 10. Bab 10 : Peningkatan Lebih Jauh untuk Efisiensi Energi dan Biaya Operasional 11. Bab 11 : Kesehatan dan Keselamatan Kerja (K3) 12. Bab 12 : Pengenalan Alat Ukur
Durasi	28 JP

Susunan Acara	Bab 1: (teori – 2 JP) Bab 2: (teori – 2 JP) Bab 3: (teori – 3 JP) Bab 4: (teori – 2 JP) Bab 5: (teori – 2 JP) Bab 6: (teori – 2 JP) Bab 7: (teori – 2 JP) Bab 8: (teori – 2 JP) Bab 9: (teori – 2 JP) Bab 10: (teori – 2 JP) Bab 11: (teori – 1 JP) Bab 12: (teori – 3 JP) Kunjungan dan Praktek Pengukuran Lapangan (praktek – 6 JP) Diskusi Hasil Praktek Pengukuran Lapangan (diskusi – 3 JP)
Materi (Kelas)	• *Sesion Notes* bagi pembina • Presentasi *Powerpoint* • Modul • Panduan dan naskah latihan dan simulasi • *Handout* untuk peserta
Materi (Lapangan)	• -
Tindak Lanjut	• Hasil latihan dan simulasi yang dibuat aplikatif sesuai data yang dibawa • Pengawasan
Evaluasi	• *Pre-test* dan *post-test* • Kuis singkat usai tiap sesi • Kuis harian • Akhir pelatihan: ujian akhir + umpan balik peserta • Setelah *training*: kunjungan/kuesioner dan/atau pelatihan ulang

SCHEDULE OF KABUPATEN/KOTA TRAINING FOR EE MODULE
Kota Padang, October 3 - 6, 2017

Date/Time	08.00-08.45	08.45-09.30	09.30-10.30		10.45-11..30	11.30-12.30		13.30-14.15	14.15-15.15		15.30-16.15	15.15-17.15
Tuesday October 3,2017	**Opening Ceremony**	Explanation about Kab/Kota Training + Pre-Test	Energy Efficiency in PDAM		Energy Efficiency in PDAM + Test 1	Basic theory of electricity		Basic theory of electricity + Test 2	Basic theory of hydraulics		Basic theory of hydraulics + Test 3	
Speaker	Committee	Committee	Prijono		Prijono	Prijono		Prijono	Gusri		Gusri	
Wednesday October 4,2017	Energy Efficiency Steps + Test 4		Electricity tariff study	**B R E A K**	Electricity tariff study + Test 5	Measure system performance	**B R E A K**	Measure system performance + Test 6	Selecting pump	**B R E A K**	Selecting pump + Test 7	Occupational Health and Safety
Speaker	Zulfikri		Zulfikri		Zulfikri	Gusri		Gusri	Zulfikri		Zulfikri	Prijono
Thursday October 5,2017	Introduction of Energy Efficiency Equipment (theory and practice)				Introduction of Energy Efficiency Equipment + Test 8	Field visit and practice		Field visit and practice			Field visit and practice	
Speaker	ALL + JICA				ALL + JICA	ALL + JICA		ALL			ALL	
Friday October 6,2017	Discussion of field visit and practice result + Post Test				**Closing Ceremony**							
Speaker	ALL				Committee							

Ministry of Public Works and Housing
Republic of Indonesia

The Project
on
Strengthening COE (Center of Excellence) Program
for
PDAMs in the Republic of Indonesia

Training Module Implementation Report

Customer Relations (CR)

May 2018

JICA Expert Team

The Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Republic of Indonesia

Training Module Implementation Report (CR)

Table of Contents

*** The following Annexes except Annex 2 (Training Curriculum) are omitted in the Project Completion Report.**

List of Tables

List of Figures

1. Introduction

The COE (Center of Excellence) is a human resource capacity building program established by Directorate of Water Supply System Development (DWSD) of Directorate General of Human Settlement (DGHS) in 2012. Since its commencement in 2012, the COE Program has 3 training modules: (i) Non Revenue Water, (ii) Energy Efficiency and (iii) SAK-ETAP. However, during the course of time, DWSD felt the need to expand the coverage of the COE Program in or der to enhance PDAM operation and facilitate comprehensive improvement.

"JICA Technical Cooperation Project on Strengthening COE Program for PDAMs in Indonesia" (JICA Project) was launched in August 2015 with its project purpose of enhancement of the implementation capacity of the COE program. DWSD and JICA Expert Team (JET) have been engaged in a number of activities. Along with that some output of the project is set, such as improvement of the current modules and development of two new training module by JET which are. (i) Financial Analysis and Management and (ii) Customer Relation (CR).

The present report will comprehensively explain the project activities carried out regarding the development of CR module; and seeks for DWSD's final approval of the relevant training curriculum, training materials and trainer's manuals, as determined by the Project Design Matrix agreed between DWSD and JICA through their Minutes of Meeting dated 13 June 2017.

2. Training Module Contents and Output

According to the Inception Report of The Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Republic of Indonesia in August 2015, one of the objective of this project is to develop Customer Relation (CR) training module for CoE Program as it is a strategic yet cost-saving method for PDAM performance improvement. The developed CR training module consists of: (i) training curriculum, (ii) training materials, and (iii) trainer's manuals.

3. Training Module Development Process

3.1. Precedent and Preparatory Works

3.1.1. CR Module Development Orientation for JET and DWSD

Customer relations management has direct connection with the water bill collection efficiency of a PDAM and is relatively an easy, cheap, and effective measure to improve its financial

conditions. The concept of CR module is to cover broad range of topics such as customer database, bill collection, complaint response, public relations and awareness building activities. The final contents of the developed module can be seen on Table 1.

Table 1. Table of Contents of the Developed CR Module (Final Version)

- General Description of Customer relation
- Customer Account Management
- Meter Record Management
- Customer Management
- Marketing (PR Activities)
- Customer Relation Performance
- Best Practice
- Case Study and Simulation

Source: CR Module, 2018

The development of CR module were determined by the module development working group that consists of DWSD staffs, COE managements consultants, and CR experts whom are practitioner from various water utilities in Indonesia. The concept and initial contents of the module was developed in the first working group meeting conducted on 18-19 August 2016. The summary can be seen in Table 2. The meeting result can be seen in **Annex 1 – CR WG Discussion Table** and **Annex 5 – MoM of First Working Group (18-19 August 2016)**.

Table 2. CR Module Concept Developed in First Working Group

Chapter	Knowledge Content	Sub Topic
Chapter 1: Outline of Customer Relations	• Necessity for Customer Relations • Relationship between Customer Relations and Non-Revenue Water Management	• What is Customer Relations • Role of Customer Relations
Chapter 2: Customer Database	• Necessity for Customer Database Development • Analysis of Customer Database	• Customer Information • Customer Database Development • Use of Customer Database • Broad Sense of Customer Relations
Chapter 3: Meter Reading	• Role of Meter Reader • Detection of Defective Water Meter and Illegal connection	• Accurate Meter Reading and Reduction of Reading Error • Comparison of Water Consumption Volume and Family Size • Detection of Illegal Connection

		• Period of Meter Reading
Chapter 4: Water Charge Collection	• Prevention of Erroneous Input • Dunning of Payment • Comparison of Paid and Unpaid. Subchapter "Evaluation" will be changed to "Monitoring and Evaluation" with added explanation on monitoring	• Confirmation of System/Input Error • Processes of Dunning Notes of Payment • Comparison of Payment Including Suspension of Water Supply and Continued Payment
Chapter 5: Complaint Countermeasure	• Sample of Complaint Resolution • Pulling out of Improvement from Complaint Analysis	• Complaints Database • Complaints and those Resolutions Example • Complaints Measurement Flow • Territorial Analysis of Complaints
Chapter 6: GIS Mapping	• Properties Management • Analysis on basis of Distribution Map • Improvement from Distribution Map	• Customer/Water Meter Information with GIS • Properties of Service Pipeline • Analysis of Water Supply Condition from Water Pressure and Residual Chlorine Map
Chapter 7: Public Relations (PRs) and Educational Activities	• Water Education from Childhood • Satisfaction of Curiosity for Water Supply System	• Improvement of Awareness regarding to Illegal Connection Prevention and Water Saving in Event/Campaign • Water Classroom at Elementary School • Water Facilities Tour at Water Treatment Plant and Water Supply Facilities

Source: CR-WG Discussion Table, 2016

3.1.2. Review of CR Performance by JICA Expert Team

3.1.2.1. JICA Expert Team BPPSPAM Analysis and Baseline Survey

In order to understand PDAM problems and challenges related to customer relation, JET have conducted BPPSPAM analysis and baseline survey in 2015 to clarify the operation status of PDAMs, relevant to the JICA Technical Cooperation Project on Strengthening COE Program

for PDAMs ("the Project") at the time of project commencement. The detailed result can be seen in CR Module Development Report (See **Annex 6**).

Based on JET BPPSPAM analysis, major problems related to customer relation in PDAM were concluded as follows:

- Increasingly low service ratio over the years
- Low increase in customer growth
- Inefficient collection efficiency
- Wide gap in complaint resolution rate among PDAM

Those aforementioned problems are then elaborated in the baseline survey with CR related problems found as follows:

(1) Difficulty to make an online system for existing database, limited knowledge on IT development and CR-related activities.

Some PDAMs especially those from outside Java and in an Kabupaten area staffs are lacking computer literacy. Not only that, some areas are not covered by internet connection. Therefore, a user-friendly customer management software combined with competent human resource training to utilize software is required. Through the COE training, human resource capacity can be enhanced to able to understand and use new methods and technology.

(2) Unautomated data input and recapitulation; existing information are not integrated

Most customer information data are input manually without automated system to update data so the final database can only be seen in the end of the month. Information between divisions are mostly separated and seldom presented in a comprehensive database. The CR module can give knowledge on how to integrate separate information in to a single database and how to utilize it.

(3) Lack of standardization of data input process and lack of SOP

There is no actual standardization of information or data collection between one PDAM unit and other unit and even one PDAM to another PDAM. Most PDAM also lack SOP for customer relation management work. The CR module and COE training

should formulate an example of a standardized data input as a reference for CR SOP in PDAMs.

(4) Lack PDAM resources to conduct customer satisfaction survey

Customer satisfaction survey is important to reflect the opinion of population within the service area. This survey should be conducted time to time to reflect PDAM service, weaknesses and the improvement required so PDAM can also determine its work plan. However, not many PDAM have resources i.e. time, human resource, equipment and funding to conduct the survey. Thus, the module for Customer Relation may provide strategies on how to arrange external resources to conduct the survey which has been done by several PDAMs.

(5) Difficulties to organize public relation or information activities

Some PDAM have organized public relation activities in public area such as local mosque, public square, etc. in cooperation with NGOs and local/district government. Information paper can sometimes be utilized in billing paper as well. However, not all PDAM have public relational and information activities. CR curriculum should elaborate public relation and information activities example applicable for PDAMs.

3.1.2.2. Direction for Training Module Development

Training module development were to be made in the following direction:

- Questionnaire and field surveys to see PDAMs' application of the training contents to their daily operation and issues derived from the application. The field survey also intends to reveal the challenges and best practices experienced by PDAMs in respective operational subjects.
- Module development will be determined through discussions in the Working Group.
- Module improvement proposal is elaborated by JICA Expert Team through reviewing the developed module documents, i.e. curriculum, textbooks, trainer guidance and other materials.

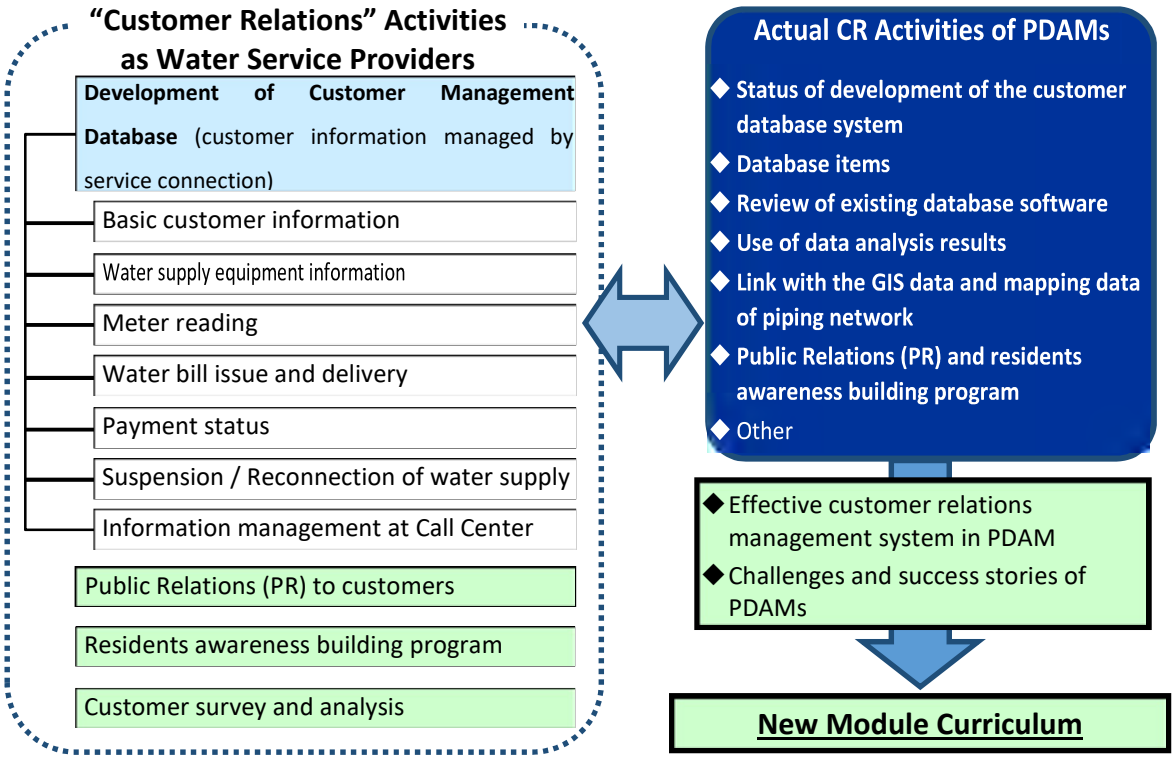
Table 3. CR Module Development Orientation

New Module Development	
Customer Relations	- Customer relations management has direct connection with the water bill collection efficiecny of a PDAM and may be one of the least cost measures to improve its financial conditions. - The module should cover broad range of topics such as customer database, bill collection, complaint response, public relations and awareness building activities.

Source: JICA Expert Team based on Detailed Planning Survey report

Basic contents of the CR module includes (i) Information of water meters, (ii) Meter reading data, (iii) Water bill calculation and delivery operation, (iv) Payment status, (v) Disconnections and reconnections, (vi) Information management at call center, (vii) Public relations activities, (viii) Residents awareness building program, (ix) Customer survey and its analysis, and (x) Meter inspection with details as follows:

Figure 1. CR Module Concept Developed in First Working Group



Source: JICA Expert Team

3.2. Formation of Working Group

As seen in 3.1.1, DWSD had formed and mandated the CR Working Group (WG) to develop CR training module for COE Program starting 2016, with JET assistance. The CR WG members consists of DWSD staff, COE Management Consultant (KMP), and experts such as experienced PDAM staffs whom are professional practitioners in respective water utilities. These members acted as the draft writers and reviewer of the module and final WG members are then selected as instructors of Provincial Training. The WG had functioned to discuss and determine all the details of the training curriculum, textbook and materials.

In August 2016, the first CR WG discussion meeting took place through DWSD's invitation to the WG members with some changes in WG members in latter working group meetings (See Annex 4 - Invitation Letter from DWSD).

3.3. Module Development and Working Group Discussions

3.3.1. Working Group Meeting 1

The first CR working group meeting was held on 18-19 August, 2016 in Veranda Hotel Jakarta. The meeting was chaired by Ms. Luky Retno Andyani, Section Head of Institutional, Sub Directorate of Standardizaton and Institutional of DWSD. It was attended by representatives of DWSD, COE Management Consultants, JET, and CR Working Group Members. The WG members are listed in Table 4 below.

Table 4. List of CR Working Group Members in the First WG Meeting

No.	Name	Institution
1.	Ms. Dedeh Syamsiah	PDAM Kab. Bogor
2.	Mr. Ardiyah	PDAM Kab. Tangerang
3.	Ms. Melia	PDAM Kab. Tangerang
4.	Mr. Yudo Mahasuta	PDAM Kab. Tangerang
5.	Ms. Farida Ariati	PDAM Kota Banjarmasin
6.	Mr. M. Firdaus	PDAM Kota Bekasi
7.	Mr. Slamet Raharjo	PDAM Kota Malang
8.	Mr. Gatot M.H	PDAM Kota Depok
9.	Mr. Teddy Syam	PDAM Kab. Bekasi
10.	Ms. Maria Jacobus	PT. Adhya Tirta Batam
11	Ms. Rika Anjulika	PT. Aetra Air Jakarta

Source: MoM CR WG Meeting 1 of JET, 2016

The agenda for the first day (18 August 2016) was: (a) Explanation on the Objectives and Background of the New Module Development; (b) Brief Overview of PDAM Performance and Operational Problems; (c) CR Module Development Process; and (d) Overview and Review of CR Module Content and Syllabus.

Meanwhile the agenda for the second day comprised: (a) Continuation of CR Module Content and Syllabus Discussion; (b) How to Use Module and Additional Tools; (c) Upcoming CR Agenda and Activities.

The first working group discussion was able to develop basic concept of CR module with elaborated contents that are more relevant for Indonesian water utilities operation. All input were summarized as revision work to be presented and discussed on the second working group meeting. Detailed discussion result and documentation can be seen in **Annex 5 – MOM of CR WG Meeting 1** and **Annex 7- Documentation of WG Meeting**.

3.3.2. Working Group Meeting 2

The second CR working group meeting was held on 26 October 2016 in Veranda Hotel Jakarta and chaired by Mr. Hilwan, Head of Sub Directorate of Standardizaton and Institutional of DWSD. It was attended by representatives of DWSD, JET, and revised CR Working Group Members as listed by DWSD's invitation as follows.

Table 5. List of CR Working Group Members in the Second WG Meeting

No.	Name	Institution
1.	Ms. Farida Ariati	PDAM Kota Banjarmasin
2.	Mr. Slamet Raharjo	PDAM Kota Malang
3.	Ms. Maria Jacobus	PT. Adhya Tirta Batam
4.	Ms. Rika Anjulika	PT. Aetra Air Jakarta

Source: MoM CR WG Meeting 2 of JET, 2016

The agenda comprised discussion on (a) Content Discussion in Detail for Chapter 1-5; and (b) Quick Review for Chapter 6-9. The following are the developed content based on revision made from first working group revision.

Table 6. Developed CR Module Contents

No.	Initial Module Content	Revised Module Content	Breakdown of Module Content Based on WG 1 Discussion
1.	Outline of Customer Relation	Customer Relation (theory of Customer Relation)	Ch. 1.1 Definition Ch. 1.2 Regulation Related with CR Ch. 1.3 CR Function Ch. 1.4 CR Benefits Ch. 1.5 CR Components
2.	Customer Database	The role of Customer Relation (Internal and external CR Organization)	Ch. 2.1 CR in PDAM Organization Structure Ch. 2.2 Relation Between PDAM and other Division Ch. 2.3 Relation Between CR and its Customer
3.	Meter Reading	Customer Data	Ch. 3.1 Definition of Customer Data Ch. 3.2 Customer Data Management

			3.2.1 Information Items in Customer Data 3.2.2 Customer Data Collection and Update 3.2.3 Technology Options in Developing Customer Data 3.2.4 Utilization of Customer Data Content
4.	Water Charge Collection	Meter Reading	Ch. 4.1. Function and Role of Meter Reading 4.1.1 Job on the Field 4.1.2 Detection of Illegal Connection 4.1.3 Detection of Leakage - 4.1.4 Detection of Defective Water Meter Ch. 4.2 Meter Reading Operation 4.2.1. SOP of Meter Reading Operation 4.2.2. Meter Reading Ch. 4.3 Quality Assurance Ch. 4.4. Reward and Punishment
5.	Complaints Measures	Water Charge	Ch. 5.1 The Issuance Process of Water Charge Ch. 5.2 System/Input Error in Water Charge Ch. 5.3 Collection Mechanism Ch. 5.4 Quality
6.	Mapping with GIS	Customer Complaint	
7.	PR and Community Awareness Activities	Utilization of Mapping Data	
8.	-	PR and Community Awareness Activities	

Source: MoM CR WG Meeting 1 of JET, 2016 with breakdown of module as summarised in MoM CR WG Meeting 2 of JET, 2016

There are several points suggested by working group members to be elaborated in the CR Module

- For chapter 1, there should be less theory and more practical understanding. It must also include Indonesian regulation and standard to help define CR and provide guideline of CR practices so it is more applicable.
- Some subchapters are proposed to be combined to make the module more compact e.g. (i) Chapter 2 regarding CR Role is moved to Chapter 1.4 as subchapter of Chapter 1 with additional schemes and explanation, (ii) Chapter 3 became Chapter 2, (iii) Chapter 4 became Chapter 3, (iv) Chapter 5 became Chapter 4.
- Add more samples and depth in technology and method option for database analysis, meter reading accuracy, and samples of non-payment negotiation as CR in Indonesia does not involve in collection mechanism activity.

The detail discussion result and documentation can be seen in **Annex 5 – MOM of CR Working Group Meeting 2 and Annex 7- Documentation of WG Meeting**.

3.3.3. Working Group Meeting 3

The third CR working group meeting was held on 28-29 November 2016 in Veranda Hotel Jakarta and was chaired by Ms. Luky Retno Andyani, Section Head of Institutional, Sub Directorate of Standardizaton and Institutional of DWSD. It was attended by representatives of DWSD, COE Management Consultant, JET, and three out of four CR Working Group Members, as seen below..

Table 7. List of CR Working Group Members in the Third WG Meeting

No.	Name	Institution
1.	Ms. Farida Ariati	PDAM Kota Banjarmasin
2.	Ms. Maria Jacobus	PT. Adhya Tirta Batam
3.	Ms. Rika Anjulika	PT. Aetra Air Jakarta

Source: MoM CR WG Meeting 3 of JET, 2016

The first day (28 November 2016) discussion has ummarized that the topic on meter reading and water charge should not be too technical as not to confuse with financial unit or technical duties of meter reader. JET was able to collect regulatory reference regarding CR. Another comment include that customer complaint topic should be widened to customer service activities in general, such as customer information, inquiry, and request. The discussion also resulted in rearrangement of module as seen below.

Table 8. CR Module Rearrangement of Module Topic

No.	Initial Module Content	New Chapter	Revised Module Content
1.	Outline of Customer Relation	1	Customer Relation (theory of Customer Relation)
2.	Customer Database	2	Connections and Customer Data + Utilization of Mapping Data
3.	Meter Reading	3	Customer Service
4.	Water Charge Collection	4	Meter Reading and Water Charge
5.	Complaints Measures	5	Non-payment and Its Countermeasures
6.	Mapping with GIS	6	Marketing
7.	PR and Community Awareness Activities	7	Best Practice
8.	Best Practice		

Source: MoM CR WG Meeting 3 of JET, 2016

The second day discussion concluded the need to add form samples, schemes, and tables to support explanation of the text content. The meeting also decided person-in-charge (PIC) responsible for reviewing, revising submitting assigned chapter to JET and the whole WG members for peer review. List of PIC and their assigned chapter can be seen below.

Table 9. Summary List of CR Module PIC

No.	PIC	Chapter
1.	Ms. Farida Ariati	Ch.2: Connections and Customer Data + Utilization of Mapping Data Ch. 3: Customer Service
2.	Ms. Maria Jacobus	Ch.1: Customer Relation Ch. 3: Customer Service
3.	Ms. Rika Anjulika	Ch. 6: Marketing
4.	Mr. Slamet Raharjo	Ch. 4: Meter Reading and Water Charge Ch. 5: Non-Payment and Its Countermeasures
5.	JET	Best Practice

Source: MoM CR WG Meeting 3 of JET, 2016

The detail discussion result and documentation can be seen in **Annex 5 – MOM of CR Working Group Meeting 3 and Annex 7- Documentation of WG Meeting**.

3.3.4. Working Group Meeting 4

The fourth and final CR working group meeting was held on 16-17 March 2017 in Veranda Hotel Jakarta and was chaired by Ms. Luky Retno Andyani, Section Head of Institutional, Sub Directorate of Standardizaton and Institutional of DWSD. It was attended by representatives of DWSD, COE Management Consultant, JET, and all CR Working Group Members below.

Table 10. List of CR Working Group Members in the Fourth WG Meeting

No.	Name	Institution
1.	Ms. Farida Ariati	PDAM Kota Banjarmasin
2.	Ms. Maria Jacobus	PT. Adhya Tirta Batam
3.	Ms. Rika Anjulika	PT. Aetra Air Jakarta
4.	Mr. Slamet Raharjo	PDAM Kota Malang

Source: MoM CR WG Meeting 4 of JET, 2017

As this is the final working group meeting, the agenda comprised: (i) Review of final revision result, (ii) Selection of key points per chapter and standardized PowerPoint development,

(iii) Reconfirmation of training schedule scheme, and (iv) CR module trial preparation for the first day.

The discussion concluded that the final module is already comprehensive, suitable and seemed applicable for water utilities in Indonesia. The module has also managed to elaborate all inputs from previous working group.

However, since there was a new SKKNI (Indonesian National Working Competency Standards), recently released in December 2016, directly covering Customer Relation Management work in Indonesia specifically for water utilities, DWSD requested JET to adjust module contents and nomenclature, such as the change of "Customer Relation" in Bahasa Indonesia *Hubungan Pelanggan* to be changed to *Pelayanan Pelanggan* or customer service in English.

Rearrangement of module structure and chaptering was also compulsory to differentiate CR activities to: i) Customer Service, ii) Meter Reading, and iii) Marketing, though in contents there weren't substantial changes. Below is the comparison.

Table 11. Comparison of CR Module Structure

Chapter No.	Current Module Structure	Proposed Module Structure Based on SKKNI
1.	Customer Relation (theory of Customer Relation)	Outline of Customer Service
2.	Connections and Customer Data + Utilization of Mapping Data	Customer Account Management
3.	Customer Service	Meter Reading Record Management
4.	Meter Reading and Water Charge	Customer Management
5.	Non-payment and Its Countermeasures	Marketing
6.	Marketing	Customer Relation Performance
7.	Best Practice	Best Practice

Source: MoM CR WG Meeting 4 of JET, 2017

The detail discussion result and documentation can be seen in **Annex 5 – MOM of CR Working Group Meeting 3 and Annex 7- Documentation of WG Meeting**.

3.4. Draft Final Module for Training Implementation

JET did the revision of CR module based on the final comments form WG members in 4th WG meeting. Best practice cases were finalized to enhance know-how and additional references to module readers. Case study and simulation scenarios were also developed in order to enhance

practical knowledge during the training. This is due to the fact that other COE Training module instils PDAM visit on the third day of training. However for CR module, it is agreed on that a practice and exercises through case study and simulation is more preferable and useful for training participants, as PDAM visit will not be beneficial due to different system, policy, CR programs, etc.

Initially, DWSD agreed to conduct the trial training and Kabupaten/Kota Training in August 2017. Further explanation of training implementation is in section 4.

4. Trial Training Implementation

4.1. Summary

The trial training implementation of the newly-developed CR module was conducted in on August 8-10 2017 and was attended by JET, DWSD, participants from various PDAM, and COE Management Consultant. The trial training was held by JET budget and supervised by DWSD. Before the implementation of trial training, a coordination meeting was held between DWSD and JET (See **Annex 5**). Several things to be prepared for CR trial training are as follows:

- Venue for invitation details issued by DWSD.
- Training schedule.
- Confirmation on whether CR Day 3 will consist of PDAM visit or simulation and exercise.
- Pre-test, post-test, and daily test to be prepared by JET and submitted to DWSD.
- Teaching materials (presentation and session notes for trainers' manual) to be prepared by JET and submitted to DWSD.
- WG member to become supporting trainers in trial training were selected by DWSD.

4.1.1. Time and Place

CR Trial Training was held on August 8-10, 2017 at Gradhika Hotel Jakarta. It was attended by representatives of DSWS, JET, CR trainers from WG members, participants, and COE Management Consultant.

4.1.2. Trainers and Trainees

The CR trial training course was mostly taught by CR expert Mr. Yokoyama Ken as to provide example of how to teach, how to understand contents, and to show basic model of presentation slides. The supporting trainers were from all four of the working group members. The WG

members are considered primary recipients of technical transfer from JICA Expert Team and will continue disseminating and updating the developed module after JICA Project. As presented in previous WG meeting summary, all WG members understand all contents of module but divide and share specialized topic per person. The role during the trial module are mainly showing variations of teaching method and reference on how to develop presentation based on basic model. The list of CR Trainers can be seen in Table 7.

Table 12. List of CR Supporting Trainers in Trial Training

No.	Name	Institution
1.	Ms. Farida Ariati	PDAM Kota Banjarmasin
2.	Ms. Maria Jacobus	PT. Adhya Tirta Batam
3.	Ms. Rika Anjulika	PT. Aetra Air Jakarta
4.	Mr. Slamet Raharjo	PDAM Kota Malang

Source: JET, 2017

The participants of CR module trial are as shown in Table 13.

Table 13. List of CR Participants in Trial Training

No.	Name	Institution
1.	Mr. Andri Kurniawan	PDAM Kab. Tangerang
2.	Mr. Samsudin Sidik	PDAM Kab. Tangerang
3.	Mr. Tugiman	PDAM Banyumas
4.	Mr. Aji Suraji	PDAM Lebak
5.	Mr. Saharuddin,	PDAM Kota Pekanbaru
6.	Mr. Endri Madriana	PDAM Kota Bogor
7.	Ms. Nurita	PDAM Kab. Blora
8.	Mr. M. Firdaus	PDAM Kota Bekasi
9.	Ms. Ida Nuraida	PDAM Kota Tangerang
10.	Mr. Sigit Pramono	PDAM Kab. Serang
11.	Ms. Binurwati Fitri	PDAM Kota Surabaya
12.	Mr. Halili	PDAM Kota Serang
13.	Mr. Ruslan Bagus	PDAM Kab. Katawang
14.	Ms. Menuk Indrati	PDAM Kota Semarang
15.	Mr. Yanuar Wulan	PDAM Kab. Bekasi

Source: JET, 2017

4.1.3. Training Implementation

The training was opened by opening remarks from Director of DWSD who was represented by Ms. Meike Kencanawulan as Acting Head Institutional and Standardization of DWSD. Then

continued with introduction from Mr. Yusaku Makita as Chief Advisor of JET and CR Expert, Mr. Ken Yokoyama and FAM Expert, Mr. Mitsuhiro Doya.

The first day was began with introduction from the participants and pre-test. Day one and two focuses on Mr. Ken Yokoyama's teaching method by presenting the basic presentation points developed by JET. Discussion also happened during the course as some of the contents introduced new know-hows.

The third day, supporting trainers divided the topic and showed the trainees method to improvise teaching method and develop presentation based on the condition of respective companies so it was more relatable for PDAMs. The agenda and materials division can be seen in Table 14.

Table 14. The Division of Teaching Materials in Trial Training

Ch	Topic	Supporting Trainer	Key Points/Additional Content for Module Draft (if any)
1	Outline of Customer Relation	Ms. Maria Jacobus	N/A (chapter is sufficient)
2	Customer Data Management	Mr. Slamet Raharjo	Elaboration on how-to begin developing system (brief explanation)
3	Meter Reading Record Management	Mr. Slamet Raharjo	Formula explanation and additional samples in the module and presentation slides
4	Customer Management	Ms. Farida Ariati Ms. Rika Anjulika	Elaboration on other ways to increase customer satisfaction, i.e. one day service, etc. Sample from PDAM Kota Banjarmasin: app-based complaint channel to track customer status that can be downloaded by customers
5	Marketing	Ms. Rika Anjulika	N/A (chapter is sufficient)
6	Performance Indicator for Customer service	Ms. Farida Ariati	Introduction on why PI evaluation is important. WG Members will try to share simplified PI indicators relating to customer service activities and target (micro-scale PI).

Source: JET, 2017

The training ended with post-test and monitoring evaluation sheet submission from participants. The detail agenda and documentaion can be seen in **Annex 5 – MOM of Trial Training** and **Annex 10- Documentation of Trial Training**.

4.2. Provincial Training

First Provincial Training for CR module was held on 29 January – 2 February 2018 at Grandhika Hotel Jakarta. The objective of this training is to train participants from various PDAMs in Indonesia as candidate trainers. Training included 3-day CR Module course and 2-day Teaching Method / Personal Development course as part of evaluation to select qualified participants as trainers. The training was opened by remarks from Mr. Yusaku Makita as Chief Advisor of JET and Ms. Susi MDS Simanjuntak as new Head of Institutional and Standardization DWSD. The training was held with JICA budget.

4.2.1.1. Date and Place

First Provincial Training for CR module was held on 29 January – 2 February 2018 in Grandhika Hotel Jakarta. The training was attended by representative of DWSD, JET, Trainers, Participants, and PERPAMSI.

4.2.1.2. Trainers and Trainees

Table 15. List of CR Supporting Trainers in Trial Training

No.	Name	Institution
1.	Ms. Farida Ariati	PDAM Kota Banjarmasin
2.	Ms. Maria Jacobus	PT. Adhya Tirta Batam
3.	Ms. Rika Anjulika	PT. Aetra Air Jakarta
4.	Mr. Slamet Raharjo	PDAM Kota Malang

Source: JET, 2018

The participants area as shown in Table 16.

Table 16. List of CR Participants in Provincial Training

No.	Name	Institution
1.	Ms. Febryanti Pakiding	PDAM Tana Toraja
2.	Mr. Samsudin Sidik	PDAM Kab. Tangerang
3.	Mr. Endie Satvika	PDAM Kab. Kebumen
4.	Mr. Sanuri	PDAM Rembang
5.	Mr. Al Mughni	PDAM Kota Bungo Jambi
6.	Mr. Hersi Erviani Harahap	PDAM Padang Sidempuan
7.	Ms. Nurita	PDAM Kab. Blora
8.	Mr. M. Firdaus	PDAM Kota Bekasi
9.	Ms. Hamzah Jusuf	PDAM Gorontalo
10.	Mr. Sigit Pramono	PDAM Kab. Sragen
11.	Ms. Binurwati Fitri	PDAM Kota Surabaya
12.	Mr. Halili	PDAM Kota Serang
13.	Ms. Murniaty Nababan	PDAM Bitung
14.	Ms. Menuk Indrati	PDAM Kota Semarang
15.	Mr. M. Ihwan Lubis	PDAM Pematang Siantar

Source: JET, 2018

4.2.1.3. Training Implementation

CR Provincial Training was opened with the opening remarks from Ms. Susi MDS Simanjuntak, as Head of Sub Directorate of Standardization and Institutional of DWSD. The

training was conducted for five days. It was begun pre-test and ended with a post test on the third day.

Participants were divided into small groups and big groups for the simulation and case study. Each of them were assigned a topic for microteaching. Microteaching encouraged participants to develop and improvise the basic presentation, and present it as part of public speaking and teaching skill consideration for trainer qualification and selection. Based on the scoring and evaluation, top three participants are:

Table 17. List of Top Three Participants

No.	Name	Institution
1.	Ms. Nurita	PDAM Kab. Blora
2.	Mr. Samsudin Sidik	PDAM Kab. Tangerang
3.	Ms. Sigit Pramono	PDAM Kab. Sragen

Source: JET, 2018

The detail agenda and documentation can be seen in **Annex 5 – MOM of Provincial Training** and **Annex 10- Documentation of Provincial Training**.

4.3. Centralized Monitoring

The Centralized Monitoring (CM) was a bridging event between Provincial Training and Kabupaten/Kota Training. Prior to CM, top four participants as mentioned in table 18 with addition of Mr. Hamzah Jusuf, were required to develop proposal and action plan for selection of Kabupaten/Kota Trainers.

The proposal and action plan was reviewed and evaluated by Mr. Slamet Raharjo (as appointed instructor for upcoming Kabupaten/Kota Training) and Mr. Ken Yokoyama. The selection results announced that Mr. Samsudin Sidik and Mr. Sigit Pramono were qualified to be the first batch of selected Provincial Trainer for upcoming Kabupaten/Kota Training.

CM was conducted to prepare the selected trainers to be ready and able to teach in the upcoming Kabupaten/Kota Training. In the Centralized Monitoring, the selected trainers were provided direct consultation and review from the original Trainer.

4.3.1.1. Date and Place

The Centralized Monitoring was held from 2-4 April 2018 at Grandhika Hotel Jakarta. The training was attended by representative of DWSD, JET, Trainers, and Participants.

4.3.1.2. Participants

Table 18. List of CR Instructor and Trainers

No.	Name	Institution	Position
1.	Mr. Slamet Raharjo	PDAM Kota Malang	Instructor (Main/Supervising Trainer)
2.	Mr. Samsudin Sidik	PDAM Kab. Tangerang	Trainer
3.	Mr. Sigit Pramono	PDAM Kab. Sragen	Trainer

Source: JET, 2018

4.3.1.3. Centralized Monitoring Implementation

CR Centralized Monitoring was opened with remarks from Ms. Riche Noviasari as representative of Standardization and Institutional of DWSD and Mr. Yusaku Makita as Chief Advisor of JET.

CM was conducted for three days where the selected trainers went on to discuss the action plan and proposal review with Mr. Slamet Raharjo. The goal is to make the proposal and action plan as concrete output of Provincial Training that can be applied in respective PDAMs. After the consultation, next agenda was to divide topic among the trainers for actual Kabupaten/kota Training and exercise their teaching method, presentation and public speaking skill with direct monitoring and evaluation from Mr. Slamet Raharjo and Mr. Ken Yokoyama.

Below are the list of topic assignment.

Table 19. CR Topic Assignation

Chapter	Lecturer
Chapter 1: Outline of Customer Relation	Samsudin Sidik (PT Trainer)
Chapter 2: Customer Database	Slamet Raharjo (Instructor)
Chapter 3: Meter Reading Management	Slamet Raharjo (Instructor)
Chapter 4: Customer Management	Sigit Pramono (PT Trainer)
Chapter 5: Marketing	Sigit Pramono (PT Trainer)
Chapter 6: Customer Service Performance	Samsudin Sidik (PT Trainer)

Source: JET, 2018

The detail agenda and documentation can be seen in **Annex 5 – MOM of Centralized Monitoring** and **Annex 10- Documentation of Centralized Monitoring**.

4.4. Kabupaten/Kota Training

The first Kabupaten/Kota Training for CR module assigned newly-produced trainers to teach along with the instructor (WG member). The training was opened by remarks from Mr. Yusaku Makita as Chief Advisor of JET and Ms. Susi MDS Simanjuntak from DWSD, with some

introduction from JET experts, Mr. Ken Yokoyama and Mr. Mitsuhiro Doya. The training was held with JICA budget.

4.4.1.1. Date and Place

The first Kabupaten/Kota Training for CR module was held on 9-11 April 2018 at Novotel Hotel Solo. The training was attended by DWSD, JET, Trainers, and Participants.

4.4.1.2. Trainers and Trainees

Table 20. List of CR Trainers in Kab. Kota

No.	Name	Institution
1.	Mr. Slamet Raharjo	PDAM Kota Malang
2.	Mr. Samsudin Sidik	PDAM Kab. Tangerang
3.	Mr. Sigit Pramono	PDAM Kab. Sragen

Source: JET, 2018

The participants are shown in Table 22.

Table 21. List of CR Participants in Kabupaten/Kota Training

No.	Name	Institution
1.	Ms. Budi Astuti	PDAM Kab. Demak
2.	Ms. Umbang Tyas Tantri	PDAM Kab. Boyolali
3.	Ms. Sri Sawitri	PDAM Kab. Magelang
4.	Ms. Iin Tri Wahyuni	PDAM Kab. Semarang
5.	Mr. Hendro Setyamoko	PDAM Kab. Wonogiri
6.	Mr. Bambang Suratno	PDAM Sukoharjo
7.	Ms. Dwi Lestari	PDAM Surakarta
8.	Ms. Mimi	PDAM Kab. Cilacap
9.	Mr. Setiyo Warsito	PDAM Kab. Banyumas
10.	Mr. Maryo	PDAM Kab. Karanganyar
11.	Mr. Edhy S.U	PDAM Kab. Klaten
12.	Mr. Ujang	PDAM Kab. Tegal
13.	Mr. Rudi Pramono	PDAM Kab. Wonosobo
14.	Ms. Pudji Sutrisno	PDAM Kab. Kendal
15.	Mr. R. Dumadi	PDAM Kab. Batang

Source: JET, 2018

4.4.1.3. Training Implementation

CR Kabupaten/Kota Training was opened with the opening remarks from Ms. Susi MDS Simanjuntak, as Head of Sub Directorate of Standardization and Institutional of DWSD. The training was conducted for three days with 2 days of theoretical class and 1 day of case study

and simulation. The participants were divided into small and big groups for the case study and simulation. The training opened with pre-test and ended with post-test and monitoring evaluation. The training was closed by remarks from Ms. Riche Noviasari, Mr. Yusaku Makita, and feedback from one trainer and one participant from CR.

The detail agenda and documentation can be seen in **Annex 5 – MOM of Kabupaten/Kota Training** and **Annex 10- Documentation of Kabupaten/Kota Training**

5. Monitoring and Evaluation of Training Implementation

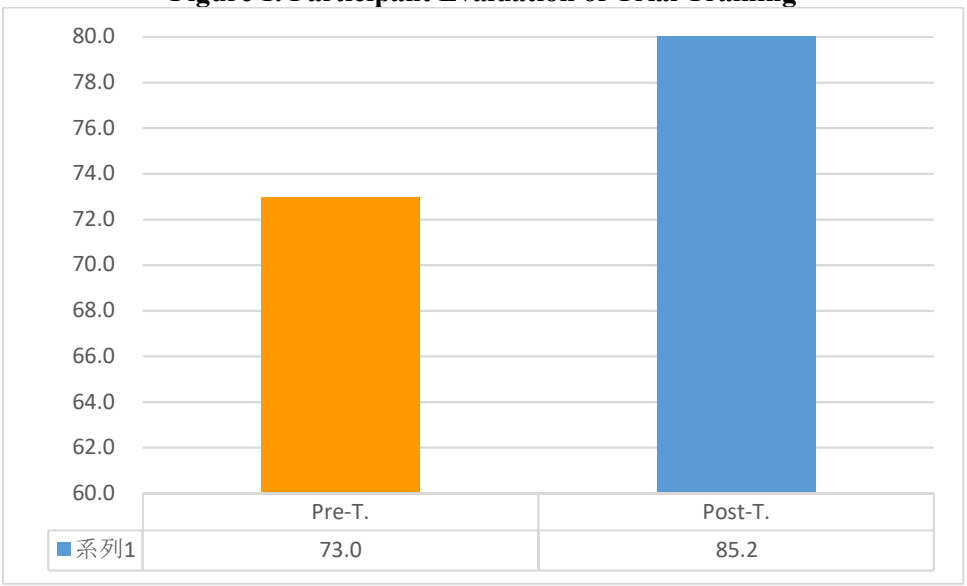
Montioring and evaluation was held every training implementation. In trial training, participant evaluation was conducted by DWSD, while module content evaluation was done by JET. On the other hand, monitoring and evaluation of Kab/Kota Training in Kota Padang were done by COE Management Consultant (KMP). There are 3 evaluation, namely (i) participant evaluation, (ii) trainers evaluation, and (iii) training content evaluation.

5.1. Monitoring and Evaluation

5.1.1. Trial Training Participant Evaluation

The result of pre-test and post test score of participant can be seen in the Figure 1. From the graph can be seen that there is an increase in the average score test of participants.

Figure 1. Participant Evaluation of Trial Training



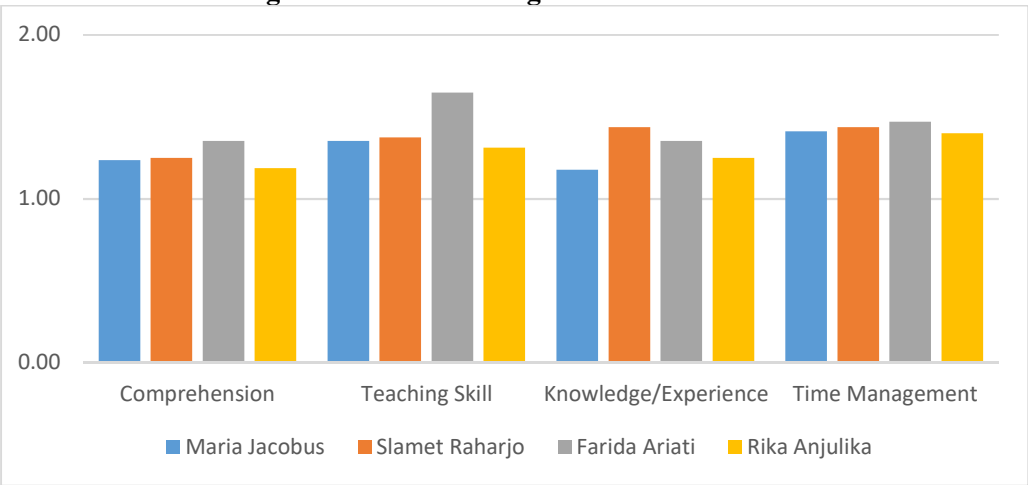
Source: JET Monitoring Evaluation, 2017

5.1.2. Trial Training Trainer Evaluation

The following graph will show the assessment of CR supporting trainers during the trial training. There are four criteria of evaluation including comprehension, teaching skill.

knowledge/experience, and time management. The most favorable score is 1 and the least favorable is 4. Overall, all supporting trainers met satisfactory level score below 2. The following is the summary.

Figure 2. Trial Training Trainer Evaluation

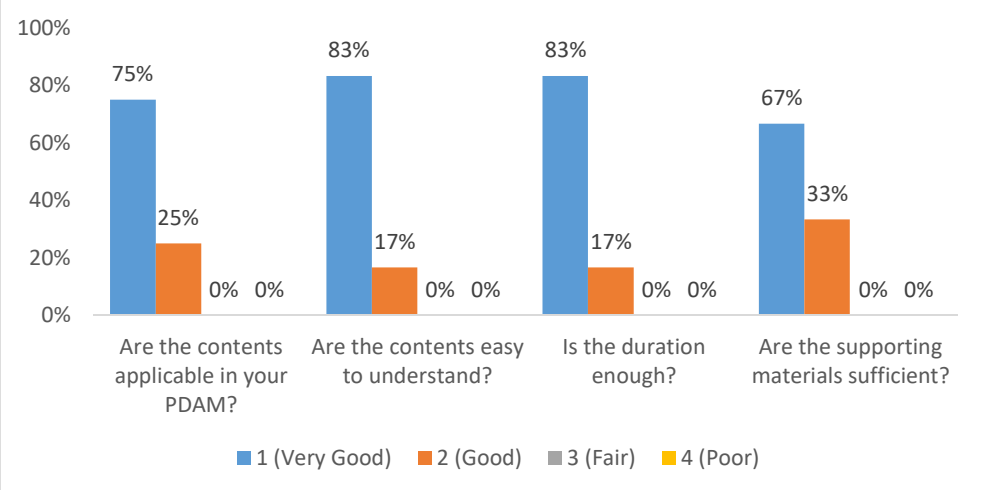


Source: JET, 2017

5.1.3. Module Content Evaluation

The module content evaluation can be seen in Figure 3. The four criteria including the applicability, easiness to understand, and duration of the class, and the supporting material sufficiency.

Figure 3. Module Content Evaluation



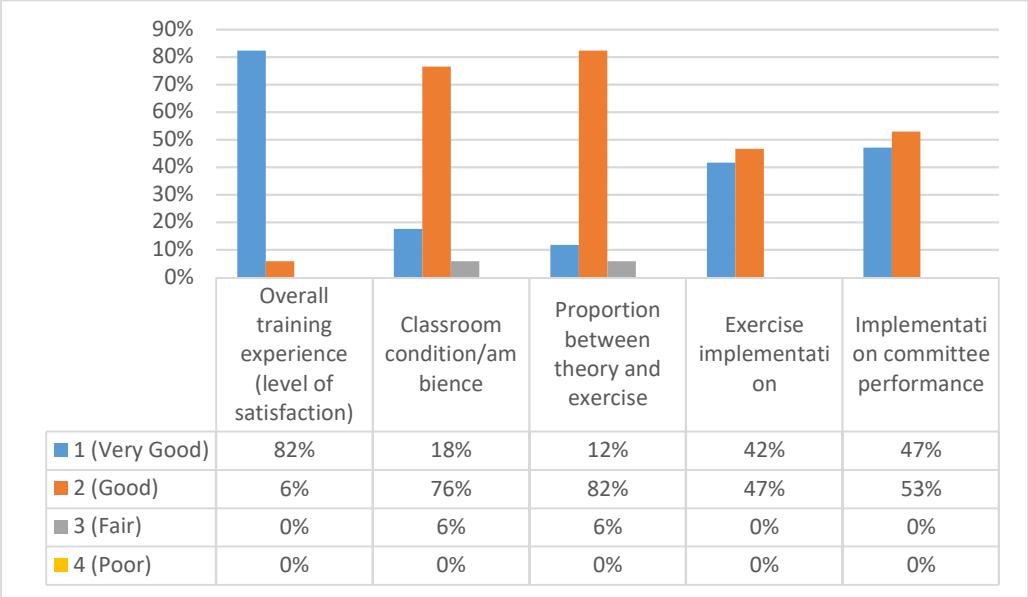
Source: JET, 2017

Based on the module content evaluation, the module received overall very good review from the training participants as score 1 stands for highest satisfaction level, while score 4 is the less satisfaction level.

5.1.4. Trial Training Implementation Evaluation

The following are the graph that summarizes participants feedback on the trial training implementation. The criteria include overall training experience, class room condition and ambience, proportion between theory and exercise, exercise implementation, and committee performance. Overall, the evaluation shows a generally favourable review from participants despite some aspects scoring fair.

Figure 4. Trial Training Implementation Evaluation



	Overall training experience (level of satisfaction)	Classroom condition/ambience	Proportion between theory and exercise	Exercise implementation	Implementation committee performance
1 (Very Good)	82%	18%	12%	42%	47%
2 (Good)	6%	76%	82%	47%	53%
3 (Fair)	0%	6%	6%	0%	0%
4 (Poor)	0%	0%	0%	0%	0%

Source: JET, 2017

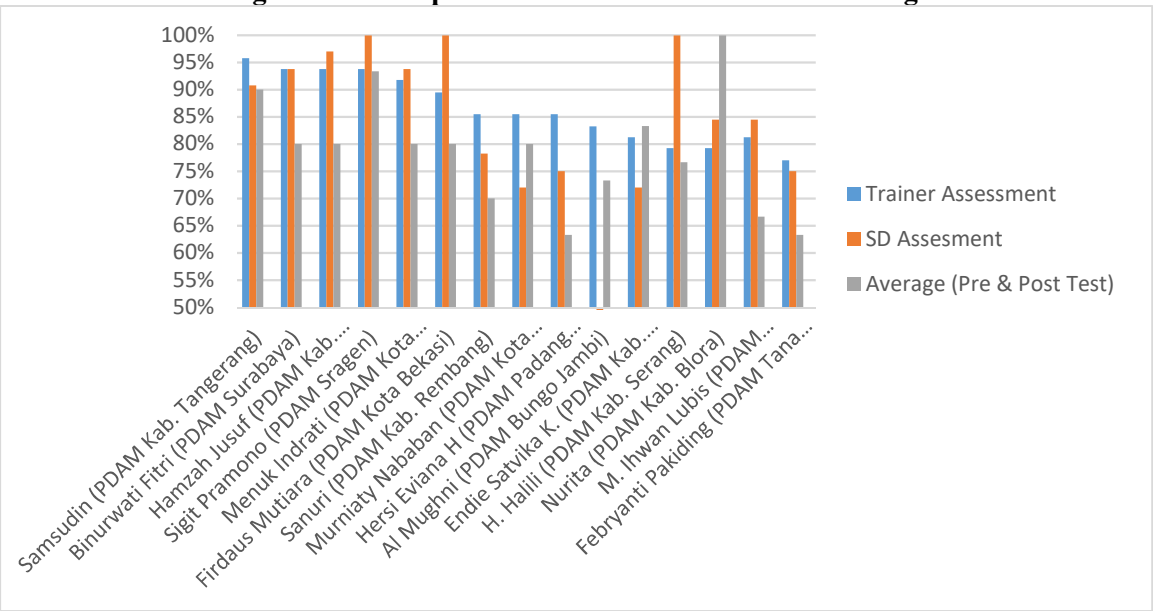
5.2. Monitoring and Evaluation of Provincial Training

The monitoring and evaluation of provincial training also included the same component such as participant evaluation, trainers evaluation, training content evaluation, and implementation evaluation. The summary can be seen below.

5.2.1. Participant Evaluation

The result of participants assessment can be seen in the Figure 5. There were several components in assessing the training participants, i.e. pre-test and post-test score; trainer evaluation based on participants' class participation, confidence, and discipline; and Personal Development / Teaching Method class evaluation.

Figure 5. Participant Evaluation of Provincial Training

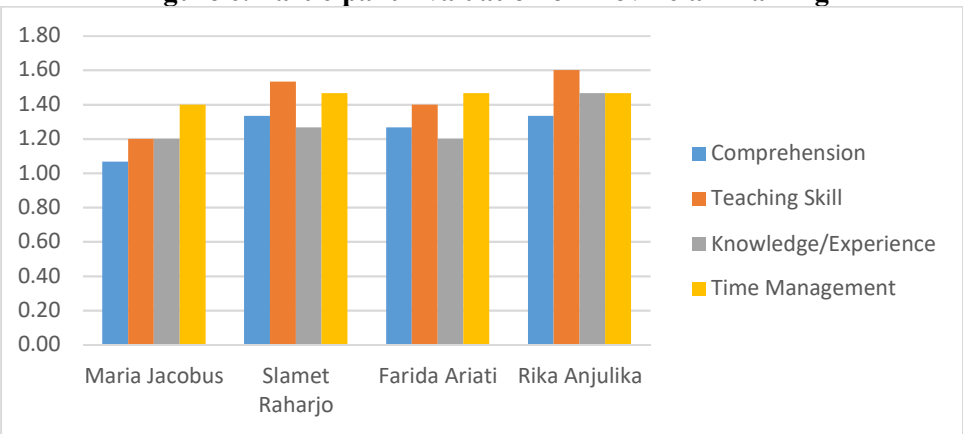


Source: JET, 2018

5.2.2. Provincial Trainer Evaluation

The following graph shows the assessment of CR trainers during the provincial training. There are four criteria of evaluation including comprehension, teaching skill. knowledge/experience, and time management. The most favorable score is 1 and the least favorable is 4. Overall, all supporting trainers met satisfactory level score below or equal to 1.60.

Figure 6. Participant Evaluation of Provincial Training

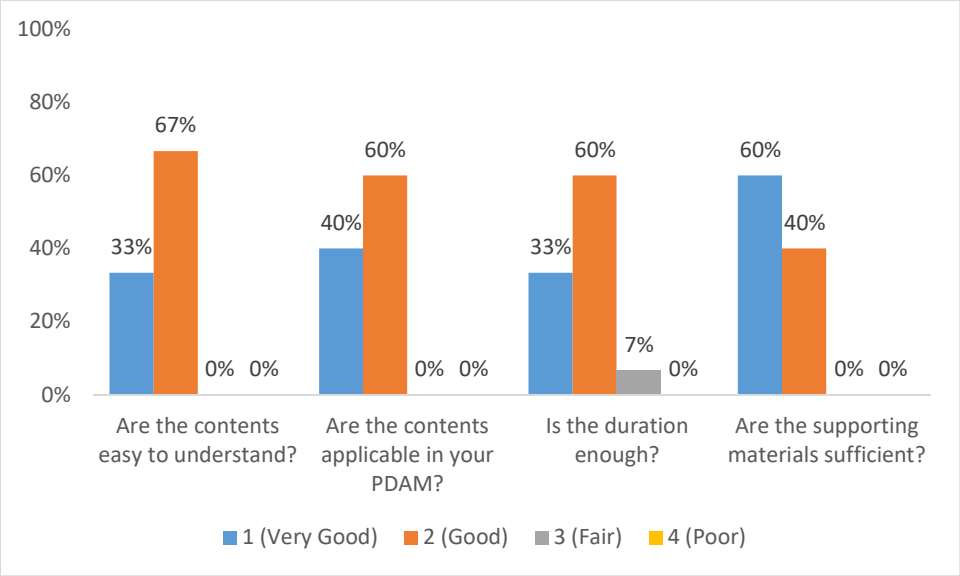


Source: JET, 2018

5.2.3. Training Content Evaluation

The result of training content assessment can be seen in the Figure 7. Overall, participants feedback shows that the training contents is favourable despite some fair evaluation in the duration.

Figure 7. Training Content Evaluation of Provincial Training

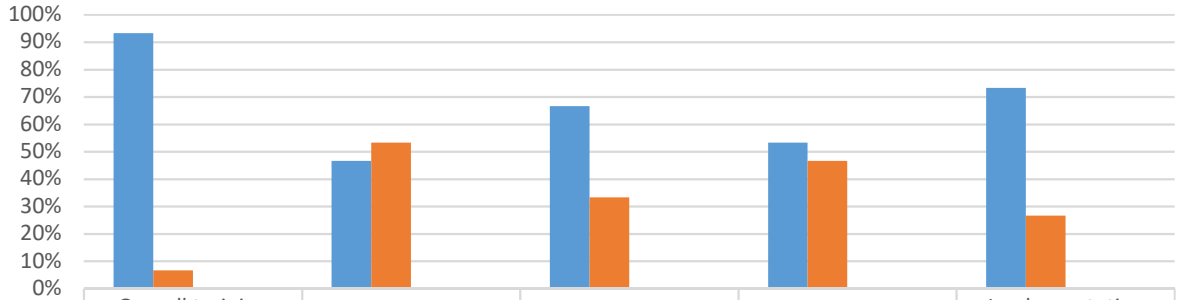


Source: JET, 2018

5.2.4. Provincial Training Implementation Evaluation

The following are the graph that summarizes participants feedback on the provincial training implementation. Overall, the evaluation shows a generally favourable review from participants.

Figure 8. Provincial Training Implementation Evaluation



	Overall training experience (level of satisfaction)	Classroom condition/ambience	Proportion between theory and exercise	Exercise implementation	Implementation committee performance
1 (Very Good)	93%	47%	67%	53%	73%
2 (Good)	7%	53%	33%	47%	27%
3 (Fair)	0%	0%	0%	0%	0%
4 (Poor)	0%	0%	0%	0%	0%

Source: JET, 2018

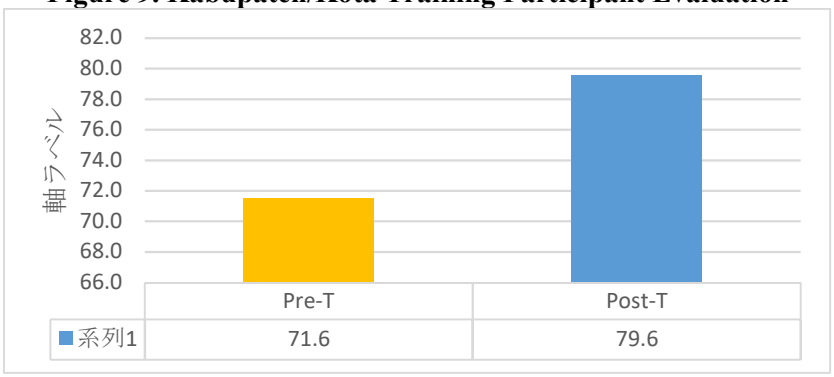
5.3. Monitoring and Evaluation of Kabupaten/Kota raining

The monitoring and evaluation of kabupaten/kota training also included the same component such as participant evaluation, trainers evaluation, training content evaluation, and implementation evaluation. The summary is as follows.

5.3.1. Participant Evaluation

The result of participants assessment can be seen in the Figure 9. Component of evaluation was mainly pre-test and post-test. It shows that there are increase in the average result of pre-test and post-test.

Figure 9. Kabupaten/Kota Training Participant Evaluation

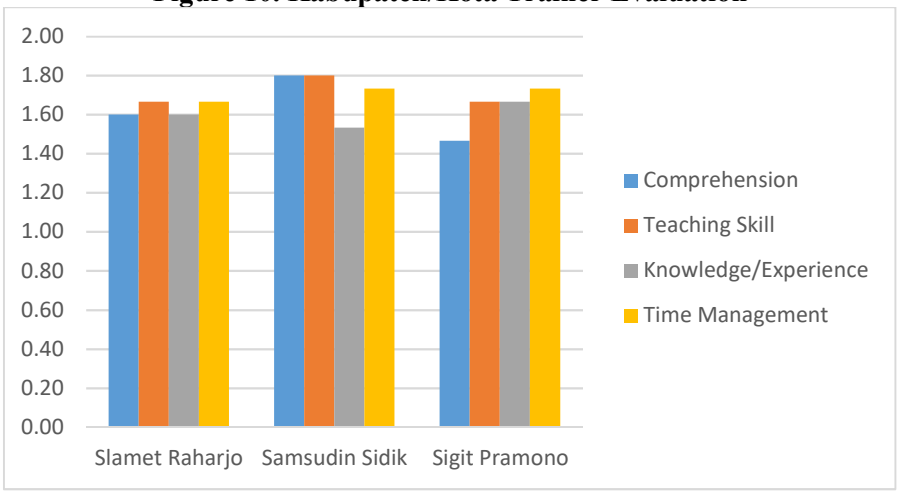


Source: JET, 2018

5.3.2. Kabupaten/Kota Trainer Evaluation

The following graph shows the evaluation of CR trainers during the kabupaten/kota training. Overall, all supporting trainers met satisfactory level score below or equal to 1.80.

Figure 10. Kabupaten/Kota Trainer Evaluation

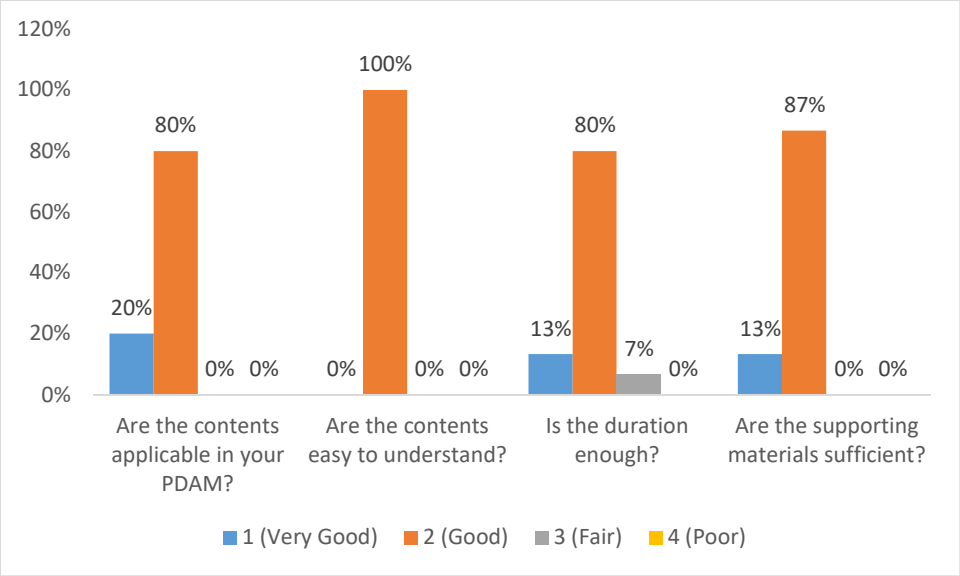


Source: JET, 2018

5.3.3. Training Content Evaluation

The training content evaluation can be seen in the Figure 11. Overall, participants feedback shows that the training contents is good despite fair evaluation in the duration.

Figure 11. Training Content Evaluation of Provincial Training

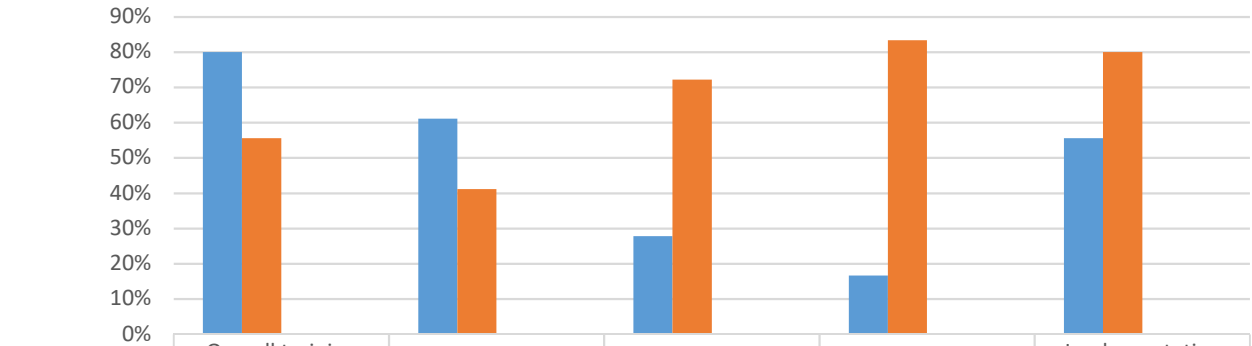


Source: JET, 2018

5.3.4. Kabupaten/Kota Training Implementation Evaluation

The following are the graph that summarizes participants feedback on the provincial training implementation. Overall, the evaluation shows a generally favourable review from participants.

Figure 12. Provincial Training Implementation Evaluation



	Overall training experience (level of satisfaction)	Classroom condition/ambience	Proportion between theory and exercise	Exercise implementation	Implementation committee performance
1 (Very Good)	80%	61%	28%	17%	56%
2 (Good)	56%	41%	72%	83%	80%
3 (Fair)	0%	0%	0%	0%	0%
4(Poor)	0%	0%	0%	0%	0%

Source: JET, 2018

6. Finalization of Training Module after Training Implementation

CR Module has been utilized in 3 training since 2017 including Trial Training in Jakarta, Provincial Training in Jakarta, and Kabupaten/Kota Training in Solo. During and after those trainings there were minor comments and revision on the content. Mostly focusing on technical matter.

Based on the monitoring and evaluation of participants, trainers, module content, and training implementation, the training results are satisfactory dominantly varying between "very good" and "good".

Finalization of training module was set on January 26, 2018 prior to Provincial Training by developing information sheet, combining session notes, module template, and cover based on the current COE module format as directed by DWSD.

7. Conclusion and Recommendations

7.1. Conclusion

The development of CR module is completed as the training module textbook, curriculum, trainer manual, and presentation sheets have been developed by JET with Working Group members while following the directive and advice of DWSD. Materials were already tested during the Trial Training with satisfactory results. Similar results were also reflected in Provincial Training and Kabupaten/Kota Training.

Despite being a new module for the COE Program and with very first produced trainers, the number of participating trainees and the number of successful trainees reflected that the feedback for the module and the training has been well. The evaluation results concluded that the CR Module is appropriately developed and all materials can be used for subsequent trainings.

7.2. Recommendation

JET makes the recommendation for CR module in the future as below.

- JET recommends to review and revise the module through similar process in every around 5 years with prior collection of training participants, trainers, and Working Group members feedback and commentary to ensure the module still complies to SKKNI (National Working Competency Standard) and existing Indonesian water utilities condition in the future.

- Recognition of other potential trainers such as assignation of other Working Group members and qualified participants (trainer candidates) from first and subsequent provincial training. In the future, COE Program might focus on provincial/regional based training and these qualified personnel from various area in Indonesia can be assigned to respective home province.
- Based on the trainings implemented, participants have given positive feedback on the case study and simulation. It is strongly recommended for future implementer that the case study and simulation must reflect real PDAM condition by ensuring participants prepares relevant data required for the training exercises. These exercises can reflect PDAM condition and will be useful for participants to bring back, report, and utilize in their PDAM for CR operation improvement.

ANNEX 2

LEMBAR INFORMASI

Modul Pelayanan Pelanggan

PROGRAM PENINGKATAN KOMPETENSI SUMBER DAYA MANUSIA (SDM) PROFESIONAL BIDANG AIR MINUM MELALUI POLA *CENTER OF EXCELLENCE* (COE)

Pelatihan : Pelayanan Pelanggan	Kode : CR-1
Topik : Pelayanan Pelanggan	Edisi : Desember 2017

Tujuan Pelatihan	Setelah menyelesaikan pelatihan ini, peserta diharapkan mengetahui dan mampu untuk: 1. Melaksanakan kegiatan kepelayananpelangganan dengan terintegrasi. 2. Mengembangakan *database* kepelangganan agar komprehensif dan terintegrasi dengan sistem informasi divisi/unit lain. 3. Melakukan analisis *database* khususnya dalam menemukan indikasi kebocoran, NRW, dan sambungan ilegal. 4. Menetapkan jadwal baca meter dan mengetahui pentingnya interval baca meter dalam memantau dan mengendalikan tingkat NRW. 5. Mengukur arus masuk keluhan pelanggan dan melakukan analisis statistik baik berdasarkan area keluhan maupun tipe keluhan. 6. Merencanakan dan mengimplementasikan kegiatan pemasaran yang sesuai dengan SWOT dan tujuan pemasaran PDAM. 7. Mengetahui cara analisis Survei Kepuasan Pelanggan. 8. Memahami fungsi Indikator Kinerja yang dapat diterapkan pada divisi/unit Pelayanan Pelanggan dan tindak lanjut hasil penilaian Indikator Kinerja.
Sasaran Peserta	1. Supervisor (setara atau lebih tinggi) di bidang hubungan pelanggan / hubungan masyarakat / pemasaran / pembaca meter. 2. Staf/operator) di bidang hubungan pelanggan / hubungan masyarakat / pemasaran / pembaca meter
Data Penunjang Latihan dan Simulasi yang Wajib disiapkan Peserta	1. Sampel *database* akun pelanggan 2. Sampel *database* keluhan 3. Jadwal baca meter 4. Rute baca meter 5. Survei Kepuasan Pelanggan (SKP) dan hasil olah data SKP 6. Data Kinerja Pelayanan Pelanggan BPPSPAM min. 2 tahun terakhir

Isi Modul	1. Gambaran Umum Pelayanan Pelanggan 2. Pengelolaan Akun Pelanggan 3. Pengelolaan Pencatatan Meter 4. Penanganan Pelanggan 5. Pemasaran 6. Kinerja Pelayanan Pelanggan 7. *Best Practice*
Durasi	3 hari (11 JP teori – 5 JP praktik)
Susunan Acara	Sesi 1: Gambaran Umum Pelayanan Pelanggan (teori – 1 JP) Sesi 2: Pengelolaan Akun Pelanggan (teori - 1 JP) Sesi 3: Pengelolaan Pencatatan Meter (teori – 2 JP) (praktik di kelas, digabung dengan topik 2 – 1 JP) Sesi 4: Penanganan Pelanggan (teori – 3 JP) (praktik di kelas – 1 JP) Sesi 5: Pemasaran (teori – 2 JP) (praktik di kelas – 1 JP) Sesi 6: Kinerja Pelayanan Pelanggan (teori – 1 JP) (praktik di kelas – 1 JP) Sesi 7: *Best Practice* (teori dan *sharing* – 1 JP)
Materi (Kelas)	• *Sesion Notes* • Presentasi *Powerpoint* • Panduan dan naskah latihan dan simulasi • *Handout* untuk peserta
Materi (Lapangan)	• -
Tindak Lanjut	• Hasil latihan dan simulasi yang dibuat aplikatif sesuai data yang dibawa • Pengawasan
Evaluasi	• *Pre-test* dan *post-test* • Kuis singkat usai tiap sesi • Kuis harian • Akhir pelatihan: ujian akhir + umpan balik peserta • Setelah *training*: kunjungan/kuesioner dan/atau pelatihan ulang

Jadwal Bimtek Provinsi Modul Pelayanan Pelanggan

29 Jan-2 Feb 2018

HARI/JAM	08.00 – 08.45	08.45-09.30	09.30-10.15	10.30-12.00	13.00-14.30	14.45-16.15
Senin, 29 Januari 2017	**Pembukaan**	**Penjelasan + *Pretest***	Gambaran Umum Pelayanan Pelanggan	Pengelolaan Akun Pelanggan	Pengelolaan Akun Pelanggan Pengelolaan Pencatatan Meter	
Pemateri			Maria Jacobus	Slamet Raharjo	Slamet Raharjo	
Selasa , 30 Januari 2017	Penanganan Pelanggan		Pemasaran		Kinerja Pelayanan Pelanggan	
Pemateri	Maria Jacobus		Rika Anjulika		Farida Ariati	
Rabu, 31 Januari 2017	Latihan dan Studi Kasus Simulasi Bab 2 dan 3		Latihan dan Studi Kasus Simulasi Bab 4	Latihan dan Studi Kasus Simulasi Bab 5	Latihan dan Studi Kasus Simulasi Bab 6	**Evaluasi + *post-test***
Pemateri	Slamet Raharjo		Maria Jacobus	Rika Anjulika	Farida Ariati	
Kamis, 1 Februari 2017	Metode CBT, siapkan pembelajaran dan tes	Prinsip-Prinsip Komunikasi: Komunikasi Efektif	Bahasa Tubuh dan Ekspresi Suara	Alat Bantu Presentasi	Pengisian dan Pembahasan DISC Pengenalan Diri – Kelebihan dan Kekurangan	DISC Lanjutan
Pemateri	Trainer A		Trainer A	Trainer A	Trainer A	Trainer A
Jumat, 2 Februari 2017	Latihan Presentasi Spontan	Pembagian Materi untuk Presentasi Topik	Praktek *Micro Teaching* Topik CR	Pembahasan Praktek *Micro Teaching* Topik CR + Penutupan		
Pemateri	Trainer B & C		Trainer B & C	Trainer B & C dan Panitia		

ISHOMA

Ministry of Public Works and Housing
Republic of Indonesia

The Project
on
Strengthening COE (Center of Excellence) Program
for
PDAMs in the Republic of Indonesia

Training Module Implementation Report

Financial Analysis and Management (FAM)

June 2018

JICA Expert Team

The Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Republic of Indonesia

Training Module Implementation Report (FAM)

Table of Contents

*** The following Annexes except Annexes 5 and 6 (Training Curriculum: Training Information Sheet and Timetables) are omitted in the Project Completion Report.**

List of Tables

List of Figures

1. Introduction

"JICA Technical Cooperation Project on Strengthening COE Program for PDAMs in Indonesia" (JICA Project) was launched in August 2015 with its project purpose of enhancement of the implementation capacity of Directorate General of Humansettlment (DGHS) regarding the COE program. Aiming at fulfilling this purpose, Directorate of Water Supply System Development (DWSD) of DGHS and JICA Expert Team (JET) have been engaged in a number of activities. One of the major outputs planned is the development and revision of the four training modules for COE Program.

The present report explains comprehensively explains the project activities which were carried out in relation with the development of Financial Analysis and Management (FAM) module; and seeks for DWSD's final approval of the FAM training curriculum, training materials and trainer's manuals, as determined by the Project Design Matrix agreed between DWSD and JICA through their Minutes of Meeting dated 13 June 2017.

2. Training Module Contents and Output

Financial Analysis and Management (FAM) module focus on Business Plan formulation and financial projection, and also covered materials about financial reports, performance indicators, and tariff. The output for FAM module is the module book and financial projection worksheet on Excel program.

3. Training Module Development Process

3.1. Precedent and Preparatory Works

JICA Expert team conducted interviews regarding good practice of INDII Toolkit to 2 PDAMs (Banyumas and Cilacap) and regarding debt restructuring to MOF and Bank Jateng. From the report on those interviews concluded that Business Plan is needed as company guidance, especially for a PDAM to improve or maintain the healthy performance. Business plan is also needed in debt restructuring to serves as an evidence of good and reliable performance, and it can also be used as evidence for commercial loan evaluation. Based on the conclusions stated before, it is considered that PDAM's self-preparation of its business plan should be placed in the center of FAM module training. The details of the report can be seen in **Annex 1 (Report on Debt Restructuring and Good Practice in Financial Analysis and Management of PDAM)**.

3.2. Formation of Working Group

FAM Working Group (WG) was formed to develop training module of FAM for COE Program. The FAM WG consisted of Indonesian experts of the field such as DWSD staff, experienced PDAM staff such as National Trainers, reputable individual professional practitioners such as consulting experts and financial experts, etc. The WG functioned to discuss and determine all the details of the training curriculum, textbook contents, and other materials.

In September 2016, the first FAM WG discussion meeting took place through DWSD's invitation to the WG members.

3.3. Module Development and Working Group Discussions

3.3.1. Working Group Meeting 1

The first FAM working group meeting was held on 26 September 2016 in Veranda Hotel Jakarta and chaired by Mr. Hilwan, Head of Sub Directorate of Standardizaton and Institutional of DWSD. It was attended by representatives of DWSD, JICA Expert Team, and FAM Working Group Members. List of FAM working group members who attended the meeting can be seen in Table 1.

Table 1. List of FAM Working Group Member in the First WG Meeting

No.	Name	Institution
1.	Budi Sulaiman	Water Supply Expert
2.	Benny Djumhana	IUWASH
3.	Retno Pandawi	DITSPAM
4.	Ari Sutiartie	Financial Expert
5.	Asep Kawaludin	PDAM Kota Depok
6.	Aneka Puspa W	PDAM Kota Malang
7.	Farid Rozin	PDAM Kabupaten Magetan

Source: MoM WG 1 of JET, 2016

The agenda of WG meeting 1 consisted of: (i) Background and objectives of FAM module development; (ii) Overview of SAK ETAP course as predecessor of FAM; (iii) FAM Module Structure Discussion; and (iv) Forthcoming Events /Activities Plan. The detail agenda can be seen in **Annex 2 (MOM dated 29 September 2016)**.

The proposed content and the result of discussion on the proposed additional material can be seen in Table 2.

Table 2. Discussion Result on the Proposed Material for FAM Module

Proposed Contents	WG & DWSD Approval	Treatment / Decision / Remarks
1. Financial Statement 1.1. Income Statement 1.1.1 Revenue Analysis 1.1.2 Cost Analysis 1.2. Balance Sheet 1.2.1 Assets 1.2.2 Liabilities 1.2.3 Equity 1.3. Cash Flow Statement 1.4. Notes of Financial Statement 1.5. Financial Projection	Approved Approved Approved with few adjustment Approved with few adjustment Approved Approved Approved Approved Approved Approved Approved	1. Ch. 1.1.1 and 1.1.2 reference are changed to INDII Toolkit 3.11
Financial Projection	Not Decided	
2. Key Performance 2.1. Financial Ratio 2.2. Other Ratio 2.2.1 PDAM Performance Status 2.2.2 PDAMs Healthy Level According to BPPSPAM Indicators	Approved Approved Approved with few adjustment Approved Approved	1. Reference of KPI should only be from BPKP Report
3. Water Tariff Setting 3.1. Determination of Basic Tariff Policy 3.2. Block Consumption and Customer Group 3.3. Calculation and Budget Projection and Basic Cost 3.4. Revenue and Tariff 3.5. Mechanism and Procedure for Tariff Determination	Approved Approved Approved Approved Approved Approved	1. The sub-chapters should be adjusted with Permendagri No. 71 year 2016
4. Business Plan 4.1 Methodology 4.1.1 Business Plan Preparation 4.1.2 Strategic Environmental Stakeholders PDAM 4.2 Analysis Profile PDAM 4.2.1 Brief History and Legal Basic 4.2.2 Vision and Mission 4.2.3 Goals 4.2.4 PDAM Profile Region 4.2.5 PDAM Current Condition 4.2.6 SWOT Analysis 4.3 Capital Project Investment Plan 4.3.1 Investment Schedule 4.3.2 Project Description 4.4 BP Item Check list 4.5 Consistency Check list	Approved Approved Approved Approved Approved Approved Approved Approved Approved with adjustment Approved Approved Not Decided Not Decided Not Decided Not Decided Not Decided	1. 4.2.4 becomes “Profile Region” 2. 4.3.1 becomes “Project Description” 3. 4.3.2 becomes “Investment Schedule”
5. Case Study	Not Decided	
Appendix 1 : Understanding of SAK ETAP accounting	Not Decided	

Source: JET, 2016

Training Curriculum Modification and Adjustment Regarding Material which have been apporved at the meeting, include:

- The lesson hours should be adjusted with existing lesson hours (1 lesson hour = 45 minutes);
- The practice sessions should be added more. If possible, the textbook is distributed to participants before the training is started;
- The discussion about chapter 4.4 until chapter 5, completion process of new module, the depth of material will be done on the next WG;
- Modified Training Schedule and classes will be discussed further on the next WG; and
- JET will make additional / supplemental module draft and COE management consultant will determine methods of how the material proposed by JET will be taught on the COE training.

3.3.2. Working Group Meeting 2

The second FAM working group meeting was held on 1 December 2016 in Veranda Hotel Jakarta and chaired by Mr. Hilwan, Head of Sub Directorate of Standardizaton and Institutional of DWSD. It was attended by representatives of DWSD, COE Management Consultant, JICA Expert Team, and FAM Working Group Members. List of FAM working group members who attended the second WG meeting can be seen in Table 3.

Table 3. List of FAM Working Group Member in the Second WG Meeting

No.	Name	Institution
1.	Budi Sulaiman	Water Supply Expert
2.	Benny Djumhana	IUWASH
3.	Retno Pandawi	DITSPAM
4.	Ari Sutiartie	Financial Expert
5.	Asep Kamaludin	PDAM Kota Depok
6.	Dewi Ratih	PDAM Kota Depok
7.	Ahmad Fathoni	PDAM Kota Malang
8.	Farid Rozin	PDAM Kabupaten Magetan

Source: MoM WG 2 of JET, 2016

The agenda consists of: (i) Important issues and suggested solutions in FAM module development; (ii) Module Development Schedule; (iii) FAM Module Structure Discussion; (iv) Chapter 1 and Appendix 1 of FAM Module Contents Discussion (v) Financial Projection

Templates Discussion.The detail agenda can be seen in **Annex 2 (MOM dated 1 December 2016)**.

The result of discussion on the proposed additional material can be seen in Table 4.

Table 4. Discussion Result on the Proposed Material for FAM Module

Proposed Contents	WG & DWSD Approval	Treatment / Decision / Remarks
1. Financial Statement 1.1 Income Statement 1.1.1 Revenue Analysis 1.1.2 Cost Analysis 1.2 Balance Sheet 1.2.1 Assets 1.2.2 Liabilities 1.2.3 Equity 1.3 Cash Flow Statement 1.4 Notes of Financial Statement	Approved with some adjustments	1. Time Slots for Chapter 1 will be kept as it is = 4 lesson hours 2. As for Kabupaten/Kota training level, taking SAK-ETAP as predecessor training or having financial knowledge is not an obligatory for the participants 3. IFRS will not be used as reference in this chapter. SAK-ETAP is the only reference that will be used in this chapter
Appendix 1 : SAK ETAP Summary	Approved with some adjustments	1. Appendix 1: SAK-ETAP will be included in Chapter 1
2. Key Performance 2.1 KPI Based on MOHA 47 2.2 KPI Based on BPPSPAM	Approve with some adjustment	1. Chapter 2 title is changed into "Penilaian Kinerja" (Performance Assessment) 2. The time slot for this chapter will be added for 90 minutes more (Total 180 minutes) 3. Lesson hour for 2.1 MOHA 47 is 90 minutes, and 2.2 BPPSPAM is 90 minutes
3. Water Tariff Setting 3.1 Determination of Basic Tariff Policy 3.2 Block Consumption and Customer Group 3.3 Mechanism and Procedure of Tariff Determination	Approved with some adjustment	1. Chapter 3 title will be changed into "Perhitungan Tarif (Tariff Calculation) 2. 2. MOHA 70 should be reference for this chapter
Appendix 2 : Financial Projection Program (Finpro)	Approved with some adjustments	1. Appendix 2 will be moved to 4.6.1
4. Business Plan 4.1 Methodology 4.2 Analysis Profile PDAM 4.2.1 Brief History and Legal Basic 4.2.2 Vision 4.2.3 Mission 4.2.4 Goals 4.2.5 PDAM Profile Region 4.2.6 PDAM Current Condition 4.2.7 SWOT Analysis 4.3 Capital Project Investment Plan 4.3.1 Investment Schedule 4.3.2 Project Description 4.4 Service and Production 4.5 Organization Plan 4.6 Financial Projection 4.6.1 Introduction 4.6.2 Income Statement 4.6.3 Balance Sheet 4.6.4 Cash Flow 4.6.5 Key Performance Indicator 4.7 BP Item Checklist 4.8 Consistency Check list	Approved with some adjustment	1. 4.2.5 changed into "Profil Wilayah Kota/Kabupaten" (City / Regency Profile Area) 2. 4.2.6 changed into "Kondisi PDAM Saat Ini" (Existing PDAM Condition) 3. 4.6.2, 4.6.3, 4.6.4 teaching methods are changed from "lecture" into "practice"
5. Case Study 5.1 Case Study 5.2 Sample BP 5.3 Exercise	Approved	

Source: JET, 2016

Training Curriculum Modification and Adjustment Regarding Material which have been apporved at the meeting, include:

- The lessons hour should be adjusted with existing lesson hours (1 lesson hour = 45 minutes). If there are any subject need less than 45 minutes that subject should be combined with another subject to make it even with the lesson hour;
- The duration of training session is flexible with participant capabilities in understanding the training materials;
- Modified Training Schedule and classes will be discussed further on the next WG.

3.3.3 Working Group Meeting 3

The third FAM working group meeting was held on 22-23 March 2017 in Falatehan Hotel Jakarta and chaired by Mr. Hilwan, Head of Sub Directorate of Standardizaton and Institutional of DWSD. It was attended by representatives of DWSD, JICA Expert Team, and FAM Working Group Members. List of FAM working group members who attended the second WG meeting can be seen in Table 5.

Table 5. List of FAM Working Group Member in the Third WG Meeting

No.	Name	Institution
1.	Budi Sulaiman	Water Supply Expert
2.	Benny Djumhana	IUWASH
3.	Retno Pandawi	DITSPAM
4.	Ari Sutiartie	Financial Expert
5.	Mya Musyarova Wati	PDAM Kota Depok
6.	Ahmad Fathoni	PDAM Kota Malang
7.	Farid Rozin	PDAM Kabupaten Magetan

Source: MoM WG 3 of JET, 2017

The agenda consists of: (i) Review of WG; (ii) Discussion on Chapter 4; (iii) Chapter 5, and ; (iv) Further Discussion on Financial Projection. The detail agenda can be seen in **Annex 2 (MOM dated 22 – 23 March 2017).**

The result of discussion on the proposed additional material can be seen in Table 6.

Table 6. Discussion Result on the Proposed Material (Chapter 4) for FAM Module

Proposed Contents	WG & DWSD Approval	Treatment / Decision / Remarks
4. Business Plan 4.1 Methodology 4.2 Analysis Profile PDAM 4.2.1 Brief History and Legal Basic 4.2.2 Vision 4.2.3 Mission 4.2.4 Goals 4.2.5 PDAM Profile Region 4.2.6 PDAM Current Condition 4.2.7 SWOT Analysis 4.3 Capital Project Investment Plan 4.3.1 Investment Schedule 4.3.2 Project Description 4.4 Service and Production 4.5 Organization Plan 4.6 Financial Projection 4.6.1 Introduction 4.6.2 Income Statement 4.6.3 Balance Sheet 4.6.4 Cash Flow 4.6.5 Key Performance Indicator 4.7 BP Item Checklist 4.8 Consistency Check list	Approved with some adjustment	1. 4.2.7 SWOT Analysis: • Revising table 4.2 by adding a scoring column. Reference from INDII Toolkit • Table 4.3 can be expanded and emphasized to the connection with SWOT and can elaborate impact of each quadrant position for 1-2 pages • Elaborate scoring and criteria based on INDII Toolkit • Add new SWOT Chart • Move the quadrants explanation to section 4.2.8 and add other company strategies relevant to PDAM scoring status aside of investment • Elaborate investment form by relating it to SWOT Analysis 2. 4.3 Capital Project Investment Plan • Change title 4.3 from "Rencana Investasi Modal Proyek" to "Rencana Belanja Modal" • Change title 4.3.1 from "Jadwal Investasi" to "Jadwal Pelaksanaan Investasi with the following order: 1. Land (Lahan), 2.Raw Water (Air Baku), 3. Production (Produksi); and so forth. • Revise table 4.6 and 4.8 to be in accordance with table 4.7. Table 4.7 must accumulate all land variable to simplify the calculation for PDAMs. 3. 4.4 Service and Production • Change title from "Pelayanan dan Produksi" to "Produksi dan Pelayanan" • Revise table 4.9 in accordance with the narration above the table and add table code. • Revise the description below the table to be in accordance with table 4.9. 5. 4.5 Organization Plan • Change table of Organizational Chart example in accordance with PERMENDAGRI No.2/2007 of Law No.7 Year 2005 • If this subchapter is truly going to discuss Organization Plan, the paragraph should include more description and how-to make planning and strategies. Table 4.9 is more suitable to be moved to PDAM Profile • Change table in Sample BP in accordance with the table of organizational chart in this section 6. 4.6 Financial Projection • Add line in table 4.10 for Average Water Sold in m3/year. • Add line in table 4.11 for Employee/1000 connection ratio. • Add narration of each section • Add description of the method used in section 4.6.3 Cash Flow • Change title from "Indikator Kinerja" Utama to "Proyeksi Indikator Kinerja Utama"
5. Case Study 5.1 Case Study 5.2 Sample BP 5.3 Exercise	Approved	1. Change title Chapter 5 to "Practice of Business Plan Formulation with Financial Projection Model" (Praktek Perumusan Business Plan dengan Model Proyeksi Keuangan)

Source: JET, 2017

Training Curriculum Modification and Adjustment Regarding Material which have been apporved at the meeting, include:

- Revised documents should be distributed to all WG members no later than April 2017
- WG or smaller meeting is required to discuss final version of all documents.

3.3.4 Working Group Meeting 4

The fourth FAM working group meeting was held on 20 June 2017 at DGHS Building in Jakarta and chaired by Ms. Meike Kencanawulan, acting Head of Institution and Standardization Sub-Directorate. It was attended by representatives of DWSD, JICA Expert Team, COE Management Consultant and FAM Working Group Members. List of FAM working group members who attended the second WG meeting can be seen in Table 7.

Table 7. List of FAM Working Group Member in the Fourth WG Meeting

No.	Name	Institution
1.	Benny Djumhana	IUWASH
2.	Retno Pandawi	DITSPAM
3.	Ari Sutiartie	Financial Expert
4.	Mya Musyarova Wati	PDAM Kota Depok
5.	Ahmad Fathoni	PDAM Kota Malang
6.	Farid Rozin	PDAM Kabupaten Magetan

Source: MoM WG 4 of JET, 2017

The agenda consists of: (i) Review of WG; (ii) Discussing revision point based on previous WG; and (iii) Discussing training aspect. The detail agenda can be seen in **Annex 2 (MOM dated 20 June 2017).**

The result of discussion on the proposed additional material can be seen in Table 8.

Table 8. Discussion Result on the Proposed Material for FAM Module

Proposed Contents	WG & DWSD Approval	Treatment / Decision / Remarks
1. Financial Statement 1.1 Income Statement 1.1.1 Revenue Analysis 1.1.2 Cost Analysis 1.2 Balance Sheet 1.2.1 Assets 1.2.2 Liabilities 1.2.3 Equity 1.3 Cash Flow Statement 1.4 Notes of Financial Statement	Approved with some adjustments	1. Use indirect method on cash flow
Appendix 1 : SAK ETAP Summary	Approved	
2. Key Performance 2.1 KPI Based on MOHA 47 2.2 KPI Based on BPPSPAM	Approve with some adjustment	1. add definition and goals 2. add function and purpose of calculating and interpreting performance scoring 3. add reference/source of table 2.5
3. Water Tariff Setting 3.1 Determination of Basic Tariff Policy 3.2 Block Consumption and Customer Group 3.3 Mechanism and Procedure of Tariff Determination	Approved with some adjustment	1. Adjust calculation with water selling projection 2. 2. Explain table 4.1 to enhance guidelines in this chapter
Appendix 2 : Financial Projection Program (Finpro)	Approved	
4. Business Plan 4.1 Methodology 4.2 Analysis Profile PDAM 4.2.1 Brief History and Legal Basic 4.2.2 Vision 4.2.3 Mission 4.2.4 Goals 4.2.5 PDAM Profile Region 4.2.6 PDAM Current Condition 4.2.7 SWOT Analysis 4.3 Capital Project Investment Plan 4.3.1 Investment Schedule 4.3.2 Project Description 4.4 Service and Production 4.5 Organization Plan 4.6 Financial Projection 4.6.1 Introduction 4.6.2 Income Statement 4.6.3 Balance Sheet 4.6.4 Cash Flow 4.6.5 Key Performance Indicator 4.7 BP Item Checklist 4.8 Consistency Check list	Approved with some adjustment	1. RISPAM (Water Supply System National Masterplan) should be elaborated in chapter 4.1.3 2. Scoring system of SWOT analysis should be clearly defined and explained. 3. 3. Narration about local government, grant, and loan should be explained in 4.6.2
5. Case Study 5.1 Case Study 5.2 Sample BP 5.3 Exercise	Approved	1. Add explanation about required data for input. Define clearly input, process and output.

Source: JET, 2016

3.4 Draft Final Module for Training Implementation

Based on the 4th working group meeting that was conducted on 20 June 2017 at DGHS Building Jakarta, the further activities were scheduled as follows:

- All input will be finalized on 22 June 2017.
- The discussion about the completion process of module, curriculum adjustment, and others training material will be done via e-mail. JET will send the revision to WG members on July 7th.

JET sent the draft of additional materials to working group member there are no feedback from members.

4. Training Implementation of FAM Module

4.1 Summary

Trainings implementation of FAM Module were held 3 (three) times during 2017 – 2018. The first training was Trial Training in 2017, followed by Provincial Training in 2018. Afterwards, Centralized Monitoring were held as a preparatory meeting for the trainers and followed by Kabupaten/Kota Training in 2018. The participants were invited through the Invitation Letters issued by DWSD (see **Annex 3**). For each training, the trainers received session notes (see **Annex 4**) that serves as manual during training implementation. The details of training objectives, general overview of module content and target of participants can be seen on **Annex 5**.

4.2 Trial Training for Provincial Trainers

4.2.1 Time and Place

FAM Trial Training was held on 8-10 August 2017 at Grandhika Hotel Jakarta. It was attended by representatives of DSWS, JICA Expert Team, FAM supporting trainers, participants, and COE Management Consultant.

4.2.2 Trainers and Trainees

FAM trial training trainers are working group member which consist of PDAM experienced staf and reputable individual professionals. The list of FAM Trainers can be seen in Table 9.

Table 9. List of FAM Trainers in Trial Training

No.	Name	Institution
1.	Benny Djumhana	IUWASH
2.	Ari Sutiartie	Financial Expert
3.	Farid Rozin	PDAM Kota Malang
4.	Mya Musyarova Wati	PDAM Kota Depok

Source: JET, 2017

The participants of trial training for FAM module consisted of 12 (twelve) persons who are PDAM staff as shown in Table 10.

Table 10. List of FAM Participants in Trial Training

No.	Name	Institution
1.	Zein Mustain	PDAM Kab. Kebumen
2.	M. Affan	PDAM Kab. Rembang
3.	Ardiansyah	PDAM Kota Pontianak
4.	Slamet Mujiarto	PDAM Kab. Banjarnegara
5.	Mahmud Gustiawan	PDAM Kab. Garut
6.	Bambang Haryanto	PDAM Kab. Bangkalan
7.	I Made Rama	PDAM Kota Denpasar
8.	Khivaldi	PDAM Kota Pekanbaru
9.	Ahmad Fathoni	PDAM Kota Malang
10.	Khairil Anwar	PDAM Kota Banjarmasin
11.	Nurjamilawati	PDAM Kab. Indragiri Hilir
12.	Siska Nurmalasari	PDAM Kota Bekasi

Source: JET, 2017

4.2.3 Training Implementation

The training was opened with opening remarks from Ms. Meike Kencanawulan as acting head of the Subdirector of Standardization and Institutional. Then continued by introduction and remarks from Mr. Yusaku Makita as Chief Advisor of JICA Expert Team.

The first day was opened with short explanation from Mr. Doya, Financial Expert of JICA Expert Team, followed by self-introduction session, and pre-test. The material for the first day are Financial Statement, KPI, and Tariff Setting.

On the second day, morning session continued with Tariff Setting, followed by Business Plan, and introduction of FINPRO (Financial Projection) Program.

On the third day, morning session continued from previous day session regarding FINPRO and business plan, followed by exercise, post-test, and evaluation. The exercise material is about using FINPRO program on provided case and formulating business plan, which the participants were divided into 4 groups and presenting their business plan.
The detail of the training can be seen in **Annex 2 (MOM dated 8-10 August 2017)** and **Annex 6 (Trial Training Timetable).**

4.3 Provincial Training

Provincial Training of FAM Module was held with the objective of COE Training to produce national trainers.

4.3.1 Time and Places

Provincial Training was held on 29 January until 2 February 2018 at Grandhika Hotel Jakarta. It was attended by representatives of DSWS, JICA Expert Team, FAM supporting trainers, participants, and Perpamsi.

4.3.2 Trainers and Trainees

FAM Provincial Training trainers are working group member which consist of PDAM experienced staf and reputable individual professionals. The list of FAM Trainers can be seen in Table 11.

Table 11. List of FAM Trainers in Provincial Training

No.	Name	Institution
1.	Benny Djumhana	IUWASH
2.	Ari Sutiartie	Financial Expert
3.	Farid Rozin	PDAM Kota Malang
4.	Mya Musyarova Wati	PDAM Kota Depok

Source: JET, 2018

The participants of trial training for FAM module consisted of 14 (fourteen) persons who are PDAM staff as shown in Table 12.

Table 12. List of FAM Participants in Provincial Training

No.	Name	Institution
1.	Zein Mustain	PDAM Kab. Kebumen
2.	M. Affan	PDAM Kab. Rembang
3.	Ardiansyah	PDAM Kota Pontianak
4.	Mahmud Gustiawan	PDAM Kab. Garut
5.	Bambang Haryanto	PDAM Kab. Bangkalan
6.	I Nyoman Darmadiasa	PDAM Kab. Gianyar
7.	Norma Diarini	PDAM Kab. Jombang
8.	Ahmad Fathoni	PDAM Kota Malang
9.	Syahrani	PDAM Kota Banjarmasin
10.	Sugeng	PDAM Kab. Wonosobo
11.	Siska Nurmalasari	PDAM Kota Bekasi
12.	Mukhlis Effendi	PDAM Kab. Kampar
13.	Jermia Tuwonanoeng	PDAM Kota Bitung
14.	Muslih Sujarwo	PDAM Kab. Purworejo

Source: JET, 2018

4.3.3 Training Implementation

The training was opened with opening remarks from Mr. Yusaku Makita as Chief Advisor of JICA Expert Team, then continued by opening remarks from Ms. Susi MDS Simanjuntak as Head of Standardization & Institutional. The program consisted of 3-days FAM material and 1.5-days SD (Self Development) Training.

The first day started with pre-test and self-introduction session of each participants, followed by discussions in each material consist of sharing about the conditions and experiences of some trainees.

On the second day, morning session started with SWOT Analysis followed by financial projection in the afternoon session. The FINPRO Program were introduced during the second day.

On the third day, morning session started with Business Plan and followed by FINPRO test where the trainees were given 1 hour to work on the provided data using FINPRO Program.

The afternoon session was group work on formulating business plan, followed by presentation of each's group business plan, and ended by post-test.

The fourth day was the start of SD Training filled with small group discussion, games, and filling out DISC personality test.

On the fifth day, the day started with preparation of micro teaching session followed by individual presentation for 5 minutes each person, which divided into 2 sessions.
The detail of the training can be seen in **Annex 2 (MOM dated 29 January – 2 February 2018), Annex 6 (Provincial Training Timetable)** and **Annex 7 (Photograph of FAM Provincial Training)**.

4.4 Centralized Monitoring

Centralized Monitoring was held with the objective of ensuring the selected trainers were prepared for teaching as well as strengthening skills on using teaching tools and practical equipment.

4.4.1 Date and Place

Centralized Monitoring was held on 2 – 4 April 2018 at Grandhika Hotel and was attended by representative of DWSD, JICA Expert Team, and FAM Selected Trainers.

4.4.2 Participants

The participants of the Centralized monitoring are Mr. Farid Rozin as the coach, Mr. Sugeng and Mr. Ardiansyah as participants (selected trainers).

4.4.3 Implementation

The Centralized Monitoring was opened by Mr. Yusaku Makita as Chief Advisor of JICA Expert Team and continued by Ms. Riche Noviasari as Section Head of Institutional of DWSD. The activities during the centralized monitoring which was held in 3 days consisted of discussion of training materials, proposal/business plan, and action plan, as well as teaching practice of the selected trainers.

The detail of Centralized Monitoring can be seen in **Annex 2 (MOM dated 2 – 4 April 2018), Annex 6 (Centralized Monitoring Timetable)** and **Annex 7 (Photograph of FAM Centralized Monitoring)**.

4.5 Kabupaten/Kota Training

Kabupaten/Kota Training for FAM module were held with the objective of COE training is to produce alumni that can apply their acquired knowledge in their PDAM.

4.5.1 Date and Place

Kab/Kota Training was held on 9 – 11 April 2018 at Novotel Hotel Surakarta, Central Java. The training was attended by representative of DWSD, JICA Expert Team, FAM Trainers, and Participants.

4.5.2 Trainers and Trainees

FAM trainers for this Kab/Kota training can be seen in Table 13. Mr. Sugeng and Mr. Ardiansyah were the main trainers, while Mr. Farid Rozin acted as supporting trainer. Mr. Sugeng and Mr. Ardiansyah were the participants of FAM Module Provincial Training in February 2018, while Mr. Farid Rozin was a member of WG as well as trainers at Provincial Training.

Table 13. List of FAM Trainers in Kabupaten/Kota Training

No.	Name	Institution
1.	Ardiansyah	PDAM Kota Pontianak
2.	Sugeng	PDAM Kab. Wonosobo
3.	Farid Rozin	PDAM Kab. Magetan

Source: JET, 2018

The participants of FAM module consisted of 17 (seventeen) persons form PDAM within Central Java Area as shown in Table 14.

Table 14. List of FAM Participants in Kabupaten/Kota Training

No.	Name	Institution
1.	Hasti Sri Maryati	PDAM Kab. Magelang
2.	Retno Wardani	PDAM Kab. Sukoharjo
3.	Kukun Kurniasih	PDAM Kota Tegal
4.	Sri Wulandari	PDAM Kab. Boyolali
5.	Legimin	PDAM Kota Salatiga
6.	Sugiarto	PDAM Kab. Tegal
7.	Imam Rochadi	PDAM Kab. Sragen
8.	Teguh Pambudi	PDAM Kab. Sragen
9.	Charis Setiyabudi	PDAM Kab. Banyumas
10.	Siwibowo	PDAM Kab. Karanganyar
11.	Subagio	PDAM Kota Pekalongan
12.	Nurwachid	PDAM Kab. Demak
13.	Eko Budi Santoso	PDAM Kab. Semarang
14.	Ary Widiyanto	PDAM Kab. Pekalongan
15.	Antonius Agung Nugroho	PDAM Kota Surakarta
16.	Agus Isyono	PDAM Kab. Brebes
17.	Gito Purnomo	PDAM Kab. Wonogiri

Source: JET, 2018

4.5.3 Training Implementation

Kab/Kota Training for Financial Analysis Management (FAM) module was opened with the opening remarks from Director of DWSD who was represented by Ms. Ir. Susi MDS Simanjuntak, MT as Head of Sub Directorate of Standardization and Institutional of DWSD which was continued by introduction and remarks from Mr. Yusaku Makita as Chief Advisor of JICA Expert Team.

After opening ceremony, learning activities were done for three days according to the timetable in Table 15. The training was begun with a pre-test and ended with a post test on the third day.

On the first day, after pre-test, session was continued with self-introduction and followed by class materials which is Financial Statement, Key Performance Indicator, Tariff Setting, and Introduction to Business Plan.

On the second day, the morning session started with material about SWOT analysis and continued with Investment Decision and Investment Schedule. In the afternoon, the participants start to learn on how to use FINPRO Program, followed by example of Business Plan. The participants were also divided into 3 groups for the third day group work.

On the third day, class started with individual test on Finpro Exercise, continued by the explanation of Finpro Exercise's answer. The participants then seated in their group to start their group work on formulating business plan using the provided template and modified Finpro Exercise data. The class continued by each group presentation and ended with post-test.
The detail of the training can be seen in **Annex 2 (MOM dated 9 – 11 April 2018), Annex 6 (Kabupaten/Kota Training Timetable)** and **Annex 7 (Photograph of FAM Kabupaten/Kota Training)**.

5. Monitoring and Evaluation of Training Implementation

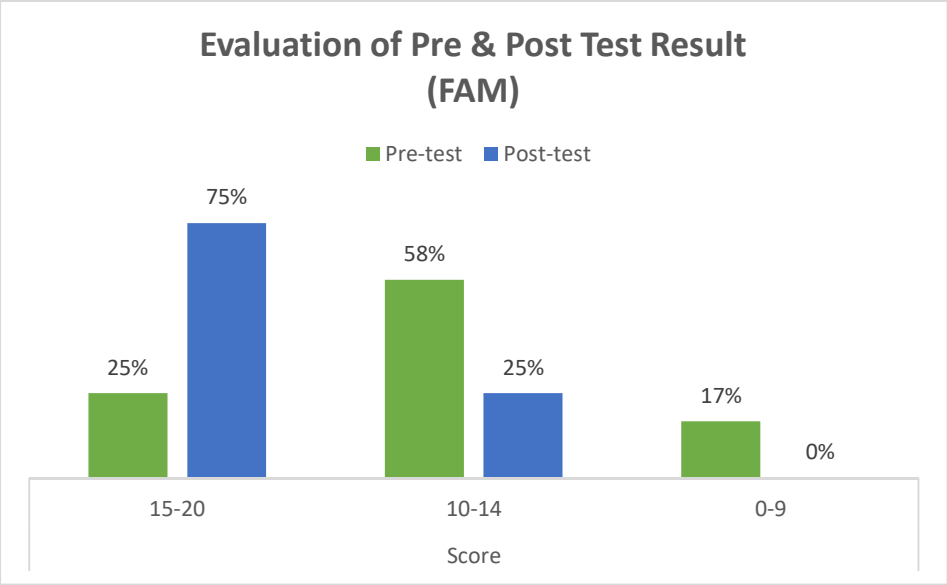
Monitoring and evaluation of all training were conducted by JET during each training implementation. The data used here is gathered from the questionnaires that were distributed during training and collected at the end of training.

5.1 Monitoring and Evaluation of Trial Training

5.1.1 Participant Evaluation

The result of participants evaluation can be seen in the Figure 1. The participants were assessed by their pre-test and post-test result. The figure showed that the participants score improved after the training.

Figure 1. Participant Evaluation of FAM Trial Training



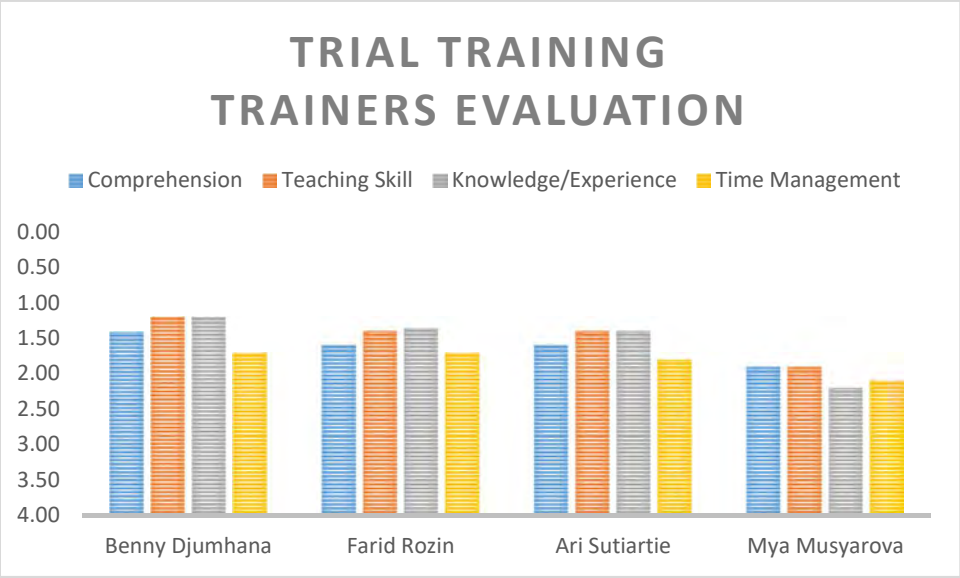
Source: JET, 2018

5.1.2 Trainer Evaluation

The result of trainer evaluation can be seen in the Figure 2. There are 4 (four) assessment criteria to the trainers, namely: comprehension, teaching skills, knowledge / experience, and time management. The value shown on the figure is the average. The scoring criteria use is 1 for the highest satisfaction level and 4 for the lowest satisfaction level.

From the four trainers, Mr. Benny Djumhana got the highest score, followed by Mr. Farid Rozin, Ms. Ari Sutiartie and Ms. Mya Musyarova.

Figure 2. Trainer Evaluation of FAM Trial Training



Source: JET, 2018

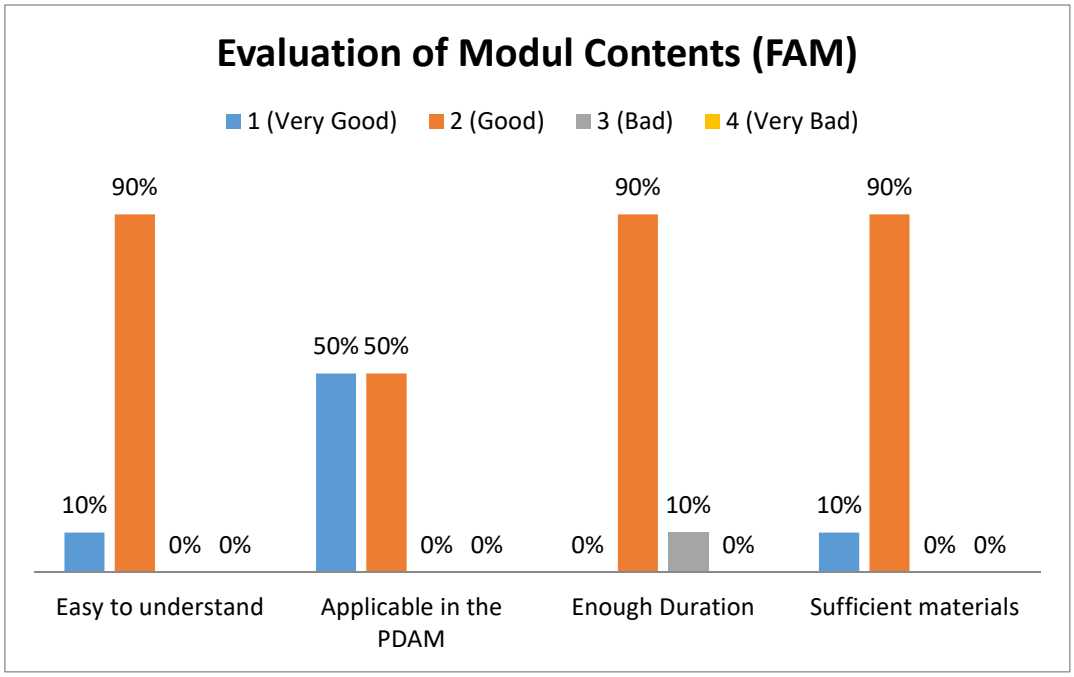
5.1.3 Module Content Evaluation

The result of module content evaluation can be seen in the Figure 3. There are 4 (four) evaluation criteria for module content:

- Is the content easy to understand?
- Is the content applicable for PDAM?
- Is the duration of the class for those material sufficient?
- Is the material for those subject sufficient?

The overall result shows that the content of the module is good to understand and is applicable to the PDAM.

Figure 3. Module Content Evaluation of Trial Training



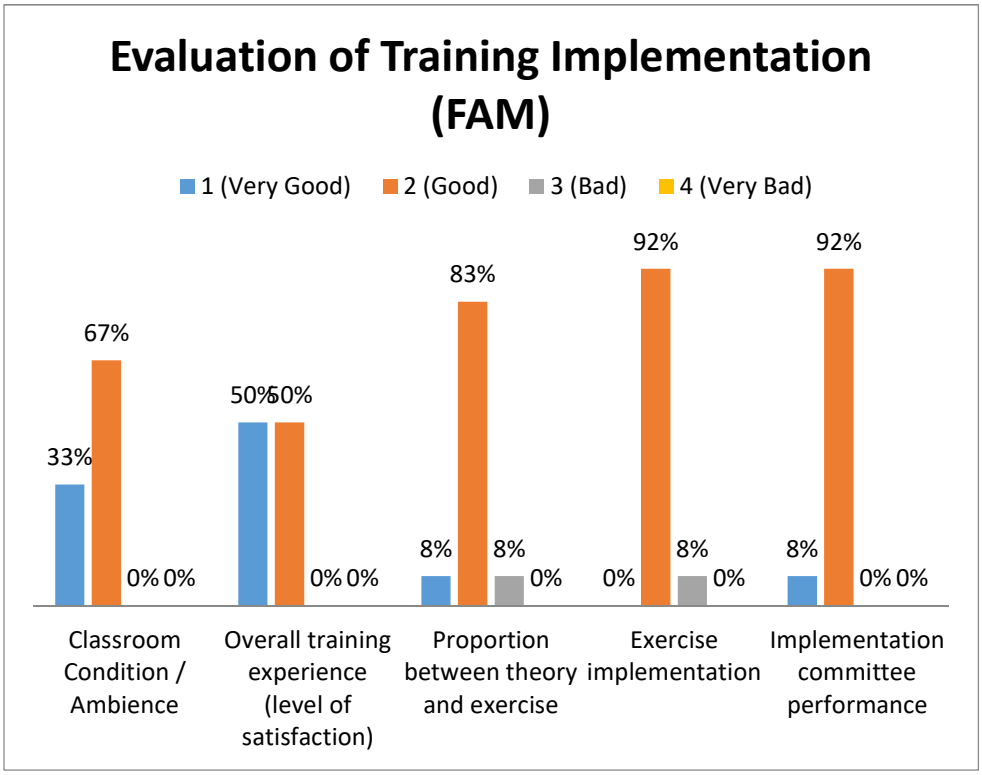
Source: JET, 2018

5.1.4 Training Implementation Evaluation

The result of training implementation evaluation can be seen in the Figure 4. There are 5 (five) evaluation criteria for training implementation evaluation, namely: Ambience, overall training experience, proportion between theory and exercise, exercise implementation, and implementation committee performance.

The overall result shows that the training implementation is good and the proportion between theory and exercise for FAM module is good.

Figure 4. Training Implementation Evaluation of FAM Trial Training



Source: JET, 2018

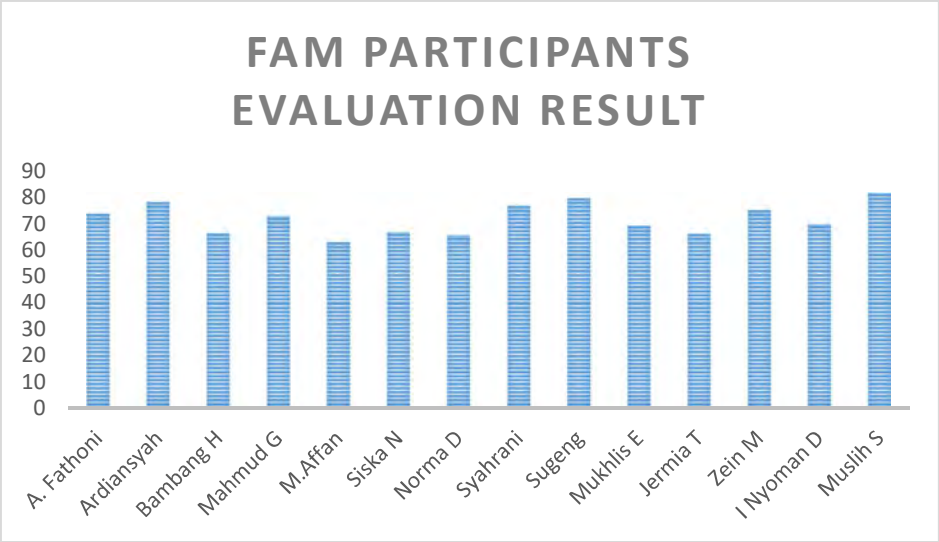
5.2 Monitoring and Evaluation of Provincial Training

The monitoring and evaluation of provincial training consisted of participant evaluation, trainer evaluation, module content evaluation, and training implementation evaluation.

5.2.1 Participant Evaluation

The result of participants evaluation can be seen in the Figure 5. There are 5 (five) assessment criteria to the participants, namely: pre-test score, post-test score, Finpro Exercise Score, Business Plan Formulation Group Work Score, and SD (Self Development) Score. The value shown in Figure 5 is the total score of all the assessment criteria.

Figure 5. Participant Evaluation of FAM Provincial Training



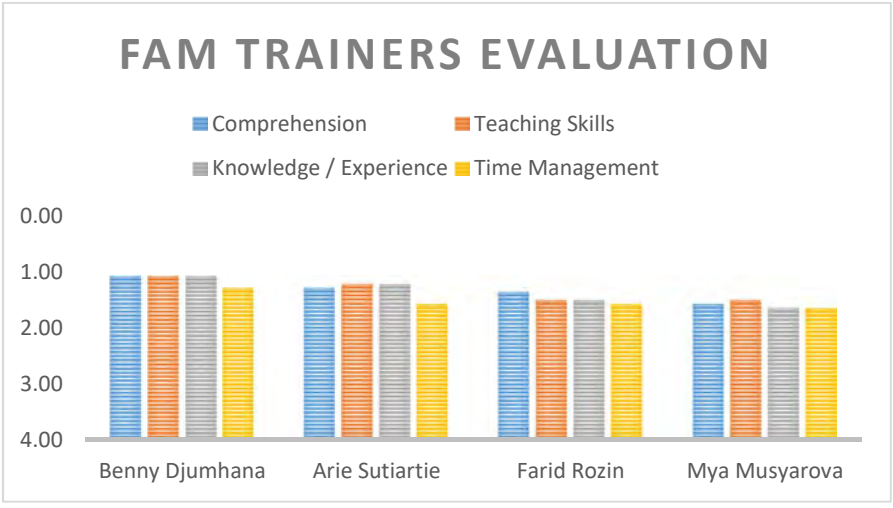
Source: JET, 2018

5.2.2 Trainer Evaluation

The result of trainer evaluation can be seen in the Figure 6. There are 4 (four) assessment criteria to the trainers, namely: comprehension, teaching skills, knowledge / experience, and time management. The value shown on the figure is the average. The scoring criteria use is 1 for the highest satisfaction level and 4 for the lowest satisfaction level.

From the four trainers, Mr. Benny Djumhana got the highest score, followed by Ms. Arie Sutiartie, Mr. Farid Rozin, and Ms. Mya Musyarova.

Figure 6. Trainer Evaluation of FAM Provincial Training



Source: JET, 2018

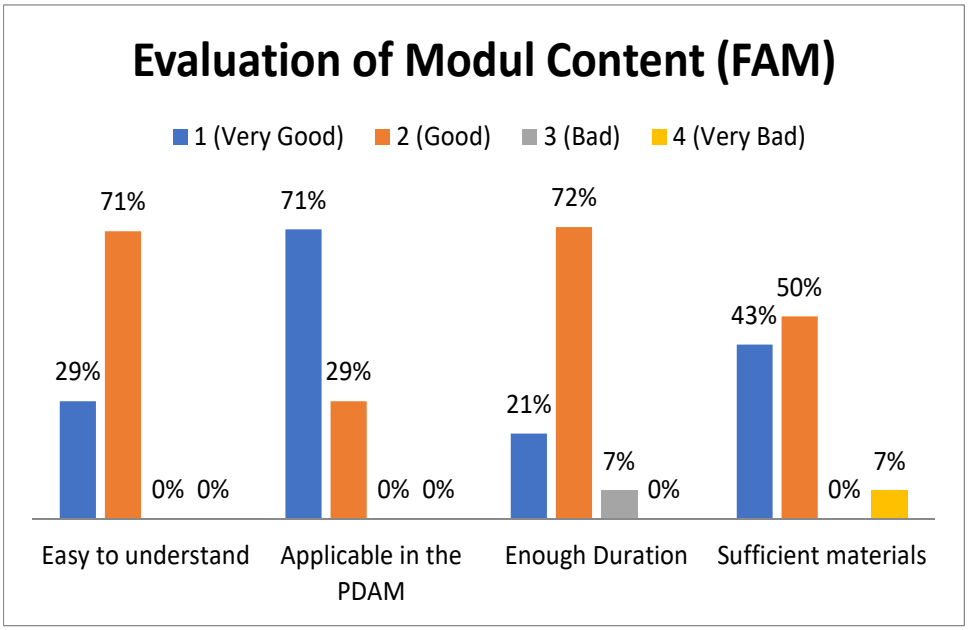
5.2.3 Module Content Evaluation

The result of module content evaluation can be seen in the Figure 7. There are 4 (four) evaluation criteria for module content:

- Is the content easy to understand?
- Is the content applicable for PDAM?
- Is the duration of the class for those material sufficient?
- Is the material for those subject sufficient?

The overall result shows that the content of the module is good to understand and is very applicable to the PDAM.

Figure 7. Module Content Evaluation of Provincial Training



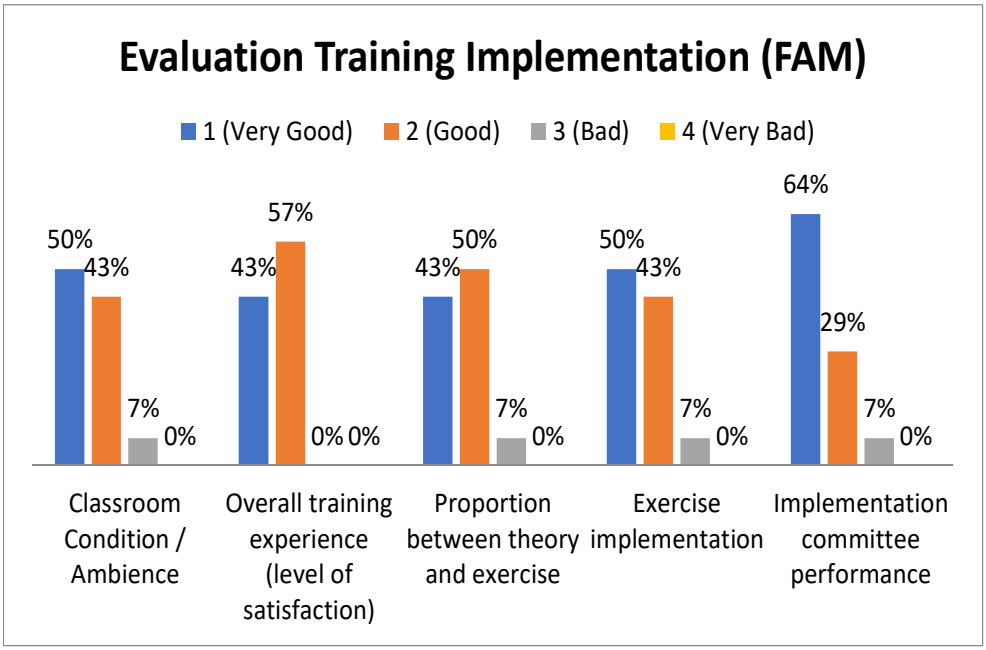
Source: JET, 2018

5.2.4 Training Implementation Evaluation

The result of training implementation evaluation can be seen in the Figure 8. There are 5 (five) evaluation criteria for training implementation evaluation, namely: Ambience, overall training experience, proportion between theory and exercise, exercise implementation, and implementation committee performance.

The overall result shows that the training implementation is good and the proportion between theory and exercise for FAM module is good.

Figure 8. Training Implementation Evaluation of Provincial Training



Source: JET, 2018

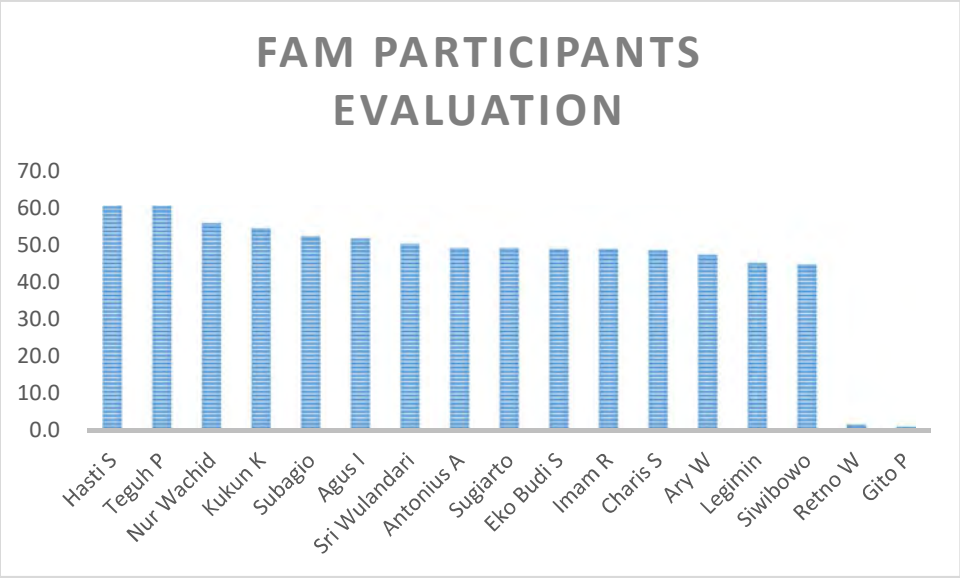
5.3 Monitoring and Evaluation of Kabupaten/Kota Training

The monitoring and evaluation of Kabupaten/Kota Training consists of participant evaluation, trainers evaluation, module content evaluation, and training implementation evaluation.

5.3.1 Participant Evaluation

The result of participants evaluation can be seen in the Figure 9. There are 4 (four) assessment criteria to the participants, namely: pre-test score, post-test score, Finpro Exercise Score, and Business Plan Formulation Group Work Score. The value shown in Figure 5 is the total score of all the assessment criteria and the full score is 70.

Figure 9. Participant Evaluation of Kabupaten/Kota Training

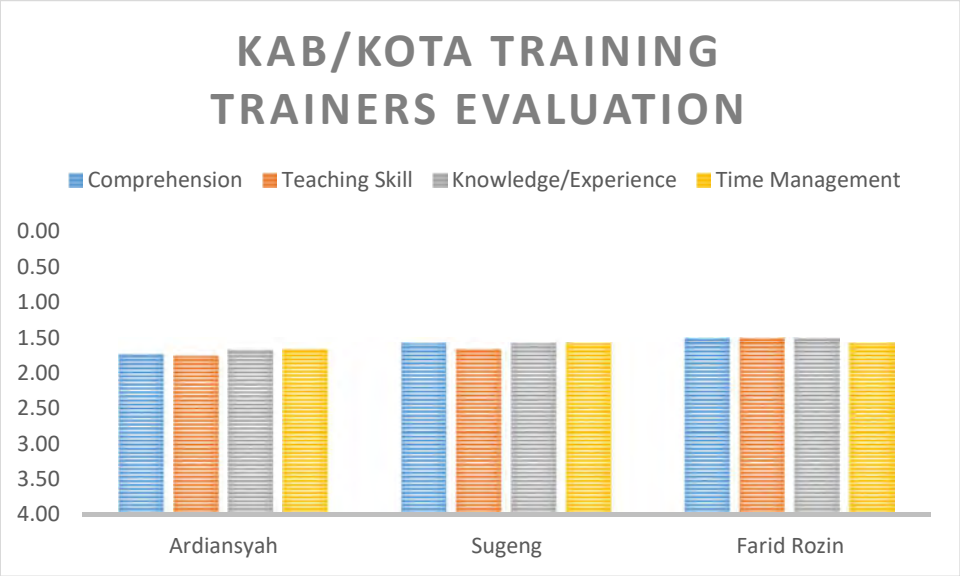


Source: JET, 2018

5.3.2 Trainer Evaluation

The result of trainer evaluation can be seen in the Figure 10. There are 4 (four) assessment criteria to the trainers, namely: comprehension, teaching skills, knowledge / experience, and time management. The value shown on the figure is the average. The scoring criteria use is 1 for the highest satisfaction level and 4 for the lowest satisfaction level.

Figure 10. Trainer Evaluation of Kabupaten/Kota Training



Source: JET, 2018

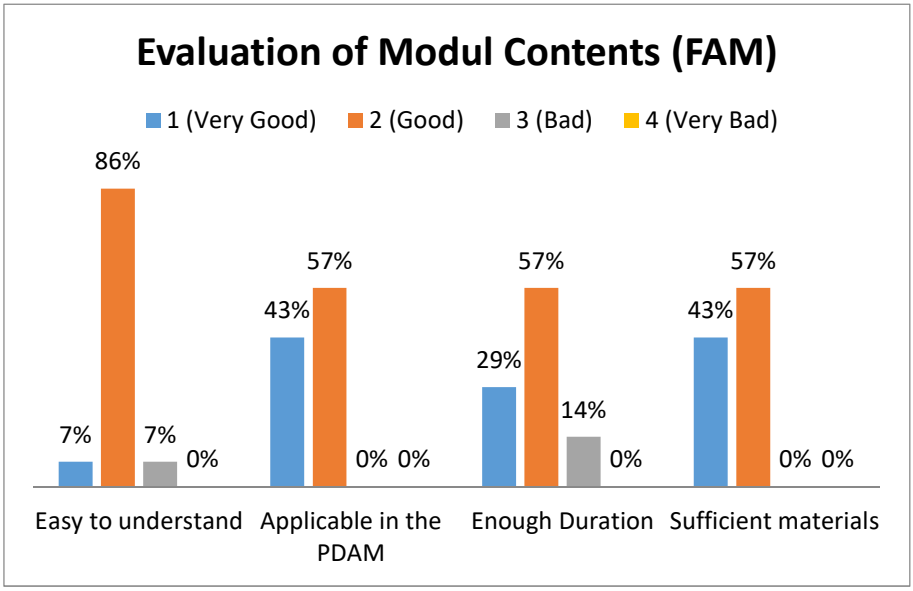
5.3.3 Module Content Evaluation

The result of module content evaluation can be seen in the Figure 11. There are 4 (four) evaluation criteria for module content:

- Is the content easy to understand?
- Is the content applicable for PDAM?
- Is the duration of the class for those material sufficient?
- Is the material for those subject sufficient?

The overall result shows that the content of the module is good to understand and is very applicable to the PDAM.

Figure 11. Module Content Evaluation of Kabupaten/Kota Training



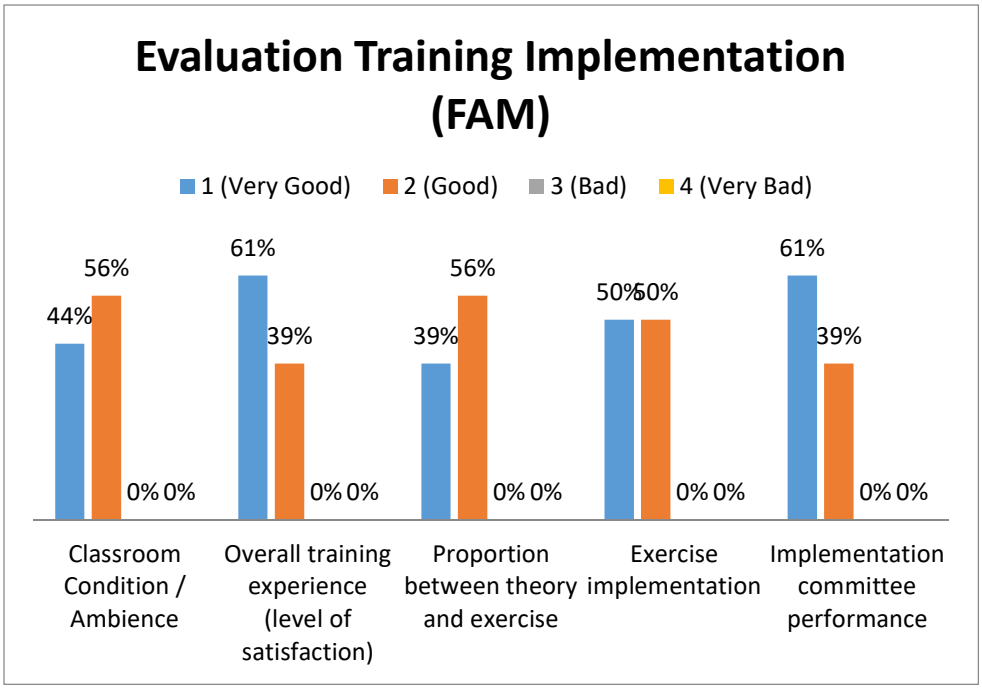
Source: JET, 2018

5.3.4 Training Implementation Evaluation

The result of training implementation evaluation can be seen in the Figure 12. There are 5 (five) evaluation criteria for training implementation evaluation, namely: Ambience, overall training experience, proportion between theory and exercise, exercise implementation, and implementation committee performance.

The overall result shows that the training implementation is good and the proportion between theory and exercise for FAM module is good.

Figure 12. Training Implementation Evaluation of Kabupaten/Kota Training



Source: JET, 2018

6. Finalization of Training Module after Training Implementation

FAM module has been used in 3 trainings since 2017, i.e. Trial Training, Provincial Training in Jakarta, and Kabupaten/Kota Training in Surakarta. Based on the evaluation conducted on the participant, trainers, module content, and training implementation, the training results are stated well. Finalization of module after training implementation are merging some documents with the module to make it more concise, checking on module details (i.e. typos, template), and rechecking outputs. The list of the finalized outputs is shown in Table 15.

Table 15. List of FAM Material Outputs

Common Training Material:
Textbook
Spine of Textbook
Finpro-S (Distribution version)
Finpro-E (post data entry version)
Finpro exercise-S (pre data entry version)
Finpro exercise-E (post data entry version)
Finpro exercise answer sheet
Pre-test / post test
Test score & answer sheet
Presentation Ch1 (PP-1)
Presentation Ch2 (PP-2)
Presentation Ch3 (PP-3)
Presentation Ch4a (PP-4A)
Presentation Ch4b (PP-4B)
Presentation Ch4c (PP-4C)
Presentation Appendix 1 (PP-Ap1)
Presentation Business Plan (PP-BP)
Provincial Training (PT) Material:
PT timetable
PT session note
PT Evaluation Sheet
Centralized Monitoring Material:
CM Candidate Evaluation - proposal & action plan
CM session note
CM Participant Evaluation - score summary
Kab/Kota Training (KT) Material:
KT timetable
KT session note
KT Evaluation Sheet

7. Conclusion and Recommendations

7.1 Conclusion

The development of FAM module is completed. The teaching materials such as textbook, financial projection software, PowerPoint presentation sheets, and session notes have been

prepared by JET, following directives and advice of DWSD and WG. Those materials were tested and placed in service through a series of WG meetings, Trial Training, Provincial Training, Centralized Monitoring, and Kabupaten/Kota Training. The evaluation results of those trainings are satisfactory. Both the number of participating trainees and the number of successful trainees were regarded as appropriate in the Provincial Training as well as the Kabupaten/Kota Training. The evaluation results of those trainings were satisfactory. It can be concluded that the FAM module is appropriately developed and that teaching materials can be used for subsequent trainings.

7.2 Recommendation

JET makes the following recommendations that can be adopted in continuing the FAM module for the future:

1. Authorization and Certification of Trainer

   At the year 2018 Provincial Training of FAM module, there was no official recognition of successful trainees as qualified Provincial Trainers although two of successful trainers were later called to Kab/Kota Training as de facto Provincial Trainer. Official recognition of trainers should be institutionalized through some kind of authorization and certification systems in harmonization with other COE modules.

2. Use of Actual Financial Data of PDAMs

   Both Provincial Training and Kab/Kota Training included exercise slot where fictitious financial data were used to practice financial analysis and business plan formulation. It was regarded difficult to ask each trainee to bring his or her own PDAM's data to be used for the exercise because of likely difficulty of preparing organized data ready to be used for the exercise. Processing actual PDAM data can be considered if the Kab/Kota training can be followed by follow-up session or if the advanced training is planned in the future.

3. Monitoring of Business Plan formulation and subsequent use

   Monitoring of the FAM trainings will be needed to see if the participants' PDAMs have actually prepared their Business Plan for themselves. Monitoring should be needed also to see how those Business Plans have been used whether for obtention of loans from

banks, information to local government, application for tariff revision, etc. Such feedbacks as to use of business plan should be useful in the next revision of training materials.

4. Restructuring of Provincial Training time schedule in consideration of SD Training contents

   FAM Provincial Training was supposed to use three days and the Self Development was two-day component. Those two trainings added up to five days, which was considered a practical time limit to keep busy trainees away from their PDAMs. The second day contents of SD training was found to be presentations of each trainee on themes directly related to FAM contents. FAM training already contains group presentation which is evaluated from various aspects including presentation skills. Therefore the evaluation of individual presentation could be incorporated into FAM module without difficulty. The first day contents of SD training was found to be lecture and game related to general communication skills, implying that there is little to do with particular FAM knowledge. Some of FAM trainees had already attended other Provincial Trainings like SAK ETAP where the same SD training should have been provided. Thus, those who already attended SD training in other COE subjects before could be exempted from taking the first day SD class for the second time. It would be also possible to combine the CR trainees and the FAM trainees in a same SD class room for the first day SD component.

5. Computer use and internet access

   Use of a lap-top computer by each trainee was observed at all FAM trainings and can be taken for granted already. Internet access was indispensable as evidenced by the fact that both before and during the trainings, soft-copied training materials were distributed online. Such IT environment should be kept also in the future trainings.

Annex 5

Training Information Sheet

PROGRAM PENINGKATAN KOMPETENSI SUMBER DAYA MANUSIA (SDM) PROFESIONAL BIDANG AIR MINUM MELALUI POLA *CENTER OF EXCELLENCE* (COE)	
LEMBAR INFORMASI	
Pelatihan : Analisa Keuangan dan Manajemen	Kode : F-1
Buku 1 : Modul Analisa Keuangan dan Manajemen	Edisi : April 2018
Tujuan Pelatihan	Setelah menyelesaikan pelatihan ini, peserta diharapkan mengerti dan mampu untuk: 1. Memahami Laporan Keuangan 2. Memahami penilaian Indikator Kinerja Utama berdasarkan PERMENDAGRI maupun BPPSPAM 3. Memahami proses perhitungan tarif 4. Memahami proyeksi keuangan 5. Memahami perumusan rencana bisnis
Sasaran Peserta	1. Manajemen tingkat menengah ke atas
Isi Modul	1. Laporan Keuangan 2. Penilaian Kinerja 3. Perhitungan tarif 4. Perumusan rencana bisnis 5. Konsep Dasar SAK ETAP
Durasi	2 hari (18 JP) Teori, 0,75 hari (8 JP) Praktik
Susunan Acara	- Laporan Keuangan (2 JP Teori) - Penilaian Kinerja & Konsep Dasar SAK ETAP (1 JP Teori) - Perhitungan Tarif (3 JP Teori) - Perumusan Rencana Bisnis (13 JP Teori) - Latihan, Diskusi Kelompok, dan Presentasi (8 JP)
Materi (Kelas)	• Presentasi *Power Point* • *Handout* untuk peserta
Kaitan Khusus	Tidak Ada
Tindak Lanjut	Latihan dan Diskusi Kelompok
Evaluasi	• Awal pelatihan : Tes Awal • Akhir Pelatihan : Latihan Soal, Umpan balik dari peserta

Annex 6

Training Timetables

FAM Trial Training Schedule

Day/Hour	08.00 - 08.45	08.45 - 09.30	09.30 - 10.15		10.30 - 11.15	11.15-12.00		13.00-13.45	13.45-14.30	14.30-15.15		15.30-16.15	16.15-17.00
8 Agustus 2017 (Tue)	1 Registration	2 Opening Remarks, Pretest	3 Financial Statement, Income Statement, Revenue Analysis, Cost Analysis		4 Balance Sheet, Assets, Liabilities, Equities	5 Cash Flow Statement, Notes of Financial Statements		6 Basic concept of SAK ETAP	7 Key Performance Indicator, Financial Ratio, Other Ratio, PDAM Performance Status	8 PDAM Performance Status, PDAM Health level		9 Tariff Setting	10 Block Consumption and Custumer Group
Speaker	Organizer	JICA Expert Team	JICA Expert Team		JICA Expert Team	JICA Expert Team		Arie Sutiartie	Benny Djumhana	Farid Rozin		Farid Rozin	Mya Musyarova Wati
9 Agustus 2017 (Wed)	11 Mechanism and Procedure for Tariff Determination	12 Business Plan, Methodology, Profile PDAM, Brief History ,Vision, Mission, Goals, PDAM Regional Profile, Current Status of PDAM	13 SWOT analysis, Investment decision	BREAK TIME	14 Investment Schedule	15 Project Description, Organization Planning	BREAK TIME	16 Service	17 Financial Projection, Income Statement	18 Balance Sheet	BREAK TIME	19 Cash Flow	20 Key Performance Indicators, BP item check list
Speaker	Farid Rozin	Benny Djumhana	Benny Djumhana		Arie Sutiartie	Farid Rozin		Arie Sutiartie	Mya Musyarova Wati	Arie Sutiartie		Farid Rozin	Benny Djumhana
10 Agustus 2017 (Thur)	21 FINPRO, Guideline for Financial Models (Case Study), Consistency Check List	22 Sample Business Plan	23 Exercise (group study)		24 Exercise (Group Study), Presentation	25 Questionarire & Closing Remark		-	-	-		-	-
Speaker	Arie Sutiartie	Benny Djumhana	JICA Expert Team		JICA Expert Team	JICA Expert Team		-	-			-	-

FAM Provincial Training Timetable

Day/Time	08.00 - 08.45	08.45 - 09.30	09.30 - 10.15		10.30 - 11.15	11.15-12.00		13.00-13.45	13.45-14.30	14.30-15.15		15.30-16.15	16.15-17.00
Mon	1 Registration	2 Opening, Pretest	3 Financial statement: Income Statement, Revenue analysis, Expense analysis, Balance Sheet		4 Financial Statement: Asset, Liabilities & Equities, Cash flow statement, Notes of Financial Statement	5 Basic Concept of SAK ETAP, PDAM Key Performance Indicator (MOHA & BPPSPAM)		6 Tariff Setting	7 Block Consumption and Customer Group, Mechanism and Procedure for tariff Determination	8 Mechanism and Procedure for tariff Determination (Cont.)		9 Introduction to Business Plan: Methodology, Profile PDAM, Brief History,Vision, Mission, Goals, PDAM Regional Profile, Current Status of PDAM	10 Introduction to Business Plan: Serive & Organization Planning
PIC	Organizer	Organizer	Arie S.		Arie S.	Arie S.		Mya M.	Mya M.	Mya M.		Arie S.	Arie S.
Tue	11 SWOT Analysis	12 SWOT Analysis	13 Investment decision, investment schedule, project description		14 Investment decision, investment schedule, project description	15 Financial Projection: Income Statement		16 Financial Projection: Balance Sheet	17 Financial Projection: Cash Flow	18 Financial Projection Program, Guideline for financial model (Case Study), Consistency Checklist		19 Basic Assumption and determining assumption	20 KPI, BP item check list, and determining group for group exercise
PIC	Benny D.	Benny D.	Benny D.		Benny D.	Farid R.		Farid R.	Farid R.	Farid R.		Benny D.	Benny D.
Wed	21 Sample business plan	22 FINPRO Exercise	23 FINPRO Exercise		24 Exercise (group study)	25 Exercise (group study)		26 Exercise (group study)	27 Exercise (group study)	28 Presentation		29 Presentation	30 Post test, Questionnaire
PIC	Benny D.	Benny D. & Arie S.	Benny D. & Arie S.		Benny D. & Arie S.	Benny D. & Arie S.		Benny D. & Arie S.	Benny D. & Arie S.	Farid&Benny&Arie		Farid&Benny&Arie	Organizer
Day/Time	08.00 - 08.45	08.45 - 09.30	09.30 - 10.15		10.30 - 11.15	11.15-12.00		13.00-13.45	13.45-14.30	14.30-14.45		14.45-15.30	15.30-16.15
Thu	31 CBT (Cognitive Behavioural Therapy) method, prepare for learning and test	32 Principals of Communication: Effective Communication	33 Body Language and Voice Expression		34 Presentation Tool	35 Presentation Tool		36 Filling and Discussion DISC (Dominance,Influence, Steadiness, Conscientiousness) Identification - Advantages &	37 Filling and Discussion DISC Identification - Advantages & Disadvantages	BREAK		38 Advanced DISC	39 Advanced DISC
PIC	SD Trainer	SD Trainer	SD Trainer		SD Trainer	SD Trainer		SD Trainer	SD Trainer			SD Trainer	SD Trainer
Fri	40 Preparation of FAM Micro Teaching, Micro Teaching based on FAM Topic	41 Micro Teaching based on FAM Topic + Discussion	42 Micro Teaching based on FAM Topic + Discussion		43 Micro Teaching based on FAM Topic + Discussion	BREAK		44 Closing	-			-	-
PIC	SD Trainer	SD Trainer	SD Trainer		SD Trainer			Organizer	-			-	-

BREAK TIME

RUNDOWN CENTRALIZED MONITORING

Time	Duration (Minute)	Agenda		PIC
Monday, 2 April 2018				
10.00 – 11.00	60	Registration		JET
11.00 – 12.05	5	Opening		MC
12.05 – 12.25	20	Greeting		Director of DWSD, Chief Advisor of JET
12.25 – 12.30	5	- Explanation of Centralized Monitoring System - Explanation of Kab./Kota Training Schedule		JET
12.30 – 13.30	60	ISHOMA		
		Class 1	**Class 2**	
13.30 – 15.30	120	Presentation of CR Proposals & Discussion	Presentation of FAM Proposals & Discussion	Class 1 – Slamet Raharjo Class 2 – Farid Rozin
Tuesday, 3 April 2018				
07.30 – 08.00	30	Registration		JET
08.00 – 10.15	135	Review / further undestanding of CR Materials	Review / further undestanding of FAM Materials	Class 1 – Slamet Raharjo Class 2 – Farid Rozin
10.15 – 10.30	15	*Coffee Break*		
10.30 – 12.00	90	Review / further undestanding of CR Subject	Review / further undestanding of FAM Subject	Class 1 – Slamet Raharjo Class 2 – Farid Rozin
12.00 – 13.00	60	ISHOMA		
13.00 – 15.15	135	Review / further undestanding of CR Subject	Review / further undestanding of FAM Subject	Class 1 – Slamet Raharjo Class 2 – Farid Rozin
15.15 – 15.30	15	*Coffee Break*		
15.30 – 17.15	105	CR Practice Simulation	FAM Practice Simulation	Class 1 – Slamet Raharjo Class 2 – Farid Rozin
17.15 – 18.00	75	Distribution of Presentation Trial Test		JET
Rabu, 4 April 2018				
07.30 – 08.00	30	Registration		JET
08.00 - 08.45	45	Review of Teaching and Learning Process		JET
08.45 – 10.30	105	CR Materials Presentation	FAM Materials Presentation	Class 1 – Slamet Raharjo Class 2 – Farid Rozin
10.30 – 11.00	30	Conclusion and Closing		JET
11.00 – 12.00	60	ISHOMA and *Check Out*		

FAM Kab/Kota Training Timetable

Day/Time	08.00 - 08.45	08.45 - 09.30	09.30 - 10.15	K	10.30 - 11.15	11.15-12.00	K	13.00-13.45	13.45-14.30	14.30-15.15		15.30-16.15	16.15-17.00
Mon	1 Registration	2 Opening, Pretest	3 Financial statement: Income Statement, Revenue analysis, Expense analysis, Balance Sheet		4 Financial Statement: Asset, Liabilities & Equities, Cash flow statement, Notes of Financial Statement	5 Basic Concept of SAK ETAP, PDAM Key Performance Indicator (MOHA & BPPSPAM)		6 Tariff Setting	7 Block Consumption and Customer Group, Mechanism and Procedure for tariff Determination	8 Mechanism and Procedure for tariff Determination (Cont.)		9 Introduction to Business Plan: Methodology, Profile PDAM, Brief History,Vision, Mission, Goals, PDAM Regional Profile, Current Status of PDAM	10 Introduction to Business Plan: Serive & Organization Planning; SWOT Analysis
PIC	Organizer	Organizer	Ardiansyah		Ardiansyah	Ardiansyah		Sugeng	Sugeng	Sugeng		Ardiansyah	Ardiansyah
Tue	11 SWOT Analysis	12 Investment decision, investment schedule, project description	13 Investment decision, investment schedule, project description		14 Financial Projection: Income Statement	15 Financial Projection: Balance Sheet		16 Financial Projection: Cash Flow	17 Financial Projection Program, Guideline for financial model (Case Study), Consistency Checklist	18 Basic Assumption and determining assumption	BREAK TIME	19 KPI, BP item check list, and determining group for group exercise	20 Sample business plan
PIC	Ardiansyah	Sugeng	Sugeng		Ardiansyah	Ardiansyah		Ardiansyah	Sugeng	Sugeng		Sugeng	Sugeng
Wed	21 FINPRO Exercise	22 FINPRO Exercise	23 FINPRO Exercise		24 Exercise (group study)	25 Exercise (group study)		26 Exercise (group study)	27 Exercise (group study)	28 Presentation		29 Presentation	30 Post test, Closing
PIC	Ardiansyah, Sugeng	Ardiansyah, Sugeng	Ardiansyah, Sugeng		Ardiansyah, Sugeng	Ardiansyah, Sugeng		Ardiansyah, Sugeng	Ardiansyah, Sugeng	Ardiansyah, Sugeng		Ardiansyah, Sugeng	Organizer

Supplemental Document 6

End-line Survey Report

2015 COE Program Survey Report

Technical Cooperation Project on Strengthening COE (Center of Excellence) Program for PDAMs in Republic Indonesia

June 2018

Background

There is urgent need for massive capacity development of PDAM staff besides the conventional trainings at centralized BTAMS.

Center of Excellence (COE) Program was launched in 2012 by DWSD, Directorate General of Human Settlements, Ministry of Public Works and Housing.

Japan International Cooperation Agency (JICA) has commenced its new Technical Cooperation Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Mid of August 2015.

COE

Modules:
1. Non Revenue Water Reduction
2. Energy Efficiency
3. SAK ETAP

Trainings-of-Trainers (TOT) type education (cascade method trainings:
1. National Training (at Hotel in Jakarta or Bandung)
2. Provincial Training (at BTAMS)
3. Kabupaten/Kota Training (at PIP2B in each province)

to improve

This 2015 COE program survey is conducted to evaluate performance of stakeholders involved in each stage of the COE program.

Training Participants Figures

	2015			2016			2017			
	NT	PROV	KAB/KOTA	NT	PROV	KAB/KOTA	NT	PROV	KAB/KOTA	
NRW	14	105	313	12	83	319	0	0	17	863
EE	6	65	136	9	0	152	0	0	10	378
SAKETAP	8	37	101	0	0	104	0	0	11	261
GIS	0	0	0	0	0	0	0	12	18	30
WTP	0	0	0	0	0	0	0	13	22	35
CR	0	0	0	0	0	0	0	15	15	30
FAM	0	0	0	0	0	0	0	14	17	31
	28	**207**	**550**	**21**	**83**	**575**	**0**	**54**	**110**	**1628**
	785			**679**			**164**			

Questionnaire - Survey Method - Sample

Questionnaire	Questionnaire is designed to evaluate experience of COE participants.
Survey Method	Survey method with tele survey which conducted by JET.
Sample	The questionnaire results are successfully gathered from National, Provincial and Kabupaten/Kota Training participants in 26 provinces. Number of respondents is 271 of 785 COE participants. The 26 provinces are **Sumatera Island** (NAD, Bangka Belitung,Jambi, Riau, Sumatera Utara, Sumatera Barat, Sumatera Selatan) ; **Java Island** (Banten, DIY, Jawa Barat, Jawa Tengah, Jawa Timur) ; **Kalimantan Island** (Kalimantan, Kalimantan Barat, Kalimantan Tengah, Kalimantan Timur); **Sulawesi Island** (Sulawesi Selatan, Sulawesi Barat, Sulawesi Utara, Sulawesi Tenggara, Sulawesi Tengah) ; NTB, NTT, Maluku & Maluku Utara.

Conclusion of 2015 COE Program Survey Result [1/2]

- Respondent profile
  - Most respondents are 41-50 years old with 21-30 years of experience working in PDAM.
  - The respondents are mostly male, except for SAK ETAP.
  - Mostly, the respondents graduated from university, except for NRW and EE at Kab/Kota Training (mostly graduated from senior high school).

- Training experience
  - The training experience is satisfactory for respondents. However, majority respondents agreed that training duration need to be added.

- Training experience

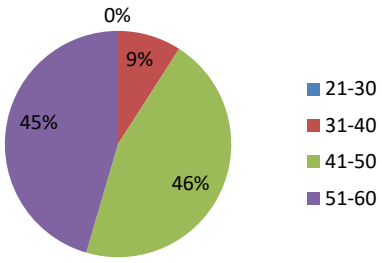
  - Majority respondents are implemented COE knowledge in their PDAMs and mostly have shared the knowledge to their colleagues in the same PDAM.

2015 PROGRAM SURVEY RESULT

NATIONAL TRAINING – NRW

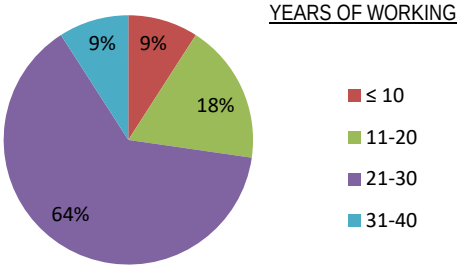
Respondent Profile

AGE



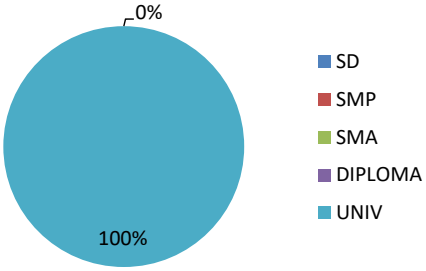
Majority respondents are 41-50 y.o

YEARS OF WORKING



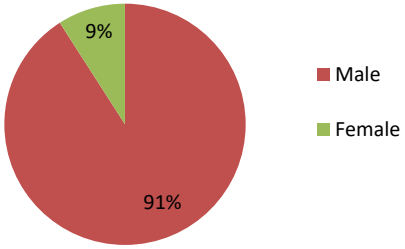
Majority respondents have 21-30 years experience working in PDAM

EDUCATION OF TRAINEES



All respondents are graduated from University

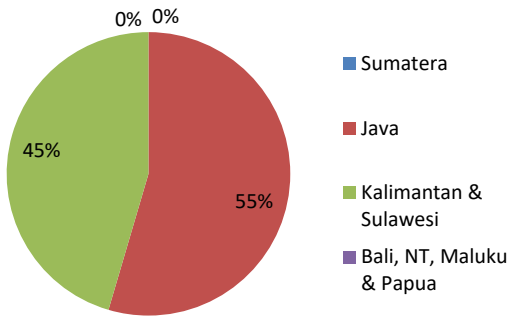
GENDER OF TRAINEES



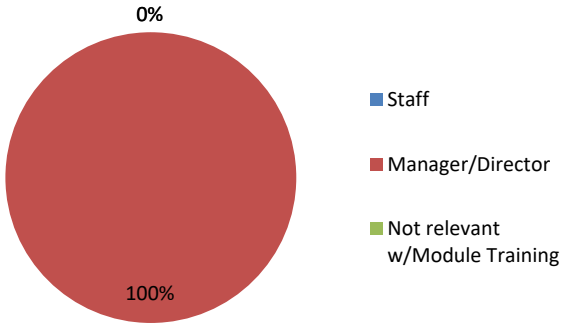
Majority respondents are male

Respondent Profile

ORIGIN OF TRAINEES



POSITION

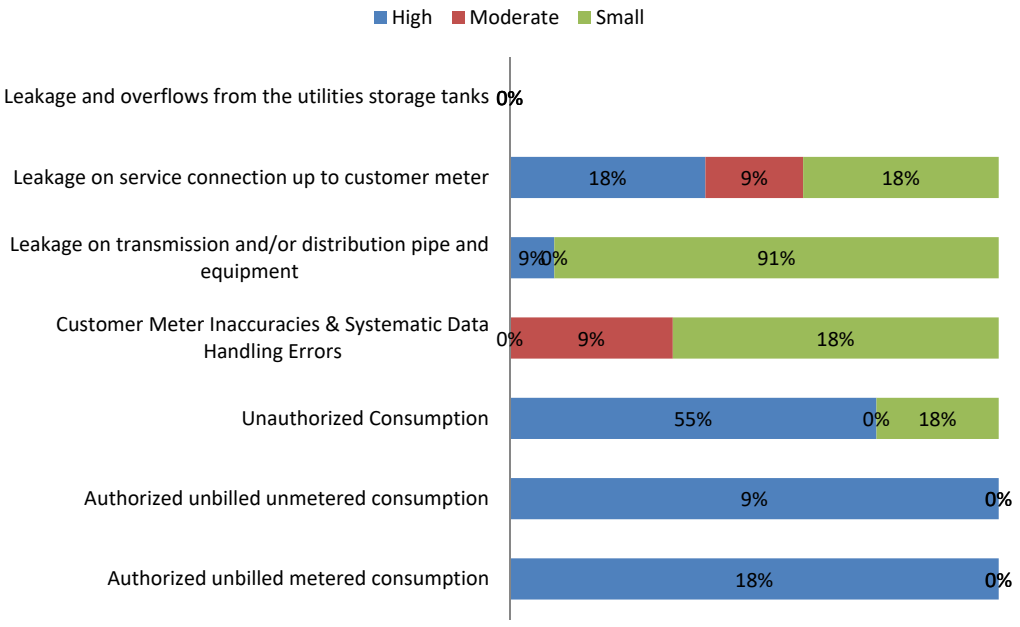


Average respondents from Java

All respondents are Manager/Director

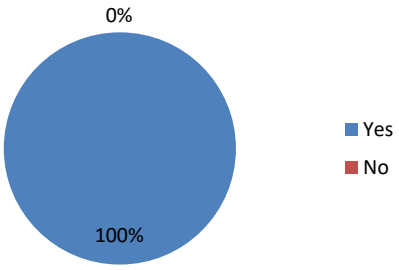
Survey Result

NRW FACTORS at PDAMs



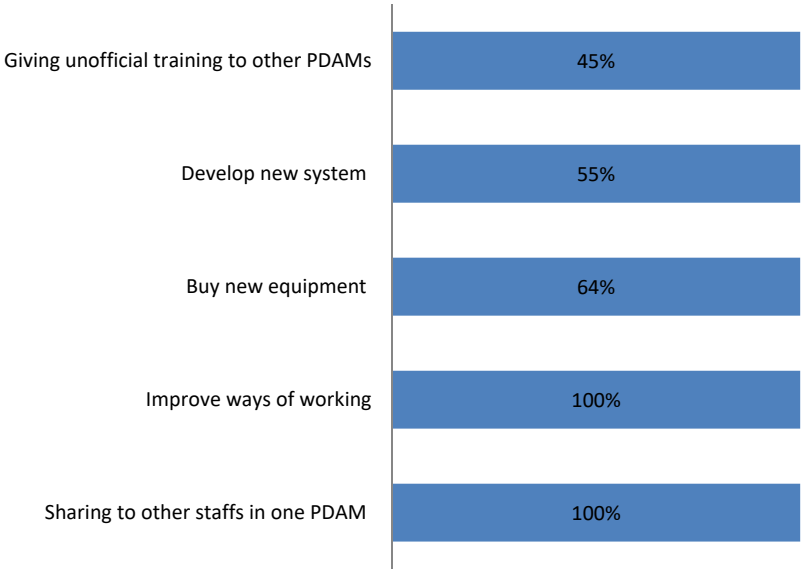
Survey Result

IMPLEMENTATION COE KNOWLEDGE TO PDAMs



100% respondents are implemented already

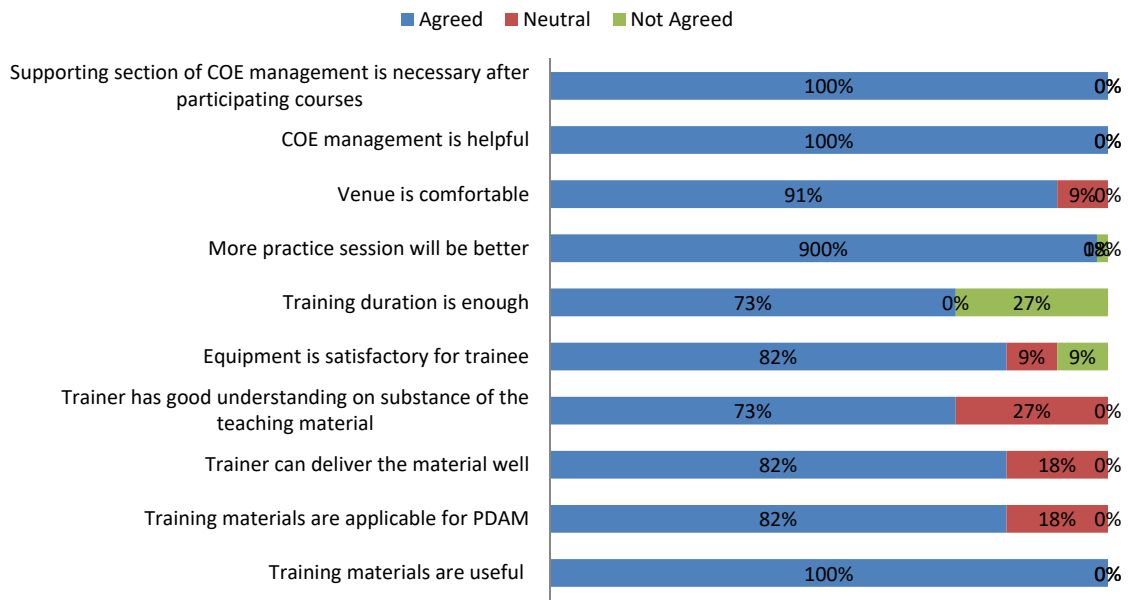
IMPLEMENTATION OF COE KNOWLEDGE



All respondents are sharing to other staff in their PDAM

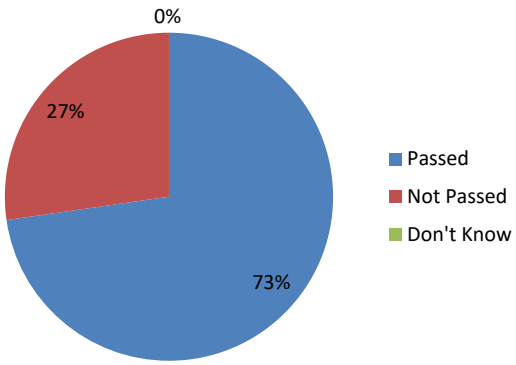
Survey Result

Training Experience



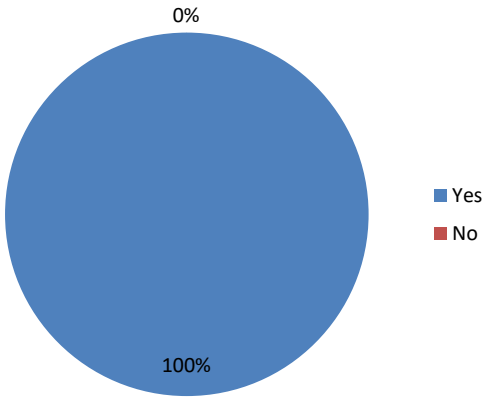
Survey Result

FINAL TEST OF TRAINERS



Majority respondents passed

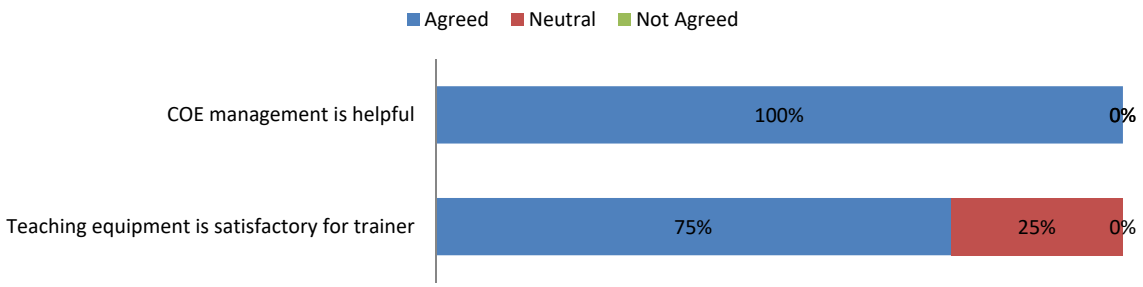
HAVE BEEN TAUGHT



All respondents passed have been taught

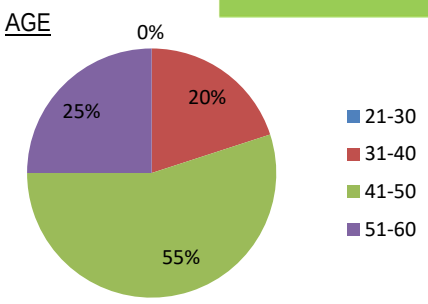
Survey Result

Teaching Experience

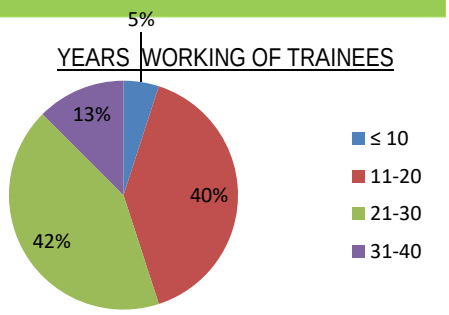


PROVINCIAL TRAINING – NRW

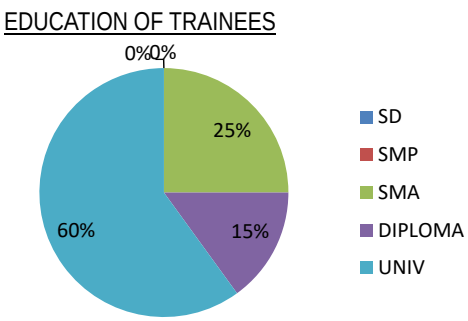
Respondent Profile



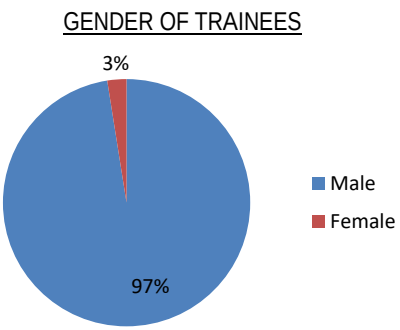
Majority respondents are 41-50 y.o



Majority respondents have 21-30 years experience working in PDAM



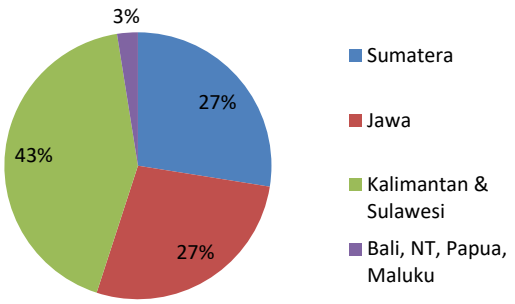
Majority respondents are graduated from University



Majority respondents are male

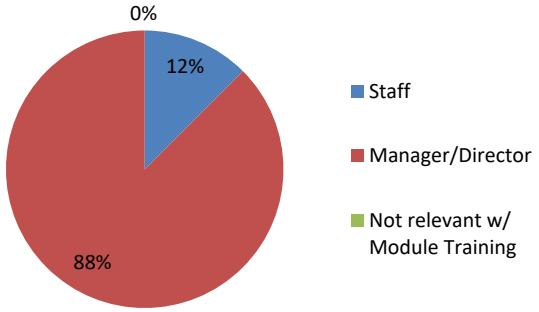
Respondent Profile

ORIGIN OF TRAINEES



Average respondents from Kalimantan & Sulawesi

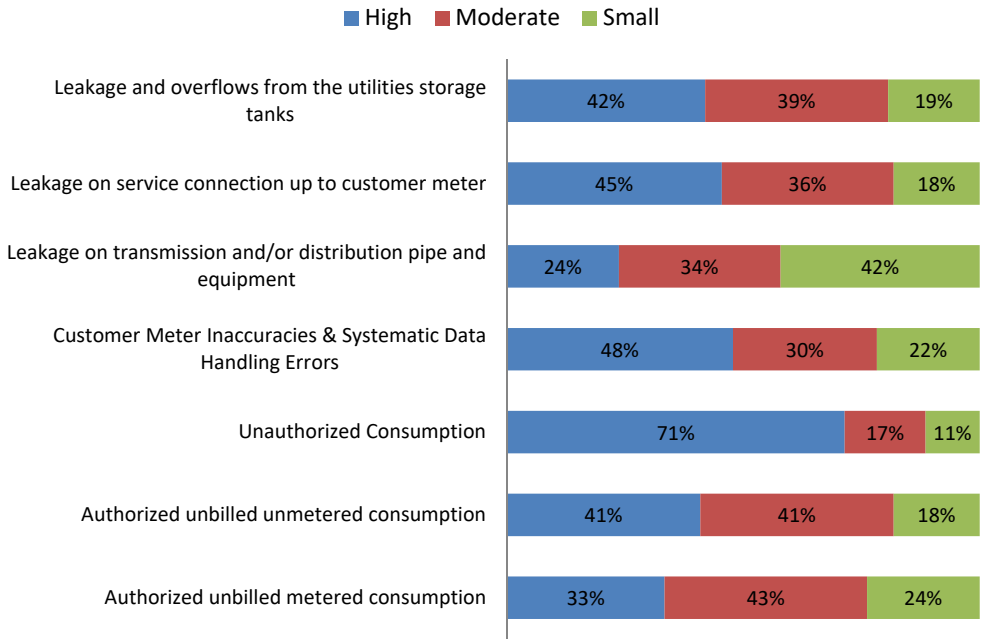
POSITION



Majority respondents are Manager/Director

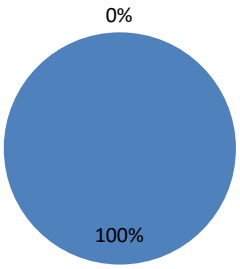
Survey Result

NRW FACTORS at PDAMs



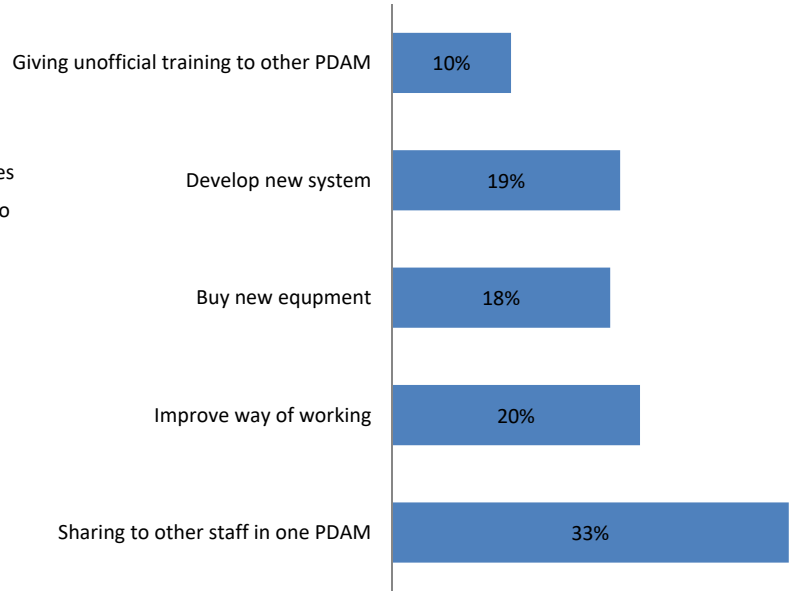
Survey Result

IMPLEMENTATION COE KNOWLEDGE TO PDAMs



100% respondents are implemented already

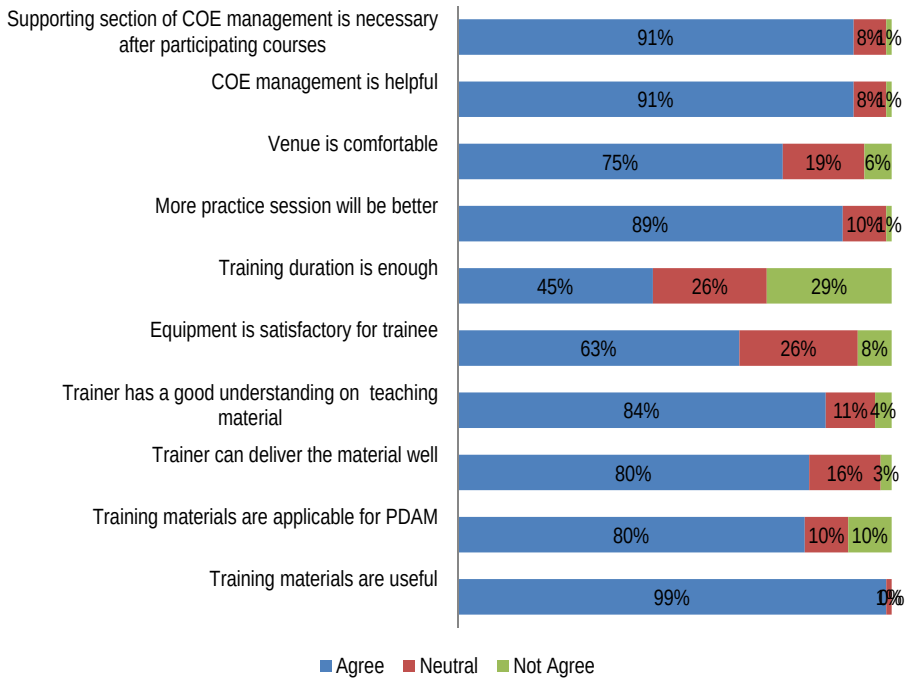
IMPLEMENTATION WAY OF COE KNOWLEDGE



Majority respondents are sharing to other staff in their PDAM

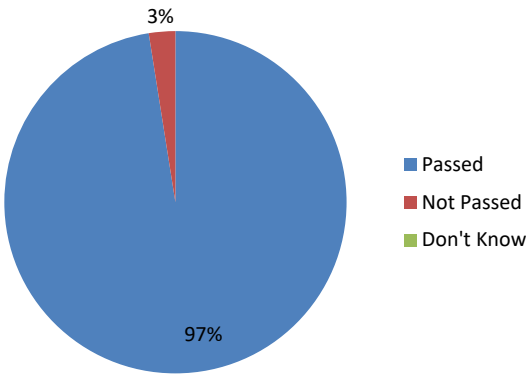
Survey Result

Training Experience



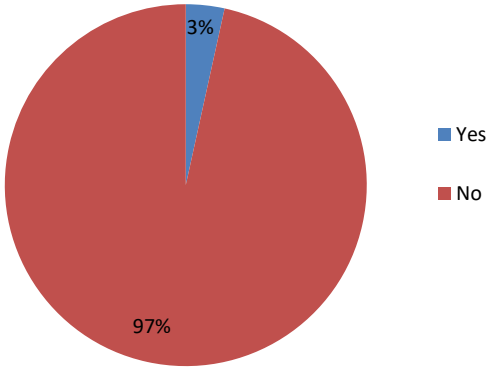
Survey Result

FINAL TEST OF TRAINERS



Majority respondents passed

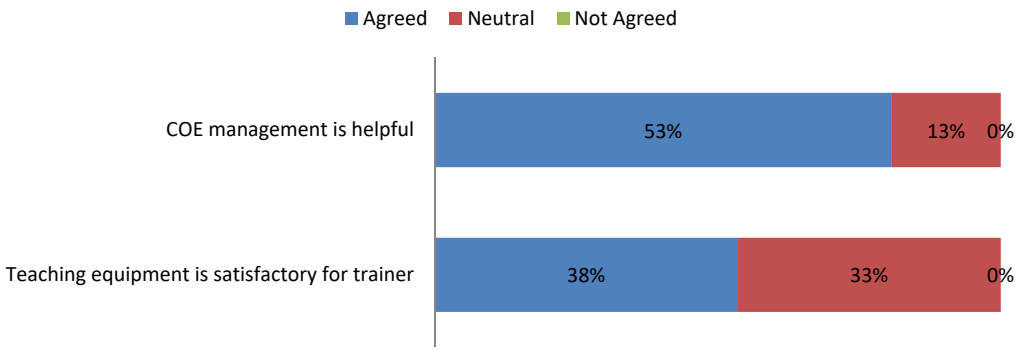
HAVE BEEN TAUGHT



Majority respondents passed have not been taught

Survey Result

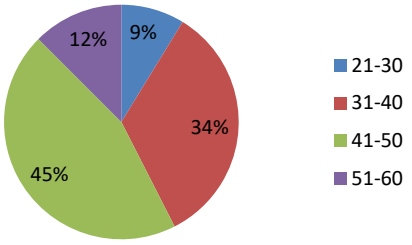
Teaching Experience



KABUPATEN/KOTA TRAINING – NRW

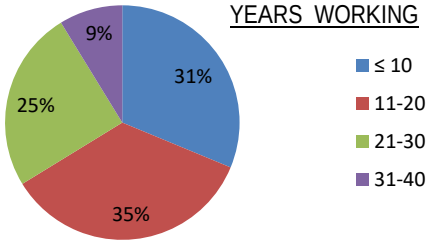
Respondent Profile

AGE



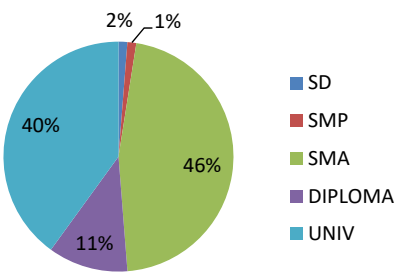
Majority respondents are 41-50 y.o

YEARS WORKING



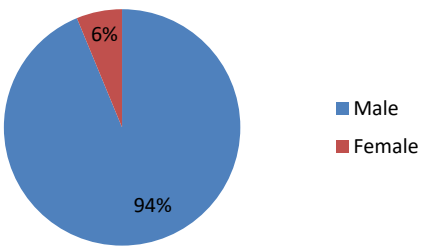
Majority respondents have ≥ 10 years experience working in PDAM

EDUCATION LEVEL



Majority respondents are graduated from senior high school (SMA).

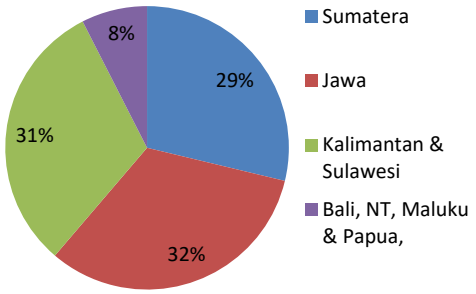
GENDER



Majority respondents are male

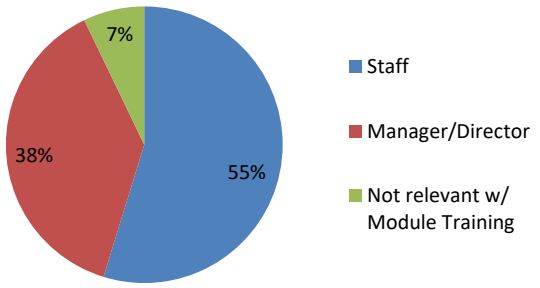
Respondent Profile

ORIGIN OF TRAINEES



Average respondents from Java & Sumatera

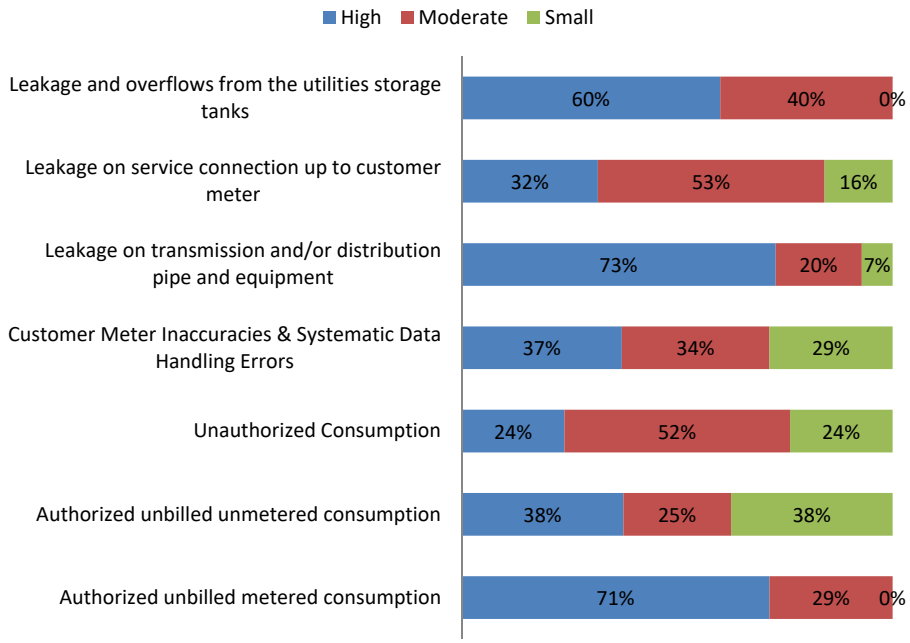
POSITION



Majority respondents are staff

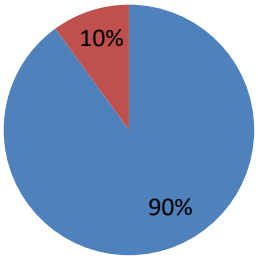
Survey Result

NRW FACTORS at PDAMs



Survey Result

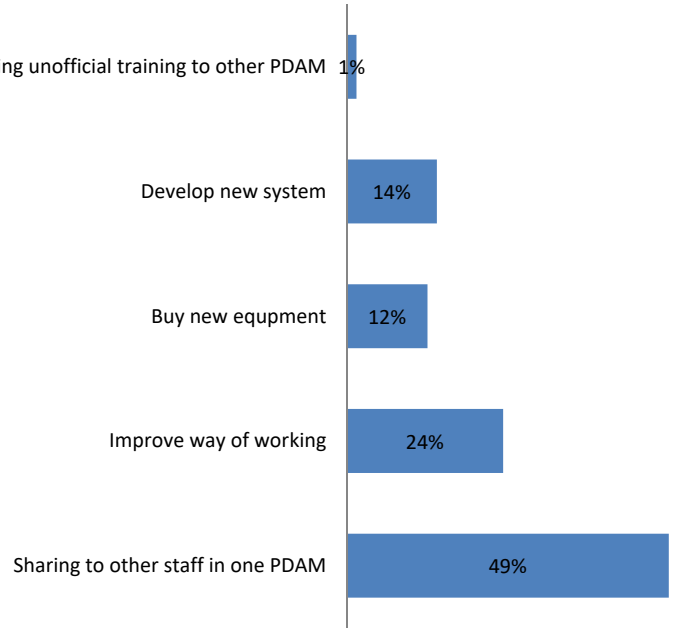
IMPLEMENTATION COE KNOWLEDGE TO PDAMs



Yes
No

Majority respondents are implemented already

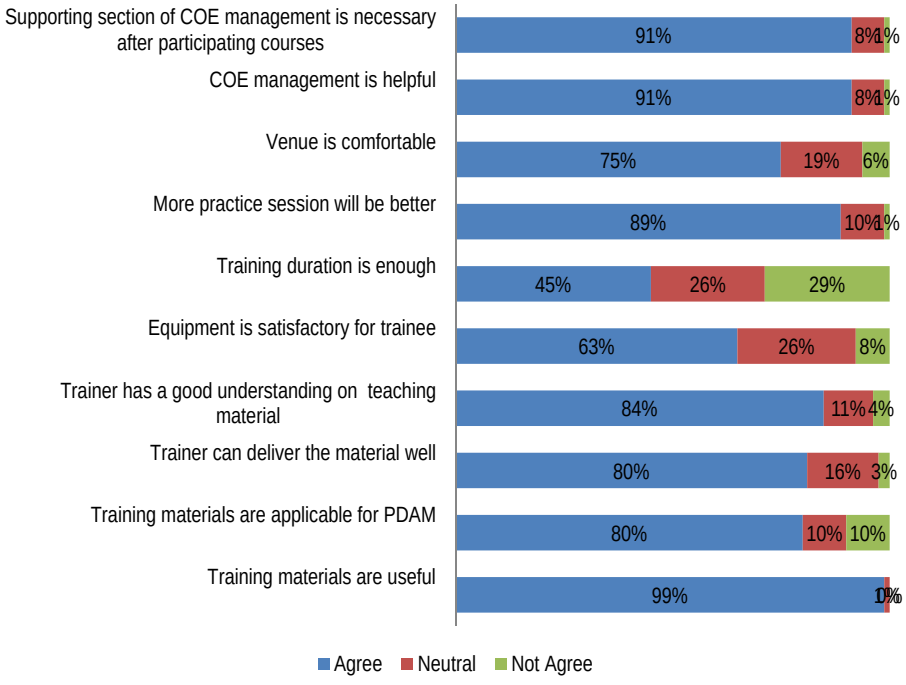
IMPLEMENTATION KIND OF COE KNOWLEDGE



Majority respondents are sharing to other staff in their PDAM

Survey Result

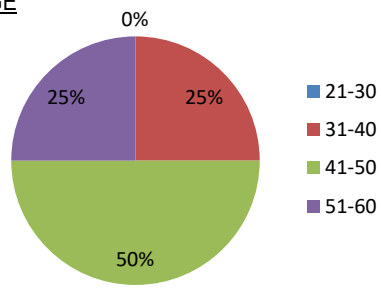
Training Experience



NATIONAL TRAINING – EE

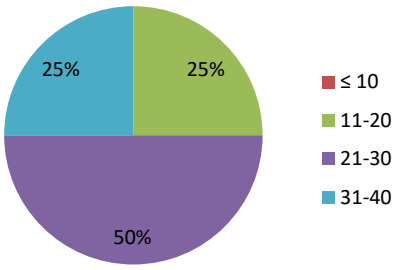
Respondent Profile

AGE



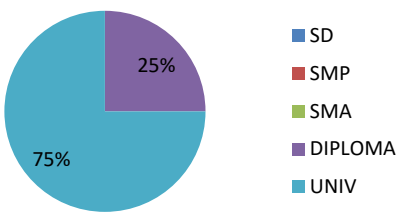
Majority respondents are 41-50 y.o

YEARS WORKING OF TRAINEES



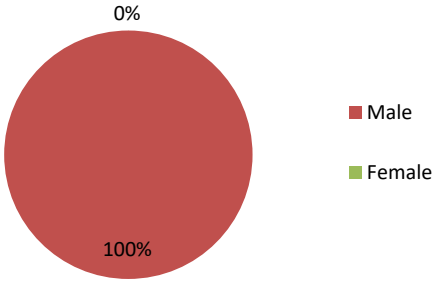
Majority respondents have 21-30 years experience working in PDAM

EDUCATION



Majority respondents are graduated from Unversity

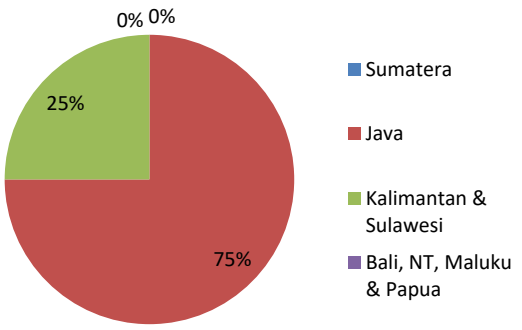
GENDER



All respondents are male

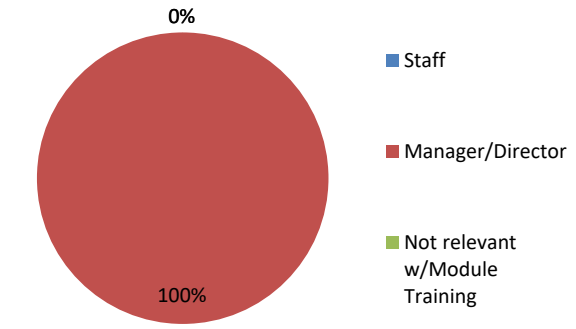
Respondent Profile

ORIGIN OF TRAINEES



Majority respondents from Java

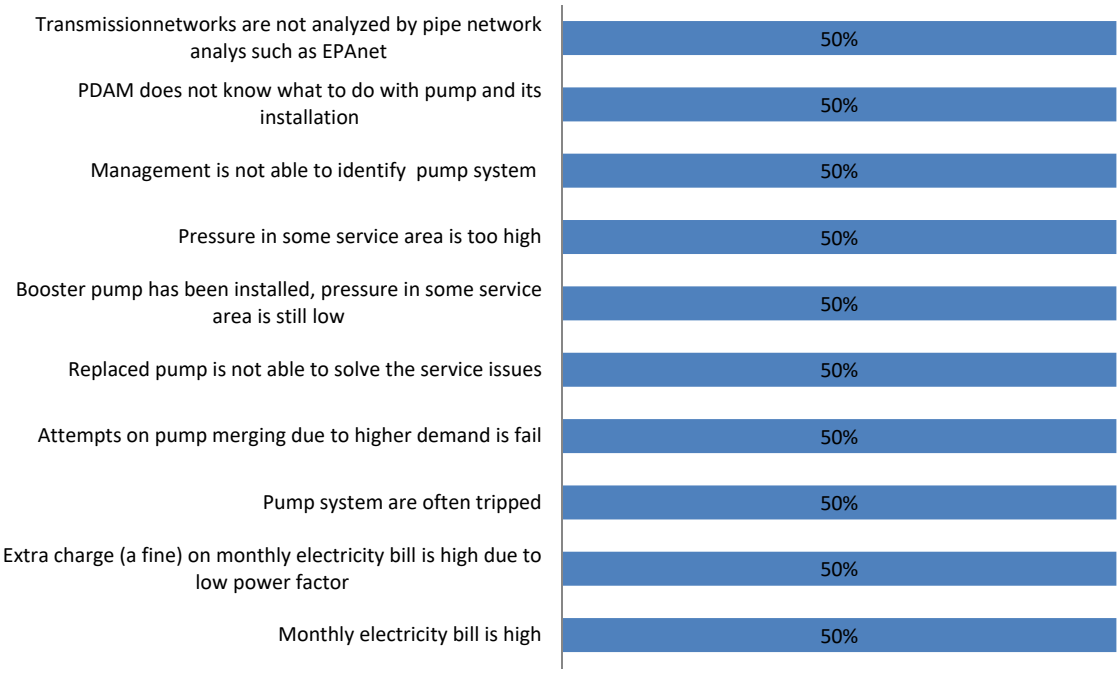
POSITION



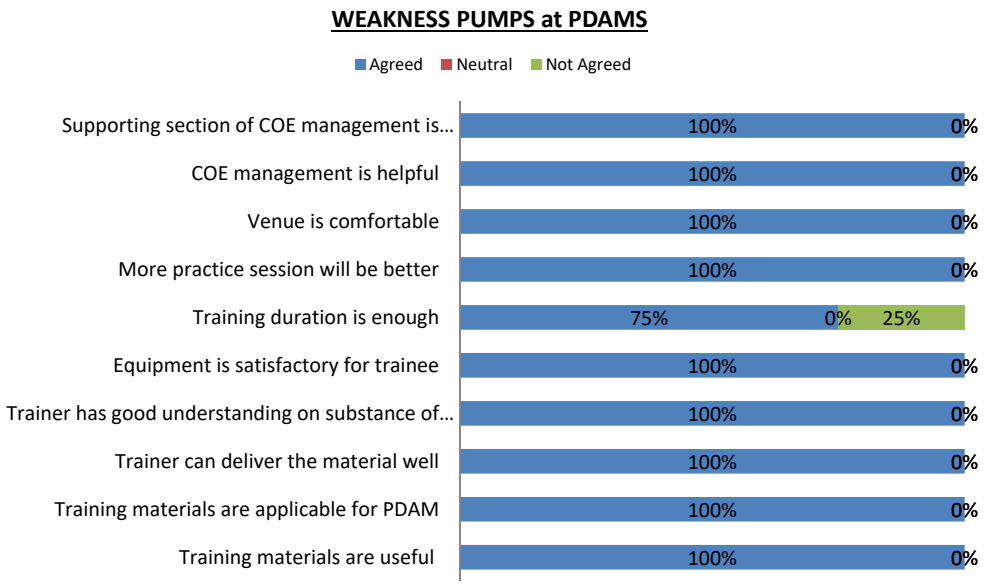
All respondents are Manager or Director

Survey Result

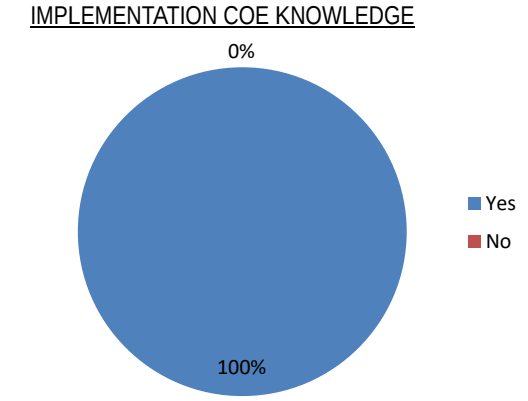
ENERGY PROBLEMS at PDAM



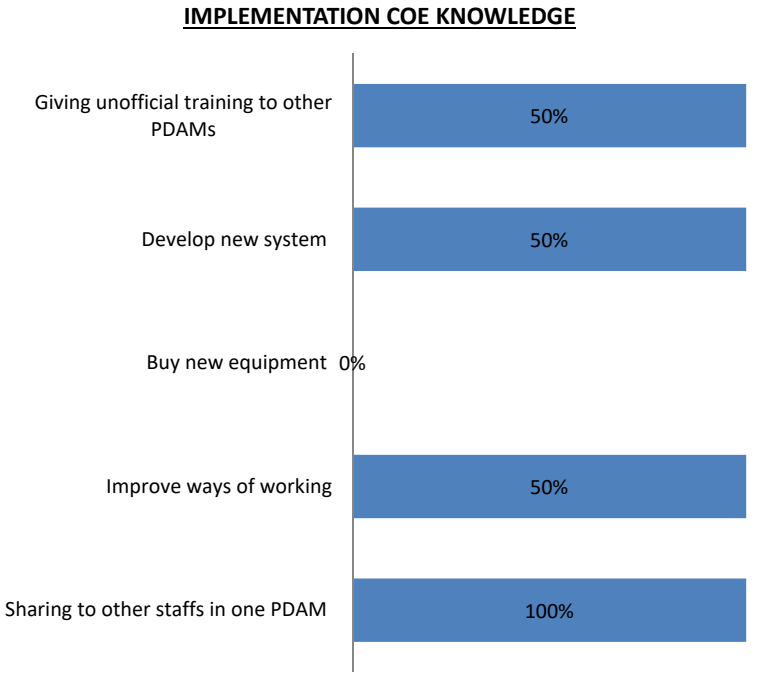
Survey Result



Survey Result



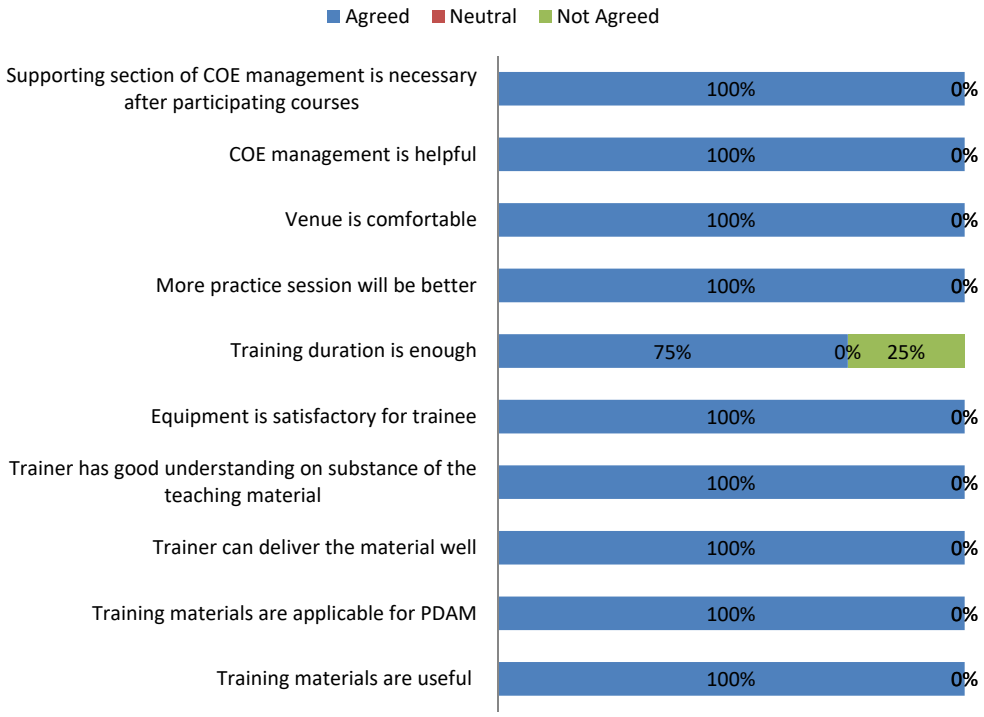
All respondents are implemented already



Majority respondents are sharing to other staff in their PDAM

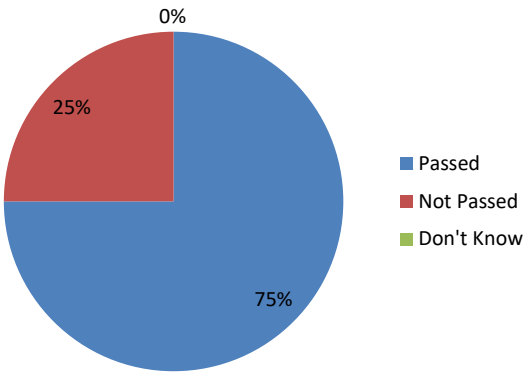
Survey Result

Training Experience



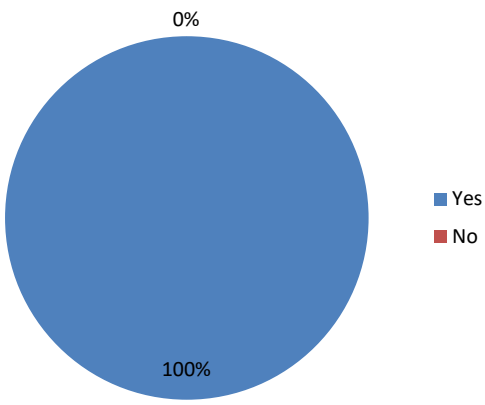
Survey Result

FINAL TEST TRAINERS



Majority respondents passed

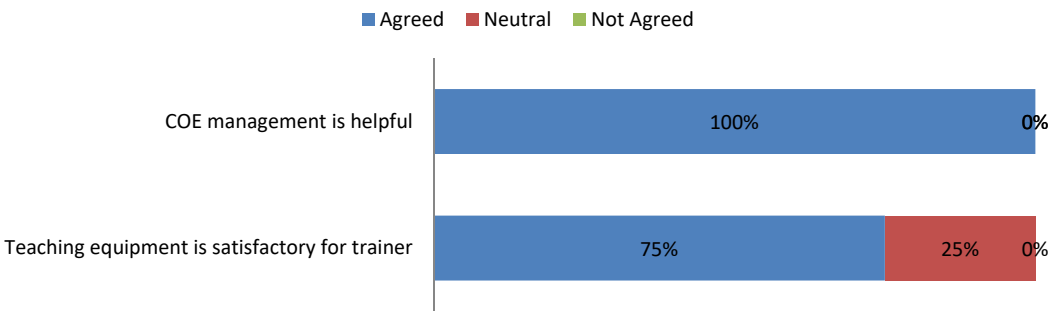
HAVE BEEN TAUGHT



Majority respondents passed have been taught

Survey Result

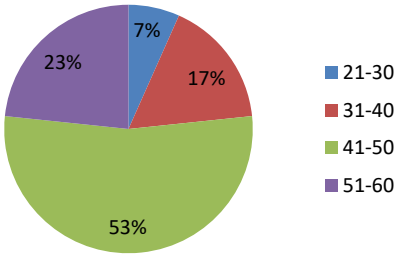
Teaching Experience



PROVINCIAL TRAINING – EE

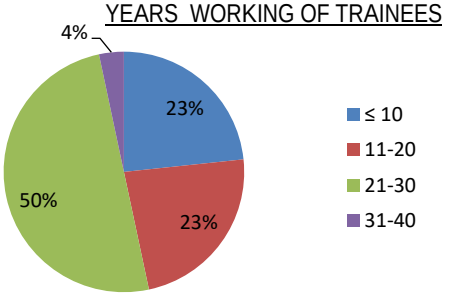
Respondent Profile

AGE



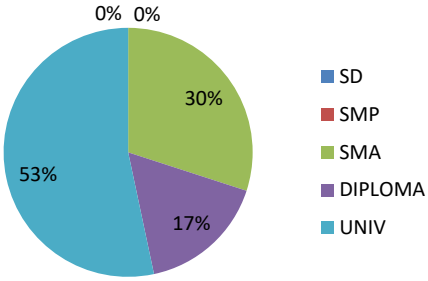
Majority respondents are 41-50 y.o

YEARS WORKING OF TRAINEES



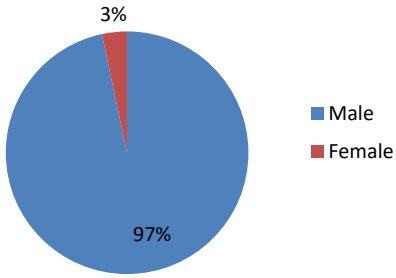
Majority respondents have 21-30 years experience working in PDAM

EDUCATION OF TRAINEES



Majority respondents are graduated from Unversity

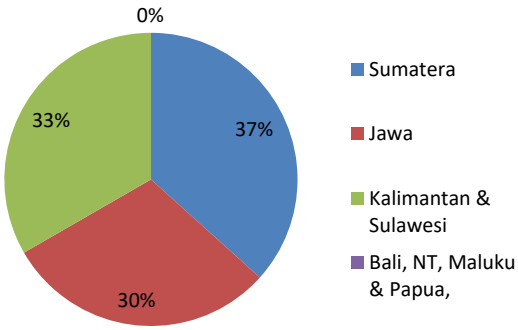
GENDER



Majority respondents are male

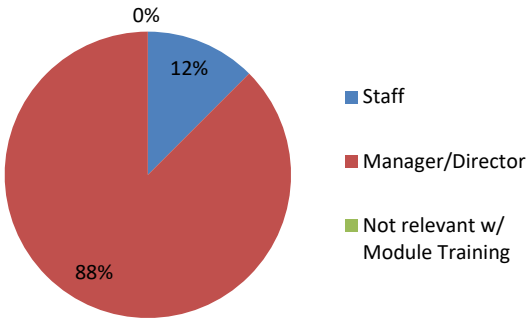
Respondent Profile

ORIGIN OF TRAINEES



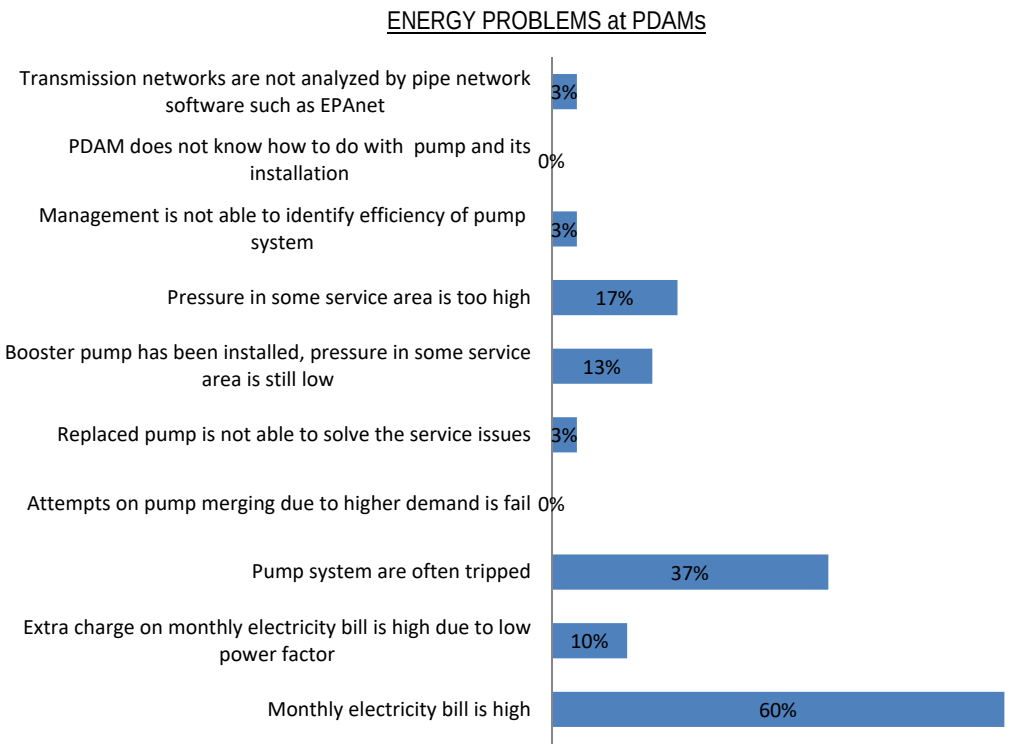
Average respondents from Sumatera, Java , Kalimantan & Sulawesi

POSITION

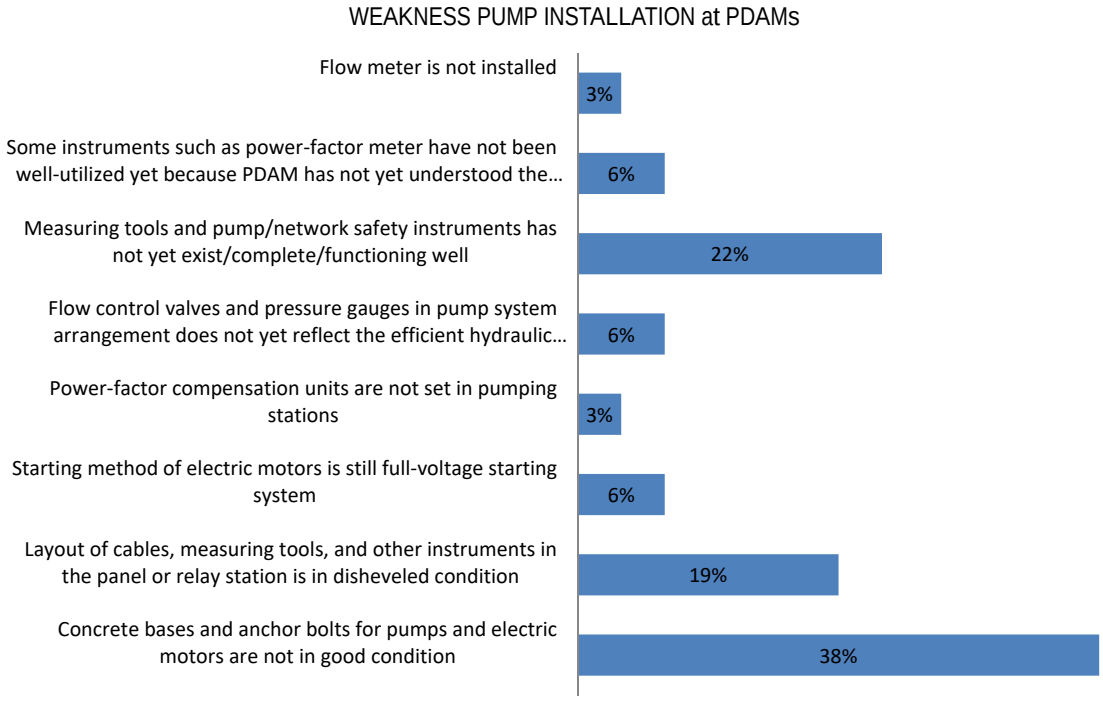


Majority respondents are Manager or Director

Survey Result

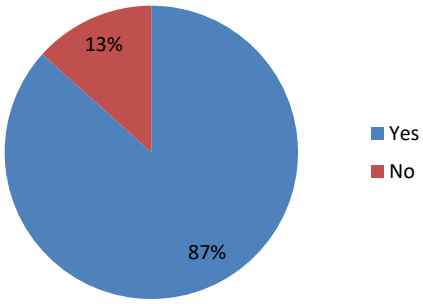


Survey Result



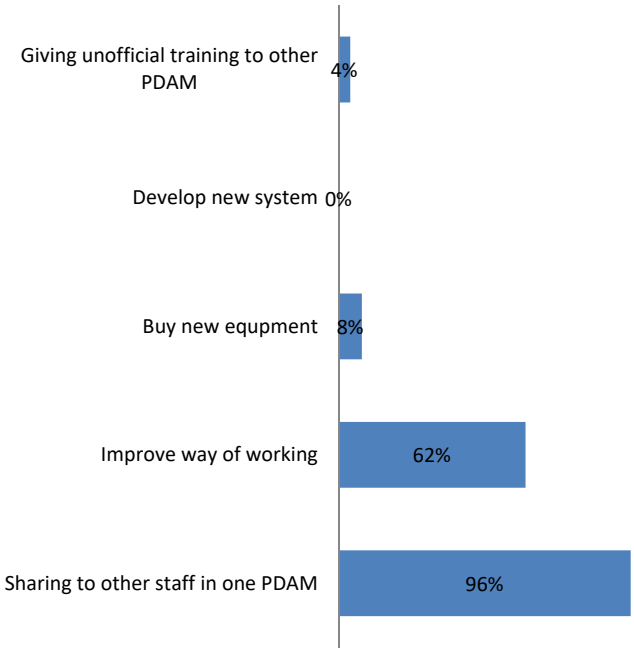
Survey Result

IMPLEMENTATION COE KNOWLEDGE TO PDAMs



Majority respondents are implemented already

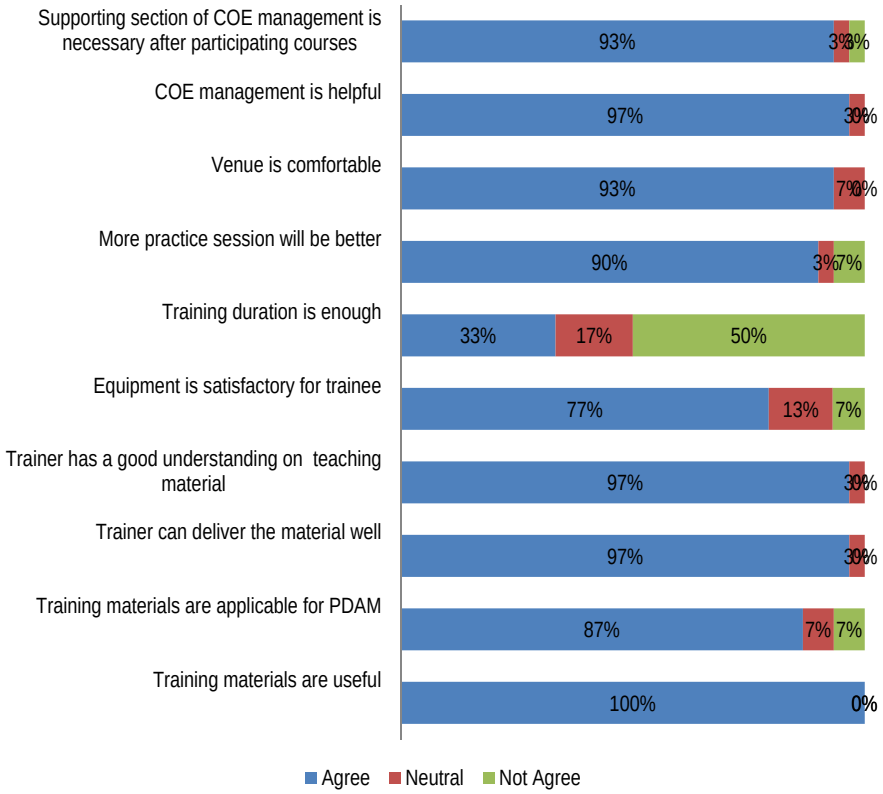
IMPLEMENTATION WAY OF COE KNOWLEDGE



Majority respondents are sharing to other staff in their PDAM

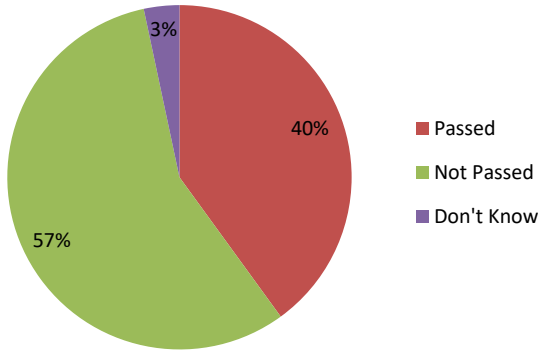
Survey Result

Training Experience



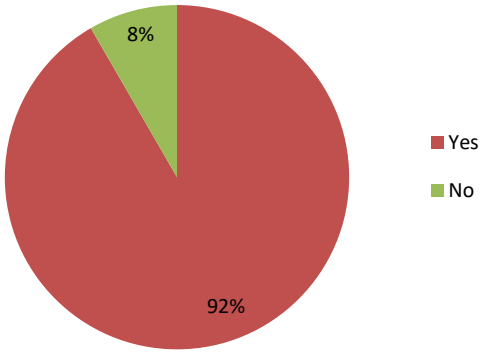
Survey Result

FINAL TEST FOR TRAINER



Majority respondents did not pass

HAVE BEEN TAUGHT

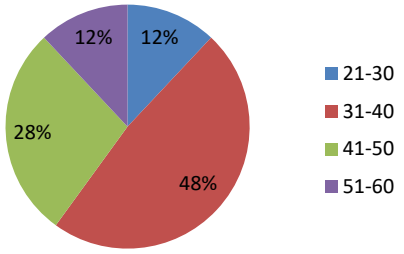


Majority respondents passed have been taught

KABUPATEN/KOTA TRAINING – EE

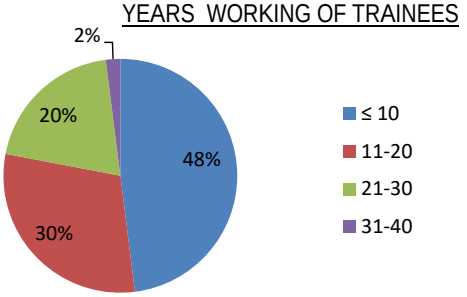
Respondent Profile

AGE



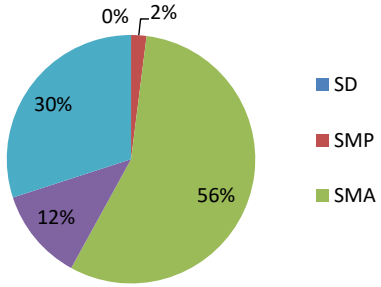
Majority respondents are 31-40 y.o

YEARS WORKING OF TRAINEES



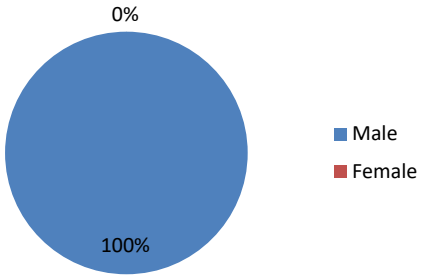
Majority respondents have ≤ 10 years experience working in PDAM

EDUCATION OF TRAINEES



Majority respondents are graduated from High School (SMA)

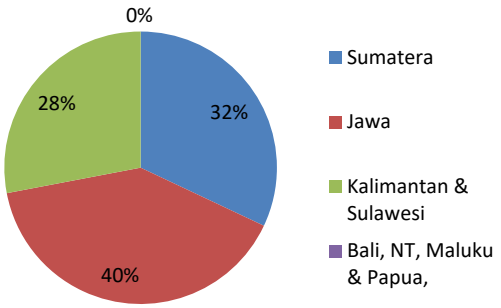
GENDER



All respondents are male

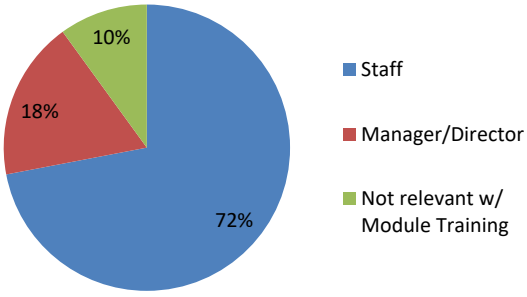
Respondent Profile

ORIGIN OF TRAINEES



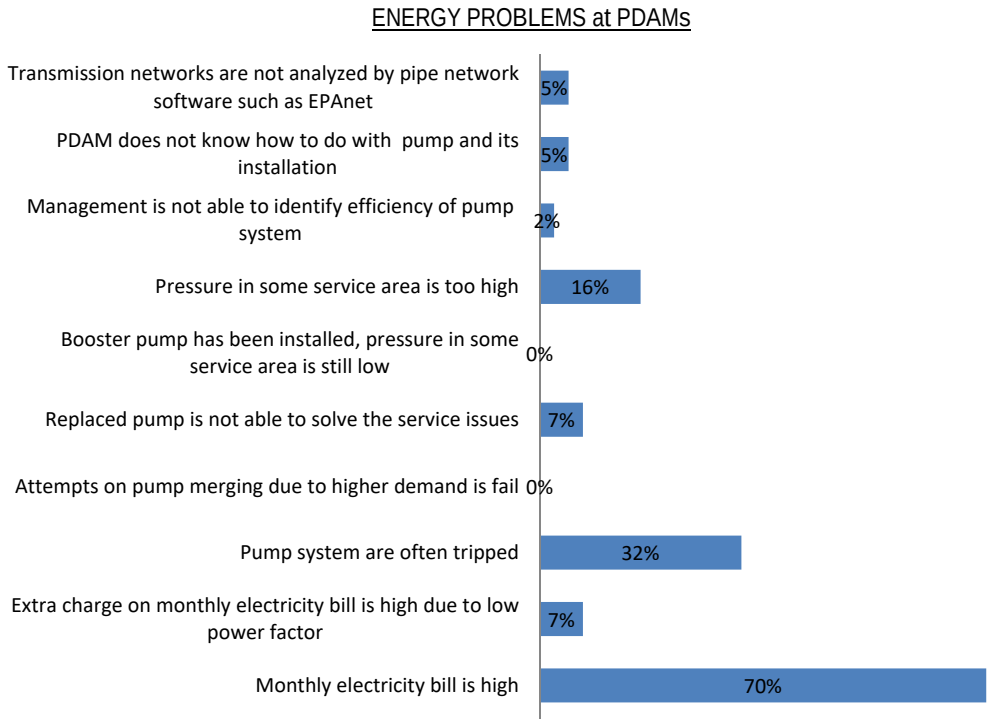
Majority respondents from Java

POSITION

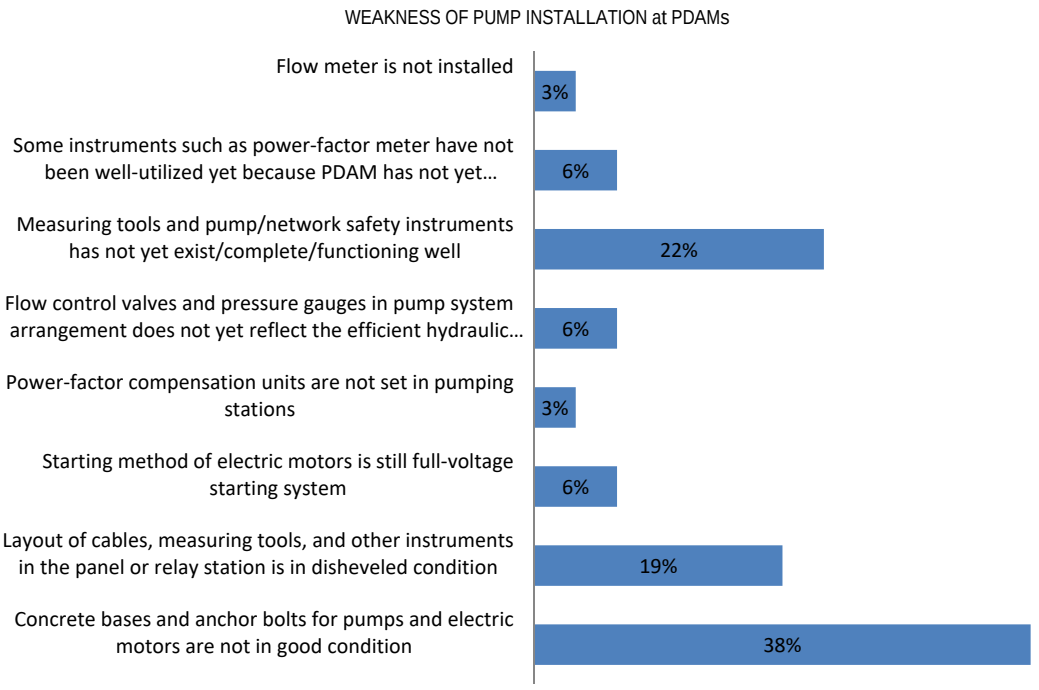


Majority respondents are Staff

Survey Result

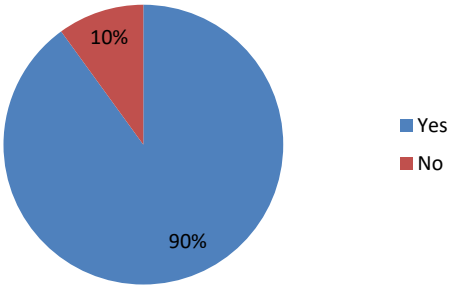


Survey Result



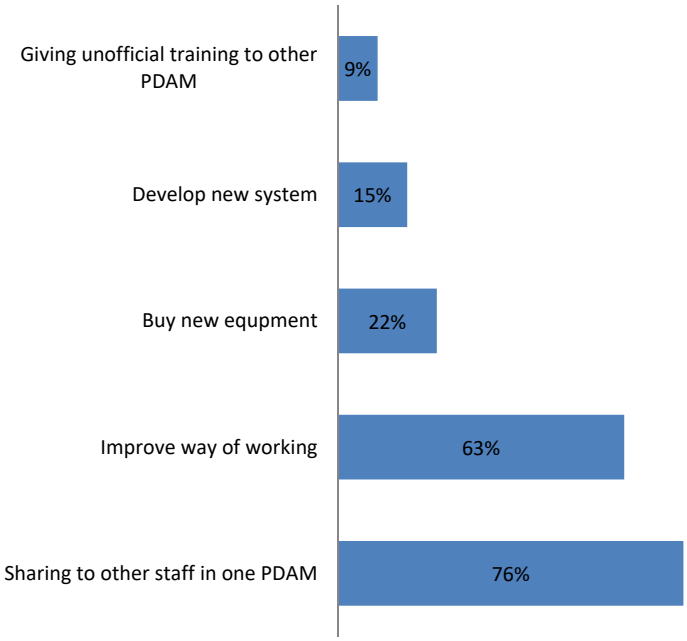
Survey Result

IMPLEMENTATION COE KNOWLEDGE TO PDAMs



Majority respondents are implemented already

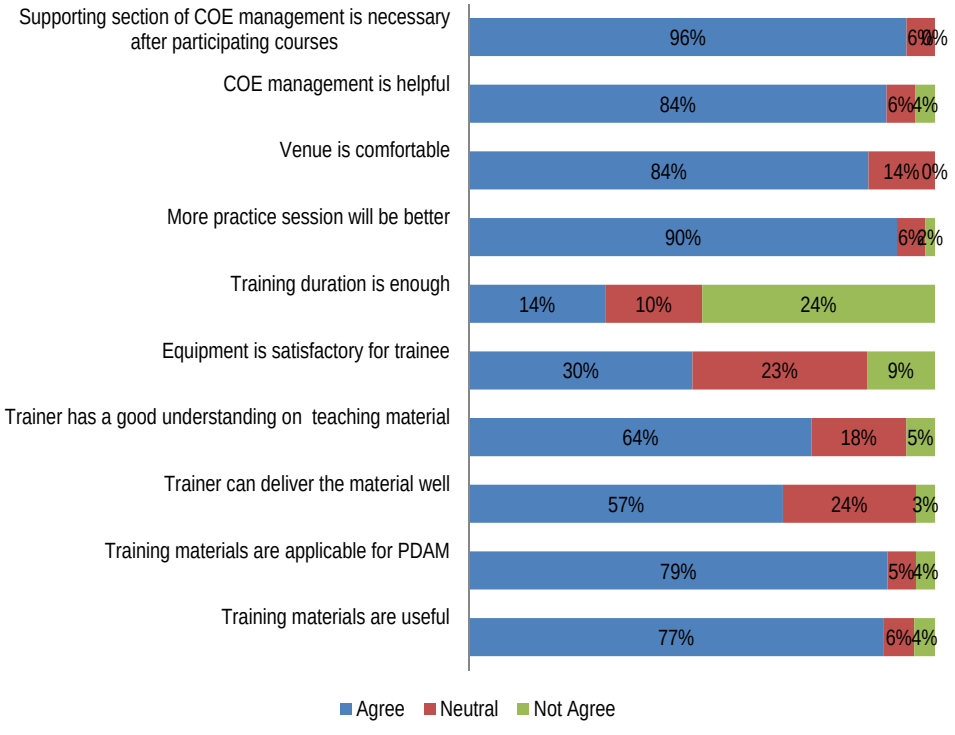
IMPLEMENTATION COE KNOWLEDGE



Majority respondents are sharing to other staff in their PDAM

Survey Result

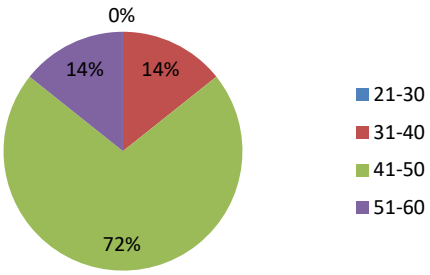
Training Experience



NATIONAL TRAINING – SAK ETAP

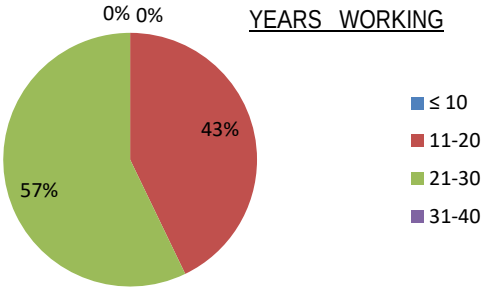
Respondent Profile

AGE



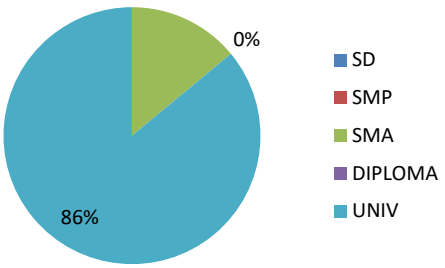
Majority respondents are 41-50 y.o

YEARS WORKING



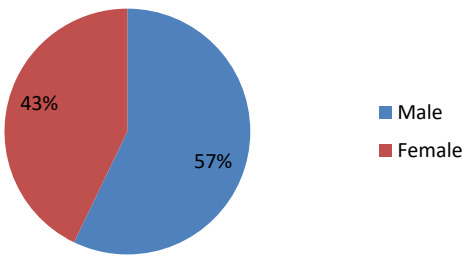
Majority respondents have 21-30 years experience working in PDAM

EDUCATION



Majority respondents are graduated from Unversity

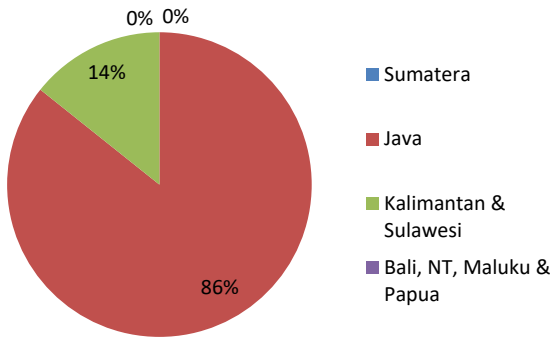
GENDER OF TRAINEES



Majority respondents are male

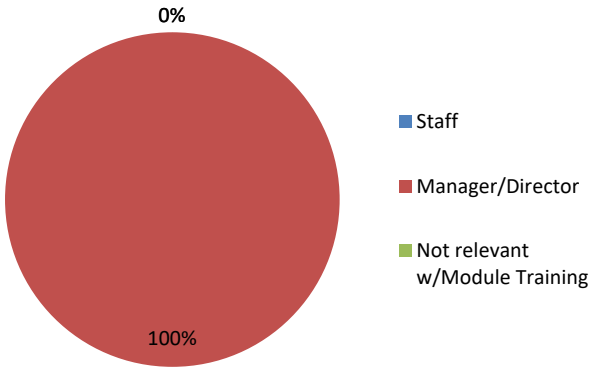
Respondents Profile

ORIGIN OF TRAINEES



Majority respondents from Java

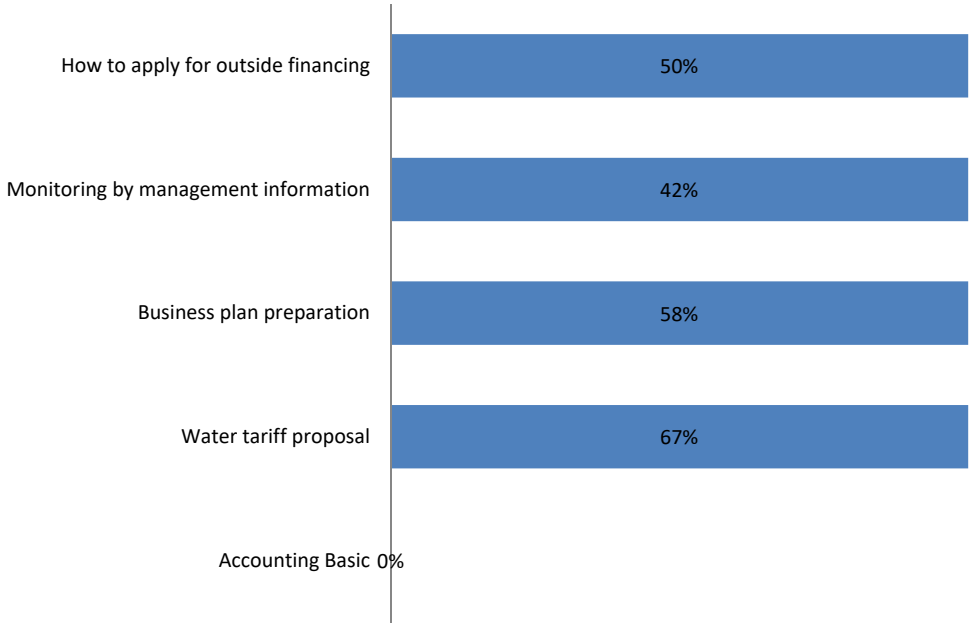
POSITION



Majority respondents are Manager / Director

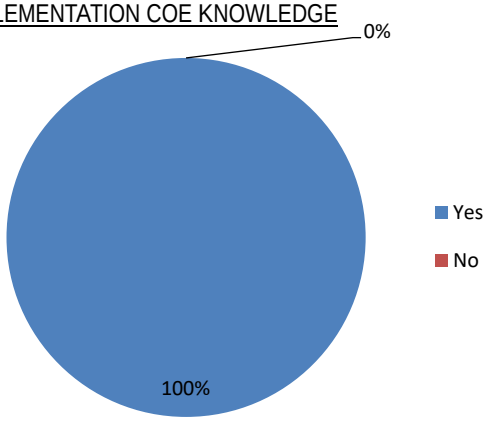
Survey Result

SUBJECT WANT TO LEARN FROM FAM



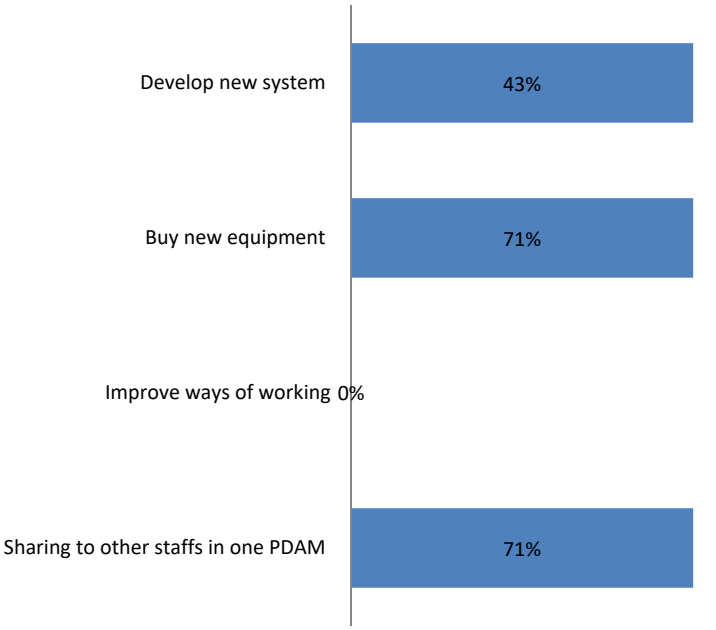
Survey Result

IMPLEMENTATION COE KNOWLEDGE



All respondents are implemented already

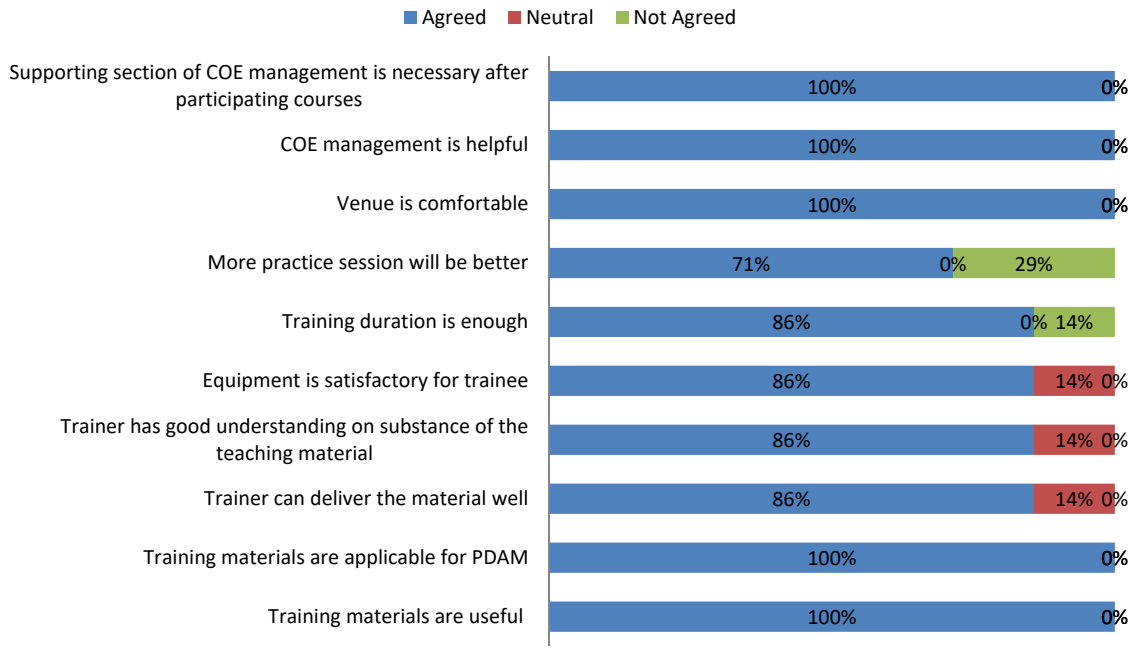
IMPLEMENTATION OF COE KNOWLEDGE



Majority respondents are sharing to other staff in their PDAM

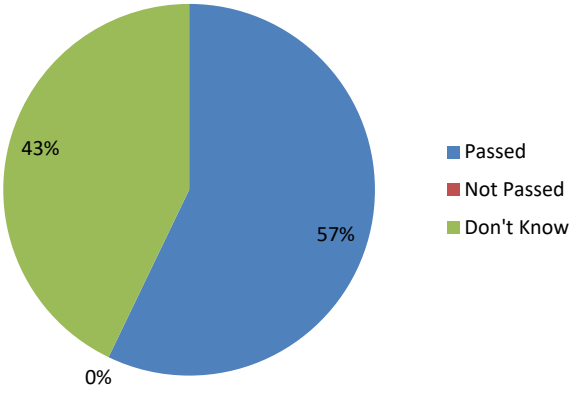
Survey Result

Training Experience



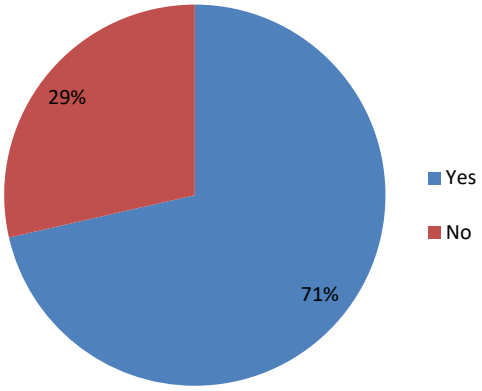
Survey Result

FINAL RESULT OF TRAINER



Majority respondents passed

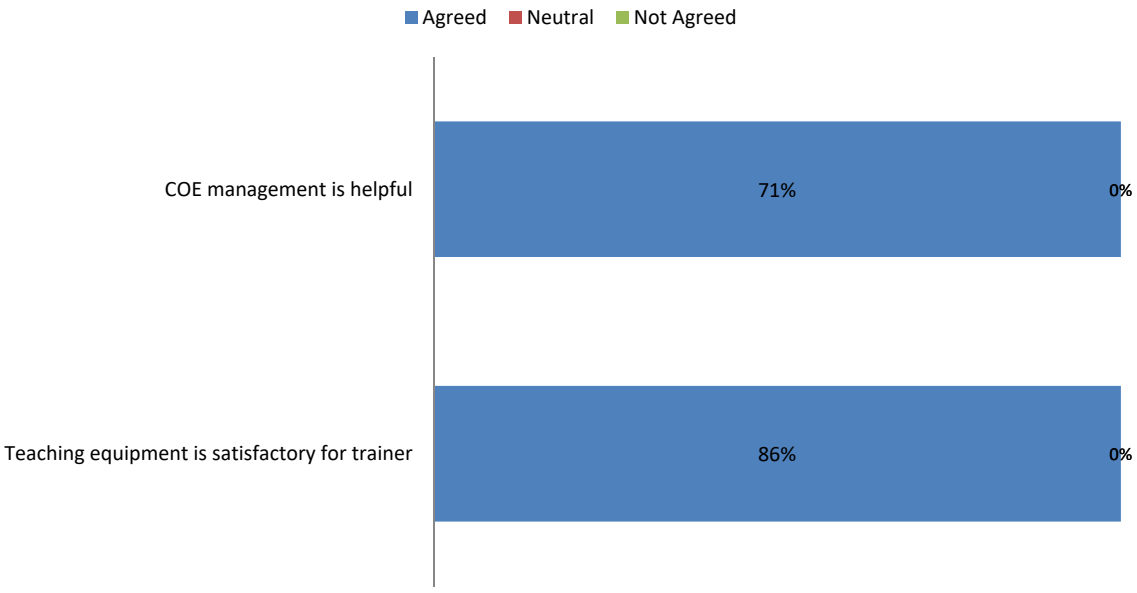
HAVE BEEN TAUGHT



Majority respondents passed have been taught

Survey Result

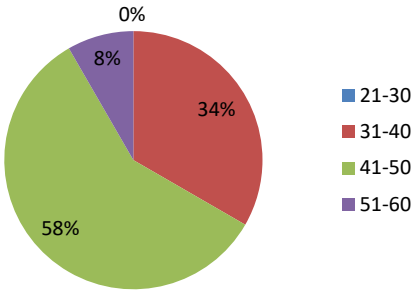
Training Experience



PROVINCIAL TRAINING – SAK ETAP

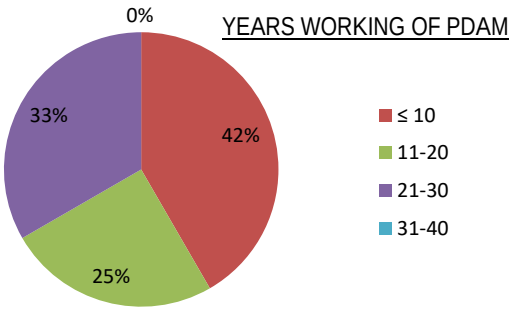
Respondent Profile

AGE



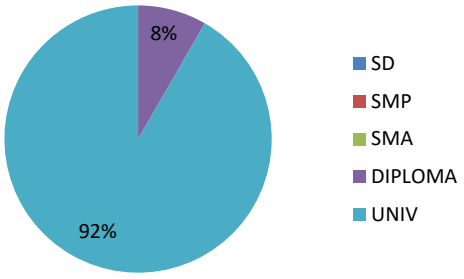
Majority respondents are 41-50 y.o

YEARS WORKING OF PDAM



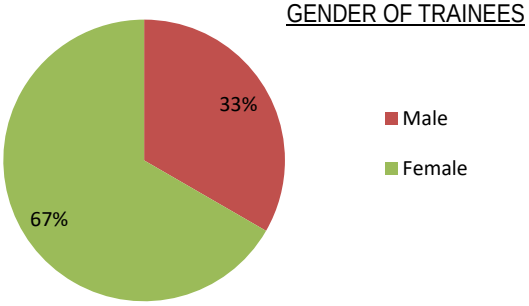
Majority respondents have ≤ 10 years experience working in PDAM

EDUCATION OF TRAINEES



Majority respondents are graduated from Unversity

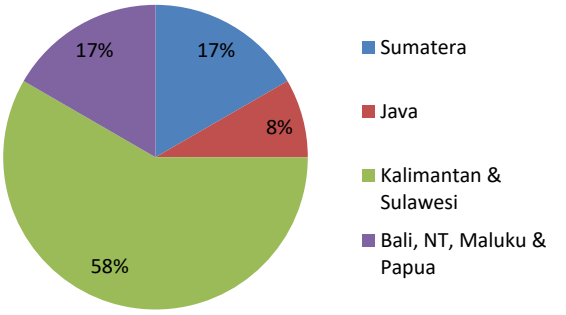
GENDER OF TRAINEES



Majority respondents are female

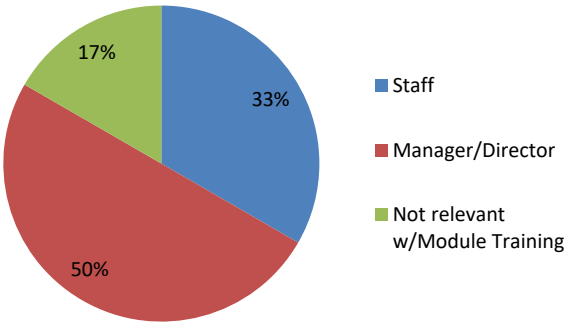
Respondents Profile

ORIGIN OF TRAINEES



Majority respondents from Kalimantan & Sulawesi

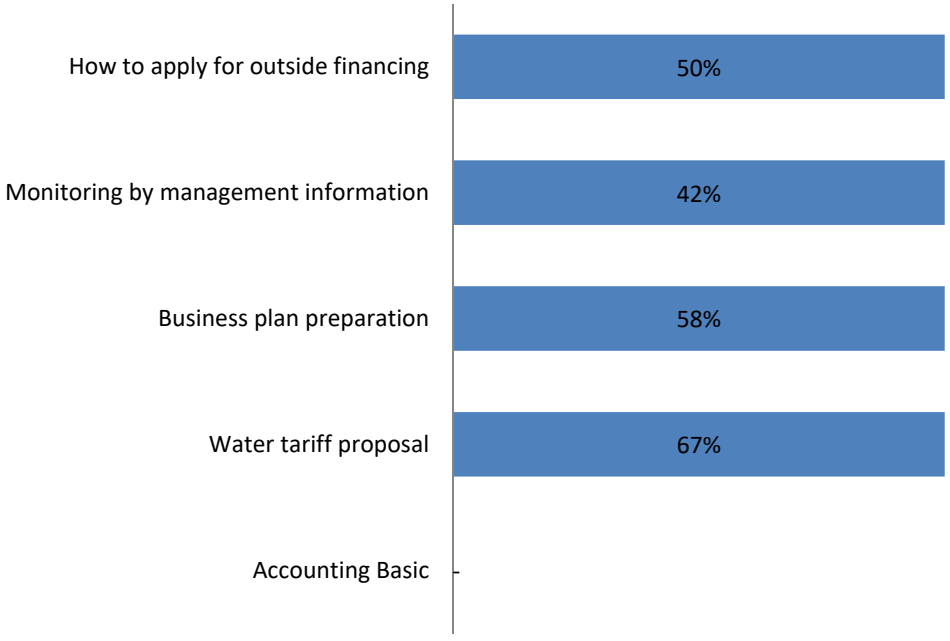
POSITION



Majority respondents are Manager / Director

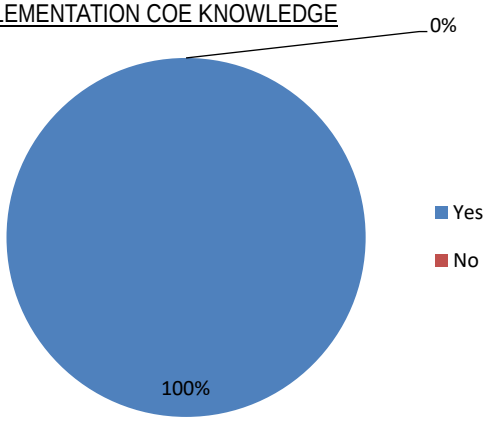
Survey Result

SUBJECT WANT TO LEARN FROM FAM



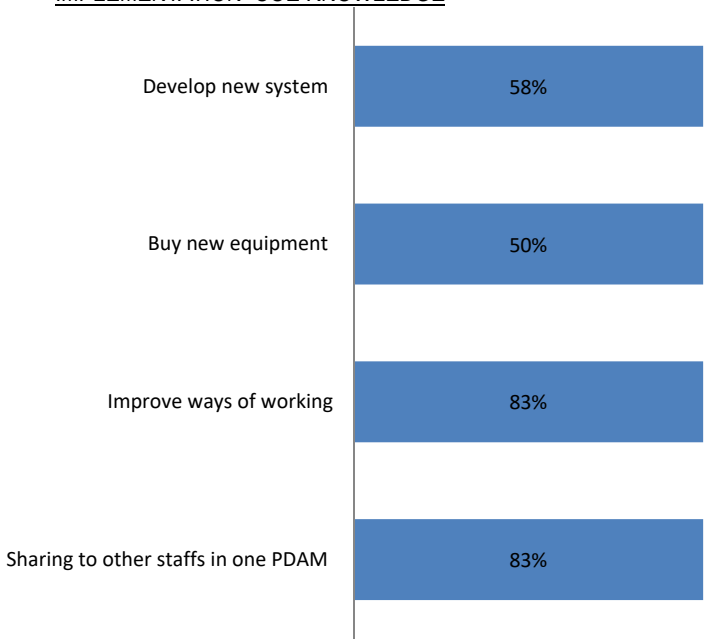
Survey Result

IMPLEMENTATION COE KNOWLEDGE



All respondents are implemented already

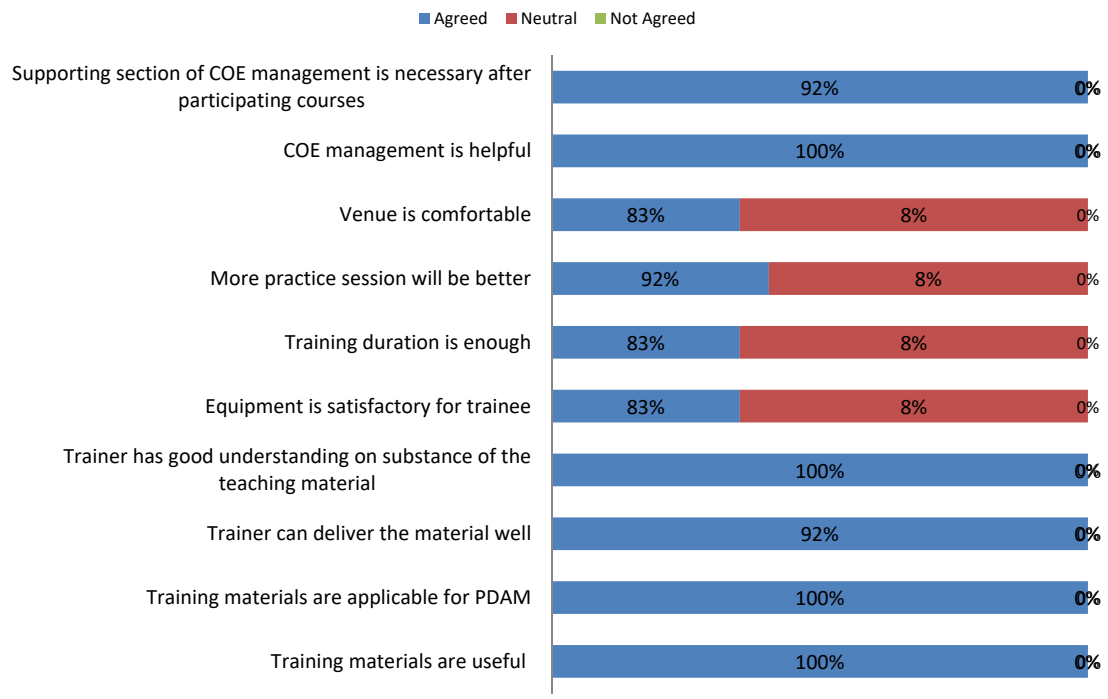
IMPLEMENTATION COE KNOWLEDGE



Majority respondents are sharing to other staff in their PDAM

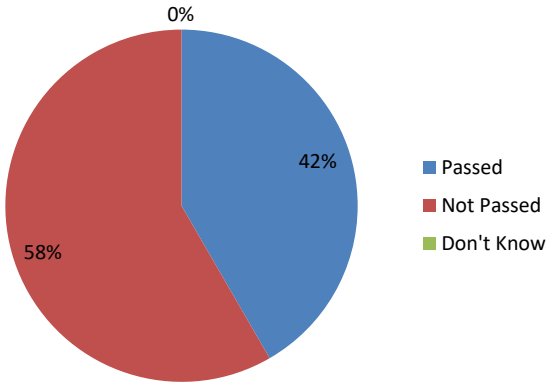
Survey Result

Training Experience



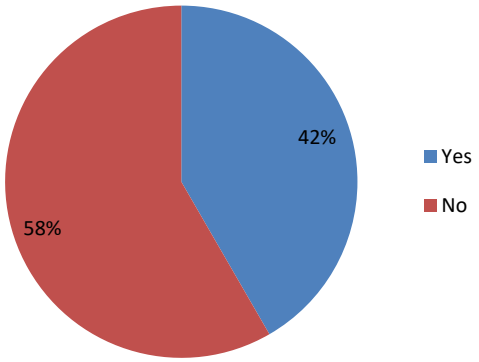
Survey Result

FINAL TEST FOR TRAINER



Majority respondents did not pass

HAVE BEEN TAUGHT

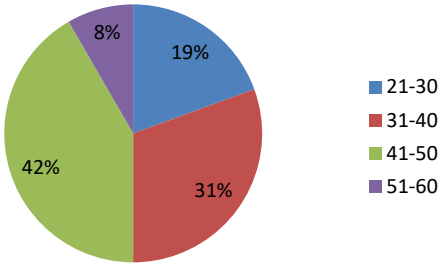


Majority respondents passed have been taught

KABUPATEN / KOTA TRAINING – SAK ETAP

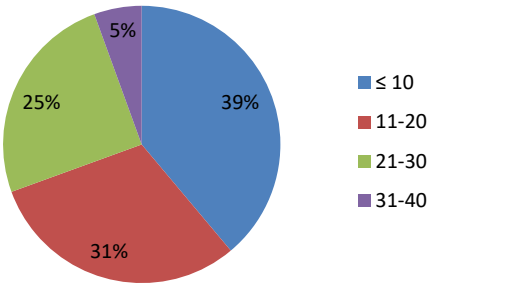
Respondent Profile

AGE



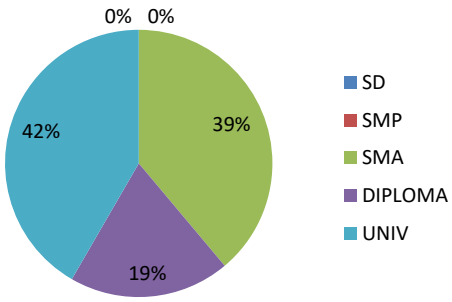
Majority respondents are 41-50 y.o

YEARS WORKING OF TRAINEES



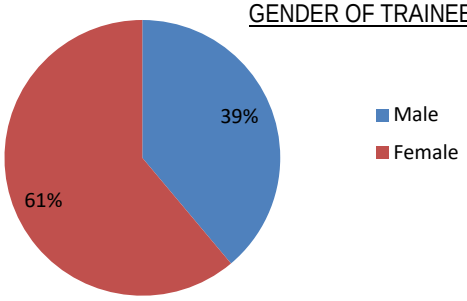
Majority respondents have ≤ 10 years experience working in PDAM

EDUCATION OF TRAINEES



Majority respondents are graduated from Unversity

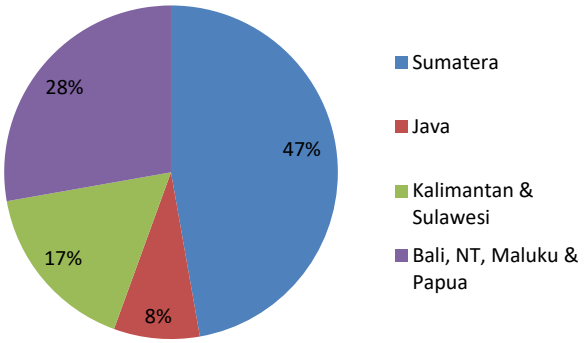
GENDER OF TRAINEES



Majority respondents are female

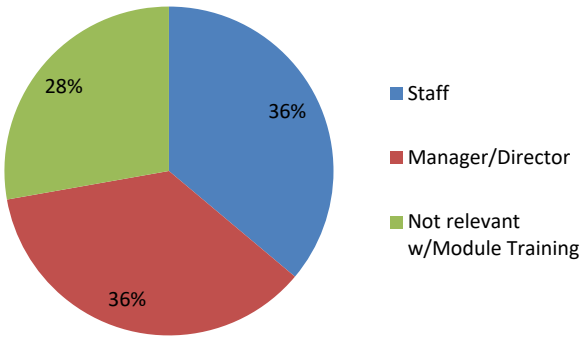
Respondents Profile

ORIGIN OF TRAINEES



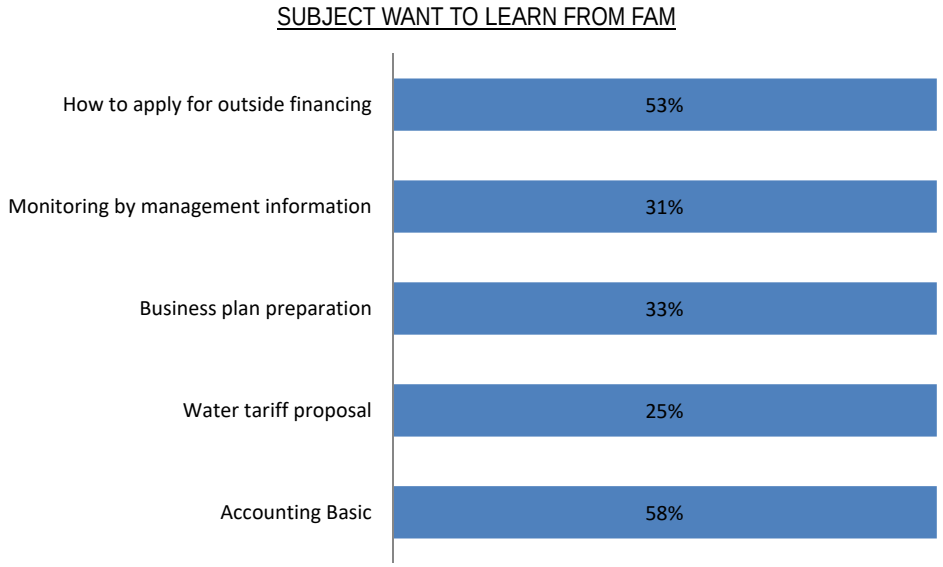
Majority respondents from Sumatera

GENDER OF TRAINEES

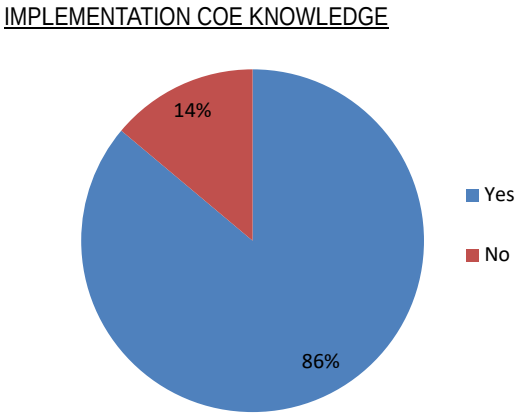


Average respondents are Manager / Director & Staff

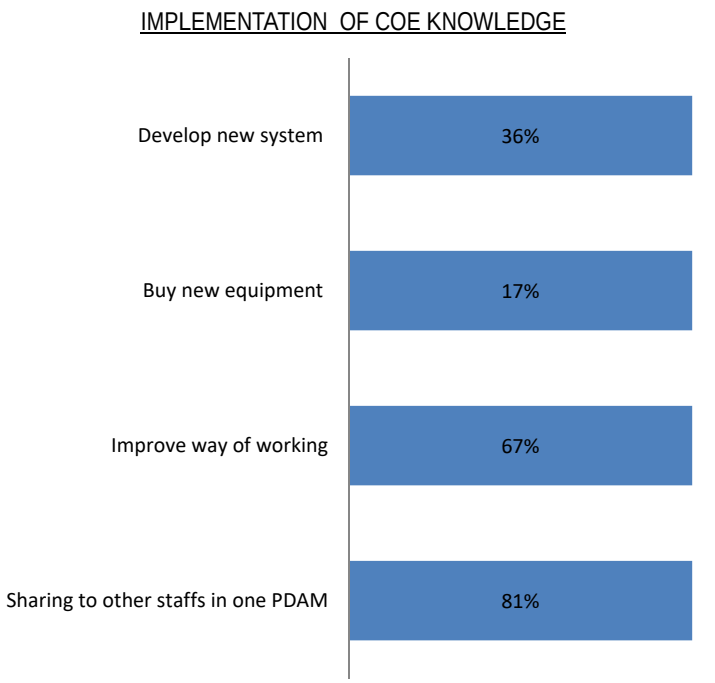
Survey Result



Survey Result



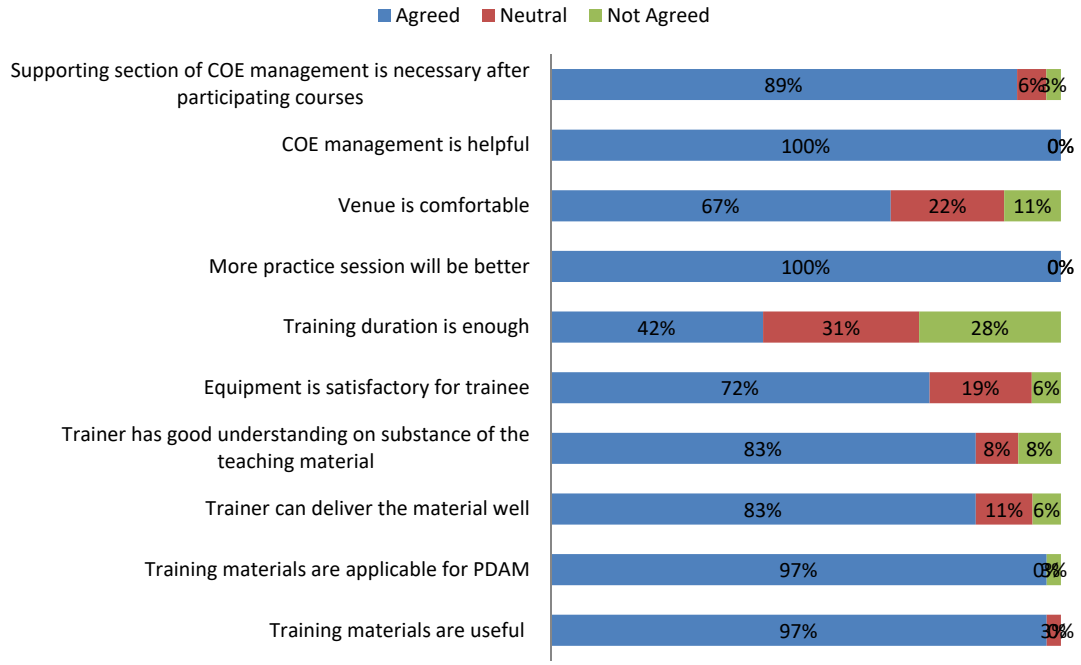
Majority respondents are implemented already



Majority respondents are sharing to other staff in their PDAM

Survey Result

Training Experience



Terima kasih

ありがとうございました

2016 COE Program Survey Report

Technical Cooperation Project on Strengthening COE (Center of Excellence) Program for PDAMs in Republic Indonesia

June 2018

Background

There is urgent need for massive capacity development of PDAM staff besides the conventional trainings at centralized BTAMS.

Center of Excellence (COE) Program was launched in 2012 by DWSD, Directorate General of Human Settlements, Ministry of Public Works and Housing.

Japan International Cooperation Agency (JICA) has commenced its new Technical Cooperation Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Mid of August 2015.

COE

Modules:
1. Non Revenue Water Reduction
2. Energy Efficiency
3. SAK ETAP

Trainings-of-Trainers (TOT) type education (cascade method trainings:
1. National Training (at Hotel in Jakarta or Bandung)
2. Provincial Training (at BTAMS)
3. Kabupaten/Kota Training (at PIP2B in each province)

to improve

This 2016 COE program survey is conducted to evaluate performance of stakeholders involved in each stage of the COE program.

Training Participants Figures

	2015			2016			2017			
	NT	PROV	KAB/KOTA	NT	PROV	KAB/KOTA	NT	PROV	KAB/KOTA	
NRW	14	105	313	12	83	319	0	0	17	863
EE	6	65	136	9	0	152	0	0	10	378
SAKETAP	8	37	101	0	0	104	0	0	11	261
GIS	0	0	0	0	0	0	0	12	18	30
WTP	0	0	0	0	0	0	0	13	22	35
CR	0	0	0	0	0	0	0	15	15	30
FAM	0	0	0	0	0	0	0	14	17	31
	28	**207**	**550**	**21**	**83**	**575**	**0**	**54**	**110**	**1628**
	785			**679**			**164**			

Questionnaire - Survey Method - Sample

Questionnaire

- Questionnaire is designed to evaluate experience of COE participants.

Survey Method

- Survey method with tele survey which conducted by JET.

Sample

- The questionnaire results are successfully gathered from National, Provincial and Kabupaten/Kota Training participants in 30 provinces. Number of respondents is 188 of 679 COE participants.
- The 26 provinces are **Sumatera Island** (NAD, Bangka Belitung,Jambi, Riau, Sumatera Utara, Sumatera Barat, Sumatera Selatan, Lampung & Bengkulu) ; **Java Island** (Banten, DIY, Jawa Barat, Jawa Tengah, Jawa Timur) ; **Kalimantan Island** (Kalimantan Selatan, Kalimantan Barat, Kalimantan Tengah, Kalimantan Timur); **Sulawesi Island** (Sulawesi Selatan, Sulawesi Barat, Sulawesi Utara, Sulawesi Tenggara, Sulawesi Tengah & Gorontalo) ; NTB, NTT, Maluku , Maluku Utara. & Papua

Conclusion of 2015 COE Program Survey Result [1/2]

- Respondent profile
  - Most respondents are 41-50 years old with 21-20 years of experience working in PDAM.
  - The respondents are mostly male, except for SAK ETAP.
  - Mostly, the respondents graduated from university, except for EE at Kab/Kota Training (mostly graduated from senior high school).

- Training experience
  - The training experience is satisfactory for respondents. However, majority respondents agreed that training duration need to be added.

- Training experience

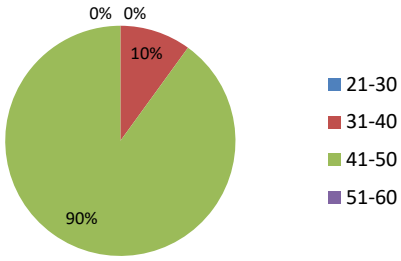
  - Majority respondents are implemented COE knowledge in their PDAMs and mostly have shared the knowledge to their colleagues in the same PDAM.

2016 PROGRAM SURVEY RESULT

NATIONAL TRAINING – NRW

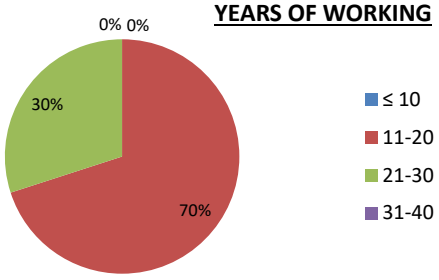
Respondent Profile

AGE



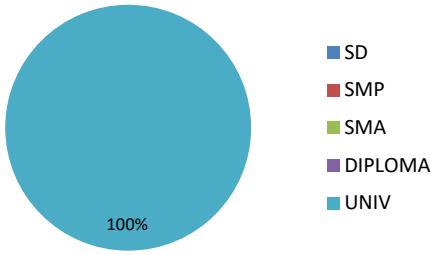
Majority respondents are 41-50 y.o

YEARS OF WORKING



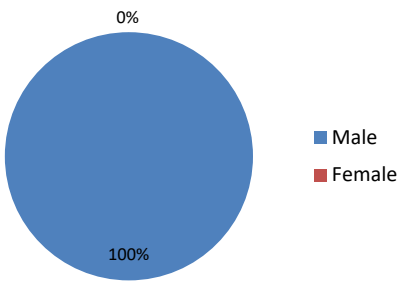
Majority respondents have 11-20 years experience working in PDAM

EDUCATION OF TRAINEES



All respondents are graduated from University

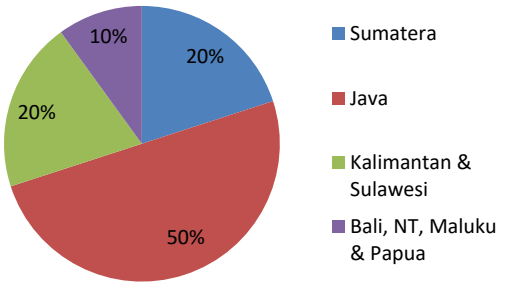
GENDER



All respondents are male

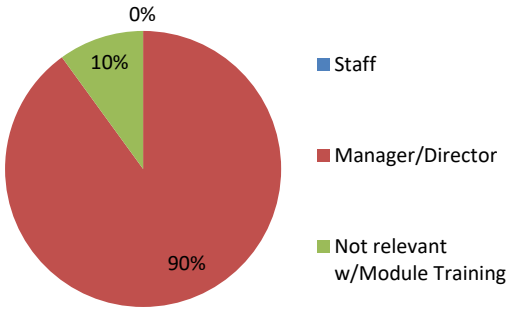
Respondent Profile

ORIGIN OF TRAINEES



Majority respondents from Java

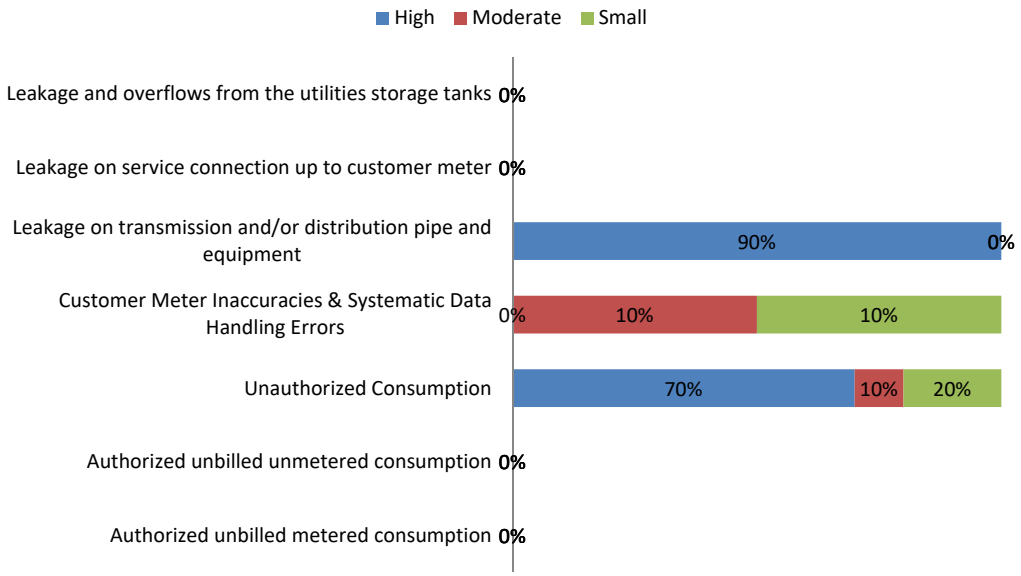
POSITION



Majority respondents are Manager/Director

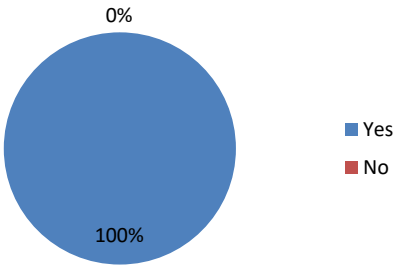
Survey Result

NRW FACTORS at PDAMs



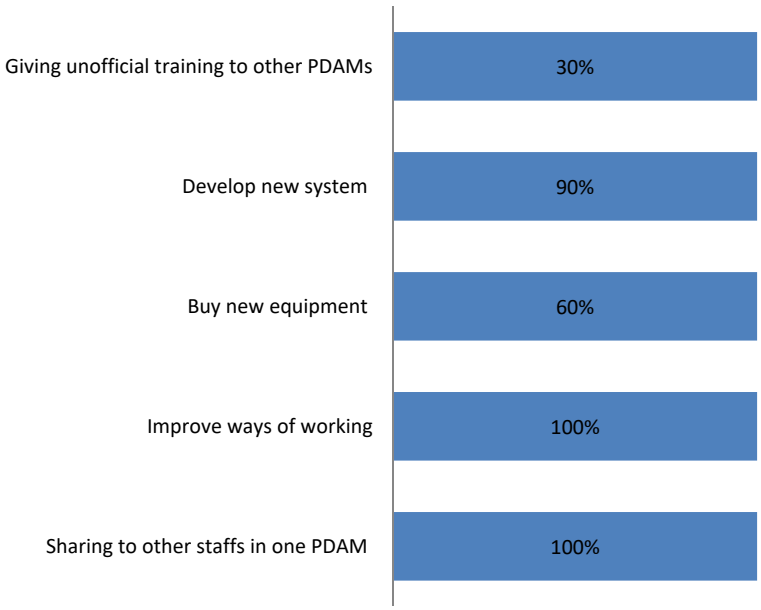
Survey Result

IMPLEMENTATION COE KNOWLEDGE TO PDAMs



100% respondents are implemented already

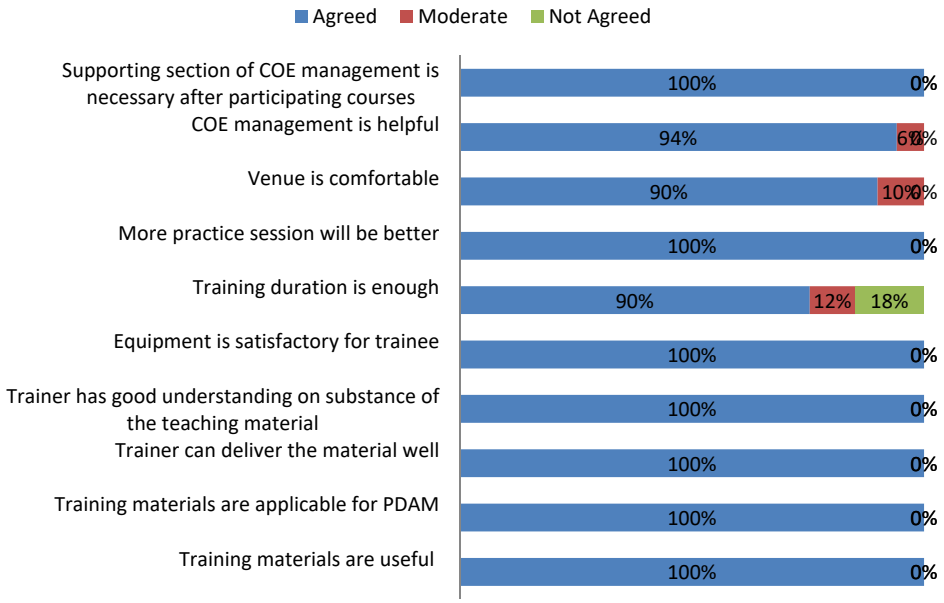
IMPLEMENTATION OF COE KNOWLEDGE



All respondents are sharing to other staff in their PDAM

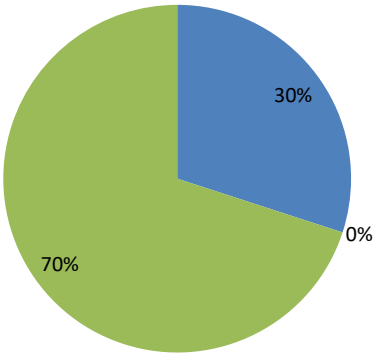
Survey Result

TRAINING EXPERIENCE

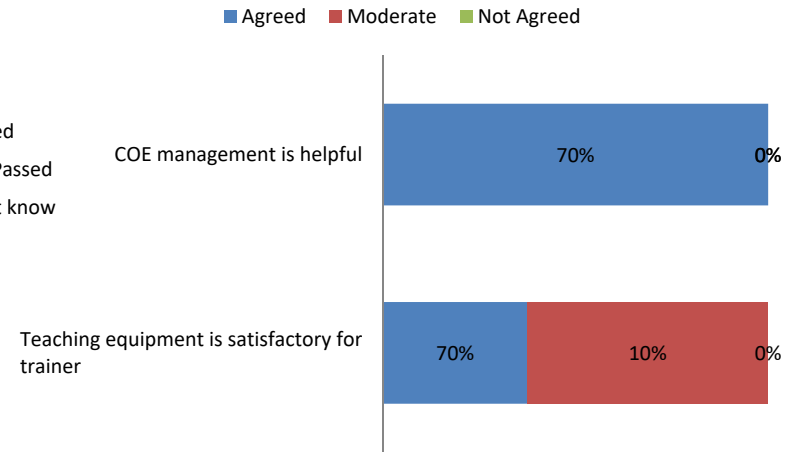


Survey Result

FINAL TEST OF TRAINERS



TEACHING EXPERIENCE

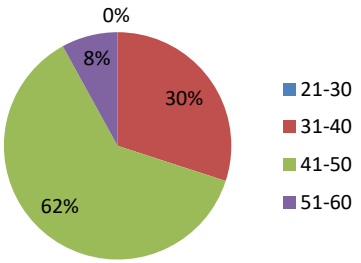


Majority respondents don't know the result

PROVINCIAL TRAINING – NRW

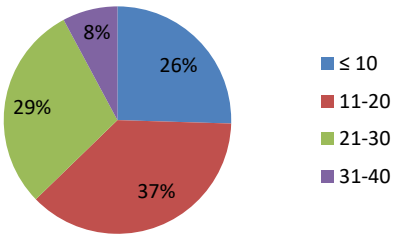
Respondent Profile

AGE



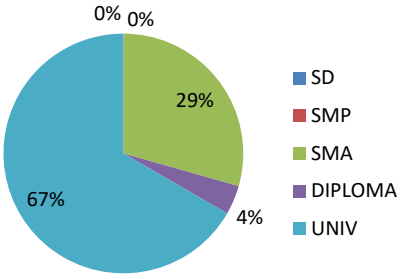
Majority respondents are 41-50 y.o

YEARS OF WORKING



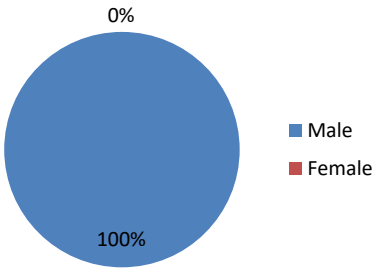
Majority respondents have 11-20 years experience working in PDAM

EDUCATION



Majority respondents are graduated from University

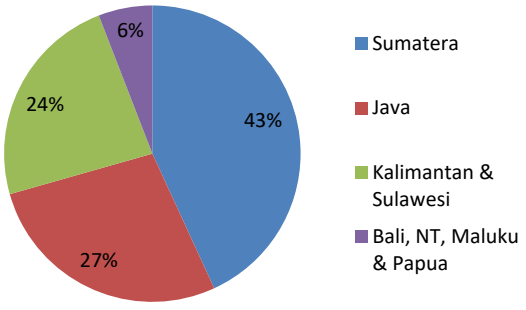
GENDER



All respondents are male

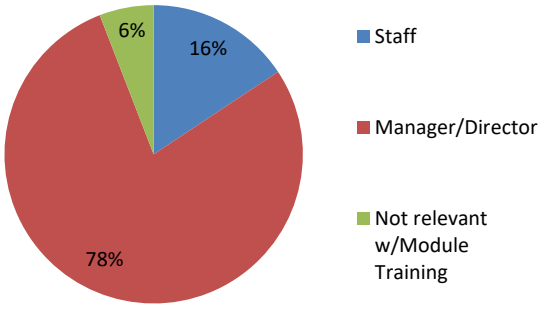
Respondent Profile

ORIGIN OF TRAINEES



Average respondents from Sumatera

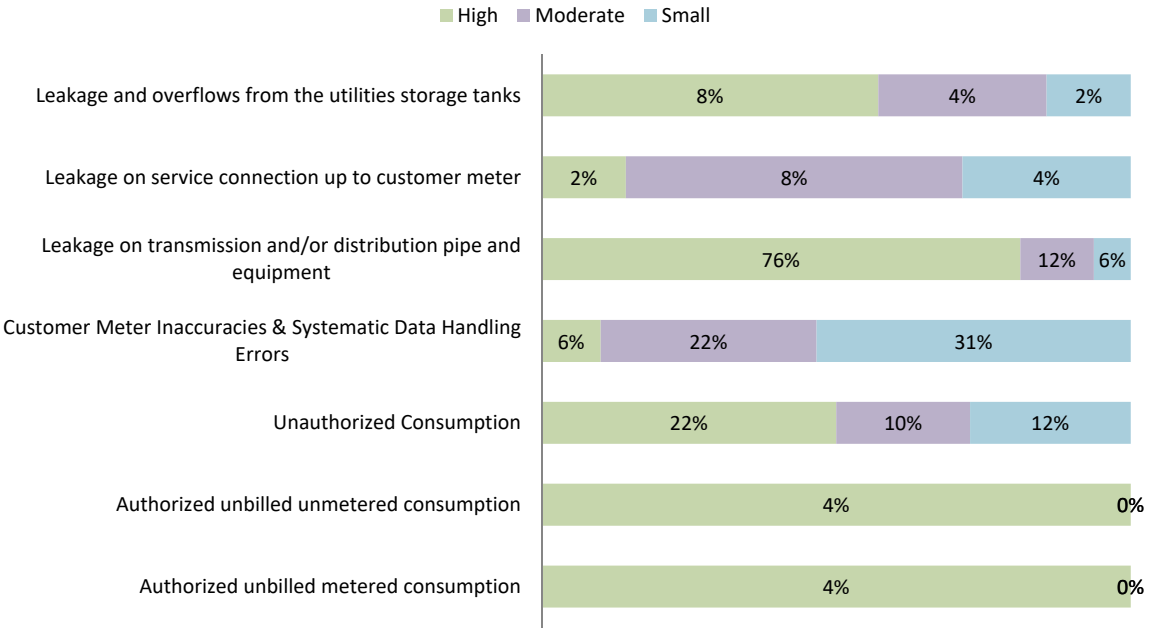
POSITION



Majority respondents are Manager/Director

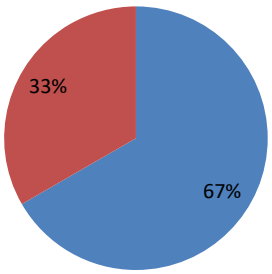
Survey Result

NRW FACTORS at PDAMs



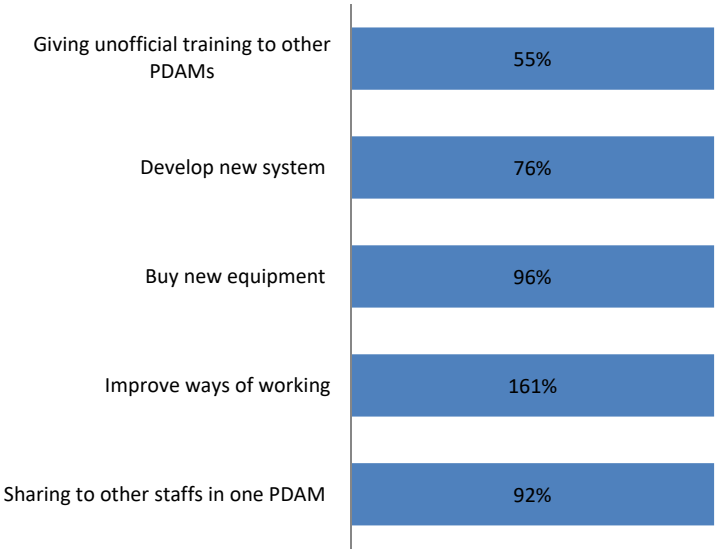
Survey Result

IMPLEMENTATION COE KNOWLEDGE to PDAMs



Majority respondents are implemented already

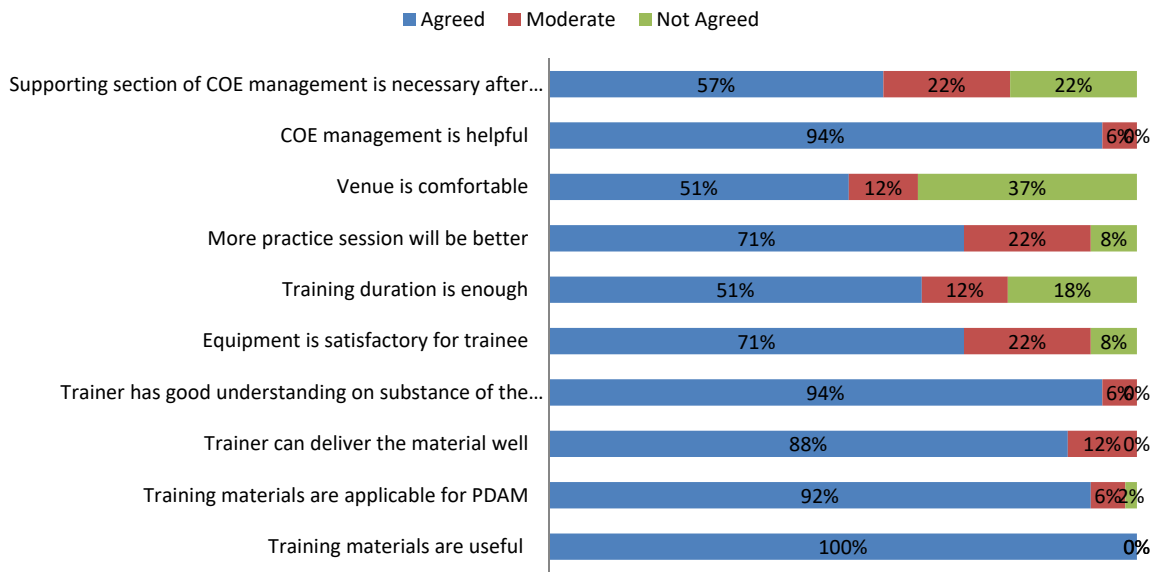
IMPLEMENTATION COE KNOWLEDGE



Majority respondents are sharing to other staff in their PDAM & buy new equipment

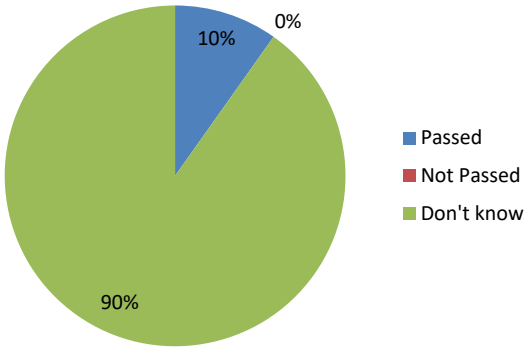
Survey Result

TRAINING EXPERIENCE



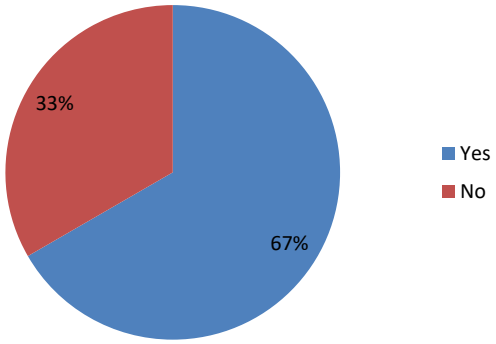
Survey Result

FINAL TEST



Majority respondents donn't know the result

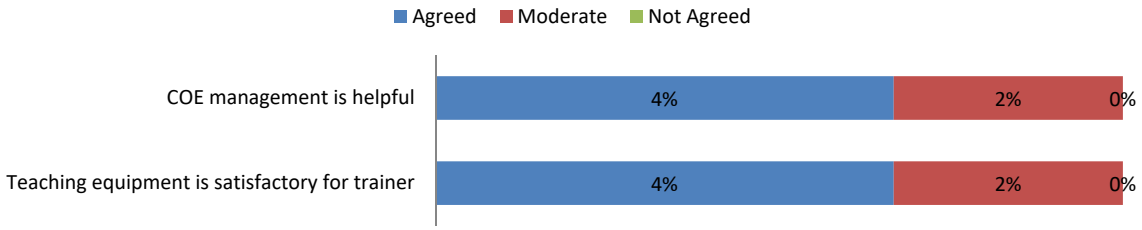
HAVE BEEN TAUGHT



Majority respondents passed have been taught

Survey Result

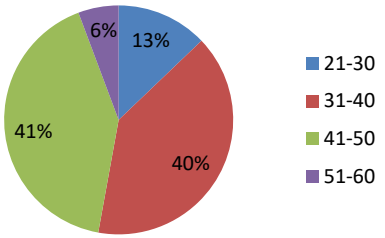
Teaching Experience



KABUPATEN/KOTA TRAINING – NRW

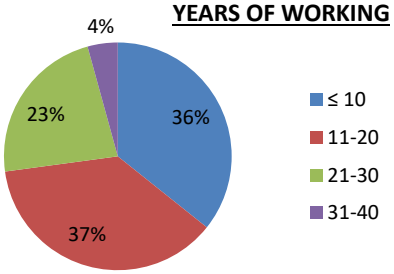
Respondent Profile

AGE



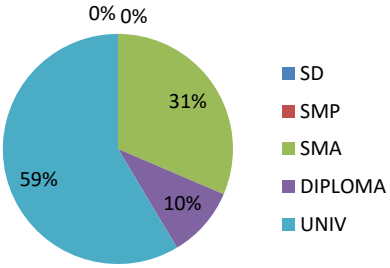
Average respondents are 31-50 y.o

YEARS OF WORKING



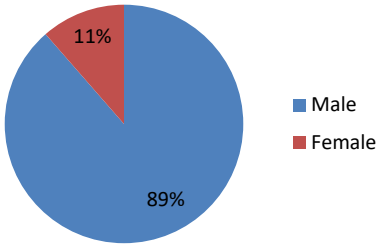
Average respondents have ≤ 10-20 years experience working in PDAM

EDUCATION



Majority respondents are graduated from University

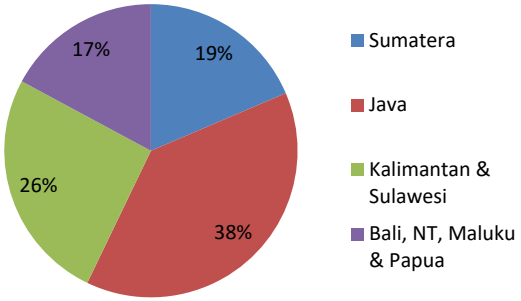
GENDER



Majority respondents are male

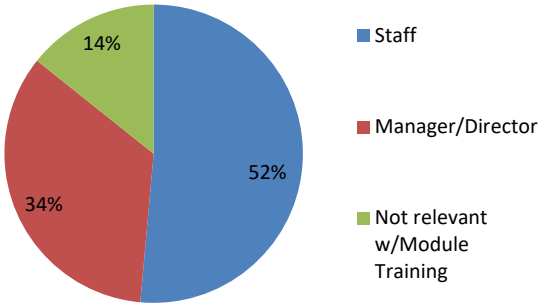
Respondent Profile

ORIGIN OF TRAINEES



Average respondents from Java

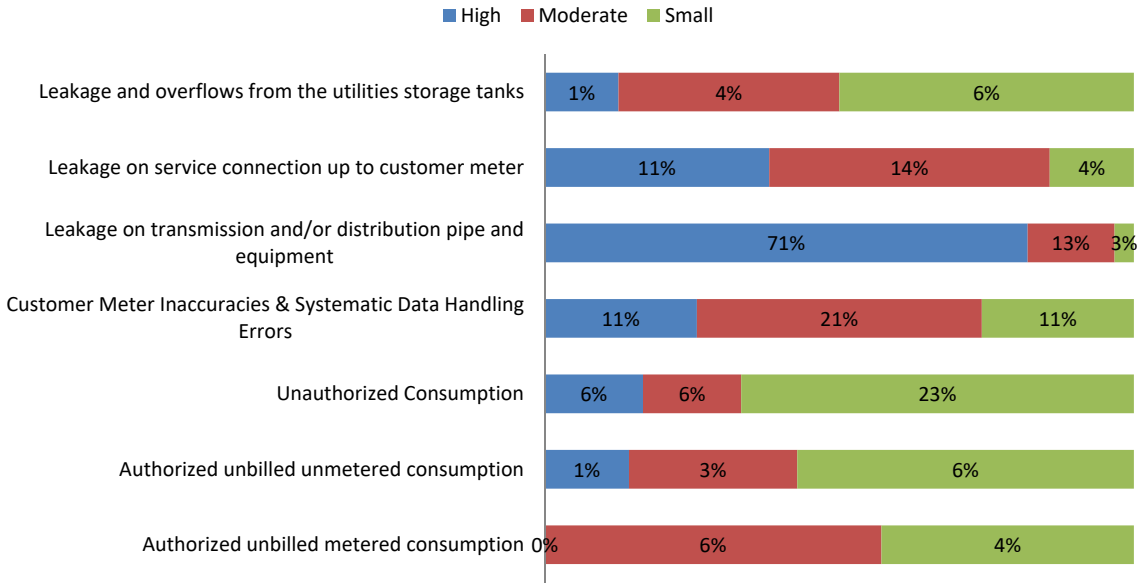
POSITION



Majority respondents are staff

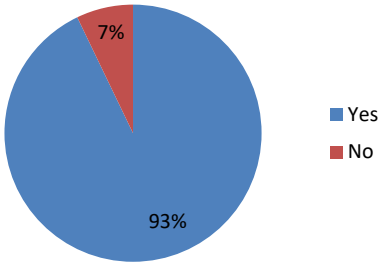
Survey Result

NRW FACTORS at PDAMs



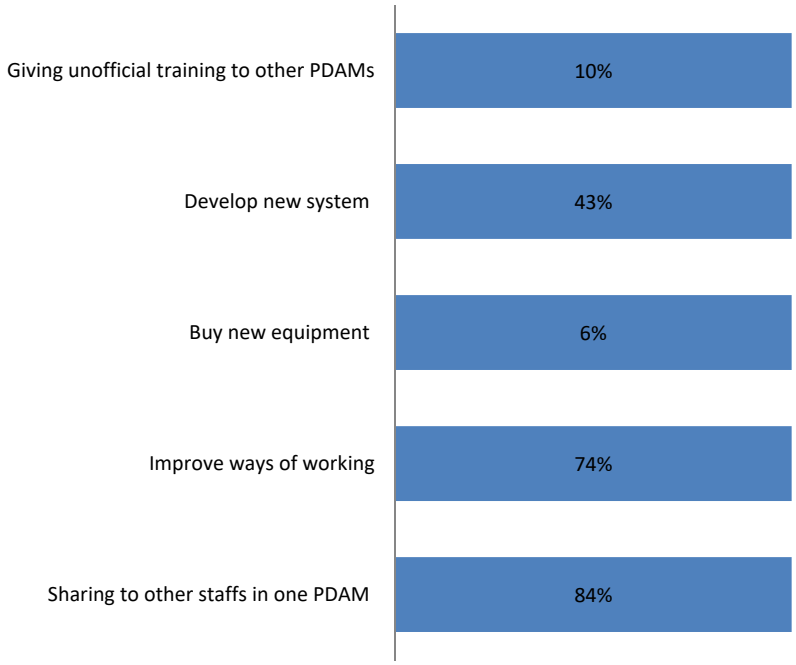
Survey Result

IMPLEMENTATION OF COE KNOWLEDGE to PDAMs



Majority respondents are implemented already

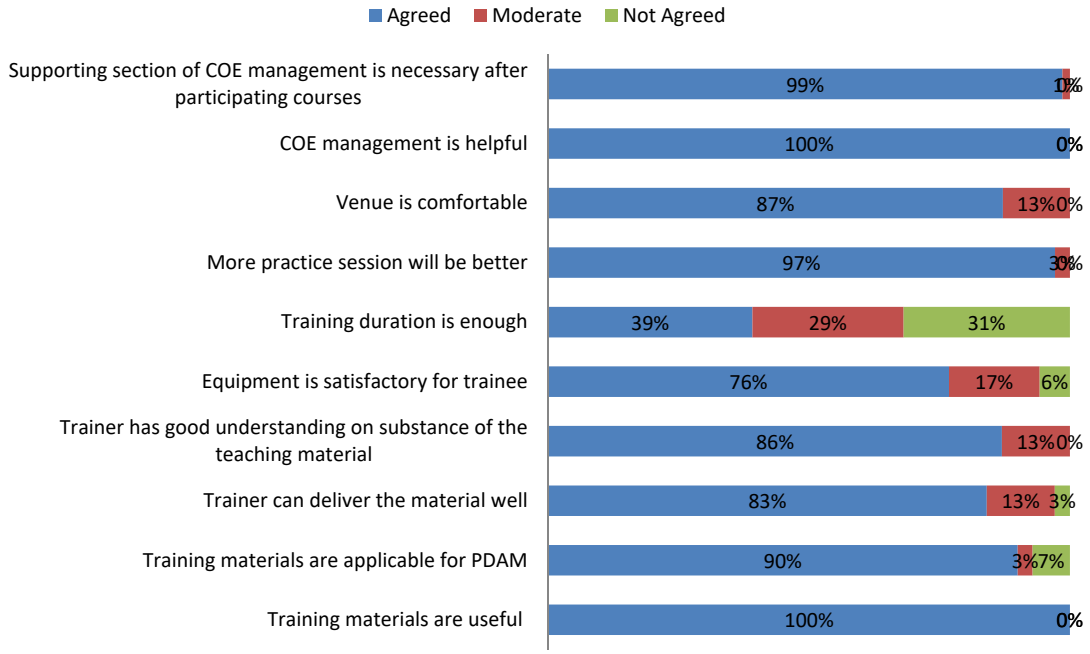
IMPLEMENTATION WAY OF COE KNOWLEDGE



Majority respondents are sharing to other staff in their PDAM

Survey Result

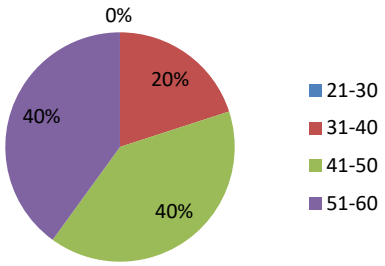
Training Experience



NATIONAL TRAINING – EE

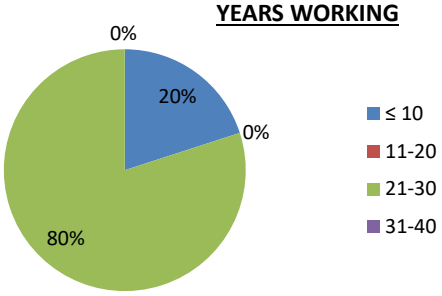
Respondent Profile

AGE



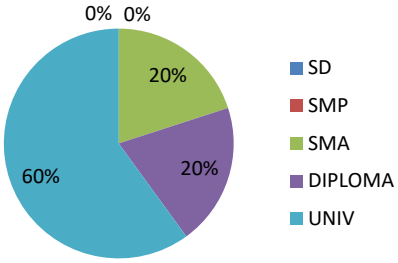
Majority respondents are 41-50 y.o

YEARS WORKING



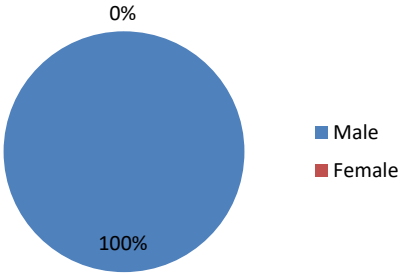
Majority respondents have 21-30 years experience working in PDAM

EDUCATION



Majority respondents are graduated from University

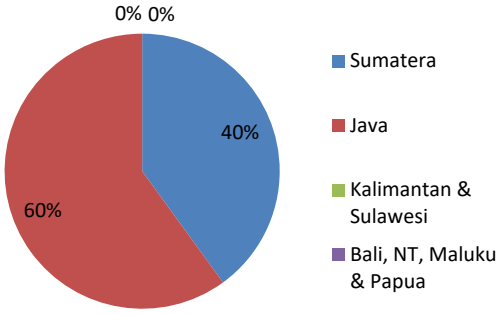
GENDER



All respondents are male

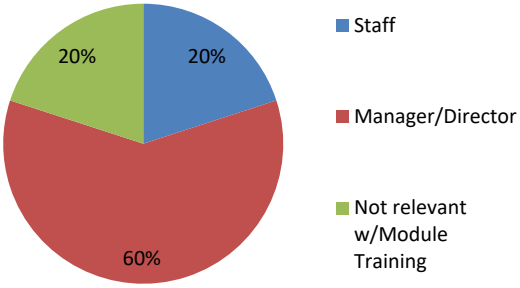
Respondent Profile

ORIGIN OF TRAINEES



Majority respondents from Java

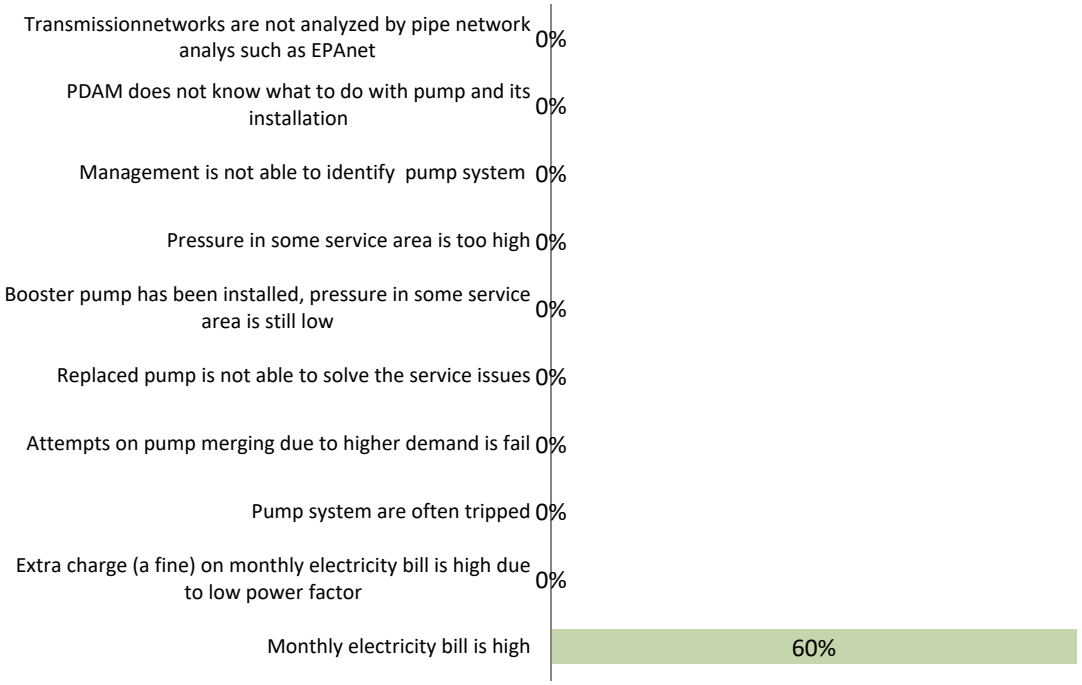
POSITION



Majority respondents are Manager/Director

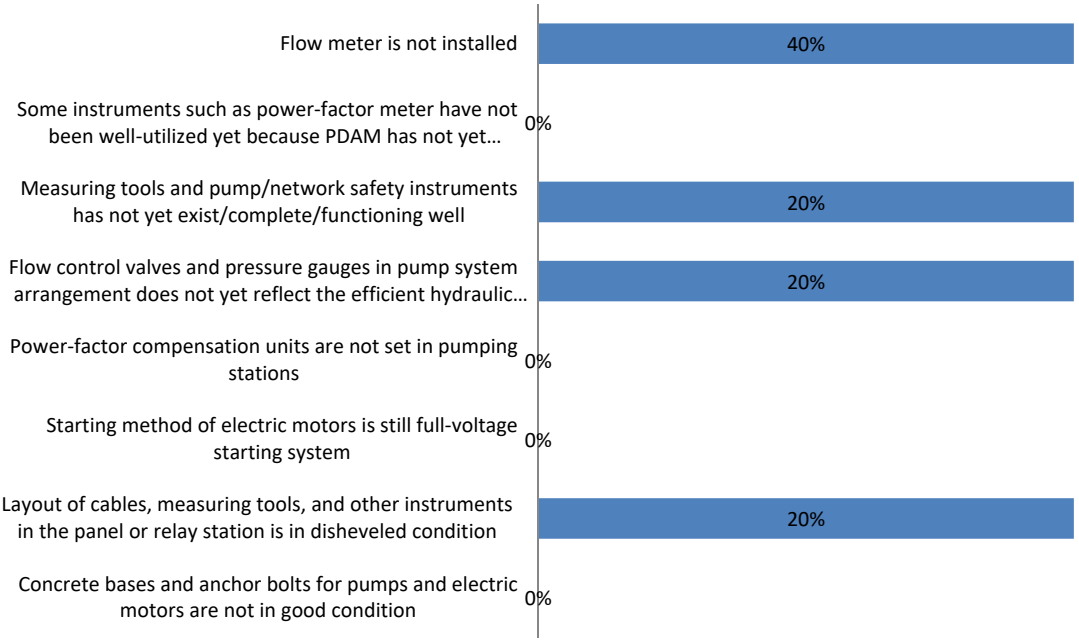
Survey Result

ENERGY PROBLEMS at PDAM



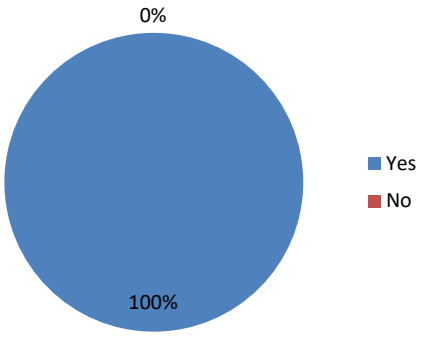
Survey Result

WEAKNESS PUMP at PDAM



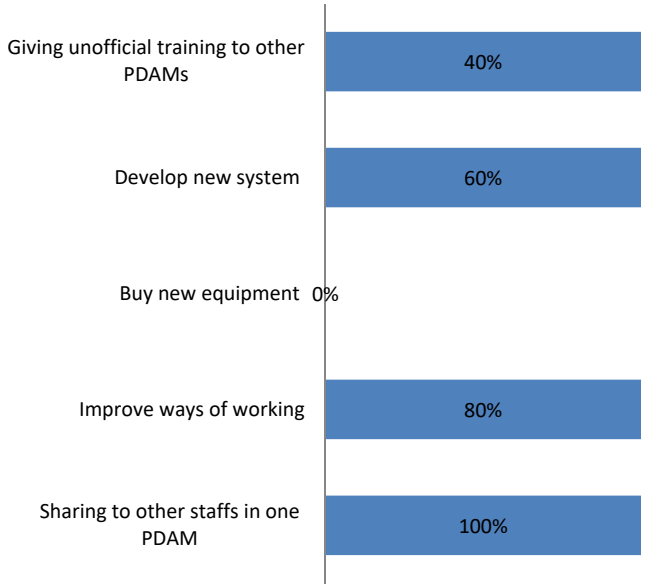
Survey Result

IMPLEMENTATION OF COE KNOWLEDGE at PDAMs



All respondents are implemented already

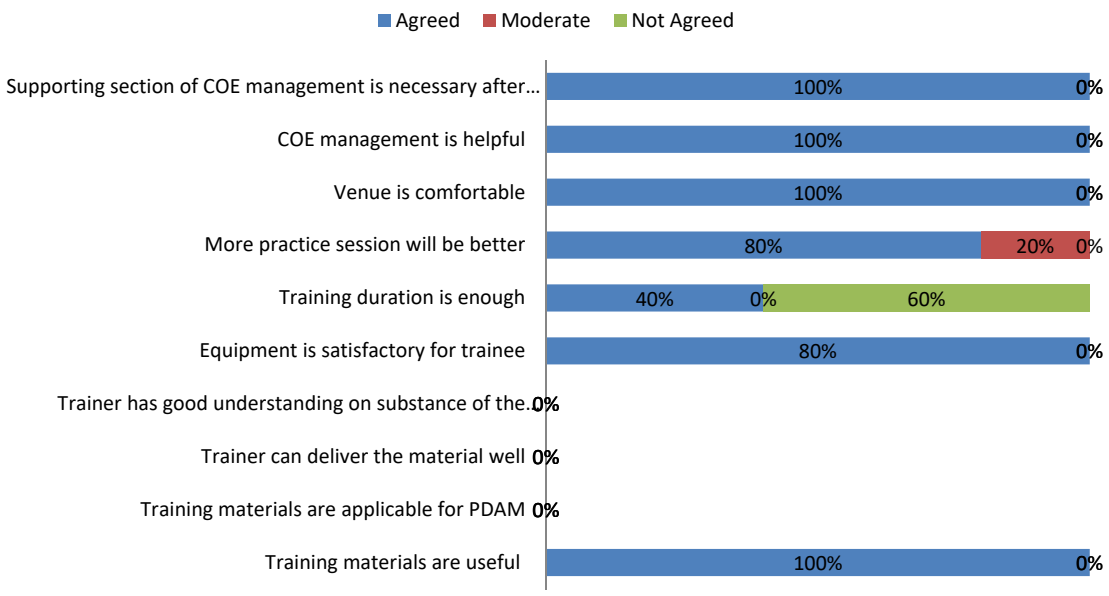
IMPLEMENTATION WAY OF COE KNOWLEDGE



All respondents are sharing to other staff in their PDAM

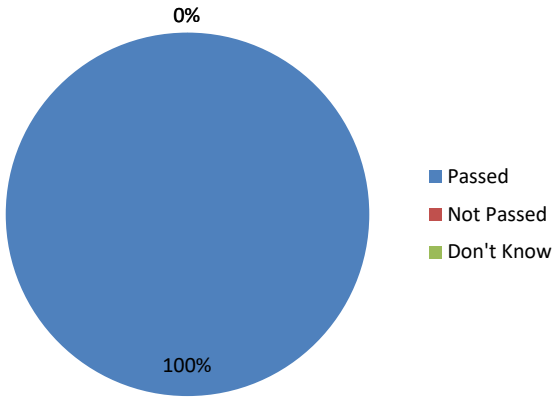
Survey Result

TRAINING EXPERIENCE



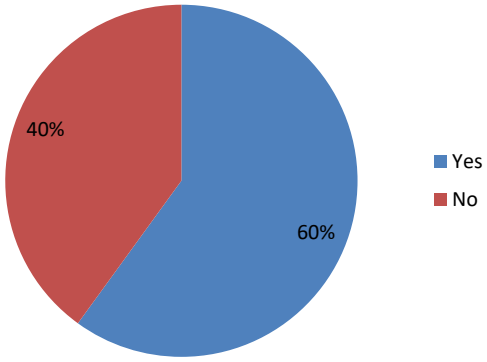
Survey Result

FINAL TEST



All respondents donn't know the result

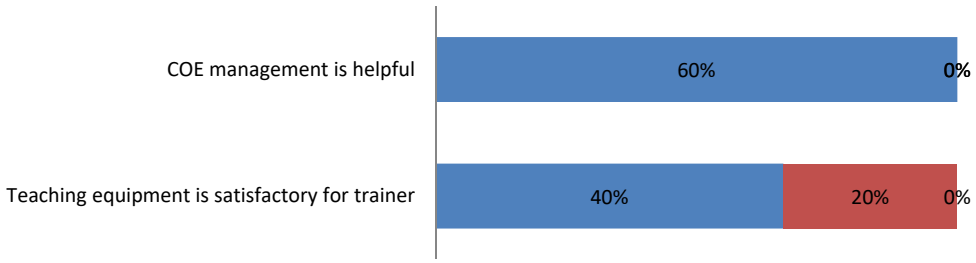
HAVE BEEN TAUGHT



Majority respondents passed have been taught

Survey Result

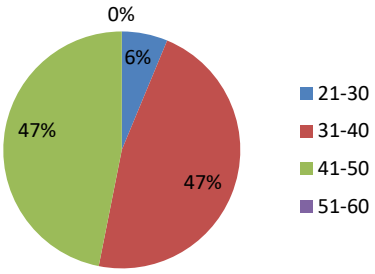
TEACHING EXPERIENCE



KABUPATEN/KOTA TRAINING – EE

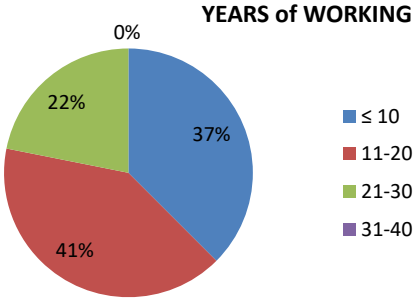
Respondent Profile

AGE



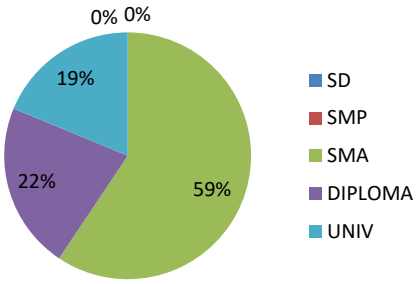
Majority respondents are 31-40 y.o

YEARS of WORKING



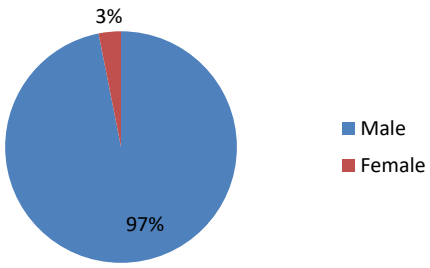
Majority respondents have 11-20 years experience working in PDAM

EDUCATION



Majority respondents are graduated from High School (SMA)

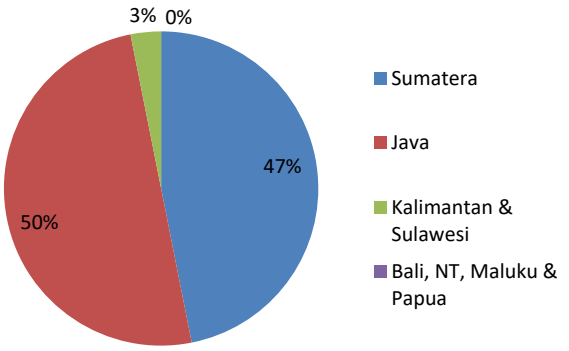
GENDER



All respondents are male

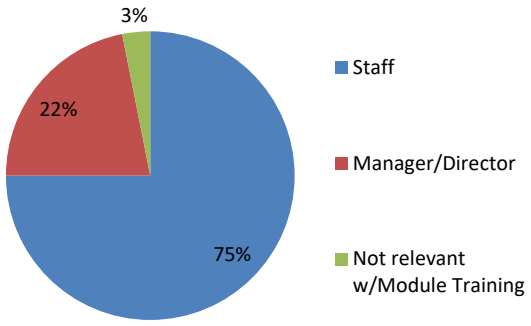
Respondent Profile

ORIGIN OF TRAINEES



Majority respondents from Java

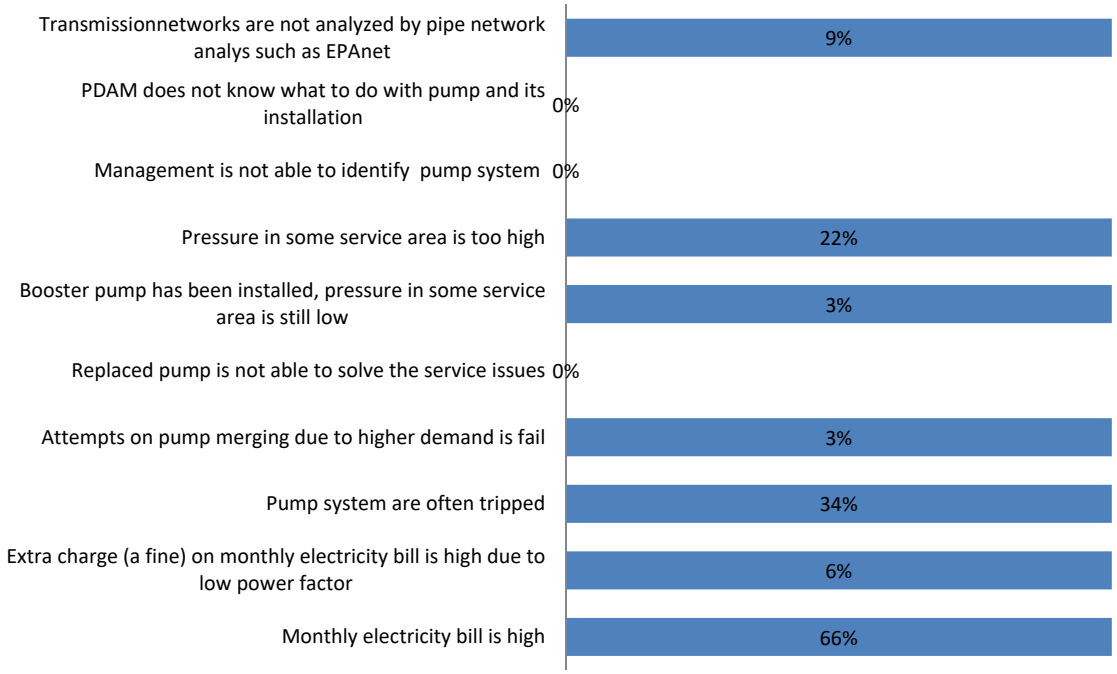
POSITION



All respondents are Staff

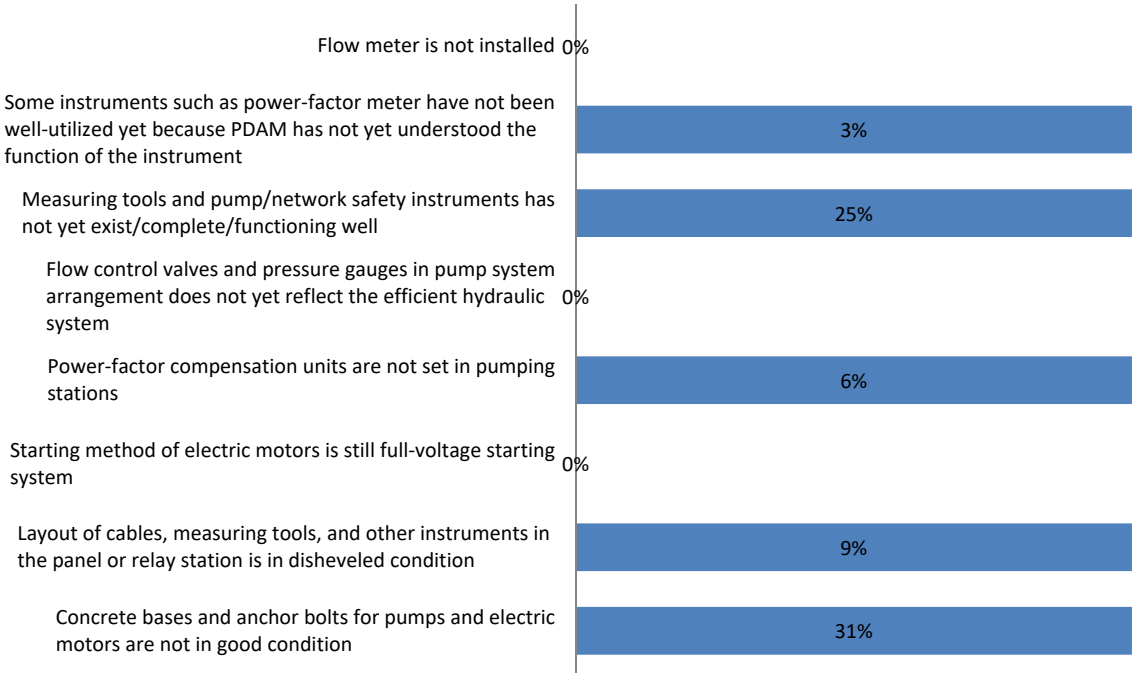
Survey Result

ENERGY PROBLEMS at PDAM



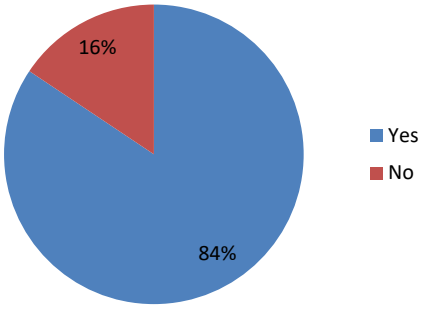
Survey Result

WEAKNESS PUMP at PDAM



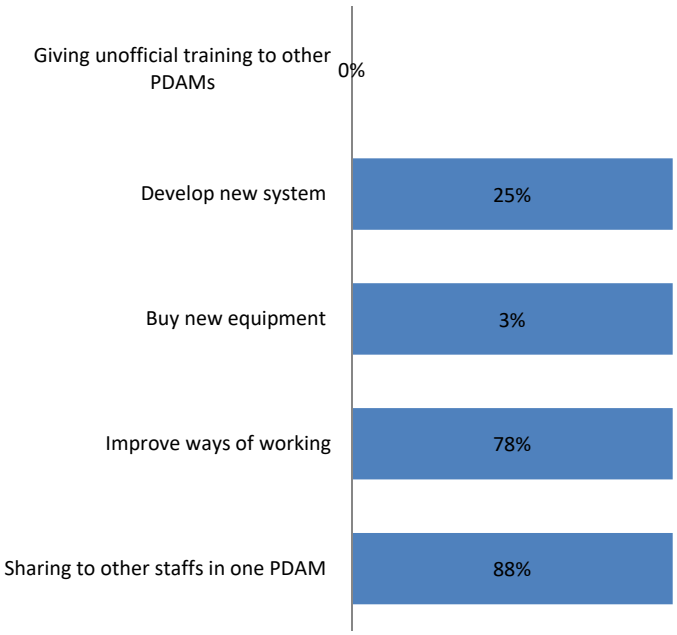
Survey Result

IMPLEMENTATION OF COE KNOWLEDGE at PDAMs



Majority respondents are implemented already

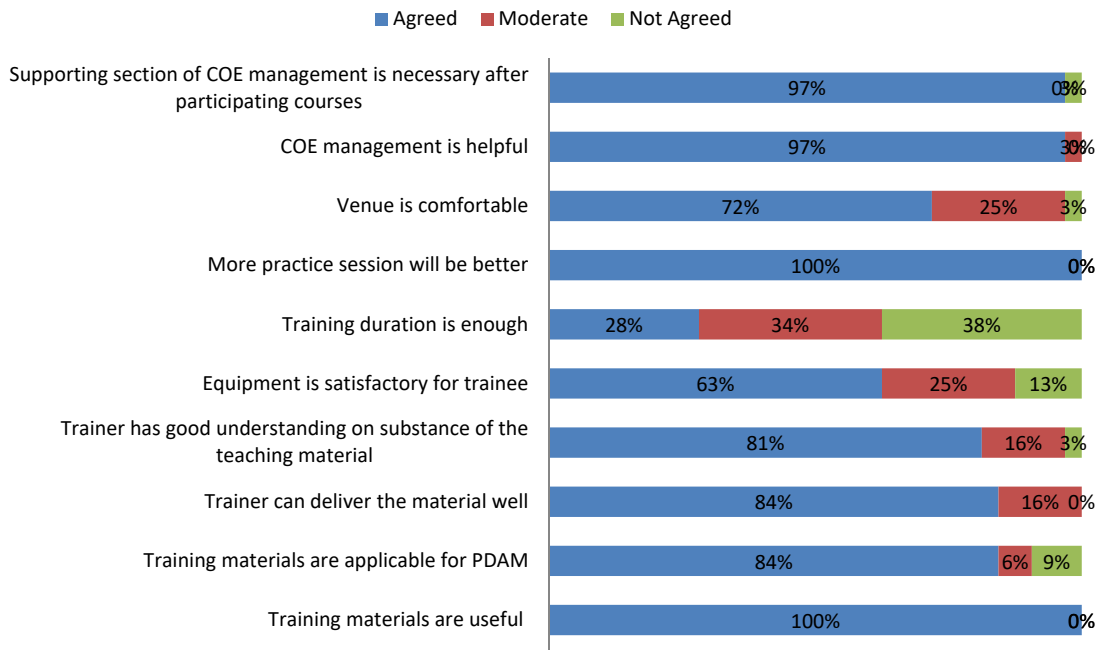
IMPLEMENTATION WAY OF COE KNOWLEDGE



Majority respondents are sharing to other staff in their PDAM

Survey Result

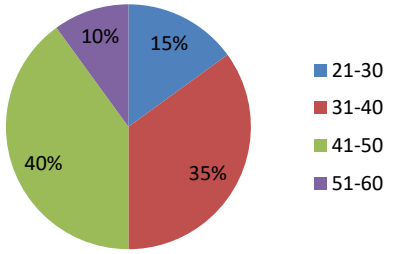
TRAINING EXPERIENCE



KABUPATEN / KOTA TRAINING – SAK ETAP

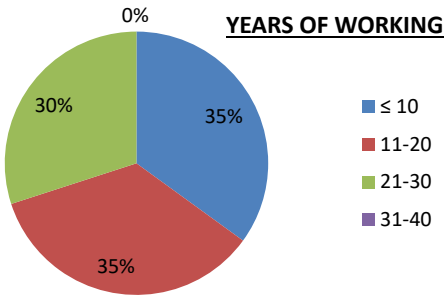
Respondent Profile

AGE



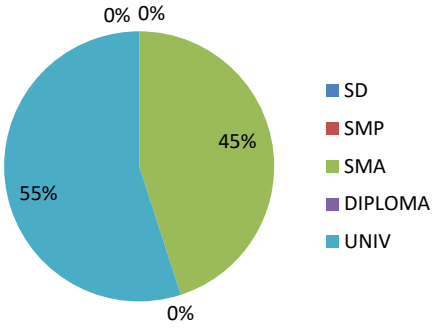
Majority respondents are 41-50 y.o

YEARS OF WORKING



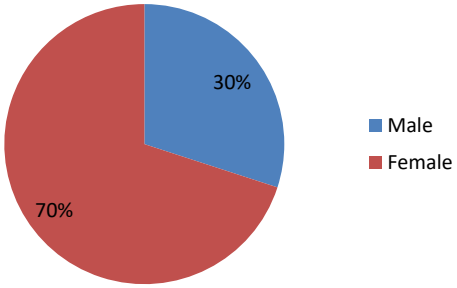
Average respondents have 0-30 years experience working in PDAM

EDUCATION



Majority respondents are graduated from Unversity

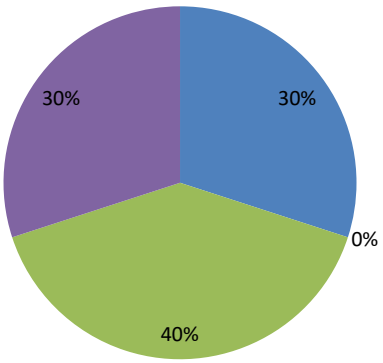
GENDER



Majority respondents are Female

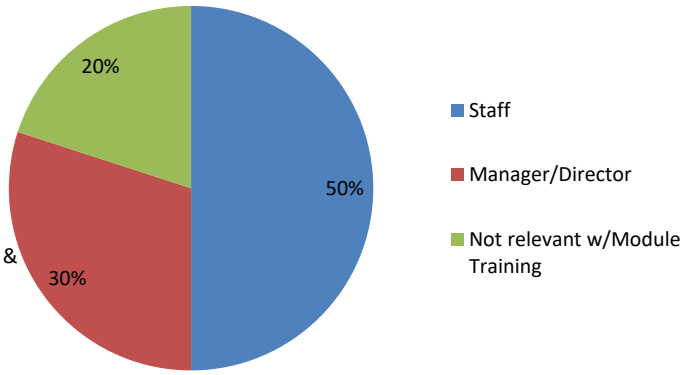
Respondents Profile

ORIGIN OF TRAINEES



Majority respondents from Kalimantan & Sulawesi

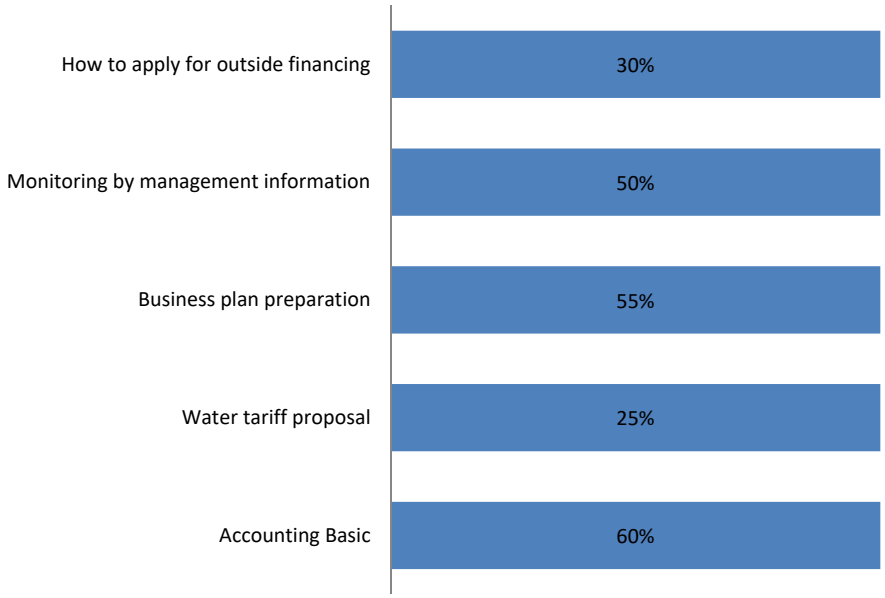
POSITION



Majority respondents are Staff

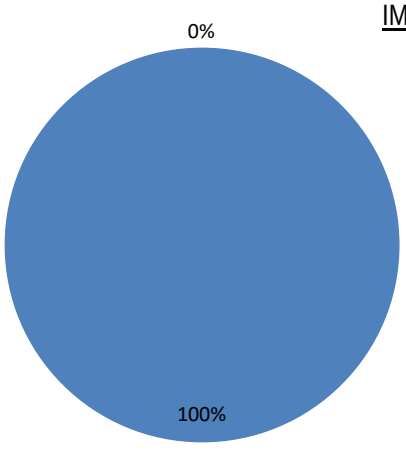
Survey Result

SUBJECT WANT TO LEARN FROM FAM

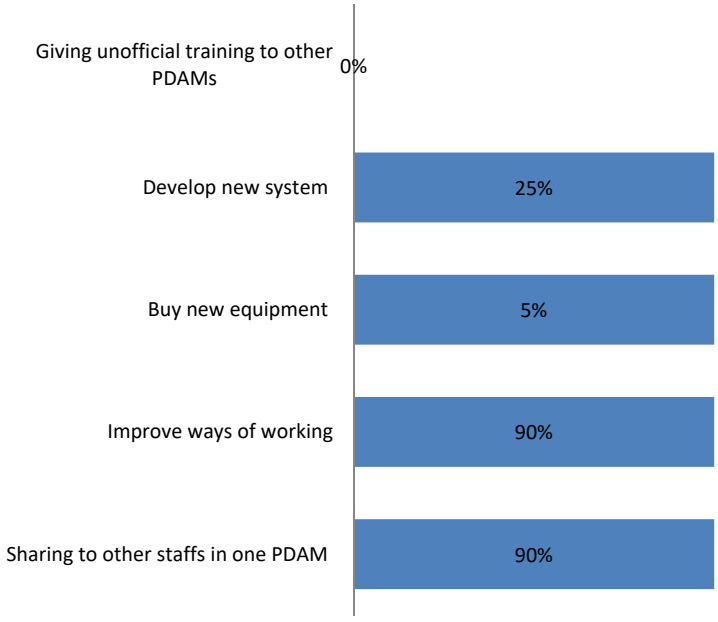


Survey Result

IMPLEMENTATION COE KNOWLEDGE at PDAMs



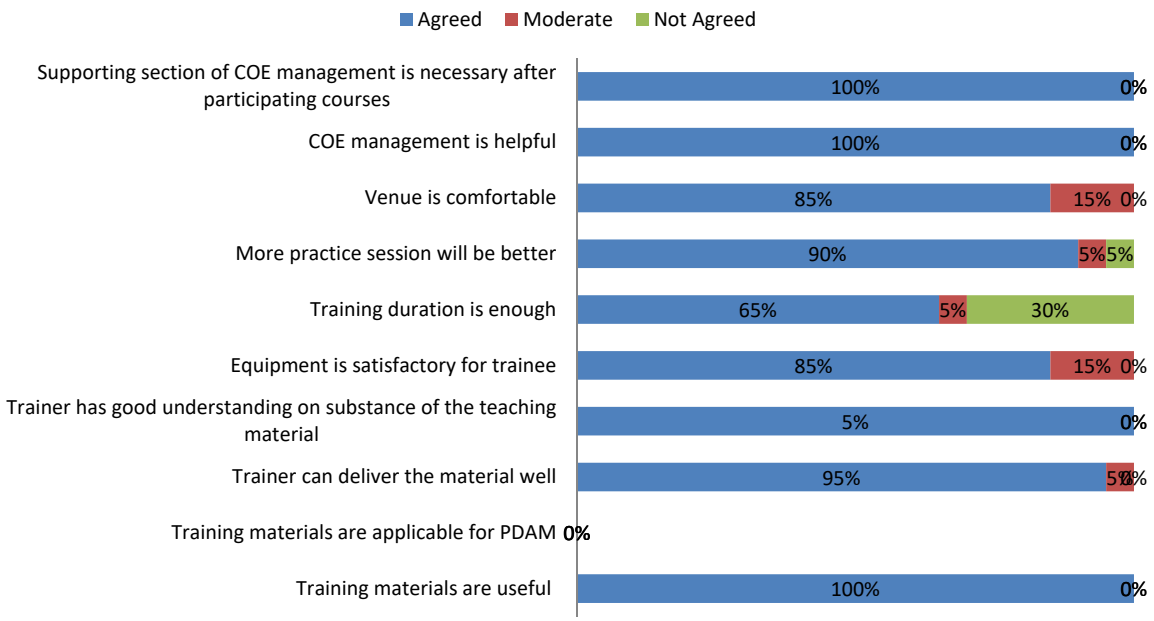
All respondents are implemented already



Majority respondents are sharing to other staff in their PDAM

Survey Result

TRAINING EXPERIENCE



Terima kasih

ありがとうございました

2017 COE Program Survey Report

Technical Cooperation Project on Strengthening COE (Center of Excellence) Program for PDAMs in Republic Indonesia

June 2018

Background

There is urgent need for massive capacity development of PDAM staff besides the conventional trainings at centralized BTAMS.

Center of Excellence (COE) Program was launched in 2012 by DWSD, Directorate General of Human Settlements, Ministry of Public Works and Housing.

Japan International Cooperation Agency (JICA) has commenced its new Technical Cooperation Project on Strengthening COE (Center of Excellence) Program for PDAMs in the Mid of August 2015.

COE

Modules:
1. Non Revenue Water Reduction
2. Energy Efficiency
3. SAK ETAP

Trainings-of-Trainers (TOT) type education (cascade method trainings:
1. National Training (at Hotel in Jakarta or Bandung)
2. Provincial Training (at BTAMS)
3. Kabupaten/Kota Training (at PIP2B in each province)

to improve

This 2016 COE program survey is conducted to evaluate performance of stakeholders involved in each stage of the COE program.

Training Participants Figures

	2015			2016			2017			
	NT	PROV	KAB/KOTA	NT	PROV	KAB/KOTA	NT	PROV	KAB/KOTA	
NRW	14	105	313	12	83	319	0	0	17	863
EE	6	65	136	9	0	152	0	0	10	378
SAKETAP	8	37	101	0	0	104	0	0	11	261
GIS	0	0	0	0	0	0	0	12	18	30
WTP	0	0	0	0	0	0	0	13	22	35
CR	0	0	0	0	0	0	0	15	15	30
FAM	0	0	0	0	0	0	0	14	17	31
	28	**207**	**550**	**21**	**83**	**575**	**0**	**54**	**110**	**1628**
	785			**679**			**164**			

Questionnaire - Survey Method - Sample

Questionnaire	▸ Questionnaire is designed to evaluate experience of COE participants.
Survey Method	▸ Survey method with tele survey which conducted by JET.
Sample	▸ The questionnaire results are successfully gathered from Provincial and Kabupaten/Kota Training participants in 8 provinces. Number of respondents is 57 of 164 COE participants. ▸ The 8 provinces are **Sumatera Island** (Sumatera Barat) ; **Java Island** (Banten, Jawa Barat, Jawa Tengah, Jawa Timur) ; **Kalimantan Island** (Kalimantan Selatanr); **Sulawesi Island** (Sulawesi Utara & Gorontalo). ▸ Subjects to be taught are : NRW, EE, SAK-ETAP (only for Kab/Kota Training) & WTP, GIS, FAM & CR (Prov & Kab/Kota Trainings)

Conclusion of 2015 COE Program Survey Result [1/2]

- Respondent profile
  - Most respondents are 41-50 years old with 21-20 years of experience working in PDAM.
  - The respondents are mostly male, except for SAK ETAP.
  - Mostly, the respondents graduated from university, except for EE at Kab/Kota Training (mostly graduated from senior high school).

- Training experience
  - The training experience is satisfactory for respondents. However, majority respondents agreed that training duration need to be added.

- Training experience

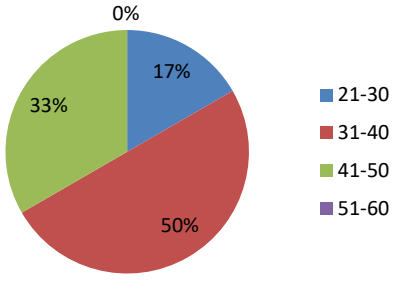
  - Majority respondents are implemented COE knowledge in their PDAMs and mostly have shared the knowledge to their colleagues in the same PDAM.

2017 PROGRAM SURVEY RESULT

KABUPATEN/KOTA TRAINING – NRW

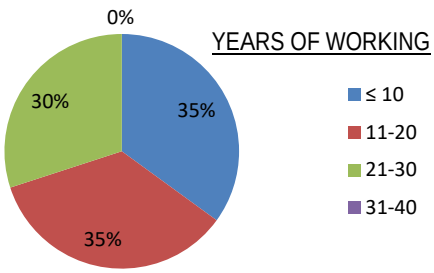
Respondent Profile

AGE



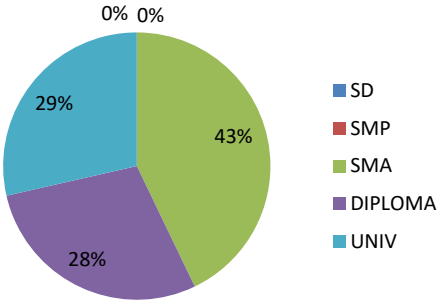
Average respondents are 31-50 y.o

YEARS OF WORKING



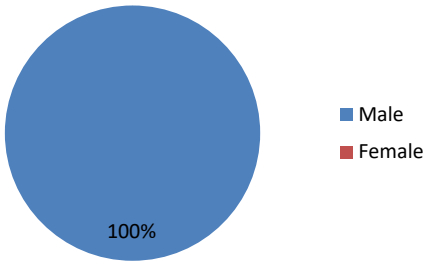
Average respondents have 1-20 years experience working in PDAM

EDUCATION



Majority respondents are graduated from High School (SMA)

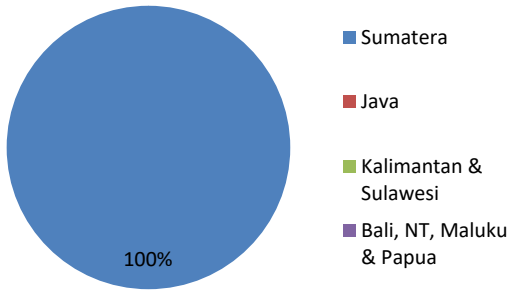
GENDER



All respondents are male

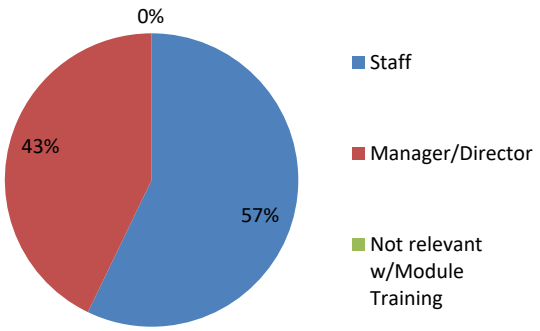
Respondent Profile

ORIGIN OF TRAINEES



All respondents from Sumatera

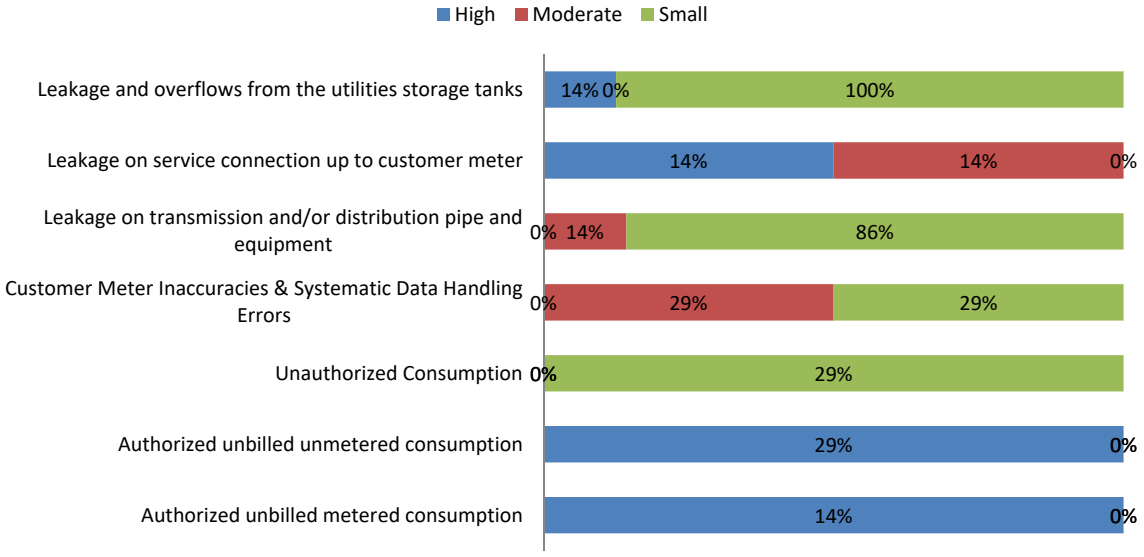
POSITION



Majority respondents are staff

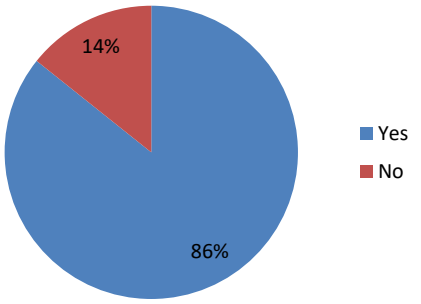
Survey Result

NRW FACTORS at PDAMs



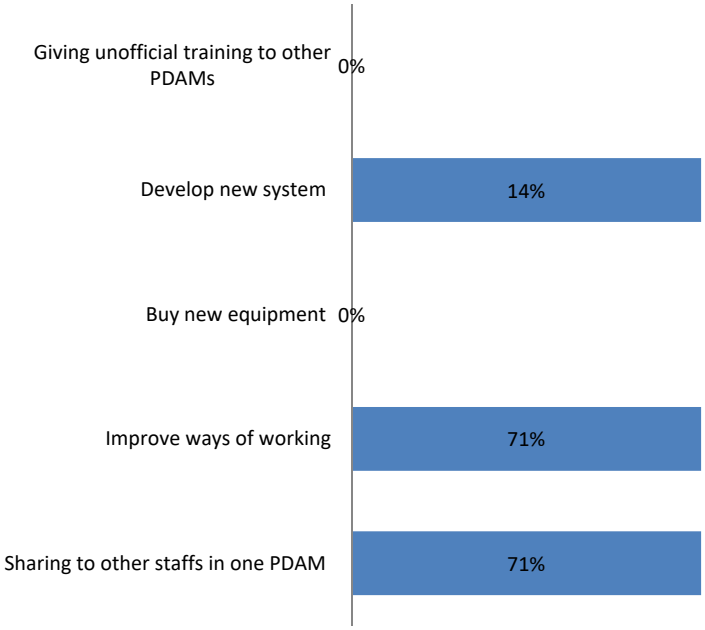
Survey Result

IMPLEMENTATION OF COE KNOWLEDGE TO PDAMs



Majority respondents are implemented already

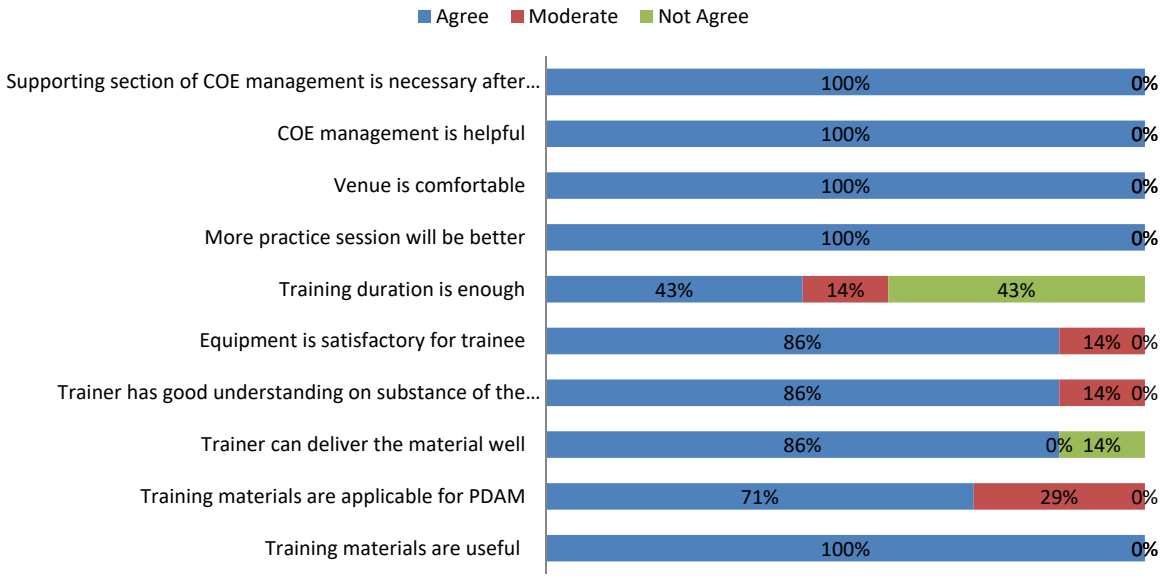
IMPLEMENTATION WAY OF COE KNOWLEDGE



Majority respondents are sharing to other staff in their PDAM

Survey Result

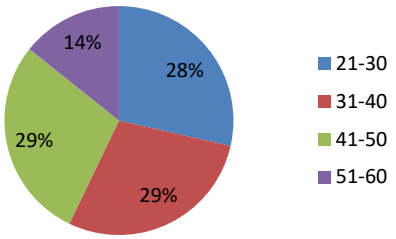
TRAINING EXPERIENCE



KABUPATEN/KOTA TRAINING – EE

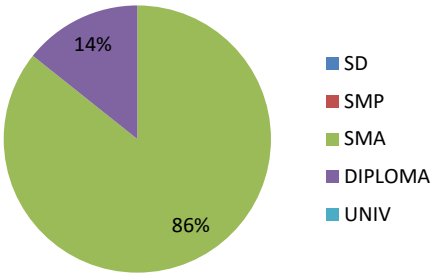
Respondent Profile

AGE



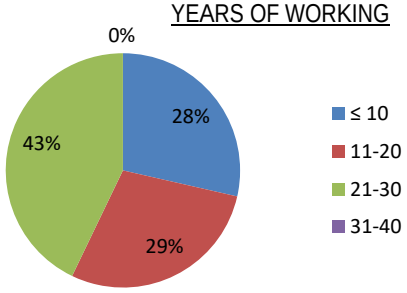
Average respondents are 21-50 y.o

EDUCATION



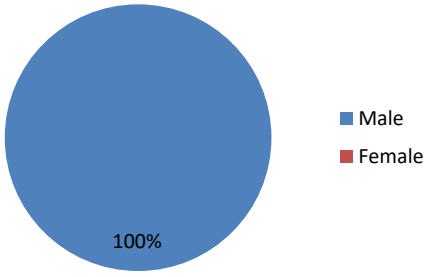
Majority respondents are graduated from High School (SMA)

YEARS OF WORKING



Majority respondents have 11-20 years experience working in PDAM

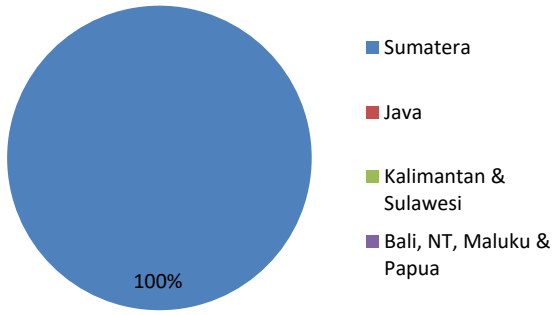
GENDER



All respondents are male

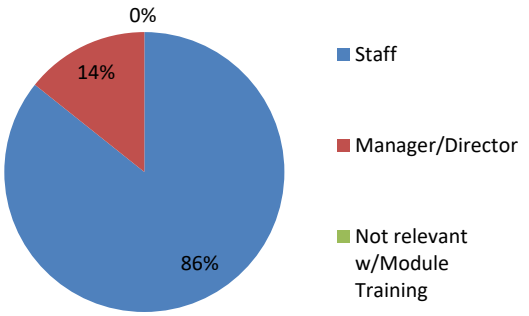
Respondent Profile

ORIGIN OF TRAINEES



All respondents from Sumatera

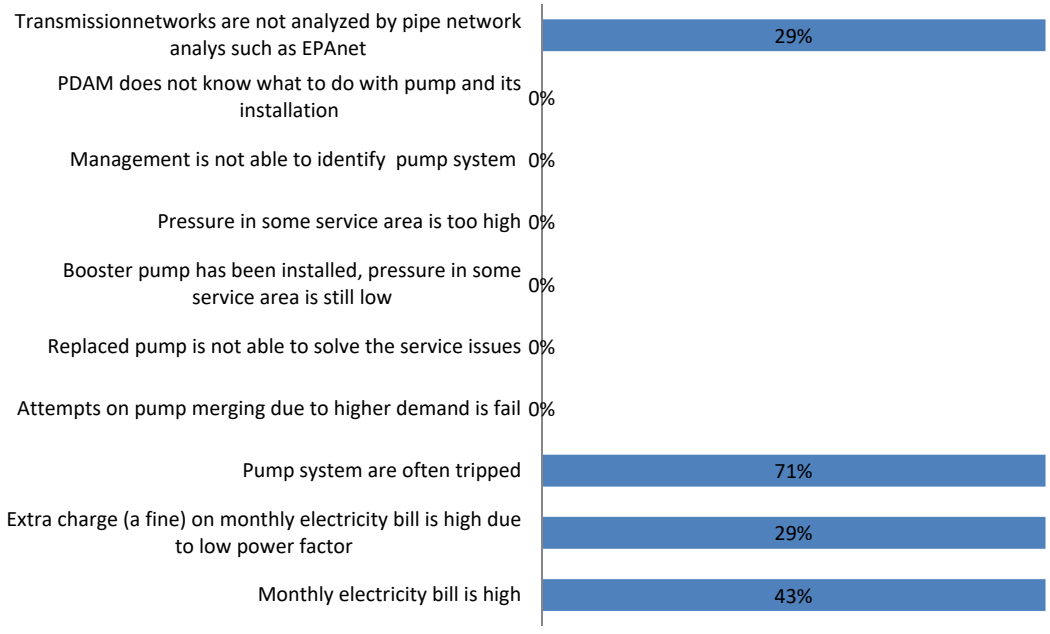
POSITION



Majority respondents are Staff

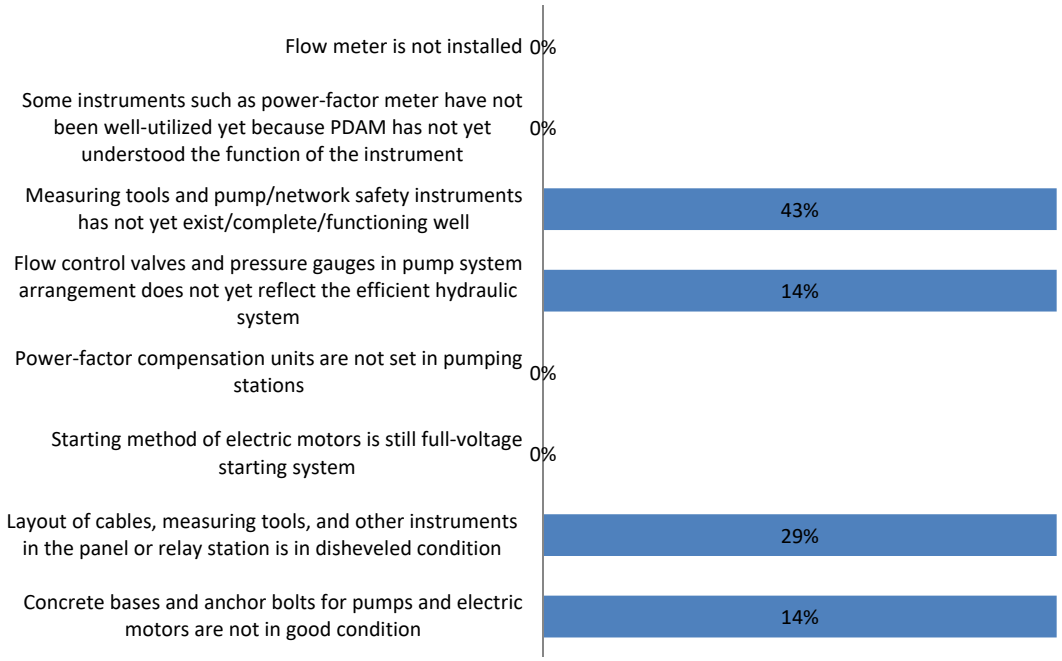
Survey Result

ENERGY PROBLEMS at PDAM



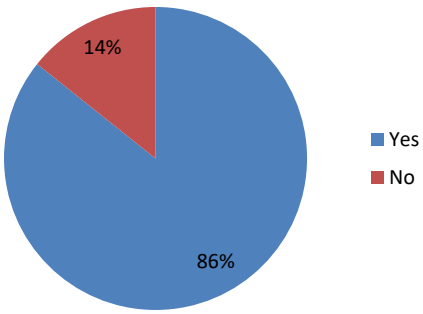
Survey Result

WEAKNESS PUMP at PDAM



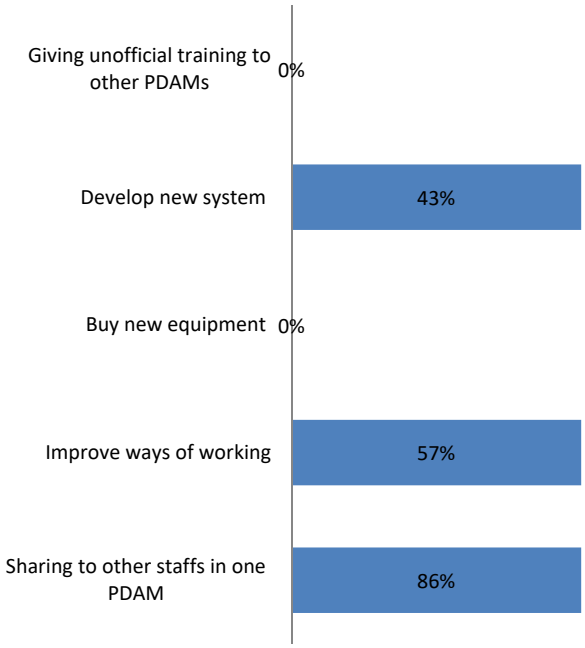
Survey Result

IMPLEMENTATION OF COE KNOWLEDGE at PDAMs



Majority respondents are implemented already

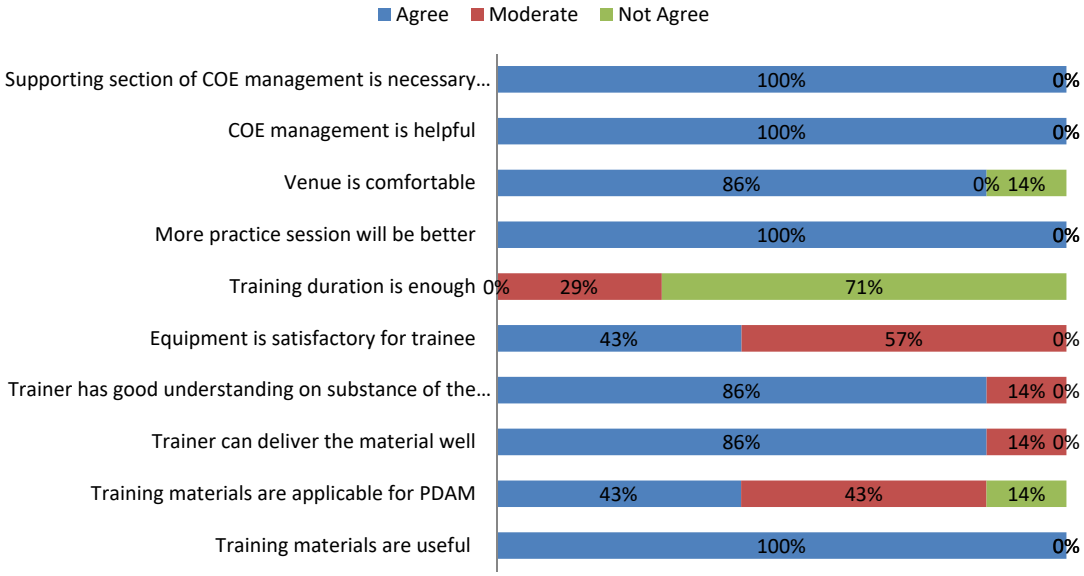
IMPLEMENTATION WAY OF COE KNOWLEDGE



Majority respondents are sharing to other staff in their PDAM

Survey Result

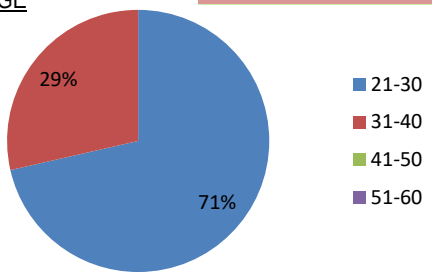
TRAINING EXPERIENCE



KABUPATEN / KOTA TRAINING – SAK ETAP

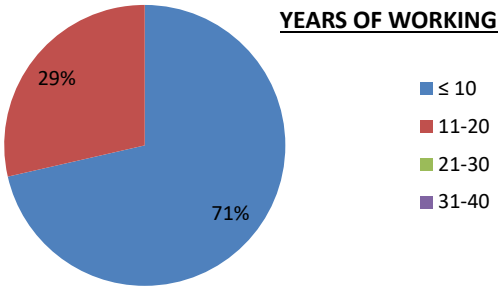
Respondent Profile

AGE



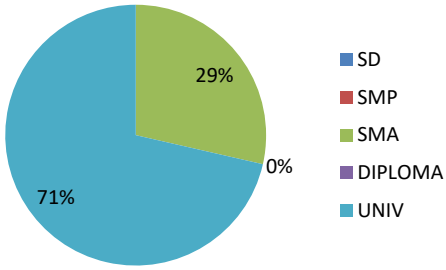
Majority respondents are 21-30 y.o

YEARS OF WORKING



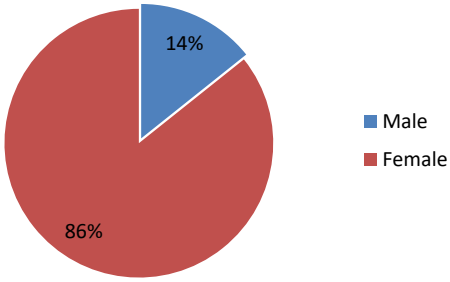
Majority respondents have ≤ 10 years experience working in PDAM

EDUCATION



Majority respondents are graduated from Unversity

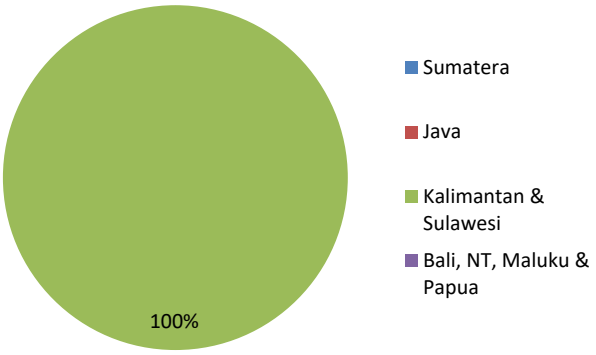
GENDER



Majority respondents are Female

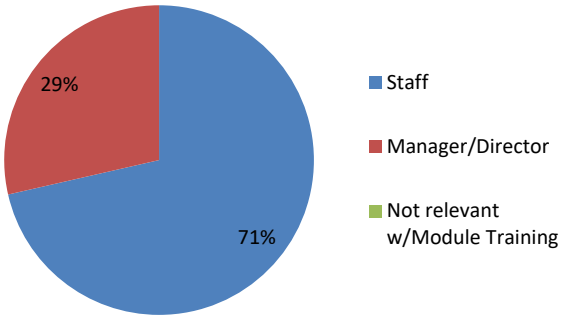
Respondents Profile

ORIGIN OF TRAINEES



All respondents from Kalimantan & Sulawesi

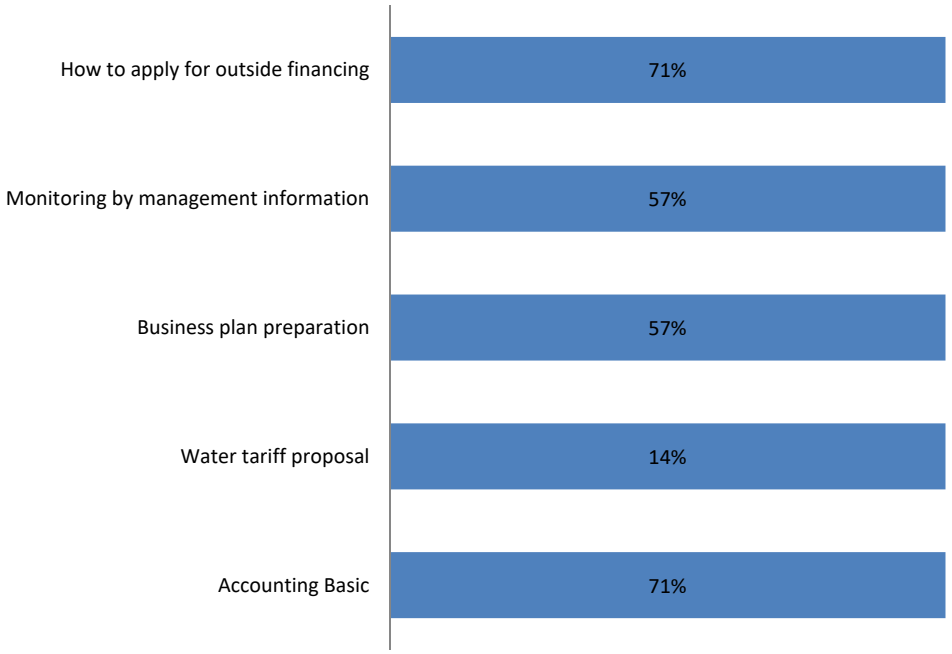
POSITION



Majority respondents are Staff

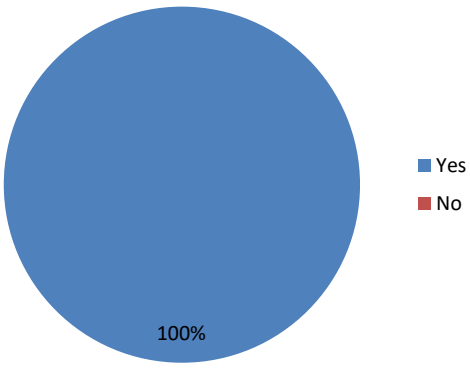
Survey Result

SUBJECT WANT TO LEARN FROM FAM

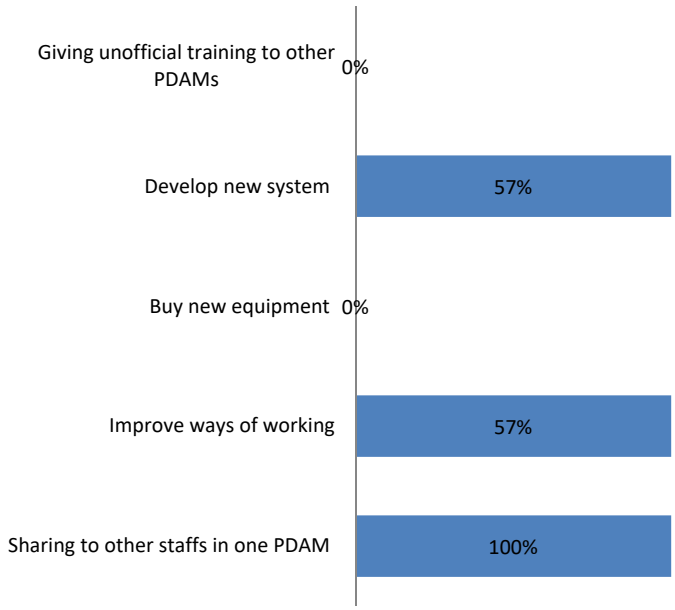


Survey Result

IMPLEMENTATION COE KNOWLEDGE at PDAMs



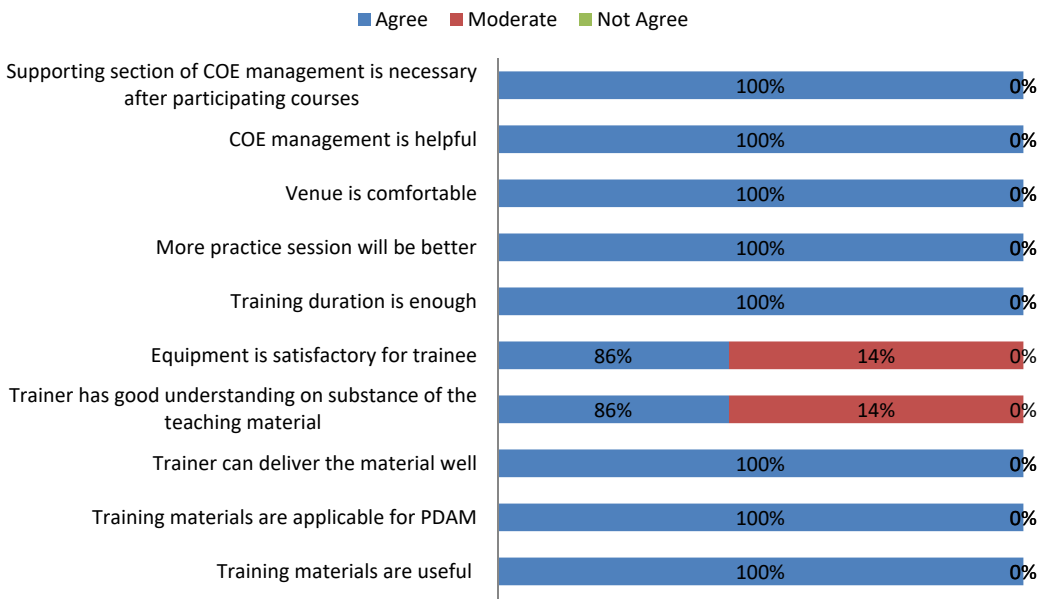
All respondents are implemented already



All respondents are sharing to other staff in their PDAM

Survey Result

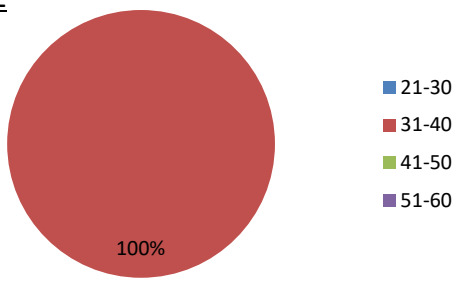
TRAINING EXPERIENCE



PROVINCIAL TRAINING – GIS

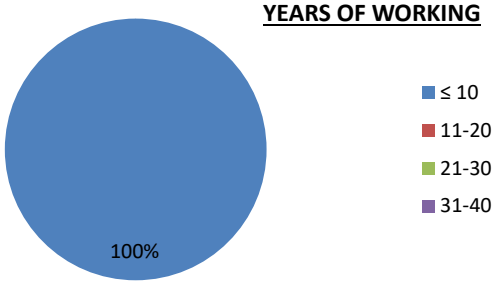
Respondent Profile

AGE



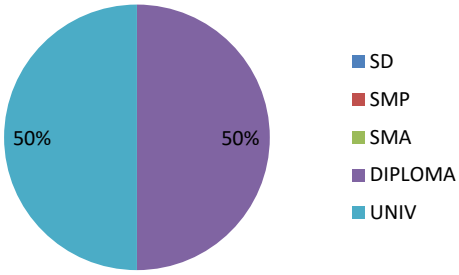
Majority respondents are 31-40 y.o

YEARS OF WORKING



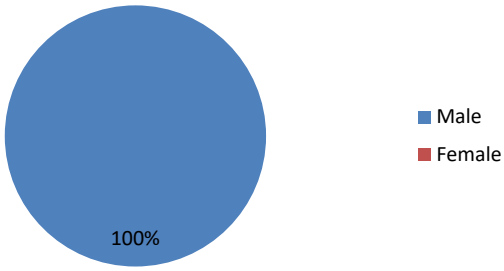
All respondents have ≤ 10 years experience working in PDAM

EDUCATION



Average respondents are graduated from Diploma & Unversity

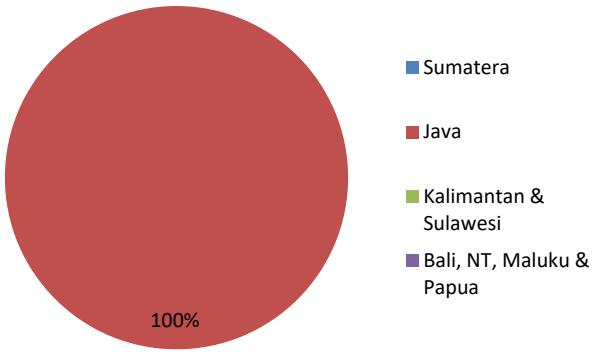
GENDER



All respondents are Male

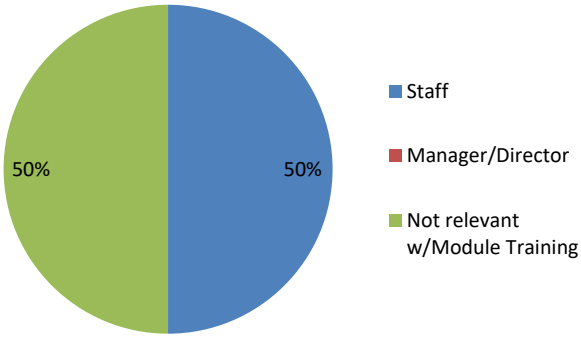
Respondents Profile

ORIGIN OF TRAINEES



All respondents from Java

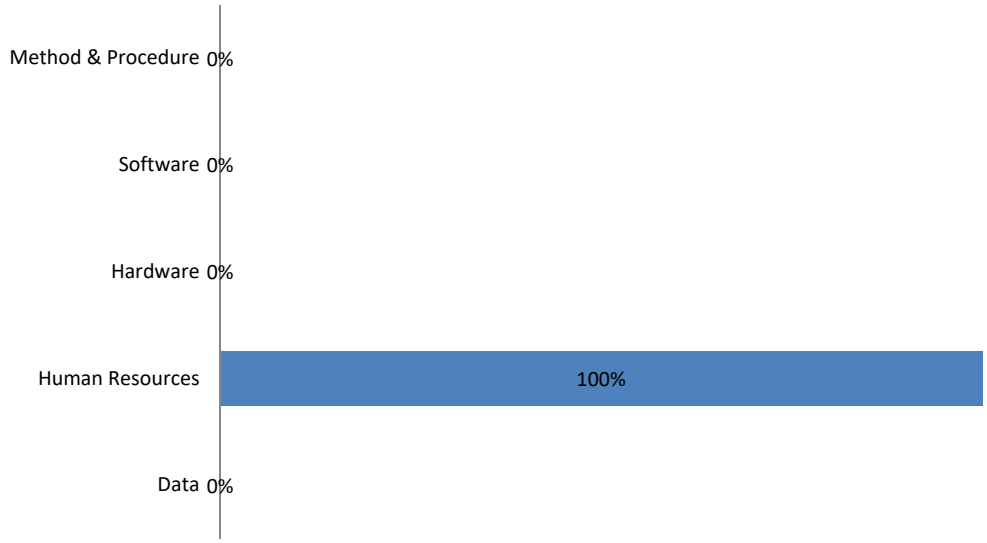
POSITION



Average respondents are Staff & Not relevant

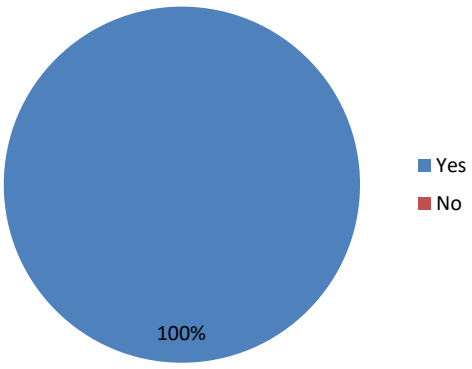
Survey Result

DIFFICULT COMPONENT TO SUCCESSFUL IMPLEMENTATION OF (GIS)

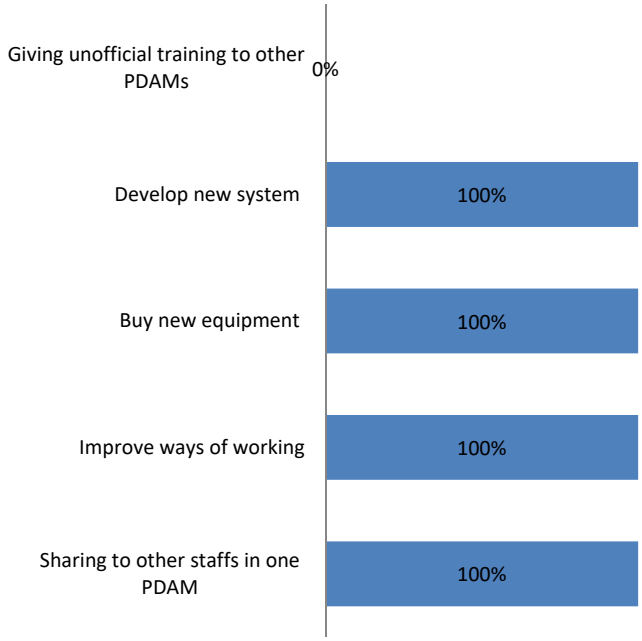


Survey Result

IMPLEMENTATION COE KNOWLEDGE at PDAMs



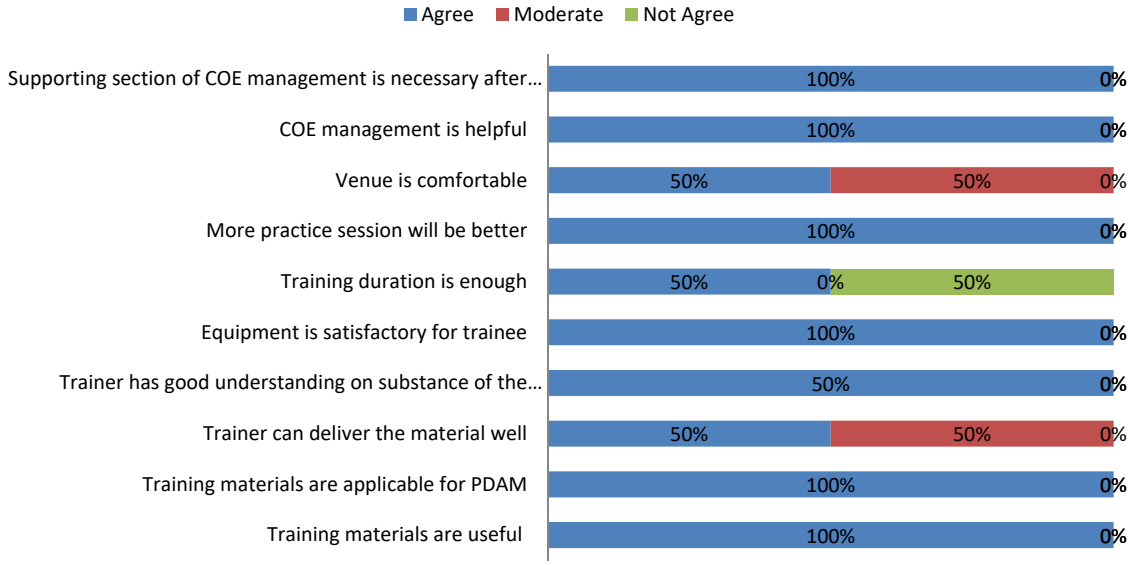
All respondents are implemented already



All respondents awere doing as above

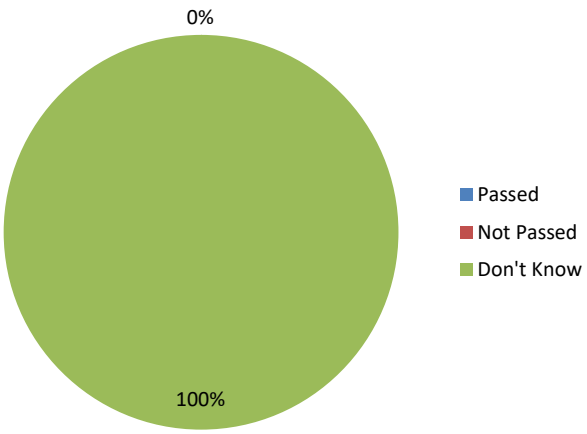
Survey Result

TRAINING EXPERIENCE



Survey Result

FINAL TEST RESULT

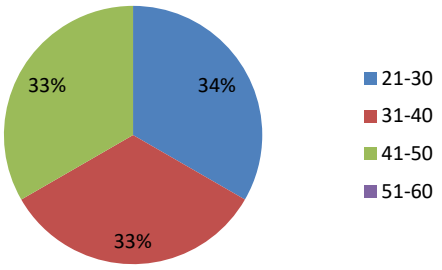


All respondents don't know the result

KABUPATEN / KOTA TRAINING – GIS

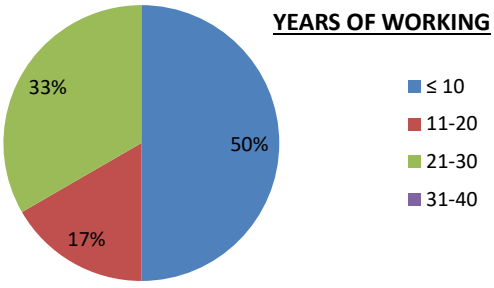
Respondent Profile

AGE



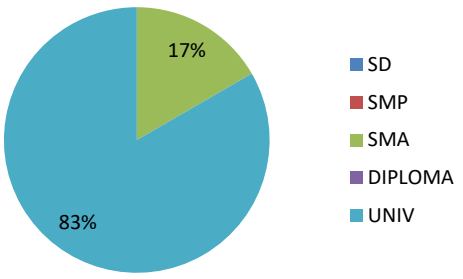
Average respondents are 21-50 y.o

YEARS OF WORKING



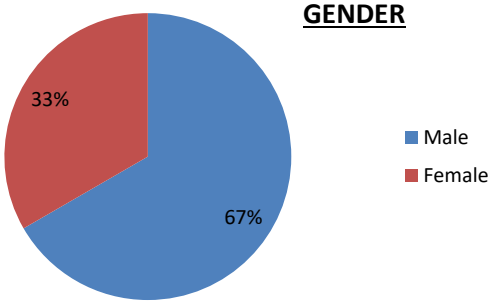
Majority respondents have ≤ 10 years experience working in PDAM

EDUCATION



Majority respondents are graduated from Unversity

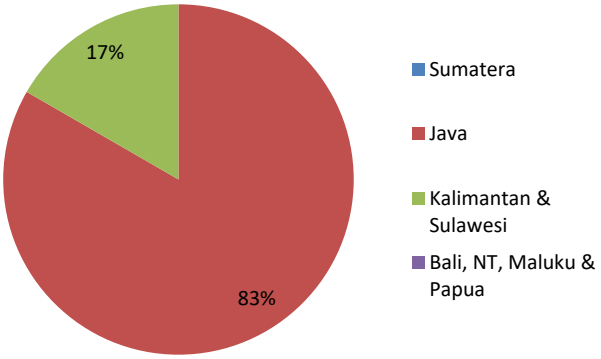
GENDER



Majority respondents are Male

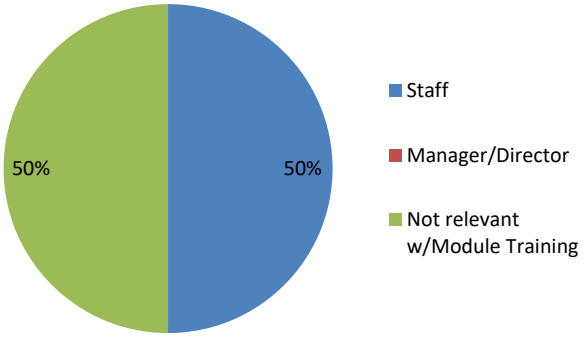
Respondents Profile

ORIGIN OF TRAINEES



Majority respondents from Java

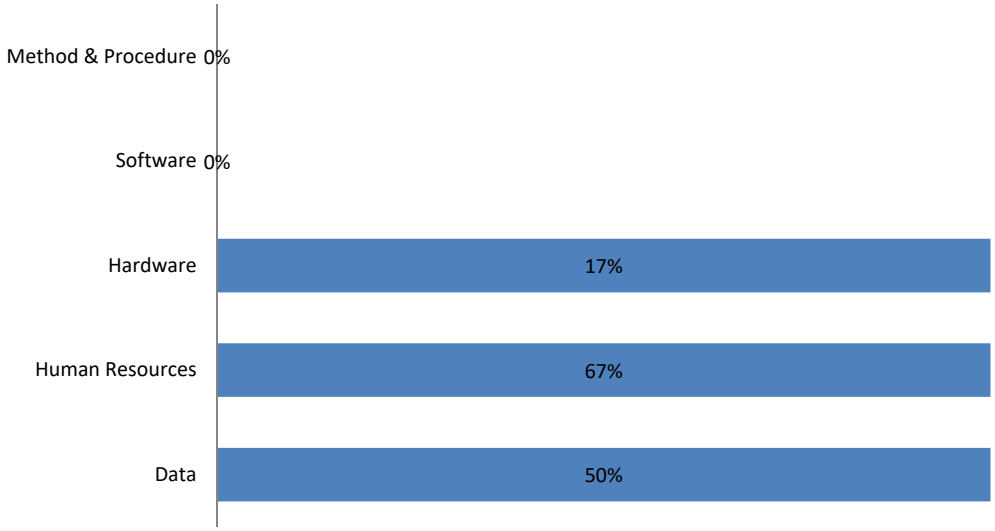
POSITION



Average respondents are Staff & Not relevant

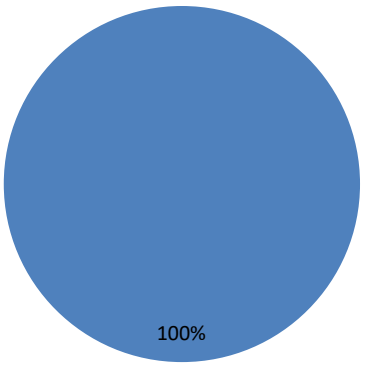
Survey Result

DIFFICULT COMPONENT TO SUCCESSFUL IMPLEMENTATION OF (GIS)

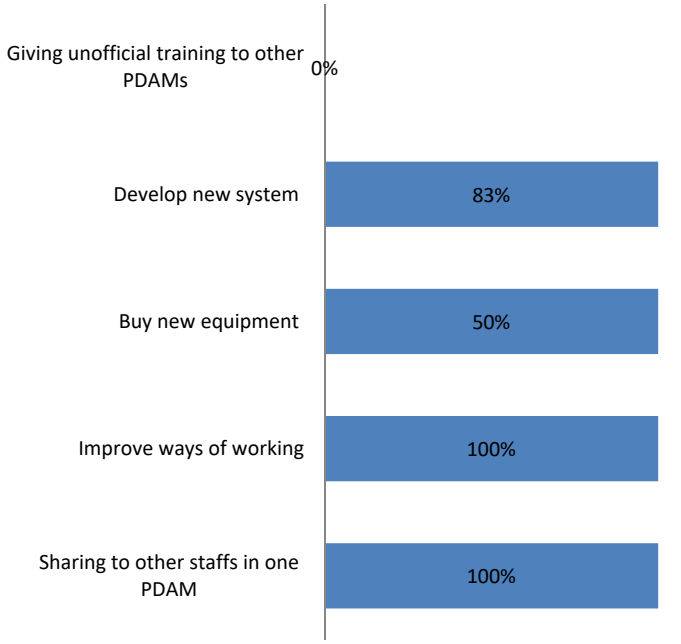


Survey Result

IMPLEMENTATION COE KNOWLEDGE at PDAMs



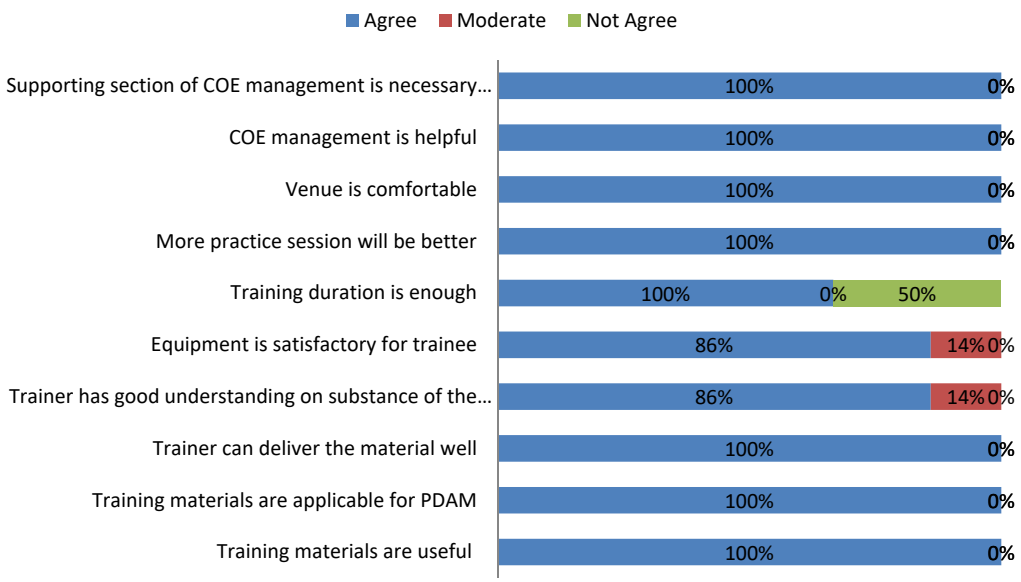
All respondents are implemented already



All respondents are sharing to other staff in their PDAM

Survey Result

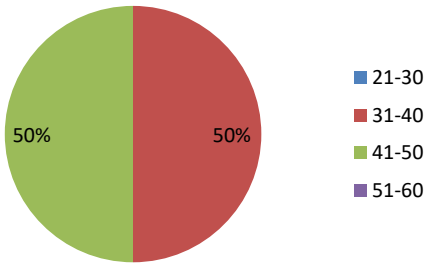
TRAINING EXPERIENCE



PROVINCIAL TRAINING – WTP

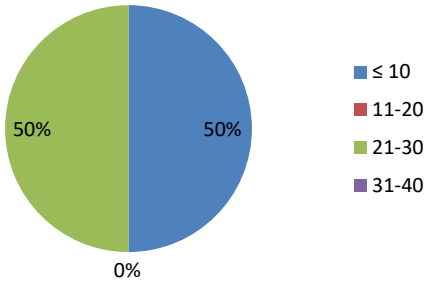
Respondent Profile

AGE



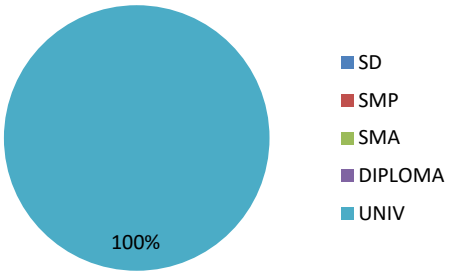
Average respondents are 31-50 y.o

YEARS OF WORKING



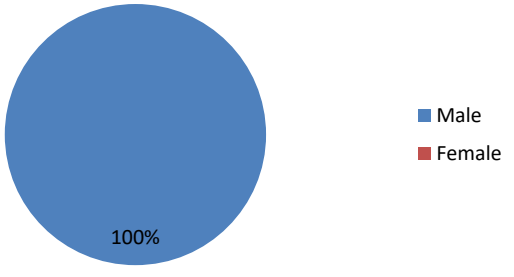
Average respondents have ≤ 10 & 21-30years experience working in PDAM

EDUCATION



All respondents are graduated from Unversity

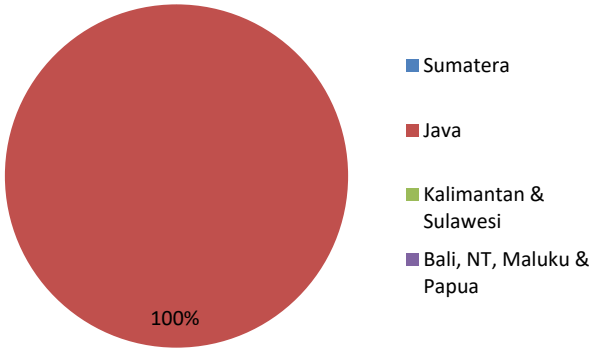
GENDER



All respondents are Male

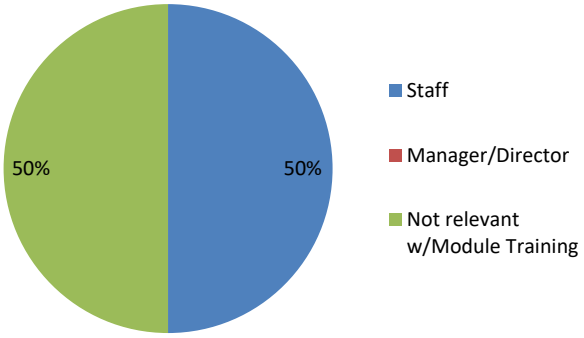
Respondents Profile

ORIGIN OF TRAINEES



All respondents from Java

POSITION



Average respondents are Staff & Not relevant

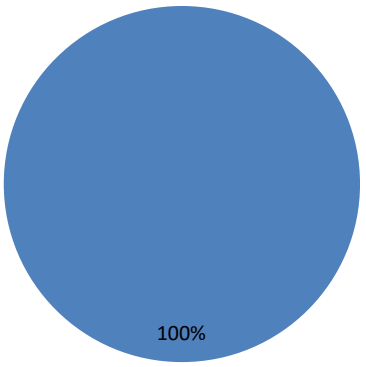
Survey Result

PERFORMANCE INDICATOR THAT AFFECT SUCCESS OF OPERATION OF WTP at the PDAMs

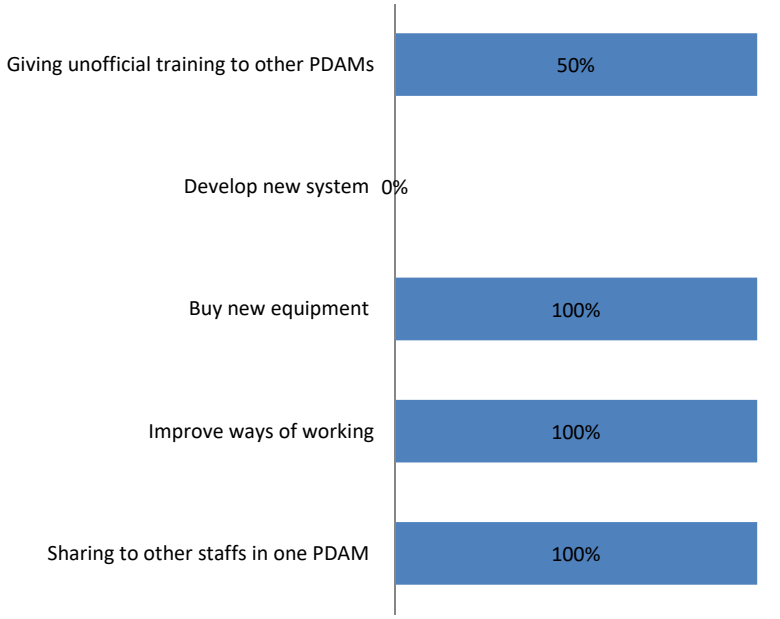
Coagulation	Flocculation	Sedimentation	Filtration
Increasing Debit		Good raw water	No problem
There is a waste		Turbidity	The quality of silica sand is bad

Survey Result

IMPLEMENTATION COE KNOWLEDGE at PDAMs



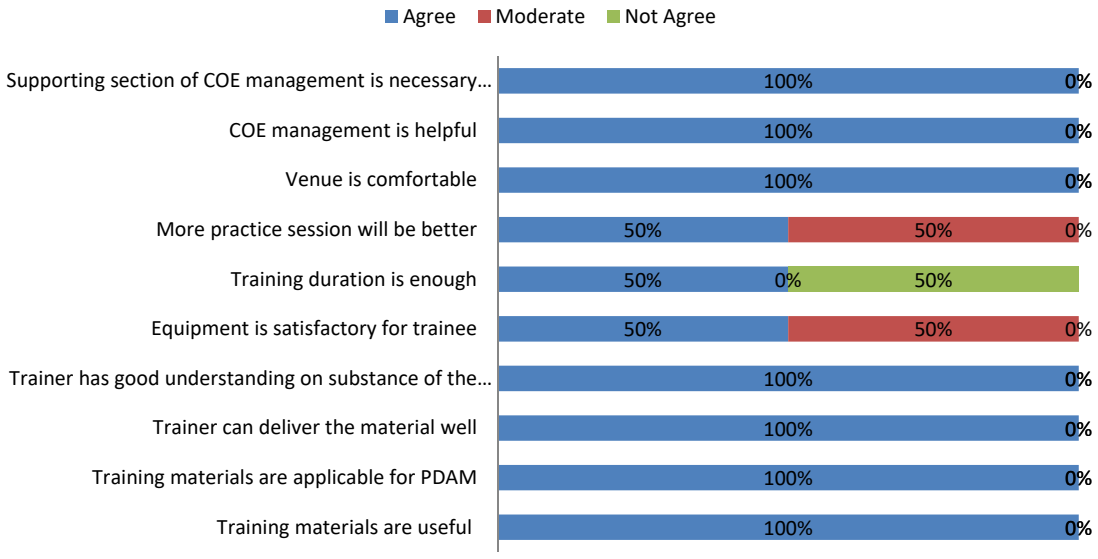
All respondents are implemented already



All respondents awere doing as above

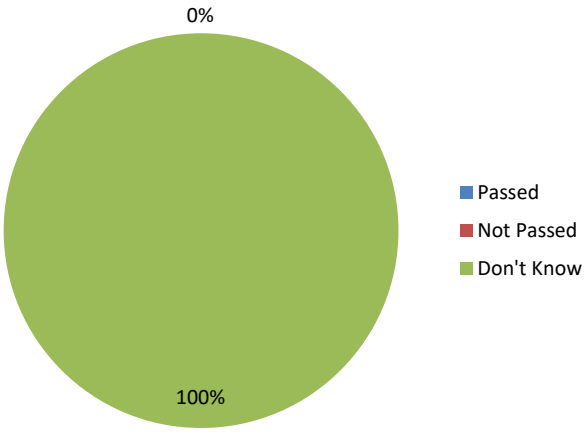
Survey Result

TRAINING EXPERIENCE



Survey Result

FINAL TEST RESULT

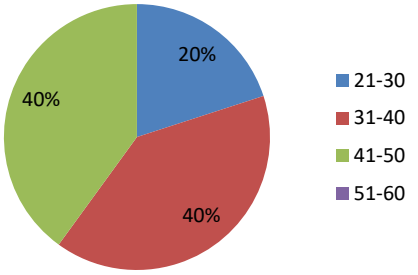


All respondents don't know the result

KABUPATEN / KOTA TRAINING – WTP

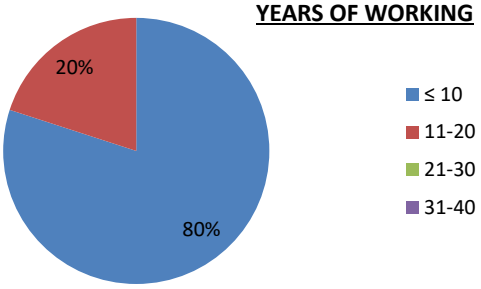
Respondent Profile

AGE



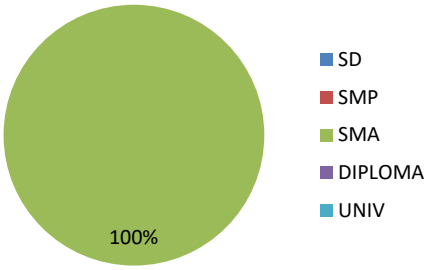
Average respondents are 31-50 y.o

YEARS OF WORKING



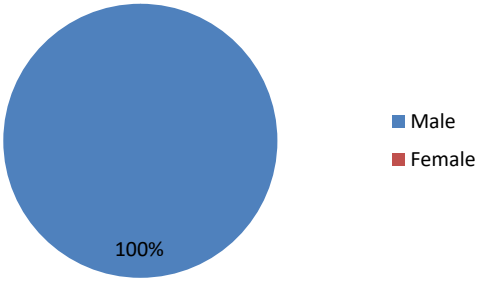
Majority respondents have ≤ 10 years experience working in PDAM

EDUCATION



Majority respondents are graduated from High School (SMA)

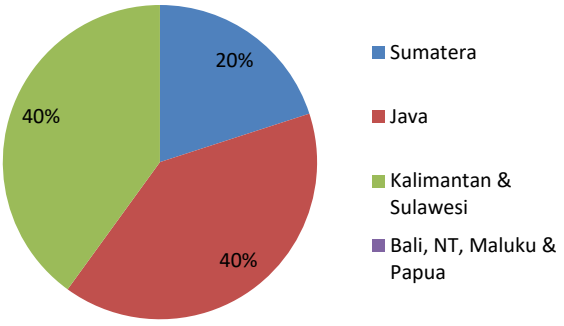
GENDER



Majority respondents are Male

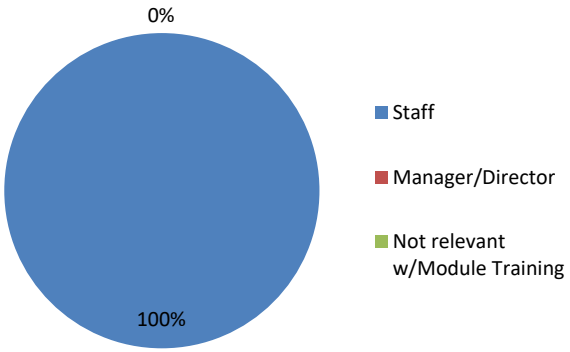
Respondents Profile

ORIGIN OF TRAINEES



Average respondents from Java, Kalimantan & Sulawesi

POSITION



All respondents are Staff

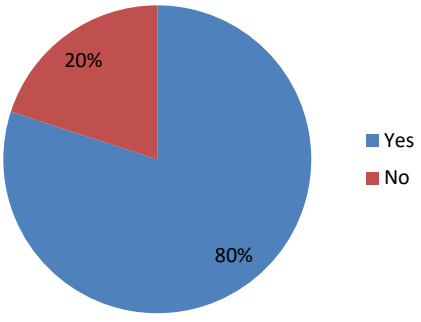
Survey Result

PERFORMANCE INDICATOR THAT AFFECT SUCCESS OF OPERATION OF WTP at the PDAMs

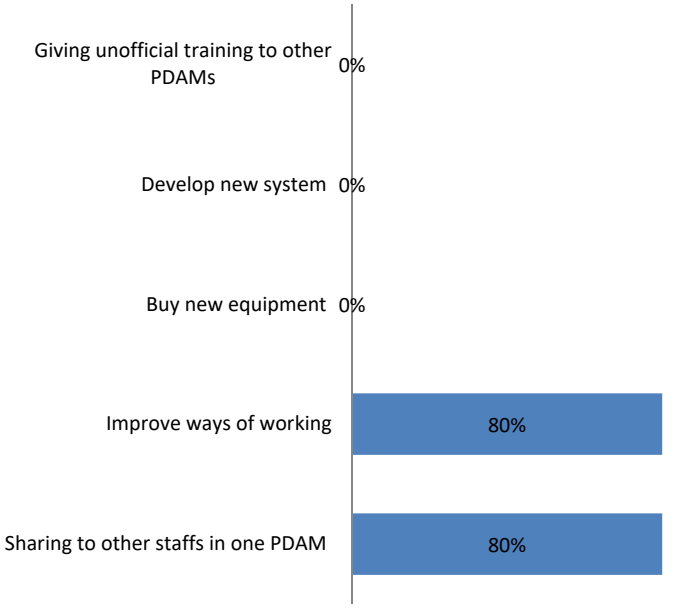
Coagulation	Flocculation	Sedimentation	Filtration
Re-optimization tools		Good	There is damage to amerol sand
Some part use chemical		Some part use chemical	No Problem
Manual	Manual	Based on estimation	No Problem
Manual		No Problem	No Problem

Survey Result

IMPLEMENTATION COE KNOWLEDGE at PDAMs



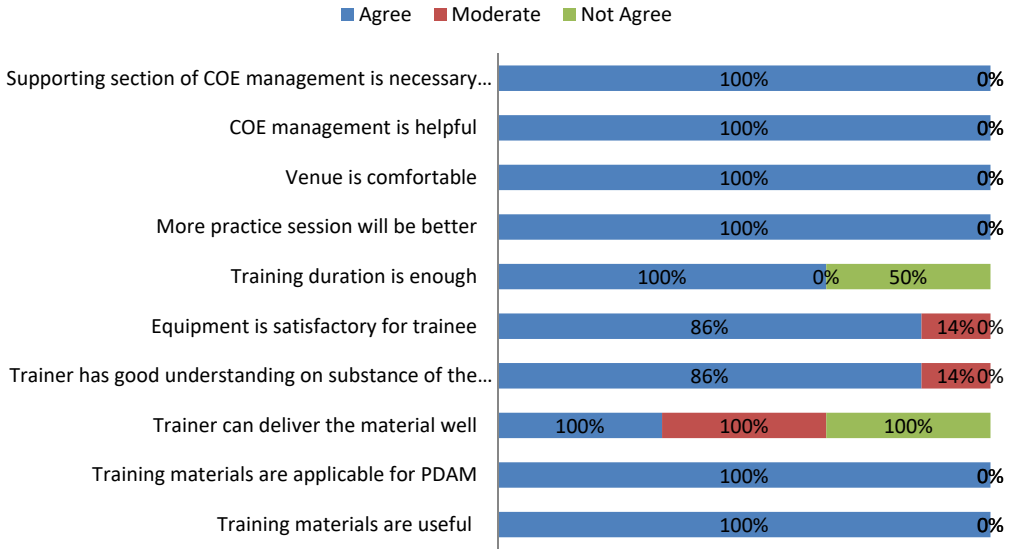
Majority respondents are implemented already



Majority respondents are sharing to other staff in their PDAM

Survey Result

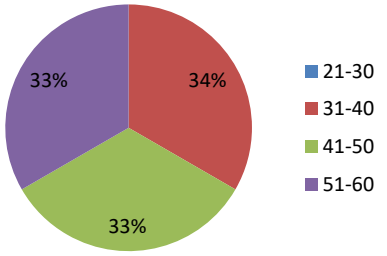
TRAINING EXPERIENCE



PROVINCIAL TRAINING – CR

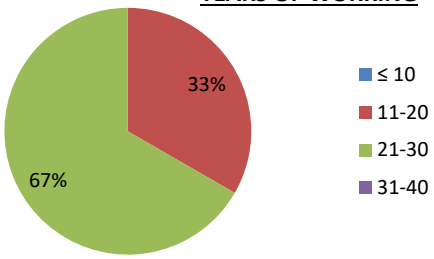
Respondent Profile

AGE



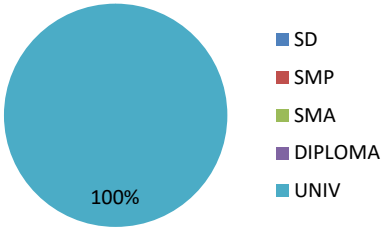
Average respondents are 31-60 y.o

YEARS OF WORKING



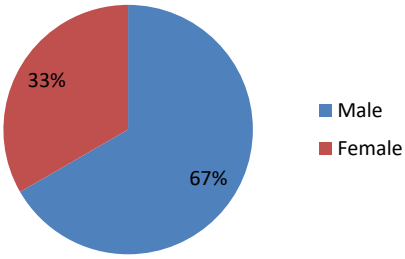
Average respondents have ≤ 10 & 21-30years experience working in PDAM

EDUCATION



All respondents are graduated from Unversity

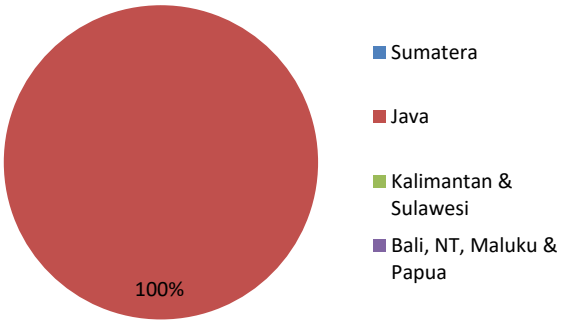
GENDER



Majority respondents are Male

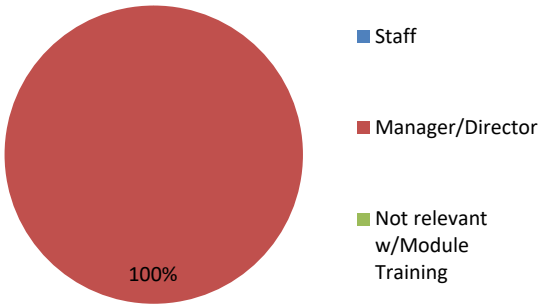
Respondents Profile

ORIGIN OF TRAINEES



All respondents from Java

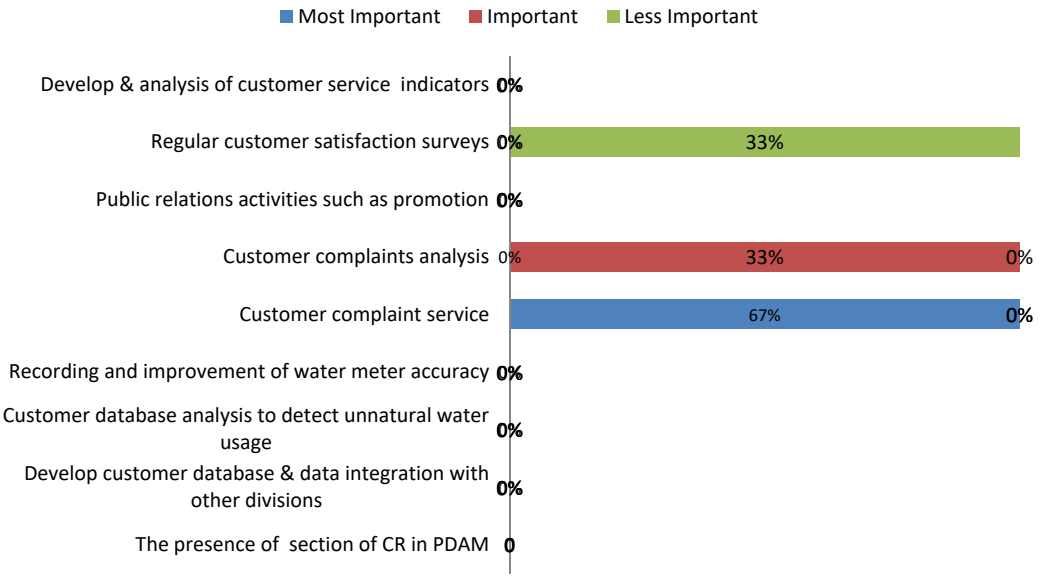
POSITION



All respondents are Manager/Director

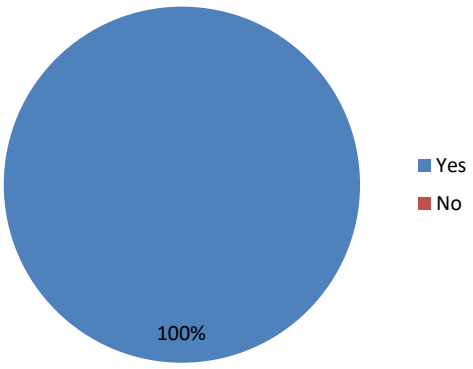
Survey Result

PERFORMANCE INDICATOR THAT AFFECT SUCCESS OF OPERATION OF CR at the PDAMs

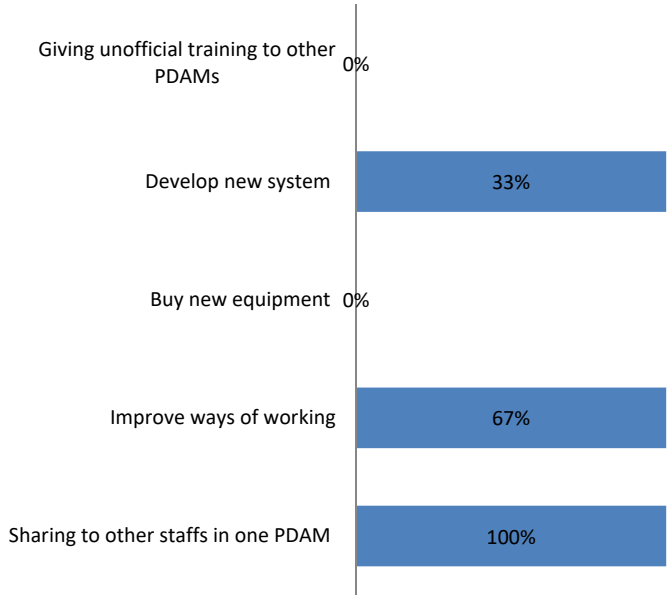


Survey Result

IMPLEMENTATION COE KNOWLEDGE at PDAMs



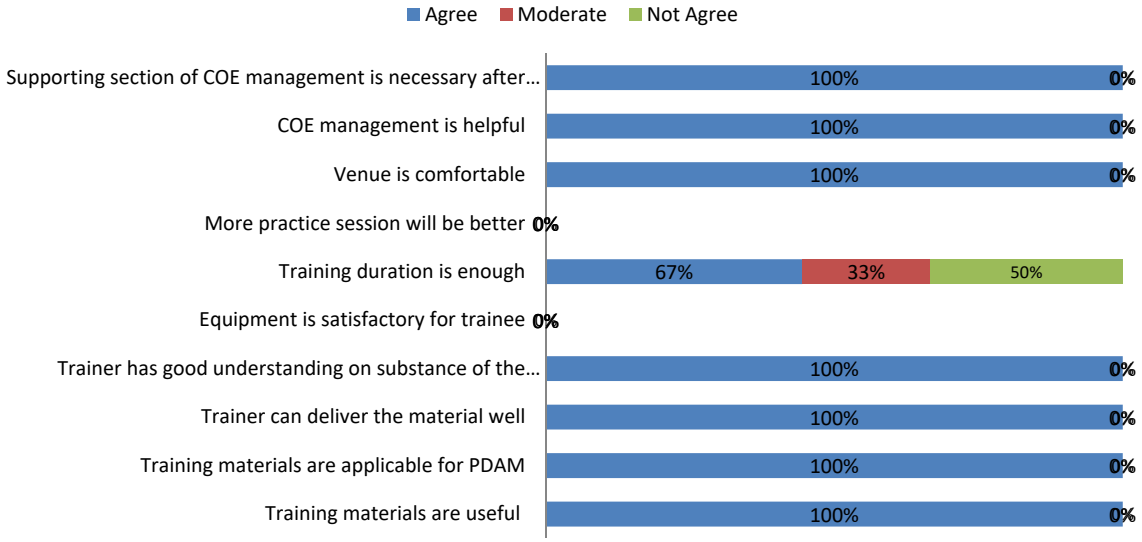
All respondents are implemented already



All respondents awere doing as above

Survey Result

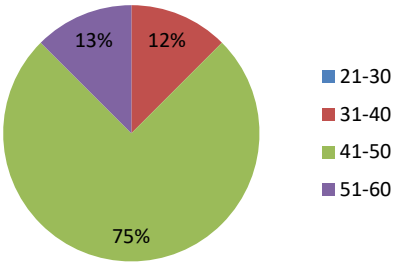
TRAINING EXPERIENCE



KABUPATEN / KOTA TRAINING – CR

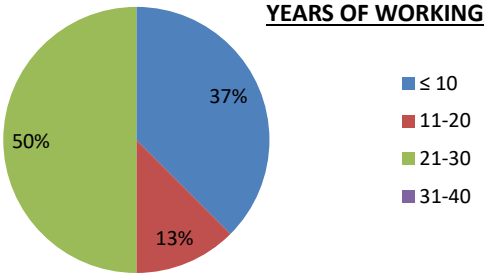
Respondent Profile

AGE



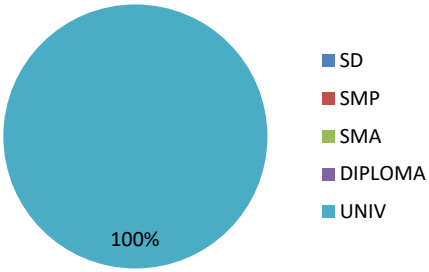
Majority respondents are 41-50 y.o

YEARS OF WORKING



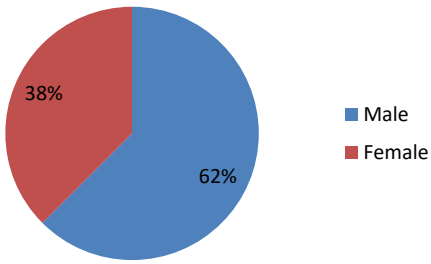
Majority respondents have 21-30 years experience working in PDAM

EDUCATION



All respondents are graduated from University

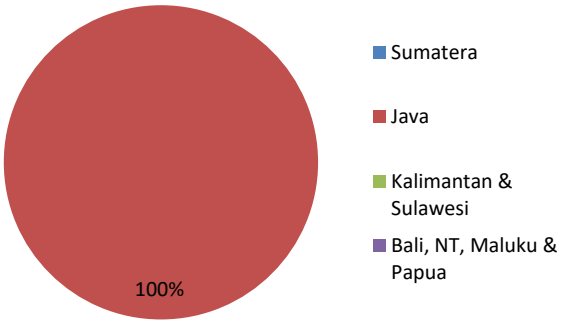
GENDER



Majority respondents are Male

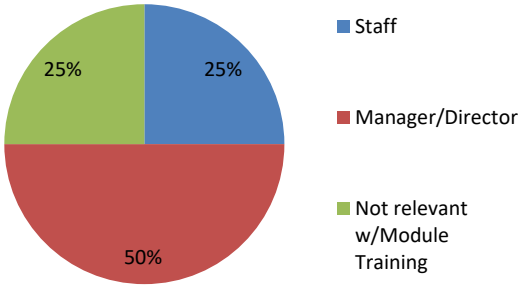
Respondents Profile

ORIGIN OF TRAINEES



All respondents from Java

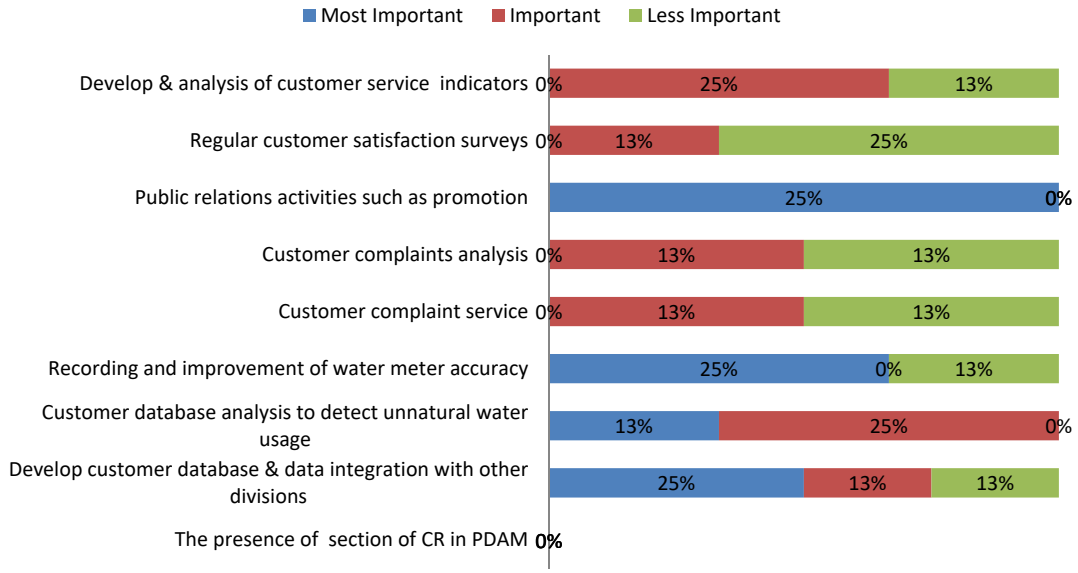
POSITION



Majority respondents are Manager/Director

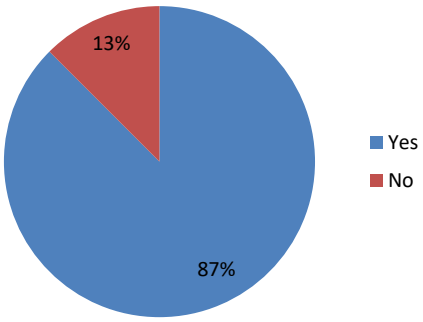
Survey Result

PERFORMANCE INDICATOR THAT AFFECT SUCCESS OF OPERATION OF CR at the PDAMs

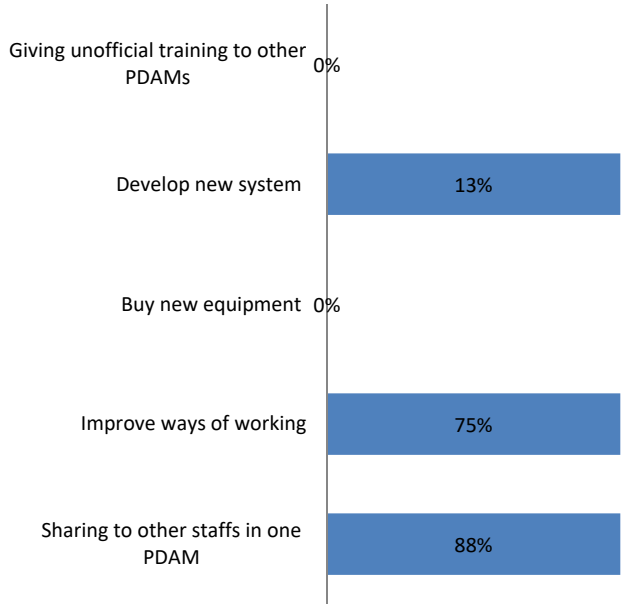


Survey Result

IMPLEMENTATION COE KNOWLEDGE at PDAMs



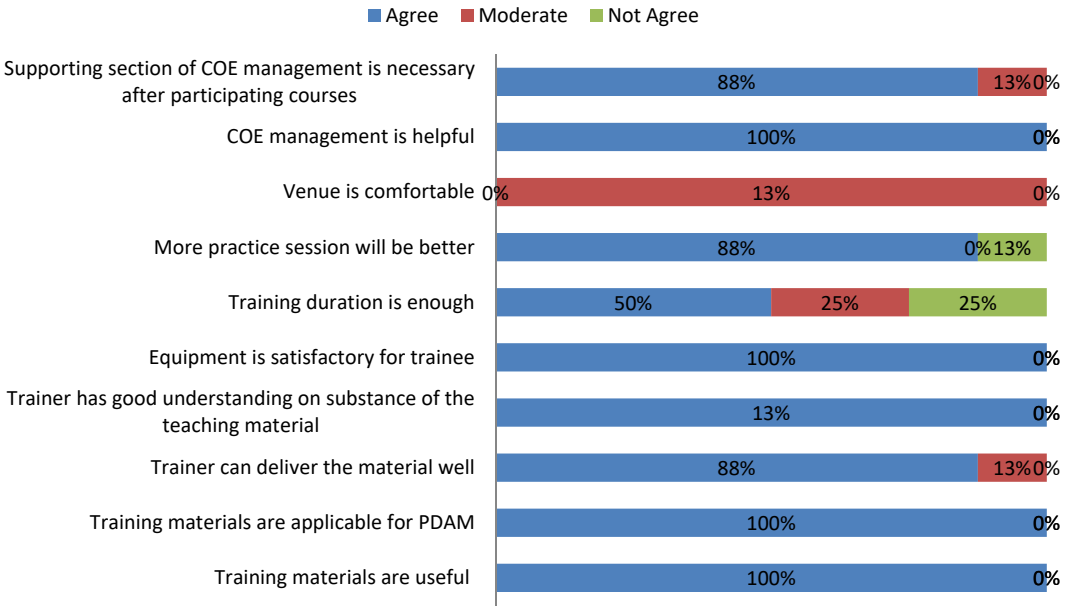
Majority respondents are implemented already



Majority respondents are sharing to other staff in their PDAM

Survey Result

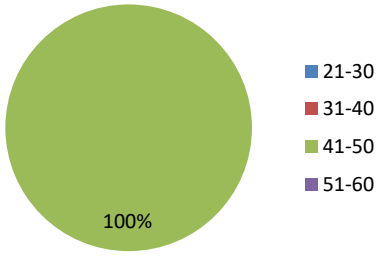
TRAINING EXPERIENCE



PROVINCIAL TRAINING – FAM

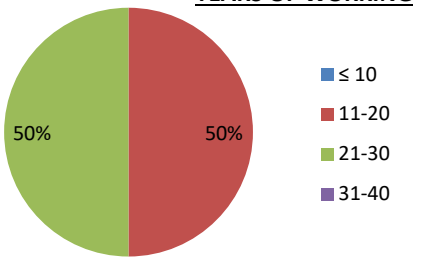
Respondent Profile

AGE



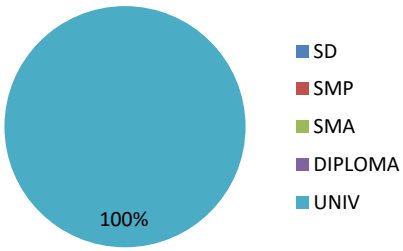
Majority respondents are 41-50 y.o

YEARS OF WORKING



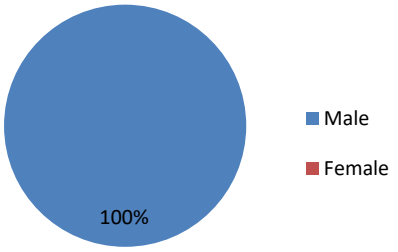
Average respondents have 11-30 years experience working in PDAM

EDUCATION



All respondents are graduated from Unversity

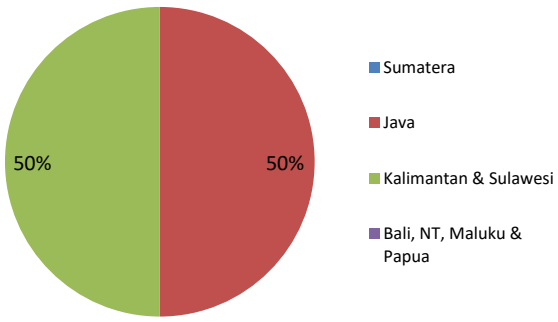
GENDER



Majority respondents are Male

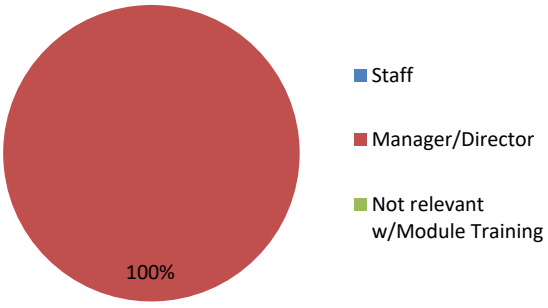
Respondents Profile

ORIGIN OF TRAINEES



Average respondents from Java, Kalimantan & Sulawesi

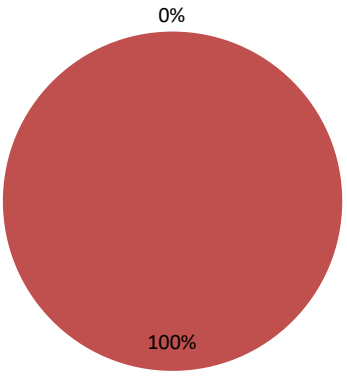
POSITION

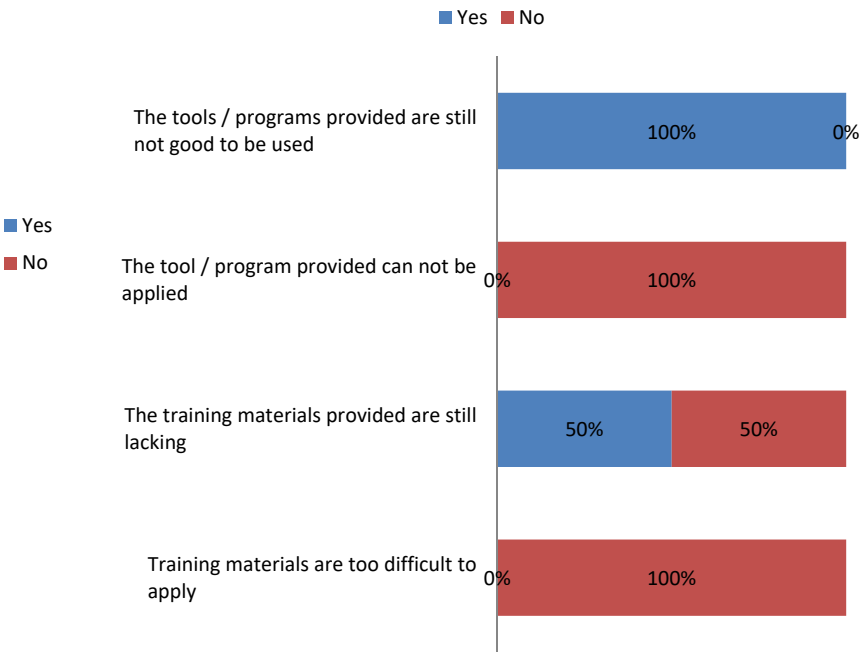


All respondents are Manager/Director

Survey Result

DEVELOPING OWN BUSINESS PLAN at the PDAMs

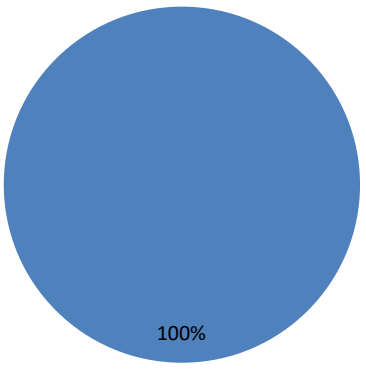


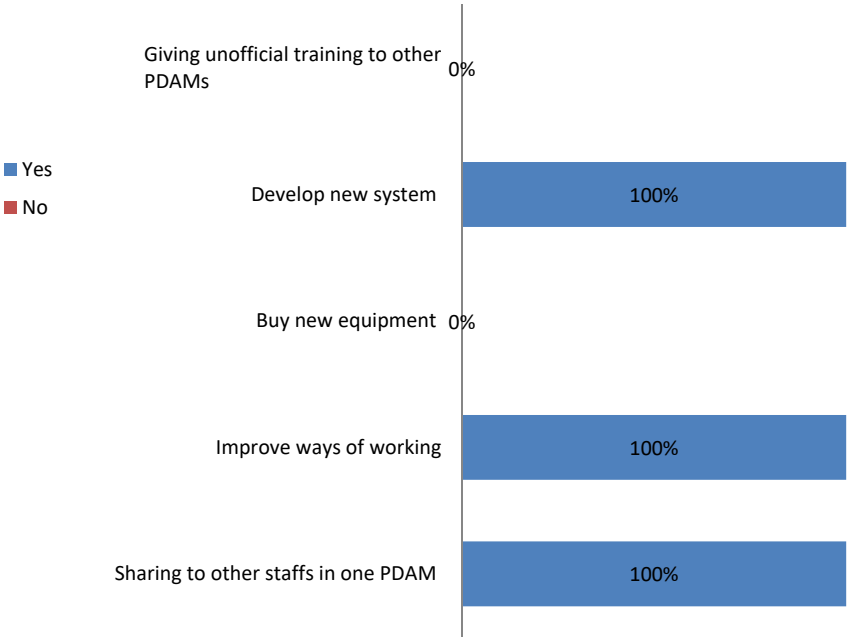


All respondents thought that developing own business plan can't be achieved

Survey Result

IMPLEMENTATION COE KNOWLEDGE at PDAMs



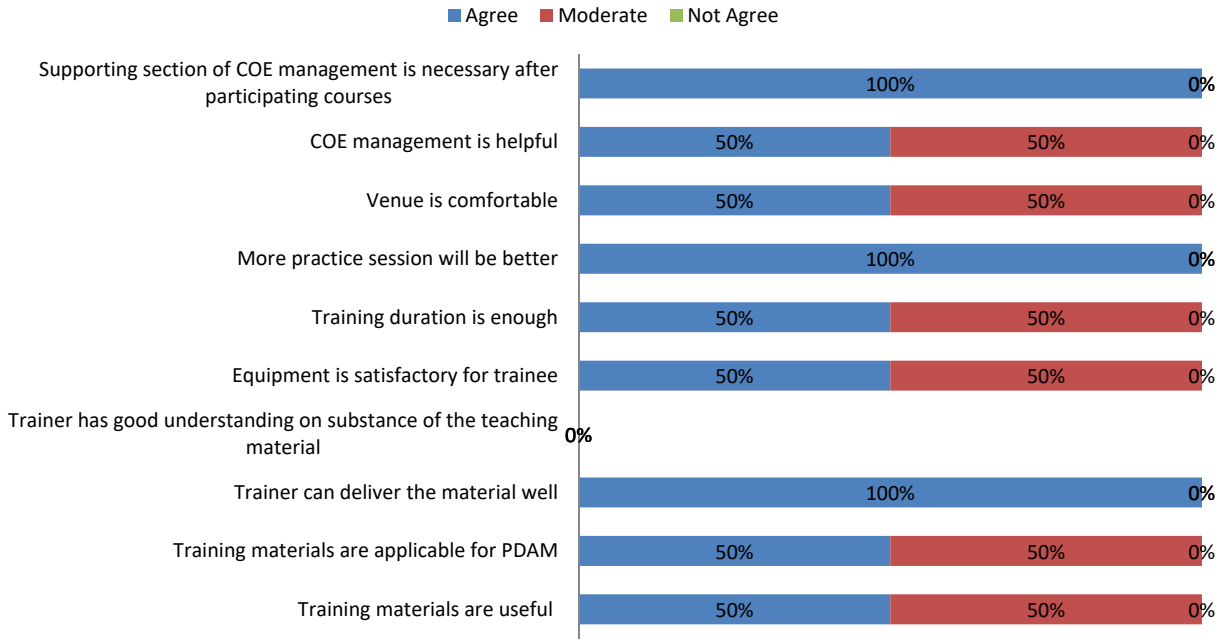


All respondents are implemented already

All respondents were doing as above

Survey Result

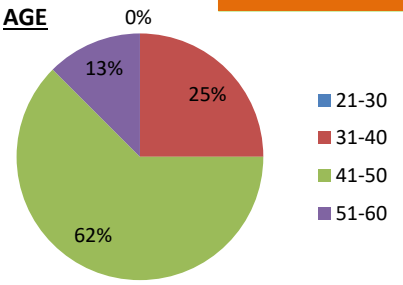
TRAINING EXPERIENCE



KABUPATEN / KOTA TRAINING – FAM

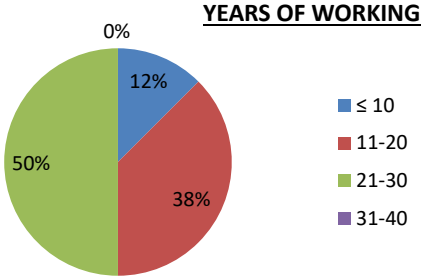
Respondent Profile

AGE



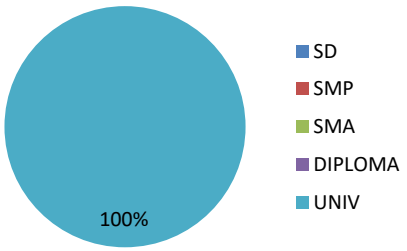
Majority respondents are 41-50 y.o

YEARS OF WORKING



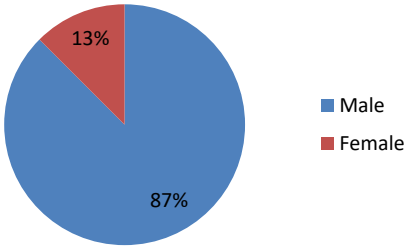
Majority respondents have 21-30 years experience working in PDAM

EDUCATION



All respondents are graduated from Unversity

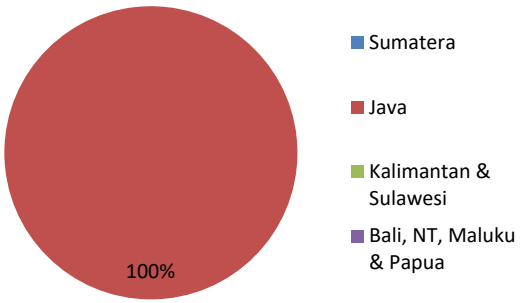
GENDER



Majority respondents are Male

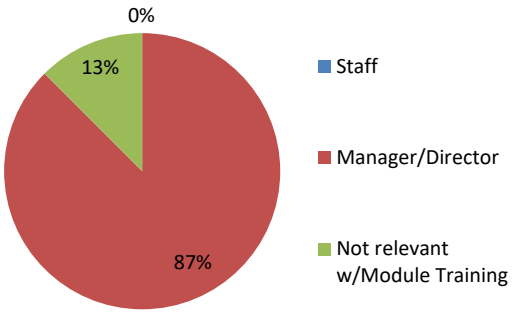
Respondents Profile

ORIGIN OF TRAINEES



All respondents from Java

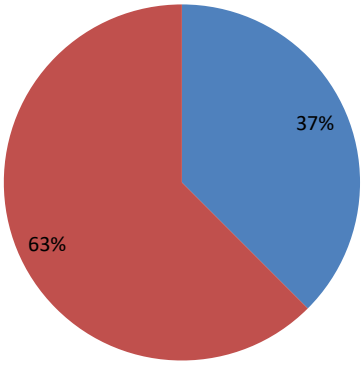
POSITION

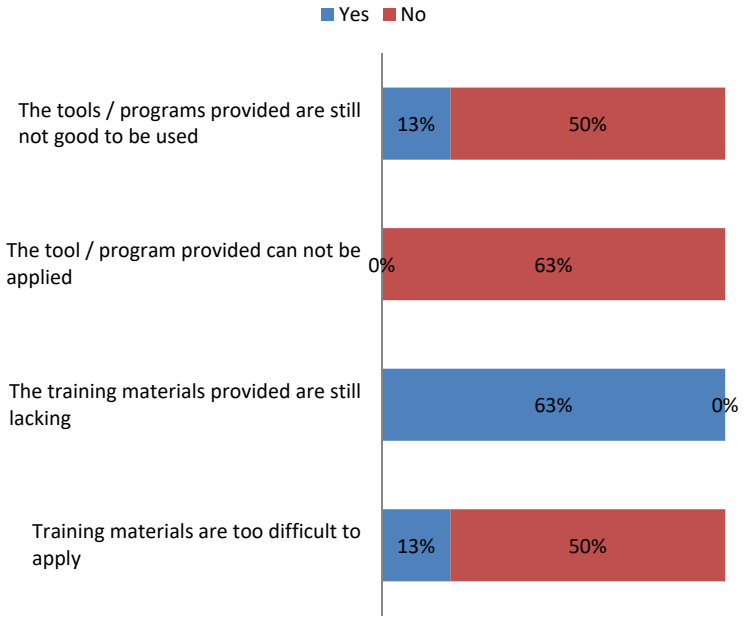


Majority respondents are Manager/Director

Survey Result

DEVELOPING OWN BUSINESS PLAN at the PDAMs

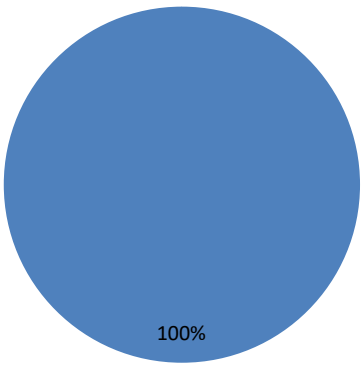


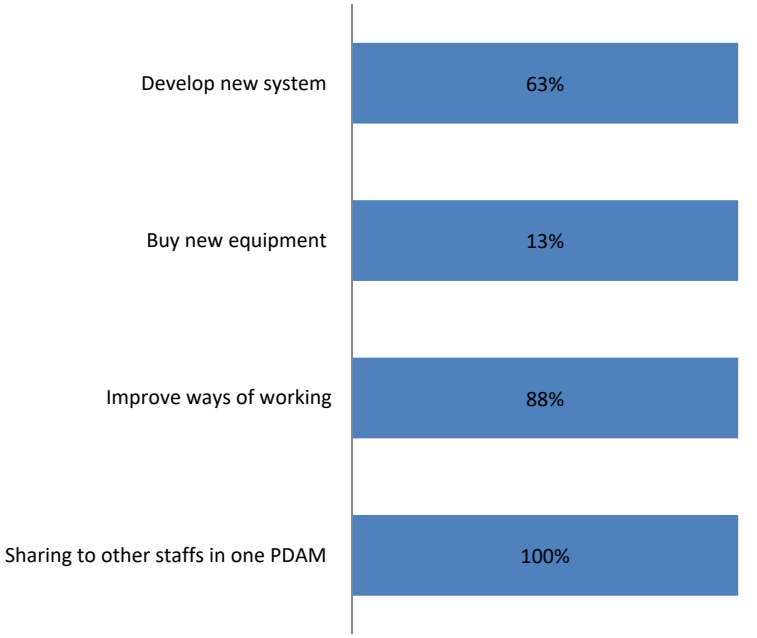


Majority respondents thought that developing own business plan can't be achieved

Survey Result

IMPLEMENTATION COE KNOWLEDGE at PDAMs



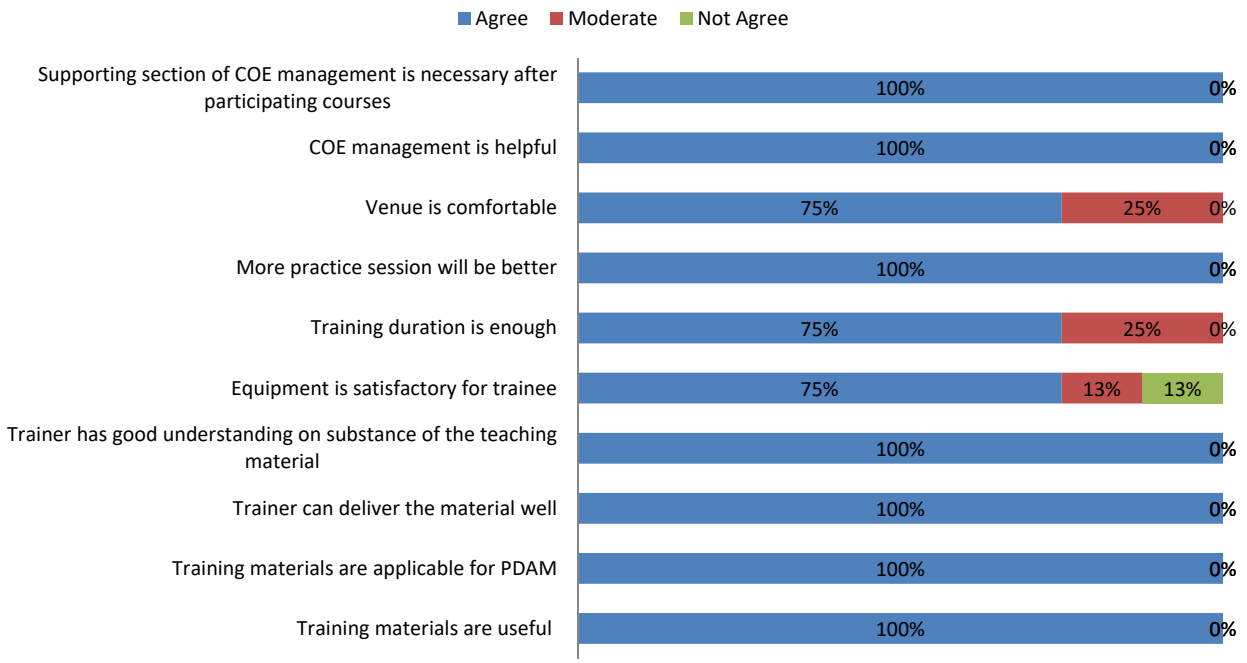


All respondents are implemented already

All respondents were sharing to other staffs

Survey Result

TRAINING EXPERIENCE



Terima kasih

ありがとうございました