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Global Programme on Skills and Lifelong Learning

Assessment of Green Technical and Vocational Training and Skills Development in Ethiopia

A study commissioned by the ILO Global Programme on Skills and Lifelong Learning (GPSL3) Ethiopia component

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List of acronyms

Cases

ATVT: Agriculture Technical Vocational Education and Training

CEEF: Confederation of Ethiopian Employers Federations

CETU: Confederation of Ethiopian Trade Unions

CRGE: Climate Resilient and Green Economy

EEA: Ethiopian Energy Authority

EEF: Ethiopian Employers Federation

EGECF: Ethiopian General Education Curriculum Framework

EIP: Eco Indatrial Park

EPA: Environmental Protection Authority

ESD: Education for Sustainable Development

GHG: Green House Gas

HGER: Homegrown Economic Reform

IAIPs: Integrated Agro-Industrial Parks

IGP: Institutional Greening Plan

ILO: International Labour Organization

IPDC: Industrial Parks Development Corporation

JCC: Jobs Creation Commission

LUCF: Land use Change and Forestry

MoA: Ministry of Agriculture

MoE: Ministry of Education

MoF: Ministry of Finance

MoI: Ministry of Industry

MoLS: Ministry of Labor and Skills

MoPD: Ministry of Planning and Development

MSMEs: Micro, Small, and Medium Enterprises

NCPC: National Cleaner Production Center

NDC: Nationally Determined Contribution

NQF: National Qualifications Framework

OHS: Occupational Health and Safety

PDC: Planning and Development Commission

PTC: Polytechnique College

RECP: Resource Efficient and Cleaner Production 2

ToR: Terms of Reference

ToT: Training of Trainers

TTLM: Training and Teaching Learning Materials

TVET: Technical and Vocational Training and Education

TVT: Technical and Vocational Training

WASH: Water, Sanitation and Hygiene

Glossary

This glossary provides definitions of key terms and concepts, which are frequently used in this report. Where readily available, ILO definitions are provided. In the event ILO has adopted the definitions of other UN bodies such as UNEP, UNESCO or UNFCCC, this is pointed out. While variants of definitions abound for terms such as "green growth", "green economy", "sustainability", and "just transition", the common denominator, which is adopted in this report is environmental, social and economic sustainability.

Climate change: "A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods."[1] [Note: The ILO adopts the UNFCC definition of this concept. See for instance ILO (2022). Greening TVET and skills development A practical guidance tool]

- **Curriculum:** "A detailed description of the objectives, content, duration, expected outcomes, learning and training methods of an education or training program."[2]
- **TVET:** "[...] education, training and skills development relating to a wide range of occupational fields, production, services and livelihoods. TVET, as part of lifelong learning, can take place at secondary, post-secondary and tertiary levels and includes work-based learning and continuing training and professional development, which may lead to qualifications. TVET contributes to sustainable development by empowering individuals, organizations, enterprises and communities, and fostering employment, decent work and lifelong learning so as to promote inclusive and sustainable economic growth and competitiveness, social equity and environmental sustainability."[3]
- **Just transition:** ILO documents reviewed in this assessment use the terms just transition quite often. An ILO definition of the concept is as follows: A Just Transition means greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind.[4]
- **Green economy**: This is a term that is often encountered in Ethiopia's key policy and strategy documents, namely GTP II, CRGE, NDC, PDP-10. ILO adopts UNEP's definition of the concept as was gleaned in the literature review. Two definitions are provided below one adopted by ILO and another simpler one from UNEP.
- ILO's definition (adopted from UNEP): "A green economy is defined as low carbon, resource efficient and socially inclusive. In a green economy, growth in employment and income are driven by public and private investment into such economic activities, infrastructure and assets that allow reduced carbon emissions and pollution, enhanced energy and resource efficiency, and prevention of the loss of biodiversity and ecosystem services." [5]

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1 UN (1992). United Nations Framework Convention on Climate Change. Available on-line at: https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf [Accessed on 02.11.2022]

2 ILO (2022). *Greening TVET and skills development: A practical guidance tool* [citing: ILO (2019). *Skills for a Greener Future*

3 UNESCO (2016)

4 ILO (n.d.). *Frequently Asked Questions on just transition*. Available on-line at: https://www.ilo.org/global/topics/green-jobs/WCMS_824102/lang--en/index.htm [Accessed on 02.11.2022]

5 ILO (2022). *Greening TVET and skills development: A practical guidance tool* [citing: ILO (2019). *Skills for a Greener Future* [citing UNEP's definition provided in https://www.unep.org/regions/asia-and-pacific/regional-initiatives/supporting-resource-efficiency/greeneconomy]

- Alternative UNEP definition: "An economy that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities." In its simplest expression, a Green Economy can be considered as one that is low in carbon, resource efficient and socially inclusive."[6]
  - "Economic progress that fosters environmentally sustainable, low-carbon and socially inclusive development".[7]
  - **'Greening' an institution**: is a method of modifying the institution's awareness, behaviors and activities with the goal of matching them up with the broader principle of sustainability - that is, economically, socially and environmentally responsible.[8]
- The "whole institution approach" to greening TVET: In practice, the whole-institution approach suggests the incorporation of sustainable development not only through the aspects of the curriculum, but also through an integrated management and governance of the institution, the application of a sustainability ethos, engagement of community and stakeholders, long-term planning, and sustainability monitoring and evaluation.[9]

  Education for Sustainable Development (ESD): "Education for Sustainable Development means including key sustainable development issues into teaching and learning; for example, climate change, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption. It also requires participatory teaching and learning methods that motivate and empower learners to change their behavior and take action for sustainable development. Education for Sustainable Development consequently promotes competencies like critical thinking, imagining future scenarios and making decisions in a collaborative way. Education for Sustainable Development requires far-reaching changes in the way education is often practiced today."[10]
- **Sustainability:** In 1987, the United Nations Brundtland Commission defined sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs."
- **Green jobs:**
- "Jobs that reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable. This definition covers work in agriculture, industry, services and administration that contributes to preserving or restoring the quality of the environment while also meeting the criteria for decent work – adequate wages, safe conditions, workers' rights, social dialogue and social protection. It also covers activities related to both mitigation of and adaptation to climate change.[11]
  - "Green jobs are decent jobs that contribute to preserving or restoring the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency. Green jobs help to improve efficiency in the use of energy and raw materials, limit greenhouse gas emissions, minimize waste and pollution, protect and restore ecosystems, and support adaptation to the effects of climate change."[12]

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6 UNEP (n.d.). *Green economy*. Available on-line at: https://www.unep.org/pt-br/node/23750 [Accessed on 04.08.2022]

7 UNESCAP, ADB, UNEP (2012). *Green growth*, resources and resilience

8 EU & ILO (n.d.). *Greening guidelines for TVET institutes*

9 UNESCO (2017). *Greening Technical and Vocational Education and Training: A practical guide for institutions*

10 UNESCO (2014)

11 ILO (2011). *Skills for green jobs: a global view: synthesis report based on 21 country studies*

12 ILO (2022). *Greening TVET and skills development: A practical guidance tool* [Citing another ILO work: ILO (2016). *A just Transition to climate-resilient economies and societies: Issues and perspectives for the world of work*: Geneva.

- **Skills for green jobs:** There is no formal definition but the ILO prefers this term over "green skills". ILO contends that the term skills for green jobs "is much broader, as it covers both core and technical skills for all types of green jobs."[13] Elaborating on the concept, the ILO also argues that, "right skills for green jobs are the prerequisite to make the transition to a greener economy happen. Today, skills gaps are already recognized as a major bottleneck in a number of sectors, such as renewable energy, energy and resource efficiency, renovation of buildings, construction, environmental services, manufacturing. The adoption and dissemination of clean technologies requires skills in technology application, adaptation and maintenance. Skills are also crucial for economies and businesses, workers and entrepreneurs, to rapidly adapt to changes as a consequence of environmental policies or climate change."[14]
- **Capacity gap assessment**: "A capacity assessment is an analysis of desired capacities against existing capacities; this generates an understanding of capacity assets and needs and serves as input to formulating a capacity development response."[15]
- **Responsible leadership:** responsible leadership can be defined as the management of an organization's interactions with society aimed at addressing the organization's various stakeholder concerns and contributing to the multiple bottom lines of economic, social, and environmental performance.[16]

[13] ILO (2015). *Anticipating skill needs for green jobs: A practical guide*

[14] ILO (2011). *Skills for green jobs: A global view*

[15] UNDP (2009). *Overview of UNDP's capacity assessment methodology*. Available on-line at: http://content-ext.undp.org/aplaws_publications/2083494/Capacity%20Assessment%20UNDP%20August%202009.pdf. [Accessed on 04.11.2022]

[16] Vogtlin, C. (n.d.). *The modern world context for responsible leadership*. Available on-line at: https://managemagazine.com/article-bank/leadership/what-responsible-leadership/ [Accessed on 04.11.2022].

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All in all, fifty Technical and Vocational Training (TVT) colleges were consulted. Unfortunately, it will not be possible to name, in this limited space, all the leadership, trainers and trainees who kindly shared their experiences. First and foremost, this study is about them and the Consultant would like to acknowledge their huge contributions.

Acknowledgement of colleagues of the Ministry of Labor and Skills (MoLS) is also well in order. In particular, the Consultant would like to extend his sincere gratitude to Mr. Azmera Kebede, Mr. Abebe Alemayehu, Ms. Shewaye Sewnet and Mr. Amlaku Alebachew for making time from their busy schedules to share their perspectives. It would be ungracious not to acknowledge Mr. Gashaw Menberu from the same ministry, who in addition to sharing his thoughts also kindly provided leads to the many TVT colleges, which the consultant visited.

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Last but not least, special word of thanks to my driver, Mr. Bereket Araya of Sphere Tour and Travel who accompanied me in the 24-days field trip out of Addis.

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Consultant

[17] SNNP region: Southern Nations, Nationalities, and Peoples' (Region)

[18] ANRS: Amhara National regional State

1. Executive Summary

This report is the result of desk research, field work and on-line survey carried out on the issue of green TVT and Skills development in Ethiopia.

The term "Technical and Vocational Training (TVT)" is used in this writing in the context of the assessment itself and when referring to the "system" in present-day Ethiopia. The overriding reason for that is to reflect the current structure of sectors in the country following the ten-year development plan (2021-2030).[19] In this re-structuring, Technical and Vocational Training is organized as one "sector" under the Ministry of Labor and Skills.[20] On the other hand, "Education" as a sector is the mandate of the Ministry of Education (MoE). However, the term Technical and Vocational Training and Education (TVET) also frequently appears in this report. Wherever "TVET" appears, it is out of necessity, namely the requirement for proper citation of the literature sources used in this report. That is especially the case in sections dealing with literature review, case studies and frameworks of analysis (**Chapters 4 and 5**). In the same vein, the term "TVT system" is used in this Report.[21]

The assessment was commissioned by ILO's Global Programme on Skills and Lifelong Learning (GPSL3) Ethiopia component. The specific objective of the study (as outlined in the Terms of Reference) is to assess selected TVT colleges on their capacity to provide green skills and identify associated gaps and challenges. At a higher level, this work seeks to contribute to Ethiopia's climate resilient green growth efforts and also to ILO's GPSL3 initiative. The interventions forthcoming from the assessment will inform ILO's and other stakeholders' continuing work on green TVT and skills development in Ethiopia.

The assessment is guided by analytical frameworks applicable to the two core issues of enquiry, i.e., green TVT; and capacity gap assessment. As will be discussed in **Chapter 4**, relevant literature was identified, reviewed and distilled into useful lenses to guide interpretation of data gathered. This process started already in the technical proposal preparation phase, continued into the inception phase, and further strengthened in the desk research phase.

Data was gathered through three approaches, namely desk research; field-work; and by means of an on-line survey. This is discussed in **Chapter 3**.

The actual visit of the TVT colleges in the regions and in Addis Ababa took place in the period August 15-September 23, 2022. Unfortunately, this coincided with the summer *(kiremt*) vacation meaning trainers and trainees were not in the campuses. The Consultant used the on-line survey to address this problem.

In addition to the **50 TVT colleges** consulted, labor and skills officials and experts at the federal, regional and zonal level were interviewed. Additional perspectives were also gathered from practitioners and experts working in related themes including from within sector ministries, donors, universities, employers, civil society organizations and research bodies.

The findings of the draft report were presented in a validation workshop held on November 10, 2022, which attracted 38 participants drawn from various sectors and organizations (**Annex 24**). This Final

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[19] In Amharic: የኮሎንና ልማት ኮሚሽን (2014 ዓ.ም.). *የአሥር ዓመት የልማት ዕቅድ እና የአስፈፃሚ ተቋማት አደረጃጀት*

[20] That was also highlighted by colleagues from the Ministry of Labor and Skills who participated in the validation workshop of the draft report (on November 10, 2022).

[21] Although the term "TVT sector" is also used in informal discussions, the ten year development plan identifies seven economic and four infrastructure sectors- of which TVT is not one.

Report was prepared by addressing the feedback given in that validation workshop and the written comments given by ILO colleagues.

The key findings of the assessment are presented below.

1.1 Broad findings

a. Overall, with the onset of the "new" Ethiopian "TVET" Policy and Strategy of 2020, TVT colleges have become more aware of the issue and also understand that, green TVT will be an agenda in the coming years.

b. In general, TVT stakeholders interviewed appreciate the importance of the green growth and sustainability agenda. Interviewees (leadership, trainers and trainees) related to a number of crucial challenges that we face at the global and local levels, among others, climate change, water scarcity, deforestation, resource efficiency, waste, access to energy, economic growth and social development issues.

c. However, and strictly speaking, the concept of green TVT is narrowly understood by colleges and stakeholders if we speak from the perspective of the framework of analysis which guided this work. The most prevalent activity practiced by colleges is greenery including planting shade trees and edible fruits and vegetables in the campus premises and participation in the green legacy initiative beyond the campus premises.

d. It is important to note that the *green legacy*[22] initiative, spearheaded by the prime minister of Ethiopia, is gaining traction. For the most part, green TVT in general and greening the campus and community in particular is understood in that light.

e. When it comes to other aspects of green TVT namely curriculum & training (including training delivery and assessment), research, workplace & community, and institutional culture, practices were limited and for the most part did not arise from a high-level commitment to sustainability objectives at the organizational level.

f. Seen from the perspective of "best-practice" thinking of sustainability (to be discussed in **Section 5.2**), viewing sustainability as a triple bottom-line concept ("people, planet and profit") is generally not well understood. Even more crucially, the notion that colleges need to make sustainability "core business" of their institutions (namely embed it into their vision, mission, objective and their short- and long-term strategies) is missing. Related to this, the fact that sustainability thinking, is first and foremost, an institutional culture that needs to be developed, nurtured and strengthened is what is lacking the most.

g. Notwithstanding those limitations, it is important to mention that there are commendable practices in the colleges fitting the sustainability/green growth concept- although they might come in as isolated activities if critically examined. Importantly, many TVT colleges have credible "social sustainability initiatives" such as "learning with disability" programs; short-term training courses for refugees and returnees; and initiatives to support poor kids' education and the elderly; and other related "social responsibility" activities. Again, along the social sustainability dimension, a number of colleges have interesting "work place" initiatives. The most important one is availing day-care facilities catering for staff and trainees[23].

h. On the environmental front, the most common activities arise from the Kaizen principles which colleges have adopted as an objective and as a unit of competence in the technical occupations they offer. The most common practice is waste minimization efforts based on the Reduce-Reuse-Recycle concept.

[22] https://greenlegacy.et/

[23] This could be the starting point for similar "workplace wellness" programs addressing health, psychosocial and financial wellness, which are implemented by "responsible" companies committed to their employees' wellness.

1.2 Specific findings relating to capacity gaps

a. **Greening the campus**: First, it is worth mentioning that although TVT colleges implement a few activities relating to this aspect, those do not necessarily cascade from a high-level sustainability policy of the organization as discussed above. For instance, colleges do not practice environmental or social "compliance" audits or similar assessments to determine their key "sustainability" aspects on the basis of which they define their respective action plans.[24] The most common activities reported by college managers and observed during the site visit include: growing shade trees, edible fruits and vegetables; growing seedlings for use in the green legacy initiative; reduce, re-use, recycle activities inspired by Kaizen (mostly restricted to workshops); limited instances of PV solar applications as back-up power source; isolated instances of water saving initiatives (drip systems to irrigate plants in the campus premises). On the social side, the most common is effort to make college buildings and facilities accessible to the disabled.

b. **Greening curriculum and training**: Again, there is no systematic approach concerning this aspect as well, especially on the environmental topics. That applies to the whole "curriculum development" cycle, i.e., labor market study; determining units of competency; defining or revising occupational standards; training material development; training of trainers; training delivery; and assessment. Overall, trainings on offer are, for the most part, donor or local municipality driven; of course, this is not bad in itself. Almost all training offered in this domain are short courses. The most common short courses include: applications of PV solar, greenery, and solid waste management. In addition, common trades taught have some elements relating to environmental sustainability. The most commonly cited are Reduce, Re-use and Recycle (motivated by Kaizen), Occupational Health and Safety in the technical fields. The automotive occupation addresses emission control aspects, as might be expected. However, there is no evidence to indicate that curriculum and training is being proactively greened for any of the following reasons or a combination of them: commitment to align TVT to the green economy objective of Ethiopia; in response to market signals; to address local needs; cognizant of local sustainability risks and resource endowments; or from a normative argument point of view. Again, TVT colleges fare well in social sustainability aspects (not forgetting the limitations already discussed). Good practice examples include: short courses customized and offered to refuges and returnees; mainstreaming the Education with Disability objective.

c. **Greening research**: Traditionally, TVT colleges only do action research and not applied research. The action researches focus on finding solutions to challenges related to the learning-teaching core activity. Except for isolated examples including trainers "doing research" as part of their studies towards undergraduate or post-graduate degrees, applied research aligned to the sustainability objectives of the college does not exist.[25] Of course, there is realization on the part of TVT system stakeholders, this needs to change and, in principle, the TVT Policy and Strategy does not prevent that. Notwithstanding that TVT colleges currently do not do applied research, greening research would have meant focusing it to address key environmental and social sustainability issues material to the college, the local community or to the nation at large.

d. **Greening the community and workplace**: The comments made above regarding the disconnect between practice and a guiding policy (which is absent) applies here as well. Overall, there is no systematic effort or program to engage the private sector with a view to work collaboratively to advance sustainable business practices (environmental and social). The most commonly encountered practice in that line is work which TVT colleges do to support micro enterprises to improve their productivity by adopting Kaizen practices. Other examples in the "community" sphere include: training in and technical support to PV solar application for refugee and host communities; maintenance of urban storm drainage lines; attempted interventions for technology transfer (solar, biogas, fuel briquettes/biomass); good practices in artisanal mining, agriculture and pottery. However, it must be mentioned that technology transfer initiatives relating to renewable energy sources are not robust. In many instances, they have stalled after some pilot experimentation and evidences of scale-up and rollout are nonexistent. Colleges also engage in various "social responsibility" initiatives in the community sphere: elderly home repair; maintenance of

[24] This is, for instance, a major activity in the environmental management systems approach of continuous improvement (the Plan-Do-Check-Act Deming Cycle).

[25] One exception was the effort by Debre Markos PTC to develop an organic fertilizer.

local cobblestone roads; providing educational materials to kids from poor families. In the environmental front, organized engagement in the green legacy project is well underway. Concerning green legacy initiatives, colleges actually have annual targets for trees to be planted per year (communicated by respective labor and skills bureau) on which they also report performance.

e. **Greening the institutional culture**: If there is any "single strategy" to guide sustainability actions of organizations, it is this one. The vision and mission statements, which TVT colleges proudly and transparently advertise on billboards in their campuses have clear elements of efficiency, effectiveness and equity mirroring the "TVET" strategy of 2008 and the "TVET" policy and strategy of 2020. However, what is visibly missing in this articulation is commitment to triple bottom line sustainability (especially the environmental bottom-line). This is also missing in their five- and ten-year strategic plans. Examples of best practices of organizations which have integrated sustainability as core business include the following: a clearly articulated (company-wide) sustainability policy or an Institutional Greening Plan; systems, standards, metrics and indicators with which to work; dedicated function and resource including a sustainability manager; and reporting and disclosure mechanisms. For instance, the websites of such organizations will have tabs on sustainability from which external stakeholders can access annual sustainability reports or other related information. Organizations which work towards sustainability also tend to adopt sector-specific or sector-wide accords. Examples of these include: the ten principles of UN Global Compact, the UN Principles for Responsible Management Education (PRME).[26] Auditable standards such as ISO 14001, etc.

f. **Thematic issues**: In addition to the five aspects relating to greening TVT, the Consultant would like to flag three, themes that deserve special attention in the broad endeavor of green TVT and skills development. The first one is the issue of gender mainstreaming and the related theme of women economic empowerment. Although colleges have gender mainstreaming activities, the issue of "women in TVT leadership" needs improvement. The second theme is (access to) water, which a number of colleges mentioned not just as environmental aspect of national and global importance but also as a local factor limiting day-to-day teaching and learning activities. Water sustainability and stewardship definitely need to be top of the green TVT and skills development agenda. The third one (also related to water) is COVID-19 and the related theme of Water, Sanitation and Hygiene (WASH). COVID-19 did have a significant adverse impact on the TVT system globally as the joint ILO and World Bank study found out.[27] One of the adverse effects of climate change is also its contribution to the emergence of new pandemics and expansion of existing diseases to new areas. These three themes need to be re-cast in light of the green TVT effort. A guiding question could be: What can green TVT contribute to addressing these challenges- through the five aspects?

1.3 Existing and structural issues

Of course, all the discussions about green TVT and skills development does not happen in isolation. There are existing conditions and constraints, under which TVT colleges have been operating. These conditions and constraints will continue to affect and shape the green TVT agenda as well. The following need to be mentioned.

a. **Finance and budget constraints:** This is probably the number one constraint, which colleges mentioned in discussions concerning capacity gaps and limitations. The impact of that is even more compounded when we consider the fact that TVT colleges are resource intensive due to the 70% practical- 30% theoretical approach of curriculum design. All TVT colleges consulted mentioned budget

[26] "Working through Six Principles, PRME engages business and management schools to ensure they provide future leaders with the skills needed to balance economic and sustainability goals, while drawing attention to the Sustainable Development Goals (SDGs) and aligning academic institutions with the work of the UN Global Compact." Available on-line at: https://www.unprme.org/about [Accessed on 05.07.2022].

[27] ILO & World Bank (2021). *Skills development in the time of COVID-19: Taking stock of the initial responses in technical and vocational education and training*. Available on-line at: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_766557.pdf [Accessed on 14.11.2022]

allocated to their colleges being a binding constraint already- both to the training, industrial extension and community engagement functions (let alone research).

b. **Responsibility not matched by commensurate technical and financial support (by all stakeholders):** By national policy, the TVT system is responsible for taking 80% of youth graduating from Ethiopian high schools; that means only the remaining 20% are expected to go to universities. Even the remaining 20% who join universities are likely to come to TVT colleges at some point for short courses as part of job creation efforts for the unemployed youth (implemented by federal and local governments). In conclusion: technical and financial support going into the TVT system does not mirror that huge responsibility of 80% of high school graduates going into the system.

c. **Institutional aspects on how occupational standards are defined:** Here, theory and practice seem at odds. The principles appear to be clear to stakeholders, namely that industry is responsible to define occupational standards and to indicate demand for those occupations as well. In reality, however, implementation in that spirit is sub-optimal, i.e., industry is not effectively participating in this key activity.[28] Interviewees (especially public TVT colleges) described the process as top-down and government-led, i.e., model occupational standards are shared by the federal government and colleges in collaboration with regional labor and skills bureaus, adapt them to local context. The private TVT colleges appeared to work more closely and effectively with industry- at least in having in place a feedback system to tune training to the needs of the workplace.

1.4 Intervention ideas for green TVT and skills development in Ethiopia

The portfolio of interventions identified and proposed are presented in **Chapter 7**. The assessment showed a number of capacity gaps (discussed in **Chapter 6**). The central principle adopted in the design of interventions is to frame them as "systemic" and not as "one-off" activities. Furthermore, the multiple issues and constraints encountered were clustered into a few manageable and logical capacity development "need themes". This process was informed by the lenses introduced in the "framework of analysis" (**Chapter 5**). The draft interventions proposed were reviewed by working groups of experts and practitioners in a validation workshop (**Annex 23 & 24**). **Table 1** presents a high-level summary of the "themes" so identified and the corresponding intervention ideas.

Although training workshops are still part of the portfolio of activities, they are intended as catalytic actions (pilots) to spur continuing actions. In the long-run, the objective is to build endogenous capacity for green TVT and skills development in Ethiopia. The majority of activities are framed to embody concepts of joint visioning, coalition building, management systems development, local knowledge services, and knowledge management.[29]

ILO need not necessarily facilitate all of the seven interventions. Given ILO's focus on lifelong learning and the objectives of the Decent Work Country Programme, Awareness Creation (No. 1) and Leadership Capacity Development (No. 2) could be its immediate focus areas. The top three interventions identified by the working groups of the validation workshop were those on awareness, policy alignment, and leadership capacity; those could also guide ILO's prioritization.

[28] The reasons for sub-optimal engagement of industry in defining occupational standards relate to: poor technical and organisational capacity of industry in defining OS; lack of a National Qualifications Framework (which has yet to be endorsed); incomplete and un-updated TVET Qualifications framework.

[29] This is in line with the capacity development philosophy and model proposed for this assessment discussed in the Framework of Analysis (Chapter 5) also introduced in the inception report.

▶ **Table 1: Summary of capacity development needs and proposed interventions**

No	Capacity development theme	Intervention idea
1	Awareness	Strengthening awareness on green growth and sustainability for the TVT system and key stakeholders
2	Policy alignment and coordination	Better policy alignment of TVT-, CRGE-, Education-, and Private sectors
3	Green occupational Standards	Technical capacity development of the TVT system on green OS development
4	Leadership capacity	Executive capacity in "responsible leadership", corporate governance and business ethics
5	Trainer capacity	Training of Trainers on green occupations (revised and new OS)
6	Partnering capacity	Technical capacity development of government, private sector and TVT system on effective partnerships for green TVT and skills development
7	Research, Technology and Industrial Extension	Technical capacity development for aligning research, technology and industrial extension functions for green TVT and skills development

2. Background

In 2011, the Government of Ethiopia committed itself to transition into a Climate Resilient and Green Economy (CRGE). That year, it adopted a strategy bearing the same name, which seeks to grow the economy by decoupling it from dependence on carbon-based production and consumption practices.

Drawing on the CRGE Strategy, Ethiopia's revised Nationally Determined Contribution (NDC), which is a commitment towards the Paris Agreement, proposes an emissions reduction target of 68.8%, which is even more ambitious than the 1st NDC commitment of 64% (pledged in 2015).[30] In the same vein, Ethiopia's National Adaptation Plan (NAP-ETH) seeks to reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience.[31] NAP-ETH focuses on sectors that have been identified as most vulnerable to the ill-effects of climate change, i.e., agriculture, forestry, health, transport, power, industry, water and urban; within these sectors, NAP-ETH has identified 18 adaptation options for implementation.[32]

Building a resilient green economy is also one of the ten strategic pillars of Ethiopia's ten-year development plan (PDP-10), which covers the 2021-2030 period. Specifically, PDP-10 envisions to "ensure sustainable development by developing, enriching, maintaining and protecting the country's natural environment, forests, wild life and other biodiversity resources, and also through ensuring sustainable utilization as well as maintenance of healthy ecosystem interactions.[33]

Ethiopia's green economy objectives and goals (indicated in the CRGE strategy and NAP-ETH plan) are integrated into PDP-10. That means, as part of their respective PDP-10 plans, the economic and infrastructure sectors have articulated their adaptation and mitigation objectives and targets. A review of this is made in **Section 4.1** with examples provided in **Annex 6**.

When it comes to the mitigation aspect, Land use Change and Forestry (LUCF) and Livestock aspects offer the highest Green House Gas (GHG) emission reduction potentials (See **Annex 12**). Green practices and technologies that could help Ethiopia meet its LUCF and livestock emission reduction targets include sustainable land and livestock management practices; improved cook-stoves; bio-gas technologies; and use of renewable energy technologies. There is certainly a role for TVT colleges in advancing these green practices and technologies. Needless to say, the adaptation objectives are probably far more urgent given Ethiopia's very low GHG emission per capita and its high vulnerability to the ill-effects of climate change. Hence, concrete and sustained actions are needed to meet the adaptation goals (**Annex 26**). All eighteen adaptation goals are relevant to green TVT and skills development. A few interesting examples, out of the eighteen, include: climate smart agriculture; sustainable natural resource management; improving access to potable water; developing and using adaptation technologies; reinforcing adaptation research and development; and developing adaptive industry systems.

In addition to job opportunities in greening the sectors (through good land-use management-, good agricultural-, and manufacturing practices), the renewable energy sub-sector alone is projected to have a high job creation potential. Thirty five thousand direct jobs are expected to be created by this sub-sector

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[30] FDRE (2021). *Updated nationally determined contribution*

[31] FDRE (2019). *Ethiopia's climate resilient green economy: National adaptation plan*. Available on-line at: https://www4.unfccc.int/sites/NAPC/Documents/Parties/NAP-ETH%20FINAL%20VERSION%20%20Mar%202019.pdf [Last accessed on 18.11.2022]

[32] Ibid.

[33] FDRE Planning and Development Commission (2021). *Ten years development plan: A pathway to prosperity 2021-2030*

in 2025, an increase of 36% over 2020.[34] In addition, through a multiplier effect, the renewable energy industry could also create up to 70,000 new indirect jobs, including those linkages with local suppliers for transport, construction, finance, and telecoms.[35] With that assessment, the renewable energy sub-sector was one of the ten sectors identified by the Jobs Creation Commission (JCC) as having high employment creation potential worth exploring.[36]

On Ethiopia's labor markets side, the following are key salient features that need to be highlighted:

- The country's labor force (age 15-64) which was about 64 million in 2019 is projected to grow to 75.4 million by 2025.[37]
- Urban youth unemployment is alarming and stands at about 25.7% across the genders and 31.7% (for female) and 18.8% (for male).[38]
- More than 2 million youth enter the labor market annually and there is a need to create 14 million jobs between 2020 and 2025 to absorb the new entrants and the current backlog of unemployed of at least 2.5 million in 2018.[39]

On the TVT labor supply side, the number of vocational students has been increasing, registered at 393,589 in 2012 and 352,134 in 2015.[40]. In addition to the traditional economic sectors, the green economy also holds employment and entrepreneurship opportunities for TVT graduates. This could be in the mitigation and adaptation aspects and also in the renewable energy industry as discussed above.

TVT institutions have a key role to play in bridging the skills gap between labor supply and demand as it relates to the green economy in Ethiopia. For that to happen, the institutions themselves need to gear up for that challenge and opportunity. As will be discussed further (in **Section 4.2**), green TVT is being advocated through a "new" national policy and strategy as a means of aligning the TVT and green economy sectors.[41] The policy and strategy document defines green skills as '[...] those skills needed to reduce environmental impacts and support economic restructuring with the purpose of attaining cleaner, more climate resilient and efficient economies that preserve environmental sustainability and provide decent work conditions."[42]

Cognizant of the challenges and opportunities relating to sustainable development globally, the International Labor Organization (ILO), in 2015, adopted policy guidelines for a just transition towards environmentally sustainable economies and societies for all.[43] This assessment in Ethiopia (supported by ILO) can be taken as one concrete action which seeks to explore the challenges and opportunities in respect of green TVT and skills development in the country.

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[34] Planning Development Commission (2020). *Plan of Action for Job Creation 2025-2030*

[35] *Ibid.*

[36] Job Creation Commission (2019). *Sector prioritization for job creation in Ethiopia*

[37] JCC (2021). *Plan of action for job creation 2020-2025*

[38] CSA (2020). *Key findings of the 2020 urban employment unemployment survey: A Comparative Analysis with 2014-2016 and 2018 Survey Results*

[39] JCC (2021). *Plan of action for job creation 2020-2025*

[40] World Bank (2020). *Data on secondary education, vocational pupils.* Available on-line at: https://data.worldbank.org/indicator/SE.SEC.ENRL.VO.FE.ZS?locations=ET [Accessed on 14.11.2022]

[41] MoSHE (2020). *Ethiopian TVET Policy and Strategy*

[42] Ibid.

[43] ILO (2015). *Guidelines for a just transition towards environmentally sustainable economies and societies for all.* Available on-line at: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_432859.pdf [Accessed on 14.11.2022]

3. Approach and Methodology of the Assessment

3.1 Approach

As a primary guiding principle, the Consultant set out with the conviction to bring (additional) value-add to this work in addition to meeting the expected deliverables. To that end, regular coordination with ILO Ethiopia Office and its key partners was one approach followed to ensure "conceptual agreement" at the start and a better "value-add" at the conclusion of the assignment.

With that in mind, a kick-off meeting was held with ILO colleagues on August 1, 2022. The meeting was very helpful and provided guidance on the following from the perspective of ILO's work:

a. Workable criteria on the selection of TVT institutes to be consulted[44];

b. Other stakeholders crucial for ILO's work and for this specific project (to be discussed below);

c. Additional informants from within the ILO office;

d. Guidance on project and administrative issues keeping in mind the relatively short period available for the work and the general security situation[45] of the country.

In addition, an interim (de-briefing) meeting with ILO colleagues was also held on September 21, 2022 in which the consultant presented the findings from the fieldwork and preliminary results. This meeting was a useful brain-storming opportunity. The following suggestions were made, which the consultant took into account in the additional work leading up to this Final report:

- The need for the interventions to have actions for the capacity development needs of trainers and trainees;
- Related to the above, the importance of sensitizing educating students on sustainable living (sustainability is not just about production; it is equally about consumption);
- That green growth and sustainability aspirations and actions should not be left only to the mercy of the "business case" rationale;
- The importance of private sector partnerships, i.e., that the private sector has a crucial role to play in green TVT and skills development;[46]
- Exploring opportunities for setting up youth, green skills accelerator challenge funds.

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[44] For instance, focusing on the cluster coordinators in view of the huge numbers of TVT colleges in the country.

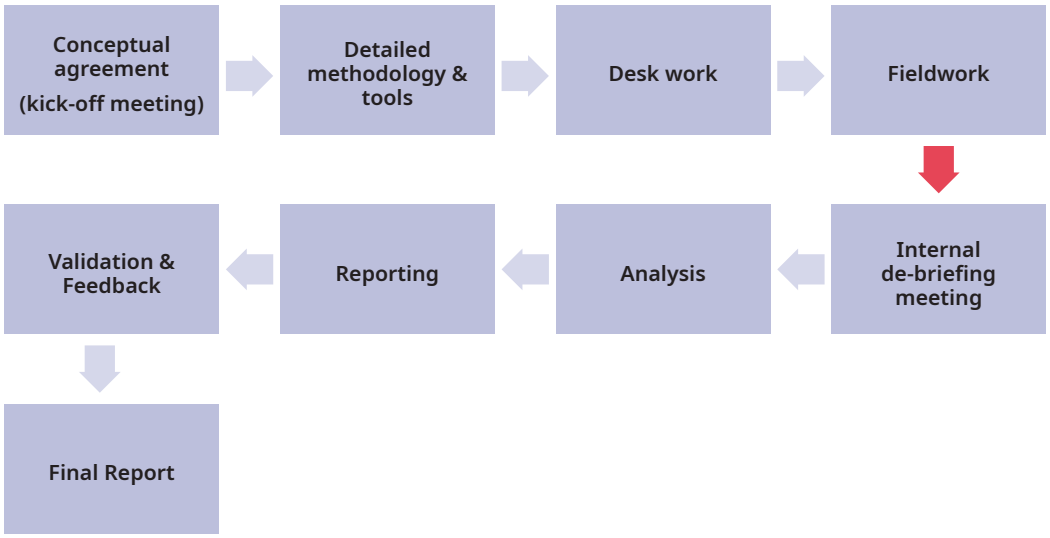
[45] Mindful of that, ILO advised the Consultant to take the on-line "BSAFE" course, which the consultant duly completed in advance of contract signing

[46] That is to say, in the absence of enabling policies to address widespread externalities, environmentally and socially desirable goods and services cannot always be competitive with the "unsustainable" equivalents.

The draft report was further reviewed and enriched through a validation workshop held on November 10th, 2022 (see **Annexes 23 & 24**). Written feedback was also provided by ILO colleges who reviewed the draft report. Comments and suggestions from these two reviews were used to update the draft report. Importantly, proposed interventions were re-visited and re-formulated considering the feedback from those reviews (as will be further discussed in **Chapter 7**).

Figure 1 depicts the work approach that was followed from inception phase to final report delivery.

Figure 1: Proposed work approach



3.2 Methodology

Data was gathered through desk research and field work.

Desk research encompassed following activities:

a. Review of strategies, project documents and studies relevant to the green economy; greening of TVT institutions; and climate change education;

b. Designing a framework of analysis, which will guide interpretation of data gathered;

c. Developing an applicable Theory of Change;

d. Formulation of interview questionnaire based on the objectives of the assessment and guidance provided in the kick-off meeting;

e. Reviewing and distilling lessons from best practice guides and selected country case-studies on the subject of green TVT;

f. Identification and elaboration of interventions; and

g. Drawing appropriate recommendations and policy-pointers.

An analytical framework and additional lenses were drawn and used for analysis of information gathered. That was done by reviewing selected literature and initiatives in the space of greening TVT institutions and the concept of Education for Sustainable Development (ESD). To this end, the Consultant reviewed the following selected literature, which informed the research guide and the interview questionnaires:

- ILO (2021). *Greening guidelines for TVET institutes*[47];
- ILO (2022). *Greening TVET and skills development: A practical guidance tool*[48];
- UNESCO-UNEVOC (2017). *Greening Technical and Vocational Education and Training: A practical guide for institutions*[49].

Literature review also focused on pertinent themes relevant to the assessment topic. To this end, selected policy and strategy documents were reviewed on the national ten-year development plan; the TVT system; greening education; the green economy; and job creation.

Field work involved Key Informant Interviews (KIIs) and Focus Group Discussions (FGD) with stakeholders. As was planned in the Consultant's proposal, most of the interviews and discussions happened to take place through face-to-face meetings. This was the case for the majority of TVT college leadership (deans and vice deans); regional or zonal TVT/Labor Skills development experts; and other stakeholders. The questionnaires which guided the interviews are presented in **Annex 1**. The complete list of stakeholders consulted in face-to-face interviews and on-line surveys is presented in **Annex 5**.

The fieldwork was conducted in the period, August 15- September 23, 2022, which, unfortunately, coincided with the summer (*kirem*t) vacation of TVT college trainers and students. That was an unforeseen problem which materialized, solely, as a result of the contracting timelines and the actual date of work commencement.

To circumvent that challenge, the Consultant introduced an additional tool for data gathering, namely an online survey- through SurveyMonkey[50]. With that, it was possible to reach out to TVT trainers, a few students and an additional number of TVT and ATVT (Agriculture Technical Vocational Education and Training) colleges. In few instances, telephonic and virtual meetings were held as an additional means of enquiry where the situation dictated.

The primary focus of the fieldwork (as stipulated in the ToR and discussions with the Client at the kick-off meeting) were the "cluster leads", which are TVT polytechnic colleges. During the meetings, these colleges were requested to provide additional leads to other TVT institutions. Based on those leads, the Consultant was able to reach additional colleges in regions and towns not covered by the "physical" fieldwork. Likewise, the interviewees also provided the contact details of trainers and a few trainees who were invited to participate in the on-line survey.

In addition to the TVT colleges themselves, the stakeholders consulted during the assessment, including also those who participated in the validation workshop, were drawn from diverse sectors, i.e.: government; industry/business; associations (organized labor, organized employers); development agencies; academia; civil society; and research organizations. Details are shown in **Annexes 5 and 24**.[51] In the interviews and the validation, organized labor was represented by the Confederation of Ethiopian Trade Unions (CETU). Organized employers were represented by the Ethiopian Employers Federation (EEF) and the Confederation of Ethiopian Employers Federations (CEEF).

The Consultant carried out interviews and focus group discussions in Amhara, Oromia, Sidama, SNNP, Harari and Somali Regions in addition to Addis Ababa and Dire Dawa towns. Through the on-line survey, it was possible to reach additional regions and TVT colleges, namely in Gambela, Benishangul Gumuz, and South West Regions. Only the Afar Region is missing as the invited TVT colleges did not respond to

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47 Available on-line at: https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo-dhaka/documents/publication/wcms_815337.pdf [Accessed on 03.11.2022]

48 Available on-line at: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_847095.pdf [Accessed on 03.11. 2022]. It must be mentioned that the final version of this report was available after the draft assessment report was submitted. Hence, the consultant reviewed it with a view distil and integrate key guidance in the Final Report as much as practicable.

49 Available on-line at: https://unevoc.unesco.org/up/gtg.pdf [Accessed on 03.22.2022]

50 The "Advantage Annual Plan" version was used.

51 A few did not respond to requests for face-to-face interviews or participation in on-line surveys. To address that gap, the Consultant visited the websites of those organizations and reviewed relevant studies and reports.

the invitations and reminders. Unfortunately, Tigray was not included in the study owing to the ongoing conflict in the region.

The draft report was presented in a validation workshop organized by ILO held on November 10, 2022. The workshop attracted 38 experts and practitioners from key sectors, including from government, business/employers, organized labor, development agencies, civil society, and research institutions (**Annex 24**). This final report was then prepared integrating the feedback from the validation workshop and written comments given by ILO.

The result forthcoming from this process (desk work, field work and validation workshop) informed the recommendations and the interventions on the greening of TVT institutions.

3.3 Sampling criteria used to select TVT colleges

According to PDP-10, the number of public TVT institutions at the start of the planning period (2021) was 672, which is projected to grow to 922 by the end of the planning period (2030). Likewise, the number of private TVT institutions in 2021 was 950, which is projected to reach 1700 by 2030.[52]

The sheer number of institutions by itself makes it necessary to have criteria with which to select a manageable number of informants for the field research. With that in mind, the following criteria were proposed and used for the selection of the TVT colleges for KIIs and FGDs.

Efficiency/Level of Effort: Mindful of the huge number of institutions, the ToR itself, stipulates that "the assessment should focus on selected TVT colleges and institutes including polytechnic colleges." It was also on that basis that the TOR determined the number of days available for the assignment and the suggested research methodology.

a. **Equity:** As much as possible, the assessment aimed at geographic coverage and regional representation. The Consultant used the on-line survey towards this objective.

b. **Alignment with national policy, i.e., the "structural transformation agenda"**: Focus will be given to TVT colleges and institutions located in the vicinity of industrial parks and integrated agro-industrial parks.

c. **Focus on cluster coordinators:** The cluster focal points are well-established colleges coordinating a number of "smaller" TVT institutions. The contact details of their deans and vice deans were more accessible than the latter. During the interview the cluster coordinators were asked to provide information on institutions under their embrace on the basis of which the Consultant followed up with on-line surveys.

d. **Type of institution:** Public, private and NGO owned institutions were sampled.

As anticipated already at the inception phase, the selection of TVT institutions happened to be a process rather than an activity to be completed at the beginning. The initial list proposed at the inception phase actually evolved as practical suggestions were provided by the cluster lead colleges and TVT skills departments/bureaus. Hence the final list of consulted colleges was the result of that "snowball" effect. This approach had the additional benefit of being "participatory" as, in many instances, lead colleges and labor and skills departments/bureaus were keen to provide additional contact details to smaller and far-flung colleges.

[52] PDC (2021). *Ten years development plan: A pathway to prosperity 2021-2030*

4. Literature Review

This Chapter presents interesting information and facts gleaned from the literature review conducted in the context of the assignment. It is not intended as a comparative analysis of the various works. What is intended is to highlight the key literature the Consultant has come across in the desk research and during consultation with stakeholders. An additional objective is to distil the major findings, conclusions and guidance from these literature with a view to inform the assessment and as reference to further research which will follow this work.

The review focuses on guidelines, policies, strategies, studies and reports relating to the issue of green TVT and skills development and the green economy of Ethiopia.[53] However, this section should not be viewed as an exhaustive review of the literature on these subjects- which is not the purpose of the assessment itself.

4.1 The ten-year development plan of Ethiopia

The ten-year development plan (PDP-10) of Ethiopia[54] followed the two, consecutive five-year plans, namely the Growth and Transformation Plan (GTP) I and II, which ran in the periods 2011-2015 and 2016-2020 respectively. The preparation of PDP-10 was overseen by the ex- Planning and Development Commission (PDC) which has now been re-structured as the Ministry of Planning and Development. The Climate Resilient Green Economy (CRGE) strategy has been mainstreamed into the ten-year development plan and, in fact, building a resilient green economy is **one of the ten** strategic pillars of the plan.

The ten-year plan outlines **seven economic sector development plans**, namely Agricultural Development; Manufacturing Industry Development; Construction Industry Development; Mining and Petroleum Development; Trade Development; Tourism Development; and Urban Development. It also outlines **four infrastructure sector development plans**, i.e., Transport Development; Water Resources Development; Energy Development; and Innovation and Technology Development. The sector and infrastructure development plans have specific targets which relate to green growth objectives derived also from the CRGE strategy. In addition, the ten-year plan has set additional vision and targets **for three other "sectors":** Human Resources Development; Gender and Social Inclusion; and separately on Environment and Climate Change. Needless to say, the national agenda for Green TVT and Skills Development needs to take stock of the high-level visions and sectoral objective and targets outlined in this plan with respect to green growth and sustainability.

Annex 6 presents a summary of the vision, objectives, strategic pillars of the ten year development plan. It also presents highlights of the green growth targets of a few of the sectors; that could be a starting point for an exercise, by concerned TVT stakeholders, to unpack the ten-year development plan to the TVT system (further discussed in **Chapter 7**).

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[53] If we see it from a labor and skills supply and demand perspective, green TVT and skills development is broadly on the supply side and the green economy of Ethiopia is on the demand side

[54] PDC (2021). *Ten years development plan: A pathway to prosperity 2021-2030*

4.2 Key policies and strategies on the TVT system

The following two strategy documents are particularly important for this subject:

- Ministry of Education (2008). *National technical & vocational education & training (TVET) strategy*
- MoSHE (2020). *Ethiopian TVET Policy and Strategy*

The 2020 strategy is in the final stages of endorsement and will be the basis of future activities relating to green TVT and skills development. The following paragraphs provide a brief overview of these strategies.

a. Ministry of Education (2008). *National technical & vocational education & training (TVET) strategy*

As the 2020 policy and strategy is not yet officially endorsed, legally speaking, the 2008 TVET strategy is still operational. The following are the key highlights excerpted from this strategy document.

- **Vision:** Technical and Vocational Education and Training (TVET) in Ethiopia seeks to create competent and self-reliant citizens to contribute to the economic and social development of the country, thus improving the livelihoods of all Ethiopians and sustainably reducing poverty.
- **Objectives:** The overall objective of the National TVET Strategy is to create a competent, motivated, adaptable and innovative workforce in Ethiopia contributing to poverty reduction and social and economic development through facilitating demand-driven, high quality technical and vocational education and training, relevant to all sectors of the economy, at all levels and to all people.

Annex 9 provides a summary of the guiding and conceptual principles of the TVET system as proposed by this strategy.

b. MoSHE (2020). *Ethiopian TVET Policy and Strategy*

This is the new policy and strategy which has yet to come into force officially.[55] A brief review of the salient features are presented below.

The document starts with a quick situational assessment of the TVET system in Ethiopia. It argues, "the technical and vocational training has not been designed in ways that could modernize agriculture and other remaining sectors, and given due emphasis, it has not been able to contribute its level best to the economic development of the country."

Building on that stock-taking, it gives the following reasons[56] as to why it was needed to revise the previous TVET strategy of 2008:

- TVET has expanded rapidly and its contribution to the economy is becoming very significant. Therefore, it is necessary and timely to **design its own national policy** that can resolve the existing constraints of the system.
- The existing strategy has served long time and do not fit with the current education and labor market contexts. Therefore, there is a need to design a new strategy that can incorporate the new contexts of the system.
- There is strong desire to align the strategy with the newly developed **education and training roadmap** and prosperity plan.
- There is no clear pathway from and to general education, TVET and higher education.
- The need to feed into and align with the ten years development plan.

Unlike the previous strategy of MoE (2008), this policy and strategy document addresses the issue of greening TVET, shedding light on greening TVET and green skills; it also describes the goal, policy objectives and strategies of greening TVET- as summarized below.

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[55] The preceding "document" (M0E, 2008) was only a strategy document and Ethiopia had no dedicated TVET sector policy

[56] Cited from the document

Understanding of greening TVET (GTVET):

- Serious concerns about climate change, environmental degradation and scarcity of resources place great pressure on TVET to develop skills and competencies that pave the way towards a green economy and society. This calls for the development of a policy intervention for greening TVET.
- Green skills are those skills needed to reduce environmental impacts and support economic restructuring with the purpose of attaining cleaner, more climate resilient and efficient economies that preserve environmental sustainability and provide decent work conditions.
- The main aspects of Greening TVET (GTVET) include transition to greater use of energy from renewable sources; transition to greater use of products and services that increase energy efficiency; transition to greater use of processes that reduce/remove pollution and green-house gas emission; transition to recycling and reuse; transition to greater use of products and services that conserve natural resources; and transition to greater use of products and services that comply with environmental regulations and standards.

Goal of GTVET: Ensure greening TVET for sustainable development.

Policy objectives of GTVET: Greening TVET shall be ensured for sustainable development.

Strategies for greening TVET:

1. Establish system for **awareness** creation on the roles and benefits of GTVET
2. Develop **occupational standard** for GTVET
3. Incorporate GTVET in TVET **Trainer** program
4. Review and revise TVET **curricula** to incorporate green courses and programs
5. Develop a comprehensive **green skill standards and certification system** in TVET.
6. Launch **regulations to offer incentive for TVET system** to support the greening process at the national and regional level.
7. Strengthen **green values, ethical standards, attitudes, and behaviors** that respect green lifestyles.
8. Develop a system encouraging TVET **campus greening** and its surrounding areas.

Annex 10 provides further details of this policy document pertaining to its vision, mission, guiding principles and implementation strategies.

4.3 Key policies and strategies on greening the education sector

a. MEFCC & MoE (n.d.). *Climate Change Education Strategy of Ethiopia 2017-2030: Strengthening the Integration of Climate Change Education into the Formal Education System of Ethiopia*

When it comes to strategies concerning "greening education" as a whole, the work that has been done by the ex-MEFCC[57], currently the Environmental Protection Authority (EPA) and the Ministry of Education (MoE) appears to be the only one. This strategy focuses specifically on climate change education.

The most important points raised by the document are discussed below. **Annex 11** provides further details.

On the global move for greening education: "The quest for integration of climate change education into the formal education is underpinned by several existing international frameworks including the

[57] Ministry of Environment, Forest and Climate Change (currently restructured as EPA)

UNFCCC, Kyoto protocol, ESD, the SDGs, and the 2015 Paris Agreement. This is further supported by practical experiences that hugely appreciate the key role of CC Education in combating climate change."

On stocktaking of the situation in Ethiopia:

"Ethiopia's education sector in general and its curricular policy in particular remains far behind the expected level of integration of CC Education in the formal education system. Review of the syllabi and text books uncovered a sub-standard level of CC integration in the general education system of the country. In fact, weaker level of integration is observed at primary and secondary levels."

- The [Ethiopian education] sector has not been fully engaged in the implementation of the country's Climate Resilient Green Economy Strategy. Among the most noticeable gaps is sub-standard level of integration of Climate Change Education (CCE) in the present formal education system of the country.
- On the objective of the strategy: "Strengthening CCE is a vital necessity to the success of Ethiopia's drive to build a green and resilient economy by 2030 and beyond. It is in recognition to the above facts that the Government of Ethiopia adopted the CCE Strategy (2020-2030)."
- It was jointly developed by the ex-MEFCC and the MoE with support from a number of donors including UNDP, Swiss Agency for Development Cooperation and UN CC: Learn. However, it is not clear whether EPA and MoE are currently, actively working to put it to practice.[58]

b. Ministry of Education (2020). *General education curriculum framework*

The Ethiopian General Education Curriculum Framework (EGECF) was introduced by the MoE in 2020 and its scope covers four levels of education namely pre-primary, primary, middle and secondary levels.

According to the framework document, the need for revising the old curriculum of 2010[59], is "to overcome the problems that persisted, align the curriculum with the 21st century advancements, and meet the requirements of the **sustainable development goals of 2030**."

A quick review of the EGECF indicates that it has integrated some useful themes on the basis of which sustainability and green growth thinking can further be built. The following are noteworthy.

- "[...] a life to be lived and a preparation for future living as well as a process leading toward personal growth, enrichment and empowerment, and a tool for **strengthening social justice, inclusion, and responsible citizenship**";
- "[...] which aims at cultivating **all-rounded, ethical**, self- reliant citizens who are armed with **21st century skills** to become productive and competitive regionally and **globally**";
- "[...] nurturing learners who possess scientific and technological literacy, have the ability to **think critically, solve problems and contribute to economic advancement and social change**"; and
- "Cultural Identity and **Global Citizenship**: Producing learners who understand themselves as citizens of their country and of the world is one of the foremost competencies".

The EGECF includes "Environmental Education" as one of the subjects in both pre-primary (KG1- KG2) and primary education (grades 1-6). In mid-level (grades 7-8) and secondary levels (grades 11-12), there is no dedicated environmental education subject; however, **"citizenship education"** is offered which, can be geared towards sustainability and green growth issues. For secondary level (grades 11-12), "learners are required to join one of the eight Career and Technical Education areas of study which is further divided into natural science and social science streams in the case of which the natural science has five fields of study and the social science has three fields of study." Needless to say, it will also be very important to mainstream green growth issues into eight career and technical Education areas.

[58] Interviews with informants both from EPA and MoF did not indicate this strategy is being put to practice.

[59] The old curriculum of 2010 is based on the Education and Training Policy of 1994.

4.4 Key policies, strategies and reports on the Green Economy

Ethiopia submitted its revised Nationally Determined Contribution (NDC) to the UNFCCC in July 2021.[60] When it comes to the green economy of Ethiopia, it is sufficient to review this work (the updated NDC) as it has built on previous strategies and assessments such as the original CRGE vision introduced in 2011, the first NDC submitted to the UNFCCC in 2015 ahead of the Paris Climate Agreement of 2015. Interesting highlights of the revised NDC are summarized below. Further details are provided in **Annex 12.**

- Ethiopia's updated NDC and Climate Resilient Green Economy Strategy commit to reduce emissions by 68.8% compared to BAU projections by 2030.
- Updated base year GHG emissions in 2010: 247 Mt CO2eq.
- Projected GHG emissions on a business-as-usual scenario by 2030: 403.5 Mt CO2eq.
- The updated NDC also includes 40 prioritized adaptation actions that derive from the NAP and align with the 10-year national development plan.
- The updated NDC is based on a set of technical information, policy review and data, significantly improving the quality and ambition of Ethiopia's commitment to the Paris Agreement.
- Moving forward, Ethiopia is developing an implementation plan for the NDC, with support from the NDC Partnership, UNDP and other partners supporting Ethiopia;
- The Government's priorities are largely focused on resource mobilization through project preparation, strengthening monitoring and reporting systems and coordinating support for implementation at the sector and sub-national levels.

4.5 Key strategies and reports on job creation and the labor market

a. JCC (n.d.). Sustainable jobs for all: Plan of action for job creation 2020-2025

The following are the key points distilled from JCC's plan of action 2020-2025. Further details are provided in **Annex 13**.

On Skills characteristics of the labor force:

"Between 1999 and 2016, the educational attainment of the labor force increased as a result of expanded access to school and training. The share of the labor force with no education fell significantly, and education outcomes are substantially better for youth today than for older labor force participants."

- However, substantial skill mismatches exist in different sectors, especially in manufacturing and services.
- Despite progress in access to education throughout the country, the labor force remains mostly low-skilled; moreover, skills that are being taught align poorly with the labor needs of different sectors.

[60] FDRE (2021). *Updated nationally determined contribution: Federal Democratic Republic of Ethiopia*. available on-line at: https://ndcpartnership.org/countries-map/country?iso=ETH [Accessed on 23.09.2022]

On job creation needs

- Sustainable job creation is a critical challenge if Ethiopia is to meet its objective to become a middle-income country by 2025.
- High levels of subsistence employment, widespread, self-employment, and very low levels of wage employment characterize the labor market in Ethiopia.
- More than 2 million youth are entering the labor market every year.
- The working-age population (10+) is expected to grow to up to 94.2 million by 2025, which will increase pressure on the labor market but may drive economic growth.
- Assuming a constant labor force participation rate (of about 80%), the labor force is expected to grow from 64 million in 2019 to 75.4 million by 2025.
- There is a need to create 14 million jobs between 2020 and 2025 to absorb the new entrants to the labor market and the current backlog of unemployed (at least 2.5 million in 2018).
- Efforts should concentrate not only on creating new jobs for the entrants to the labor market but also *on improving the quality of these jobs and the inclusiveness of the labor market*.

The objectives of the Plan of Action for Job Creation- 2020-2025

- The plan aims to foster the business environment and conditions necessary to create 14 million jobs by 2025, to absorb the currently unemployed, and to ensure that jobs are waiting for new entrants to the labor force.
- A primary consideration for the new Plan of Action for Job Creation is a paradigm shift from state-led to private-sector-led growth.

b. JCC et al. (2021). *Ethiopia job creation through off-grid energy access*

In 2011, the JCC also completed a study examining the job creation potential through 0ff-grid energy systems- a work relevant for this assessment. Key findings are summarized below and details are provided in **Annex 14.**

On Focus on solar technologies

- The government, through the Jobs Creation Commission, aims to explore the untapped job creation potential of Micro, Small, and Medium Enterprises (MSMEs) through Productive Use of Energy (PUE) technologies.
- These technologies are usually targeted towards populations that are off-grid or have unstable grid connections that can be powered via stand-alone solar panels attached to the appliance or through mini-grid connections.
- Across three high-potential value chains, PUE technologies present opportunities to mechanize tasks and expand production capacity, creating on the order of 190,000 jobs.

On high-potential value-chains for PUE applications

- Three value chains analyzed showed with the highest potential for impact and job growth, i.e., *horticulture, wheat, and milk.*
- **Horticulture:** Introducing solar water pumps in the horticulture value chain can potentially meet a significant irrigation need, and it can help create up to approximately **130,000 new jobs** across the value chain.
- **Wheat value chain:** PUE solutions can address challenges of unreliable power and can create up to approximately 50,000 jobs across the wheat value chain.
- **Milk:** PUE in milk chilling from source to retail can address challenges of spoilage and wastage and can create over an estimated 11,000 jobs.
- **JCC (2019).** Sector prioritization for job creation in Ethiopia

This 2019 study by the JCC sought to examine the job creation potential of the various sectors in Ethiopia. Based on a set of criteria, it went on to identify ten high-potential priority sectors for job creation. These sectors are also relevant for the TVT system- both from a greening perspective and also in respect of the courses which TVT colleges are offering or plan to offer in the future.

Stocktaking of sector's performance: Most sectors of the Ethiopian economy, with the exception of mining, have been growing steadily, resulting in diverse opportunities for job creation.

Priority sectors for job creation: Based on an in-depth analysis JCC identified ten sectors as a high potential for job creation. These sectors are horticulture; livestock; agro-processing; apparel, leather & textile; renewable energy; construction; mining; arts, entertainment & recreation; and tourism.

Additional details excerpted from the JCC study are provided **in Annex 7**.

4.6 Guides and tools on greening TVT

This section seeks to distill key guidance on the greening of TVT drawing mainly on ILO's work. One additional material from UNESCO is also reviewed. The literature review started already in the technical proposal preparation stage and continued into the inception phase of this assessment. The main objective is to inform the "framework of Analysis" (Chapter 5) on the basis of which data will be analyzed and presented.

a. ILO (2022). Greening TVET and skills development: A practical guidance tool[61]

This work is the latest addition on the subject which was made publicly available on October 18, 2022. It will be an invaluable tool for practical actions for greening of the TVT system (beyond assessment). A summary of its key suggestions and guidance is provided below (cited from the work).

On the rationale for greening of TVT

- The nature of the environmental crises we face means that the skills development and training response should not be limited to a narrow range of occupations such as waste management operatives or biogas digester installers; rather, it is relevant to every job, since putting into action greener behaviors like waste reduction brings benefits to every workplace.
- It is critical to strengthen governance and management structures required to mainstream environmental sustainability in TVET systems and to incorporate skills required for the green transition in the development and upgrading of competency standards, curricula, training design, delivery and assessments in both initial and continuing TVET.
- The 'greening' of the economy requires a parallel greening of jobs which, in turn, requires us to consider the skills needed and the technical and vocational education and training (TVET) required to provide those skills.
- Greening TVET has a vital role to play in tackling the on-going challenges to our environment. It can not only support the green transformation of our societies and the economies: it has the potential to lead the changes required by equipping everyone (from those in initial education to those coming to the end of their working lives) with the knowledge, skills and behaviors that they can use to transform their workplaces and their communities.
- Greener TVET has a key role to play in ensuring the green transition is fair and just by equipping everyone with the skills needed to play an active role in the new job opportunities that will arise. It will also play a key role in ensuring a resilient recovery.
- The evidence indicates that TVET has some way to go yet in responding to the challenge of the green transition. A key finding of the ILO's report, Skills for a Greener Future, was that:

[61] Available on-line at: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_847095.pdf [Accessed on 04.11.2022]

On the global practice so far

- Citing another ILO work preceding it, it makes the following assessment. "Most countries [...] have not developed a systematic approach to incorporating skills for green jobs into their TVET systems, and into the development or renewal of their TVET qualifications, since 2011. If this is done at all, it is done by incorporating a focus on skills for green jobs into existing policies, strategies, frameworks and/or education systems in general (not TVET only), by including components on skills for green jobs. This incorporation of green components is usually focused on several priority sectors (such as renewable energy and sustainable development)."
- Overall, the green transition is forecast to create more jobs than it destroys, and mostly affecting existing occupations rather creating new ones, although some new occupations will be created, especially at higher skill levels.
- Particularly important sources of green jobs to date, across most countries, have been the renewable energy and the environmental goods and services sectors, which includes waste, energy and water management.

On what greening "TVET" means

"Greening TVET is a normative process of change that requires approaches that are clear, holistic, systematic and methodical. It goes beyond looking just at the skills now in use in 'green jobs' to consider how and why skills should change in the interest of long-term environmental and social goals, and not just shorter-term economic ones. This adds an important dimension to what needs to happen in TVET: using existing processes and structures not just to reflect the status quo but from a normative perspective and introducing new ones where needed."

On the process of greening TVET

- Greening TVET takes a holistic and process-based approach, dealing with all the key elements of the processes in TVET system including competency standards and curriculum design, training provision and assessment, as well as the critical underpinning topics of the professional development of teachers and in-company trainers and the sensitization of employers and technical supervisors. **Annex 3** presents a graphic portrayal of this systemic and holistic approach.
- Greening involves:
  - What might be seen as the core processes of designing and delivering TVET: creating competency standards tuned to industry needs, which includes having as a solid foundation stone a systematic approach to identifying skill needs; developing and implementing green curricula; greening training at local level; and developing appropriate assessment packages.
  - It also involves ensuring: that the physical environments around teaching and learning -TVET campuses- contribute to the development of green awareness and behaviors; that teachers and trainers are equipped with the skills they need to teach green curricula and pedagogies; as well as encouraging, motivating and stimulating employers and workers to engage with the greening process.
  - It also relates to wider system features- governance (which includes activities such as monitoring and evaluation), funding, and the role of social partners.
- The process of designing and implementing TVET that is fit for the green transition comprises several elements which starts with identifying the knowledge, skills and attitudes/behaviors that people are expected to possess in order to be competent in an occupation. These are known as 'competency standards' or sometimes just as competencies.
- The greening TVET agenda offer opportunities not just to ensure programs, qualifications and provision are fit for the purpose of ensuring people and employers have the skills they need for the green transition but also to upgrade structures and processes more widely, such as systems to design competency standards (CS) and social dialogue mechanisms.
- There is also an important opportunity to link to (national) strategies and programs related to greening in a wider social and economic sense.
- Greening TVET is a continual process.

On practical steps, activities and recommendations

- Practical steps and activities of greening TVET fall across a spectrum from 'light' to 'deep' green where light green activities represent adjustments to existing practices and deep green activities involve more thoroughgoing and systematic transformation of TVET.
- Light greening of TVET is a relatively passive type of response, which affects only those occupations most directly impacted by environmental challenges and might deal predominantly with technical skills, e.g., to meet the needs of new 'green' tasks such as wind turbine installation. It will tend to focus on decarbonizing existing production and service delivery processes and pollution reduction.
- Deep green is a more thoroughgoing response to the challenges we face and embraces the development of new ways of thinking and of green behaviors across the workforce.
- Deep greening includes more systematic revision, innovation and digital elements with adaption of all curricula and qualifications etc., along with mainstreaming through the TVET system. Deep greening would also involve the adoption of new approaches to teaching and learning, seeking to equip learners with the skills to be active agents of change, so that we can move towards not just decarbonization and pollution reduction but towards the circular economy.
- This means developing skills like critical thinking, problem-solving, adaptability and collaboration and introducing new ways of delivering TVET such as learner-centered approaches and pedagogical innovations such as project-based learning.
- In practice, it is important that countries and institutions take stock of where they currently stand in respect of greening TVET as a whole, i.e., that they diagnose their strengths, assess future opportunities and weaknesses against all the different elements, as a basis for determining where to focus their attention

On green skills

- In terms of skill requirements, whilst only some occupations require new specific technical skills (like the skills needed to install wind turbines), every occupation can undergo some change in skill to support the green transition.
- Indeed, all occupations require a range of core (or 'soft') skills like general environmental awareness, waste minimization and recycling etc. which are essential for the greening of all production and services and which can be transferred between jobs**.**
- National authorities in partnership with relevant stakeholders should consider developing a list of skills related to their own environmental policies. An important weak link often found in the policy framework for meeting the skill needs for the green transition lies between environmental and TVET policy.

On types of core skills needed in all jobs to support the green transition[62]

- Environmental awareness and protection; willingness and capability to learn about sustainable development
- Adaptability and transferability skills to enable workers to learn and apply the new technologies and processes required to green their jobs
- Teamwork skills reflecting the need for organizations to work collectively on tackling their environmental footprint
- Resilience to see through the changes required
- Communication and negotiation skills to promote the required changes to colleagues and customers
- Entrepreneurial skills to seize the opportunities of low-carbon technologies and environmental mitigation and adaptation
- Occupational safety and health
- Basic digital skills to enable use of technologies that can reduce environmental impacts

[62] Which are adopted from ILO (2019). *Skills for a greener future*

High-level recommendations

- One way of addressing the lack of linkage between the environmental and TVET policies is to involve all relevant stakeholders, especially the social partners, in determining the core skills that would be needed to achieve a country's environmental goals. Indeed, this could provide the basis for a green reference point against which to review the 'greenness' of competency standards of existing programs/ qualifications and for developing new ones.
- The involvement of stakeholders, and in particular the social partners, is particularly noteworthy since it is considered key to developing a more nuanced understanding of skill needs that brings in qualitative insights to the discussion and adjustment of sectoral and occupational forecasts.

b. ILO (2021). *Greening guidelines for TVET institutes*[63]

This short guide prepared by ILO with support and cooperation with international partners[64] is straight forward and concise. The main guidance distilled from that work is presented below.

Relevant concepts

Education for Sustainable Development (ESD) is a concept which implies that the world's existing education and training system should be utilized together with the public awareness system to implement sustainable development efficiently.

Unpacking the greening of "TVET" concept

- 'Greening' an institution is a method of modifying the institution's awareness, behaviors and activities with the goal of matching them up with the broader principle of sustainability - that is, economically, socially and environmentally responsible.
- Greening education and training is a method to integrate what may be termed 'institutional DNA' into the very ethos of the institution, to be conveyed to the immediate population of the institution and to be monitored and assessed over a period of time.
- Technical and Vocational Education and Training (TVET) institutions may also engage in greening through a holistic comprehensive framework that aims to improve awareness, expertise and behaviors that could contribute to more productive workplace and community practices.

The benefits of greening a TVET institution

- Greening a TVET institution as a whole will make young people active members of the green economy, resulting in increased human well-being and social justice, while reducing environmental risks and ecological scarcity.
- The United Nations motivates colleges, universities and communities to move forward with the ESD and the new SDGs.
- Greening TVET can contribute to transforming learning and training to address the need for sustainable development. The United Nations motivates colleges, universities and communities to move forward with the ESD and the new SDGs.

Approaches to greening TVET institutions

- ESD can be implemented in TVET Institutions by a framework of Five Approaches: Greening the campus, greening the curriculum and training, greening research, greening the community and workplace and greening the institutional culture.
- Greening should not be an endpoint but rather a continuous and evolving process, as demands and possibilities arise within the organization, workplace and society at large.
- Like any other process, greening a TVET institution requires someone who takes the responsibility and controls and runs the process, i.e., the process manager.

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[63] Available on-line at: https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo-dhaka/documents/publication/wcms_815337.pdf [Accessed on 04.11.2022]

[64] The ILO's European Union funded Skills 21 project supported the Directorate of Technical Education [in Bangladesh] to develop a guideline for greening TVET institutes.

c. UNESCO (2017). *Greening Technical and Vocational Education and Training: A practical guide for institutions*[65]

While this publication has similar concepts to ILO (2021) on the approaches to greening TVET institutions, it presents some concepts in an interesting way. A short discussion of those is presented below.

- TVET has a role to play in ensuring that the knowledge, skills and competencies acquired by individuals will enable them to contribute to the developing green economy, and indeed to pursue sustainable practices in other areas of their lives.
- ESD in TVET provides an enhanced tool to equip youth and adults with the skills needed in the changing world of work, including the knowledge and competency requirements to make the transition to green economies and societies.
- **The five approaches for implementing ESD in TVET:** These are Greening the Campus, Greening the Curriculum and Training, Greening Research, Greening the Community and Workplace and Greening the Institutional Culture. The approaches are independent actions that make up a whole-institution approach.
- The political as well as environmental imperatives for the transition to a green economy are evident. However, the economic and social imperatives of these transitions need further exploration.
- Knowledge is only one aspect of education and training. Often equally important are wide-ranging skill sets that go beyond the specific task to include increasing employment opportunities, constructing sustainable lifestyles, and promoting sustainable businesses and self-employment.
- From social and economic perspectives, greening TVET enhances the employability of workers and productivity of enterprises.
- In case when there is a shift in job processes, displaced workers can be re-trained and upskilled so they can be employed in other sectors, minimizing the time required for them to find new jobs and enterprises to fill new positions.
- Moreover, disadvantaged groups in the labor market (young people, women, persons with disabilities, rural communities and other vulnerable groups) require targeted support to develop their potential knowledge and skills for green jobs.

A model of the whole institutional approach to greening TVT institutions proposed by this guide is presented in **Annex 2.**

4.7 Guides and tools on capacity gap assessment

The purpose of this section is to introduce a tool which will guide capacity gap assessment- and capacity development response as it relates to the issue of greening TVT. For this purpose, the UNDP capacity assessment methodology is recommended. The reasons for that are three-fold. First, its concept of "Core Issues as levers of change" (to be discussed below) lends itself for a pragmatic analysis. Second, it provides an easy-to-understand and adaptable theory of change for systemic institutional capacity development efforts. Third, it has been widely used including for capacity gap assessments in the green economy space and also for similar assignments in Ethiopia. Specifically, this tool guides two crucial activities, First, it will help in the systematic categorization of the long-list of gaps and needs, which usually arise in such assessments, into a manageable number of "themes". Second, its versatile theory of change for capacity development, informs the identification and formulation of interventions in a systematic manner.

[65] Available on-line at: https://unevoc.unesco.org/up/gtg.pdf [Accessed on 04.11.2022]

While there are a couple of versions of this material, what will be reviewed here is: UNDP (2008). *Capacity assessment methodology: User's guide.*[66]. Key guidance distilled from this work is presented below.

On guiding questions for capacity gap assessment

Three questions guide the gap assessment exercise, namely: 'capacity for why?', 'capacity for whom?' and 'capacity for what?' These questions will inform the need assessment enquiry and the capacity development response.

On the "four core issues" as the lever of change

The **Capacity Assessment** exercise seeks to focus on four CORE ISSUES as a lever of change, namely **Institutional Arrangements, Leadership, Knowledge and Accountability**. This seems to be validated by UNDP's own evidence, which attests, "from empirical evidence and UNDP's first-hand experience, it is in these four domains that the bulk of change in capacity happens."[67] **Box 1** provides definitions of key terminologies relating to capacity gap assessment.

Box 1: Definitions of capacity gap assessment terminologies

Capacity Assessment: An analysis of desired capacities against existing capacities that offers a systematic way of gathering critical data & information on capacity assets and needs and serves as input for the formulation of a capacity development response.

Capacity Development: The process through which individuals, organizations and societies obtain, strengthen and maintain the capabilities to set and achieve their own development objectives over time.

Core Issues:

Institutional arrangements: the policies, practices and systems that allow for effective functioning of an organization or group. These may include 'hard' rules such as laws or the terms of a contract, or 'soft' rules like codes of conduct or generally accepted values.

Leadership: is the ability to influence, inspire and motivate others to achieve or even go beyond their goals. It is also the ability to anticipate and respond to change. Leadership is not necessarily synonymous with a position of authority; it can also be informal and be held at many levels.

Knowledge: or 'literally' what people know, underpins their capacities and hence capacity development. Knowledge has traditionally been fostered at the individual level, mostly through education. But it can also be created and shared within an organization, such as through on-the-job training or even outside a formal organizational setting through general life experience, and supported through an enabling environment of effective educational systems and policies.

Accountability: Exists when two parties adhere to a set of rules and procedures that govern their interactions and that are based on a mutual agreement or understanding of their roles and responsibilities vis-à-vis each other.

Functional and technical capacities: A set of essential management skills that allow for planning, implementing and monitoring and evaluating initiatives for growth. The following five are noteworthy: Capacity to engage stakeholders; Capacity to assess a situation and define a vision; Capacity to formulate policies and strategies; Capacity to budget, manage and implement; and Capacity to evaluate.

Source: UNDP (2009). *Capacity development: A UNDP primer*

A graphic depiction of the framework is presented in **Annex 4.**

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[66] UNDP (2008). *Capacity Assessment Methodology: User's guide*. Available on-line at: http://content-ext.undp.org/aplaws_publications/1670209/UNDP%20Capacity%20Assessment%20Users%20Guide.pdf [Accessed on 04.11.2022]

[67]

4.8 Case studies

The consultant reviewed the experiences of three countries, namely Germany, South Africa and Vietnam. That was based on an ILO case study comprising 21 countries.[68] These three countries provide context and practice from three different continents and diverse socio-economic contexts. What the consultant did is to distill and organize pertinent information (context, drivers, success factors, recommendations) in an organized manner. This exercise will serve two purposes. First it will inform and help validate the intervention idea selection and elaboration process. Second, it could serve as a starting point for further case study research, which key stakeholders (TVT colleges, Federal TVT Institute, MoLS, MoE) are encouraged to carry out in the bid to green TVT in the years ahead.

The main lessons from these countries, which could inform this assessment and more importantly future efforts in Ethiopia summarized below. Details of the three case studies are presented in **Annex 8**.

Germany:

- A culture of strong public partnership with business to create apprenticeship opportunities for trainees and also to define what amounts to "green skills";
- A sustained and long-run effort to enforce existing environmental policies and regulations- as means to develop marketable technologies, for job creation and economic growth; as a result: German environmental technology firms are now well established and often market leaders;
- Related to the above, a sustained and high investment into the sector (even by EU standards);
- A clear objective on annual energy efficiency improvements and future share of renewable energy in total energy supply; these seem to drive resource efficient production and consumption practices;
- A focus on energy efficient cars and buildings is also an opportunity for the TVET sector;
- Environmental considerations increasingly influencing both technological innovations and people's lifestyles;
- A robust system of continuing vocational training (initial, continuing and university) contributing to skills anticipation and greening of existing occupations; companies also participate in each of these phases; a long tradition of German industries organizing dual training rather than company-based continuing training;
- In addition to formal education, there are policy-initiated programs supporting environmental sector apprenticeships, environmental vocational training pilot projects, and environmental sector promotion and research;
- A continuing revision of vocational training courses, which make the integration of environmental protection issues a key priority;
- The existence of a "national catalogue of occupations" the BERUFENET).
- Rather than focusing on creating new, specific "green" occupations, many occupations and training curricula have been adjusted and refined to take account of the skills needs of increasingly green aspects of mainstream industry as well as eco-industries. In that respect, the skills response has followed an integrated approach;
- Whilst new occupations have emerged, their relevance is small compared to the great number of existing occupations which have been modified
- Social partners are also active in determining the content of new training programs;
- What did not work well: Germany reacted slowly as it underestimated the growth potential of the green economy. This highlights the need for the education and training system to react quickly to respond to potential skills shortages.

[68] ILO (2011). *Skills for green jobs: a global view: synthesis report based on 21 country studies*

South Africa:

- An urgent need to de-carbonize the economy- ranked 8th globally in per capita emissions;
- As a water-scarce economy, water efficiency is an agenda;
- Solar water heating is already an identified opportunity;
- A long-standing power crisis ("load shedding") as a driver for energy management initiatives and necessitating new investments which could go renewables;
- A clear, national energy efficiency target (voluntarily negotiated0; and a feed-in tariff regulation (yet to be implemented)
- A skills identification framework that is globally recognized (has yet to cover greening of the economy and green jobs);
- A relatively developed private sector means green initiatives are also business driven although gauged as reactions to crises and changes in consumer preferences;
- The Expanded Public Works Program- helps to catalyze the green sector;
- Also specialized programs such as the *South African Dual System Pilot Project*, *Centers of Specialization*, *Installation, Repair and Maintenance Initiative* working as regular delivery mechanisms to TVET (e.g., training plumbers, electricians, etc.)
- The National Job Fund- as a potential instrument 9has yet to be tapped into as demand grows);
- NGO participation in training 9e.g conservation, energy efficiency);
- Existence of a National Low Carbon Economy Skills Forum, located in the State President's Office for Economic Planning;
- The Department of Forestry, Fisheries and the Environment has a green skills portal.
- **The challenges for South Africa:**
- A need for balancing act- redressing the inequalities of the past (e.g., through BEE policies) versus pursuing green growth;
    - The general lack of skills in many sectors also limiting the growth of the green economy;
    - No coherent national strategy/policy to meet the skill needs for greening the economy;
    - Government has week funding capacity to go into developing the green economy or green skills
    - Green skills anticipation at an early stage of "assessment".

Viet Nam: The case of Bac Thang Long Economic Technical College (BTL)

- Vietnam has a clear national target for share of renewable energy in total energy supply;
- The country has also identified areas to focus for the green economy: Improvement in the productivity of raw materials, water, and energy; increase in recycling and reuse;
- TVET in Viet Nam has flexibility in curriculum development- an important factor in the greening of curricula;
- A relatively good enforcement capacity of environmental regulations- motivating TVET system to respond; regulations and curriculum guidelines have the most influence on the greening of courses.
- What has worked for BTL college:
    - Close coordination with local businesses and employers which facilitates Labor Market Forecasting (specifically short-term forecasting);
    - The college uses surveys and institutional dialogue to gather information on labor market needs and its flow into programs and courses;
    - The college conducts annual need assessment surveys with local businesses supported by donors;

- Use of a well-established mechanisms to collect data through industry surveys, interviews, and workshops to ascertain the needs of industry and ensure that the content of courses is relevant to the skills required;
- Student preference and satisfaction are a major consideration in determining long-term training programs;
- Regular review of trainees' performance in apprenticeship;
- All courses are reviewed annually;
- Continuing professional development for trainers in which industry is strongly engaged;
- Active participation of trainers in determining skill-sets that need to be developed during apprenticeship (including green skills) in partnership with companies;
- Environmental awareness has been included in the BTL curriculum and is recognized as a core skill;
- A number of well-developed green courses: Programmable Logic Control, Energy Efficiency, Renewable Energy and Climate Change Education (a few of those developed also concerned ministry (of education and training);
- Imparting soft skills for environmental consciousness: a good example is a green message encouraging students to save the power consumption of computers by downloading and using a free software program.

5. Framework of Analysis

A crucial part of the desk research was to build a suitable framework of analysis with which to interpret data collected.

The Consultant carried out literature review focusing on the theme of greening of TVT institutions. An in-depth discussion of that is provided in **Section 4.6**.

Going forward, The Consultant will use the frameworks and lenses derived from the literature review (**Sections 4.6 and 4.7**) and blend in additional insights from the Consultant's own knowledge on sustainability and green growth as will be discussed further below.

5.1 Key sustainability and green growth concepts

The main purpose of this section is to distill the most important concepts and principles relating to sustainability and green growth. The objective is to draw a "checklist" of concepts and principles which should be kept in mind in efforts (including this work) to green TVT institutions including future action by stakeholders. The concepts and principles will not be mapped based on a separate literature review of the sustainability and green growth professions. Rather, they will be drawn based on the Consultant's own insights and experience. **Box 2** presents the identified concepts and principles.

Box 2: Key sustainability and green growth concepts

Sustainability and green growth as "triple bottom-lines": The contemporary (and working) perspective of sustainability/green growth is to think of it as having triple-bottom-lines, i.e., social, environmental and economic (also referred to as people, planet profit). This triple-bottom line thinking is central to a number of other concepts and practices such as responsible leadership[69], responsible management education, sustainability (integrated) reporting, responsible investment, ESG issues, etc. The "triple bottom-line" concept will also serve as a common denominator for the various terms often used by organizations and countries (e.g., "just or green transition" by the ILO) and countries (e.g., "green growth" in Ethiopia).

Sustainability as a process: The principles and practices of sustainability and green growth straddle other professions (natural sciences, engineering & technology, economics, law, management sciences and ethics). Our understanding and practice of sustainability, therefore, will change as those professions evolve. Just like the concept of quality management, it makes sense for any organization (business, academic or any other) to view sustainability/green growth as a *continuous improvement process*.

The "business case" question is usually the first one to be asked; but sustainability also has normative and scientific imperatives: Organizations (companies, government, academic institutions) which seek to embrace green growth principles and practices often ask about the business case of doing that. The potential business cases usually reside in many aspects: cost reduction (eco efficiency); access to new markets (e.g., ethical consumer markets); access to investment (e.g., Socially Responsible Investing); legal license to operate (e.g., meeting local wastewater and emissions standards); and social licenses to operate (good milage with communities, workers and local government).

Current, policy and incentive frameworks in Ethiopia do not necessarily give the right and adequate signals to the markets when it comes sustainable production and consumption. That means, environmentally and socially sustainable goods and services tend to be costly and uncompetitive. Transition from the current "brown" economy to the real "green" economy cannot be fully realized without the introduction of clear and effective policy signals to the markets including the finance sector. A few of the economic instruments used to that end include ecotaxes, subsidies, tariffs, deposit and refund systems, preferential public procurement, etc.

However, there are also *normative arguments* motivating sustainability thinking and practices. Often times, we also hear arguments such as "the right thing to do", and "beyond regulation". This is especially important in weak governance contexts, in which governments cannot always enforce regulations and standards or in situations where regulations and standards are lacking altogether.

Scientific findings (especially on the health of our planet and local ecosystems) do not usually find their way to boardroom discussions. How many executives (in business, government and academia) have heard about the nine planetary boundaries (Rockström et al., 2009, 2015)? Does it make sense to do business as usual while almost four of the nine life-support eco-system functions are being compromised to unsafe levels? These four life support functions are: biochemical flows on nitrogen and phosphorous, climate change, land system change, biosphere integrity (biodiversity).[70] The tipping points have now been expanded from 9 to 16 and "five of the sixteen identified tipping point may be triggered at today's temperatures".[71]

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[69] The following definition of responsible leadership is sufficient for the purpose of this assessment: "In a very basic sense, responsible leadership can be defined as the management of an *organization's* interactions with society aimed at addressing the *organization's* various stakeholder concerns and contributing to the multiple bottom lines of economic, social, and environmental performance. The leader is thereby the one who enables and moderates interactions with the various stakeholders of the *company*. Source: Vogtlin, C. (n.d.) The modern world context for responsible leadership. Available on-line at: https://managemagazine.com/article-bank/leadership/what-responsible-leadership/

[70] Stockholm Resilience Centre (2022). *The nine planetary boundaries*. Available on-line at: https://www.stockholmresilience.org/research/planetary-boundaries/the-nine-planetary-boundaries.html [Accessed 24.09.2022]

[71] Stockholm Resilience Center ().*World at risk of passing multiple climate tipping points above 1.5°C global warming*. Available on-line at: https://www.stockholmresilience.org/research/research-news/2022-09-08-world-at-risk-of-passing-multiple-climate-tipping-points-above-1.5c-global-warming.html [Accessed on 20.11.2022]

At the local level, stakeholders usually identify with the growing problem of fresh water scarcity, in-door and outdoor air pollution, growing solid waste and worsening traffic congestion (example in in Addis Ababa).

It is not just about sustainable production but importantly also about sustainable consumption: Use-and-throw consumerism is on the rise. Plastic pollution (shopping bags and PET bottles) is growing and one of the most recognizable patterns of our unsustainable consumption culture. We are postponing the problem of electronic waste for the future with all these electronic goods which get obsolete in a matter of months (and don't get collected or recycled). How many of or organizations have made decisions to minimize paper consumption (or opted for recycled paper)?

Greening versus green, Do-No-Harm, Less-is-More and the Circular Economy: Building on the two concepts already discussed above (triple bottom-line and sustainability as a trajectory), green growth actions should straddle all of those dimensions. Do-No-Harm is the basic action- be it concerning human rights, labor rights, pollution control or business ethics and corruption prevention. Moving beyond pollution control, cleaner production is getting increasing traction driven by eco-efficiency benefits- hence the adage "Less is More". The real green economy lies in our ability to harness the potential of the circular economy in the production and consumption of goods. At the highest and global level, a model that can guide that aspiration could be Kate Raworth's *"Safe and Just Space for Humanity*[72].

Life-cycle thinking: We cannot comprehend the complete environmental and social impacts of goods and services we consume unless we take a full life-cycle view. Without that kind of analysis and information, we won't be able to make decisions on whether to use reusable shopping bags or single-use plastic bags? What is the end-of-life impact of the plastics and electronic goods we throw? Who should be responsible for the administrative and financial costs of the handling, recycling or disposal of those goods?

Sustainable development calls for effective partnerships: That is the reason why there is SDG 17. The multi-faceted environmental, social and economic development challenges of our time cannot be solved by a lone action. If what we envision is a is a "Safe and Just Space for Humanity", we need effective collaborations to pull the required finance, technology, policies, information, knowledge, etc.

We can't do without the right policy packages, namely the carrot, the stick, and the sermon[73]**:** Doing concrete greening activities and, even more importantly, moving into the new green economy (e.g., circular economy) cannot be achieved without the design, enforcement and continuous improvement of a package of policy instruments composed of regulations, standards, economic instruments, informative instruments and voluntary action.

What about the other sectors- it is all interconnected: Greening the TVT system is not an isolated activity. As with many things having supply and demand dimensions, we need to look into the other sectors, e.g., economic and infrastructure sectors and their respective development plans.

It all starts with own convictions- making sustainability part of core business (the DNA): Any serious attempt to put an organization on the sustainability journey should start with internal commitments. One way to ascertain that is to demonstrate those commitments in the vision and mission of organizations and in their strategic plans.

[72] For more on that have a look at: https://www.youtube.com/watch?v=HHB2vkrhThc [Accessed on: 24.09.2022]

[73] That is the title of a popular book on environmental policy: Bemelmans-Videc, M. et al. (1998). *Carrots, sticks, and sermons: Policy instruments and their evaluation*. Transaction, New Brunswick

5.2 Analytical lenses and frameworks

This section seeks to summarize the discussions already made in the foregoing chapters and paragraphs, namely the literature review presented in **Sections 4.6, 4.7 and 5.1.**

The concepts and tools distilled in those sections will guide the assessment through its full "project cycle", namely understanding of the "research" questions, enquiry through desk and field work and, more importantly, in the interpretation of data, and write up of findings.

The following is a high-level summary those sections.

A framework for greening TVT institutions: This will be based on the discussions in **Section 4.6** (ILO, 2021 & ILO, 2022) covering the aspects of campus, curriculum & training, research, work-place and community, and institutional culture.

Project life-cycle of greening TVT institutions (the whole-institutional approach): This framework clearly indicates the *complete project cycle of greening TVT institutions* and exactly where the current assessment fits. **Section 4.6** (ILO, 2022 & UNESCO, 2017) inform that theme. On the basis of the model in **Annex 2**, the scope of this assignment falls within Step 1 ("Understanding the Process").

A lens for capacity gap assessment: This is discussed in **Section 4.7**. The key concepts of the capacity gap assessment also filtered into the interview questionnaires and as additional self-assessment questions in the on-line survey. **Annex 4** present useful extracts of UNDP's capacity gap assessment model.

The above frameworks also helped in framing the table of contents and presentation of this report itself.

6. Summary of Findings of the Assessment and Interpretation of Results

6.1 Regions & colleges reached and stakeholders consulted

All in all, **fifty** TVT colleges were reached through face-to-face interviews and the on-line survey; out of these, three were agricultural TVT colleges. **Table 2** below shows the regional representation and the actual colleges consulted. The decision to employ an on-line survey (which was not originally envisaged at the inception phase) helped in reaching regions and colleges, which were not in the field mission plan. In addition to TVT colleges, other stakeholders were also interviewed, namely regional and zonal labor and skills bureaus/departments; development agencies, sector ministries, civil society organizations and universities.

When it comes to TVT colleges, leadership (deans and vice deans), trainers and trainees were consulted. Trainers and trainees were for the most part reached through the on-line survey.

The complete list (and contact details) of stakeholders consulted is provided in **Annex 5**.

Table 2: Lead TVT institutions as key informants

No.	Region/City	Institution	Participated in on-line survey[74]
1	Addis Ababa	General Wingate Polytechnique College	
2		Tegbare Ed Polytechnique College	
3		Lideta Manufacturing College	
4		Hope Enterprise (TVET College)	
5		Dorcas	
6		Don Bosco Catholic TVET Institute	
7	Amhara	Debre Birhan Polytechnique College (PTC)	
8		Yifat PTC	
9		Kombolcha PTC	
10		Dream College (Dessie)	X
11		Motta PTC	X
12		Bahir Dar PTC	
13		Gondar PTC	
14		Debre Tabor PTC	

[74] Those marked 'X" participated in the online surveys; the rest were consulted through face-to-face interviews.

No.	Region/City	Institution	Participated in on-line survey[74]
15		Inijibara PTC	
16		Bure PTC	
17		Merawi PTC	
18		Dur Bete PTC	X
19		Debre Markos PTC	
20	Oromia	Fichie PTC	
21		Sululta TVT College	
22		Sebeta PTC	
23		Woliso PTC	X
24		Shashemene PTC	
25		Chercher PTC	X
26		Ambo	X
27		Haramaya	
28		Nekemte	X
29		Agarfa ATVT College	X
30		Ardaita ATVT College	X
31		Robe PTC	X
32	SNNP	Wolkite PTC	
33		Hossana PTC	
34		Durame PTC	
35		Wolaita Sodo PTC	
36		Arbaminch PTC	
37		Sawla PTC	X
38		Dilla PTC	X
39		Jinka PTC	X
40	South West	Bonga PTC	X
41		Aman PTC	X
42		Tarcha PTC	X
43		Mizan ATVT College	X
44	Sidama	Hawassa PTC	
45	Dire Dawa	Dire Dawa PTC	
46		Ethio-Italy PTC	
47	Harar	Menschen for Menschen Foundation Agro Technical College	X
48	Somali	Jigjiga PTC	
49	Gambela	Openo PTC	X
50	Benishangul	Assosa PTC	X

6.2 Understanding of green growth/sustainability issues

This section discusses the findings of the assessment made on awareness and understanding of key TVT system stakeholders concerning green growth and sustainability issues and agendas. A high level summary of the findings is presented including a rating based on a simple scale of: *poor, fair, good and very good*. Details are provided in the respective annexes.

6.2.1 TVT college leadership understanding of the green growth concept and agenda

d. Understanding of the concepts of green growth and sustainability

A total of 31 TVT senior managers participated in the on-line survey mostly deans and vice-deans.

Their answer to the first question asked, **"What does green growth/sustainability mean to you?"**, presented with interesting insights. At the very least, one respondent mentioned "it is a good idea". A few of the respondents understood it in the context of planting trees and edible vegetables and creating a safe and attractive environment within the colleges. A couple chose to resort to the internet and came up with definitions provided by the World Bank and the OECD.

More interesting were those who understood it in the context of concepts such as changing the mindset; as protecting the environment; becoming resilient to the adverse effects of climate change; preventing air pollution; growing within the limits of what the environment could provide; use of renewable energy; and the need to become considerate of future generations. The full answers are provided in **Annex 15.**

Assessment of the responses given[75]**:** Broadly speaking, leadership of TVT colleges seem to have a fair understanding of the notion of green growth and sustainability. There is a gap when it comes to understanding it as a triple bottom-line objective of environmental, social and economic sustainability- **especially in view of the concepts introduced in Section 5.1**. The issue of ethics and ethical practices did not also feature in the answers excepting the few who mentioned the need to work on the mindset. Well-articulated answers of the relevance of these concepts to education in general and the TVT system in particular is missing- for instance climate change education, education for sustainable development (its linkage with the SDGs), global initiatives for responsible education. Of course, quite a few mentioned greening TVT but that can be guessed from the headlines of the interview questions.

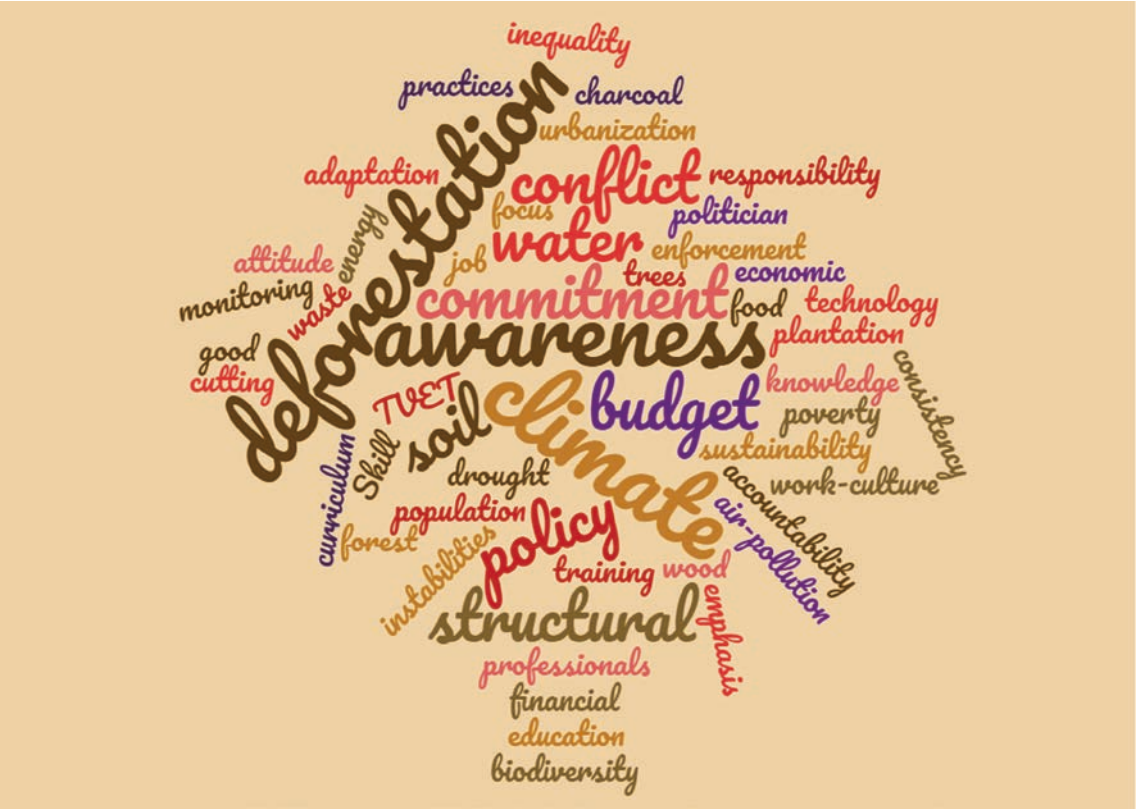
The second question posed to TVT college leadership was**: "In your opinion, what are the top three green/sustainability challenges or problems for Ethiopia?"**

This question attracted very diverse responses. Word cloud generators were used to sift through the answers given. The words that came out the most appear to be awareness (lack of), climate (degradation), deforestation, water (scarcity), soil, budget/finance (lack of), and conflict. See **Figure 2**.

Assessment of the responses given: Overall, college leadership exhibited a good understanding and articulation of local environmental problems. The most pressing issue of biodiversity loss was not explicitly mentioned but one can argue deforestation is a related concept. Awareness can be further strengthened through training by qualified environmental sustainability experts.

[75] This assessment will be based on a simple scale of: poor, fair, good, very good

▶ **Figure 2: TVT college leadership prioritization of Ethiopia's environmental problems**



Credit: Word cloud generated using https://classic.wordclouds.com/

The third question posed to gauge level of awareness of green growth issues was: **"What is your understanding of Ethiopia's agenda of greening the economy?"**

This question also attracted diverse replies. Conspicuously absent in the answers was the CRGE strategy itself and its variants such as Ethiopia's NDC implementation efforts or the National Adaptation Plan.

On the other side, the Green Legacy initiative and even its targets of planting 20 billion trees in 4 years got mention by a few respondents. The cluster farming and the dry season wheat production initiative of the government also got mentioned a few times.

The way the respondents answered the question was, to some extent, aspirational in which they expressed what they would like to see addressed rather than what actually is addressed in the ten-year development plan, the CRGE strategy, the NAP or the revised NDC. **Figure 3** is a cloud of single word issues which appeared in the answers of the senior managers.

Assessment of the responses given: Awareness is poor. There is little knowledge of national policies and strategies, e.g., the Environmental Policy of Ethiopia, The Environmental Impact Assessment proclamation, the CRGE, the NAP, the NDC and even the ten year development plan. There is an urgent need to introduce these policies and strategies and also to "unpack" them to the context of the TVT system.

▶ **Figure 3: TVT college leadership understanding of Ethiopia's green growth strategy[76]**

The fourth question posed in the same vein was: **"What do you think are the most important international environmental/sustainability agreements (Ethiopia has committed to) from the perspective of your TVT college?"**

This is probably the question on which respondents did not provide accurate answers. A few admitted to having no knowledge. Of the handful that were in the right direction the following were mentioned by name: MDGs, SDGs, the Paris Climate Agreement and the Vienna Convention (not clear which convention exactly). Clearly there is a knowledge gap in this area as can be gathered from the full answers provided in **Annex 15.** That is of course acknowledging that the respondents mentioned a number of issues/themes one can find in the SDGs, the Paris Climate Agreement or other Multilateral Environmental Agreements.

Assessment of the responses given: Awareness on this theme is poor. There is a need to impart "a working understanding" of the SDGs and the Paris Agreement on climate change. A cursory introduction to a few of the multilateral environmental agreements[77] to which Ethiopia is party is also important as TVT colleges could align training and help the country meet a few of those objectives.

a. On the national agenda for greening education

The question which was posed to senior management of TVT colleges was: **"What is your understanding of the national agenda for greening education?"**

The respondents appeared to have a comparatively good understanding of this subject (See full answers in **Annex 15**). A few specifically mentioned the (latest) "Ethiopian TVET Policy and Strategy (MoSHE, 2020) indicating as well that "Green TVET is one pillar". What did not get mentioned was the "Climate Change Education Strategy of Ethiopia 2017-2030". As in many of the responses given, there tends to be a bias in the responses towards planting trees.

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[76] Word cloud generated using https://classic.wordclouds.com/

[77] Examples: UNFCCC, Stockholm Convention on POPs, Montreal Protocol, CITES, The Basel Convention on Hazardous Wastes

Assessment of the responses given: Awareness on this theme is very good. The new TVET policy and strategy of 2020 and its link to greening TVT is well understood. The college leadership's oblivion on the Climate Education and Strategy 2017-2030 is understandable as neither the EPA nor MoE seem to be pushing the agenda. When and if that strategy gets traction, EPA and MoE need to sensitize TVT leadership about it.

6.2.2 TVT college trainers' understanding of the green growth concept and agenda

The first question posed to TVT trainers (through the on-line survey platform) was: **"What is your understanding of green growth/sustainability?"**

Quite a few were straight forward and claimed they have little or no understanding of the subject matter; a couple of respondents simply said, "good". A look at the answers provided by the many who were elaborate brought diverse issues to light (See **Annex 16 for full answers**). In addition to planting trees and other edible plants (often mentioned), interesting topics such as waste minimization, recycling, management of chemicals, pollution prevention and renewable energy were also raised. There is also a possibility that the more articulate answers are borrowed from official definitions- e.g., the Brundtland Commission of 1987.

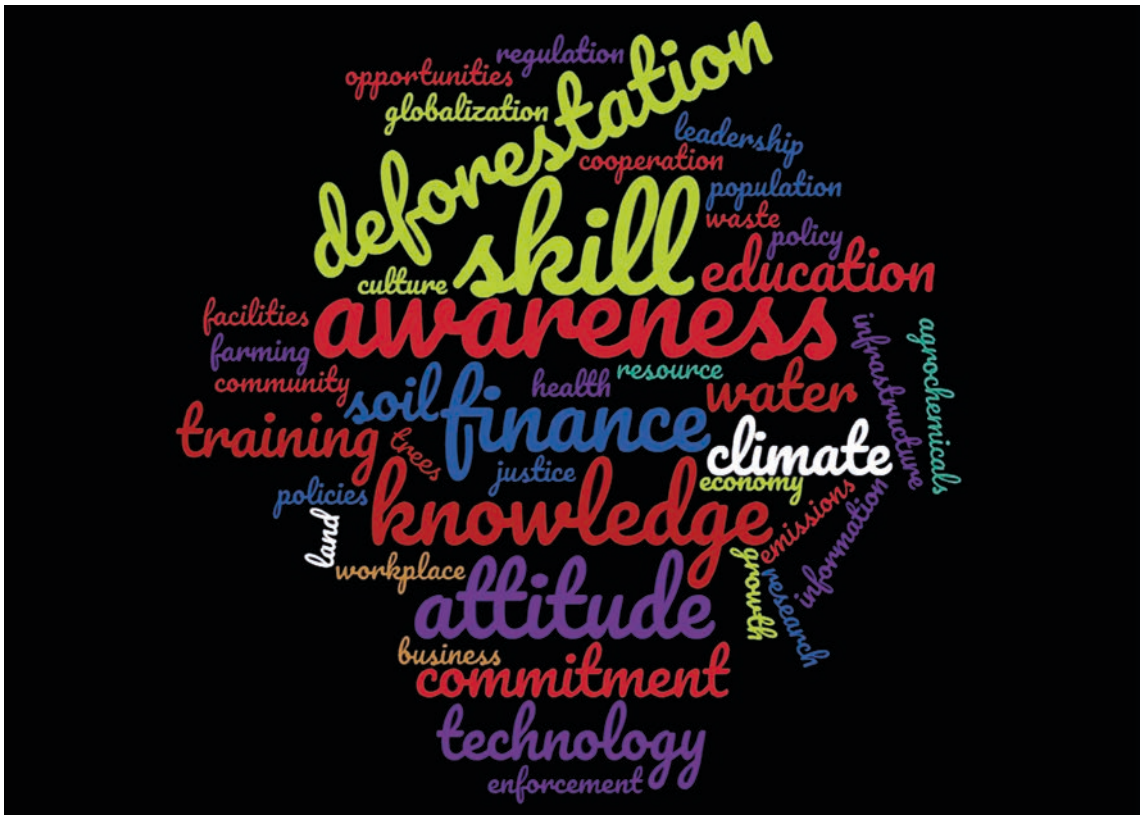
Assessment of the responses given: Broadly speaking trainers have a fair understanding of the notion of green growth and sustainability. There is a gap when it comes to understanding it as a triple-bottom line objective of environmental, social and economic sustainability**.** The key concepts introduced in Section 5.1 also do not feature in their answers. The issue of ethics and ethical practices did not also feature. Well-articulated answers of the relevance of these concepts to education in general and the TVT system in particular is missing- for instance climate change education, education for sustainable development (its linkage with the SDGs).

The second question posed to trainers was**: "In your opinion what are the top three green/ sustainability challenges or problems for Ethiopia?"**

The answers given by the respondents were filtered with the help of a word cloud generator (shown in **Figure 4)**. It is interesting to see that the trainers focused on awareness, knowledge, skills, attitude and education and inter-related themes. Deforestation, climate, soil and water were the environmental aspects that got frequent mention.

Assessment of the responses given: Overall, trainers showed a good understanding and articulation of local environmental problems. Their tendency to highlight cross-cutting issues of awareness, knowledge, skills, attitude and education is also commendable. Trainer awareness on the themes (green growth and sustainability) can be further strengthened through training by qualified environmental sustainability experts.

▶ **Figure 4: TVT college trainers' prioritization of environmental problems[78]**



6.2.3 TVT trainees' understanding of green growth and sustainability

The field-work period (August 15- September 23) overlapped with the Ethiopian school holidays. Even with the on-line survey option, reaching students proved to be the most difficult. There was no readily available register, or even better, a Telegram or WhatsApp group through which the consultant could reach trainees. The only participation was from students of the Menschen für Menschen Agro-technical and Technology College for which the consultant is grateful. The limited number of responses is, therefore, one limitation. There were also answers that shunted the question- by responding "good" or simply as "7/10" without elaborating further. The full responses are provided in **Annex 16**.

Assessment of the responses given: Broadly speaking, trainees seem to have a "fair" understanding of green growth and sustainability. The responses pointed out the following issues: greenery, environmental protection, energy use, care for future generations, climate change, the need to balance economic growth and environmental protection. However, there is room for improvement in view of the concepts introduced **in Section 5.1**. For instance, the issue of sustainable consumption did not feature in the answers.

6.2.4 Labor and skills sector officials' understanding

In discussions held with labor and skills officials at the federal, regional and zonal levels, the following issues were mentioned as key problems relating to green growth.

- Deforestation, degradation of local ecosystems often in association with over population;
- Pollution and eutrophication of lakes and the diminishing fish stocks in the lakes;
- Climate change and its ill effects; and
- The importance of developing renewable energy sources, e.g., solar and geothermal.

Only a limited number of officials participated in the on-line survey. With that limitation, labor sector officials' understanding of green growth is assessed as "good".

[78] Word cloud generated using https://classic.wordclouds.com/

6.3 Understanding and practices of greening TVT colleges

Section 6.2 attempted to gauge key stakeholders' understanding of green growth concepts. **Section 6.3** will look at **practices** on the basis of the framework of analysis of greening TVT institutions introduced in **Chapter 5.** In this section, qualitative assessments of the respondents' answers are provided whereas the actual responses themselves are documented in respective annexes. Again, the assessment is based on a simple scale of *poor, fair, good and very good*.

6.3.1 TVT college leadership's understanding and practice of greening TVT

The first question that was asked to gauge TVT college manager's understanding of green TVT was: **What is your understanding of greening a TVT college? What aspects need to be greened?** See **Annex 15** for details.

Assessment of the responses given:

There are a couple of outliers, which gave "text-book" definitions of the concept. There is a likelihood that the respondents were influenced by the Terms of Reference (ToR) of the assessment shared ahead of the interviews. Likewise, the new TVT policy and strategy (MoSHE, 2020) also provides a definition, which the respondents might have looked into. Other than that, the answers focused more on greenery aspects and planting trees. However, interesting themes were also raised such as waste minimization, recycling, resource efficiency, renewable energy, greening the mind, greening the curriculum, preventing pollution, protecting the environment, and sustainable practices. Although colleges have existing activities on social aspects and in the local community, these did not feature in the answers! That "greening" needs to embody the triple-bottom-line thinking seems to be missing.

Overall, college leadership's understanding and practice of greening TVT, examined against our framework (as introduced in Chapter 5), is assessed as "poor" necessitating training on the issue.

To differentiate between perception and practice, senior TVT college managers were asked a second question: **What are the most important activities which you and your team have carried out so far to green your TVT college?** See **Annex 15** for full responses given.

Assessment of the responses given:

The majority of activities mentioned relate to greenery and planting trees. A few pertinent themes which got mention were on solar applications, waste minimization and a few "social responsibility" activities. Overall, existing practice in greening TVT colleges is assessed as "poor". Definitely more needs to be done in each of the five aspects and importantly in greening institutional culture.

The third question posed to management to help examine practice was: **Has your college carried out a study to determine the demand for green skills in the job market?**

Of the 31 respondents who participated in the survey, 21 responded "No"; 9 responded "Yes"; and two skipped the question. However, of the nine who responded "yes", only three provided clear answers mentioning solar, biogas and greenery; the other answers were not precise.

The fourth question asked in this respect was: **What opportunities do you see in aligning your TVT college to the green economy agenda of Ethiopia?** The complete responses are presented in **Annex 15.**

Assessment of the responses given:

Interesting answers given concerning opportunities relate to training the labor force with green skills; revision of curriculum considering the green economy objective; and working in partnership with local business and donors. Thematic issues mentioned were: solar, emissions reduction, resource efficiency, conservation of eco-systems, food security. However, it is not clear whether these answers were provided with an understanding of the country's objectives as articulated in the CRGE, NAP, NDC or the ten-year development plan (which is believed to be on serious gap).

Three additional, inter-related questions were also asked to gauge TVT college leadership's perception and sense on whether the green economy could afford employment and entrepreneurship opportunities to their graduates.

To the question, "**Do you think there are employment opportunities for TVT graduates in the green economy?**", 90% responded "yes". The sector often mentioned as having high potential is agriculture. Other sectors and sub-sectors respondents named were energy (including solar), urban sector, and service sector. The answers (See **Annex 15)** could be starting points for further research into the issue- as this is an area where additional work is needed. For instance, MoLS (in collaboration with the TVT colleges) could conduct an assessment similar to the one carried out by JCC on the employment potential of the green economy "sector" and "sub-sectors".

The second question posed in the same vein was: "**Do you think there are entrepreneurship opportunities for TVT graduates in the green economy?**" 93% of respondents answered "Yes and provided interesting answers. The followinga are a few of the sectors, sub-sectors and areas, which repondents suggested: agriculture, horticulture, seedling production (also for the Green Legacy initiative), waste management, recycling, solar, biogas, urban agriculture and tourism. The answers are insightful and hence the full responses are provided in **Annex 15**.

The third question asked was **"Do you know employers who offer jobs to graduates in the green professions?"** About 43% of respondents answered, "Yes". However, only a few of the respondents gave specific names- even then local sector bureaus. The majority gave broad answers, e.g., NGOs, greenery projects, sector bureaus, etc. This goes to show that little is done, so far, by way of gearing labor market assessments to understand employers' needs. The Vietnamese case study (presented in **Section 4.8**) is a good practice to emulate.

6.3.2 TVT Trainers' understanding and practice of greening TVT

The first question posed was: **What does "green" TVT college mean to you? Please briefly explain your understanding on the issue.**

Assessment of the responses given:

A couple of respondents borrowed official definitions from UNESCO-UNEVOC available on the internet. That limitation aside, the following issues were raised: creating a safe environment free from pollution; green campus including growing fruits and vegetables; reducing waste; a culture of sustainable practices; energy efficiency; policy; entrepreneurship; technology development; conservation of natural resources, biodiversity and water; trainees who address environmental problems and more.

On balance, trainers' grasp of the issue is assessed as good- especially looking at the diversity of the themes they raised. Of course, there is room for improvement in light of the discussions made in Section 4.6 and Chapter 5. The complete answers are presented in **Annex 16**.

The second question posed to trainers was: **Which of the subjects or courses you teach have element of green issues?**

Assessment of the responses given:

A few respondents answered none. As might be expected, most of the respondents identified elements (chapters) in their respective trades, which address environmental aspects, such as Occupational Health and Safety (OHS), Kaizen, waste minimization, preventive maintenance. The agricultural and related occupations, understandably, have close relations, e.g., in agrochemicals management, forest management, soil and water conservation. These could be good starting points to identify and define the respective "green" units of competences for the various occupations. Of course, a number of emerging or developed themes are missing. Examples of these include: climate smart agriculture; cleaner production, pollution control, pollution prevention; wastewater treatment; solid waste management; energy efficiency & management; renewable energy and solar; etc. These and others need to be developed as units of competence or new occupations informed also by labor market assessment and an understanding of Ethiopia's green economy objectives. Overall, the stage at which this activity is found in the colleges can be assessed as "poor". The full answers of the trainers are provided in **Annex 16.**

The third question asked was: **Do you address the issue of climate change in the subjects or courses you teach?** Of the 39 respondents 25 (or 70%) answered "Yes", 11 answered "No", three skipped the question.

Assessment of the responses given:

A few of the relevant answers are the following: Kaizen & waste management; in textile chemical processing course; climate change adaptation and mitigation (level V); automotive exhaust system; afforestation; climate & weather; dairy production; forage development; nursery; refrigeration & air conditioning; diesel engine overhauling. A few also answered: "none" and "not much". Overall, the trainers are on the right track and identified courses having relevance to climate change. From the responses provided, this issue is assessed as "good" (to mean good basis for further development). However, climate education as a common course is missing and the "depth" of the lessons on climate change adaptation and mitigation needs its own evaluation. The complete answers given by teachers is presented in **Annex 16**.

Three other, inter-related questions were also asked to gauge TVT trainers' perception and sense of whether the green economy could afford employment and entrepreneurship opportunities to their students.

To the question, "**Do you think there are employment opportunities for your students in the green economy sector?**", 68% answered "Yes". Respondents provided elaborate answers. The most important ones were: urban greenery & beautification; agriculture; agro-processing; industrial parks; recycling and re-use of agricultural waste; seedling production; forestry; and natural resources management. Their overall understanding is assessed as "good". However, there is a room for an "informed" perspective based on a labor market assessment on the question. The full answers given are presented in **Annex 16**.

To the question, "**Do you know any employers who could offer job opportunities to your graduates in the green professions?**", 40% answered "Yes". However, very few followed up on their answers with examples (actual names). The majority mentioned broad (potential employers) such as energy & mines bureau; industry parks, seedling production (for the green legacy). A couple mentioned actual names, e.g., the Burie IAIP. Similar to assessment made for college leadership, there is a need to make this question part of the labor market assessment emulating the lessons of the Vietnam case study. The complete answers are provided in **Annex 16.**

To the question, "**Do you think the green economy holds entrepreneurship opportunities for TVT graduates?**", 76% answered "Yes". They were also able to follow up their responses with examples. The following deserve mention: recycling of waste; production of organic fertilizers; forestry; organic farming; solar; renewable energy; automotive sector; and ICT. That "understanding" is assessed as "good". However, there is a need to "inform" that question with a dedicated market assessment. The full answers given are presented in **Annex 16**.

6.3.3 Labor and skills system officials' perspective

There is a shared understanding amongst TVT system experts at the federal, regional and zonal level that, as far as current practice goes, green TVT for the most part, is interpreted by TVT colleges to mean greenery including growing fruits and vegetables. The green legacy activities of the colleges have also become part of bureaus' planning.

Interviewees mentioned that guidance and support is being provided with the limited understanding that the sector's experts themselves have on the issue of sustainability and green growth. Information gleaned from interviewees is discussed in **Section 6.5.3**.

The interviewees also mentioned the importance of integrating concepts such as resource efficiency (re-use, recycling); Kaizen; shift to renewable energy sources; and agriculture as the sector that could benefit the most from green growth practices and technologies.

Interesting perspectives shared include:

- The TVT system is a resource intensive institution and hence resource efficiency (green practices) makes a lot of sense for colleges themselves and, hence, requires concrete action;
- Especially the agricultural sector needs to be revisited; it stands to benefit the most from green practices and technologies;
- In identifying the green occupations and trades, best would be to go bottom-up: identify locally appropriate practices and technologies mindful of local resource endowments and local constraints; and for a feasibility (tracer) study to determine these occupations will be useful.

6.4 Assessment on the basis of the selected framework for greening TVT

The assessment will be made on the framework of analysis presented in **Chapter 5**, which is also informed by **Chapter 4** (literature review).

To re-cap the five pillars of *greening "TVET"*[79] will be used as a frame of reference in the following discussions. These are: campus; curriculum & training; research; community & work-place; and institutional culture**. Annexes 2 and 3** are also useful frames of reference.

6.4.1 Greening the campus

What is being practiced

- Comparatively speaking, greening the campus is the concept and activity which is most widely understood out of the five aspects of the framework;
- From a practice perspective, planting of shade, ornamental, and edible plants within the campus premises is frequently mentioned;
- The main driver for that is the conviction to create an attractive and healthy environment in the campuses;
- The green legacy initiative is another driver and so is the related agenda of urban agriculture;
- A few colleges in hotter areas also claimed the need to moderate the local climate is a strong motivation and, with that, the possibility to create a comfortable environment for students;
- With an ever-climbing food inflation rate (observed in 2022), the vegetable garden initiatives seem to get favor with college employees- especially amongst low-income employees, e.g., security guards and cleaners;
- Many colleges also claimed they follow and implement the Kaizen 5S principles[80], especially in workshops;
- Kaizen also seems the motivation for the Reduce-Reuse-Recycle culture a number of colleges mentioned they practice, mostly also in the workshops; reuse also applied to old furniture and equipment which the colleges collected from other organizations to extend the life of the goods and find applications in their respective colleges for training purposes.
- A handful of colleges are experimenting with solar power. Donor funded initiatives are almost always behind these cases. That is to say: a donor partnered with a TVT college in which they collaboratively organized short term training to identified beneficiaries (usually would-be entrepreneurs). After the trainings were completed, a few colleges found good use for the equipment, namely as back-up power supply. A case in point is the Yifat PTC in Shoa Robit.

What is missing

- Not having a systematic process for doing the activities that are already happening; for instance, there is no linkage with the other inter-related aspect, i.e., institutional culture.
- No environmental management system in place; credible environmental management systems for instance could be based on ISO 14001 standards;

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[79] As mentioned, the literature reviewed use the term "greening TVET.

[80] Namely: Sort, Straighten, Shine, Standardize, and Sustain. For more on the 5S have a look at: https://www.6sigma.us/six-sigma-articles/understanding-5ss-of-kaizen/#:~:text=The%205S%20factors%20include%20that,You%20also%20eliminate%20obstacles. [Accessed on 07.11.2022]

- On the basis of the ISO 14001 standard, for instance, colleges would be able to do an internal environmental audit with respect to the most common aspects, namely emissions to air; pollution of land; discharge to water bodies; use of materials, natural resources, energy; solid waste management; and hazardous waste. Based on the findings, they would then define clear actionable interventions, which would then be managed and monitored on the principles of continuous improvement, i.e., following the Plan-Do-Check-Act cycle.
- Thinking in terms of the well understood *environmental aspects* and interfacing that with *life-cycle considerations* is also missing. That kind of thinking could help colleges to re-consider their "business-as-usual practices"- including unsustainable consumption patterns of the college community. Examples could be: paper use (minimizing or use of recycled paper or digitalization), use of disposable packaging (PET bottles, plastic bags), energy & water use, transportation of staff and students, etc.
- One of the most telling findings during interviews was a couple of colleges mentioned water is one of the serious constraints they are facing- in some instances to the extent it is affecting the day-to-day teaching-learning process. As one way around that problem, college management are working hard to resort to ground water; a few (with limited resources) are digging boreholes. However, water stewardship thinking ("within and beyond the fence-line") is missing. That is to say, without proper watershed management which requires partnership and concrete action with stakeholders in the concerned watershed (especially the private sector), there is a risk that groundwater resources will be over-extracted and wells will run dry.

6.4.2 Greening the curriculum and training

What is being practiced

In the colleges assessed, the few training activities which relate to green growth aspects happen to be short-term courses.

- These short-term courses are usually initiated by donors or local municipalities. The most common environmental topics are PV solar applications, municipal solid waste management and greenery. The colleges, which are engaged in PV solar short courses and partnerships are Yifat PTC, Don Bosco Catholic TVET Institute and Jigjiga PTC.[81]
- Kaizen also happens to be the most often cited concept that has found its way into TVT college curriculum (often as a dedicated unit of competence); with that practices such as waste minimization and recycling are also getting traction.
- Concerning social sustainability issues, the most common themes are: Education with Disability; training of refugees and returnees; training of unemployed youth. These are also short-term engagements and usually are carried out in partnership with donors and CSOs.
- Some occupations have elements or "chapters" that relate to green growth issues. For instance, the most commonly encountered trade of automotive technology deals with emission control issues- optimizing air-fuel ratio, fuel efficiency, catalytic converters, etc. Garment and textiles introduce the reduce-re-use-recycle concept and the need for efficient use of chemicals (in wet processing of textile manufacturing). OHS is a theme addressed in the technical trades (e.g., garment, metal, woodwork, electrical, construction).

What is missing

- The Ethiopian TVET Policy and Strategy (MoSHE, 2020) is still in its draft stage. Although TVT colleges are aware of it and a few colleges claim to have started adopting it, it has yet to be endorsed and implemented.
- **Seen from a policy alignment perspective:** There is no practice or plan in-place to understand and unpack the major green growth strategies of Ethiopia, importantly the CRGE strategy, the National Adaptation Plan, the revised NDC and the ten-year development plan with the explicit purpose of

[81] These colleges had credible/visible activities; evidences were readily visible.

revising or defining occupational standards and curricula. This is probably one of the glaring gaps identified in this assessment.

- **For the sectors and trades already on offer:** There is no effort to introduce a relevant unit of competency on green growth aspects. Themes which could be covered in such unit of competencies could broadly address well understood approaches such as, pollution control, cleaner production, solid waste management, energy efficiency, etc.
- **Seen from a market perspective:** The labor market assessment studies which colleges carry out (on a yearly basis) do not address the green economy sector.
- **From a normative argument point of view**: there is no systematic effort to introduce common courses on climate change education (CCE); environmental consciousness/management[82]; anti-corruption & business ethics; and other broader sustainability principles[83].

6.4.3 Greening research

What is being practiced

There is broad consensus amongst the interviewees that, traditionally TVT colleges only do action research- mainly with a view to address burning administrative and management challenges within the teaching-learning process.

What is missing

There is no purposeful and systematic tradition in applied research, not least geared towards the green economy.

Applied research could also be used as a tool to clearly define what needs to happen in the other four aspects of greening TVT, namely greening the campus; curriculum & training; community & work-place; and institutional culture.

There is huge role for applied research within the TVT system. Of course, this has to be determined and scoped through a purposeful assessment keeping sight of what research universities are mandated to do. However, based on this study, the following themes would be interesting for TVT colleges to pursue:[84]

- Alignment of the environmental policy and CRGE with the "TVET" policy and strategy: specifically unpacking the CRGE, NDC, NAP in a meaningful way as a basis for greening TVT;
- Partnering capacity with the industry/private sector geared to the green economy including a number of topics: greening of existing processes; new green business models; technology development and adaptation; collaborative training; etc.
- Specific environmental thematic topics of high interest: PV solar application; productive use of renewable energy for instance as proposed by the JCC in its 2021 study (See **Section 4.5**); energy efficiency & management; water sustainability & stewardship; cleaner production and circular economy; climate smart agriculture; eco-tourism; organic farming & eco-labelling; sustainable procurement; and Climate Change Education.
- On the policy, management, social, and health dimensions, the following could be good topics for research: responsible education; responsible leadership & corporate citizenship (for business); gender mainstreaming & women economic empowerment; resilience of the TVT system to COVID-19 and potential pandemics arising from a changing climate (including new forms of malaria in Ethiopia).

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82 This, for instance, could include ethical consumption practices.

83 Which, for instance, can be informed by the UN Global Compact and its ten principles.

84 This is not intended as an exhaustive list and universities also have a stake in this research topics (so coordination with local universities is key).

6.4.4 Greening the community and workplace

What is being practiced

TVT colleges engage in a number of activities in this space. The commonly encountered activities include the following.

In the "Community-Social" domain, a number of "social responsibility" initiatives are taking place, e.g., elderly home repair; maintenance of cobblestone roads; providing educational materials to kids from poor families; and supporting local schools, for instance, in the maintenance of school generators.

In the "Community-Environmental" domain, the following experiences exist: PV solar application for refugee and host communities; attempts for technology transfer (solar, biogas, fuel briquettes, fuelwood from the invasive weed, *prosopis juliflora*[85]); good practices in artisanal mining, pottery and agriculture. In the "Industry Extension" domain, existing activities include: advisory support to micro and small enterprises on resource efficiency and productivity aspects.

What is missing

Lack of an institutional sustainability policy or an Institutional Greening Plan (IGP) implies also that there is no systematic effort to engage industry (the private sector) and community on green growth issues.

For instance, while a number of colleges mentioned water shortages as a serious concern, there were no initiatives to engage on concrete water stewardship initiatives, e.g., watershed management in partnership with local companies, municipalities and the community. The most common response to address water shortage is to resort to groundwater (to drill boreholes within the premises). Watershed management to ensure sustainable groundwater recharge issues do not feature in the discussions. The same could be said of application of PV solar. TVT colleges encounter frequent power interruptions and consider PV solar as one of the solutions to the problem.

However, the industrial extension and technology transfer pillars of TVT colleges could be good instruments for future work on greening the community and work-place. For that to happen, these pillars need to be re-visited based on a clearly articulated policy/IGP.

For instance, the Industrial Parks Development Corporation (IPDC) which operates twelve industrial parks throughout Ethiopia in which a growing number of companies (mostly international businesses) are setting shops has an objective to engage and work with the TVT system. In fact, in 2022, they have started signing memoranda of understanding (MOU) with TVT colleges with a view to ensure a formal and well-organized process of sourcing labor in the TVT professions. Amongst the key issues, which IPDC would like to advance in its industrial parks and the tenant factories are: rollout of the Eco Industrial Park (EIP) framework; proper operation of its facilities, especially its wastewater treatment plants including the Zero Liquid Discharge (ZLD) plants; handling, re-use and recycling of various by-products and waste generated by the facilities. One specific priority area is the opportunity of using ZLD sludge for use in the making of non-structural bricks. Occupational Health and Safety (OHS) and Social Compliance are other important issues for IPDC, which concern TVT colleges as well, especially in the greening of community & industry; curriculum & training; and research. TVT colleges can also provide continuing training services on a number of those areas.

The Integrated Agro-Industrial Parks (IAIPs)[86], which are recent entrants into the scene, also have needs in the handling of industrial waste. For example, the Yirgalem IAIP (based in the Sidama Region) is already facing the challenge of proper handling and recycling of waste (pulp) from the avocado oil processing plant. Needs for similar services to those needed by IPDC, are expected to arise as more factories start operation in the IAIPs of which three have started operation already.

Other key areas relevant to green production and consumption in Ethiopia, especially as they relate to industry and the private sector relate to the following:

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[85] Jigjiga PTC mentioned they are working on this issue. Prosopis juliflora is a growing invasive weed in the Afar and Somali Regions of Ethiopia.

[86] There are four IAIPs in Ethiopia, namely Ba'eker, Bulbula, Bure and Yirgalem. The last three have already started operation. These IAIPs are managed by regional IPDCs.

- Resource Efficient and Cleaner Production (RECP): The Ethiopian National Cleaner Production Center (NCPC) promotes RECP concepts and practices within industry and businesses in Ethiopia. Green TVT and skills development has a clear relevance to this endeavor.
- Energy efficiency and energy management: The Ethiopian Petroleum and Energy Authority (EPEA)[87] is the regulatory body for electricity, energy efficiency and conservation. Its predecessor, the Ethiopian Energy Authority (EEA) identified a total of 26 project activities across six programmatic areas of which 14 projects are designated as high priority and slated to start "as soon as possible".[88] The top priority was to address industrial energy demand (including fossil fuels), followed by electricity use in residential and commercial buildings. The Energy Efficiency Strategy (overseen by ex-EEA) focuses on three sub-sectors, i.e., industry, buildings and appliances (commercial and home). The Authority has developed a number of guidelines pertaining to energy audits and standards for various electrical appliances.[89] This certainly is of high interest for TVT.
- Urban water use efficiency: According to a report by the Addis Ababa Resilience Project Office, while water supply to Addis Ababa is 580,000 m3/day, demand is 1.1 million m3/day. [90] The report also claims, of the 450,000m3/day of water produced, 36.5% of that is lost due to leakage caused by ageing infrastructure and other system inefficiencies.[91] That is a potential skills development area for green TVT and skills development relating to good pluming practices, leak detection systems (including digital technologies), and preventive maintenance.
- Post-Harvest Loss (PHL) management: Post harvest loss of crops in Ethiopia remains very high. The FAO did studies for PHL by crop type and the results indicate there is huge room for improvement. One such study of PHL of tomatoes showed that total loss across the value chain could be as high as 37.8%.[92] A similar FAO study estimated the PHL for potatoes could be in the range of 23.7% to 38.7% for shelf and floor storage conditions (average for the three areas studied).[93] Similarly, the average PHL for Sorghum as per FAO studies in four areas averaged at 33%.[94] To sum up, good practices and technologies for minimization of PHL is another opportunity for green TVT and skills development, especially for the ATVET colleges.
- Green manufacturing: The Ministry of Industry (MoI) endorsed the Green Manufacturing Strategy in 2019. It makes sense for TVT colleges to look into that strategy with a view to re-purpose their own activities and services- in close coordination with the MoI. Green manufacturing is particularly more important in the leather, textile, chemicals and food processing industries.

6.4.5 Greening the institutional culture

What is being practiced

The vision and mission statements, displayed in billboards in the college compounds, have clear articulations on efficiency, effectiveness and equity considerations. Those statements mirror the essence of the national 2008 strategy as stated in the vision statement, "to create competent and self-reliant citizens to contribute to the economic and social development of the country."

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87 Formerly the Ethiopian Energy Authority

88 EEA (n.d.). *Energy Efficiency program and activity plan*

89 Available on-line at: http://www.eea.gov.et/index.php?option=com_content&view=article&id=347&Itemid=369&lang=en {Accessed on 11.11.2022]

90 Addis Ababa Resilience Project (n.d.). *City characterization report*: Addis Ababa.

91 Ibid.

92 FAO (2020). *Postharvest Loss and Supply Chain Studies of Tomato Fruits in Dugda Woreda, Oromia Regional State-Ethiopia*

93 FAO (2020). *Postharvest Loss and Supply Chain Studies of Potato Tuber in Sinan, Arsi Negele and Ezha zuria woredas of Amhara, Oromia and SNNP Regional States - Ethiopia*

94 FAO (2017). *Postharvest loss assessment of maize, wheat, sorghum and haricot bean*

What is missing

What has not found its way into the colleges' vision and mission is clear articulation of green growth (environmental sustainability to be specific). The five-year and ten-year strategic plans also do not have action plans on the same topic as was evidenced in the interviews held with college leadership.

All other aspects of greening TVT (campus, curriculum & training, research, and community & workplace) should actually have clear interlinkages and be part and parcel of the institutional culture. The best way to demonstrate that is an organization-wide sustainability policy or an Institutional Greening Plan (IGP). That will be the starting point to make sure all other aspects are considered and addressed, i.e., clear responsibilities (a sustainability manager or team), action-plan, budget and resources, accountability and reporting systems.

▸ 6.5 Capacity gap and needs assessment

A number of questions in the face-to-face and in the on-line survey aimed at examining this issue. The answers respondents gave were very informative.

In addition, "self-assessment" questions on capacity gaps relating to the four Core Issues[95] were administered on-line using the standard Likert (five-point) scale. However, the results did not exactly mirror the responses given to the open-ended questions (including those already discussed in **Sections 6.2-6.4**) and the additional questions expressly asked on this issue to be discussed further. On the Likert scale self-assessment, college leadership and trainers gave answers ranging from 3-4 (out of 5) on the four-capacity gap core-issues. That result corroborates the limitations often-cited about self-assessment methods[96]. Hence, the results of the self-assessment questions (documented in the annexes) should be taken with caution.

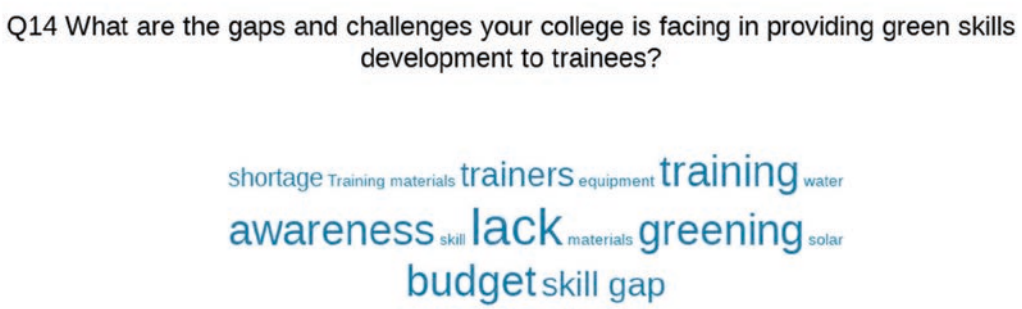
6.5.1 TVT college leadership perspective

The face-to-face interviews and the on-line survey with college deans and vice deans revealed a number of gaps and challenges.

The main question that was posed to that end was: **What are the gaps and challenges your college is facing in providing green skills development to trainees?**

The word cloud analysis generated by SurveyMonkey (**Figure 5)** points to a certain direction, lack in awareness, training, budget, equipment and training materials. The actual answers given by the respondents are presented in **Annex 19**.

▸ **Figure 5: Capacity gaps and challenges mentioned by college leadership: Random words**



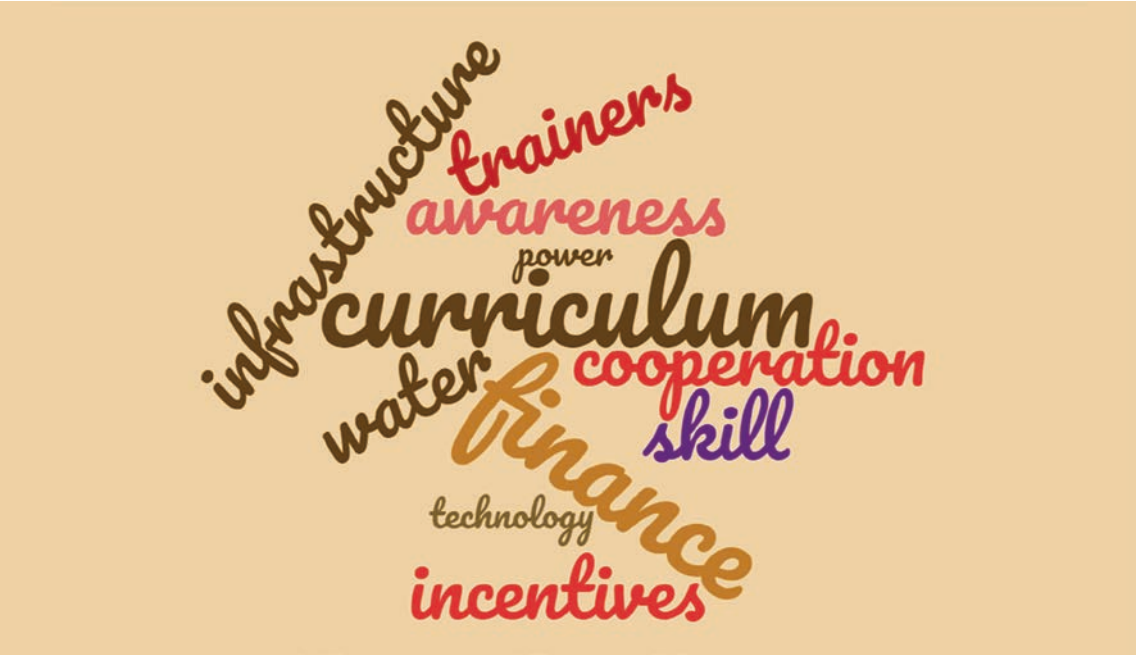
Source: Automatically generated by SurveyMonkey

[95] As defined by the UNDP Capacity Gap assessment framework

[96] Self-assessment could be fraught with lack of objectivity, lack of honesty, lack of accurate information to make the assessment, etc.

The consultant also distilled and clustered the statements and phrases into one-word lists for an in-depth look into the answers.[97] The answers are self-evident (**Figure 6)**.

Figure 6: Capacity gaps and challenges mentioned by college leadership: Common themes



Note: Generated by using https://classic.wordclouds.com/.

Using the UNDP capacity gap assessment framework, the following picture emerges.

Knowledge: appears the most important capacity **gap core issue** encountered. The following inter-related themes fall in this core issue and were on top of the list.

- Issues to do with (absence/lack of) OS, curriculum and Training, Teaching, Learning Materials (TTLM) shown also as "curriculum";
- Lack of awareness of green growth and sustainability amongst senior managers, trainers and students;
- Skills gaps related to trainers; and
- Lack of knowledge and skills for effective partnerships (to raise funds and resources).

Institutional arrangement: is the second core issue under which gaps and constraints were mentioned-keeping in mind this core issue is also inter-related to the "Knowledge" core issue. The following themes got frequent mention:

- Lack of cooperation (with local government);
- Mis-alignment of policies;
- Finance and infrastructure (workshops, laboratories, facilities, etc.) are an institutional arrangement issue but they relate to the core issues of leadership and knowledge as well;
- Trainers (access to training);
- Incentives and motivations (for top management, trainers and trainees);
- Other themes which emerged in the face-to-face interviews relate to "reporting mechanisms", and "monitoring and evaluation".

[97] Word counts indicated the following top issues: curriculum and finance (10 times each); awareness and infrastructure (9 times each); cooperation and trainers (8 times each); water (5x); skills (4x); and incentives (3x).

Leadership: A few themes relating to this core issue which appeared in the discussions were incentives, ethics, values and mindset.

Accountability: This was probably the core issue, where the least number of issues were mentioned by the respondents except monitoring and evaluation. Other than the standard practice of (labor market assessment), participatory feedback mechanisms did not feature into the discussions (except for tracer studies, which could be geared towards the green TVT objective).

It is worth mentioning that a number of the themes described under the four core issues discussed above also appeared in the discussions in **Section 6.2.1**. Self-assessment (by TVT college leadership) of capacity gap core issues on the Likert scale are presented in **Annex 19**.

6.5.2 TVT trainers' perspective

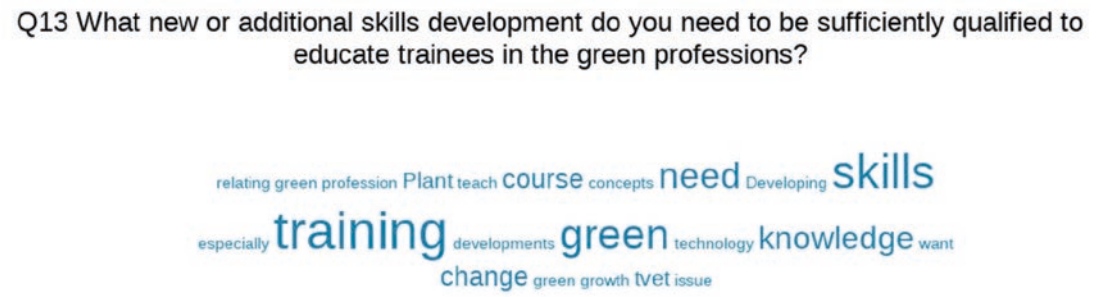
The first question posed was: **Did your own training as TVT trainer provide you with sufficient skills on green/sustainability issues?** About 75% responded, "No". (**Annex 20**).

The second question in the same line was: **What new or additional skills development do you need to be sufficiently qualified to educate trainees in the green professions?**

Here, trainers mentioned various needs straddling general green growth/sustainability themes; applied green growth approaches relevant to the courses they teach; preparation of curricula; strategies for better education of green growth subjects (pedagogy aspects, action plans); and cooperative training and experience-sharing for green growth education. The complete answers are presented in **Annex 20**.

The word-cloud generated by SurveyMonkey corroborates the need for training and up-skilling in green growth subjects (**Figure 7**).

▶ **Figure 7: Skills development needs of trainers in green growth issues**



Probably the most conclusive answer on this subject became evident through the other question asked: **What additional support do you need as a trainer to improve your skills in the green professions?** The answers showed an overwhelming need for training, TTLM, teaching aid and technology. The full responses are shown in **Annex 20**.

The responses on self-assessment questions asked in the same lines, using a five-point Likert scale, gravitated to average scores, i.e., 2.5 to 3 out of 5. Again, those answers (See **Annex 20)** require cautious interpretations as already discussed above.

6.5.3 Labor and skills sector officials' perspective

The labor and skills "sector" officials (MoLS at the federal level and bureaus and departments at the regional and zonal level) were also consulted.

The following gaps were pointed at the federal level in discussions held with experts of MoLS:

- Awareness on the subject is a key gap: green TVT, for the most part, is interpreted to mean greenery and planting trees;
- Revision of OS and curriculum (from a green TVT perspective) has not yet started; ideally these needs to happen based on the request of (in consultation with) the concerned sectors;
- Going forward, there is a need to introduce relevant unit of competencies on green/sustainability to the various trades in a meaningful way[98];
- Reporting: the only reporting happening is on greenery activities and to a certain extent on Kaizen; reporting on all five aspects of greening TVT has yet to happen;
- Trainers' capacity: The accountability of the Federal TVT Institute is to MoLS; however, development of the curriculum with which it trains TVT trainers is under the jurisdiction of the Ministry of Education; notwithstanding that, there is a need also to revisit trainer's curriculum;
- There is also a need to revisit the old TVET National Qualifications Framework (NQF) which was introduced before the 2020 TVET policy and strategy; once the National Qualification Framework (still in its draft stage) is endorsed, MoLS needs to revise the old TVET NQF as well.

The discussion held with the Federal TVT Institute provided the following insights:

- Although green TVT is an agenda (forthcoming from the 2020 TVET policy and strategy), familiarization and mainstreaming is lacking;
- SDG framing: Three out of seven SDG targets focusing on education relate to the TVT system; lifelong learning, inclusivity and quality are principles that resonate also with green growth and sustainability; that framing and interpretation will be key going forward;
- The concept is also narrowly understood to mean greenery; there is a need to "standardize" the concept across the board;
- Practice needs to broaden to embrace other crucial environmental aspects such as resource efficiency, waste management, environmentally friendly technologies, climate mitigation and adaptation, etc.;
- There is a need for revisiting the curricula- both existing curricula (introducing unit of competencies on green) and new occupations (the whole cycle from UC, curriculum, TTLM and assessment);
- Although MoLS has signed MoUs with various sectors (ministries), there is still a dysfunction when it comes to the elaboration of occupational standards; the sectors and their industries neither clearly define the OS of the trades they need nor give accurate forecasts of these trades based on clearly defined OS;
- Trainer capacity: Training of Trainers (ToT) needs to be crystal clear; that is one capacity gap;
- Scaling up of good practices: Like all other themes, implementation capacity will be different for different colleges on green TVT aspects as well; there is a need to have a system for rolling out good practices within Ethiopian TVT colleges; and
- Going forward, green TVT must also be made a reporting and evaluation item.

[98] Previously the TVT sector in Ethiopia used to have about 800 "basic" Occupational Standards; that has now been revised to about 120. Still re-visiting those 120 existing OSs and adding new green ones is a huge task and will be a gradual process.

Discussions with regional and zonal labor and skills bureaus and departments also generated the following insights:

- TVT is a highly practice-oriented sector; however increasingly donor support is being directed to "soft-skills"; this needs to change as what is really needed is to put theory to practice in the local context;
- There is a need to strengthen and roll-out what has already been started especially on biogas and solar; the vision for those technologies should be made clear in respect of contextualization to local needs (e.g., solving local energy shortages, generating income);
- There is still work that needs to be done when it comes to mainstreaming green concepts into TVT skills development process including the 30% theory-70% practice tradition;
- Focus so far has been on short-term training of certain trades: solar, greenery, biogas, etc.;
- Awareness creation on environmental degradation to local community is key; even seemingly fertile and green highland areas are being degraded as a result of overpopulation;
- Research is often considered as a university activity; green TVT research is neglected but it needs to be guided and strengthened; a few TVT colleges, especially ATVETs have good experience in crop/vegetable research which needs to be strengthened.
- Partnering capacity: Technical capacity is missing;
- The green TVT concept also needs to be unpacked in the context of Ethiopia's commitment to the SDGs;
- Labor and skill government officials also lack knowledge on the issue of green growth and sustainability;
- Labor and skills bureaus and departments have limited understanding of green TVT; the support they give to the TVT colleges is offered with that limitation;
- The potential of green digital is not harnessed and needs to be explored;
- There is a realization that colleges also lack facilities- workshops, labs on green technologies;
- Budget constraint; and
- Poor coordination of different sectors.

The on-line survey also sought opinions from bureaus and departments (although the participation was very limited). The questions asked and the responses are presented in **Annex 21**.

6.6 Commitment to engage in greening TVT

6.6.1 TVT college leadership

Two questions posed to evaluate TVT college leadership commitment. To the question, **"Do you think it makes sense to work towards greening your TVT college?":** 100% of respondents replied, "Yes". To the follow-up question, **"If you think it makes sense to green your TVT college, are you committed (as top management) to work towards that objective?":** 97% answered, "Yes".

6.6.2 TVT trainers' perspective

For TVT trainers, a different question was asked to assess interest and commitment, i.e.: **Are you interested to pursue an academic career (further study) in the green professions?** To that question, 95% of respondents answered, "Yes". Trainers mentioned broad and specific themes in which they would like to further their skills (**Annex 20**).

6.6.3 Labor and skills sector perspective

In discussions held with MoLS TVT "sector" senior managers and experts, the following was established:

- MoLS is committed to put to practice the green TVT objective stipulated in the Ethiopian TVET policy and strategy (MoSHE, 2020);
- In fact, they are determined to put concrete activities (on greening TVT) into their next annual plan and, therefore, are keen to be informed about the findings of the ILO assessment;
- After the "draft" TVET policy and strategy is endorsed, the activity MOLS' experts have in sight is introducing a management system (manual) on the mainstreaming of the GTVET pillar into all aspects. This will straddle the whole project cycle from revision of curricula; introducing new UCs; introducing new OS on green occupations; training and monitoring & evaluation. The construction phase of new colleges, will also need to integrate the concept of GTVET.

The Federal TVT Institute is also committed to advance the green TVT agenda, especially in ToTs. The motivations for that arise from the following:

- For the past seven years, the Institute has been the go-to college for training of trainers at BA/BSc and MA/MSc levels; it covers technical, pedagogical and management aspects;
- The institute also trains TVT leaders, i.e., deans and vice deans and experts working for labor and skills bureaus;
- It provides short-term skill-gap training in all occupations taught at TVT colleges;
- It also offers advice (to MoLS) and technical support in curriculum development & quality assurance; and carries out research as well.

In conclusion, the Federal TVT Institute will be one of the key partners in advancing the green TVT and skills development agenda.

7. Proposed Interventions

As can be gathered from the foregoing discussions, green TVT and skills development is a multifaceted agenda. That means, isolated and single-handed interventions are not expected to address all the identified gaps and needs.

Hence, there is a need to intervene at the ecosystem level **in which the TVT system (labor supply side) and the green economy sector (labor demand side) operate and interact**. With that in mind, the Consultant made an effort to identify systemic and inter-related interventions using the identified analytical lenses and taking into account (the sector-wide) capacity development needs determined through the desk and field assessments.

Some of the constraints are common for all economic sectors (not just for the TVT system) and there is no easy way to address them. The most important, cross-sectoral, constraint is lack of finance. Building the partnering capacity of the TVT colleges to mobilize resources is one intervention proposed with a view to address lack of finance- including partnering capacity with the private sector. Other constraints are also shared across economic and infrastructure sectors. Key in this category is lack of awareness on the inter-related concepts of green growth, sustainability and responsible leadership. In order to cultivate these cultures, there is a need to intervene at all levels and sectors- and for the long run. Efforts in green TVT and skills development will have to be based on strong foundations of those kinds of cultures.

With the above in view, intervention idea selection and design is carried out with a view to address the following issues and considerations:

- The capacity gaps and needs determined in the assessment;
- The five aspects of greening TVT as introduced in **Section 4.6**;
- A multi-stakeholder approach with regard to intended beneficiaries and potential partners to facilitate the interventions;
- The levers of change for capacity development as introduced in **Section 4.7**, i.e. Institutional Arrangements, Leadership, Knowledge, and Accountability; and
- A focus on pilot interventions to be facilitated by partners (including development agencies) to be rolled-out and scaled up (to be owned by the target beneficiaries).

It is important to point out that, there is a strong role for the private sector in all of the interventions proposed. In fact, all the identified "capacity need themes" for green TVT and skills development apply equally well to the private sector, which stands at the labor demand side. Hence, the proposed activities in the interventions have a private sector/industry angle as well. As the interventions are organized by "themes", there is no separate intervention proposed for the private sector. This should, by no means, be taken as an omission.

As will be seen, the interventions are deliberately framed to embrace long-term capacity development activities such as coalition building, joint visioning, institutional twinning, local knowledge services, communities of practice, and knowledge management. This approach to intervention design is informed by the UNDP capacity development philosophy as discussed in **Section 4.7**. The case studies (**Annex 8**) helped as a "validating" frame of comparison.

The interventions proposed (in the Draft Report) were reviewed in the validation workshop held on November 10, 2022. Four groups randomly formed and consisting of 8-9 participants reviewed the interventions with the following objectives in mind: (a) to prioritize two or three out of the seven proposed; (b) review the activities, partners and beneficiaries; (c) and if deemed necessary, suggest missing activities or interventions to address the identified gaps.

The following were the main findings and feedback from the four groups. Details are presented in **Annex 23**.

Awareness was the capacity need theme which all groups prioritized (four times)- implying that partners start with interventions to address the sector-wide awareness gap on green growth and sustainability. The working groups suggested the inclusion of the following aspects into the intervention and its activities:

- M&E on green TVT implementation as one activity;
- Strengthening a learning culture and knowledge management practice;
- Learning from international best practice;
- Inclusion of the community, and primary-, secondary-, and university education as additional beneficiaries;
- Proposed partners (additional): Media, Ministry of Agriculture (MoA), and Religious Institutions/leaders.

Policy Alignment and Coordination was prioritized by three of the four groups. The groups suggested additional beneficiaries for this intervention, namely: community leaders and religious leaders. PSI and MoLS were also proposed as important partners in driving the agenda. Additional themes or activities recommended by the groups include:

Revision of the education curriculum with a green economy thinking;

Strengthening enforcement capacity of existing policies, proclamations and directives;

Leadership Capacity was selected by two of the four groups. Additional beneficiaries suggested for this intervention are community- and religious leaders; whereas potential partners proposed are universities, bilateral organizations and consulting firms.

Partnering Capacity, Trainer Capacity and **Green Occupational Standards** were selected one times each.

Table 3 below presents a summary of the final portfolio of interventions re-cast by incorporating the key suggestions made by the working groups of the validation workshop and the written feedback given by ILO colleagues. A more expanded version in MS Excel, including additional analysis, is presented in **Annex 22**.

The portfolios of interventions are further visualized with the help of a broad theory of change presented in **Figure 8**. This helps to show the results chain leading to desirable, sector-wide changes at the output, outcome and impact levels.

▶ Table 3: Green TVT & Skills Development: Proposed portfolio of systemic interventions

Capacity need theme	Intervention ideas proposed	Beneficiary (Target Group)	Proposed activities	Potential partners
Awareness	1.0 Strengthening awareness on green growth and sustainability for the TVT system and key stakeholders	Labor & Skills experts (Federal, Regional & Zonal levels); TVT College deans and vice deans; TVT college trainers; TVT college trainees; Employers (Business) Local community Primary, - Secondary- & Tertiary education Organized labor (through CETU)	1.1 Developing training materials by target group; integrating appropriate methodologies for continued learning	MoLS, EPA, MoE, MoPD, Federal TVT Institute (FTVTI), Sector Ministries (e.g., MoA), EEF, CEEF, CETU, ECCSA Research Universities, Donors (ILO, GIZ, World Bank), Civil Society (ESD), Media, Religious Leaders
			1.2 Carry out regular awareness training events; document results for the intended target group (based on the guidelines developed)	
			1.3 Set up local Community of Practice and local networks on Green TVT & Skills Development (Theme: Green Growth & Sustainability by target group)	
			1.4 Institutional twining arrangements for green TVT experience sharing and cooperation with regional/global centers of excellence	
			1.5 Pooling local talent/national expertise on green growth and sustainability; mobilizing local consulting market	
			1.6 Supporting local knowledge capture mechanisms in a systematic manner	
Policy alignment and coordination	2.0 Better policy alignment of TVT-, CRGE-, Education-, and Private sectors	TVT System CRGE sectors Education Sector Private sector Organized labor (CETU) Employers (CEEF, EEF)	2.1 Set up a multi-stakeholder platform for policy coordination and alignment of the TVT-, CRGE-, Education- and private sectors	MoPD, MoLS, EPA, MoE, sector ministries, ECCSA Donors, Research Universities
			2.2 Unpack national policies, strategies and plans on TVT-, Education-, and Green Economy- sectors for better policy alignment and coordination in the sectors	
			2.3 Stakeholders mainstream relevant goals and activities in the mission, vision and strategic plans of their respective sectors; they develop & own implementation systems to facilitate the process	
			2.4 TVT colleges integrate relevant goals and activities in the mission, vision and strategic plans	
			2.5 Respective sectors document experiences and share lessons-learnt (success, challenge, dilemma)	
			2.6 Set up Community of Practice and local networks (Theme: Policy Alignment & Coordination for Green TVT & Skills Development)	

Capacity need theme	Intervention ideas proposed	Beneficiary (Target Group)	Proposed activities	Potential partners
Green occupational standards	3.0 Technical capacity development of the TVT system on green OS development	MoLS (Federal, Regional and Zonal) Federal TVT Institute MoE TVT colleges Businesses	3.1 TVT "sector-wide" System Documents: (a) guidelines for labor market study of the green economy; (b) for greening the curriculum, i.e., review of existing OS, introducing green UC, and developing new green OS	Industry/Business/Employers represented by sector ministries, EEF, CEEF, CETU, ECCSA, sub-sector associations, EPA, Donors
			3.2 Setting up database of pool of local experts on the green professions and trades (to support with curriculum review)	
			3.3 Support pilot-level green labor market studies and green curriculum review & development for 2-3 colleges	
			3.4 Document lessons-learnt from the pilot and share experiences (success, challenges and dilemmas) for scale-up to additional colleges	
			3.5 Set up local Community of Practice and local networks (Theme: Green OS for Green TVT & Skills Development)	
Leadership capacity	4.0 Executive capacity in "responsible leadership", corporate governance and business ethics	Top leaderships of: MoLS (Federal, Regional and Zonal) Federal TVT Institute MoE TVT colleges EEF, CEEF, CETU, ECCSA Sector ministries Businesses CSOs Local communities Youth groups	4.1 Organize pilot short-term training on responsible leadership, Environment, Social and Governance (ESG) systems, and business ethics for senior officials	MoLS, EPA, MoE, MoPD, Federal TVT Institute (FTVTI), Sector Ministries (e.g., MoA), EEF, CEEF, CETU, ECCSA Research Universities, Donors (ILO, GIZ, World Bank, IFC), Civil Society (ESD, Save the Future), Media, Religious Leaders
			4.2 Facilitate and support local capacity for executive development on responsible leadership: Identification of local and regional "centers of excellence" on responsible leadership; support institutional twinning	
			4.3 Support the preparation of locally owned executive development programs (short courses) on responsible leadership, corporate governance and business ethics	
			4.4 Pooling local talent/national expertise on responsible leadership, ESG, corporate governance, business ethics	
			4.5 Set up local Community of Practice and local networks (Theme: Responsible Leadership, Corporate Governance and Business Ethics for Green TVT & Skills Development)	

Capacity need theme	Intervention ideas proposed	Beneficiary (Target Group)	Proposed activities	Potential partners
Trainer capacity	5.0 Training of Trainers on green occupations (revised and new OS)	TVT colleges FTVTI Private Sector/Employers Trainers	5.1 TVT "sector-wide" System Documents: Preparation of guidelines for review of existing curriculum of TVT ToT (Federal TVT Institute)	FTVTI, MoLS, MoE, EPA Industry/ Business, Donors
			5.2 Setting up database of pool of local experts on the green professions and trades (to support with curriculum review)	
			5.3 Training of prospective reviewers on guidelines for revision of ToT curriculum	
			5.4 Review and develop green curriculum for FTVTI	
			5.5 Set up local Community of Practice and local networks (Theme: Trainer capacity for Green TVT & Skills Development)	
			5.6 Facilitation of institutional twinning of Federal TVT Institute with other universities specializing on training TVT trainers	
Partnering capacity (with a focus on partnering with the private sector	6.0 Technical capacity development of government, private sector and TVT system on effective partnerships for green TVT and skills development	TVT colleges, Industry/Business/ Employers represented by sector ministries, EEF, CEEF, CETU, ECCSA, sub-sector associations Government in general	6.1 Organize pilot short-term training on partnering capacity for senior officials (and for potential, local service providers)	MoLS, FTVTI, MoPD, sector ministries, EPA, civil society, Research Universities, Donors (GIZ, ILO, UNDP, World Bank)
			6.2 Facilitate and support local ownership of "partnering capacity development": Committed service providers on partnering capacity (e.g., EMI, FTVTI, AAU, etc.)	
			6.3 Support the preparation of locally owned training packages and toolkits on strengthening partnering capacity (by the identified service providers)	
			6.4. Service providers roll-out training on partnering capacity to the broader TVT system and stakeholders (Business, Government, CSO, Academia)	
			6.5 Set up local Community of Practice and local networks (Theme: Partnering Capacity for Green TVT & Skills Development)	

Capacity need theme	Intervention ideas proposed	Beneficiary (Target Group)	Proposed activities	Potential partners
Research, Technology and Industry Extension	7.0 Technical capacity development for aligning research, technology and industrial extension functions for green TVT and skills development	TVT colleges, MoLS Industry/ Business/Employers	7.1 Assessment of green technology development experiences within the TVT system and global best practices	FTVTI, sector ministries, sub-sector associations, EPA, research universities, donors, civil society
			7.2 Assessment of Industry Extension Services experiences within the TVT system and global best practices	
			7.3 Dissemination of assessment findings to the TVT system (TVT colleges) to inform internal policies and systems	
			7.4 Development of guidelines for aligning research, technology and industrial extension functions towards green TVT and skills development (based on the assessment findings and recommendations)	
			7.5 TVT colleges take ownership and re-visit and align their Research, Technology and Industrial Extension function for green TVT and skills development	
			Set up local Community of Practice and local networks (Theme: Research, Technology and Industrial Extension for Green TVT & Skills Development)	

Figure 8: Broad Theory of Change for green TVT & skills capacity development

IMPACT: Sustainable TVT System

- **Social:** Equity and participatory goals
- **Environmental:** Climate resilience & green growth goals
- **Economic:** Efficiency and effectiveness goals

OUTCOME: Change in Institutional Performance, Stability & Adaptability of the TVT System for Green TVT & Skills Development

- Government officials, executives, community at large are conscious of sustainability and responsible leadership
- MoLS and its regional bureaus & zonal departments are efficient, effective, robust and resilient in discharging the green TVT & skills development function
- Federal TVT Institute effective in its services: TVT leadership & trainer development, curriculum development & policy advice
- TVT colleges are effective at planning and executing green TVT & skills development objectives (training, research, industrial extension, technology development
- TVT trainers are adept at educating for sustainable development (Training, Research, Industrial Extension, Collaborative Training, Technology Development & Transfer)
- Proactive businesses and employers which innovate and integrate sustainable approaches & technologies; clearly define green OS and demand for green skills
- TVT system, government, private sector, donors, academia & civil society adept at cross-sectoral partnerships for sustainability

OUTPUTS: Change in Capacity Level across Core Issues of the TVT system (whole ecosystem) for Green TVT & Skills Development

- **Systems for INSTITUTIONAL ARRANGEMENTS**: Streamlined Processes: Clear Roles & Responsibilities; Merit-based Appraisal; Coordination Mechanism
- **Systems for LEADERSHIP**: Clearly Formulated Vision; Communication Standards; Management Tools; Outreach Mechanism
- **Systems for KNOWLEDGE MANAGEMENT**: Brain Gain & Retention Strategies; Knowledge Sharing Tools & Mechanisms; Research & Linkage Mechanisms
- **Systems for ACCOUNTABILITY:** Audit Systems & Practice Standards; Participatory Planning Mechanism; Stakeholder Feedback Mechanism

SYSTEMIC INTERVENTIONS:

Awareness on green growth and sustainability for the TVT system and key stakeholders

a. Policy alignment of TVT-, CRGE-, Education-, and Private "sectors"
b. Green OS development
c. Executive capacity in "responsible leadership", corporate governance and business ethics
d. Training of Trainers on green occupations (revised and new OS)
e. Partnering capacity
f. Research, technology and industrial extension functions for green TVT and skills development

CONSTRAINTS:

Lack of awareness on the scientific, business and moral imperatives of green growth and sustainability

- Lack of technical capacity in strategic planning (alignment with national objectives; effective project management)
- Lack of technical capacity in developing green Occupational Standards
- Weak cross-sectoral capacity for responsible leadership
- Weak trainer capacity for green TVT and skills development
- Weak partnering capacity (with private sector, development agencies, government, academia, civil society)
- Poor alignment of Research, Technology and Industrial Extension functions to green TVT and skills development

8. Recommendations

The recommendations given below are intended to highlight actions, which need to be taken in order to reinforce the proposed interventions. That is to say, they should not be viewed as stand-alone, prescriptive statements. They are distilled from the observations made during the course of the assessment and the consultant's own insights as a professional who has worked in the sustainability policy and green growth space for more than fifteen years.

8.1 Recommendations for immediate action

Taking into account the assessment findings and the prioritizations made in the validation workshop, ILO needs to determine which capacity development areas (out of the seven proposed) fit its current and upcoming program objectives. Since MoLS expressed interest to integrate relevant findings and actions of this assessment into its own action plans (during interviews held with their experts and officials), ILO needs to hold follow-up meetings with them to chart the next steps forward.

8.2 Sector-wide recommendations for collaborative action

As discussed in the foregoing chapters, the assessment revealed multiple gaps and capacity development needs. Understandably, it will be unrealistic and inefficient to propose interventions for each and every problem. With that in mind, an effort has been made in this study to identify and define systemic interventions.

Green TVT and skills development is such a huge and crucial objective, so much so that, it cannot be left to one sector or partner. The following roles and responsibilities are proposed for the key stakeholders identified/consulted in this assessment.

a. For federal government

- While it is commendable that the CRGE has been mainstreamed into the ten-year development plan, it is equally important for the federal government (and the mandated ministries and agencies) to revisit, align and set in motion a package of policies aimed at advancing sustainable production and consumption. These portfolios of policies could be in the realm of regulation, standards, economic instruments and informative instruments. This is such an important issue that, without it, it will be impossible to create a credible green economy transition and sustainable society.
- Related to the above, there is a need for government (including the EPA) to look into the status of policies that are long in the pipeline, e.g., payment for ecosystem services and the eco tax bill.

- Likewise, enabling policy instruments should be crafted for the labor supply side as well, namely green TVT and skills development. This could go a long way to alleviate the financial constraint which the sector in general and TVT colleges are facing.
- Of course, like all other organizations (e.g., business and academia), governments can also demonstrate concrete sustainability practices. First and foremost, this should start from an articulation of such policy; putting clear objectives, target and indicators; allocation of dedicated human and financial resource; introducing management systems (implementation, monitoring, reporting and communicating); etc. Obviously, this recommendation extends to the sector ministries. By putting a robust system and institutional culture, they need to demonstrate that they have taken the CRGE (green economy, sustainability) as one of their core businesses just like all the other functions which have been traditionally "core business".
- One practical step the federal government itself could take is to enact a sustainable procurement policy. It can make active decisions to purchase goods and services from sustainable sources. This could have positive impact for the TVT system itself.
- Unlike the "brown economy" there is a huge expectation placed on the green economy- that is- it should work for all stakeholders including nature; that it should "keep all boats afloat". That means, the green economy is so important that it should not be allowed to fail. Such is the nature of the problem and why it is important to talk about responsible leadership also at the highest level. This argument is also supported by ILO's own work, which contends, "The growth dividend from greening the economy will be attained only if access to new training provided as part of green measures is made accessible to disadvantaged youth, persons with disabilities, rural communities and other vulnerable groups. "Incentives to increase women's participation in technical training programs will not only increase their participation in technology-driven occupations but also help solve the skill shortage problem in this segment of the labor market."[99]
- In their 2008 book, "Green Collar economy: How One Solution Can Fix Our Two Biggest Problems", Van Jones and Ariane Conard put the above argument in a poetic way:
- "To give the Earth and its peoples a fighting chance, we need a broad, populist alliance- one that includes every class under the sun and every color in the rainbow. By focusing on the fourth quadrant- and ensuring that as many people as possible have a financial stake in the green economy- we have a real shot at that outcome. The key is to ensure that, having learned the lessons of the past, a critical mass commits to ensuring that the green wave *lifts* all boats."

b. Regional governments

The recommendations made for the federal government also apply for regional governments excepting those, which clearly are within the mandate of the federal government.

Specifically for the Ministry of Labor and Skills

- MoLS could start by setting in motion concrete activities to implement the green TVT pillar of the "TVET" Policy and Strategy, namely setting management systems for implementation. This is one of the proposed interventions for immediate action.
- Going forward, MoLS could also own and further develop a few of the proposed seven interventions. Best would be to facilitate a process with the objective of mobilizing stakeholders to "own and drive" interventions and activities fitting their organizational mission and capacity. Of course, owning it does not mean they will go it alone but rather work in the spirit of multi-stakeholder partnerships, mobilizing resources from government, private sector, donors, civil society and academia.
- MoLS is, of course, best placed to lead on Intervention No. 3 (Technical capacity development of the TVT system on green OS development) in cooperation with the Federal TVT Institute and by mobilizing industry (private sector).

[99] ILO (2011).

c. Federal TVT Institute

- First and foremost, the federal TVT Institute should focus on training of trainers. Recommended would be for it to own and drive Intervention No. 5 (Training of Trainers on green occupations) in partnership with MoE and other stakeholders (the private sector).
- Desirable would be also for the Institute to drive the agenda for Responsible leadership (Intervention No 4: Executive capacity in responsible leadership) as this fits its mandate. It can rally other organizations (MoE, EPA, MoPD, PSI) and business schools (e.g., AAU College of Business & Economics; Ethiopian Management Institute) to create coalition and drive this agenda. South-South learning in cooperation with universities within from Africa is another activity which the Institute could facilitate.
- Of course, the Institute could lead on or support the other interventions.

d. TVT colleges

- First and foremost, TVT colleges need to revisit their vision, mission and strategies with a view to integrate sustainability objectives (environmental, social and economic).
- Going forward, they need to proactively initiate and engage in partnerships, which advance green TVT and skills development. This report will be a useful input for them, on the basis of which they could prepare their own action plans. Their action plans need to indicate, how they foresee to address the seven capacity "need themes" identified in this assessment including partnerships and collaborations they will forge, including with the private sector.
- Although gender mainstreaming is an objective TVT colleges are pursuing at the workplace, it appears there is room for improvement. A look at the list of stakeholders consulted is an anecdotal pointer to the need for further work- specially to bring women to positions of leadership. The broader issue of women economic empowerment in the community and work-place is an important theme that needs to be part of the greening TVT agenda as well.
- **Sector ministries**
- Recommendations given for the federal government also apply here. The sector ministries have CRGE related targets, which have also been integrated into the ten-year development plan. Unpacking those objectives and targets for the education and TVT system by engaging MoLS, the Federal TVT Institute, MoE, TVT colleges and research universities will go a long way to catalyze Ethiopia's green economy ambitions in general and the green TVT and skills development objective in particular.
- Intervention No. 2 (Better policy alignment for TVT-, CRGE-, Education-, and Private sectors) is particularly where sector ministries are expected to play a crucial role. The Ministry of Planning and Development (MoPD) is better placed to mobilize the traditional "CRGE sectors" towards that objective. Likewise, the Ministry of Finance (MoF) could help unpack the CRGE Facility[100] and its relevance to green TVT and skills development.
- **For MoE:** It will be important to revisit the Ethiopian General Education Curriculum Framework (EGECF) with a view to integrate green growth considerations into the eight career and technical education areas (specifically into the 34 field-based subjects under these eight areas). Citizenship Education offered in mid-level and secondary education needs to be revisited with a view to integrate green growth thinking. MoE also needs to forge partnerships with MoLS and the TVT institute for better implementation of the proposed interventions.

e. Private sector, industry, employers

Business/industry plays multiple roles as an investor, producer, employer or consumer. As a result, it has huge responsibilities to align its culture with green growth/sustainability objectives. There is a role for this group in all of the proposed interventions- be it for the individual private sector or organized groups.

[100] The mission of the CRGE Facility (as described by the Ministry of Finance) is: "to mobilize funding in a flexible, coordinated and predictable manner that is invested in climate relevant projects and programs compliant with national and international fiduciary standards; support efficient and effective actions in GHG emissions reduction and increasing resilience as set out in the CRGE strategy, which is aligned with sustainable development goals; and provide a unified engagement point where government, development partners, civil society and other stakeholders can engage and make decisions about climate finance related issues."

The organizations representing the diverse "functions" and interest of industry are: the sector ministries themselves; the various sub-sectoral institutes and authorities under their oversight; chambers of commerce (e.g., the Ethiopian Chamber of Commerce and Sectoral Associations (ECCSA)); Ethiopian Employers Federation; Confederation of Ethiopian Employers Federation; and sub-sector-based associations (e.g., ETGAMA, ELIA, EHPEA, etc.).

Concrete and continuing action is needed from this group to support and eventually drive Intervention No. 3 (Technical capacity development of the TVT system on green OS development).

f. Development agencies & donors

- Development agencies and donors have a vital role to play by facilitating and supporting all of the interventions based on their respective program objectives. Already, a number of agencies and donors have been providing technical and financial support to the TVT system in Ethiopia. As a contribution to "Knowledge Management" to the TVT system, they could also share their experiences on what has worked and what has not- with a view to inform better intervention design for green TVT and skills development. That could be one contribution for the Communities of Practice activity.
- Most TVT colleges mentioned lack of infrastructure and facilities as a crucial constraint. This is definitely one area donors and development agencies could support- tailored to green TVT and skills development. They could also help by setting up green (challenge) funds for TVT colleges and local businesses engaged in green skills and business development.

g. Specifically for ILO

This is already discussed in Section 8.1 above. Keeping oversight of "who does what" and "what is missing" will be an important function. It will be important for ILO to further build on its "first mover" advantage on this theme in Ethiopia. An important contribution could be to assume the role of a knowledge broker for *effective intervention design and implementation on green TVT development in Ethiopia*.

h. Civil society

- It is worth mentioning that CSOs already have a strong presence. They support activities such as Education with Disability, training of refugees and returnees in various trades, and in PV solar applications.
- Further building on those, they can play a crucial role, specially, in the themes, "Awareness", "Leadership Capacity", and "Partnering Capacity". Their important contribution will also be in "fostering social dialogue". They also need to play their bit as "watch dogs" on sustainability issues in Ethiopia- especially in mobilizing concrete action from the private sector.
- Sustainability is both a production and consumption issue. Sustainable (ethical consumerism) is one agenda civil society could promote to local communities in general and to TVT students in particular.
- Articulating and advancing the moral/normative imperative of sustainability is another area which civil society organizations can support. Voluntary concepts and principles that are gaining traction in the rest of the globe are missing in Ethiopia. Examples of those could be the UN Global Compact and its ten principles, the Principles for Responsible Management Education and the UN Principles for Responsible Banking.

i. Academia and Research Houses

- "Awareness", "Leadership", and "Research & Technology" are the themes and interventions in which these institutions could contribute to advance the green TVT agenda.
- However, our universities themselves need to be in the driving seat when it comes to advancing concepts like responsible leadership, responsible management education and education for sustainability. While they might be giving courses or programs related to those themes, there is no evidence to indicate that they are working systematically to emerge as sustainable institutions themselves. The Consultant did a quick check on the PRME website. The result: No Ethiopian university has signed up to the PRME principles whereas universities from our African peer countries have done so.

Annexes

Annex 1: Questionnaire and supporting checklists

Questions for TVT institute directors, administrators

1. Overview of the institute/college

1. 1 Year of establishment

1. 2 Type of TVT: Public, Private, NGO

1. 3 Format of training: Formal, informal

1. 4 Area of specialization: courses, training offered and qualification levels

1. 5 Number of trainees: enrolment and graduates per cycle or per year

1. 6 Number of staff by qualification (Please share Table showing current standing)

2. Understanding of sustainability and the greening the process

2 1 What do you understand by "sustainability" and "education for sustainability"?

2 2 What is your understanding of greening a TVT institute? What aspects need to be greened?

3. Institutional alignment with the green economy

3 1 What is your understanding of the national agenda for greening the economy?

Which are the most important international environmental/sustainability agreements (Ethiopia has committed to) from the perspective of your TVT institute/college?

What is your understanding of the national agenda for greening education?

What is your assessment of local employment needs from a green skills perspective?

What (sector) policies do you think drive the demand for green skills?

What existing or missing (sector) policies do you think hinder the demand for green skills?

4. In the event there is some greening work, what are the activities, status & results of:

Greening the campus?

Greening the curriculum and training? Specifically:

Have market assessments and tracer studies been carried out? What were the main findings?

What skills development courses do you offer aimed at contributing to the green economy initiative?

Do you have training packages (courses) which help to reduce the impact of climate change?

Greening research?

Greening the community and workplace?

Greening the institutional culture?

6. What are the gaps and challenges in providing green skills?

Discuss this both from an external and internal perspective (policies, regulations, institutional arrangements/structures, labor demand (markets), internal policies (vision, missions), mandate, knowledge, leadership, partnering capacity, finance, human resources, etc.

7. What opportunities do you see in aligning your TVT institute to the green economy?

Which sectors of the economy are already demanding green skills?

Is there aspiration/interest from students?

Is there aspiration/interest from trainers?

8. The future: What do you propose

From the discussion so far, do you think it makes sense to green your TVT institute?

If so, is there commitment from management to make that happen?

What actions/activities) are you willing to take/implement?

What kind of support do you need? From whom?

9. Questions for teachers (Better in an FGD format)

What courses are you teaching?

What green/sustainability issues and themes arise in the course you are teaching?

What specific courses do you teach relating to sustainability/green growth?

Are there needs/requests from students on training relating to green skills?

How do you assess your technical capacity to offer training on green skills: What do you have? What do you lack?

What capacity gaps does the institute has to offer green skills (curriculum, facilities, qualification of trainers, funding, market demand, etc.)

What are your recommendations?

10. Questions for trainees (Better in an FGD format)

What course/field are you studying?

What is your understanding of green growth / sustainability?

What green themes, issues, problems, opportunities have you come across in your training so far? How did you address them?

Do you think there is employment or entrepreneurship opportunities in the green field? If so, which areas?

What skill gaps (in your identified green area) do you lack? What support do you need to fill those gaps?

How do you evaluate employers' demand/role in green skills?

Any other suggestions or recommendations?

11. Questions for government offices/policy makers

What policies, strategies or programs are advancing ESD and greening of TVTs?

What concrete activities or projects are being implemented by your organization?

If not much has happened so far: what needs to be done to align TVT education with ESD or meet the SDG goals relating to ESD?

What capacity gaps exist (Institutional, Accountability, Knowledge, Leadership)?

What needs to happen: in which core issues? Who needs to do what?

Any other suggestions or recommendations?

12. Questions for employers

What do green, green economy or sustainability mean to your company?

Do you have a company-wide environmental or sustainability policy or goal?

What are the sustainability issues, aspects, challenges you are dealing with?

What opportunities do you see in the green economy space for your company? Exactly in what areas?

Do you employ TVT graduates? Do you offer apprenticeship opportunities to TVT students?

Do you have demand for green skills? If so, for which areas?

If affirmative: what are the gaps and challenges you see in green skills development by TVT institutes? What other challenges exist?

Does your company train staff on themes or subjects related to green skills?

What needs to happen to address those capacity gaps (Institutional, Accountability, Knowledge, Leadership)?

What are you ready to do as an employer? What do you need?

What needs to happen from the labor supply side? What do TVT institutes need to do?

Any other suggestions or recommendations?

13. Questions for development agencies

Does your organization support ESD and green skills development? If so in which areas?

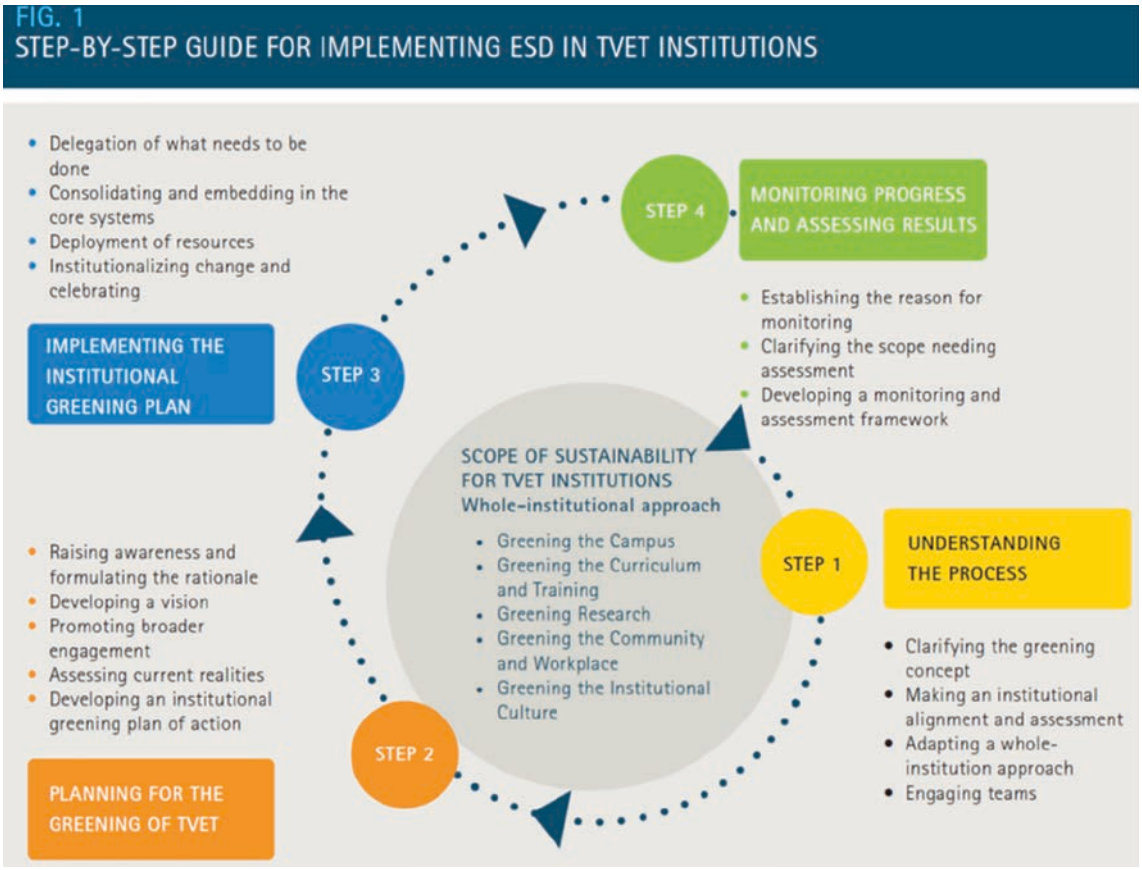
Do you partner with TVT institutes in green skills development? If so, what activities and what is your experience so far?

If affirmative, what capacity gaps have you assessed in ESD and greening TVT from your work so far?

Is your organization willing to support ESD and green skills development in TVT? If affirmative, in what way?

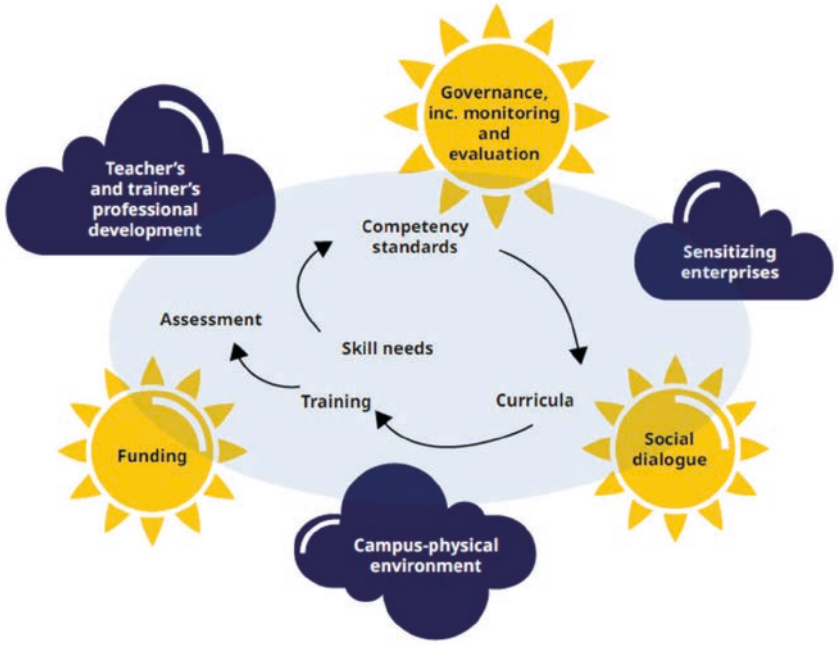
Any other suggestions or recommendations?

Annex 2: Project life-cycle of greening TVT institutions: the whole-institutional approach



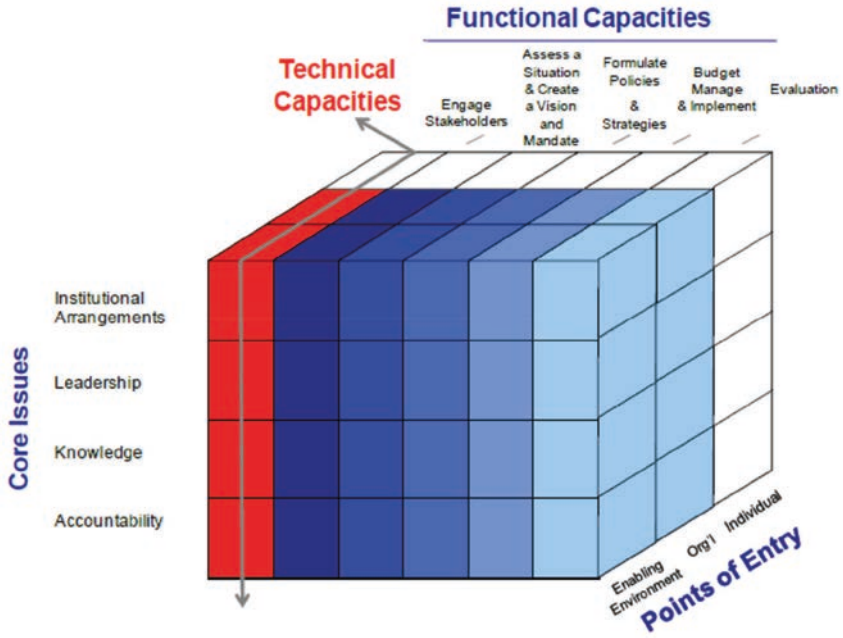
Source: UNESCO (2017). *Greening Technical and Vocational Education and Training: A practical guide for institutions*

Annex 3: A systematic and holistic approach to greening TVET



Source: ILO (2022). *Greening TVET and skills development: A practical guidance tool*

Annex 4: The UNDP capacity assessment framework



UNDP (2008). *Capacity assessment methodology: User's guide*

Annex 5: List of stakeholders consulted

Participants of KII and FGDs

No.	Name	Organization & Position	Date of Interview
1	Alemayehu Zewdie	ILO Ethiopia, National Coordinator GPSL3	01.08. 2022 (Kick of meeting)
2	Shiferaw Bejie	ILO Ethiopia, Finance & Admin Assistant	01.08. 2022 (Kick of meeting)
3	Gashaw Menberu	MoLS, TVT system, Expert	29.07.2022 and also on 20.06.2022
4	Tilahun Tola	Sululta TVT College, Dean	11.08.2022
5	Dagmawi Asrat	Sululta TVT College, Trainer (Surveying & Drafting)	11.08.2022
6	Menbere Birhanu	Sululta TVT College, Trainee	11.08.2022
7	Mekonnen Hundessa	Sululta TVT College, Trainee, ICT	11.08.2022
8	Almaz Tesfaye	Sululta TVT College, Trainee, ICT	11.08.2022
9	Getachew Geleta	Sululta TVT College, Trainee, IMDS	11.08.2022
10	Shiferaw Eba	Sululta TVT College, Trainer, Construction	11.08.2022
11	Abebaw Lema	Federal TVT Institute, TVVET Leadership & Management Department Head (Instructor)	12.08.2022
12	Abebe Alemayehu	MoLS, Training and Trainer Development Desk Head	12.08.2022
13	Tigist Kebede	MoLS, Curriculum & Training Materials Preparation Head	12.08.2022
14	Solomon Tiruneh	Sebeta Polytechnic College, Dean	15.08.2022
15	Worku Hailu	Sebeta Polytechnic College, Deputy Dean	15.08.2022
16	Dereje Kebede	Sebeta Polytechnic College, Outcome Based Process Owner	15.08.2022
17	Abdulshikur Ahmed	Gurage Zone TVT Department, Coordinator Capacity Building Quality Assurance Core Process	15.08.2022
18	Ajmel Mohammed	Wolkite Polytechnic College, Vice Academic Dean	16.08.2022
19	Dilebo Abate	Hoasaena Polytechnic College, Deputy Dean	16.08.2022
20	Cherenet Abebe	Hoasaena Polytechnic College, Industry Extension Team Leader	16.08.2022
21	Tirsit Desalegn	Hoasaena Polytechnic College, Urban Greenery Team Leader	16.08.2022
22	Tessema Erchayo	Hoasaena Polytechnic College, Institutional Capacity Building and Quality Assurance Team Leader	16.08.2022

No.	Name	Organization & Position	Date of Interview
23	Lukas Gaetano	Durame Polytechnic College, Dean	17.08.2022
24	Mathewos Markos	Durame Polytechnic College	17.08.2022
25	Muluken Deginet	Durame Polytechnic College	17.08.2022
26	Degenet Dessalegn	Durame Polytechnic College	17.08.2022
27	Fitsum Tagesse	Durame Polytechnic College	17.08.2022
28	Alenmayehu Oyida	Durame Polytechnic College	17.08.2022
29	Muluken Geremew	Wolaita Sodo Polytechnic College, Deputy Dean	17.08.2022
30	Abebe Mengiste	Wolaita Sodo Polytechnic College, Capacity Building and Quality Assurance Core Process Coordinator	17.08.2022
31	Temesgen Lamaro	Wolaita Sodo Polytechnic College, ICT Officer	17.08.2022
32	Dereje Solomon	Arbaminch Polytechnic College, TDCWPP	18.08.2022
33	Asnake Banjaw	Arbaminch Polytechnic College, Training Quality Coordinator	18.08.2022
34	Zenebech Gebre	Arbaminch Polytechnic College, TDCWPP	18.08.2022
35	Utele Uluro	Arbaminch Polytechnic College, Trainer Development Coordinator	18.08.2022
36	Wosen Mamo	Arbaminch Polytechnic College, Trainee Development Coordinator	18.08.2022
37	Getaneh Tesfaye	Arbaminch University, Dean Deliverology	19.08.2022
38	Silenat Deriba	Arbaminch University, Counselling Coordinator	19.08.2022
39	Matusala Tomas	Gamo Zone TVT Department, Training and Trainers Development Directorate Head	19.08.2022
40	Yohannes Demamu	Gamo Zone TVT Department, Training and Trainers Development Directorate Curriculum Development Expert	19.08.2022
41	Eyoel Yone	Hawassa Polytechnic College, Vice Dean	22.08.2022
42	Atnafu Belew	SNNP TVT Bureau, Deputy Bureau Head	22.08.2022
43	Tiliksew Leta	Shashemene Polytechnic College, Dean	22.08.2022
44	Mohammed Hussein	Jigjiga Polytechnic College, Deputy Dean	24.08.2022
45	Muktar Omer Abdi	Jigjiga Polytechnic College, Outcome Based Training Director	24.08.2022
46	Muhyadin Hussen Abdalah	Somali Regional State Labour & Skills Bureau, Director	24.08.2022
47	Muhyedin Sheik	Somali Regional State Labour & Skills Bureau, Trainer Development Coordinator	24.08.2022

No.	Name	Organization & Position	Date of Interview
48	Milkeysa Ahmed	Harar Polytechnic College, Dean	25.08.2022
49	Haile Nigussie	Haramaya Polytechnic College, Dean	25.08.2022
50	Hanna Getachew	Haramaya Polytechnic College, Vice Dean	25.08.2022
51	Baharudin Yusuf	Dire Dawa Polytechnic College, Dean	26.08.2022
52	Fassil Mazengia	Ethio Italy Polytechnic College, External Fund Raising Coordinator	26.08.2022
53	Hiwot Eshetu,	Ethio Italy Polytechnic College, Trainer Electrical & Electronics Dept.	26.08.2022
54	Deacon Worku Mulugeta	Debre Birhan Polytechnic College, Vice Dean	29.08.2022
55	Amdetsiyon Bezabih	Yifat Polytechnic College (Shewa Robit), Vice Deana	29.08.2022
56	Melaku Aragaw	Kombolcha Polytechnic College, Dean	30.08.2022
57	Milkyas Tabor	ANRS TVT Labor and Skills Bureau, TVT Training Directorate Director	01.09.2022
58	Bantayehu Sintie	Bahir Dar Polytechnic College, Vice Dean	01.09.2022
59	Tesfahun Mekonnen	Gondar Polytechnic College, Vice Dean	02.09.2022
60	Kinde Getahun	Debre Tabor Polytechnic College, Vice Dean	02.09.2022
61	Muluken Yenet	Injibara Polytechnic College	05.092022
62	Aschenek Kassa	Bure Polytechnic College	05.09.2022
63	Tamene Wubetie	Debre Markos Polytechnic College, Dean	06.09.2022
64	Negese Yekenalem	Debre Markos Polytechnic College, Deputy Dean	06.09.2022
65	Teklie Guta	Fichie Polytechnic College, Dean	07.09.2022
66	Dawit Moges	Ethiopian Employers Federation (EEF), President	13.09.2022
67	Endris Mohammed	Lideta Manufacturing College, Deputy Dean	14.09.2022
68	Ashenafi Gebre	Lideta Manufacturing College, Deputy Dean	14.09.2022
69	Wondwossen Tadesse	Environmental Protection Authority, Policy and Law Directorate, Legal Expert	15.09.2022
70	Abebe Haile	Confederation of Ethiopian Employers Federation (CEEF), Executive Director	16.09.2022
71	Aemiro Mussie	Education for Sustainable Development, Deputy Director	16.09.2022
72	Addisu Wondimu	Ardaita ATVET College, Academic Dean	17.09.2022
73	Girum Girma	Addis Ababa Tegbareid Polytechnic College, Dean	19.09.2022

No.	Name	Organization & Position	Date of Interview
74	Gebremichael Gebrekidan	Ministry of Industry	20.09.2022
75	Yemane Werede	Ministry of Industry Capacity Building and Integration Desk, Lead	20.09.2022
76	Tilahun Abegaz	Hope Enterprise, Executive Director	21.09.2022
77	Firew Dessalegn	Hope Enterprise, Assistant Executive Director	21.09.2022
78	Solomon Abebe	ILO Ethiopia	21.09.2022
79	Hae Kyeung Chun	ILO	21.09.2022
80	Laura Schmid	ILO, Skills and Employability Specialist, ILO Cairo Office & Decent Work Team for North Africa	21.09.2022
81	Azmera Kebede	MoLS, Senior Advisor	22.09.2022
82	Shewaye Sewnet	MoLS, Expert	22.09.2022
83	Bamlaku Alebachew	MoLs, Expert	22.09.2022
84	Matebie Alemayehu	Ministry of Education, Head, Career and Technical Education Curriculum Desk	22.09.2022
85	Zewdu Eshetu, PhD	Addis Ababa University, School of Earth Sciences	03.09.2022
86	Kalkidan Tadesse.	East Africa Skills for Transformation and Regional Integration Project	03.10.2022
87	Abebe Damte	Environment and Climate Research Centre, Policy Studies Institute, research fellow	03.10.2022
88	Mergia Kuma	IPDC, Environmental and Social Compliance Director, Industrial Parks Development Corporation	06.10.2022
89	Gizachew Mern	IPDC, Plant Manager, Hawassa Industrial Park	06.10.2022
90	Gizachew Ayele	Skills Initiative for Africa, Country Coordinator	15.08.2022 (on-line survey)
91	Yechale Abebe	GIZ STEP Agro, Regional coordinator (Bahir Dar)	08.09.2022 (on-line survey
92	Alemnew Shumye	GIZ STEP, Advisor (Bahir Dar)	12.09.2022 (on-line survey)
93	Yared Negash	Dorcas Ethiopia, Finance Manager	25.10.2022
94	Endalkachew Bayu, Brother (SDB)	Bosco Children TVET Institute, Dean	27.10.2022
95	Dejene Keysa	Aman Polytechnic College, Dean	18.08.2022 (Telegram)

TVT college leadership who participated in the on-line survey

No	Response Date	Name	TVT college	Responsibility
1	Sep 21 2022 04:24 PM	Kasahun Getachew	Jinka poly technic college	Dean
2	Sep 21 2022 10:45 AM	Walelign Mitiku	Sawla poly Technic College	Vocational Guidance and Counselor
3	Sep 17 2022 06:21 PM	Abraham Tesfu	Agarfa ATVT	Academic Vice Dean
4	Sep 17 2022 05:21 PM	Addisu	Ardaita AVET College	Academic Vice Dean
5	Sep 17 2022 04:27 PM	Tilahun Alemayehu	Mizan ATVET college	Academic vice dean
6	Sep 16 2022 09:16 PM	chernet Abebe	Hossana Polytechnic College	Industry Extension Services Team Leader
7	Sep 16 2022 09:03 PM	Tessema Erchayo	Hossana Polytechnic College	Institutional Capacity building & Quality Assurance Team Leader
8	Sep 14 2022 05:28 PM	Dinka Etefa	Harar polytechnic college	v/dean
9	Sep 14 2022 09:39 AM	Gemechis Tadesse	Nekemte poly techinc college	vice dean/training process owner/
10	Sep 10 2022 12:36 PM	Teku Taye Abebe	Lideta Manufacturing College	dean of the college
11	Sep 09 2022 02:03 AM	Dires Ayana	Durbete polytechnic	Academic vice dean
12	Sep 02 2022 11:42 AM	Bantayehu Sentie	Bahir Dar polytechnic college	Academics V/Dean & Outcome based training coordinator
13	Aug 31 2022 04:41 PM	Tamene Wubete	Debre Markos polytechnic College	Dean
14	Aug 30 2022 09:12 PM	Daniel Moges	Chercher polytechnic college	Dean of college
15	Aug 29 2022 04:59 AM	Girma Dori	Dilla Polytechnic College	College Dean
16	Aug 23 2022 03:48 PM	Solomon Tiruneh	Sebeta Polytechnic College	Dean
17	Aug 22 2022 12:00 AM	Lukas Gaetano	Durame poly Technique College	Academic Vice Dean
18	Aug 20 2022 06:53 PM	Tujuba Gutema	Assosa poly technic college	Trainer and department head
19	Aug 20 2022 11:35 AM	WORKU Hailu	Sebeta polytechnic College	Vocational Counselor
20	Aug 19 2022 08:05 PM	shibru Birhnu	Asossa TVT college	Instructor
21	Aug 19 2022 05:54 PM	Admasu Bekele	General Wingate polytechnic college	vice dean
22	Aug 19 2022 01:25 PM	Muluken Yenet	Bahirdar Polytechnic college	Instructor/ before I have worked @ V/dean
23	Aug 19 2022 12:05 PM	Nigussie Debele	Robe Poly techinc college	dean
24	Aug 19 2022 09:51 AM	Dilebo Abate	Hossana Polytechnic College	College Vice Dean
25	Aug 19 2022 09:35 AM	Temesgen Lamaro	Wolaita sodo polytechnic college	Information communication technology
26	Aug 18 2022 10:00 PM	Baharudin Yusuf	Dire Dawa Polytechnic College	Dean

No	Response Date	Name	TVT college	Responsibility
27	Aug 18 2022 08:16 PM	Abebe Mengiste	Wolaita SODO POLYTECHNIC COLLEGE	Capacity Building & Quality Assurance Core Processor
28	Aug 18 2022 01:24 PM	Zewge Kebede	Woliso Polytechnic College	Dean
29	Aug 17 2022 01:39 PM	Zelalem Zewdie	Bonga Poly Technique College	Dean
30	Aug 15 2022 09:38 PM	Efrem Ayisa	Tarcha polytechnic	Dean
31	Aug 14 2022 09:24 AM	Melaku Aragaw	Kombolcha polytechnic	Dean
32	Aug 13 2022 08:27 PM	Mulugeta Chane	Dream Science and Technology College	Board Chair

TVT college trainers who participated in the on-line survey

No.	Response Date	Name	TVT college
1	Oct 04 2022 04:40 PM	Zelalem Anley	Debre Markos poly TVET
2	Sep 14 2022 11:07 PM	Deresse Yalew	Lideta manufacture collage
3	Sep 13 2022 10:56 AM	Mandefro Tadesse	Burie poly technic college
4	Sep 13 2022 10:06 AM	Mandefro Tadesse	Burie poly technic college
5	Sep 12 2022 10:11 PM	Kaleamlak Abebe	Gondar Polytechnic College
6	Sep 12 2022 08:29 AM	Mulugeta Abera	Fitche Polytechnic College
7	Sep 10 2022 04:22 PM	Beneberu Hailu	Yifat Polytechnic College
8	Sep 10 2022 01:12 PM	Getu	Yifat polytechnic college
9	Sep 10 2022 10:26 AM	Masresha Mekonnen	Gondar Poly technic College
10	Sep 10 2022 09:32 AM	Berhanu Anbessa	Fitche Poly Technics College
11	Sep 09 2022 11:08 AM	Amlaku Tewellign	Burie poly technic college
12	Sep 09 2022 09:51 AM	Andualem Engida	Burie poly technic college
13	Sep 08 2022 10:34 PM	Abebe Kassaw	Injibara poly technic college
14	Sep 08 2022 09:42 PM	Yohannes Wubale	Debre Markos poly technic college
15	Sep 08 2022 08:43 PM	ZELEKE ADEFRIS	FITCHE POLY TECHNIC COLLEGE
16	Sep 08 2022 05:54 PM	Abraraw Dejen	Gondar polytechnic college
17	Sep 08 2022 05:00 PM	Deribow Gonfa	Fitche Poly Technical College
18	Sep 08 2022 04:33 PM	Mulgeta Nuguse	Fitche PTC
19	Sep 06 2022 12:27 PM	Yusuf Nuru	Injibara poly technique college
20	Sep 05 2022 10:56 AM	Neway Yilma	Ethio-Italy polytechnic college
21	Sep 04 2022 02:42 PM	Yezina Beza	Debre Tabor poly technique college
22	Sep 04 2022 11:00 AM	Tesfaye Asrat	Motta Poly Technic College
23	Sep 04 2022 10:41 AM	Workineh Wana	Ethio-Italy Poly Technic College
24	Sep 04 2022 08:55 AM	Bihon Gubena	Debre Tabor poly technic college
25	Sep 03 2022 03:04 PM	Hiwot Derebe	Ethio Italy poly technic college
26	Sep 03 2022 12:05 PM	Zelalem Teshome	GPTC
27	Aug 29 2022 01:18 AM	Saladin Abeyazed	Haramaya Polytechnic College
28	Aug 28 2022 11:45 PM	Samuel Bekele	Haramaya poly technique college

No.	Response Date	Name	TVT college
29	Aug 25 2022 06:22 PM	Worku Biru	Sebeta Poly Technic College
30	Aug 23 2022 08:40 PM	Gemta	Openo Poly Technical College/Gambela
31	Aug 21 2022 09:03 PM	Koang Yak Geng	Openo Polytechnic college
32	Aug 21 2022 05:03 PM		Openo polytechnic college
33	Aug 20 2022 10:46 PM	Alemayehu Oyida	Durame polytechnic College
34	Aug 19 2022 05:39 PM	Negussie Tirfe	MfM
35	Aug 19 2022 05:33 PM	Melkamu Gemeda	Ambo PTC
36	Aug 19 2022 03:43 PM	KIBROM GABREEGZIABHER	Menschen für Menschen, Agro Technical and Technology College
37	Aug 19 2022 02:01 PM	Helen Getachew	Agro technical and technology college MfM
38	Aug 18 2022 10:50 AM	Muluken Deginet	Durame polytechnic college
39	Aug 17 2022 09:49 PM	Degenet Dessalegn	Durame poly
40	Aug 17 2022 06:00 PM	Fitsum Tagesse Ertiro	Durame poly technic college

TVT college trainees who participated in the online survey

No.	Response Date	Name	TVT College:	Field of Study
1	Sep 12 2022 05:57 PM	Zewude Geto	YIFAT Polytechnic College	ICT
2	Sep 10 2022 04:56 PM	Siryet Liyuwork	YIFAT Polytechnic College	database Administration
3	Aug 27 2022 09:37 AM	Hewan Wondossen	MFM ATTC	electrical
4	Aug 20 2022 01:49 PM	Esmelealem Mihretu	MFM-ATTC	Automotive technology
5	Aug 17 2022 08:09 AM	Yisehak	MFM-ATTC	Electrical
6	Aug 17 2022 07:31 AM	Abdurahman Ziyad	MFM-ATTC	Electrical and electronics technology
7	Aug 16 2022 06:25 PM	Hana Arega	MFM-ATTC	Automotive technology
8	Aug 16 2022 05:24 PM	Matiyas Tarekegn	MFM-ATTC	
9	Aug 16 2022 04:56 PM	Lemessa Leta	MFM-ATTC	Electrical and electronics
10	Aug 15 2022 03:58 PM	Dame Tolossa Jebreruk	MFM-ATTC	Manufacturing Technology
11	Aug 13 2022 09:37 PM	Zelalem Alemayehu	MFM-ATTC	Alternative fuel and propelling energy
12	Aug 12 2022 10:14 PM	Helen Belay	MFM-ATTC	manufacturing technology
13	Aug 12 2022 06:31 PM	Mikias Mekuria	MFM-ATTC	Electrical and Electronics Technology
14	Aug 12 2022 06:28 PM	Mardokiyos Abdella	MFM-ATTC	Manufacturing

Annex 6: The ten-year development plan- Highlights and green growth aspects

A. Selected highlights of the ten-year development plan

On the rationale and thrust of the new, ten-year development plan (2021-2030): "The Homegrown Economic Reform (HGER) with the central objectives of sustaining rapid growth, maintaining stable macroeconomic environment by reducing debt vulnerabilities and creating adequate and sustainable job opportunities has, therefore, been domestically initiated. The economic reforms are being translated into action through policy that enhances the supply side of the economy. *The main aim and focus of the HGER is the enhancement of productivity and competitiveness of the overall economy, and a gradual transition from public to private sector-led growth*. (p. 8).

On the [new] national development vision:

"The ten-year development plan lays a long-term vision of making Ethiopia an "African Beacon of Prosperity" by creating the necessary and sufficient conditions. Ensuring high per capita income through rapid economic growth is one of the sources of prosperity, but not a measure of prosperity on its own. Prosperity is largely defined *in terms of happiness, improvement in standard of living and quality of life, and the level of complete satisfaction created by the overall capability we build through economic gain, human and social development by harnessing tangible and intangible wealth, including social capital and natural resource wealth.* (p. 19)

The development objectives to be pursued:

- Six development objectives set [Note: all have relevance and inter-linkage to the concept of sustainability and green growth].
- Building a prosperous country by creating a *pragmatic market-based economic system and enhance the role and participation of the private sectors*.
- Maintaining macroeconomic stability, ensuring rapid *and sustainable economic growth, and creating decent jobs*.
- Ensuring structural economic transformation *by promoting overall productivity, and competitiveness*.
- Creating an enabling environment where every *citizen would become the owners and beneficiaries of the development endeavor by ensuring the quality and accessibility of basic social services* and the provision of infrastructure.
- Ensuring competent, independent, and quality civil service system by building the capacity of the government and *establishing good governance*.
- Building strong and *inclusive institutions that would ensure peaceful society, access to justice and upholding the rule of law and human rights*.

The strategic pillars of the ten-year development plan:

Ten pillars are envisaged (p. 21)

- *Quality Economic Growth and Shared Prosperity*
- *Economic Productivity and Competitiveness*
- Technological Capability and Digital Economy
- Sustainable Development Financing,
- Private Sector-led Economic Growth
- *Resilient Green Economy,*
- Institutional Transformation,
- *Gender and Social Inclusion*,
- Access to Justice and Efficient Civil Services, and

- *Regional Peace Building and Economic Integration*.

[Note: Seen as a whole, they mirror the concept of sustainable development. A few directly relate to triple bottom line sustainability, i.e., economic, social and environmental. Green growth is one of the pillars].

Key priority areas:

Six priority areas are identified which will be the basis for the homegrown economic reforms and policy direction at the macroeconomic and sectoral levels. (p. 21)

- Multi-sectoral and Diversified Sources of Growth and Job Opportunities,
- *Sustainable and Inclusive Financial Sector Development,*
- Harnessing the Demographic Dividend,
- Quality and Efficient Infrastructure Development,
- Sustainable Urban Development, and
- Peace, Justice, and Inclusive Institutions.

On the sector reforms to be introduced:

"The country will follow a multi-sectoral growth approach by diversifying sources of economic growth and job creations by undertaking necessary and substantive policy reforms across the different sectors. In this context, particular attention has been given to the agricultural sector, manufacturing sector, mineral sector, tourism sector and the ICT sector as sources of growth." (p. 10).

Specific plans on the CRGE (p. 41):

- Enhance the reduction of greenhouse gas emissions from 36.84 million metric tons to 125.8 million metric tons by mainstreaming environmental issues into sectoral plans and by implementing a green economy strategy as an integral part of regular work programs;
- Enhance the reduction of greenhouse gas emissions from 7.23 million metric tons to 37.8 million metric tons in the crop production subsector;
- Enhance the reduction of greenhouse gases from 12.06 million metric tons to 48 million metric tons in the animal husbandry subsector;
- Raise the level of annual additional sequestration of greenhouse gases from 17.55 million metric tons CO2E to 40 million metric tons CO2E from emission in the natural resource development subsector.

B. Green growth aspects of the agriculture, industry and urban sectors

1. Green growth aspects of the agriculture sector development plan

- The main objectives of the agricultural development plan are to raise the incomes and livelihoods of farmers and pastoralists and end poverty by making agriculture more productive and competitive; to play a major role in the structural transformation of the economy, especially to satisfy the food and nutritional needs of the nation by modernizing agriculture; to supply raw material inputs for the industrial sector; to provide adequate quantities of exportable agricultural products that have added value; to create sufficient job opportunities in rural areas; and to reduce the impact of climate change on the sector.
- To increase the total annual quantity of crop production in all production systems from 543 million quintals to 925 million quintals;
- Increase the supply of improved seeds from 1.09 million quintals to 2.3 million quintals;
- Increase the distribution of fertilizers from 16.1 million quintals to 32.9 million quintals;
- Make substantial effort to reduce the demand for chemical fertilizers by promoting widespread utilization of natural fertilizers such as compost and by improving land management methods;
- Increase the application of pesticides from 15.4 thousand litters to 100 thousand litters against invasive pests and from 4.9 million litters to 5.5 million litters against regular pests;
- Increase crop production through irrigation from 8 million quintals to 38 million quintals;

- To establish associations vested with legal personality for 10 thousand catchment areas in order to enhance sustainable natural resources development, management and conservation;
- To increase horticulture production from 181 million quintals to 261 million quintals;
- Increase irrigated horticulture production from 65 million quintals to 95 million quintals;
- To raise the rate of annual increase of soil carbon content from 1.8% to 2.18% by increasing the amount of additional annual biomass quantity from 27 million metric tons to 75.2 million metric tons;
- Reduce the total number of milk cows owned by farmers and pastoralists from 11.5 million to 9 million and, of these, to raise the proportion of those with improved breed from 2.7% to 17%;
- Increase the average daily milk yield per indigenous breed, crossbreed, and exotic breed cows from 1.45 litters to 2.02 litters, from 6 litters to 10.7 litters and from 13 litters to 17 litters, respectively;
- Increase egg production from 2.8 billion tons to 5.5 billion tons and chicken meat production from 48 thousand tons to 106 thousand tons;
- Increase regular water fish production from 59 thousand tons to 247 thousand tons and that obtained from aquaculture from nil to 13 thousand tons;
- Increase honey production from 59 thousand tons to 152 thousand tons;

2. Green growth aspects of the industrial sector development plan

- The objectives of manufacturing industry development are to create employment opportunities by improving the production and productivity of existing manufacturing plants and by attracting new high quality investments; to expand manufacturing industries that can produce strategic commodities that can substitute imports; producing high quality export goods in volume and variety; to increase the share of manufacturing in the gross domestic product by creating a conducive environment for improved participation of private investors in the subsector; and to ensure that the development of manufacturing industry is consistent with the country's sustainable and green economy development strategy.
- To increase average capacity utilization of the manufacturing industry from 50% to 85%;
- To raise the domestic market share of locally manufactured industrial products from 30% to 60% by expanding manufacturing industries that produce substitutes of strategic import goods;
- To raise the competitiveness of the manufacturing industry by improving product quality;
- To raise the number of small and medium-scale manufacturing enterprises from 2,000 to 11,000 by attracting high quality investments and focusing on those industries that employ advanced technologies;
- To create a total of 5 million new job opportunities.

3. Green growth aspects of the urban sector development

- The principal objectives of the urban development plan are to develop cities/ towns in a way that facilitates the development of both urban and rural areas in a coordinated manner; to create a system by which cities/towns are managed in a participatory and decentralized way; to create job opportunities; to make residential areas conducive for living by designing an efficient system of land and housing provision; to develop integrated and standard infrastructure and services; to improve greening and sanitation services so that cities/towns are livable and resilient to economic, social, environmental and ecological shocks.
- The urban development plan also aims to set standards for housing in rural centers; to enhance the development of micro and small enterprises in order to mitigate unemployment; to reduce poverty and food insecurity in urban areas; to strengthen good governance in urban areas;
- To guide the social, economic and environmental development activities and services of around 4 thousand towns and 14 thousand rural development centers through an integrated urban development plan;
- To reduce the proportion of urban sections that do not fulfil the standard from 74% to 30% by ensuring that all cities/towns are managed through planning and by redeveloping dilapidated urban sections;
- To raise the ratio of housing demand satisfied in urban areas from 64% to 80% by building more than 4.4 million houses;

- Around 600 thousand houses (or about 14% of the total number of houses planned to be built) in the vicinities of industrial parks;
- To standardize houses to be built in rural centers and to build 2.8 million houses that meet the standard;
- To raise the coverage of liquid waste removal from 1% to 50% and dry waste removal from 30% to 80% in towns with a population of over 20 thousand;
- To raise the coverage of green infrastructural development that is accessible and up to standard in all urban areas to 30%, thereby raising the number of cities/towns that meet the standard from 6 to 200;
- To reduce the rate of unemployment in urban areas from 18.7% to 9% by creating job opportunities for 15 million citizens;
- To facilitate the establishment of 2 million new micro enterprises, of which 10% to be promoted to small-scale and 1% to medium-scale manufacturing.

Annex 7: The ten high job creation potential sectors identified by the JCC

Sector	Sub-sector	Overall Economic Transformation Potential	Overall, Job Creation Potential	Overall Potential	Additional considerations	Shortlisted Sectors (>=3)
Agriculture	Agriculture (Horti/ floriculture)	2	4.2	3.1		X
	Cash crop	1.5	4.4	2.9		
	Livestock (poultry, etc.)	3	4.4	3.5		X
Industry	Agro-processing (food and beverages)	2	4.0	3		X
	Apparel, leather and textiles	3	3.4	3.2		X
	Other manufacturing	3.5	2.2	2.9		
	Renewable energy	3	1.8	2.4	Abundant renewable energy resources, identified as a priority for the government	X
	Water supply & waste management	2	2.2	2.1		
Industry: Construction & mining	Construction	3	3.8	3.4		X
	Mining	3	2.2	2.6	Considerable mineral potential underexploited	X
Services	Arts, entertainment and recreation	4	2.0	3		X
	Education	2	2.6	2.3		
	Financial services	3	1.8	2.4		
	Health and social services	2	2.0	2		
	Hotel and restaurants (tourism)	2	3.8	3		X
	ICT	2	1.8	1.9	Ability to boost growth across sectors	X
	Transport & storage	2	2.6	2.3		
	Public defense	4	1.4	2.7		
	Real estate activities	2	1.6	1.8		
	Wholesale and retail	3	3.6	3.3	Dependent on other sectors	

Key: 0-2: Very Low; 2-3: Low; 3-4: Medium; 4-5: High; sectors which scored 3 and above were selected.

The study also makes the following assessment concerning performance of the key productive sectors vis-à-vis their job creation potential- which informed the above prioritization.

Agriculture

Agriculture has been growing at an average of 6% sector growth since 2011, while its share of GDP continues to decline. **Future jobs:** with an increased focus on industrialization, there are growing opportunities in agro-processing

Industry - Manufacturing

Manufacturing has been steadily growing during the 2011-2017 period, peaking in 2017 with a 24.7% growth rate, albeit a sharp decline registered in 2018 at 5.5%. **Future jobs:** entry-level jobs in basic manufacturing industries

Industry - Construction and Mining

In 2017/ 2018, the construction industry expanded by 15.7% signifying the leading role of the construction sector while GDP growth for the mining sector has averaged -12.7% since 2013, with low levels of investment. **Future jobs:** jobs with specialized skills

Services

The services sector has shown consistent growth, with an average of 10.3% from 2010-2015, and an average of 9.4 from 2016 to 2018. Hotels and Restaurants sub-sector grew the fastest at an average of 21.9% from 2010-2015 & 30% from 2016-2018. **Future jobs:** customer service jobs in sectors such as *tourism*, specialized jobs in the *digital sector*

Source: JCC et al. (2021)

Annex 8: Greening TVT- Country experiences of Germany, South Africa and Vietnam

A. Greening TVT: A short case study of Germany

Main national, green objective: Reducing GHG emissions

Guiding policies, strategies and programs:

- National Strategy for Sustainability of 2001
- The Integrated Energy and Climate Program of 2007
- National Climate Protection Program of 2000 and 2005
- Federal Environment Ministry's educational initiative entitled "environment creates perspectives" in cooperation with business (2006). As a result, 6,000 additional apprenticeships were created in 2009. The initiative aims to identify the apprenticeship trades, skills and competencies required by the environmental sector.

Specific national targets:

- 40% reduction of GHG emissions by 2020 compared to a 1990 baseline;
- 3% annual growth in energy efficiency;
- Expansion of renewable energy to 18% of the overall energy supply by 2020, and 50% by 2050; and
- Increasing combined heat and power generation to 25% of power by 2020.

Drivers

- The drive to improve energy efficiency across the economy, coupled with growth in renewable energy capacity and broader carbon emissions reduction targets, are greatly influencing the behavior of both manufacturers and consumers

- Suppliers of consumer and industrial products are vigorously pursuing reductions in GHG emissions by using optimized production processes and energy efficiency measures.
- More fuel-efficient vehicles
- Low-carbon buildings
- Renewables being used in ever more imaginative ways (e.g., to power air conditioning systems
- The agricultural sector is also beginning to follow more environmentally sustainable production methods, reducing its waste generation and water consumption

Pathways:

- A focus on energy efficiency and cleaner power production than previous policies
- Industrial restructuring
- Environmental considerations increasingly influencing both technological innovations and people's lifestyles
- Investments will support employment growth and lead to 500,000 additional jobs in environmental protection by 2020 and 800,000 by 2030
- Skill anticipation: Coordinated by initial vocational training; continuing vocational training; and university studies
- Greening of existing qualifications often takes place within the system of continuing vocational training.

Challenges:

- Germany suffers from demographic changes which negatively affect the number of young people enrolling for TVET.
- The largest problem for the environmental sector remains the availability of engineers, as graduation rates have also been low in recent years and short-term prospects do not appear to have changed.
- German educational policy is believed to have "missed the opportunity" to increase capacities sufficiently because the sector's high growth was underestimated. As in previous cases of rapid transition, the education and training system reacted slowly to skills shortages, which will need to be addressed in the future.
- Sector "image issues: especially in the areas of waste, sewage and sanitary, heat and air conditioning, where apprentice numbers are low.

Successful approaches:

- For decades, environmental protection has been at the center of public policy development.
- The combination of legislation and incremental awareness has influenced the restructuring of German economic sectors and occupational competencies.
- From the outset, German policies on environmental protection have not only been perceived as a step towards better living conditions, but also as a mechanism to develop market opportunities for domestic suppliers of environmental technologies and services.
- The roll out of environmental policies has therefore been used to create new jobs and support economic growth.
- **The national catalogue of occupations, BERUFENET:** differentiates between 36 job descriptions covering "occupations in environmental and nature protection" by type of training. The majority of these are not "new" in the sense that they already have an established training system.
- The environmental technology and services sector is now one of Germany's major economic sectors, employing 1.8 million people in 2006 (4.5 per cent of the labor force). German environmental technology firms are now well established and often market leaders.
- Financing: During the global financial crisis (2007-2008), the proportion of the stimuli packages spent on green investments was around 13 per cent – higher than other EU Member States.
- No significant displacement of the labor force due to restructuring: This is mainly a result of the education system, which trains apprentices and students for flexible employment in the labor market

with the dual vocational training system focusing on **the transfer of basic knowledge rather than workplace-specific competencies.**

- The greening of skills is to a large extent captured by the education and training system. The three main channels: **initial vocational training, continuing vocational training and university studies** are systematically organized and companies are involved at each of these levels.
- Beyond new types of training, many existing training courses are becoming intrinsically greener due to the incorporation of environmental training elements.
- Federal Environment Ministry's educational initiative, "Environment creates perspectives": created 6,000 additional apprenticeships in 2009. The initiative aims to identify the apprenticeship trades, skills and competencies required by the environmental sector.

Relevance for TVT

- The long-standing policy program for greening of the economy has significant impacts on occupational profiles and formal vocational training
- Skill needs in the environmental sector have mainly been met by the creation of formal training courses within the German system of dual training and university training. This follows a long tradition of German industries organizing dual training rather than company-based continuing training;
- Although the main strategy for promoting environmental protection and management is integration of training on environmental issues into formal education, there are a number of policy-initiated programs supporting environmental sector apprenticeships, environmental vocational training pilot projects, and environmental sector promotion and research.
- Retraining across the economy in response to green restructuring is mainly focused on the education and training system, i.e., technical qualification training courses are offered; and new study courses and further training in environmentally relevant subjects have been developed.
- Beyond new types of training, many existing training courses are becoming greener due to the integration of environmental protection aspects.
- The range of continuing vocational training courses related to environmental protection is now substantial.
- This is chiefly due to the continuing revision of vocational training courses, which make the integration of environmental protection issues a key priority.
- For private suppliers of (TVT), the training programs are products which "must be sold" and thus the supply is influenced by the demand for the product.

Examples of green "stand-alone" occupations

- environmental technicians (revised in 2002);
- plant mechanics for sanitary, heating and air conditioning (revised in 2003);
- electronic technicians for energy and building services engineering (revised in 2003); and
- builders of stoves and air heating systems (revised in 2006).

Approaches to greening of existing occupations

- basic training which imparts environmental protection aspects such as waste and recycling, energy conservation and environmental legislation
- specialized training for further work as an environmental specialist, energy consultant or environmental engineer

Sectors targeted for greening

- agricultural occupations that commit to organic farming;
- traffic-related occupations that support environmentally friendly mobility;
- energy occupations that focus on renewable energy and energy conservation;
- manufacturing occupations that produce products from recycled materials;

- chemical occupations that use biodegradable substances; and
- motor vehicle occupations that promote alternative propulsion technologies.

Key conclusions

- Rather than creating new, specific "green" occupations, many occupations and training curricula have been adjusted and refined to take account of the skills needs of increasingly green aspects of mainstream industry and business as well as eco-industries. In that respect, the skills response has followed an integrated approach.
- The focus of an integrated approach rather than on a specialized occupation guarantees the flexible use of skilled workers and better job opportunities.
- Social partners play an important role in the formation of training courses, both in dual training and university training. They are active in shaping the content of new training programs.
- The majority of workers' occupations have been modified to take account of environmental considerations, in line with the overall German objective of greening the economy.
- Whilst new occupations have emerged, their relevance is small compared to the great number of existing occupations which have been modified.

Recommendations:

- It will be important to measure green skills and competencies better, as well as being able to quantify green jobs more systematically to help shape training provision
- A publicly financed lifelong learning system is needed to provide green skills for the labor market at large rather than individual workplaces, in order to enable a larger shift towards a low carbon economy.

Source: ILO (2011). *Skills for green jobs: a global view: synthesis report based on 21 country studies*

B. Greening TVT: A short case study of South Africa

Guiding policies, strategies and programs:

- Biodiversity Act, the Integrated Coastal Management Act, the Integrated Waste Management Act and the Air Quality Act
- South Africa's Long Term Mitigation Scenarios
- Voluntary greenhouse gas emission targets of 34% by 2020 and 42% by 2025 (introduced in 2009).
- The country has set an energy efficiency target of 12% by 2015.
- Renewable Energy Feed-In Tariff (2009) was agreed upon, aiming to support the development of wind, hydro, landfill gas and solar energy.
- The CDM allows for the creation of a greenhouse gas mitigation plan that promotes sustainable development by technology transfer, donor funding and capacity-building opportunities.
- Green sector plan (2010).

Challenges

- When South Africa's new democracy came to power in 1994, it faced formidable problems stemming from the structural (historical) inequalities of the past which are still being dealt with in a socio-economic context today. Unfortunately, due to this, greening of the economy has had to take a back seat and has not been able to develop extensively.
- One critical challenge is the general lack of skills in many sectors, and in particular the lack of scientists, engineers, technicians, and human resource and training and development professionals
- Renewable Energy Feed-In Tariff (2009) not enforced
- CDM not sufficient
- There is currently no coherent national strategy/policy to meet the skill needs for greening the economy of South Africa.

- Furthermore, South Africa's Government still does not have sufficient capacity or fund allocations to direct the green economy, or to provide the skills development
- The overriding lack of sufficient basic skills in South Africa is the major inhibiting factor to the development of a green economy.
- In terms of anticipation and monitoring of skill needs, South Africa is still only at the outset of identifying the economic possibilities presented by greening the economy and moving towards a low-carbon pathway of development, and thus is not ready for this stage of the process.
- South Africa has developed a skills identification framework that is globally recognized, but it lacks any reference to greening of the economy and green jobs.

Drivers

- South Africa will have to decarbonize its economy. Currently South Africa is ranked eighth globally in terms of per capita emissions
- South Africa is a centralized, coal-based energy economy with large reserves of coal, and thus it is the primary energy supply and coal-fired power plants produce the majority of electricity
- South Africa is a semi-arid country, and lack of water is a limiting factor to development.
- The market or macroeconomic forces have played an important overriding role in terms of greening and the development of related green skills. However, in many cases these forces are not underpinned by green imperatives or a concern for environmental sustainability on the supply side of the economy, but rather reactions to crises and changes in consumer preferences.
- Longstanding power crisis provides an economic imperative for diversification of South Africa's highly centralized energy supply
- There is significant potential for restructuring in the power industry to increase employment in the alternative energy sector due to the vast amount of untapped natural resources. These include wind, solar and biomass energy

Approaches to green

- Workers with green skills will need to be added to the pool of current workers in industries such as coal-fired stations, rather than replace current workers. With current plans for the extension of use of coal-fired power stations, it does not appear that those jobs will become obsolete.
- Most of the unemployed population are considered unskilled and therefore it will be necessary to up-skill these people in order to increase the pool of skills available to facilitate the creation of a green economy.
- **The Expanded Public Works Programme (EPWP)** has been established to help cushion the effects of the unemployment rate (over 25%), and a major part of this program is involved with environmental management.

Best practices:

- DFFE has portal for green skills: https://www.dffe.gov.za/projectsprogrammes/greenskills
- The implementation of the South African Dual System Pilot Project (DSPP), Centers of Specialization (CoS) programme and dual short courses (Installation, Repair and Maintenance Initiative (IRM) as part of the Job Summit commitments, and its transfer to the national vocational education and training system as a regular delivery mechanism. Nearly 240 electrician and plumber apprentices are currently undergoing a 3-year dual occupational programme in 70 training companies and 5 TVET colleges.[101]
- DSPP: ecosystem services and training for employment expansion.
- The environmental sector's contribution to the EPWP involves employing people to work on projects to improve their local environments. Overall, the EPWP has been declared a success by the Government as it met its target of creating 1 million work opportunities by 2008, one year ahead of schedule. The scheme has been expanded into phase II, targeting 2 million full-time equivalent positions by 2014.

[101] https://www.giz.de/en/worldwide/35089.html

- The National Job Fund: is one method in place that would certainly respond to green skilling of certain workers, if the demand existed
- NGO participation: training offered by NGOs, such as the Wildlife and Environment Society of South Africa, which offers two Environmental Educators Courses. These courses address environmental issues and risks and aim to demonstrate knowledge of energy efficiency goals, principles and methods of their appropriateness in different contexts; review a variety of approaches to learning, teaching and evaluation; and network broadly to source information and support key environmental issues or risks.

Sectors/areas with potential for greening

- The solar water heating sector has large potential for job creation and the technology is relatively simple so training would not be extensive.
- In retail, sustainability managers are coming into demand and would ensure that certain aspects of production and distribution processes were controlled in a sustainable manner.
- Demand for increased knowledge around carbon foot printing will undoubtedly lead to demand for carbon auditors across many industries
- in the construction industry, new occupations are focused around architectural design.
- A lot of energy and water consumption in South Africa happens in work domains, where managers often find it difficult to control how much their staff is consuming. There is potential to curb this large consumption if South Africa increases awareness among workers and businesses about energy and water efficiency. Simple but important changes such as these will need to be instilled in skills of all workers from the bottom up.
- In agriculture, three key areas must be addressed to obtain and implement better irrigation methods, which would increase water efficiency
- Construction: green building technologies, and incorporating them into designs
- The retail sector can be greened through ensuring that the supply chains for various goods meet certain criteria for environmental sustainability.

Conclusion/Lessons/Recommendations:

- Since a critical aspect of challenges for the green economy is the general lack of skills in many sectors, any labor market development will have to be monitored and kept up-to-date so that greening initiatives can be incorporated where possible.
- Market opportunities need to be monitored and exploited for future greening because policy in South Africa is far from the implementation stages that will reach a broad enough audience.
- Existing environmental policies need to be more strictly enforced.
- National Low Carbon Economy Skills Forum, located in the State President's Office for Economic Planning, would be useful to monitor and direct the National Qualifications Framework to ensure that essential skills for greening the economy are considered.

Source:

ILO (2011). *Skills for green jobs: a global view: synthesis report based on 21 country studies*

Additional on-line sources

C. Greening TVT: The case of Bac Thang Long Economic Technical College (BTL), Vietnam

Policies, Strategies, Programs driving green economy and green TVT

- Environmental Protection Law (2005)
- Viet Nam National Green Growth Strategy (2012)
- Clean Production and Energy Efficiency Project, 2011–2016
- Renewable Energy Mandate: In 2007, the government set targets to increase the share of renewable energy in total production from 3% in 2010 to 5% in 2020 and to 11% in 2050
- Targets for wind and biomass renewable energy generation: from 3.5% of total electricity generation in 2010 to 4.5% in 2020 and to 6% in 2030
- **Green economy focus area for Vietnam**
- Improvement in the productivity of raw materials, water, and energy;
- The minimization of waste and emissions;
- Increase in recycling and reuse;
- Use of renewable energy

Best Practice from BTL and broader success factors

- Bac Thang Long (BTL) has close links with local businesses to minimize the gap between TVET outcomes and job requirements. It uses well-established mechanisms to collect data through industry surveys, interviews, and workshops to ascertain the needs of industry and ensure that the content of courses is relevant to the skills required of students to undertake future employment.
- Student preferences and satisfaction are major influences when the college plans the content of long-term programs.
- Students receive workplace training as part of their courses, and their progress is regularly reviewed. They are fully supported by highly skilled teachers
- All courses are reviewed annually to ensure their relevance. For the training of existing workers, short-term programs have been specifically designed to meet industry needs.
- Professional development is conducted regularly with teachers to ensure that their skills are up to date;
- Industry is fully involved in the professional development of teachers.
- Labor Market Forecasting: Approaches used by BTL are at the local level and are focused on short-term forecasting. The college uses qualitative needs assessment surveys and institutional dialogue (through a well-established and effective mechanism) to allow information about labor market needs and its translation flow into programs and courses. But this is possible because the college has close collaboration with local industry partners
- Annually the college conducts need assessment surveys with local businesses supported by Uniterra.[102] Result: employers' views are well known to the college, helping it to plan relevant training programs and courses and to accommodate their requests in the college's plans, teaching, and training practices.
- TVET in Viet Nam has sufficient flexibility in curriculum development that serves as an important factor in the greening of its curricula;
- Active role of trainers: For example, when teachers are developing lists of skills for students to perform during workplace learning, they could identify (together with company representatives) current or potential green components to be included in training. This will potentially lead to a need to buy additional equipment, so the government could develop a grant scheme to support these initiatives by vocational training providers.

[102] www.uniterra.ca

Drivers of green TVT in Vietnam

- Environmental legislation,
- Industry responding to environmental regulation>> provide a good combination of specific and general, practical and more knowledge-based approaches, toward the introduction of green aspects into training.
- TVET providers are very responsive to skills development policies; therefore, regulations and curriculum guidelines have the most influence on these green inclusions.
- The social responsibility mission of BTL

Practical greening initiatives/subjects within BTL

- **Environmental awareness** has been included in the BTL curriculum and is recognized as a core skill required for all occupations.
- **Programmable Logic Control (PLC) programming (automation):** customized to energy saving and environmental protection[103]
- **Energy efficiency use and energy saving:** Its rationale relates to the need to save energy, increase energy efficiency, and reduce the costs of production and running a business
- **Renewable energy:** the practical significance of the use of renewable energy sources to protect the environment and promote sustainable development
- **Tourism:** two subjects- environmental protection & nutrition and food
- **Climate Change Education:** the Vietnam Ministry of Education and Training (MOET) introduced compulsory 30-h subject on climate change at all institutions under its supervision.
- **Environmental protection**: MOET has developed two separate subjects; one for agriculture (30 h) and another for industry (30 h). After February 2013, these became compulsory for secondary professional schools. There are 650,000 students at the intermediate TVET level who will be affected, and 19,000 teachers are to be trained.
- **Leveraging soft skills for environmental consciousness:** Although green soft skills are not currently given as a subject, BTL recognizes the need **to pay special attention to attitude development**. Various strategies are used by the college to remind students of the need to think about environmental protection and to then act accordingly. On the home page of the college website is a green message encouraging students to save the power consumption of their computers by downloading and using a free software program called Granola[104].

Key take-aways from Vietnam:

- The government plays an important role in the development of green TVT and mainstreaming green skills in all skills development plans is important to achieve systematic reform.
- The introduction of new green courses should be related to a country's green development strategies and environmental laws and regulations.
- The content of vocational programs needs to meet the requirements of employers, students, and the wider economy.
- TVET providers should have adequate freedom for curriculum adjustments that allow them to respond to industry demands regarding the greening of existing skills.
- To meet the requirements of greening strategies adopted by the government, TVET graduates need two sets of green skills: first, occupation-specific; and second, generic, soft skills that are related to building a general awareness of environmental protection.

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[103] Industry applications: programming of automatic lighting control: simple thermostat equipment; automatic on/off control systems based on temperature and humidity; programming of automatic power switch systems: electricity, solar energy, and generator; and optimizing the use of fuel and raw materials: control concrete mixer models, elevator control models, and control waste treatment systems.

[104] Granola is free software that was launched to help save power consumption when using computers, but does not affect the performance of devices. It can help save from 10% (in heavy computations) to 30% (in light computations).

- Greening should include social and environmental aspects
- Systematic professional development [by TVET TOT colleges] could ensure systematic training of staff and pedagogical development in relation to green skills.
- TVET providers with good green practices should be identified as key players in consortia development by employers and industry organizations, training providers, and regulatory organizations. Government funding allocated to those consortia that demonstrate best practices in green skills could be scaled up.

Source:

Asian Development Bank (2018). *A holistic approach to greening TVET: A case study and analysis of Bac Thang Long Economic Technical College practices in Viet Nam*

Annex 9: Principles of the TVET system (2008 TVET strategy)

Guiding Principles of the National TVET System

Demand-orientation: respond to the competence needs and qualification requirements in the labor market

Quality and Relevance: the introduction of the system of occupational standards, assessment and certification

Equal access and equal opportunity: social inclusion by increasing overall access to relevant formal, non-formal TVET and informal learning opportunities by all target groups, while ensuring equality of access.

Pathways: The TVET system will promote vertical and horizontal mobility and progression between different TVET occupations and different qualification levels, but also between TVET, general and higher education. TVET should always create the possibility of career progression and continuation of learning

Flexibility: To respond to the changing occupational requirements and to accommodate the different demand of the various target groups, the TVET system will allow and encourage flexibility and dynamic development of the TVET offers

Life-long learning

Gender sensitivity

Contributing to the fight against HIV/AIDS

Contributing to environmental protection: TVET will help create environmental awareness in Ethiopia and will educate Ethiopians about sustainable uses of scarce natural resources.

Conceptual Principles of the TVET System:

Making TVET Institutions Centers of Technology Capability Accumulation & Transfer

Aiming at a Comprehensive and Integrated TVET System: the TVET system will explicitly address the occupational requirements in all segments of the labor market, target all population groups in need of TVET and thus incorporate and coordinate all aspects of TVET in Ethiopia

Stakeholders' Involvement

Public Private Partnership

Outcome-Based Approach: This means that identified competences needed in the labor market will become the final benchmark of teaching, training and learning, and that all institutions, rules and regulations of the TVET system will be (re-)defined so that they support citizens to become competent.

Decentralization

Efficiency in the TVET System: The integration of non- formal and informal TVET with formal TVET through recognition of previous learning outcomes will eventually add significantly to the overall efficiency of the system, avoiding unnecessary learning duplications.

Other highlights:

- TVET has to respond to the competence needs of the labor market and create a competent, motivated and adaptable workforce capable of driving economic growth and development.
- The main thrust of the strategy is that TVET development relies on an outcome-based system and dedicated and trusting cooperation among stakeholders.
- Ethiopia's population is growing by around 2 million people annually, putting tremendous strains on the country's resource base, the ability to deliver services and the labor market.
- The manufacturing sector continues to be based narrowly on food, beverages and textiles, which together account for more than half of the manufacturing output.
- Around 35 million people of the Ethiopian work force are characterized by low skill levels and very low average educational attainment. Only 10% of the urban population has post-secondary school education. As a consequence, 75% of the workforce is concentrated in low skill employment sectors such as commerce, services and elementary occupations. Less than half of the urban workforce is engaged in wage employment. A significant portion of the urban workforce works for unpaid family business. More than 40% are self-employed in the informal economy, most of which live on the edge of poverty.
- In urban areas, about 26% of the workforce is officially unemployed, a figure believed to underestimate the real situation. Of particular concern is that unemployment among the youth is significantly higher than the rest of the workforce.
- Substantial skill gaps exist throughout the economy, especially in economic sectors with a higher skill level and outside of Addis Ababa.
- The National TVET Strategy is an important element of the overall policy framework towards development and poverty reduction.
- TVET is expected to play a key role in this strategy by building the required motivated and competent workforce.
- The Industrial Development Strategy of 2003 highlights the tremendous human resource deficits in Ethiopia being a major reason for the low state of industrial development.
- It also calls for efforts to raise the quality of the Ethiopian workforce to international standards, to reverse the previous marginalization of industrial professions in the TVET system, and to put a substantial focus on building a culture of entrepreneurship and preparing people for self-employment.

Annex 10: Vision, mission & principles of the TVET policy and strategy (MoSHE, 2020)

Vision: Aspires to create competent and self-reliant citizens and improve the livelihoods of all Ethiopians by 2030.

Mission:

- Producing productive, self-reliant, competent and innovative workforce with employable skills to meet labor market demand in terms of both quality and quantity so as to contribute to the prosperity of Ethiopia
- Engaging in research-based knowledge and technology transfer endeavors to transform the economy and solve societal problems through community engagement.
- Policy objective: The objective of Ethiopian TVET policy and strategy is to provide demand driven, high quality, relevant technical and vocational education and training; to all citizens to create competent, motivated, adaptable and innovative work force which can contribute to the prosperity of the country.

Guiding principles:

- Labor Market Orientation
- Relevance and Quality
- Access and Equity
- Outcome-based system of education and training
- Decentralization
- Innovativeness
- Transparency and responsiveness
- Collaboration and linkage
- Efficiency and effectiveness
- Inclusiveness
- Lifelong Learning
- Flexibility
- Greening TVET
- Pathways

Core policy issues and implementation strategies:

- Ethiopian TVET Relevance, Quality, Equity, and Access,
- Ethiopian TVET Research, Innovation and Technology Transfer,
- Ethiopian Science Culture Development and Community engagement,
- Ethiopian TVET Infrastructure and Facility Development,
- TVET Institutional Capacity Development,
- Monitoring and Evaluation Mechanisms

Annex 11: Key highlights of the climate change education strategy of Ethiopia (2017-2030)

Global directions

The [global] quest for integration of climate change education into the formal education is underpinned by several existing international frameworks including the UNFCCC, Kyoto protocol, ESD, the SDGs, and the 2015 Paris Agreement. This is further supported by practical experiences that hugely appreciate the key role of CC Education in combating climate change.

For example, UNESCO has established the Climate Change Education for Sustainable Development (CCESD) programme, recognizing the crucial part that education and awareness raising have to play in rolling back the threat to a sustainable future that climate change represents.

Stocktaking of the Ethiopian situation

Ethiopia's education sector in general and its curricular policy in particular remains far behind the expected level of integration of CC Education in the formal education system. Review of the syllabi and text books uncovered a sub-standard level of CC integration in the general education system of the country. In fact, weaker level of integration is observed at primary and secondary levels.

The [Ethiopian education] sector has not been fully engaged in the implementation of the country's Climate Resilient Green Economy Strategy. Among the most noticeable gaps is sub-standard level of integration of Climate Change Education (CCE) in the present formal education system of the country.

Limited engagement of schools in the implementation of CRGE, lack of skilled human resource and deficiency in institutional capacity are also among the impediments.

Assessment done as part of the Strategy formulation process, covering primary, secondary and tertiary education, indicated that the level of Integration of CC *Education is described as very low or low as rated by 71.6%*; 21.5% rated as moderate, and only 6.8% rated it as high or very high level of integration.

The existing environmental protection related subjects lack practical-orientations. The extra-curricular activities in the schools are very weak and fragmented.

Consensus has been reached among the MoE at federal and sub-national levels on the need to strengthen the level of CCE integration in the curricula of the general education at all cycles/ grades in Ethiopia.

Vision, objectives, scope

Strengthening CCE is a vital necessity to the success of Ethiopia's drive to build a green and resilient economy by 2030 and beyond.

It is in recognition to the above facts that the Government of Ethiopia adopted the CCE Strategy (2020-2030). The strategy is not only demand-driven and country-owned *but also strategically aligned with the national normative frameworks including the Growth and Transformation drive, Education sector and CRGE.*

The CCE Strategy covers the period 2017-2030 and shall serve as Ethiopia's Comprehensive Framework for promoting CC Learning during the period.

In terms of scope, the strategy encompasses three cycles of Strategic Guidance and Priority Actions: First Cycle: 2017-2020; Second Cycle: 2021-2025; and the third Cycle: 2026-2030.

The first cycle National Strategic Guidance and Action Plan focuses on strengthening the integration of climate change education into the formal education system with special attention to primary and secondary levels of education.

In view of the significant level of support for the CRGE, including a large-scale capacity building program, the Government of Ethiopia engaged with the UN CC Learn programme with the purpose of strengthening human resources, climate change learning, skills development to advance the national climate change development agenda.

Annex 12: Overview of Ethiopia's updated Nationally Determined Contribution of 2021

Overview[105]

Ethiopia's updated NDC and Climate Resilient Green Economy Strategy commit to reduce emissions by 68.8% compared to BAU projections by 2030, including 14% reductions unconditionally committed and 54.8% contingent on international support.

The updated NDC also includes 40 prioritized adaptation actions that derive from the NAP and align with the 10-year national development plan.

The updated NDC is based on a robust set of technical information, policy review and data, significantly improving the quality and ambition of Ethiopia's commitment to the Paris Agreement. It also forms the basis for updating the CRGE, Ethiopia's primary strategy for climate action;

Moving forward, Ethiopia is developing an implementation plan for the NDC, with support from the NDC Partnership, UNDP and other partners supporting Ethiopia;

The Government's priorities are largely focused on resource mobilization through project preparation, strengthening monitoring and reporting systems and coordinating support for implementation at the sector and sub-national levels.

[105] Provided by the NDC Partnership, available on-line at: https://ndcpartnership.org/countries-map/country?iso=ETH [Accessed on 23.09.2022]

Details

Updated base year GHG emissions in 2010: 247 Mt CO2eq

Projected GHG emissions on a business-as-usual scenario by 2030: 403.5 Mt CO2eq

Combined impact of unconditional and conditional actions (pathways) will enable a GHG reduction of 68.8% (of the base line), which is a reduction of 277.7 Mt CO2eq. The Table below

below presents a summary of the sectoral GHG emission figures, baseline, end-line (combined) and the anticipated reductions in absolute terms.

No.	CRGE Sector	BAU emissions projections [Mt CO2eq]	Unconditional & conditional projection [Mt CO2eq]	Expected reductions [Mt CO2eq]
	Industry	26.1	22.6	3.5
	Energy	20.0	9.5	10.5
	Land use Change and Forestry (LUCF)	140.2	-99.9	240.1
	Livestock	194.8	180.0	14.8
	Managed soils	11.0	10.6	0.4
	Waste	11.5	2.9	8.6
	Total	**403.6**	**125.7**	**277.9**

Source: Reproduced by the Consultant from FDRE (2021). *Updated nationally determined contribution: Federal democratic republic of Ethiopia*.

Annex 13: Highlights of Ethiopia's Plan of Action for Job creation 2020-2025

Strategic objectives

- **Adopting job-rich macro-policies** by ensuring macroeconomic stability, optimizing the job-creation potential of public investment, improving the financial sector, and upgrading the institutional and statistical framework for job-rich macro-policies;
- Building a **vibrant local private sector** by revamping the current support to MSMEs, effectively supporting high-potential and high-growth MSMEs, and improving the quality of business development services;
- **Developing human capital** to meet the changing needs of the labor market by improving the level of work-readiness of the labor force, ensuring its proficiency in the 21st century skills, improving the entrepreneurial mindset, and building more effective linkages between educational institutions and industries;
- **Strengthening labor market intermediation and linkages** by (i) building modern employment centers that provide effective employment services and (ii) developing a labor market information system to reduce the asymmetry of information and improve social and spatial mobility in the labor market;
- **Improving the inclusiveness of the labor market** by providing targeted services to populations excluded from the labor market as well as to vulnerable populations, such as refugees, migrants, and people with disabilities;
- **Realizing the job-creation potential of prospective high-yield sectors**: providing a more balanced development policy with a focus on realizing the job-creation potential of sub-sectors in agriculture, industry, and services.

Prospective high-yield sectors

- **Improving outputs in the agriculture sector** (focus on horticulture and poultry) *by improving necessary inputs and services including small-to-medium-scale irrigation*, *improving access to financial services*, and *building linkages between industries (such as agro-processing) and urban markets*;
- **In the industry sector**, including manufacturing, focusing on building effective backward and forward linkages, encouraging an innovative and diversified local production, and building a more demand driven labor force;
- Developing **ICT** as an enabler of the services sector and as a sector capable of leading the nation's transition to an inclusive digital economy; and
- Improving the performance of the **tourism sector** by increasing the accessibility and attractiveness of Ethiopia as a destination and by creating an enabling environment for the creative arts sector to unleash the Ethiopian creativity.

Annex 14: Highlights of JCC study on job creation potential of off-grid energy in Ethiopia

A. Focus on solar technologies

- The government, through the Jobs Creation Commission, aims to explore the untapped job creation potential of MSMEs through the use of PUE technologies.
- MSMEs created 880,000 new jobs between 2018 and 2019 alone.
- PUE technologies are defined as solar-powered systems that enable agricultural, commercial, or industrial activities.
- These technologies are usually targeted towards populations that are off-grid or have unstable grid connections that can be powered via stand-alone solar panels attached to the appliance or through mini-grid connections.
- Once integrated into the business, PUE technologies can increase income levels and create jobs as they drive higher outputs, open up new income streams, and increase sales revenues.
- Across three high-potential value chains, PUE technologies present opportunities to mechanize tasks and expand production capacity, creating on the order of 190,000 jobs.

B. High-potential value-chains for PUE applications

- Three value chains analyzed showed with the highest potential for impact and job growth, i.e., *horticulture, wheat, and milk.*
- **Horticulture:** Introducing solar water pumps in the horticulture value chain can potentially meet a significant irrigation need, and it can help create up to approximately **130,000 new jobs** across the value chain. Horticulture is a key farming activity in Ethiopia, but a lack of adequate water supply is a major constraint to production. Uptake of solar water pumps can boost horticulture production several-fold as farmers can extend growing into the dry season. As production levels increase, additional jobs are created across the horticulture value chain, from sales to processing.
- **Wheat value chain:** PUE solutions can address challenges of unreliable power and can create up to approximately 50,000 jobs across the wheat value chain. Grain milling and the processing of baked food are prevalent activities in the food and processing industry in Ethiopia. However, MSMEs are currently using expensive technologies with unreliable power, which reduces production levels. Some estimates suggest that solar powered mills can boost average production levels by 25%.
- **Milk:** PUE in milk chilling from source to retail can address challenges of spoilage and wastage and can create over an estimated 11,000 jobs. Dairy farmers in Ethiopia produce about 4 billion liters of

milk per year. *However, 20-35% of all the milk produced is wasted primarily due to a lack of efficient cooling mechanisms*. In retail business, MSMEs involved in food and beverage handling can use PUE technologies like solar-powered refrigerators, freezers, and cold rooms to reduce the risk of milk contamination and to preserve and extend the shelf life of milk.

Annex 15: TVT college leadership understanding of green growth issues and greening TVT

A. TVT college leadership understanding of green growth and sustainability

Those responses which the consultant considers to be original and reflective are shown in boldface. Citations are provided for those definitions borrowed from elsewhere.

1. Changing the environment by planting different kinds of tree for the long time create suitable living area for all living things
2. It is a state of attaining the expected goal of TVET program and developing a culture of regular outcome.
3. Green growth is a growth pattern that is efficient in its use of natural resources, clean in that it minimizes pollution and environmental impacts, and resilient in that it accounts for natural hazards and the role of environmental management and natural capital in preventing disasters.[106]
4. It deals with various issues like, green curriculum, Training, green community, green research etc. so as to create eco-friendly generation and climate resilient economy.
5. Growth with environmentally friendly
6. Green growth is a growth pattern that is efficient in its use of natural resources, clean in that it minimizes pollution and environmental impacts, and resilient in that it accounts for natural hazards and the role of environmental management.[107]
7. Past a decade; Ethiopia was very known green infrastructure. But recently not. So, to overcome this.
8. green growth means fostering economic growth and development.
9. green growth regards to as a name green site in and out in all activities and environments by performing of different planting which means edible and non-edibles; planting by using as a standard of TVET green manuals
10. it is to mean making an environment suitable for free from any pollution. sustainability is to mean continuity of something as it is(persistence)
11. Decreased amount of carbon in the air that affects climate change
12. in my opinion, it means becoming environmentally friendly and sustainability of natural resources for current and future generations.
13. **Continuity Development of Economic and social Human Mind of the Society.**
14. Green growth mean relating with mind and environmental protection from poisoned air and good work environment.
15. Greening skills or vocations, greening income, greening decent tasks jobs as well

[106] https://www.worldbank.org/en/news/video/2018/05/09/green-growth-for-sustainable-development

[107] *Ibid.*

16. Green growth mean encouraging economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies.[108]
17. First green growth, in good thinking and positive attitudes. Second, keeping the environment from natural and human creation of hazards.
18. To me green growth is to decrease the air pollution and the attractive people's lives
19. Making the both the ecological and working environment conducive or friendly through applying pollution resistance mechanisms as needed
20. fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies.[109]
21. **As to me, green growth / sustainability is the economic growth program that is resilient to ever-changing environment. The program usually utilizes renewable resources.**
22. sustainable for development of the TVET and the country
23. **It is sustainable community development**
24. It is good idea
25. **Free from carbon emission**
26. **Producing Committed green mind trainers & Administrative workers. Making the curriculum & the training green. - Making comfortable the training workshop, classroom, the office & the compound with the help of Kaizen philosophy**.
27. **...my understanding toward sustainability is better. Because, I have got a chance of participating in different meeting on sustainability issue. The central focus of sustainability is the development of social economic and environmental situation of the society. My understanding of the Greening is focused on greening campuses with plants, cleaning workplace, and protect environment from different chemicals.**
28. **To deal with environment protection and keeping the natural resources for the current and future use**
29. **Building Development which could not affected by climate change.**
30. To me it is significant to our life and sustainable economic development
31. **Sustainable economic growth and development in an eco-friendly manner, where tasks and activities are in line with protecting the environment**

B. TVT college leadership understanding of international environmental agreements

- Remove adverse impacts of municipal waste; prevent environmental pollution; and ensure proactively the integration of environmental and ethical dictates especially mainstreaming gender equity in development; 4. Producing trained citizens striving for sustainable growth and improvement.
- Copenhagen agreement
- I don't have any clue.
- Doing more on green growth, awareness, preparing edible seedlings and distributes for the local community. Providing training concerning green economy
- There are two relevant approaches here with regard to TVET: Firstly, integrating green skills in existing vocational giving training. secondly, supporting partner colleges as required, in building skill profiles with independent environmental professions.

[108] https://www.oecd.org/greengrowth/

[109] *Ibid.*

- Ethiopia has taken a bold and ambitious decision to set its vision to achieve middle- income status by 2025 while developing a green economy.
- "External green and internal clean the college as a kaizen modality participating on climate change of characteristics about TVET Green"
- Yes, Ethiopia has committed for sustainability agreement on greening.
- Quality education, environmental protections, occupational health and safety, clean water and sanitations, affordable and clean energy, decent work & economic growth...
- The most important international environmental/sustainability agreements from TVET college are very important, because curriculum is already incorporated about TVET Greening; so, we are committed to implement in our college.
- Afforestation ang green legacy
- important for the synergy/addition of communities, tool for economy development, means for community service
- Controlling Air Pollution
- Trainee all employee and students to make green TVT including inclusive competency
- To my college Perspective good institute for health metrics
- The MDG goal
- world climate agreement
- protecting the environment from pollution due to wastes, safeguarding resources from degradation, waste reduction
- The Conservation Strategy of Ethiopia (CSE) and the Environmental policy of Ethiopia (EPE) were adopted in 1997. Federal laws on environmental organs establishment, environmental pollution control, solid waste management, and environmental impact assessment (EIA) as well as effluent emission standards have been issued.
- Green TVT
- producing middle level technical for the green economy.
- Offering practical training with different occupations in order to transform the country to industry zone.
- Quality Education and training, Green TVET and poverty reduction issue
- the agreements on greening TVET and inclusive training
- Climate change mitigation issues.
- Convention for climate change, Paris agreement and Vienna convention
- I don't think that Ethiopia had signed an agreement

C. TVT college leadership understanding of the greening education agenda

1. Create drought resistance environment by planting trees.
2. It is sustainable education which is empowerment through knowledge, skills and values to protect the planet. Education for sustainable development (ESD) is a national consent with UNESCO's education sector response to the urgent and dramatic challenges the planet faces.
3. Technical and Vocational Education and Training (TVET) in Ethiopia seeks to create competent and self-reliant citizens to contribute to the economic and social development of the country, thus improving the livelihoods of all Ethiopians and sustainably reducing poverty.
4. On recent TVET policy (2020) and strategy, green TVET as one of intervention strategy.
5. Education focusing on environmentally friendly

6. A growing number of initiatives and actions on climate change, biodiversity and sustainability are taking place across Ethiopia in education and training. For Example, let we take a green legacy.
7. Approaches to quality education for climate action.
8. Every people make planting in your environment: annual, quarterly rural and town community make plant edible and non-edible plants
9. The agenda toward greening education centers is now increasing
10. It is mainstreaming a curriculum especially in TVT.
11. It is a broad green project, designed to bring us the big green ideas that can help us deal with the modern world.
12. I know, greening education in TVET is to Increase Trainees mined to Think the Future Economic and Social development of the Society.
13. There is no green Education but government trying to announce by media
14. it is social, economic and environmental well-being
15. Educating the youths about greening economy though each competency
16. All people most take the responsibility to green nation
17. Greening in education means the generation keep trees
18. Greening has to be included within the training Curriculum
19. making curriculum suitable for greening concepts and making the school environment green
20. As to me, national agenda for greening the education focuses on incorporating relevant training courses to the education and training sector to capacitate people and hence make them capable of realizing green economic development.
21. "Green Agenda is a broad green publishing project, designed to bring us the big 'green' ideas that can help us deal with the modern world.
22. Greening' an institution is a method of modifying the institution's awareness, behaviors and activities with the goal of matching them up with the broader principle of sustainability - that is, economically, socially and environmentally responsible."
23. Focus on creativity and job creation
24. Yes, good advantages of the students
25. Strengthening the Integration of Climate Change Education into the Formal System of Education of Ethiopia.
26. Greening education means making the curriculum & the training to new technology
27. Greening Education mean a strong educational curriculum which focus on sustainable development issues like climate change, disaster risk reduction, poverty reduction etc.
28. to include the greening concept on the curriculum
29. I have no clear understanding.
30. It has the goal of create environmentally conscious citizens by 2030
31. Green education is not an option, it is a must that every educational policy should take care of. It is a matter of survival. Hence, making green education an agenda is the first priority and issue of the century. An educational system that doesn't take green economy as an agenda in its curriculum is not complete

D. TVT college leadership understanding of what green TVT means

- Make the college environment more attractive and suitable to teaching - learning process.
- *" 'Greening' a TVET college is a method of modifying the college awareness, behaviors and activities with the goal of matching them up with the broader principle of sustainability - that is, economically, socially and environmentally responsible. Aspects need to be greened: a) Teaching methodology and content; b) Human capacity development; c) School management and ethics; d) Cooperation with the industry and partnership; e) Quality management; and f) Campus and facility management;"*
- My understanding of greening a TVT means reduce the usage of raw material, recycle waste, minimizing energy use, avoids pollution of the environment, proper use of resources and making the Environment green
- *Curriculum, working environment, Community, Working culture etc.*
- Planting different grass, plants and making suitable for work
- Understanding the core principles of greening of TVET institutions, the reasons for investing in green environment, expecting the potential return from investments in TVET, is an important first step in guiding the process.
- All aspects
- use of energy from renewable sources, transition to greater use of products and services that increase energy efficiency transition to greater use of processes that reduce/remove pollution and green-house gas emission and transition to recycling and reuse natural resources.
- Greening TVET college is applying external and internal green regards to green TVET manuals. In a sense, green means planting the compound by different planting trees also planting edibles and non-edible planting, also applying internal compound preparing renovating, painting, make showing direction by standard of TVET manuals, and rule.
- greening TVET is making the TVET compounds conducive environment for training and free from any pollutants
- Increased motivated workforce; human well-being; justice to be greened our college, delivering the staffs training, awareness creation
- *1) campus; 2) occupational standards and curriculum; 3) research and technology; 4) community and work place; 5) public private institutions, etc. needs to be green in all aspects*.
- Tevet Training and Greening is Human Development of Mined for the Future of Life.
- Green work environment and green mind
- "UBUNTUING/humanity towards others- college community, enhancing income generation, skill acquisition
- Greening TVET means the efforts of encouraging the culture of sustainable practices in TVET and facilitates the transition to climate-resilient societies and greater resource efficiency.
- Changing human resource as green thinking and making the environment as green plant and teach the people about green TVT
- I understand greening is the solution of decrease the air pollution
- Greening TVET is greening the Physical environment and the working environment and also enhancing concepts related to green sustainability to the Community
- Relating training curriculums with the greening concept and also making the TVET compound green
- As per my understanding, Greening the TVET college encompasses different issues bin addition to the greening of the compound using trees and flowers for creating pleasant work area. The other aspects to be greened include: waste disposal system; training system; type of energy that the college utilizes
- beautification of the campus
- Greening college; Greening skills
- "Income ....

- All energy sources must be replaced with alternative energy sources.
- Planting forest & food plant around the TVET compound; Making the curriculum & the training green with the help of current technology; Helping the society in different aspect
- My understanding of the Greening TVET is focused on greening campuses with plants, cleaning workplace, and protect environment from different chemicals.
- greening a TVET college means making the college compound safe comfortable for work, maintaining the facilities and reduce wastage
- After all attitude greening is basic
- The college shall start training in greenery, the college compound & its surrounding
- Producing graduates having an awareness on Green TVET. This: 1. starts with practicing planting trees in the college compound 2. Creating awareness on waste disposal, deforestation and air pollution 3. Innovating technologies which environmentally friendly and can contribute a lot to environmental protection such as waste segregation technologies

E. TVT college leadership understanding on activities for greening TVT

- planting eatable fruits, aesthetic tree and clearing unused plants.
- College compound afforestation; Fruits and vegetables cultivation; Establishment of technology research units for greening
- proper use of resource and minimizing waste
- Seedling preparation, biogas, green campus
- Preparing and disseminating different coffee and forest seedlings
- A Green TVET approach to sustainable development can pursued by our institution in partnership with policy enablers, industries and stakeholders with clear cut.
- planting different types of trees, vegetables and fruit
- preparing plan; make awareness; Identifying site of green; preparing team/group; allocate budget; participating all concerned persons
- deliver training, identifying the area for greening, deciding the types of green plant for greening and take action over it
- Awareness creation, skill training.
- there is a commencement in greening the campus, workshop kaizen implementation, awareness creation on the reformed policies in green TVET
- To implement the Green TVET curriculum, to clean and green the college and the Environment.
- planting and treatment of plants
- UBUNTUING underdisciplined college workers; delivering digital library service; cow fattening, honey behave service, planting multipurpose trees
- Beautifying the College's compound by planting different types of trees
- Team spirit or work together to green TVT national agendas
- To make sure and keeping the trees
- Plantation every year
- tree plantation, greenhouse, fishing, dairy farming, poultry, vegetation and landscaping
- planting the trees and flowers around the compound, treating wastes, reuse of waste materials.
- Identify what they wand and then create new curriculum for that skill then give training for enterprise in different skill
- solar energy

- Planting trees; Helping the society in maintaining cobble stone road; Maintaining the house of poor family; Helping the disable trainees by giving training.
- Awareness creation, strengthening the curriculum, provide quality training, develop quality teaching and learning materials, apply green legacy to control climate change
- participating on green footprint, planting flowers near the office and workshop
- Planning, creation of awareness, planting.
- Provide training in agriculture; planting trees and fruits
- Planting trees, solid waste management, implementing Kaizen in the workplace

F. TVT college leadership view of opportunities of aligning to the green economy

- The college agenda align with the national agenda by planting eatable and aesthetic trees.
- Promoting qualitative **economic growth** is a key building block for sustainable development as well as for poverty reduction; Also, TVET College can invest in training and systems to help the **disadvantaged groups** acquire skills required for participating in the green economy.
- the opportunities that we have - there is a river surrounding the college, good environment and land and human resource
- It can contribute a lot since we are providing training trainee coming from all parts of the country. Thus, inculcating the skills and able to address throughout the country.
- geographical Location and availability of 9-month rail fall, suitability of the land, desire of the people to plant seedlings
- When we start a green TVET, for not only beautification and also for fruit.
- **employment opportunity**, access to vegetables and fruits from for surrounding communities
- decreasing of inflation of market; make structed properly in all sectors (government and non-governments); climate condition of Ethiopia
- inclining with agenda of making green Ethiopia it is an opportunity for TVET college applying this agenda (since the agenda is the agenda of the country
- It is integrated with in TVET policy and having **occupational standards**.
- there is new reformed TVET policy and strategy that includes green TVET as a guiding principle so it helps to make it a driving force 4 implementations
- It is good opportunity's and support the green TVET
- delivering effective **training for sustainable development**
- There are many **Industries in our city** and willing to do with our college; Our trainers are very committed and interested on green economy
- We support by **keeping our environment** making green TVYT
- To make green growth accordingly their **own food**
- The government willing to enhance **greenery** is one of the opportunities
- manpower, suitable compound, suitable **curriculum revision** condition
- **The government's development programs are most focusing on development of green economy and hence and our college can produce sufficient workforce that is equipped with a greening capability to support the program**.
- **In green economy we reduced carbon emissions and pollution, enhanced energy and resource efficiency, and prevention of the loss of biodiversity and ecosystem services.**
- Good management approach and different needs
- Yes

- **open the center of alternative energy sources in the college. and especially in solar energy.**
- The preparation of the new TVET policy on green TVET agenda; The formation of the new labor & skill minster.
- Strong government policy, the government initiative, it is the global agenda, the natural resource of the country, availability of workforce in the country.
- **organizing awareness creation event; Experience sharing**; forming club
- The area has great potential in forest, free land to available green skilled youth in team, high protentional of charcoal mining, Presence of *Chebera churchura* national park, *Gebeta lahager halala* cluster is there,
- **Contribute to environment protection; Get support from NGOs**
- The National green legacy agenda, **the inclusion of some courses in the curriculum** like "work effectively in an environment, occupational health and safety"

G. TVT college leadership view of employment opportunities to TVT graduates in the green economy

The following were the additional answers provided to the question, "Do you think there are employment opportunities for your students in the green economy sector?

- in private and government sector
- Urban greenery, Agricultural sector, Water supply enterprise
- agricultural offices, greenhouse, university and privet farms
- Seedling preparation, urban beautification, training
- Urban beatification
- City Administration and Municipality
- forestry
- agriculture
- Agriculture, manufacturing, administrative, and service activities aimed at substantially preserving or restoring environmental quality, energy, construction, ICT, municipality service
- Agriculture Sector
- Agriculture and green buyer
- Job opportunity in the green legacy club cafe
- Solar Energy
- After one years we start agro or land plant and environment development departments
- Construction
- In nursery plantation waste recycling, solar cells production and distribution
- vegetation and other urban agriculture like dairy and poultry
- recycling, planting, renewable energy generation
- In a green economy, growth in employment and income are driven by public and private investment into such economic activities, infrastructure and assets that allow reduced carbon emissions and pollution, enhanced energy and resource efficiency, and prevention of the loss of biodiversity and ecosystem services.
- Self-employment and enterprise
- solar energy.
- Electro- mechanical, electrical electronics/ solar energy/, water supply

- In Agriculture, Water technology, Electro- Technology (solar energy), Garment technology, tourism sector
- as stated above in question 11
- Horticultural production, gardening
- Agriculture, health

H. TVT college leadership view of entrepreneurship opportunities to TVT graduates in the green economy

The following were the additional explanation given to their answers on the question, "**Do you think there are entrepreneurship opportunities for your trainees in the green economy**?"

- by seed selling
- Waste recycling works; Fruit and vegetable processing; Afforestation
- vegetable production, fruit production, poultry production, dairy production etc.
- Biogas, Training, Seedling preparation, urban greening etc.
- Preparation of coffee seedlings and providing them
- I believe green entrepreneurs, a dynamic force, can help us in building green, inclusive and localized economies. anywhere
- urban agriculture
- All areas that people are entertained. Public and private institutions.
- Alternative energy sources (e.g., Solar PV system installation, Biogas, wind power system, greening& beautifying the cities), Digitalization, green building works, etc.
- plant science and Forestry
- Nursery area
- Green legacy club has already established in the college
- Assembling and maintaining solar energy equipment
- By small medium enterprise they can produce any types of trees
- Waste recycling solar cells, biogas production
- vegetation and other urban agriculture like dairy and poultry
- resource recycling wastes, greening working environment using economic trees and flower
- Green entrepreneurs are important for economic development. Green entrepreneurs can make a significant contribution to eliminating unemployment, poverty and environmental problems. Green entrepreneurs have a greater role in environmentally friendly practices and environmental tasks than other entrepreneurs
- How to create job
- Your town
- solar panel maintenance, solar motor pumps and so on.
- Production of bio-gas, Electro-mechanical/Water pump, producing brick
- In Agriculture, Electro- Technology (solar energy), Garment technology, tourism sector
- in recycling waste materials
- In different economical fruits, coffee, ornamental flowers, vegetables
- Horticultural production
- Agricultural

Annex 16: TVT college trainer's understanding of green growth and green TVT

A. TVT college trainer's understanding of green growth

- I have good [understanding] on green and growing and sustainability
- limited
- Not enough
- At first my understanding of greenery is simply planting a Tree, covering a field with grass and the like but now after new TVET policy and Strategy it has a broad concept it incorporates **waste minimization, reuse, recycle and minimizing emission of hazardous chemicals to the environment**....
- TVET is a complex sector, in which a wide range of skills and knowledge is imparted in a wide range of settings. Greening is an emerging and ongoing concept that has an infinite timeframe. **Development that meets the needs of the present without compromising the ability of future generations to meet their own needs**[110]
- Green growth is best alternatives to prevent **environmental changes and risks**. it helps to reduce carbon and increase oxygen for us.
- increasing of TVET economy and more [motivation] of colleges to train
- environmentally sustainable may be the future the world needs these types of growth
- **Contribute to preserving in restoring environmental quality, longstanding demands and goals of the labor movement**
- green growth is necessary for survive in our life and developing our self and our country.
- Green growth/sustainability means encouraging economic growth with by ensuring environmental sustainability. **Each economic growth shall be environmentally friendly, economically feasible and socially acceptable**. General it's better to use alternative energy source's than using natural gases like fossil fuel.
- Good
- I understand the green growth strategies is ensuring that natural assets can deliver their full economic potential on a sustainable basis. That potential includes the provision of critical life support services – clean air and water, and the resilient biodiversity needed to support food production and human health or green growth means fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies.
- I HAVE LITTLE UNDERSTANDING ON GREEN GROWTH/SUSTAINABILITY ISSUE
- good
- It is the term which indicating the ways of growing the societal economy without adversely affecting the environments of coming generation.
- Good
- **I like this idea b/c the green growth is the basic need of the world. It minimizes greenhouse effect and global warming. It maximizes personal satisfaction. It motivates the future growth of our country.**
- I think in my opinion green growth means growing up with greening activities which are using renewable energy and transfer our product or service in to energy efficacy product and service.

[110] Borrowed from Brundtland Commission of 1987: not bad in itself if the respondent knew about the Commission but there is also a likelihood that googling the issue might have led to that answer.

- I understand green growth is the socio-economic idea and implemented by agriculture
- Green Sustainability in my understanding is using **environmentally friendly products** and services in a way that **does not damage the future generation's resources** by covering the institute's compound via plants those have both economic and aesthetic value for human beings and animals. It is a particular study about having green land coverage in specific work compound; and those plants have both Economic, Aesthetic and Animal feeds Value for the institute.
- It a continuous and non-stopping economic growth without damaging and/or keeping the environment and also creating attractive & safe working environment.
- I believe that green growth is the core of our economy
- I understand to be productive and to make the work space beautiful and attractive
- Green TEVT is very important for making attractive training environment and help for contributing in improving climate changes.
- It's not much
- According to my understanding green growth is a style of using of natural resources in that it minimizes pollution and environmental impacts continually without the system leads to natural hazards by human activity and the role of environmental management and natural capital in preventing disasters.
- Green Growth in the context of TVT as of my understanding is making green futures of the trainees in all aspects such as motivating them in creation, innovation, improving and sustaining them for better change.
- "The green growth skill on TVET it is good to eliminate the waste, reduce the climate change and promote the green areas in the college."
- Nothing
- Making conducive environment by developing OHS, skilled man power, protecting weather condition by forestation and afforestation and etc.
- Sustainability through holistic approach such as environment, Economic, culture and social consideration for development
- continuous improvement
- I think this concept deals with using of renewable energy sources, efficient utilization of energy, and the reduction of greenhouse gases for the sustainable development of countries.
- I do not have any information
- Green growth is a growth pattern that is efficient in its use of natural resources, clean in that it minimizes pollution and environmental impacts, and resilient in that it accounts for natural hazards and the role of environmental management and natural capital in preventing disasters.
- Making the environment green by planting different plant. it means also reducing environmental pollution during production and after production by using different technique's such as reuse, recycling, reducing and others.
- Green growth/sustainability is making our surrounding environment green, comfortable, recycling by-product and using renewable resources like solar energy overall creating conducive environment for the sake of life existence.

B. TVT Trainers' understanding of green TVT

- Technical and vocational education and training (TVT) understood as comprising education, training and skill development relating to wide range occupational fields and production service.
- Creating of safe environment or free from any pollution
- In my understanding Green TVET College means the campuses with green fruit and vegetables, reducing and eliminating waste which polluting the environment, for this reason, include them in the courses in the TVET system, and be able to create a clean and comfortable environment for work in TVET and promoting in all areas beyond.

- *The process of pursuing knowledge and practices with the intention of becoming more environmentally friendly, enhancing decision-making and lifestyle in more ecologically responsible manner, that can lead to environmental protection and sustainability of natural resources for current and future generations*.[111]
- Green TVT mean make a green environment or compound in the college by using attractive plants and create awareness for the society.
- *Greening TVET describes the efforts of fostering the culture of sustainable practices in TVET and facilitates the transition to climate-resilient societies, greater resource efficiency, and circular economy.*[112]
- No budget from government finance and Private finance. So, give the Budget for green TVT
- *Describes the efforts of fostering the culture of sustainable practices in TVET and facilitates the transition to climate-resilient societies, greater resource efficiency, and circular economy.*[113]
- *Green TVT means developing the habit of culture of sustainable practices in TVT and facilitating the transition to climate resilient societies*.[114]
- Green TVT is the back bone of the country.
- "In general, beside with different training, the implementation of planting the plant in the campus for different purposes" like recreation value, landscape and design for the decorations, research center for the plant science student to cooperative training. Greening of TVET is not just about the courses we teach; it goes all way down to how we light and power to how we clear the waste. A green TVET will invest in policies and technologies that reduce the usage of raw material, recycle waste, minimizing energy use, and avoid pollution of the environment. Greening of TVET is also an opportunity to explore and develop new ways of entrepreneurial learning, and business development start up where sustainable and social enterprises are encouraged.
- MAKE A TVET COMPUND GREEN AND ATTRACTIVE AND ALSO ATTRACTIVE WORKPLACE FOR WORKERS.
- to reduce air pollutant
- It is one of the institutions, which provide good knowledge, skills and attitude for the trainee's, to conserve natural resources like water and biodiversity, optimize energy efficiency, manage waste and minimize climate change.
- Green: Our College is overall having Continuity
- Green TVT means in my opinion/my understanding is every TVT is glory and fancy about the workers and customers. It satisfies every customer and every learner. It builds comfortable situation to the TVT customers.
- Create skillful trainees who understand and engage to solve the problem of our Environment, recourse scarcity and the climate change and also each training and college compound of TVT colleges will be attractive and free from environmental impact and utilization of resource
- the green TVET is a new socio-economic idea and paradigm strategies. This entails transitioning to green jobs and green skill and creating new jobs in the relation to the greening of workforces
- Green TVT Challenge means all about those difficulties or barriers to implement and practice Green TVT and Skill Development in TVET institutions.
- Green TVT mean: making attractive, safe and minimizing environment pollutants practice in TVT college. So, it is not only planting a plant, also keeping the environment.
- (1) Green our college staff (mind set); (2) Green the compounds and keeps the climate; (3) solve sustainability issue

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[111] Adopted from UNESCO-UNEVOC (2017). Available on-line at: https://unevoc.unesco.org/home/TVETipedia+Glossary/filt=all/id=725#:~:text=The%20process%20of%20pursuing%20knowledge,for%20current%20and%20future%20generations. [Accessed on 07.11.2022]

[112] Adopted from UNESCO-UNEVOC. Available on-line at: https://unevoc.unesco.org/bilt/BILT+-+Greening+TVET [Accessed on 07.11.2022]

[113] *Ibid*.

[114] *Ibid*.

- With a beautiful and attractive TVT College, a good learning master is to make a trained and productive generation
- It is making green training environment in well designed and organized manners by planting fruity, attractive and beautiful trees.
- Use green atmosphere around TVT like plated and green area and related to weather .and also directly related to solar system technology
- It refers to initiatives to promote a culture of sustainable practices in TVT and ease the transition to societies that are more resource-efficient, climate-resilient, and reliant on a circular economy.
- It is the efforts of fostering the culture of sustainable practices in TVET and facilitates the transition to climate resilient societies, greater resource efficiency, and circular economy.
- Specially [in our] Polytechnic college the green TVT it means a lot such as, it improves the use of productivity, Reduce the waste and promote the employment for TVT graduates.
- Developed or capable TVT college by skilled man power, machines, tools, equipment and making conducive environment to achieve the desired goal.
- Development of competent well qualified workforce with update green skill for sustainable development
- making continuous development for TVET
- In my opinion, TVT college which extends its training to include concepts in the utilization of renewable energy sources and efficient energy utilization can be considered as a green college. In addition, the college should apply the concepts for its own use.
- From my understanding it is directly related to climate change if our college will green it contributes great for prevent our environment
- Greening the institution, use of renewable energy sources.
- Making the TVT compound green by different greenery. it also using renewable energy to reduce environmental pollution. we can also say it is a collage which use waste minimization techniques to reduce waste and pollution.
- Green TVT means creating green environment like making green the college, using renewable resources, recycling by-product, efficient use of resources

C. Trainers' perspective of employment opportunities for TVT graduates in the green economy

- landscaping, recycling of agricultural products into animal feed, fertilizer and energy source.
- industry park, agricultural sectors
- Industry Park, agriculture sectors, any areas may include according to the situations
- in urban development and Municipality
- industry
- forestry, farming, tourism
- students can be actives on the opportunity of green economic sectors like that producing of different types of seeding, for their community for example producing of floriculture, olericulture pomology and any plantation seedling
- industry sectors, example agro processing industry parks
- Waste collection and recycling, Seedling production....
- Awi/Injibara. Manufacturing, EELPA, Oil Factory & Other.
- enterprise around Debre Markos town and Debre Markos university
- ENVIRONMENTAL PROTECTION AND NATURAL RESOURCE UTILIZATION
- In both government and individual sector

- companies, might produce green product
- Like Agricultural government sectors there is at least one Nursery site and Horticultural crop production that is fruit and vegetable production farm.
- Urban beatification or greenery, waste disposal...
- In solar sector and green production.
- Students could cooperate and doing this job for city greening and also in Haramaya university there is employment opportunities.
- Especially modern company and Organization that run with foreigners
- In the environmental protection particularly in non-governmental organization
- Ministry of Agri, Higher institution, Environmental protection, Private their own business
- industry
- Urban greenery
- Urban greenery, agro processing

D. Trainers' perspective of potential employers of TVT graduates with green skills

Zonal city administration greening core process.

May be industry park, agriculture sector

From Teleport

Burie industry park

Landscape and Environmental impact management in Burrier industry park

Oil Factory; EELPA; Ethio Telecom; Flour Factories; Atnkut

Some of our trainees employed by Fitche town by Greening town and waste management

Private and Governmental Nursery sites are examples me.

Yared steel making industry

Private nursery plantation center

mechanics

Water mine and energy

E. Trainers' perspective of entrepreneurship opportunities for TVT graduates in the green economy

recycling of waste materials, like organic fertilizer preparation

Recycling of waste materials, like organic fertilizer preparation

Municipality and Large industries

forestry, farming

especially vegetables

IT

industry sectors, example agro processing industry parks

In woredas Environmental protection offices, Town municipality, Land administration and use offices....

Injibara (EELPA), Oil Factory, Building Electrical Installation

NATURAL RESOURCE UTILIZTION

As experts of organic farming

agricultural

automotive

solar energy

Horticultural and crop production or fruit and vegetable farms like Green Houses, Governmental and Private Nursery sites.

Greenery

Production and process

Environmental Greening

Renewable energy

In environmental protection and manufacturing area

Gambela Town

By creating job opportunity

Private nursery plantation center

Automotive, construction, manufacturing

Agro processing

Annex 17: TVT college courses with elements of green growth and climate change aspects

A. TVT college courses with green growth aspects

- The awareness problem
- Maintain environmental work, observing and interpreting weather, applying chemicals
- in my subject area all the courses have the element of green issue but not implement/execute as expected... because of the challenges mentioned above
- Maintain and Repair Instrumentation and Control Devices; Prevent and Eliminate MUDA; Apply 5S Procedures; Perform Technical Consultation; Perform Commissioning of Process Control Systems
- None
- Construction raw materials
- Some; Like preventive maintenance
- No courses in manufacturing class talk about green TVT
- 1. working in sustainable environment: Climate change adaptation and mitigation; 2. Forest development and utilization; 3. Maintain and monitor environmental work practices; 4. Soil and water conservation; 5. Non wood forest products; 6. Nursery establishment and management and so on
- Creative, Innovation & Technology Transfer person
- There are a few courses I have taught in different levels soil fertility, propagation, horticultural crop, landscape and design etc.
- CONTINOUS IMPROVEMENT AND GREEN OFFICE PROGRAM AS INITIATIVES FOR STUDENT
- automotive exhaust system
- Soil and water conservation, afforestation, organic soil improvement, develop soil health program...etc.
- Network Installation
- before the new curriculum I teach Kaizen subject. there is no courses or subject about this idea before learned process.

- the core competences that have oils, acid, gaskets, refine petroleum's, asbestos product, ...
- Haven't
- In my teaching unit of competences as Green TVT element includes: Nursery site establishment; Pasture and Forage development which involves grasses, shrubs, trees, etc. both have economic and esthetic value.
- Actually, almost all courses have elements of green issues. To mention the major courses, dairy production, fattening, swine production, poultry production and sheep & goat production are contained more about green issues.
- All
- Kaizen
- No
- Solar installation
- The existing curriculum is more not focused on the green TVT system so I would like to point this out in future linking this system in to Learning Curriculum
- Kaizen, working with other, participate in workplace environment.
- Kaizen (MUDA)
- OHS, maintain tools and equipment and the like
- Forage and pasture; Aquaculture; Beef; Rangeland ecology
- Industrial development strategy and comitative manufacturing strategy
- Refrigeration and Air Conditioning Engineering and in some sense Turbomachines
- All Automotive technology department courses are directly related to green issues
- Environmental protection,
- Waste minimalization techniques
- Managing environmental protection process, retrofitting,

B. TVT college courses with climate change aspects

- environmental policy and procedure courses.
- Construction
- Observe climate and weather
- in textile chemical processing course
- Apply 5S Procedures, Prevent and Eliminate MUDA, Perform Commissioning of Process Control Systems, Maintain and Repair Instrumentation and Control Devices
- selection of raw materials
- Climate change adaptation and mitigation
- Basic Electricity/c Use Electric decrease C2O, deforestation,
- climate change course in level V
- MINIMIZING CO2 FROM AIR AND IMPROVE PLANTATION IN EVERY PLACE
- automotive exhaust system
- Afforestation and Apply Interpreted weather Data and Minimize crop production risks
- In Location
- engine overhauling, battery servicing, fuel system, brake system

- Yes, I address climate change issue in unit of competences I train like Intensive Forage development and Nursery site establishment.
- Dairy production, swine production
- የግድ ቀጥታ ከግሪን ጋር የተያያዘ ትምህርት ማስተማር አይጠበቅብኝም ግን በየሰብጀክቱ ግሪን ቲቼትን አላማ ማስፈፀም እችላለሁ ለምሳሌ በሶላር ትምህርት እንዲሁም ተማሪዎች ራሳቸውን የሚችሉበት ስራ የሚፈጥሩበት ሁኔታ ማመቻቸት መቻል ... የሚሰሩት ፕሮጀክቶችን በቀጥታ ክላይሜቱን እንዲነካም ማድረግ ይቻላል
- Kaizen
- Not too much
- KAIZEN
- **Environmental science is missing in TVT course**
- Managing the safety and environmental protection.
- Forage and Pasture and Rangeland ecology
- Refrigeration and Air Conditioning Engineering
- For example, in gasoline and diesel engine overhauling
- Waste minimization techniques
- Managing environmental protection process, retrofitting

Annex 18: TV students' understanding of green growth and sustainability issues

- greenery and beautification
- not very much
- It's about carbon free future, more natural and environmentally friendly way of life.
- If I rate it 1-10 it will be like 7
- It is the utilization of different energy sources which are not harmful to the environment, Such as sunlight, wind, biofuels, etc.
- Fostering Economic growth while ensuring natural resources.
- green growth is one of a basic project to control climate change and keep the environment safe. It helps a country for sustainable economic and environmental development.
- Not much but as I understood it is about products or services in a way that does not damage the future generations resources.
- Green growth in our community is not seriously used because we are not work with effective educated man power
- Now in our country the green growth is very appreciated.
- economic growth environment
- Green growth is an essential issue which can make a development with a green future.
- Good

Annex 19: Gaps identified by TVT college leadership and capacity self-assessment

A. Gaps and challenges identified by TVT college leadership

- Skill gap
- Awareness gap concerning Green TVET; Skill gaps on the part of teachers on their existing jobs to meet greening skill demand
- there is a challenge of transportation to cooperative training and scarcity of laboratory input and scarcity of water on demonstration site
- Training materials, Technology, resources
- Lack of inputs and vehicles to address and fund to provide more
- Inadequate materials, tools, equipment and workshop is a major reason
- No OS, curriculum and training materials, trained personnel
- lack of professionals, awareness, budget, training, access etc.
- scarcity of water, accessibility of infrastructure/input/material, problem of understanding agenda
- There is no [clarity] skill for green economy, and their impacts.
- Skill gaps, Financial/budget constraints,
- practical work area, water, and some teaching materials
- Understanding and interest about the green TVET
- Lack of trained staff
- Lack of equipment to give a training on solar energy
- Water problem; power or generator or solar power
- Less attention in creating awareness about greening
- supplies and budget deficiency
- Lack of awareness and focus for the green skills issue; the demotivated trainers' mindset due to insufficiencies of incentives
- there is limited evidence of a mainstreaming of policies within these fields, suggesting a potential for better cooperation, awareness and action among policy-makers and the social partners
- Trainer skill gap, equipment shortage and shortage of budget is the main challenges
- and solar infrastructure in workshop and laboratories.
- lack of commitment on the side of trainers; lack of budget; lack of attention from local government
- Lack of training facilities, skill gap of trainers, lack of well-prepared curriculum and teaching training material (module)
- the greening activity mostly carried out by voluntary staff members; there is resistance to sustain among few staff members
- Lack of new approach to devote trainees, shortage of finance, water shortage,
- Budget and trainers
- Low awareness level of trainees and trainers, poor support from the local government

B. Self-assessment of TVT college leadership on capacity gap core issues

On a scale of 1-5, how do you self-assess your college's capacity of "Institutional Arrangements" from the perspective of the work that need to happen for effective "Green TVT and Skills Development"?

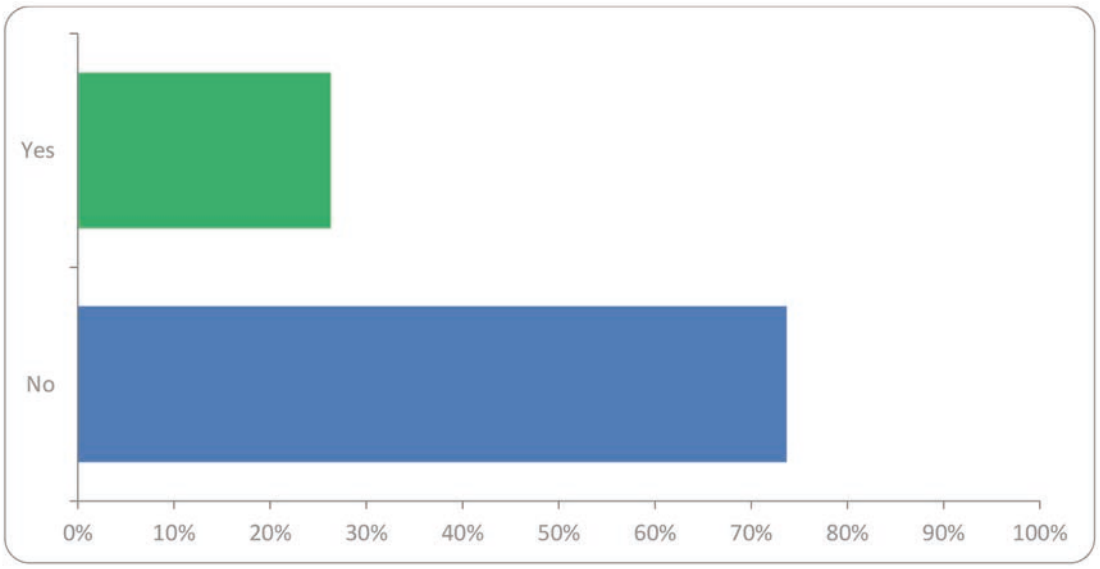
On a scale of 1-5, how do you self-assess your college's capacity concerning "Leadership" from the perspective of the work that need to happen for effective Green TVT and Skills Development?"

On a scale of 1-5, how do you self-assess your college's capacity concerning "Knowledge" from the perspective of the work that needs to happen for effective Green TVT and Green Skills Development?"

On a scale of 1-5, how do you self-assess your college's capacity concerning "Accountability" from the perspective of the work that needs to happen for effective Green TVT and Green Skills Development?"

Annex 20: Gaps identified by TVT college trainers and capacity self-assessment

A. Trainers' assessment of own technical capacity on green growth concepts



B- Skills development sought by trainers for teaching green growth

subjects

- relating to environmental issues or green revolution
- To be effective, we need some training about it.
- In-depth knowledge and skills in green professions, skills and knowledge that the rest of the world has reached, especially new discoveries related to the courses we offer...
- How to get collective training can be mobilized by establishing green agendas as a norm in an institution.
- Plant science or forestry
- creation of curriculum like one course
- Training
- Developing an institutional greening plan of action
- short term training about green TVET growth courses must be providing.
- Experience sharing especially from other organization /countries how they are environmentally friendly for their economic developments.
- Common course. Psychology.

- practical lessons and training specially tissue culture concepts and technology like clone / asexual reproduction of plant by technology and the important materials that relevant for the such green profession and research center for cooperative training to the student in order to seeking about essential technics and skills about the green.
- TRAINING RELATED TO GREEN GROWTH CONCEPTS AND IMPLEMENTATION METHODS
- General garden care and lack of knowledge to treat garden diseases
- If there is newly specified material on green growth, I need them to read and if there is training on this issue??
- skill Knowledge
- The trainees learn for [tb be] skilled or qualified person
- Real training about green based automotive technology there is a lot of subjects in this body of knowledge
- The government Develop curriculum
- Capacity building training and short-term training regarding to Green TVT and Skill Development are among my need in this particular and great task.
- Since it is new idea for us getting skill is crucial especially, the difference between with Kaizen.
- I need full knowledge
- I need advanced training to change my attitude
- Few theoretical concepts and technical skills about: 1. Preparing area for planting; 2. Seeding of plants
- It's about attitude to change this attitude it should be continue training
- I specially need additional skill on green TVET because I believe that the view of this system has important pillars to change our mindset in order to implement it as needed to bring change.
- specific skills required to teach; focus of green profession; whom to teach, when and what to teach
- It needs the organization to influence the federal TVET agency to include the green skill course in TVET curriculum development system
- Training
- Protecting their environments and workshops as well as coworkers from hazard, accidents, injury or death
- Agroecology, Ecosystem and Hydrology
- green TVET strategy and how it can be implemented
- Short-term training regarding the issue
- For example, I want to know in detail about different exhaust gas analyzer
- Alternative energy sources, climate change, Environmental protection
- I want to develop my capacity by different training on green growth.
- I want to take different topics about green skill, training about sustainability and green environment

C.. Additional support needed by trainers on education for green growth

- Technology aid
- we need training and teaching materials
- We need trainings as well as teaching materials
- Providing organized theoretical and practical training in this regard; It is possible to improve our Green TVET activities by supporting colleges with budget after the training delivered and implement
- Training on sustainable greening based on my department or profession

- Training
- train out based train like project based
- Continues training
- Clarifying the green concept; ideas and methods for organizing activities a green plan
- green TVET additional training.
- More courses about green development and how to integrate economic developments with environmental sustainability.
- Skill Gap Training
- we need from the project class room, standard laboratory rooms that are essential for tissue culture or plant biotechnology, the essential equipment or material for plant biotechnologies.
- TRAINING AND MATERIALS ABOUT GREEN GROWTH
- training
- Based on the number of people which increase through the time, there is natural resource degradation. so that, to minimize these problems in short time by building the capacity of generation if there are new materials and ways, I need them.
- The trainer is given short- or long-term training by qualified person and for the future this subject is include the learning curriculum lower level to higher levels and colleagues.
- Training and materials that support our trainings
- it required training for all stakeholders on green TVET
- As a trainer, I need additional short-term training and experience sharing with those who have better practice in this area.
- How to incorporate with other courses and corelate with occupations. And also, the concept of green profession
- Detail training about green profession
- to take well known training about green professions
- Technical skills on taking care of plants and how to beautify it
- continues training
- Workshop training with fulfilled material and access that support me as Trainer who is going to train the trainees.
- Practical and theoretical pre organized teaching package
- It need training on green development system.
- Skill gap training
- Regular training to gain additional skills
- Training
- to gain additional training on this aspect
- I need any new knowledge about the field
- International level Training opportunities
- Additional to training I need the facility's support also.
- Getting different materials and modules, training about green

D. Green growth professions in which TVT trainers seek to develop their skills

- animal production processing technology
- any areas need green revolution
- Maintain environment
- Greenery, waste elimination/minimization and management
- Industrial electrical
- Plant Science
- depend on soil type
- IT
- Environmental and climate changing
- Green jobs (green-collar jobs, sustainability jobs, eco jobs or environmental jobs
- Environmental engineering
- NATURAL RESOURCE DEVELOPMENT AND GREEN GROWTH APPROACHES
- Any where
- Green economy and sustainability
- Network
- advised automotive because it is Emphasis on renewable energy
- Building, agriculture, transport, tourism
- If possible, except my background study restriction in nursery site and Animal forage development.
- Farmer and technologist
- Environmental Specialist
- Renewable energy like solar energy, biogas etc....
- Manufacturing and environmental protection
- Agriculture
- Metal manufacturing
- Ecosystem Ecology
- industrial development areas
- Energy Efficiency in buildings
- Water resource conservation
- Waste minimization techniques and green growth
- Using solar panels, urban greenery, agro processing

E. Self-assessment of TVT college trainers on own technical capacity on green skills

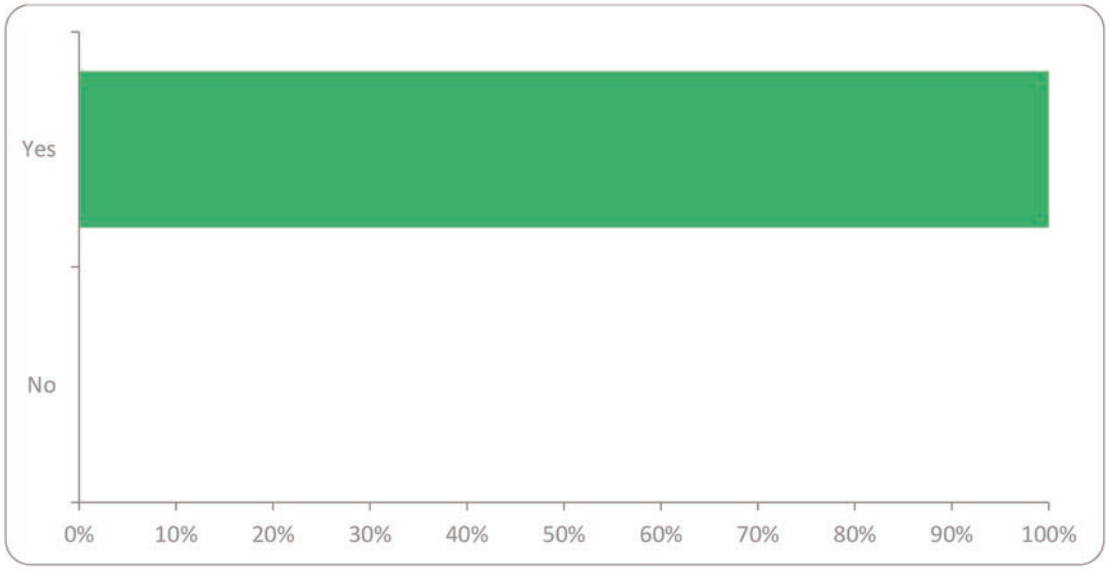
a. On a scale of 1-5, how do you assess your current technical knowledge on green growth and sustainability issues?

b. On a scale of 1-5, how do you assess your own technical knowledge and preparedness to educate trainees on green growth and sustainability subjects?

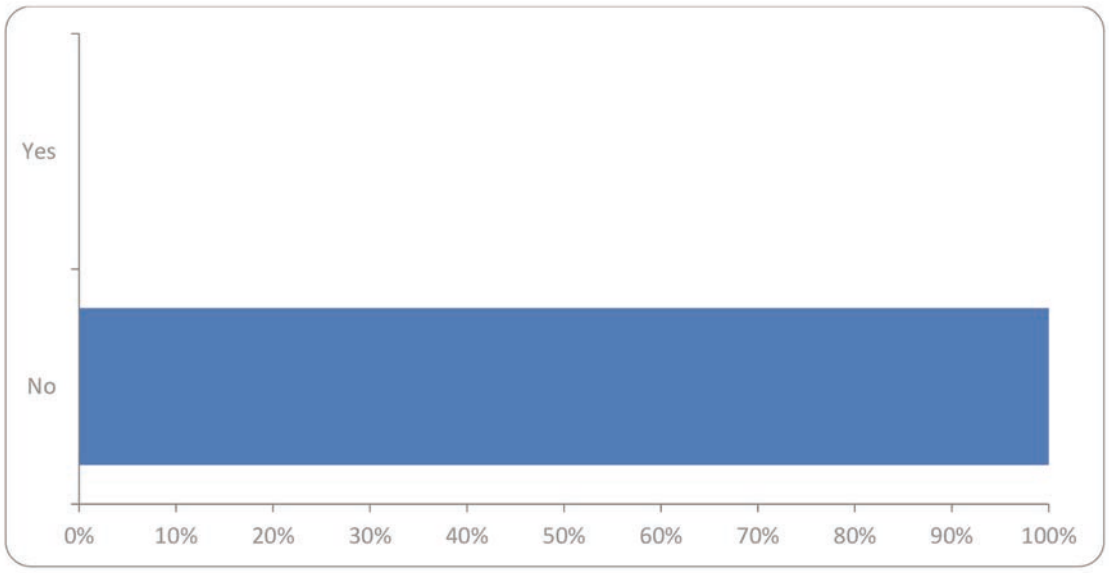
Annex 21: Labor and skills bureaus' assessment of green TVT implementation

a. Does your bureau have on-going activities or projects to support Education for Sustainable Development?

b. Do you think there are employment or job creation opportunities in the green economy for TVT graduates?



c. In your view and on a scale of 1-5: How adequately is Education for Sustainable Development (ESD) mainstreamed into both education (all levels) and sustainable development policies?



d. In your view and on a scale of 1-5: How adequately is sustainability principles integrated into education and training settings at tertiary level?

e. In your view and on a scale of 1-5: How adequate is the work being done (by all stakeholders) to strengthen the capacities of educators and trainers to effectively deliver ESD & CCE at tertiary level?

f. In your view and on a scale of 1-5: How do you rate the work that is being done (by all stakeholders) to empower and mobilize the youth, namely to multiply ESD and CCE actions among the youth?

g. On a scale of 1-5: How do you rate the work that is being done (by all stakeholders) to accelerate sustainable solutions at local/community level, to scale up ESD programs and multi-stakeholder ESD networks?

Specifically, for TVT institutions: On a scale of 1-5, how adequately do you think ESD and CCE are mainstreamed in TVT education and culture?

Annex 22: Portfolio of interventions for green TVT and skills development

Green TVT & Skills Development: Proposed portfolio of systemic interventions

Capacity need theme	Capacity Gap Core Issue*	Intervention ideas proposed	Beneficiary	Proposed activities		Potential partners	Remark
				Description of the activity	Focus of the activity		
Awareness	Leadership Knowledge Accountability	1.0 Technical capacity development on green growth and sustainability for the TVT sector	Labor & Skills experts (Federal, Regional & Zonal levels); TVT College deans and vice deans; TVT college trainers; TVT college trainees; Employers (Business)	1.1 Developing training materials and guidelines integrating appropriate methodologies for continued learning	Functional Clarity (Management Systems development)	EPA, MoPD, MoLS, FTVTI, Sector Ministries, EEF, CEEF, CETU, ECCSA Research Universities, Donors (ILO, GIZ, World Bank), Civil Society (ESD)	The following need to be covered: 1) Introduction to the concept and principles of sustainability and green growth (including the scientific, business, and normative rationales and imperatives) 3) Education for sustainable development: The rationales for ESD and related initiatives (e.g. CCE, Principles for Responsible Management Education, etc.) 2) Green TVT: Introducing the green TVT concept and principles based on ILO and UNESCO guidelines (a few of which are already reviewed in this Study) blending in selected case studies from around the world. Suggestions: To facilitate effective and continuing learning the training (modules) could also be made available on on-line platforms. Participants can also be encouraged to take them at their own pace, take assessments and generate Certificate of Completion; the target beneficiaries could encourage and put requirements for key employees to complete these courses on a yearly basis.
				1.2 Carry out regular awareness training events; document results (based on the guidelines developed)	Knowledge Management (KM) System		
				1.3 Set up local Community of Practice and local networks on Green TVT & Skills Development (Theme: Green Growth & Sustainability for the TVT Sector)	Knowledge Networks		
				1.4 Institutional twining arrangements for green TVT experience sharing and cooperation with regional/global centers of excellence	South-South Learning, Twinning		
				1.5 Pooling local talent/national expertise on green growth and sustainability; mobilizing local consulting market	Local knowledge Services		
				1.6 Supporting local knowledge capture mechanisms in a systematic manner.	KM		
Policy alignment and coordination	Institutional Structure Accountability Leadership Knowledge	2.0 Technical capacity development of the TVT sector for better alignment with national green economy goals (PDP-10, CRGE, NAP, NDC and the SDG targets)	MoLS (Federal, Regional and Zonal) Federal TVET Institute MoE TVT colleges	2.1 Review key national strategies and plans, namely PDP-10, CRGE strategy, NAP and SDG targets	Joint Visioning, Functional Clarity,	MoPD, EPA, sector ministries, MoLS, FTVTI, Donors, Research Universities	Policy Alignment & Coordination will also focus on building project management (The whole Plan-Do-Check-Act "Deming" cycle) For MoLS, that will focus on system document preparation and roll-out for green TVT mainstreaming as per the 2020 TVET policy and strategy: i.e.,. manual on the whole project cycle from market study to assessment
				2.2 Prepare guidelines for mainstreaming relevant goals and activities in the mission, vision and strategic plans of the TVT sector	Functional Clarity (Management Systems development)		
				2.3 Prepare guidelines for implementation, monitoring & evaluation and reporting of green TVT activities	Functional Clarity (Management Systems development)		
				2.4 Training on the final guidelines	Functional Clarity		
				2.5 Set up local Community of Practice and local networks on Green TVT & Skills Development (Theme: Planning, Implementation, M&E, Reporting)	Coalition Building; Joint Planning & Visioning	Industry/Business/ Employers represented by sector ministries, EEF, CEEF, CETU, ECCSA, sub-sector associations, EPA, Donors	Important will be to learn from what has not worked in the past on this issue. The problem is not expected to go away overnight as that depends on the technical capacity of industry (and employers). A continuous improvement process is what need to be aimed at.

Capacity need theme	Capacity Gap Core Issue*	Intervention ideas proposed	Beneficiary	Proposed activities		Potential partners	Remark
				Description of the activity	Focus of the activity		
Green occupational Standards	Institutional Structure Knowledge Accountability	3.0 Technical capacity development of the TVT sector on green OS development	MoLS (Federal, Regional and Zonal) Federal TVET Institute MoE TVT colleges	3.1 Preparation of guidelines for conducting labor market study for the green economy covering participatory mechanisms	(Management Systems development)		
				3.2 Preparation of guidelines for review of existing OS; for introducing green UC; for crafting new green OS	(Management Systems development)		
				3.3 Setting up database of pool of local experts on the green professions and trades (to support with curriculum review)	Local knowledge Services		
				3.4 Training on the final guidelines	Functional Clarity		
				3.5 Set up local Community of Practice and local networks on Green TVT & Skills Development (Theme: Green OS revision and development)	Coalition Building; Joint Visioning		
Leadership capacity	Leadership Accountability Knowledge Institutional Structure	4.0 Executive capacity in responsible leadership	MoLS (Federal, Regional and Zonal) Federal TVET Institute MoE TVT colleges EEF, CEEF, CETU, ECCSA sector ministries	4.1 Organize pilot short-term training on responsible leadership for senior officials	Joint Visioning, KM		Regionally (in South Africa): The University of Stellenbosch and University of Pretoria have executive development initiatives on responsible leadership. Locally, departments or colleges of business and economics (of research universities) could twine with regional universities to offer short executive development programs. Addis Ababa University School of Commerce and Ethiopian Management Institute are good candidates to spearhead this as national initiative
				4.2 Facilitate and support local capacity for executive development on responsible leadership: Identification of local and regional "centers of excellence" on responsible leadership; support institutional twinning	Local Knowledge Services; Endogenous Capacity; South-South Learning;		
				4.3 Support the preparation of locally owned executive development programs (short courses) on responsible leadership	Systems Development, Endogenous capacity		
				4.4 Preparation of guidelines for human resources development on responsible leadership and training on final guideline	Functional Clarity (Management Systems development		
				4.5 Training workshop on the guideline for human resources development on responsible leadership	Functional Clarity; KM		
				4.6 Set up local Community of Practice and local networks on Green TVT & Skills Development: (Theme: Responsible Leadership)	Joint Visioning; Coalition Building; KM		

Capacity need theme	Capacity Gap Core Issue*	Intervention ideas proposed	Beneficiary	Proposed activities		Potential partners	Remark
				Description of the activity	Focus of the activity		
Trainer capacity	Knowledge Leadership Accountability Institutional Structure	5.0 Training of Trainers on green occupations (new OS and UC): Pedagogy, management and technology	TVT colleges	5.1 Preparation of guidelines for review of existing curriculum of TVT ToT colleges (Federal TVET Institute)	Management Systems, Functional Clarity	FTVTI, MoLS, MoE, Industry/Business, Donors	It will be important for the Federal TVT Institute to document what has worked and what has not from the practice so far. Those lessons should inform the effort in ToT for green TVT and skills development.
				5.2 Setting up database of pool of local experts on the green professions and trades (to support with curriculum review)	Knowledge Networks; Local knowledge Services		
				5.3 Training on the final guidelines for revision of ToT curriculum	Functional Clarity, KM		
				5.4 Set up local Community of Practice and local networks on Green TVT & Skills Development (Theme: ToT on green professions)	Coalition Building, Joint Visioning, knowledge networks		
				5.5 Facilitation of institutional twinning of Federal TVET Institute with other universities specializing on TVET ToT	Twinning, South-South Learning		
Partnering capacity (with a focus on partnering with the private sector	Institutional Structure Leadership Accountability Knowledge	6.0 Technical capacity development on effective partnerships for green TVT and skills development	TVT colleges, Industry/ Business/Employers represented by sector ministries, EEF, CEEF, CETU, ECCSA, sub-sector associations	6.1 Organize pilot short-term training on partnering capacity for senior officials	KM, Functional Clarity, Joint Visioning	MoLS, FTVTI, MoPD, sector ministries, EPA, civil society, Research Universities, Donors	Partnering objectives: Resource mobilization; cooperative training; coalition building; institutional twinning, etc. Types of partnerships: - Partnering with the private sector, PPPs - Partnering with development agencies, donors, CSOs, universities
				6.2 Facilitate and support local capacity for partnering capacity development	Endogenous capacity, Local knowledge Services		
				6.3 Support the preparation of locally owned training packages on partnering capacity (short courses)	Endogenous capacity, Local knowledge Services, KM		
				6.4 Set up local Community of Practice and local networks on Green TVT & Skills Development: (Theme: Partnering Capacity)	Coalition Building, Joint Visioning, KM		
Research, Technology and Industry Extension	Knowledge Institutional Structure Leadership Accountability	7.0 Technical capacity for aligning research, technology and industrial extension functions towards green TVT and skills development	TVT colleges, MoLS Industry/Business/ Employers	7.0 Guideline (internal policy) for aligning research, technology and industrial extension functions towards green TVT and skills development	Management Systems, Functional Clarity, KM	FTVTI, sector ministries, sub-sector associations, EPA, research universities, donors, civil society	The assessments need to focus on: - what has been tried, what has worked, what has not worked and why? - Identify new (additional) technologies (including also green digital) - based on local needs, risks or resource endowments, and other criteria (financial viability, long-run acceptability, etc.) The guidelines also need to address the issue of incentives to researchers

Capacity need theme	Capacity Gap Core Issue*	Intervention ideas proposed	Beneficiary	Proposed activities		Potential partners	Remark
				Description of the activity	Focus of the activity		
				7.1 Assessment of green technology development experiences within the TVT sector	KM, Functional Clarity		
				7.2 Assessment of Industry Extension Services experiences within the TVT sector	KM, Functional Clarity		
				7.3 Dissemination of assessment findings to the TVT sector (TVT colleges)	KM, Functional Clarity		

*Note: The sequence in which the capacity gap core issue appear implies the order/degree in which the proposed intervention affects the capacity gap core issues

Green TVT & Skills Capacity Development Plan: Broad Theory of Change

Impact	**Sustainable TVT Sector** • Social: Equity and participatory goals • Environmental: Climate resilient & green growth goals • Economic: Meets efficiency and effectiveness goals
Outcome	**Change in Institutional Performance, Stability & Adaptability of the TVT Sector for Green TVT & Skills Development** • Government officials, executives and the community at large are conscious of sustainability and responsible leadership • MoLS and its regional bureaus & zonal departments are efficient, effective, robust and resilient in discharging the green TVT & skills development function • Federal TVT Institute effective in its services: TVT leadership & trainer development, curriculum development & policy advice • TVT colleges are effective at planning and executing green TVT & skills development objectives (training, research, industrial extension, technology development • TVT trainers adept at educating, researching and advising for sustainable development (Training, Research, Industrial Extension, Collaborative Training, Technolgy Development & Transfer) • Proactive businesses and employers which innovate and integrate green/sustainable approaches & technologies; clearly define green Occupational Standards and demand for green skills • TVT sector, government, private sector, donors, academia & civil society adept at cross-sectoral partnerships for sustainability
Output	**Change in Capacity Level across Core Issues of the TVT Sector (whole ecosystem) for Green TVT & Skills Development** • **Systems for INSTITUTIONAL ARRANGEMENTS:** Streamlined Processes: Clear Roles & Responsibilities; Merit-based Appraisal; Coordination Mechanism • **Systems for LEADERSHIP**: Clearly Formulated Vision; Communication Standards; Management Tools; Outreach Mechanism • **Systems for KNOWLEDGE MANAGEMENT**: Brain Gain & Retention Strategies; Knowledge Sharing Tools & Mechanisms; Research & Linkage Mechanisms • **Systems for ACCOUNTABILITY**: Audit Systems & Practice Standards; Participatory Planning Mechanism; Stakeholder Feedback Mechanism
Systemic Interventions	1. Technical capacity development on green growth and sustainability for the TVT sector 2. Technical capacity development of the TVT sector for better alignment to PDP-10, CRGE, NAP, NDC and the SDG targets 3. Technical capacity development of the TVT sector on green OS development (whole cycle) 4. Build executive capacity in responsible leadership 5. Training of Trainers on green occupations (new OS and UC): Pedagogy, management and technology 6. Technical capacity development on effective partnerships for green TVT and skills development 7. Technical capacity for aligning research, technology and industrial extension functions towards green TVT and skills development
Constraints	• Lack of awareness on the scientific, business and moral imperatives of green growth and sustainability • Lack of technical capacity in strategic planning (alignment with national objectives; effective project management) • Lack of technical capacity in developing green Occupational Standards • Weak cross-sectoral capacity for responsible leadership • Weak trainer capacity for green TVT and skills development • Weak partnering capacity (with private sector, development agencies, government, academia, civil society) • Poor alignment of Research, Technology and Industrial Extension functions to green TVT and skills development

Annex 23: Group feedback from validation workshop on proposed interventions

Group	Prioritization	Specific comments	Additional remarks
1.	Awareness	Awareness raising should also include the "community" as a beneficiary. The intervention on "awareness" can also help answer the question, "Is green TVT a priority for Ethiopia?"	Green jobs vs. green skills: green jobs need to be created before green skills development! Creating jobs is a burning issue!! **Expression of commitment:**
	Policy alignment & coordination	This is very crucial; there is a tendency to develop policies only to shelve them; discussion to reach a common understanding is crucial Revision of the education curriculum with a green economy thinking will be key	**Collaborative role**: MoE, Don Bosco, Save the Future (and TVT colleges as a whole) **Consultative role**: CETU, EEF, MoE
	Partnering capacity	Line ministries and private sector are key stakeholders (need to be engaged)	
2	Awareness	M&E on green TVT need to be made part of the awareness theme Strengthening a learning culture and knowledge management systems is important Awareness raising needs to include the community as a beneficiary (Community Outreach)	**Proposed role for the ILO:** Resource/ funding role; needs to play an active support/facilitation role **Expression of commitment:** **Collaborative role:** IPDC and MoLS **Consultative role**: EEF MoLS has been working on capacity development of trainers (achievement so far: 400 certified master trainer); MoLS has also signed Joint Action Plan with Sector Ministries to make the TVT system demand-driven (e.g. OS development). **It is also in the process entering an MoU with the private sector with the same objective. ILO need to support this effort.**
	Leadership capacity	This is definitely needed	
	Trainer capacity	There is a need to look into Certificate of Competence (CoC) as well.	
3	Policy alignment & coordination	There is a need to follow-up policies with actionable proclamations, directives and guidelines Enforcement is key	The private sector often complains about the quality of the TVT system and the graduates. Conversely their own commitment and participating to change the situation is very low.
	Awareness	Needs to include learning from international best practice Awareness raising activities must be thorough	
	Green occupational standards	OS to be developed first and training of trainers to follow next TTLM and Assessment Tools need to be revised to reflect the green TVT concept For cross-cutting and common themes: One OS could suffice; revising existing OS; and developing new ones The private sector (employer) needs to commit and engage all the way through the assessment process	

Group	Prioritization	Specific comments	Additional remarks
4	Awareness	The beneficiaries should include the community, and primary-, secondary-, and university education The media needs to be engaged as well Proposed partners (additional): Media, Ministry of Agriculture (MoA), Ministry of Education, Religious Institutions, CSOs MoLS need to lead this intervention MoA can mobilize ATVETs	
	Leadership capacity	This is key; oftentimes the effort and hard work of subordinates might not be understood by leadership (owing to weak leadership capacity) **Additional beneficiaries:** community leaders, religious leaders **Potential partners:** universities, bilateral organizations, consulting firms	
	Policy alignment and coordination	Enforcement is key **Additional beneficiaries:** community leaders, religious leaders **Potential partners:** PSI, MoLS	

Summary of prioritization of proposed interventions:

- Awareness: 4X
- Policy alignment & coordination: 3X
- Leadership capacity: 2X
- Partnering capacity, Trainer Capacity and Green OS: 1X

Annex 24: Participants of the validation workshop (November 10, 2022)

No.	Name	Organization	Position
1	Abebaw Lema	Federal TVT Institute	TVT Leadership & Management Department Head (Instructor)
2	Abebe Damte (Dr.)	Environment & Climate Research Center (ECRC)/Policy Studies Institute (PSI)	Senior Research Fellow
3	Alemayhu Humnessa	Sebeta PTC	Department Head
4	Asefa Chimdi	Ministry of Agriculture Ethiopia	Representative for the CRGE department
5	Ashebir Debele Dida	Sululta TVT College	V/Dean
6	Ashenafi Gebre	Lideta Manufacturing College	Deputy Dean
7	Asmamaw Mekonnen	Save the Future	Finance head
8	Ayalew Kibret	Save the Future	Project Coordinator
9	Belaynesh Birru	Save the Future	Managing Director
10	Daniel Taddesse (Dr.)	Ministry of Education (MoE)	Agriculture Career and Technical Education curriculum expert
11	Enawgaw Nigussie	GIZ	Advisor
12	Endalkachew Bayu (Brother -SDB)	Bosco Children TVET Institute	Dean
13	Endris Mohammed	Lideta Manufacturing College	V/Dean
14	Engidu Tsegaye	Industrial Parks Development Corporation (IPDC)	ISFS Head
15	Gashaw Menberu	MoLS	TVT system, Expert
16	Gessesse Dessie	SNV Ethiopia	Project Manager
17	Girma Kelemework	Selam Technical and Vocational College	JPS
18	Hana Basazinew	Ministry of Industry	Senior Climate Change expert
19	Jobir Ayalew	Environment and Climate Change Directorate	MoT, Ex- Director
20	Kalkidan Tadesse	East Africa Skills for Transformation and Regional Integration Project	National Project Coordinator
21	Lemma Delelegn	Oromia JCC	Expert
22	Matebie Alemayehu	Ministry of Education (MoE)	Head of Career and Technical Education curriculum Desk
23	Nebiyu Gesesse	Jobs Commission	Lead, Work Readiness and Skill development

No.	Name	Organization	Position
24	Nigus Tefera	IPDC-Head Office	Expert
25	Saud Mohammed	EEF	Acting Executive Managing Director
26	Solomon Fufa	Dorcas Aid Ethiopia	Dorcas TEVT Coordinator
27	Solomon Tiruneh	Sebeta PTC	Dean
28	Tamirat Tadesse	IPDC-Bole Lemi	sustainability representative and senior expert
29	Teshager Abebaw	Agriculture & Natural Resources Team	FAO Post-harvest expert
30	Tilahun Tola	Sululta TVT College	Dean
31	Tolosa Benti	Ministry of Agriculture Environment and Climate change Coordination Directorate	Senior Climate Change and Monitoring, Report and Verification Expert
32	Tsegabu Teka	UNIDO	National Project Coordinator
33	Wubishet Asres	Education for Sustainable Development (ESD)	M and E officer
34	Zerihun Gezahegne	Confederation of Ethiopian Trade Unions (CETU)	Head
35	Dawit Hagos	AA Tegbred PTC	Institutional capacity Building Coordinator
36	Asnake Tadele	YBT PLC	HRM Manager
37	Tilahun Abegaz	Hope Enterprise	Executive Director
38	Desalegn Rejo	Sebeta PTC	Trainer
	ILO Coordinators & Consultant		
1	Alemayehu Zewdie	ILO/GPSL3 Project	National Project Coordinator
2	Shiferaw Bejie	ILO/GPSL3 Project	Finance and Admin. Assistant
3	Girum Bahri	ILO Consultant	Green Growth Consultant

Annex 25: The 18 adaptation options proposed by NAP-ETH

1. Enhancing food security by improving agricultural productivity in a climate-smart manner.
2. Improving access to potable water.
3. Strengthening sustainable natural resource management through safeguarding landscapes and watersheds.
4. Improving soil and water harvesting and water retention mechanisms.
5. Improving human health systems through the implementation of changes based on an integrated health and environmental surveillance protocol.
6. Improving ecosystem resilience through conserving biodiversity.
7. Enhancing sustainable forest management.
8. Building social protection and livelihood options of vulnerable people.
9. Enhancing alternative and renewable power generation and management.
10. Increasing resilience of urban systems.
11. Building sustainable transport systems.
12. Developing adaptive industry systems.
13. Mainstreaming endogenous adaptation practices.
14. Developing efficient value chain and marketing systems.
15. Strengthening drought, livestock & crop insurance mechanisms.
16. Improving early warning systems.
17. Developing and using adaptation technologies.
18. Reinforcing adaptation research and development.

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