



The implementation of cooperative training program in Ethiopia: Experience from selected agro processing TVET colleges

 **Million Tadesse Woldeyes**

Institute of Education and Behavioral Sciences, Ambo University, Ethiopia.
Email: millitade2008@gmail.com



ABSTRACT

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Cooperative training is a central component of the outcome-based training (OBT) approach in Ethiopia's TVET system, intended to align training with labour market needs. It provides trainees with opportunities to integrate theoretical knowledge with practical workplace experience and develop occupational competencies relevant to industry requirements. Effective cooperation between TVET institutions and enterprises is therefore essential for ensuring the relevance and quality of training. However, its implementation in agro-processing TVET colleges remains limited. This study assessed the status and challenges of cooperative training in selected colleges. A qualitative approach was employed using primary and secondary data from stakeholders in six TVET colleges, eighteen agricultural industries, and regional TVET offices. Data were collected through interviews and focus group discussions and were analyzed thematically. The findings revealed that the implementation of the OBT system was weak and that existing cooperative training documents were insufficient to effectively guide practice. Although management boards and regional TVET bureaus provided some support, monitoring and evaluation mechanisms were inadequate, contributing to weak implementation across most colleges. The findings also indicated gaps in institutional capacity and coordination necessary to sustain effective cooperative training. Based on these findings, the study recommends developing comprehensive cooperative training documents supported by clear incentive mechanisms and appropriate legal frameworks, strengthening coordination and monitoring systems, improving training facilities, providing continuous professional development for trainers, and adopting alternative training modalities to enhance the effectiveness and sustainability of cooperative training in agro-processing TVET colleges.

Contribution/Originality: This study contributes to the literature by examining how cooperative training is implemented in Ethiopia's agro-processing TVET colleges. Drawing on stakeholders' experiences, it identifies gaps in industry collaboration, institutional support, and training practices. The findings offer practical insights for strengthening workplace learning, improving coordination, and developing more effective training policies.

1. INTRODUCTION

Technical and Vocational Education and Training (TVET) is central to Ethiopia's efforts to develop a skilled workforce, promote employment, and support industrial development. Its effectiveness, however, depends not only on institution-based instruction but also on opportunities for trainees to apply knowledge and skills in authentic workplace settings. Strong TVET–industry collaboration is therefore essential for aligning training with labour-market and production requirements (Kebede, Asgedom, & Asfaw, 2024).

Cooperative training strengthens this connection by combining college-based learning with practical experience in enterprises. It enables trainees to engage with real production processes, technologies, occupational standards, and workplace practices, thereby enhancing practical competence, work readiness, and employability (Dehnie, Kidane, & Demissie, 2026; Dukale, Demissie, & Abebe, 2022). This is particularly important in agro-processing, where occupational competence requires hands-on experience with production equipment, processing technologies, quality control, and safety procedures. However, Ethiopian agro-processing TVET faces challenges related to trainer competence, training resources, and cooperative training practices, which affect graduate competence and employment outcomes (Gebremeskel, 2023, 2025).

Although cooperative training is emphasized in TVET policy, its formal existence does not necessarily ensure meaningful workplace learning. Effective implementation requires relevant enterprise placement, clear responsibilities, appropriate workplace tasks, adequate supervision, communication, and systematic monitoring and assessment. Evidence continues to indicate weak institutional collaboration, limited industry participation, resource constraints, and inadequate alignment between training and labour-market needs (Kebede et al., 2024).

Existing studies have focused mainly on cooperative training in relation to graduate competence and employability, with limited attention to how it is implemented and experienced by key stakeholders in agro-processing TVET colleges. This study therefore examines the implementation of cooperative training in selected agro-processing TVET colleges in Ethiopia, focusing on college–industry collaboration, organization and delivery, workplace learning, supervision, assessment, and factors facilitating or constraining implementation. It aims to generate evidence for strengthening the relevance and quality of agro-processing TVET in Ethiopia.

2. LITERATURE REVIEW

Concept of Cooperative Training: Cooperative training is a form of work-based learning in which TVET institutions and enterprises share responsibility for developing occupational competence (Woldeyohanis, 2023). It combines institution-based instruction with practical learning in authentic workplace environments, enabling trainees to apply theoretical knowledge, develop technical skills, and become familiar with production processes (Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), 2025). In Ethiopia, cooperative training is intended to strengthen the practical orientation of TVET and improve connections between training institutions and the labour market (Dukale et al., 2022; Kebede et al., 2024).

The main rationale is to reduce the gap between skills acquired in colleges and those required in workplaces (Kebede et al., 2024). Workplace learning provides opportunities to use relevant technologies, perform occupational tasks, solve practical problems, and develop appropriate work habits that may not be fully replicated in college workshops (Kebede et al., 2024). Evidence from Ethiopia indicates that cooperative training can contribute to employability. Dehnie et al. (2026), for example, found a positive relationship between cooperative training and graduate employability in four polytechnic colleges.

However, cooperative training is more than simply placing trainees in enterprises. Its effectiveness depends on joint planning, implementation, supervision, monitoring, and assessment by colleges and enterprises. Trainees may be placed in workplaces without receiving relevant tasks, adequate supervision, feedback, or access to appropriate equipment. Therefore, the quality of implementation and the experiences of key stakeholders are central to understanding its effectiveness (Guta, 2025; Ministry of Labor and Skills, 2025).

TVET–Industry Linkage: Strong TVET–industry linkage improves the relevance of vocational education by enabling institutions to respond to changing occupational requirements, technologies, and labour-market needs. Enterprises also benefit by participating in the preparation of potential employees (Wobneh, Getachew, & Alemu, 2024). Such collaboration can strengthen curriculum relevance, practical competence, and the transition to employment (Kebede et al., 2024). Nevertheless, Ethiopian TVET–industry relationships remain constrained by weak institutional collaboration, limited industry participation, inadequate resources, and mismatches between training and labour-market requirements (Kebede et al., 2024). Effective linkage therefore requires sustained collaboration rather

than occasional contact, with clear responsibilities for curriculum development, training, supervision, assessment, and employment-related activities.

Enterprises provide exposure to production schedules, equipment, quality-control procedures, occupational standards, and workplace problem-solving that colleges may not be able to reproduce fully (Dukale et al., 2022; Kebede et al., 2024). At the same time, enterprises may face challenges such as supervision costs, safety concerns, limited space, and possible disruption of production. These constraints can reduce the quality of workplace learning. Institutionalized communication, clear responsibilities, supervision, and joint monitoring are therefore necessary.

Cooperative Training in the Ethiopian TVET System: Cooperative training is part of Ethiopia's effort to make TVET more demand-driven and responsive to labour-market needs. Dukale et al. (2022) described it as a dual training arrangement involving collaboration between TVET institutions and businesses. However, evidence suggests that implementation has not always matched policy intentions (Demissie, 2026).

Gebremeskel (2023), studying agro-food processing TVET, identified trainer skill gaps, inadequate material resources, and poor cooperative training as major challenges (Kassa, 2024). Trainer competence and commitment were significant predictors of graduate competence. Effective cooperative training therefore requires colleges to prepare trainees, identify suitable enterprises, establish agreements, communicate learning expectations, monitor placements, and assess workplace learning. Enterprises must provide relevant occupational tasks, equipment and supervision. Recent evidence also links cooperative training with outcomes beyond workplace experience. Dehnie et al. (2026) found that cooperative training was positively associated with graduate employability, reinforcing its importance as a component of TVET quality rather than merely an administrative requirement.

Evidence from Agro-Processing TVET: Agro-processing is particularly relevant to cooperative training because occupational competence depends on practical experience with processing technologies, equipment, production procedures, quality assurance, hygiene, safety, and packaging. These competencies require exposure to authentic production environments and strong college–industry collaboration.

Evidence indicates that agro-food processing TVET in Ethiopia faces trainer skill gaps, inadequate resources, and weak cooperative training (Gebremeskel, 2023, 2025; Guta, 2025). These studies similarly found that weak cooperative training and shortages of human and material resources contributed to inadequate graduate competence, although broader labour-market barriers also affected access to employment. These findings suggest that cooperative training should be considered within the wider TVET system. The quality of workplace learning is influenced by college preparation, resources, supervision and enterprise participation. Effective workplace training can nevertheless provide access to equipment, production processes and occupational practices that may be unavailable in colleges (Dehnie et al., 2026; Gebremeskel, 2023).

Factors Influencing Effective Cooperative Training: The literature identifies several interrelated factors affecting cooperative training.

- **Institutional capacity:** Competent trainers, relevant curricula, facilities, training materials, and effective management are essential for preparing trainees and coordinating workplace learning (Gebremeskel, 2023).
- **Industry participation:** Enterprises need to participate in planning, training, supervision, and assessment rather than merely accepting trainees (Kebede et al., 2024).
- **Training resources:** Adequate materials and equipment are necessary for effective preparation and practical learning (Dehnie et al., 2026).
- **Workplace supervision:** Regular guidance and feedback help trainees connect workplace activities with expected learning outcomes (Kebede et al., 2024).
- **Curriculum alignment:** Workplace activities should correspond to curriculum competencies and current occupational requirements (Kebede et al., 2024).
- **Assessment and monitoring:** Joint monitoring and assessment by colleges and enterprises can improve the authenticity and quality of competency assessment.

- Stakeholder commitment and communication: Clear roles and regular communication among trainers, managers, workplace supervisors, and trainees are necessary to keep workplace learning connected to the formal training program.

Research Gap: Studies provide evidence that cooperative training can improve practical competence and employability in Ethiopia, but the literature remains fragmented. Existing studies have examined college–enterprise collaboration (Dukale et al., 2022), determinants of graduate competence in agro-food processing (Gebremeskel, 2023), TVET–industry linkage (Kebede et al., 2024), graduate competence and employment (Gebremeskel, 2025), and the relationship between training resources, cooperative training, and employability (Dehnie et al., 2026).

Despite these contributions, important gaps remain. Existing research focuses more on outcomes such as competence and employability than on the actual implementation of cooperative training. Moreover, the formal existence of enterprise agreements or trainee placements does not necessarily indicate meaningful workplace learning, which depends on relevant tasks, resources, supervision, feedback, and assessment. Therefore, this study examines the implementation of cooperative training in selected agro-processing TVET colleges in Ethiopia, focusing on college–industry collaboration, planning and delivery, workplace learning, supervision, assessment, and factors facilitating or constraining implementation. It seeks to provide stakeholder-based and comparative evidence to strengthen the effectiveness and relevance of cooperative training.

3. METHODOLOGY

Design: The study used a qualitative research design to explore and understand the meaning that TVET and industry officials, experts, and trainers ascribed to the implementation of cooperative training in 4 regions and 6 agro-processing TVET colleges. In this qualitative research, the researcher applied a process that involved emergent questions or procedures, where data are typically collected in the participants' setting, data analysis inductively builds from particular to general themes, and the researcher provides interpretations of the meaning of the data (Creswell, 2014). In this research, the researcher closely interacted with TVET officials, experts, and trainers at different levels, with greater emphasis placed on gaining deeper insights from diverse respondents, as this approach better captures the complexity of cooperative training practices and stakeholder interactions.

Scope: The study focused on examining the practices and constraints of cooperative training in Ethiopia. The study was geographically limited to four regions, Amhara, Oromia, Sidama, and SNNP, and included six agro-processing TVET colleges: Bure and Tilili (Amhara), Batu and Negele Arsi (Oromia), Dilla (SNNP), and Aleta Wondo (Sidama). It also covered 18 agro-processing industries (both within and outside industrial parks) and the Job Creation and Enterprise Development Bureaus of the four regions.

Table 1. Summary of participants, organizations, sample size, and data collection tools.

No.	Participant category	Organization	Sample size	Tool
1	Management members (1 dean and 1 OBT V/Dean from each college)	6 colleges	12	Interview
2	TVETC management board members: 1 from each college	6 colleges	6	
3	3 available industry owner/Manager around each college	6 colleges	18	
4	Region - skills development head	4 regions	4	
5	Region job creation head	4 regions	4	
6	Region women and children affairs head	4 regions	4	
7	1 VGCS and 1 CT coordinator from each college	6 colleges	12	
8	Agro-processing department trainers	6 colleges	21	FGD
9	OBT V/Dean, CT and VGCS coordinators, Agro-processing dep't head	6 colleges (6 FGDs)	24	

Sampling and Participant Selection: The study employed a purposive sampling technique to select participants who were directly involved in the implementation and management of cooperative training in agro-processing TVET colleges. This approach was appropriate because it enabled the inclusion of information-rich participants with relevant experience and insights. Management members (deans and OBT vice deans), board members, and regional officials were selected due to their decision-making and supervisory roles. Industry owners/managers were included based on their engagement with TVET colleges in cooperative training. Coordinators (VGCS and CT) and trainers from agro-processing departments were chosen for their direct operational involvement. FGD participants were selected from key college staff to facilitate in-depth discussion and shared reflections on implementation practices. Data were collected using a combination of interviews and focus group discussions (FGDs) to ensure triangulation and enhance the validity of the findings. The categories of participants, their respective organizations, sample sizes, and data collection methods are summarized in Table 1.

Data collection instruments: To secure relevant information from TVET institutions and industries involved in agro-processing, a literature review and two data-gathering tools were used. These were an interview checklist and a focus group discussion.

Desk Review: A desk review was conducted to examine relevant policy documents, strategies, training curricula, occupational standards, training content, guidelines, study and evaluation reports, research findings, international practices, and tracer studies related to cooperative training and TVET implementation. The review focused on identifying existing policies and institutional frameworks, implementation expectations, good practices, documented challenges, and evidence on training outcomes and graduate employability. The information obtained from these documents was used to provide contextual understanding, inform the development of data collection tools, and triangulate findings from interviews and focus group discussions.

Interview guide: Semi-structured interviews were conducted with key stakeholders, including college deans, OBT vice deans, Vocational Guidance and Counseling Service (VGCS) and Cooperative Training (CT) coordinators, industry representatives, and regional TVET bureau experts. Participants were purposively selected based on their direct involvement in cooperative training and TVET implementation. A structured interview checklist guided the discussions around key issues such as cooperative training implementation, college–industry collaboration, student placement and supervision, OBT implementation, challenges, institutional support, and improvement strategies. Before each interview, the purpose of the study was explained, confidentiality was assured, and informed consent was obtained. Participants were encouraged to elaborate on their experiences, with probing questions used to clarify and deepen responses.

With participants' consent, interviews were audio-recorded and complemented by brief researcher notes. The recordings were subsequently transcribed accurately and reviewed for completeness and consistency. The transcripts were then organized and coded according to the study objectives and emerging themes, focusing on implementation practices, stakeholder experiences, challenges, and recommendations. Interview findings were also compared with FGD results and documentary evidence to provide a more comprehensive understanding of cooperative training implementation and to enhance the credibility of the study findings.

Focus group discussion: Focus group discussions (FGDs) were conducted with VGCS coordinators, Cooperative Training (CT) coordinators, and the heads and trainers of the agro-processing departments at each selected TVET college. Participants were purposively selected based on their direct involvement in student guidance, cooperative training, and the delivery and management of agro-processing programs. A semi-structured FGD guide was used to facilitate discussions on cooperative training implementation, college–industry collaboration, student placement and supervision, training quality, challenges, and possible improvement strategies. The discussions were moderated by the researcher, who encouraged all participants to share their views and experiences while using probing questions to clarify important issues.

With participants' consent, the discussions were audio-recorded, supplemented by note-taking, and conducted in a conducive environment that encouraged open participation. At the beginning of each session, the purpose of the

discussion, confidentiality, and the voluntary nature of participation were explained. Following the FGDs, recordings were transcribed and reviewed for accuracy. The data were then coded and organized into major themes, with similarities and differences in participants' views identified across the colleges. FGD findings were triangulated with interview and document-review findings to provide a comprehensive understanding of cooperative training implementation.

Method of Data Analysis: A qualitative method of data analysis was employed. The raw data collected from the field were organized and systematically framed according to the similarities among the issues raised in the interview guide and focus group discussion. Qualitative data, such as respondents' views and document analysis results, were presented and analyzed by narrating the evidence and responses in words (Atkins & Wallace, 2012). In doing so, the researcher focuses on understanding the meaning that the participants hold about the problem or issue, not the meaning that the researcher brings to the research or that writers express in the literature (Creswell, 2014).

Ethical Considerations: The study followed Ambo University Research Ethics and Standard Operating Procedure guidelines, with permission obtained from relevant TVET authorities and participating colleges. Participants were informed about the purpose of the study, voluntary participation, confidentiality, and their right to withdraw at any time, and verbal informed consent was obtained before the KIIs and FGDs, including consent for audio recording. Participants' identities were protected, data were accessed only by the research team and used solely for research purposes, and findings were reported in aggregate to maintain confidentiality and privacy.

4. DATA ANALYSIS AND DISCUSSION

The study utilized thematic analysis to systematically analyze qualitative data obtained from interviews, FGDs, and open-ended responses. The analysis process began with careful reading and review of the transcripts. This was followed by the generation of initial codes by identifying meaningful and relevant segments of the data in line with the study objectives. The codes were then organized into categories and subsequently developed into broader themes that captured recurring patterns and key issues emerging from the data. The identified themes were reviewed and refined to ensure coherence, consistency, and clear distinction among them. Finally, the themes were defined, interpreted, and presented in relation to the research questions, supported by relevant evidence from participants' responses. As a result, five interrelated themes were identified, and the analysis was conducted based on their logical sequence, with findings presented accordingly.

4.1. Demography of Respondents

Regarding demographic factors, the study addressed variables such as gender, qualifications, and respondents' work experience. These variables would help present the findings in line with the implementation of cooperative training and its challenges.

Table 2. Demographics of respondents.

Variables	Region					
		Amhara	Oromia	Sidama	SNNP	Total
Gender	M	21	23	12	11	67
	F	2	2	2	1	7(9.5%)
	Total	23	25	14	12	74
Qualification	Doctorate	2				2
	MA/MSc	17	11	5	5	38(51%)
	BA/BSc	3	12	8	7	30(40.5%)
	Diploma		2	1		3
	Other	1				1
	Total	23	25	14	12	74
Work Experience	Below 5		3	3	3	9
	6 -10	10	10	4	5	29(39%)
	11-15	7	6	3	1	17(23%)

	16 - 20	1	2	2		5
	21 - 25	2	1	1	2	6
	Above 25	3	3	1	1	8
	Total	23	25	14	12	74

From Table 2, it can be deduced that many of the respondents were male (90.5%). It was observed that, in the 6 TVET colleges, female trainers are not represented at the top management level in positions such as dean, v/dean, department head (agro-processing), VGCS, and training coordinator. In the 6 colleges, there are only 4 female trainers working in the agro-processing department. This may imply that the TVET college management and agro-processing departments in the 6 colleges are male-dominated. In terms of the trainers' level of qualification, the table shows that 51% of the participants hold MA/MSc qualifications and 40.5% hold BA/BSc qualifications. These figures show that the respondents can easily understand the issues under discussion and provide the necessary information. In addition, in terms of work experience, more than half (62%) of the respondents had moderate experience, falling into the categories of 6–10 years and 11–15 years of service, and could understand the TVET sector and the concept of cooperative training as well.

4.2. The status of Outcome-Based TVET System Implementation

Document analysis was employed as a key qualitative method in this study to examine relevant policy frameworks and extract insights related to the implementation of the outcome-based TVET system. This approach enabled the researcher to systematically review and interpret official documents, identifying recurring concepts, policy directions, and intended outcomes. Through thematic qualitative analysis of these documents, key themes were generated, providing a foundation for understanding the policy expectations and benchmarks against which implementation practices were assessed. Accordingly, as stated in the Ministry of Education (2008), "The goal of the TVET system in Ethiopia is to create a competent and adaptable workforce to be the backbone of economic and social development and to enable an increasing number of citizens to find gainful employment and self-employment in the different economic sectors of the country. This means that identified competences needed in the labour market serve as the final benchmark of teaching, training and learning of the TVET system. In the outcome-based TVET system, the goal of TVET providers/colleges is to create the necessary skills, knowledge, and attitudes of trainees, so that they are able to perform according to occupational standards, and hence receive certification."

In addition to document analysis, to assess the current implementation status of the outcome-based TVET system, qualitative data were collected through key informant interviews and focus group discussions. Interviews were conducted with directors of regional outcome-based training (OBT) directorates across four regions. In addition, focus group discussions were held with OBT vice deans, Vocational Guidance and Career Services (VGCS) coordinators, training coordinators, agro-processing department heads, and trainers. According to the consolidated responses from the interviewees mentioned above, the implementation of the outcome-based TVET system is largely influenced by several critical factors, including:

"The availability of adequate training facilities, the qualifications and competencies of trainers, the instructional methodologies employed, and the existence of occupational standards and labor market-oriented curricula."

The majority of respondents reported that the current level of implementation remains below expected standards. This is primarily attributed to significant limitations in training resources and a shortage of qualified trainers, particularly in the agro-processing sector. These constraints have adversely affected the effective delivery of outcome-based training in the regions assessed. Similarly, a summary of the respondents' reflections from the Sidama, Oromia, and Amhara regions indicated that the implementation of outcome-based training in their respective regions was found to be at a low level because of the reasons listed below.

- The presence of an acute shortage of resources/facilities (workshops, laboratories, and classrooms).

- The existence of a limited number of industries in the regions to acquaint the trainees with CT and the world of work.
- Lack of skilled trainers in TVET colleges. It was discussed that many trainers in TVET colleges have a deficiency in the technical skills required to provide training that meets the demands of the labor market.
- In the TVET colleges and at all levels of the TVET system, there is no structure for VGCS and CT. These activities are implemented by delegating one trainer from the college and are considered additional work for the OBT vice dean and the delegated trainer, without any form of training on these issues.
- The departments of agro-processing in the colleges under assessment are newly established. As a result, the trainers lack experience in implementing the OBT system.
- Because of a shortage of facilities, trainers were unable to apply the project-based training (PBT) methodology. Instead, most of the time, they were forced to apply the theory-based training method.

To obtain relevant information on the implementation status of OBT in the TVET colleges, FGDs were conducted with the colleges' OBT vice dean, VGCS coordinators, training coordinators, the agro-processing department head, and trainers at each college. The results of the FGD discussions with participants from Oromia and Amhara colleges consistently indicated that the implementation of outcome-based training (OBT) remains at a low level across the assessed institutions. This result corroborates the interview results, highlighting critical challenges such as shortages of training resources, limited technical competence among trainers, and the inadequate availability of industries to support cooperative training. Despite these constraints, the FGD participants from SNNP and Sidama TVET colleges revealed that the implementation of OBT exhibits certain strengths. These include the alignment of training programs with labor market analyses, the application of the 30/70 training modality, where trainees spend 30% of their time in classroom-based learning and 70% in practical training, and the active involvement of training staff in monitoring and supervising both college-based and industry-based training conducted under cooperative training agreements.

In conclusion, the findings from the focus group discussions and interviews underscore that resources, staff qualifications and experience, and curriculum design and training processes constitute the key determinants influencing the implementation of the outcome-based TVET system in the colleges under investigation. These interrelated factors ultimately shape the effectiveness with which outcome-based training principles are translated into practice.

4.3. Effectiveness of the Existing CT System Documents (CT Framework, Manual, Handbook...)

The TVET sector developed and used different system documents for the implementation of CT programs in the country. The main purposes of these system documents are to provide potential participants with information about CT, covering its procedures, the roles played by each partner, the potential benefits, and how CT is monitored and evaluated. With this information, participants can assess their capacity and suitability for engaging in CT.

Some of the CT system documents are those developed by the Ministry of Education (2007a), Ministry of Education (2007b), and Ministry of Education (2010). In addition, a memorandum of understanding, a CT implementation control checklist, and a trainees' results reporting form are also used in the implementation of CT. There are also newly developed CT-related system documents by the Ministry of Labor and Skills (2022) (on pilot testing) and a TVET guidance and counseling manual (Ministry of Labor and Skills, 2023).

TVET college deans, OBT V/deans, college VGCS, training coordinators, and regional project coordinators were asked to share their views and understanding of the effectiveness of the existing CT system documents, such as the CT Framework, manual, and handbook. The summary of their responses is organized in terms of the strengths and weaknesses observed during the implementation of these documents:

4.4. Strengths of the Documents

- The availability of the CT system documents is one of the strengths mentioned by the respondents. The documents provide a basic initial concept of the meaning and purposes of the CT programs; provide guidance on the steps of CT implementation, how colleges should implement it, and who can participate in the implementation of the program; and, in general, serve as a basis for CT implementation.
- The documents clearly discuss the roles and responsibilities of stakeholders and also indicate the benefits of CT for trainees, industries, and colleges.
- Among the CT system documents, the colleges actively use the MoU manual, intent letter, and trainees' result-recording manual.

4.5. Weaknesses

The system documents show several critical shortcomings. They are not contextually adapted; some issues are irrelevant for rural colleges, and they lack legal provisions to enforce industry participation. For instance, colleges have no legal authority to require companies to accept trainees even after signing an MoU. While incentive packages are mentioned in the 2022 TVET CT Implementation Manual, practical guidance on their implementation is missing. Detailed strategies for implementation and mechanisms for compensating damages caused by trainees to equipment are also absent.

The preparation of these documents did not involve stakeholders or industries, which has contributed to their limited practical application. Many of the documents remain inaccessible to industries and other partners, and some CT programs do not follow the prescribed guidelines. Additionally, industries are still at an early stage of development and are unable to meet the expectations outlined in the system manuals. Shortages of machines, equipment, and materials, along with a significant skills gap among college trainers, further constrain effective implementation.

Moreover, the system documents fail to incorporate lessons from other countries and do not address critical elements such as awareness creation, clearly defined roles and responsibilities for all stakeholders, or the promotion of a win-win approach in CT programs. These gaps collectively limit the effectiveness, relevance, and practical applicability of the CT system within the assessed colleges.

4.6. Supports Provided to TVET Colleges on CT Implementation

There are different stakeholders who participate in cooperative training. These are all role players at different levels in the TVET system, including enterprises/organizations, training institutions, trainees, trainers, training coordinators, and supervisors. These stakeholders have their own duties and responsibilities to fulfill for the proper implementation of the cooperative training program (Ministry of Education, 2010).

In this regard, participants in this assessment were asked to explain their views and opinions on the type of support provided by different bodies to TVET colleges for the implementation of CT programs. This question was posed to college deans; college management board members; women's and children's affairs and outcome-based training directorates; and Skills Development Deputy Bureau heads from the Regional Job Creation and Enterprise Development Bureau. Concerning the type of support from the TVET College Management Board, one of the college deans from the Amhara region responded as follows:

"The college management board chairperson is the mayor of the town, and some other members are also officials in government organizations; as a result, they have the power to positively influence company owners and other stakeholders to participate in CT in general and accept trainees for apprenticeship/practical training in industries in particular."

College deans from Oromia and Sidama explained that the management board has many responsibilities. Among these are approving the college's long-term and short-term plans, including the CT plan, with the budget required to implement them, and evaluating the college's performance. The management board holds regular quarterly meetings

to evaluate the college's performance in implementing the planned activities, including CT implementation, during that specific quarter. The board also evaluates the challenges encountered by the college in implementing CT during each quarter of the academic year and provides technical and managerial support and direction for improvement.

In addition, concerning the support provided by the regions' Job Creation and Enterprise Development Bureaus, one of the respondents from the Sidama region described the following forms of support:

- Provision of capacity development training on skill gaps for college management and trainers.
- The bureaus monitor and evaluate the colleges' performance and provide technical support.
- Support for facilitating CT programs between colleges and industries.
- Supply machines and equipment for the colleges to enhance the provision of quality training. For instance, in 2022, the bureau supplied different machines and equipment that cost about 30 million ETB. In addition, in 2023, the bureau identified and purchased different machines and equipment based on the needs of the colleges, and the materials are currently ready to be disseminated to the colleges.

Similarly, a respondent from the Amhara region listed the types of support supplied by the bureau as follows: upgrading C-level trainers to B level and B-level trainers to A level; equipping TVET colleges with the necessary machines, tools, and equipment; collecting demands for facilities from colleges for the 2023 budget year; conducting supervision and follow-up to support colleges; providing continuous project-based training administration for college trainers; providing trainers for each field of study from local and international sources; facilitating linkages with related industries for CT programs; and constructing additional classrooms, offices, and workshops as required.

Further, the responses from the Job Creation directorates or Deputy Bureau heads of the four regions are summarized hereunder: organizing job seekers to access loans and sheds, initiating work, creating access to markets and market networks, supporting industrial extension (technology, technical, entrepreneurship, kaizen...), allocating budgets, conducting monitoring and evaluation, providing material support, and performing coordination work.

The information obtained from different groups of respondents depicted that various types of support, such as facilities, provision of training, technical and administrative support, and financial support, among others, have been given to TVET colleges from different sources for the implementation of CT. Although the participation of these stakeholders is encouraging and appreciable, it is not in an organized, structured, institutionalized, systematic, and sustainable manner. Hence, in order to alleviate the problems and properly manage the resources, the establishment of a cooperation platform and having a comprehensive legal framework are of paramount importance.

4.7. Strengths and Weaknesses/ Constraints of TVET Colleges and Industries on CT Implementation

Industries and TVET institutions share the responsibility of providing the trainees with the best possible job qualifications, the former essentially through practical training and the latter by securing an adequate level of specific, general, and occupation-related basic competency. In this regard, to assess the level of participation and to identify the strengths and weaknesses of TVET colleges and industries in the implementation process of CT, respondents were asked to explain their views. Based on the information obtained from different groups of respondents on the strengths and weaknesses observed in TVET colleges and partner industries, there are various strengths and weaknesses on both sides. The responses are summarized as follows:

4.8. Strengths and Weaknesses of TVET Colleges

The respondents of this assessment were asked to describe the strengths and weaknesses of the two major role-players (colleges and industries), which are at the forefront of implementing CT programs in their respective colleges and industries.

The common and repeatedly mentioned strengths of the colleges are: almost all (6, 100%) of the colleges have established good relationships with the available industries around their colleges; they have signed memoranda of understanding with the identified industries; the colleges send trainees for practical training to the industries based

on the agreed schedules with the industries. In addition, 3 of the colleges (50%) have provided awareness-creation training for industries, and there are also individual college-specific strengths.

On the contrary, the data obtained from the respondents showed that the colleges and industries are suffering from various weaknesses during the implementation of CT programs. Some of the major weaknesses common to all colleges, as identified by the respondents in the assessment, are: trainees lack the required basic skills, knowledge, and attitudes to operate and manage industrial machines, equipment, tools, and materials during CT programs; trainees lack proper orientation about the situation in the industry, how to communicate with industry workers, work ethics in the industry, and disciplinary issues in the industry; and there is a shortage of resources (facilities and trainers) and budget to implement cooperative training at remote sites (transport, allowance, accommodation, etc.).

4.9. Strengths and Weaknesses observed in Industries

As explained during the discussions, the majority of industries have a good relationship with TVET colleges for CT implementation. Their relationship depends more on the personal behavior and qualities of the individual dean, vice-dean, or training coordinator, as the relationship is not guided by any legal basis. As a result, when a college dean or vice-dean leaves the position, the relationship may break down or be discontinued. Hence, the current relationship lacks continuity and sustainability.

From the responses provided by different respondents regarding the strengths and weaknesses of the colleges and industries in implementing CT, one can easily understand that the implementation lacks uniformity from college to college and from industry to industry. This indicates the necessity of a strong, binding legal framework, a comprehensive implementation manual, and the establishment of a cooperation platform that can lay the groundwork for quality management of CT programs.

Furthermore, the weaknesses identified on the industry side clearly show the problems of using the current approaches to CT. Some of the challenges identified by the assessment are: the existence of a limited number of agro-processing industries with very small capacities to accept trainees; the unwillingness of some industries to accept trainees or provide practical training as a curriculum requirement; the limited capacity of industries to provide practical training to large numbers of trainees; the need to travel long distances to find CT venues; the lack of skilled and professional workers and trainers in industries; and the lack of practical training opportunities for TVET institutions, especially in remote rural areas.

Hence, at this stage, it seems logical and timely to seek an alternative approach to CT that suits the current situation of the TVET system, particularly the agro-processing sector. In this regard, as discussed in the Fifteen-Year Road Map of Ethiopia 2015 to 2030, the importance of a learning factory is suggested as an alternative approach when other forms of CT are not applicable and when the level of economic development of a country is at a lower stage. It reads as follows:

“Cooperative, dual-training, and apprenticeship training: their effectiveness has a strong correlation with the level of maturity of manufacturing culture and industrial discipline. In addition, the ownership of such training by the company and the professionals working in it is crucial. Experience shows that such a model will not be effective at this level of our industrial development. Rather, it is good to consider the teaching factory model, which is used in many countries in the early stages of their economic development (Teferra et al., 2018).”

4.10. Policy, Legal and Structural Interventions required at all Levels for Effective Implementation of CT

Ethiopia has adopted different types of cooperative training approaches. Accordingly, Ethiopia has so far developed different working documents pertinent to cooperative training. Of these, the National TVET Strategy (Ministry of Education, 2008), Ethiopian TVET Policy and Strategy (Ministry of Science and Higher Education, 2020), Cooperative Training Handbook (Ministry of Education, 2007b), Cooperative Training Framework (Ministry of Education, 2007a), Cooperative and In-company Training Manual (Ministry of Education, 2010), Cooperative Training Implementation Manual (Ministry of Labor and Skills, 2022), and TVET Guidance and Counselling Manual

(Ministry of Labor and Skills, 2023) are the major ones. These indicate that Ethiopia has been striving to realize TVET and make it more practical.

To this end, even though several trainees have undergone the cooperative training system and joined the world of work, the implementation has encountered various challenges, including loss of trust in the industry. Therefore, it is necessary to make the TVET sector more effective by strengthening a system of cooperative training accepted by the industry and looking for a complementary alternative approach to effectively implement outcome-based TVET delivery that enhances the practical skills of TVET graduates to meet labour market demands.

The respondents in this assessment were asked to propose any policy, legal, and structure-related interventions necessary for implementing CT programs in the TVET system. The respondents suggested various policy, legal, and structure-related documents needed to effectively implement CT programs in the TVET sector. These are some of the suggestions forwarded by the interviewees.

Establishing a system that enables stakeholders to work collaboratively with TVET colleges and enhance CT implementation; having insurance packages for college trainees and industries in the event of harm or damage during the implementation of CT programs; incorporating CT programs into government policy documents; ensuring that senior officials and politicians are committed to implementing CT programs; having strict trainee admission requirements to ensure quality training. Admission should be based on trainees' merit rather than the current quota system. In addition, colleges have to admit a limited number of trainees based on the facilities they have and admit trainees by providing entrance exams and other screening mechanisms to identify capable trainees; establishing a continuous awareness-creation mechanism for stakeholders and industries; designing a policy that enforces industry to take over the responsibility of implementing alternative CT programs; establishing a zero-tolerance system for quality training and education in the TVET sector; and establishing a system that can align our labor market system with the international labor market system.

Establishing a specific funding system for improving TVET delivery, implementing CT programs and alternative platforms; establishing rules and regulations requiring role players to fulfill the minimum requirements when opening a college in general and programs in particular (human resources and material resources); designing a system that encourages development agents and NGOs to share their experiences, in addition to providing financial support; and establishing incentive packages for trainees (transportation, accommodation, pocket money, and insurance) and industries (taxation, revenue, recognition, duty-free importation of machinery, awards, and promotion).

Having a clear and understandable structure for the implementation of CT programs in TVET colleges and industries, as well as in the TVET system; establishing well-equipped workshops in the colleges to a small-scale learning factory level; and establishing a system that enables TVET colleges to organize production units so as to serve as centers of practice for trainees.

In conclusion, for effective implementation of CT in an outcome-based TVET system, the presence of policy, legal, and structural frameworks is mandatory, and the lack of them is considered one of the major gaps observed in the implementation of CT and OBT, requiring practical intervention to alleviate the problems observed. Concerning the types of interventions that must be considered, the respondents in this assessment proposed different ways forward for each of the three components. The points suggested by the respondents should be properly formulated and framed and considered as guidance for CT and OBT implementation. The points should be cascaded down into detailed implementation schemes, such as the establishment of an awareness-creation modality for all stakeholders in the OBT and CT systems of the TVET sector; the establishment of alternative platforms to strengthen the implementation of CT; and the establishment of a comprehensive legal framework that includes incentive mechanisms and an insurance package in the OBT TVET system.

4.11. Challenges and Mitigation Measures taken in the Implementation of CT

Various factors can contribute to the unsuccessful implementation of cooperative training. Among these, one can mention the failure to maintain coordination among partners. It is true that the implementation of cooperative training should be supported by institutional arrangements among unions, industries, training providers, and state regulatory authorities. The training arranged in this way may last from some months to several years and has a kind of recognition and acceptance. This kind of arrangement requires specific agreements among the partners. However, in actual practice, the remuneration of trainees varies from country to country and even among individual states (Hoeckel, Field, Justesen, & Kim, 2008). Despite the general facts mentioned above, it seems necessary to mention some of the specific factors that can severely affect the implementation of cooperative training. Given the magnitude of their influence on the implementation of cooperative training, this assessment identified, from the documents reviewed, the following factors as influential.

These include a lack of a legal framework, inadequate financial resources, a lack of stakeholder participation, a weak monitoring and evaluation system, poor public perception of the TVET program, a lack of facilities in enterprises, and inadequate professional capacity among trainers and other professionals. On the same issue, the information obtained from respondents during the field assessment corresponds with the challenges identified through the document review. Such consistency in the assessment results shows that the challenges are diverse.

In addition to the remedies suggested for each of the challenges mentioned in the system documents, the respondents also forwarded more recommendations for the problems encountered during the implementation of CT and OBT in the TVET system. Some of the major suggestions are listed as follows:

- Organizing training for company trainers, managers, HR managers, and owners on OS, curriculum, TTLM, assessment, and the concept of CT.
- Establishing a system for continuous awareness-creation programs with industry owners, managers, and workers on the concept and importance of CT.
- The TVET colleges have to design events/exhibitions to introduce, display, and sell quality materials produced by college trainees and trainers.
- Allowing industries and stakeholders to participate in the college's activities has resulted in trainees having opportunities for employment in industries.
- Designing motivational packages for both trainees and industries during CT implementation.
- Establishing a structure responsible and accountable for CT program implementation at all levels.
- Establishing a continuous professional development (CPD) program to build the capacity of TVET trainers to fill the skills gap.
- Establish a system that allows TVET trainers to become involved with/work together with all types of industries during their vacation/spare time.
- Design an experience-sharing program with colleges and industries that have performed well in CT programs, nationally and internationally.
- Equipping TVET colleges with all the necessary machines, equipment, and materials to make them places of training, innovation, production, technology transfer, and income generation.

5. RESULTS AND CONCLUSION

5.1. Key Findings

The assessment found that although Outcome-Based Training (OBT) has several strengths, its overall implementation across the assessed agro-processing TVET colleges and regions remains weak. Major gaps include inadequate facilities and equipment, shortages of qualified and experienced trainers, and limited practical skills among training staff. The implementation of Cooperative Training (CT) is further constrained by the absence of a comprehensive legal and institutional framework. Although colleges have established relationships with industry and signed Memoranda of Understanding (MoUs), these agreements are not consistently implemented. CT

documentation is also limited, with insufficient provisions for legal enforcement, incentives, insurance, and context-specific arrangements, particularly in rural and remote areas. In addition, training schedules often do not correspond with industry production schedules, while some industries have limited understanding of CT and restrict trainees' practical involvement. Other major challenges include weak industry ownership, limited financial resources, inadequate transport support, a shortage of large agro-processing industries, and an insufficient number of skilled trainers.

5.2. Implications

The findings imply that the effectiveness and sustainability of CT cannot be achieved through college–industry agreements alone. Weak institutional arrangements, inadequate resources, limited industry commitment, and insufficient enforcement mechanisms may reduce trainees' opportunities to acquire meaningful workplace competencies. The differences in implementation across colleges and industries also suggest the need for context-specific approaches, particularly in rural and remote areas. Strengthening collaboration among TVET institutions, industries, regional authorities, and other stakeholders is therefore essential for improving the quality and relevance of cooperative training.

5.3. Recommendations

1. Strengthen legal and institutional frameworks: Establish a comprehensive and enforceable CT framework with clear guidelines, binding MoUs, incentive and insurance mechanisms, and a functional Public–Private Partnership (PPP) platform.
2. Enhance industry engagement: Improve industry awareness of CT objectives, promote ownership through appropriate incentives and recognition, and align college training schedules with industry production activities.
3. Strengthen trainer capacity and facilities: Improve trainers' qualifications and practical skills through continuous professional development and provide adequate facilities and equipment aligned with curriculum requirements.
4. Standardize CT implementation: Develop comprehensive and context-sensitive CT manuals and documentation, establish effective monitoring mechanisms, and institutionalize sustainable support from college management boards and regional authorities.

5.4. Limitations of the Assessment

The assessment was conducted in selected agro-processing TVET colleges and therefore may not fully represent the implementation of OBT and CT across all TVET colleges and occupational sectors in Ethiopia. The study also relied substantially on participants' experiences and perceptions, which may be influenced by individual or institutional perspectives. In addition, variations in industry availability, particularly in rural and remote areas, may have limited the breadth of industry-level evidence.

5.5. Areas for Future Research

Future studies should examine the effectiveness of different CT models across TVET sectors and regions and investigate the factors that influence sustained industry participation. Further research is also needed on the effectiveness of incentive mechanisms, PPP arrangements, and legal frameworks in strengthening college–industry partnerships. Longitudinal studies could assess whether improvements in CT implementation have led to better trainee competencies, employment outcomes, and industry satisfaction over time.

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Informed Consent Statement: Verbal informed consent was obtained from all participants before the key informant interviews (KIIs) and focus group discussions (FGDs) were conducted. Verbal permission for audio recording was also obtained from participants before recording began. Only individuals who voluntarily agreed to participate were included in the study. All data were anonymized to protect participant confidentiality.

Transparency: The author states that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

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