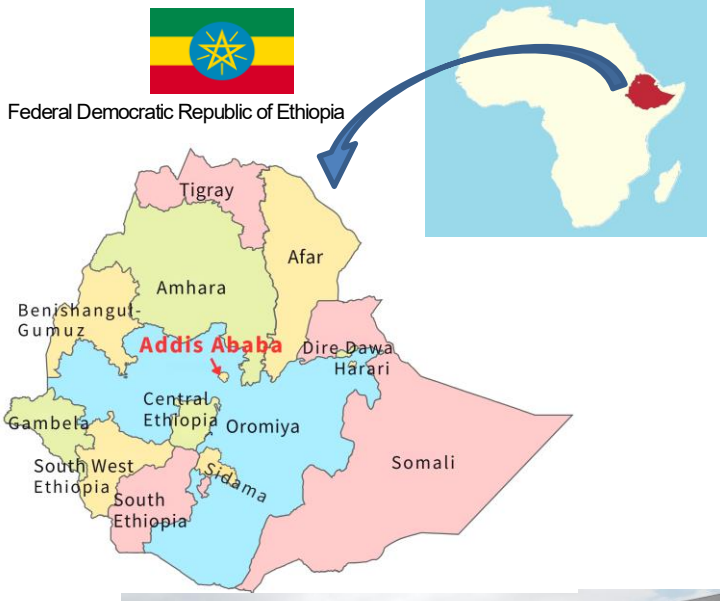
JICA Project Brief Note

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

No.3 August 2024



1. Background of the Project

In 2015 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. However, this rate was still far behind the country's target. The activities related to the water sector in Ethiopia were carried out based upon the Second Growth and Transformation Plan (GTP II), which had 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) begun supporting the Ethiopian Water Technology Centre (EWTEC), which was 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 technical cooperation projects. This led to establishing 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 on track to become a leading institute of human resource development in the water sector in Ethiopia.

Under GTP-II for the water sector, it was stipulated that 13,000 technicians and engineers needed to be newly trained to achieve target goals of access to safe drinking water by 2020. EWTI, among other training institutes was one of the key organisations in human resource development in the water sector in the country. However, EWTI still faced challenges such as the insufficient competence of its trainers, its inadequate organisational capacity in training operation and management, as well as shortcomings in its institutional management. In order for EWTI to become an independent and sustainable training institute, it was therefore critical that it overcame these challenges by delivering adequate organisational capacity and quality human resources.

2. Approach to address the Problems

The Project aimed 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 trainings.

This Project supported EWTI to get out of its dependency syndrome, whilst fully utilising their accumulated knowledge and the skills that they had gained from their experiences of previous projects. The basic principle of the Project, therefore, was that the Project's support was to strengthen EWTI as a fully independent and sustainable training institute.

The Project attempted to contribute to strengthen EWTI's capacity in the area of training operation and management, the capacity of the EWTI trainers, and EWTI's organisational management through the following 5 technical strategies.

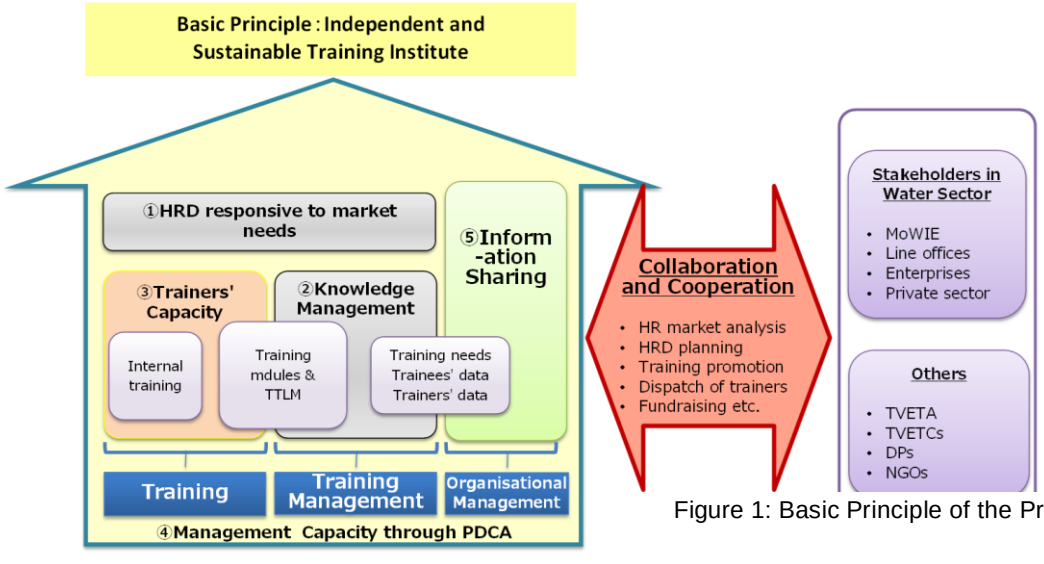


Figure 1: Basic Principle of the Project

【Overall Goal】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.

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 supported EWTI to be able to conduct research and analysis to plan their training programmes so that they are responsive to market needs.

Strategy 2 Knowledge management and utilisation of EWTI's intellectual property

A considerable amount of intellectual property, including training materials with their associated references had disappeared with the ex-trainers who had left the Institute. The Project intended to strengthen EWTI's knowledge management system and to 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 was of critical importance for upkeeping the standards of the training. The Project introduced Instructional Design (see Box 1) to strengthen the capacity of the EWTI trainers. The Project also assisted to establish a system of internal training so that the knowledge and skills of the trainers are passed onto 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 promoted the application of the PDCA cycle in every process of EWTI's work, so that EWTI is able to provide quality training reflecting the lessons learnt from past experiences.

Box 1: What is Instructional Design (ID)?
ID is a methodology using a systematic approach which leads to optimal training effectiveness, efficiency and attractiveness, aiming at satisfying the capacity development needs of the trainees and of 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 it and then 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 the improvement of future trainings.
Katsuaki Suzuki Ed., 2004

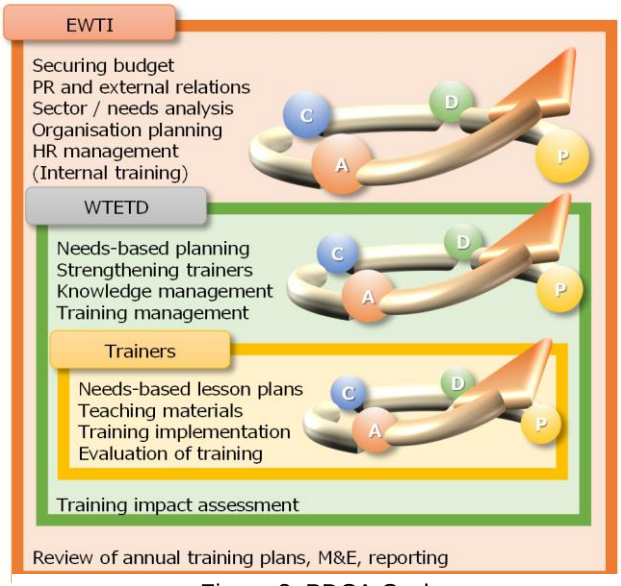


Figure 2: PDCA Cycle

Strategy 5 Information dissemination through various opportunities

There have been 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 recognised as a training institute with an excellent standard. This should create an enabling environment for EWTI to

become an independent institute which can establish a network for collaboration and cooperation, and possibly to then find additional funding sources. The Project supported EWTI by promoting the values of EWTI to the public on various occasions.

3. Achievements

The activities and the achievements of the Project are presented in the following sections.

1) Output 1: Training Management

Development of the Guidelines for Training Operation and Management

"The Guidelines for Training Operation and Management" was developed and revised between 2018 and 2020. The Guidelines clarified the basic principles of EWTI's training and established mechanisms to ensure training quality, defining the processes for planning, implementation and evaluation of training courses. The contents of the Guidelines were continuously verified and revised through pilot trainings, resulting in the release of the 3rd version. The latest version was distributed to stakeholders, such as regional water bureaus and W-TVETCs[1].The outline of the Guidelines is presented in the table below:

No.	Chapter title
1	Introduction (objectives and scope)
2	Principles of EWTI's training provision
3	Planning and approval of EWTI annual training plan
4	Formulation, approval and evaluation of training programme, curriculum and TTLM
5	Course announcement, selection and admission
6	Training operation
7	Training assessment, evaluation and reporting
8	Certification
9	Type of training related services for trainees
10	Role and responsibility of different actors
11	Training participants disciplinary issues
12	Operational procedures manual for international training

The establishment of the guidelines has enabled uniform training management across all technical departments at EWTI, allowing for the smooth implementation of numerous training sessions without confusion. Furthermore, by standardising formats within the Guidelines for trainee registration, evaluation, and training reports, it has become easier to maintain training records and to create an accurate database.

Photo 1 : Process steps for training planning and management were discussed during the PDCA Workshop

Pilot Training

Along with the development of the Guidelines, three batches of the following trainings were conducted (twice for GWDM):

Technical area	Title	Target
GWDM	Well drilling supervision	Hydrogeologists from RWB
DT	Fluid engineering	Drillers from WWDE
EMMT	Generator operation and 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

The process of each training course was monitored using the following methods; observations by Experts, recording of the training process by recorders, the Daily Reflection Sheets filled in by the participants, Daily and Weekly Reflection Meetings by the trainers' team, the End of Course Review Meeting among those who were involved in the training courses. Based on these

[1] Water - Technical and Vocational and Education Training Centres

monitoring results, reflections and lessons learned regarding training management and content and teaching methods were applied to subsequent training courses. Revisions of the training management guidelines and updates to the materials used in the training courses were made continually. This embodies the Plan-Do-Check-Action (PDCA) cycle outlined in the Project's strategy. Prior to the Project, training management methods and procedures lacked clear rules, but they have since been clarified and routinised. The improvements are as follows:

- All training courses should be monitored by the Training Management Committee
- Training schedules should be fixed before the course is announced and not changed once the training has begun.
- Machines and equipment for training should be ready before the starting date of training.
- The site for field practice and visit should be fixed well before the scheduled day.

During review meetings in the pilot training sessions, trainers from technical fields other than the three selected ones also participated as needed, which contributed to improvements in training management across other technical fields as well.

Photo 2: Internal discussion among trainers and Experts for betterment of pilot training

Improvement of trainees' recruitment and selection methods

To overcome previous challenges, such as trainees with varying levels of experience learning in the same class or the selection of trainees with no experience, the pilot training tried improvements in the selection methods of trainees to achieve more effective training. The main improvements are presented in the box (right):

- Clarification of entry requirements
- Early course announcement (one and half months prior to the training)
- Notification of the course contents at the time of the announcement of the course
- Final selection of the trainees by the EWTI trainers

The Training Management Committee in collaboration with the Registrar's Office implemented these improvements and the aforementioned points were explicitly stated as rules in the Guidelines.

International training

From November 2019 to February 2020, the 3rd pilot training was conducted for two courses: Drilling Fluid Engineering and Gen-set Operation and Maintenance. This training was international, with trainees from Nigeria, Malawi, and within Ethiopia. The EWTI took the lead from planning through to implementation and evaluation, making it an important opportunity to gain achievements and experience in training management practice.

Photo 3: Trainees from Malawi and Nigeria participated in the international training (Fluid Engineering Course)

Maintaining documents at a portal site

At the beginning of the Project, training materials were treated as the personal property of the trainers and were not managed properly by the Institute, which was a significant challenge. The Expert Team aimed to create a system for sharing training materials and assisted in the

establishment of a portal site.

The portal site shares the Guidelines with standard formats, TTLM[2], and reference materials. This has created an environment where trainers can always access the latest materials. Moving forward, it is essential for EWTI to continuously update the portal site to further enhance its value for users.

2) Output 2: Trainers' Capacity Development

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

Developing Learning Modules and TTLMs

Instructional design (ID) workshops were conducted primarily for trainers who are directly responsible for training, aiming to improve teaching methods so as to enhance the effectiveness of training. Additionally, by incorporating the principles of ID, we repeatedly created and revised training materials (TTLM) through the pilot sessions to improve effective training design, management, and evaluation. The TTLM was also utilised in international training, receiving positive feedback from participants from abroad who expressed a desire to use it as a reference for training in their own countries.

Major points for improvement are as follows:

- A training course should be managed and monitored by a Course Leader who is assigned by the Water Technology Education and Training Directorate.
- Time for lectures should be minimised and time for practise should be maximised.
- Tools for promoting self-learning and for assessment should be included in all Learning Guides.
- Self-check should take place before the lecture and not after the lecture in order to stimulate the learners' interest.
- Certificates should be given for accomplishment and not for attendance.

[2] Training, Teaching and Learning Materials: a standard set of materials used for technical and vocational education and training under the Ministry of Education.

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 the 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 (1924-2014), Professor Emeritus of the 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 introduces evaluation into levels 3 and 4 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 utilised the learned knowledge and skills in his/her position?
4. Result	How the training influenced the organisational objectives/goals ?

The major ID concepts adopted for training improvements are presented in the Box 2.

Improvement of practical skills

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

Technical area	Title	# of trainers
GWDM	Making columnar section drawings and geophysical/ geological logging, well design, pumping test analysis, water quality analysis, etc.	22
DT	Planning and performing fluid engineering, pumping test, drilling cost estimation	20
DMMT	Compressor operation and maintenance, drilling machinery maintenance	41
EMMT	Generator operation and maintenance, installation of mechanical workshop equipment, welding machine maintenance	8
	Total（Accumulated number）	91

*GWDM: Groundwater Development and Management; DT: Drilling Technology; DMMT: Drilling Machinery Maintenance Technology; EMMT: Electro-mechanical Machinery Maintenance

Some positive changes were observed as a result of the above trainings:

- ◆ A GWDM trainer was able to deliver a training unit on geophysical/geological logging, using the method of making columnar section drawing.
- ◆ DT trainers were able to teach fluid engineering in training.
- ◆ DMMT staff obtained basic knowledge and skills in performing disassembling, cleaning and reassembling major parts of a drilling machine.
- ◆ An EMMT trainer was able to manage the training course on gen-set operation and

In addition to the improvement in technical skills, some positive changes were observed in trainers' attitudes and awareness through the training.

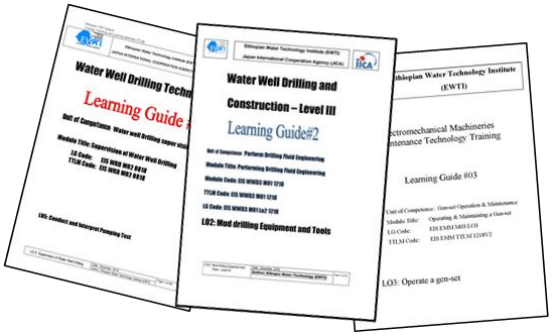


Photo 4: TTLMs

Photo 5: Japanese Experts demonstrate not only technical skills but also good attitudes as trainers

3) Output 3: Internal Training System

The TTLM created during the activities through the Project is subject to annual review, as stipulated in the Guidelines, with revisions made as necessary. Throughout the project period, trainers conducted almost annual TTLM revision workshops as internal training, gaining the ability to plan and implement workshops while using an online learning management system.

Additionally, a "Maintenance Team" was established, consisting of technical staff who improved their practical skills through training in drilling and electrical machinery maintenance. This team operates as a unit responsible for the maintenance of equipment necessary for training.

4) Public Relations

Public Relations

The Project supported the production of promotional tools. For example, for the preparation of the newspaper and Training Information Booklet, the Experts provided

technical advice and partial financial assistance for printing. These were distributed to the public at various promotional events, such as the Multi-stakeholder Forum.

A Training Information Booklet was prepared to provide a handy information package related to the training courses provided at EWTI.

The EWTI participated in the Japan Festival in October 2017 and 2018, 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. EWTI hosted the events of the World Water Day (WWD) in 2018, mobilising some 600 participants, which was also a good opportunity for promotion of EWTI.

5) Cooperation and collaboration with other organisations

The Project received many visitors and tried to expand their relationships with other organisations and individuals. The following are some examples of collaborative activities.

SMART Centre Group

The Project in collaboration with the SMART Centre Group[3], which promotes low-cost water technologies in Africa, established a demonstration site within the EWTI's compound to display different low-cost technologies, such as low-cost water lifting devices, a simple groundwater recharging system, a rainwater harvesting tank, hand drilling tools and toilets. The site was opened on the World Water Day (WWD) in 2018, and EWTI maintains it as a regular demo site. Since then, EWTI has promoted low-cost water technologies as one of the Institute's objectives. The Institute's activities have expanded to include the dispatch of technical experts to organise trainings in other regions outside Addis Ababa with external funds from organisations such as IOM (International Organization for Migration).

EWTI was officially assigned as a Self-supply promotion centre in the country by the Minister of Water and Energy in 2019. The Project Team assisted the coordination and logistics of these activities.

Photo 6: Various low-Cost technologies exhibited at the demonstration site

Photo 7: Manual drilling demonstration for self-supply practitioners and promoters

JICA Overseas Cooperation Volunteers

The Project is in touch with six Japan Overseas Cooperation Volunteers (JOCVs) who have been dispatched to Ethiopia. In November 2018, these volunteers visited EWTI and participated in the activities related to SMART technologies. They had an opportunity to exchange ideas with a Dutch expert, Mr. Henk Holtslag, who has rich experience both in promotion and of these technologies in African countries.

Collaboration with JICA projects

The Project explored the opportunity to collaborate with another JICA project in the agricultural sector. A group of Japanese Experts from the EthioRice Project (Project for Functional Enhancement of NRRTC[4]) visited EWTI in December 2017, and both EWTI and NRRTC later agreed to implement a collaborative activity. In May 2018, the EWTI conducted a field drilling work exercise 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. In November

[3] http://www.smartcentregroup.com/

[4] https://sites.google.com/site/ethiorice/

2018, the construction of a 120m-water well was completed. EWTI and NRRTC learned many lessons from this experience, in terms of collaboration with other organisations.

In February 2020, a series of training sessions were conducted in collaboration between EWTI and the Project for Strengthening Capacity of Institutional Management in State Water Corporations (PROMISE Project) in the Republic of Sudan. A group of the Japanese Experts and their counterparts came over and had technical exchanges. This experience gave EWTI trainers a confidence boost.

Photo 8: Joint training with the PROMISE Project from Sudan

Cooperation with Internship Programmes

The Project Team accepted a small number of people from Internship Programmes to support the career development of selected young Japanese. Three were students from Utsunomiya University and 4 fellows of the JICA Internship Programme who participated in the Project's activities on a short-term basis.

6) Impact of the Project

EWTI is increasingly recognised as a key training institution for engineers and technicians in the water sector. Through various activities and communication efforts related to the Project outputs, EWTI's presence in Ethiopia has grown significantly over the years.

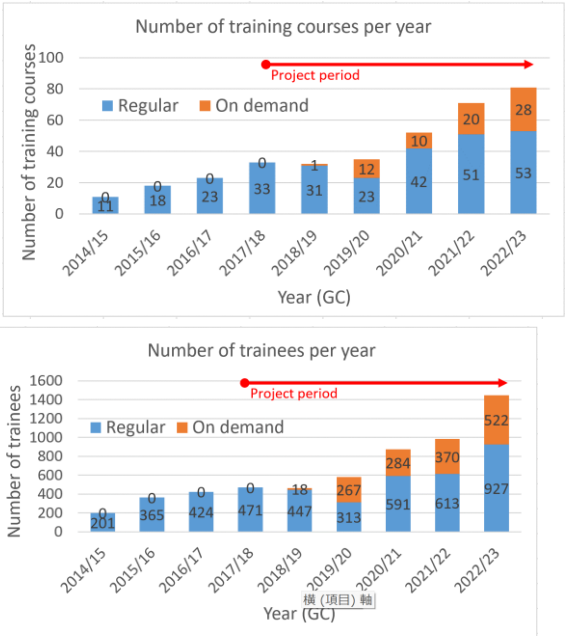


Figure 4：No. of training courses (above) and No. of accepted trainees from 2014/15 to

The figure on the left illustrates the growth in the number of training courses and the intake of trainees at EWTI. The number of training courses has increased from 33 in the 2017/18 fiscal year to 81 in the 2022/23 fiscal year, approximately a 2.5-fold increase. Similarly, the number of accepted trainees has surged from 471 to 1499—more than a threefold increase

Of particular note, is the rise in on-demand training initiated in response to external requests from NGOs, UNICEF, and universities during the COVID-19 pandemic (2019/20). The share of on-demand training has significantly escalated, both in terms of the number of courses and trainees. As many of these on-demand trainings are funded by the requesting organisations, approximately one quarter of EWTI's training courses, which were traditionally funded by the government, are now conducted with external financial support as of the

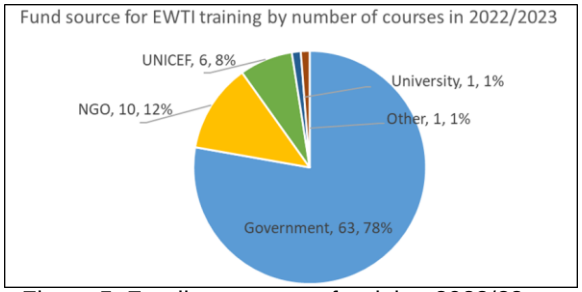


Figure 5: Funding sources of training 2022/23

2022/23 period.

These changes reflect the project's success in strengthening EWTI's capacity to manage training operations, allowing it to effectively meet diverse training needs. Furthermore, EWTI's proactive engagement in communicating its activities on various occasions, such as Multi-stakeholder Forums, has demonstrated a significant impact, indicating progress towards the Project's overall goal: EWTI continues skill development for technicians and engineers with the Project outputs.

4. Findings and Lessons Learnt

Initiative of Counterpart Staff

Throughout the project, the Project Team made a concerted effort to implement activities with as many leadership from counterpart organisations as possible. For instance, in the development of the Guidelines for training operation and management, counterparts took the lead in developing the outline, preparing the work plan, and writing the document. By prioritising the counterparts' ownership over the perfect completion of the documents, the Project have fostered a strong sense of engagement amongst them. As a result, the members involved in this activity have developed a deep familiarity with the content, in addition to a strong sense of ownership.

Action-oriented Documentation

The Guidelines and training materials (TTLM) developed in this project are both action-oriented documents that have been refined through practical implementation during pilot trainings. By allowing counterparts to revise these documents based on their own experiences, the Project have enhanced the latter's sense of ownership, resulting in products that reflect a deep attachment to and understanding of the content.

The Guidelines stipulate that the materials will be reviewed and updated annually, and there is a high probability that this process of continuous improvement will be maintained in the future.

EWTI's commitment to Outcome-based training

Before the Project, EWTI planned and conducted training without being constrained by the formalities of TVET systems. This project, however, adopted a policy aligned with the country's TVET framework, which emphasises outcomes, and mirrored the national standards. Incorporating the principles of Instructional Design, the Project adapted the standard format used by the Ministry of Education for new entrants straight out of high school into a tailored package for working adults. This involved creating and improving training materials specifically suited to their needs.

EWTI has committed to updating all short-term technical training modules and materials according to this "EWTI-style TTLM" as a standard. This includes tools for measuring trainee proficiency, such as Performance Evaluation Guide and LAP tests, which were not part of previous training programmes.

The Project followed this strategy to enhance the training materials, fostering learner-centred learning and ensuring a hands-on approach to training. As a result, by the end of the Project, the trainers who received guidance were able to articulate their experiences regarding learner-centred, outcome-based training in their own words. This transformation marks a significant milestone in the pursuit of effective training practices at EWTI.

Activities for sustainability

During the project period, the COVID-19 pandemic brought significant changes to the environment and shifted social needs. EWTI, as a training institute, quickly recognised the growing demand for non-face-to-face training and began exploring training methodologies that incorporated online tools. After a process of trial and error, rather than making an immediate leap to establishing fully-fledged e-learning courses, EWTI opted to implement "hybrid training" that combines in-person training with online tools.

As a result, trainers have become adept at planning and managing internal training workshops, particularly for the revision of TTLMs using online platforms.

Activities for sustainability

To realize the project's basic principle of EWTI becoming an "independent and sustainable training institute", recommendations were made and capacity was enhanced to improve the institute's sustainability, without being constrained by the project's framework. Since the COVID-19 pandemic, EWTI has been able to continuously conduct "on-demand" training for international organizations such as NGOs and UNICEF. This has not only enhanced EWTI's significance in Ethiopia but also increased its potential to operate without relying solely on government funding. On the other hand, as a training institute, there are organizational limitations to actively gaining external income for its operations. Therefore, in the latter half of the project, efforts were made to raise internal awareness and to engage with relevant government ministries to enable EWTI to utilise the income generated from its activities internally, creating an environment for sustainable operation and further growth as a training institute.

Photo 9: Trainers check the machinery before the training (EMMT)

Project Duration：
June 2017 – August 2024

Project Implementation Organisations：
Ethiopian Water Technology Institute（EWTI）

Reference：

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