

The Project for Strengthening the Capacity for Training Operation and Management for Ethiopian Water Technology Institute (EWTI)



1. Background of the Project

The Federal Democratic Republic of Ethiopia, hereinafter referred to as “Ethiopia”, achieved its Millennium Development Goal target of 57 percent of the population having access to safe drinking water according to the UNICEF/WHO Joint Monitoring Programme (JMP) Report as of 2015. However, this rate is still far behind the country’s target. Current activities related to the water sector in Ethiopia are carried out based upon the Second Growth and Transformation Plan (GTP II), which has set a goal of 83 percent of the population having access to safe drinking water (75 percent in urban and 85 percent in rural areas) by 2020.

Under these circumstances, the Japan International Cooperation Agency (JICA) has been supporting the Ethiopian Water Technology Centre (EWTEC), which is the predecessor of the Ethiopian Water Technology Institute (EWTI), for 15 years from 1998 to 2013. In addition to the

support in hard components such as the procurement of equipment and machines, JICA has supported the development of training programmes through the technical cooperation projects. This led to building the foundation of EWTEC as a core training centre for water-related technicians and engineers. In 2013, EWTEC was transformed into a public institute called EWTI, which is destined to become a leading institute of human resource development in the water sector in Ethiopia.

Under GTP-II for the water sector, it is stipulated that 13,000 technicians and engineers need to be newly trained to achieve target goals of access to safe drinking water by 2020. EWTI, among other training institutes is one of the key organizations in human resource development in the water sector in the country. However, EWTI still faces challenges such as the inadequate capacity of trainers, inadequate organizational capacity in training operation and management, as well as inadequacies in institutional



Figure 1: Issue addressed by the Project

management. In order for EWTI to be an independent and sustainable training institute, it is critical that it overcomes these challenges with adequate organizational capacity and quality human resources.

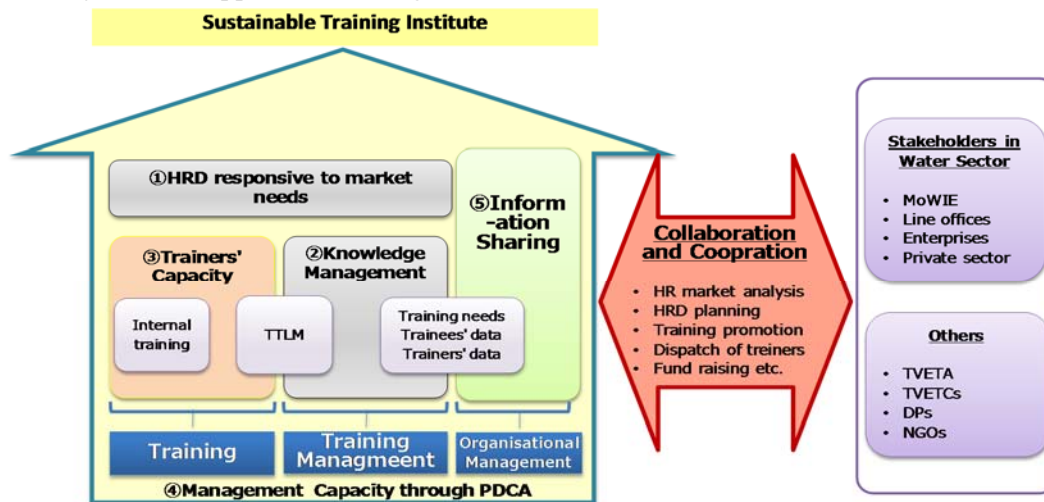
2. Approach to address the Problems

The Project is aiming at strengthening the capacity of EWTI in training operations and management through the Project’s activities, such as planning and management of pilot trainings, and the establishment of a systematic and sustainable structure for the internal training.

This Project will support EWTI to get out of

its dependency syndrome, while fully utilizing the accumulated knowledge and skills from the previous experiences through the earlier projects. The basic principle of the Project, therefore, is that the Project’s support is to strengthen EWTI as a fully independent and sustainable training institute.

The Project is intending to contribute to strengthen EWTI’s capacity of training operation and management, capacity of the EWTI trainers, and organisational management through the following 5 technical strategies.



Strategy 1

Human resource development responsive to market needs

What sorts of human resources are needed in the labour market in the water sector? What sorts of skills are required for water technicians? What sorts of training are necessary for human resource development? The Project will support EWTI to be able to conduct research and analysis for planning their training programmes responsive to market needs.

Strategy 2

Knowledge management and utilisation of EWTI's intellectual property

A considerable amount of intellectual property, including training materials and references have disappeared with the ex-trainers who have left the Institute. The Project intends to strengthen EWTI's knowledge management system and maintain and utilise the existing documents and training materials as organisational property, and not as personal property.

Strategy 3

Retention and reproduction of instructional capacity

Retention and reproduction of the trainers' capacity is critically important in upkeeping the standards of the training. The Project is introducing Instructional Design to strengthen the capacity of the EWTI trainers. The Project also intends to establish a system of internal

Box 1: What is Instructional Design (ID)?

ID is a methodology of a systematic approach which leads to optimal training effectiveness, efficiency and attractiveness, aiming at satisfying the capacity development needs of the trainees and the trainees' organisations. ID examines the objectives of the training, and defines "effective training" with clear training targets. A trainer should select the most effective and attractive training method, deliver and evaluate it. The effectiveness of the training should be measured even after s/he goes back from the training to his/her duty station (position), which contributes to improvement of the future trainings.

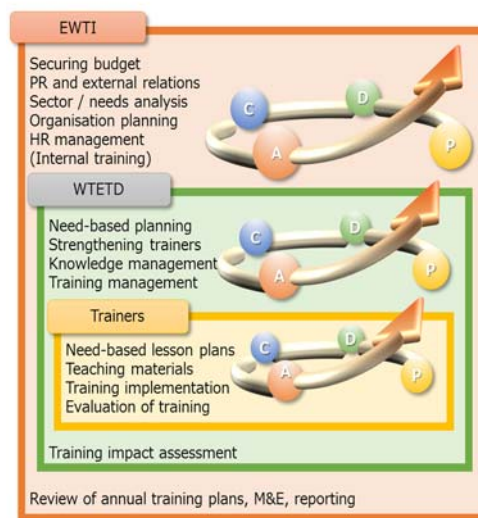
Katsuaki Suzuki Ed., 2004

training so that the knowledge and skills of the trainers are transferred to the other trainers.

Strategy 4

Continuous self-analysis and work practice through PDCA

Plan-Do-Check-Act (PDCA) cycle is known as a management tool widely utilised in business and project management. The Project will promote the application of the PDCA cycle to every process of EWTI's work, so that EWTI is able to provide quality training reflecting the lessons learnt from past experiences.



Strategy 5

Information dissemination through various opportunities

There are many organisations and companies who send their staff to EWTI for training, such as water line offices, public enterprises and private companies. It is very important for EWTI to be recognized as a training institute with a good standard. This should create an enabling environment for EWTI to become an independent institute who can establish a network for collaboration and cooperation, and possibly to then find additional funding sources. The Project supports EWTI by promoting the values of EWTI to the public on various occasions.

[Overall Goals] EWTI continues skill development for technicians and engineers with the Project outputs.

[Project Purpose] EWTI's training operation and management structure is strengthened.

[Output 1] Training management capacity of EWTI is strengthened through PDCA cycle

[Output 2] Training capacity of EWTI's trainers is enhanced through pilot training courses

[Output 3] Implementation structure of internal training for EWTI's trainers is established.

3. Achievements

The activities and the achievements of the Project in Period 1 (June 2017 – July 2018) are presented in the following sections.

[Output 1] Strengthening training operation and management of EWTI

Introduction of PCDA cycle

The PDCA Workshop was held for both technical and administrative staff of EWTI in July 2017. The participants shared the general direction and plans of the Institute, while the Japanese Experts introduced the concept of the PDCA cycle and the 4-level training evaluation model (see the box on p.6).

This workshop was a catalyst the EWTI staff in the standardisation of their training management methods and procedures.



Photo 1 : PDCA Workshop

The EWTI is developing **their training operation and management guidelines** and the

Project will support this process, while developing the training operation and management manual in line with the above guidelines.

Technical Gap Survey (TGS)

A group of EWTI trainers conducted the Technical Gap Survey from July to December 2017. They led the process of designing, the preparation of research tools, data collection, analysis and report making, all with some technical assistance from the Project. The data collection was done in 6 regions and the targeted organisations were the ones who send their staff to EWTI, included water line offices and public enterprises, etc. (39 organisations and 159 respondents). The technical areas covered were groundwater investigation, drilling technology, drilling machinery maintenance and electro-mechanical machinery maintenance, in which the Project will conduct pilot training. The survey outline is shown in the table below;

Item	Method
Job tasks of the technician and the frequency of involvement	Questionnaire survey (self-assessment)
Capacity of the technicians for each job task	Questionnaire survey (self-assessment)
Actual competencies for the above items	Interview

The results of the survey indicated the technical gaps and organisational challenges, such as inadequacy in practical experiences. The findings were reflected in the pilot training plans.

In addition, through the process of this survey, the EWTI trainers who were involved in the survey process gained experience in research and analysis.

Capacity Development Plans, Pilot Training Plans

Based on the results of the TGS, the Pilot Training Plans were formulated with the following steps. The technical areas covered by the pilot training are 1) groundwater investigation (GI, 2) drilling technology (DT), 3)

drilling machinery maintenance (DMMT) and 4) electro-mechanical machinery maintenance (EMMT).

- ◆ Formulation of Capacity Development Plans for the EWTI trainers
- ◆ Selection of pilot training module subjects
- ◆ Formulation of the Pilot Training Plans

In the process of the selection of the pilot training module subjects, the following points were considered;

- ◆ Giving priority to the technical gaps identified from the TGS
- ◆ EWTI is equipped with the adequate human resources and equipment/materials
- ◆ Training duration should be enough to try out the improved teaching methods and TTLM*, but not too long

*TTLM: Training, Teaching and Learning Material

The outline of the Pilot Training Plans is shown in the table below. The duration of the trainings range from 10-15 days, and they are scheduled between September and December 2018.

Technical area	Title	Target
GI	Well drilling administration	Hydrogeologists from RWB
DT	Fluid engineering	Drillers of WWDE
DMMT	Compressor maintenance	Mechanics from RWB, WWCE, WWDE, Private companies
EMMT	Generator maintenance	Mechanics from Woreda Water Offices and Town Water Service Utilities

*RWB: Regional Water Bureau, WWCE: Water Works and Construction Enterprise, WWDE: Water Works and Drilling Enterprise

Improvement of trainees' recruitment and selection methods

In order to increase the effectiveness of the training, the Project is intending to improve the methods of trainees' recruitment and selection. The following points will be proposed for the envisaged pilot training.

- ◆ EWTI will inform the stakeholders that they will accept only the trainees who fulfill the requirements (this information will be delivered with the training plans)
- ◆ EWTI will start the process of trainees' recruitment well in advance of the time of the training so that the stakeholders have enough time for selecting the trainees'
- ◆ The stakeholders should select the right persons according to the given criteria.
- ◆ EWTI will make a final decision on the acceptance of the trainees.

Knowledge Management (KM) Training

A series of activities to strengthen knowledge management of EWTI were implemented for the management staff, the trainers and the IT officers. An external trainer from the Ethiopian Management Institute was invited and facilitated the process using the following steps;

- ① Organisational analysis done by the external trainer (interviews and observations)
- ② Problem analysis with the external trainer, the EWTI management staff and the Project
- ③ Knowledge Management Training for the practitioners (the trainers, IT Officers, etc.)
- ④ Knowledge Management Awareness Raising Training for the management staff

In the training sessions, the external trainer introduced the importance and the basic concepts of KM (tacit and explicit knowledge, methods and process of KM, etc.). The participants discussed the issues and future steps through group work and gained the basic knowledge and skills for KM.

The Project will assist the process of formulation of the Action Plans, selection of task force members and monitoring of the implementation of the Action Plans.

Output 2 Capacity Development of the Trainers

The Project intends to build the capacity of the EWTI trainers in two aspects; strengthening instructional capacity and improvement of practical skills.

Instructional Capacity

The Instructional Design Workshop was held on four occasions. The important points for the improvement of the trainers' instructional capacity are summarized in the table below, while the basic concepts in ID are presented in Box 2.

ID concept	Action points for EWTI
3 questions for training design	Clarification of training objectives
5 learning outcome	Clarification of learning outcomes (Shifting from dumping the verbal information, and instead to building intellectual skills)
9 events of instruction	Improvement of teaching methods
4 level training evaluation	Measuring learning outcomes Measuring attainment of practical skills

Improvement of practical skills

Practical training was given to the trainers who are in charge of four technical areas for the pilot training.

Technical area	Title	# of trainers
GI	Water quality analysis	11
	Pumping test analysis	5
	Water balance analysis	5
	GIS	7
DT	Fluid engineering	7
DMMT & EMMT	Generator maintenance and loading tests	11
	Generator maintenance	11
	Generator maintenance TOT	11
	Compressor maintenance	9
	Drilling rig maintenance	3
Total (Accumulated number)		80

*TOT for TVETC trainers

Some positive changes were observed as a result of the above training.

Box 2 : Major Concepts in Instructional Design

3 Questions

Robert F. Mager (1923-) is an American psychologist and author. He suggested three important questions for training design. 1) Where am I going? 2) How do I know when I get there? 3) How do I get there?

5 Learning Outcomes

Robert M. Gagne (1916 ~ 2002) was an American educational psychologist, and father of Instructional Design theory. He classified the learning outcomes into 5 categories; verbal information, intellectual skills, cognitive strategy, attitude and psychomotor skills. The Project promotes shifting the objective of the training from the dumping of verbal information to the enhancement of intellectual skills.

9 Events of Instruction

Gagne introduced 9 events of instruction in his instructional design theory; 1) Gain attention; 2) Tell the learning objective; 3) Stimulate recall of prior learning; 4) Present the stimulus; 5) Provide learning guidance; 6) Elicit performance; 7) Provide feedback; 8) Assess performance and 9) Enhance retention and transfer to their contexts. The Project encourages the EWTI trainers to employ these steps in their training.

4 Level Training Evaluation

Donald Kirkpatrick (1914-2014), Professor Emeritus of University of Wisconsin and past president of the American Society of Training and Development, introduced the 4-level training evaluation model in order to make technical trainings meaningful with the intended results. The Project promotes improvement of level 2, and introduction of level 3 and 4 evaluation in EWTI's training management.

Level	Evaluation Item
1. Reaction	How the participants reacted to the training ?
2. Learning	What knowledge and skills the participants attained from the training ?
3. Action	How the participants utilize the learned knowledge and skills in his/her position?
4. Result	How the training influenced the organisational objectives/goals ?

- ◆ Fluid engineering was added to the regular DT training course and the EWTI trainers are teaching the subject
- ◆ The trainers for the EMMT course taught generator maintenance to the TVET trainers for the first time
- ◆ The trainers for EMMT began to pay attention to the maintenance of office equipment. They installed and maintained the generator connected to the administrative building.

The EWTI trainers are gradually showing some positive changes not only in their technical skills but also in their attitudes towards improvement.



Photo 2: Drilling Technology training

Development of Training Module and TTLM¹

Through the Instructional Design Workshops, the trainers reviewed the current teaching practices and came up with some action points. They are working on the improvement of the presentation materials incorporating the 9 events of instruction (see Box 2 on p.6).

They are also working on the development of training modules and TTLMs for pilot training courses.

【Output 3】 Internal Training System

There was no activity planned for Period 1 of the Project. The Project Team defined the “internal training”, as “training intended to enhance the capacity of the EWTI staff based on

¹ Training Teaching and Learning Material: the package of materials for TVET education, stipulated by the Ministry of Education.

the gap between the actual and expected performance”.

Other Activities

Counterpart Training in Japan

The 1st counterpart training was held in Japan for four of the EWTI management staff between May 17-29, 2019. They visited various water-related organisations, an educational institute and private companies in Tokyo, Saitama and Yamanashi and learned Japan’s experiences in water works, technical education and training in Japan. They also had a lecture on Instructional Design at Kumamoto University and visited the sites to observe how the local people nurture their groundwater resources.

Public Relations

(1) Preparation of Promotional tools

The Project supported the production of promotional tools. In particular, the Project assisted technically and financially with the establishment of the EWTI’s web site (www.ewti17.com), the printing of newsletters, and the production of calendars and banners.

(2) Promotion events

The EWTI participated in the Japan Festival in October 2017, which was the annual event, organised by a group of the Japanese people who are residing and working in Ethiopia. An exhibition booth was prepared to display various promotional tools and the Japanese Experts as well as the EWTI staff received many visitors on the day.

World Water Day

The Ministry of Water, Irrigation and Electricity (MoWIE) celebrate the World Water Day (WWD) in March every year. The EWTI proposed to organise the ceremony at the EWTI compound combined with the inauguration ceremony for the newly built administration building and two dormitories. MoWIE accepted the idea and consequently, a series of events were held at EWTI. The Project provided technical advice and partial finance.



Photo 4: SMART Demonstration Site

Date	Event	
3/22	WWD Ceremony	Exhibition of water technologies (private companies, enterprises exhibited water technologies, products and their activities)
	Inauguration of new buildings of EWTI	
3/23	Launching of construction of new training facilities	Low-cost water technology showcase (in collaboration with SMART ² Centre)
	Stakeholder Forum	

More than 600 people visited EWTI during these events and 9 media outlets broadcast news of the events.



Photo 3: Opening of WWD Exhibition

Cooperation and collaboration with other organisations

The Project received many visitors and tried to expand their relationships with other

² SMART: Simple, Market based, Affordable and Repairable Technology

organisations and individuals. The following are some examples of collaborative activities.

(1) SMART Centre Group

The Project in collaboration with the SMART Centre Group³, who promote low-cost water technologies in Africa, established a demonstration site within the EWTI's compound to display different low-cost technologies. Low-cost water lifting devices, a simple groundwater recharging system, a rain water harvesting tank, hand drilling tools, and toilets. This demonstration site was opened on the WWD, and EWTI will maintain it as a regular demo site. The EWTI is also interested in promoting low-cost technologies, by providing training in the future. The EWTI also self-nominated as one of the SMART Centres to be recognized by the SMART Centre Group. The Project assisted with the first contact with the resource persons, as well as provision of technical and material assistance for the establishment of the demo site.

(2) Japan Overseas Cooperation Volunteers (JOCVs)

The Project is in touch with two JOCVs members who were dispatched to Ethiopia in October 2017 and January 2018, respectively. The Project and JOCV often exchange information and experiences. For instance, JOCV members helped with the establishment of the SMART demo site by assisting a Dutch expert dispatched from SMART Centre Group in preparation of the site. They also assisted with the preparation of the WWD events.

(3) National Rice Research and Training Center (NRRTC)

The Project explored the opportunity to collaborate with another JICA project in the agricultural sector. A group of the Japanese Experts from EthioRice Project (Project for Functional Enhancement of NRRTC⁴) visited EWTI in December 2017, and both EWTI and

³ <http://www.smartcentregroup.com/>

⁴ <https://sites.google.com/site/ethiorice/>

NRRTC later agreed to implement a collaborative activity. In May 2018, the EWTI conducted a field drilling work as a part of the Drilling Technology Course in the compound of the NRRTC. The EWTI sent its drilling team and the drilling equipment, while the NRRTC provided the necessary consumable materials.

Internship Programme for the Japanese Students

The Project Team accepted two intern students from the Faculty of International Studies of Utsunomiya University in Japan, after a group of teaching staff and students paid a visit to EWTI in August 2017. One of the interns conducted his internship programme from January to June 2018, and another student did this as a part of her study curriculum for three weeks in March 2018. Both of them assisted with regular Project activities and reported their activities weekly to their advisor (Chief Advisor). In addition, they initiated some activities, by setting individual objectives. The Japanese Experts gave technical advice to encourage their activities throughout their internship periods.



Photo 5: Drilling training at NRRTC

4. Findings and Lessons Learnt

Initiative of Counterpart Staff

The counterpart staff are encouraged to lead all the Project activities. For example, most of the tasks for the Technical Gap Survey were carried out by the counterpart staff; including

preparation of TOR, scheduling, data collection and compilation. Rather than the compilation of a high quality report, a priority was given to the initiative of the counterpart staff members to accomplish the work. This process took longer than expected, but the sense of ownership by the counterpart members who participated in the TGS was high and at the end they knew all the details of the research.

They take the initiative in the development of training modules and TTLMs which will be the major outputs of the Project. The Project Team will give them backup-support by providing technical advice and by organising monitoring workshops.

Utilisation of the existing system: Training along with the TVET System

In order to increase the efficiency and the sustainability of the Project, the Project Team utilise the existing systems of education.

The Project Team collected the information on the TVET system and shared with EWTI. The Project and the EWTI management staff came to a consensus that the existing guidelines and manuals related to TVET are also useful for EWTI and that EWTI needs to utilise them. In particular, the TTLM Development Manual has to be followed for the preparation of the training materials.

EWTI's commitment for Outcome-based training

The EWTI clarified its stand that EWTI has an intention to direct all the training provided at EWTI to be in line with the government policy of TVET and to make it outcome-based.

TTLM as a package of training materials contains a number of teaching and learning tools to support outcome-based training, including Assessment Packet and LAP test.

The EWTI's commitment of utilising TTLM as a standard package may contribute to the improvement of the quality of training at EWTI. This is not merely the development of the materials, but may bring positive changes in the

trainers' teaching practices, and the learners' pro-active learning.

Utilisation of local experts

The Project invited some ex-trainers of EWTEC for the TGS and the capacity development training as external trainers; 2 DT experts, a DMMT expert and 4 EMMT experts participated in these activities.

These human resources are also important resources for EWTI in the future. The EWTI needs to continue utilising these external experts, by maintaining these relationships.

Activities for sustainability

The Project tries to support EWTI not only within the scope of the Project, but also to increase the sustainability of the Institute over the long term.

For instance, in order to create an enabling environment for income generation activity, the Project tries to foster a discussion forum between the stakeholders.

Promotional activities

The Project utilises various occasions for promotion of EWTI. In addition to Participation in various promotional events, and production of promotional tools, the Project attempted to participate in the proposal competition of a research project, and submitting a paper to national and international conferences.

The Project will continue its efforts to explore more promotion opportunities in the coming years.

Reception of visitors, collaboration with other organisations

The EWTI is located in the capital city of Ethiopia and is relatively speaking, in an advantageous position to be in touch with different people and organisations. The existing collaborative activities, such as SMART demo site and collaborative training with NRRTC were begun with their visit to the Institute.

The Project together with EWTI continue welcoming visitors and ideas on collaboration

and cooperation.



Photo 6: Capacity Development Training (DMMT/EMMT)

Project Duration :
June 2017 – June 2020

Project Implementation Organisations :
Ethiopian Water Technology Institute (EWTI)

Reference :

- *JICA (2017) Project for Strengthening Capacity for Training Operation and Management for EWTI Work Plan*
- *JICA(2018) Project for Strengthening Capacity for Training Operation and Management for EWTI Project Progress Report (1)*
- *WHO/UNICEF, 2015, Progress on Sanitation and Drinking Water - 2015 update and MDG Assessment*
- *Katsuaki Suzuki Ed., 2004, Shousai Instructional Design; E-learning Fundamental (Original in Japanese, The details of Instructional Design: E-learning Fundamental), NPO E-learning Consortium, pp1-10*
- *Prof.Katsuaki Suzuki, 2016, Instructional Design Manual (p.11)*