

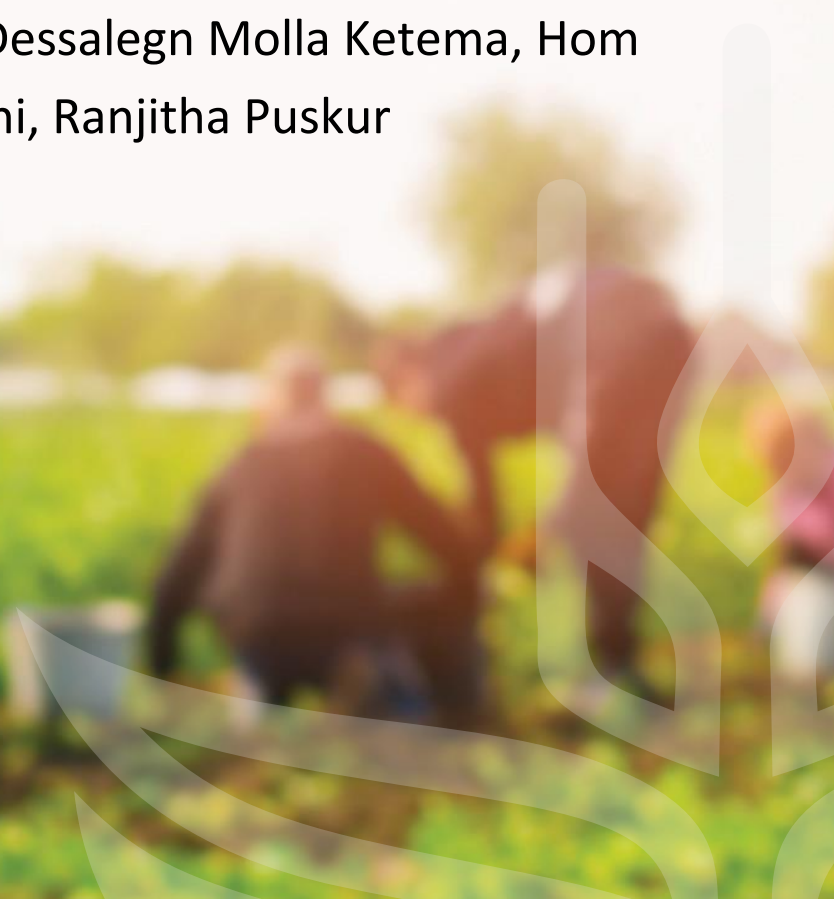


INITIATIVE ON
Gender Equality

Enabling socio- technical innovation bundles (STIBs) Implementation in Ethiopia: A Literature Review of the policy context

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Abbreviations and Acronyms

ADLI	Agriculture Development-Led Industrialization
CBOs	Community Based Organizations
CGIAR	A global research partnership for a food-secure future
CRGE	Climate Resilient Green Economy
CSA	Climate Smart Agriculture
CSOs	Civil Society Organizations
EWDF	Ethiopian Women's Development Fund
FAO	Food and Agriculture Organisation
FDRE	Federal Democratic Republic of Ethiopia
FTCs	Farmer Training Centres
GDP	Gross Domestic Product
GESA	Gender Equality Strategy for Ethiopian Agriculture sector
GHG	Greenhouse Gases
GIS	Geographic Information System
GTP I	Growth and Transformation Plan
GTP II	Growth and Transformation Plan II
ICT	Information and Communication Technology
IFPRI	International Food Policy Research Institute
IWMI	International Water Management Institute
IWUAs	Irrigation Water Users' Associations
MFI	Microfinance Institutions
MoANR	Ministry of Agriculture and Natural Resources
MSMEs	Micro, Small and Medium Enterprises,
NAIP	National Agriculture Investment Plan
NAP-GE	National Action Plan for Gender Equality
NGOs	Non-Governmental Organisations
NPEW	National Policy on Ethiopian Women
NSIDS	National Smallholder Irrigation and Drainage Strategy
PIF	Policy and Investment Framework
PSNP	Productive Safety Net Program
QMS	Quality Management System
RDPS	Rural Development Policy and Strategies
SDGs	Sustainable Development Goals
SMEs	Small and Medium-Sized Enterprises
STIBs	Socio-Technical Innovation Bundles
TVET	Technical & Vocational Education & Training
UN	United Nations
WDCP	Women's Development and Change Package
WHO	World Health Organisation

Executive Summary

This report provides a comprehensive review of the intersection of agriculture, gender and socio-technical innovation bundles (STIBs) in Ethiopia, with a focus on understanding how policies, strategies and legislation can support the empowerment and resilience of women within the country's agrifood systems. STIBs are a comprehensive approach to tackling multifaceted challenges in agrifood systems by integrating technology with social and cultural innovations. Understanding how the innovations can be embedded into the existing policies within the agricultural sector to empower women and enhance gender equality, including women's resilience and self-confidence is crucial. Agriculture remains the cornerstone of Ethiopia's economy, contributing 34% to the GDP and employing about 75% of the population. The report explores how aligning STIBs with Ethiopia's national development strategies can support key priority areas such as agricultural productivity, gender equality, food security, climate change adaptation, inclusive economic growth, technological advancement and education and training initiatives.

The review assessed the existing policies, strategies, and legislative frameworks in Ethiopia to produce a policy context report on enabling the implementation of STIBs, focussing on gender empowerment and agricultural resilience. The research addressed these key questions:

- Which Ethiopian policies, strategies, and legislation support agrifood systems and gender equality?
- What opportunities exist for cross-sectoral collaborations with the Ethiopian government and diverse stakeholders to scale up STIBs as a comprehensive approach?
- How can various components be integrated to create a holistic approach to sustainable and inclusive interventions?
- Which aspects of STIBs can enhance women's resilience, empowerment, production, food security, gender equality, self-confidence, and innovation uptake?
- What are the potential barriers to the success of STIBs in Ethiopia?

The review identified policy gaps and provided recommendations for aligning STIBs with Ethiopia's national development goals. Ethiopia's key policies and strategies impacting the agricultural sector and gender equality include the Growth and Transformation Plan II which focuses on structural transformation and inclusive economic growth; Agricultural Sector Policy and Investment Framework aimed at enhancing productivity and food security. The Rural Development Policy and Strategies emphasise rural development and poverty reduction while the National Policy on Ethiopian Women, National Action Plan for Gender Equality and the Women's Development and Change Package address gender equality and empowerment. The Sustainable Jobs for All: Plan of Action for Job Creation (2020-2025) targets inclusive and sustainable employment opportunities, particularly in agriculture. Strategies such as the Agricultural Extension Strategy of Ethiopia, Gender Equality Strategy for Ethiopia's Agriculture Sector and National Technical and Vocational Education and Training Strategy promote gender-responsive agricultural development. Legislative frameworks including the Constitution of the Federal Democratic Republic of Ethiopia, proclamations such as Rural Land Administration and Land Use, Microfinance Business (Amendment), Irrigation Water Users' Association, Ethiopian Women's Development Fund Establishment and Investment Proclamation support gender equality and inclusive economic growth.

The Ethiopian government aims to achieve a low-middle-income status by 2025 through inclusive and sustainable economic growth. While existing policies indirectly incorporate STIBs to address poverty, climate change, food insecurity and gender inequality, they do not fully address the specific challenges faced by small-scale farmers, particularly women and youth in accessing agricultural inputs, credit, technology, extension services, and land tenure. This limits their participation in agricultural programs and hinders women's ability to benefit from productivity improvements. Although Ethiopian policies promote women's participation in capacity building and education, there is a need for tailored skills development and knowledge towards women's needs and priorities, enabling them to fully engage in modern agriculture, assume leadership roles, and overcome cultural norms that inhibit their participation. Opportunities exist for integrating STIBs into existing frameworks, leveraging digital technologies, and promoting inclusive policies that enhance women's leadership and decision-making roles in agriculture. Key priorities include strengthening women's land rights, improving access to inputs, credit, and diverse technologies, and providing gender-responsive extension services. Integrating context-specific technological innovations with social and institutional support can advance gender equality and help Ethiopia realize its vision by 2025.

To successfully implement STIBs in Ethiopia's agricultural sector, the report recommends focusing on several key areas. **Gender-transformative innovations** should ensure that agricultural policies and strategies are inclusive, empowering and can address gender norms, harmful traditional practices and targets the specific needs and priorities of women through gender mainstreaming and using participatory approaches.

Strengthening Institutional Support and cross-sectoral collaborations which involves fostering partnerships between government agencies, local organizations, NGOs, educational institutions and farmers to align innovations with agricultural and gender policies, promoting knowledge exchange while creating employment for women and youths. **Capacity building and education** should provide targeted training on digital tools, new technologies, sustainable practices and business skills for women and youth farmers. Expanding access to digital platforms is crucial for women empowerment and enhancing their skills and knowledge. **Market Access and Value Chain Transformations** should develop digital markets to enhance market access and integrate small-scale farmers, particularly women and youth, into value-added chains, providing real-time information on market prices, farming techniques, and climate data. **Sustainable Resource Management** to integrate climate-smart agriculture and water-efficient irrigation, promoting inclusive participatory approaches and support community-based resource management associations to ensure equitable resource distribution. **Financial Inclusion** is crucial for improving women's access to credit through partnerships with the private sector and micro-financial institutions as well as providing financial literacy training to enhance their skills to manage savings and investments. Lastly, **Monitoring and Evaluation** should include gender-responsive monitoring and evaluation systems that include gender-disaggregated data and sustainability indicators including resilience and food security to measure progress, identify gaps and guide continuous improvement. Secure funding and collaboration with various agencies are essential to scaling up STIBs across Ethiopia's agricultural sector.

INTRODUCTION

Background and context: Ethiopia's agrifood systems and gender dynamics

Ethiopia has successfully managed to increase its agricultural production and enhancing food security in the country over the past three decades, with major investments in agricultural technology and rural infrastructure and liberalization of agricultural markets (Dorosh and Minten, 2020). Further, the Productive Safety Net Program of 2005 responded to the challenges of chronic food insecurity through the creation of well-targeted safety net in both rural and urban areas which utilizes community-level partnerships with local government to accurately select beneficiaries and provide timely, adequate and predictable transfers of food and/or cash to these vulnerable groups, thus contributing to sustained economic growth and rising real incomes of the rural and urban poor (Reach Project, 2019; Dorosh and Minten, 2020). As agriculture is the cornerstone of the economy in Ethiopia and the most volatile sector due to climate change (Teshome, 2006), the agricultural sector has made use of chemical fertilisers and improved seeds varieties since 2000 and the sector has continuously grown rapidly (Dorosh and Minten, 2020). However, the Ethiopian agricultural sector remains the most complex to understand as it largely contributes 34% to the nation's Gross Domestic Product (GDP) and employs approximately 75% of the population (NAIP, 2022) but on the other hand the performance of the sector is very low due to many natural and manmade factors. Thus, Ethiopia is now regarded food secure at national level as it has the ability to produce enough food for its population but this food self-sufficient gap is very large due to high food insecurity rates at household and individual levels, which makes the agricultural sector the focal point for both local and international attention (Teshome, 2006).

The Ethiopian agricultural sector is dominated by rural small-scale farmers, whose land accounts for 95% of the total area under agricultural use and are practically responsible for approximately more than 90% of the entire agricultural product. These small-scale farmers largely practice rain-fed mixed farming, and they employ traditional technologies while adopting a low input and low output production system (Gebre-Selassie and Bekele, 2012). Therefore, the small-scale farmers in the rural areas play a crucial role in strengthening the government's efforts towards agricultural growth and hence the overall economic growth in Ethiopia. However, poverty levels for the small-scale rural farmers remained high despite the agricultural performance in the country and rural livelihoods have not improved. The lack of appropriate policies and strategies was considered as the ultimate reason for the sector's past stagnation and the Ethiopian government has developed a national development strategy Agricultural Development Led Industrialization (ADLI) (1995) to alleviate absolute poverty and food insecurity problems (Dube et al., 2019) significantly affecting women in the rural areas (FDRE Ministry of Finance and Economic Development, 2013; Nure et al., 2020), while transforming the economy through modernizing agriculture and promoting industrialization and economic growth. Dube et al. (2019) noted that for the government of Ethiopia to achieve rapid agricultural growth with wide economic effect, it is necessary to help farmers to adopt large enough new technologies which in turn would enable them to produce significant marketed surplus. The government then emphasized on building the capacities of the small-scale farmers and has introduced measures such as providing technology to small-scale farmers and better farming practices, improved seeds, fertilizers, irrigation, rural roads, and marketing services as well as information on input use and better agricultural practices to increase agricultural production (Dube et al., 2019). While ADLI has been successful in increasing the agricultural productivity and promoting rural development in Ethiopia, it has been gender-blind in not adequately addressing the specific needs and challenges faced by women farmers even though they are pivotal to agriculture, significantly contributing to crop production and household food security (ibid). Women farmers face exceptional challenges and barriers such as limited access to and control over land, credit, agricultural inputs and extension services, which hinders their productivity and economic empowerment. Gebre-Selassie and Bekele (2012) noted that women in Ethiopia still experience enormous difficulties when trying to benefit from their newfound rights including land rights and they lack capital and other agricultural assets, despite the government's efforts to promote gender equality. Similarly, Nigussie et al. (2024) also noted that variations in rainfall lead to food and income losses, disproportionately affecting resource-poor households, especially women and men with limited assets like land and livestock. Women from these affected households often sacrifice their own meals and well-being to ensure their families are fed, resulting in malnutrition and worsening poverty, while female-headed households face heightened challenges in providing for their families. Furthermore, a study by Nure et al. (2020) found that factors such as gender, education level, lack of extension services and training significantly impacted the income status of

participants of the study with women participants greatly affected by poverty than their men counterparts. Ensuring gender-sensitive policies and strategies including those which underpin targeted support for women to promote gender equality, improving access to resources and gender-sensitive policy design is crucial for empowering women in agriculture. This enhances agricultural productivity and ensure food security which may have significant reward for the nation's agricultural outcomes. Thus, both women and men will benefit from agricultural productivity and economic empowerment.

Despite progress in bridging the gender gaps in agriculture, Ethiopia still faces significant food security challenges due to factors such as climate change, land degradation, and population growth. Additionally, Tsige et al. (2020a; b) found that women small-scale farmers' needs are usually overlooked especially those that are essential to the use of agricultural technologies and their access to agricultural inputs and extension services is restricted. Sadly, increasing agricultural production is a national policy goal for Ethiopia but gender equality in production growth appears to be not a key priority in the implementations of agricultural policies mainly due to the absence of proper institutionalization and implementation of gender mainstreaming in agriculture (Tsige et al., 2020a). As noted in the Country Strategic Plan (2020 - 2025), gender inequalities resulting from harmful cultural practices and structural and social discrimination remains a challenge which is contributing to poor health, nutrition, education and decreased livelihood opportunities for women and girls as compared to men and boys. Integrating gender considerations, especially the realities, interests and needs of small-scale women farmers into all aspects of agricultural policy and practice, and also focusing on policies that enhance agricultural resilience and food security is crucial for building a resilient and sustainable agrifood system in Ethiopia. As stipulated in the ten-year National Development Plan (2021), developing Ethiopia's agricultural sector and prioritising gender and social inclusion to achieve sustainable growth, economic empowerment and food security for all is a national priority. The plan further highlights the need to create an enabling and just environment where Ethiopian citizens would be able to utilize their potentials and resources as well as the need to improve in aspects of social dignity, equality and freedom so that they lead quality life. Further, the plan also highlights the importance of implementing climate-resilient strategies to improve the agricultural sector's climate-dependence by expanding irrigation and enhancing the use of technology. However, agricultural technology-based interventions are often designed with the aim of improving productivity while they fail to emphasise on the importance of improving gender inequalities responsible for unequal production relations between men and women small-scale farmers (Tsige, 2019).

Although Ethiopia's policies and legal frameworks promote gender equality and women empowerment, the implementation of these is far-fetched as the customary norms (including multiplicity of patrimonial and customary laws), ethnicity, religious beliefs and social practices especially in rural areas shadow their full realisation (FAO, 2019). For example, and as noted by FAO (2019), some traditions and religions dominating the northern part, according to their customary norms, women cannot plough the land and are forced to rent their land to others and share only 30% of the products. Similarly, in southern regions, women have no right to own land and can only have access to land through their husbands (FAO, 2019) even though the constitution of Ethiopia Article 35 Section 2 stipulates that women have equal rights with men in marriage and Section 4 stipulates that "the state shall enforce the right of women to eliminate the influences of harmful customs", prohibiting laws, customs and practices that oppress or cause bodily or mental harm to women. Therefore, when implementing programmes in Ethiopia, the focus should be placed on context-specific socio-technical innovations such as gender-responsive agricultural extension services, women's cooperatives and self-help groups, time-saving agricultural technologies, microfinance and credit solutions and digital platforms for market to support the Ethiopian agrifood systems as well as establishing better outcomes including household resilience and gender equality specifically for small-scale women farmers.

Socio-technical innovation bundles on empowerment and resilience in women

Some serious rethinking is needed about how best to tailor local, national, and global institutions and policies to promote greater cooperation, more trust.... The twinning of science and solidarity reveals the importance of socio-technical bundles, not just technological advances on their own. Socio-technical bundles have succeeded before in delivering us from harrowing food security crises. They can do so again if we direct human ingenuity towards tomorrow's challenges rather than yesterday's – Christopher B. Barrett et al. (2020).

The world has previously faced and overcome similarly daunting food security challenges by gathering together both scientific advances and social protection innovations (Barrett, 2021). Thus, addressing food security challenges always requires a combination of both scientific advances that enhance agrifood system and socio-cultural change and/or policy measures that foster solidarity among people. However, the institutions and policies should be enabling in order for the science and associated financing to follow and enable technology diffusion to achieve real transformations at scale (Herrero et al., 2021). While Socio-technical innovation bundles (STIBs) are reviewed as a framework in other literature (Nchanji et al., 2023), they are represented as an approach in this study following Barrett et al. (2020). STIBs represent a comprehensive approach to tackling challenges in agrifood systems by integrating technology with social and cultural considerations. This refers to integrated sets of technologies, practices and social arrangements designed to address complex challenges in a way that aligns technical solutions with social, cultural and institutional contexts which is particularly effective in addressing challenges such as climate change, food insecurity and gender inequality (Barrett et al., 2020). Thus, the socio-technical innovation bundles approach ensures inclusivity and equitability in addressing the needs of marginalized groups such as small-scale farmers, particularly women and youth.

In general, the components of socio-technical innovation bundles include (i) **technological and technical innovations** (e.g. improved seeds and crop varieties which are drought-resistant, pest-resistant, or high-yield crop varieties; irrigation technologies that are affordable and efficient like drip irrigation or rainwater harvesting; digital tools including mobile apps, remote sensing and Geographic Information System (GIS) for precision agriculture and market information; climate smart agricultural practices, agricultural intensification and conservation agriculture), (ii) **social and institutional innovations** (e.g. farmer cooperatives including organizing farmers into cooperatives to enhance access to markets, resources, and training; microfinance and credit schemes to provide accessible financial services tailored to the needs of all small-scale farmers including women; extension services which are gender-sensitive and can provide technical assistance and knowledge sharing), (iii) **cultural and behavioral innovations** (e.g. supports community engagement to involve local communities in the design and implementation of innovations to ensure they meet cultural and local needs; gender equity programs with emphasis on initiatives that promote women's participation and leadership roles in agriculture and also ensuring that they have access to resources and are involved in decision-making) and, (iv) **policy and regulatory innovations** (e.g. supportive policies where government policies promote the adoption of sustainable agricultural practices and protect the rights of vulnerable groups and has regulatory frameworks which are enabling and allow for conducive environments for the adoption of new technologies, including standards and certifications that encourage sustainable practices). However, identifying and combining the appropriate innovations for specific contexts is inherently a social process which requires collaboration that is often harder to come by than scientific insights (Brooks and Loevinsohn, 2011; Gartaula et al., 2023). Barrett et al. (2020) noted the need to build socio-technical innovation bundles of mutually reinforcing technologies, policies, knowledge, social institutions and cultural norms with context-specific combinations as no single innovation can suffice nor work everywhere. For example, the 'fits all' bundles approach usually neglect the specific needs of women farmers who are often disadvantaged as the bundle configuration does not consider their preferences, capacities and/or capabilities yet women constitute about half of the agricultural labour force (Pasha et al., 2023). Further, single innovations have consistently yield incomplete gains in the agrifood sector and therefore complementary interventions are mostly needed, with broader agrifood systems stakeholder participation. This is essential to co-create the right bundle for a specific context and group, and at the right time in order to achieve broad-scale results, especially in sub-Saharan Africa (Barrett et al., 2020).

Combining different types of socio-technical innovations is a promising way forward to achieve household resilience and gender equity, especially if the correct kinds of social and technical innovations are combined and channelled into contextualized activities and interventions for better outcomes in agrifood systems

(Johnstone et al., 2023). Thus, a tailored approach is needed as what works in one place may not work in another, and therefore the bundles may vary e.g. as climate impacts and socio-cultural contexts vary with space and time. A number of studies have examined the application of bundles of innovations with focus on gender equality. For example, a case study from Vietnam, (Farnworth et al., 2017) incorporated gender into low emission development by bundling (i) agricultural trainings, (ii) reduction in farm input costs (iii) an intermediary (Women's Union) that challenged deep gender norms and reduced barriers (iv) women social learning and (v) information sharing through informal networks. The Women's Union implemented agricultural trainings that also challenged deep seated gender norms, which instilled confidence into women. As other women saw their neighbours benefitting, it increased their self-confidence and pushed themselves to join the trainings, which increased their knowledge and shifted gender norms in agriculture and made space for women's agency. The initiatives helped with increased productivity, increased women's income as they made profit and became resilient to food insecurity. Similarly, a case study on 'Sustainability of agroecological interventions in small scale farming systems in the Western Highlands of Guatemala' (González-Esquivel et al., 2020) bundled (i) agricultural trainings including promotion of gender equity (ii) deteriorating land quality and decreasing yields and (iii) more women involvement in promoting agroecological practices within the implementing organisations. In this case, women extension officers implemented trainings in agroecological principles, which instilled confidence in women farmers which increased gender equity, productivity and food security.

In Africa, studies were conducted in Tanzania (2020 and 2022) and Kenya (2021). In Tanzania (Blakstad et al., 2020), home gardening was used to improve dietary diversity among Tanzanian women through a combination of (i) agricultural training and inputs to promote home gardens and diversifying diets, including farmer field schools (ii) nutrition and public health counselling from agricultural extension workers and community health workers and, (iii) social learning (peer-to-peer knowledge sharing) between women in the farmer field schools. The study noted that a combination of access to nutritious vegetable seeds with integrated health advice significantly changed understanding of nutrition. Further, additional agricultural extension support, and peer sharing increased women's knowledge and practices as well as building self-confidence in establishing home gardens and disseminating knowledge through trusted networks. This led to improved nutrition with increased women's dietary diversity and improved food security. Also, in Tanzania, a study by Pamuk et al. (2022) followed a community-based approach to promote adoption of integrated climate smart agriculture (CSA) practices based on soybean production combined with mulching, intercropping, crop rotation, manure application and rhizobium inoculation methods. The study bundled Farmer Field Business Schools with Village Savings and Loans Associations where farmers received technical training and financial support for the initial adoption of soybean production, and women's empowerment activities gave women the confidence, resources, and agency to continuously adopt Climate Smart Agricultural practices in their households. This combination of different innovations enabled higher productivity, strengthened household income, increased nutrition and women's empowerment as well as household resilience.

Additionally, a study conducted in Kenya by Crossland et al. (2021) titled 'On to the farm, into the home: How intrahousehold gender dynamics shape land restoration in Eastern Kenya' bundled restoration practices and agricultural technology adoption to allow women's participation in innovation processes and broader societal changes mostly due to the outmigration of rural men. The study combined (i) training on tree planting and planting basins, and (ii) an intra-household approach engaging both men and women in the activities as outmigration of men can give agency to women. An intra-household approach where women participated in farmland restoration activities increased their self-confidence and agency in implementing tree planting and planting basins schemes on their farms. The study highlights how socio-technical innovation bundles can be more inclusive and achieve gender-equitable outcomes such as increased knowledge, women's empowerment and self-confidence in decision making. Furthermore, the study also highlights the need to understand intra-household dynamics in the implementation of socio-technical innovation bundles.

Lastly, 'Amanzi for food': a social learning approach to agricultural water knowledge mediation, uptake and use in smallholder farming learning networks' (Lotz-Sisitka et al., 2022) also applied the STIBs approach as it developed a strategy for achieving effective knowledge dissemination and uptake, which included practical training to encourage productive water use for food crop production amongst smallholder farmers and food growers in South Africa. The project emphasised on trainings on rainwater harvesting and conservation techniques, conservation farming, communities' engagement and participation in the project and considering community realities and needs through dialogues. The project worked with marginalised women and youth farmers, included capacity development and skills enhancement of the farmers, emphasised social learning and collaborative partnerships as well as integrating traditional knowledge in the project, thus creating a platform

for co-creation of knowledge and diffusing power dynamics. This contributed towards addressing the wider contextual and sustainable development problem of household food insecurity in South Africa and improved women and youth empowerment especially in decision making, with some women taking up leadership roles in agricultural programs.

Although some studies have been conducted in Ethiopia on STIBs (personal comm.), these are unfortunately not available in the public literature except for a presentation by Puskur et al. (2023) planning for the pilot project. In this presentation, the authors identified the possible innovations in the vegetable value chain, emphasising on the farmers' participation in co-designing the STIBs and allowing the use of indigenous knowledge and their land resources. The possible innovations including agronomic, nutrition and post-harvest trainings for women and men, use of improved vegetable seed, engagement of different stakeholders forming business networks with women also being active agents for digital marketing. However, major challenges in the vegetable value chain with respect to gender equality and women empowerment were identified by the stakeholders.

Another study that was also conducted in Ethiopia as mentioned through personal communications with researchers from the International Center for Agricultural Research in the Dry Areas (ICARDA) included a Community-Based Breeding programmes for small ruminants (goats and sheep). The project firstly looked at rapid value chain analysis to identify the challenges and opportunities. Initially, the project focused solely on breeding but in the process, it became clear that breeding was not the top priority for the villagers and therefore they expanded the project to address the entire value chain to include feeding, resource development, transportation, health and product quality and markets, all integrated into a holistic approach. Thus, breeding became just one of many bundling components employed in the Bundling and Innovation Packages - Smart Packs which combined it with innovations from other different areas such as genetics for breeding, feeding for consumption and marketing as well as considering the health of the animals for product quality and nutrition. These smart packs were designed based on the specific needs of villages, where each village had unique challenges and they selected the innovation bundles that could work for them. Farmers and other stakeholders were invited to select the innovations which would work best for them through a "buffet-style" system. Reducing the number of breeding sires in villages to about 10 best animals and fattening the surplus animals for market benefitted the farmers through improved quality and efficiency of livestock development and economic empowerment. The project considered gender inclusion and gender transformative approaches to increase women participation and their involvement in decision making which was initially low. The study managed to increase awareness and has overcome Ethiopia's customary laws which impacted the initiative, and has encouraged the formation of women-only cooperatives and created safe spaces to allow community conversations, increased capacity development for women to increase participation by women, which has now expanded from five women-only breeding groups to a total of 70 groups; with a total of 250 villages (increased from only four) participating in the program. The program emphasised the importance community engagement and respecting local norms through having thorough and honest conversations with communities, ensuring that new initiatives were not forced but accepted through dialogues. Additionally, the established women-only community-based breeding programs led to greater women empowerment and participation. The same program and approach have also been done in Sudan which was replicated in Ethiopia, with ongoing efforts to increase women's involvement and test the outcomes of these gender-inclusive initiatives as well as scaling up the initiatives to other regions.

Overall, all the studies discussed above have shown the importance of inclusivity and participation in the implementation of the innovations and that the combinations of socio-technical innovation bundles are context and need specific for them to yield desired sustainable outcomes. Considering the knowledge produced from the above-mentioned countries on successful outcomes of implementing the socio-technical innovation bundles (STIBs), this current study used literature review to understand the agrifood sector, gender dynamics, policies, strategies and key legislation for Ethiopia to determine how these can support the implementation of STIBs in the country. Over the years, Ethiopia has implemented various policies, strategies, and legislative measures to create a more equitable and sustainable food system to address the country's food security and gender equality challenges. However, it remains a challenge to ensure women's participation in economic, social and political spheres, and benefits in education, health and other developmental fields in the country.

Objectives of the review

The main objective of the review was to produce a policy context report on enabling STIBs implementation in Ethiopia. The sub-objectives included:

- To review policies and strategies and legislation in Ethiopia, with a special focus on the agrifood systems sector and gender.
- To review how the different policies can support the implementation of STIBS

The research questions included:

- Which policies, strategies and legislation in Ethiopia support agrifood systems and gender equality?
- What opportunities exist for collaboration with the Ethiopian government to bring together different stakeholders in STIBs as a comprehensive package?
- How can different components be integrated to bring a holistic approach to sustainable interventions?
- Which intervention and implementation features of STIBs can enhance women's resilience and empowerment, improve production and food security as well as support gender equality, women's self-confidence and innovations uptake to improve outcomes of interest?
- What are the potential barriers to the success of STIBs in Ethiopia?

METHODOLOGY

The study used desktop literature review.

Overview of desktop research

The literature review was performed firstly by clearly defining the objectives and scope of the review as well as the goal of the literature review, focusing on what needed to be achieved and the information that was relevant to this study. Keywords for the search were defined, which included Ethiopia's key agricultural policies and strategies, gender policies and strategies, Legislation, development policies and strategies relevant to the agricultural sector and gender (especially rural farmers, specifically women farmers) as well as gender mainstreaming guidelines and regulations. We also searched for different STIBs that has been conducted in Ethiopia. The focus was mainly on identifying if the policies, strategies and legislature would support the implementation of STIBs in Ethiopia and how these may ensure the integration of different components together, what would be the best practice to bring a holistic approach to solutions as well as informing decision-making. In the case of STIBs having been implemented in Ethiopia, the search then focused on how these innovations could also influence policy.

The research was also carried out by reviewing the relevant academic and grey literature on gender and agriculture in the Ethiopian context, specifically rural small-scale farmers including women farmers. The research was mainly done on the internet through search engines Google and Google scholar, also through the government of Ethiopia's webpage and other organisations such as Food and Agriculture Organisation (FAO), International Water Management Institute (IWMI), International Food Policy Research Institute (IFPRI) and CGIAR space. Lastly, this report was also informed by the CGIAR Policy brief report, CGIAR Initiative on Gender Equality (HER+) study by Pasha et al. (2023) on the evidence gap on the impacts of STIBs on women's empowerment and resilience and the baseline report on the effective of STIBs on empowerment and resilience in Kenya by Ayuya et al. (2024).

Stakeholder meetings and feedback

The study also used feedback from the reviews and comments which were provided by HER+ experts on the draft report of this study. We also used feedback from the stakeholders in Ethiopia which was provided based on the presentations held to them on the overview of the findings which were presented in the draft report. The stakeholders' feedback meetings held included representatives from CARE-Ethiopia, Lersha-Ethiopia, IWMI-Ethiopia, WorldVeg-Ethiopia, Alliance Bioversity-CIAT, SNV-Ethiopia, ICARDA and representatives from the Ministry of Agriculture in Ethiopia. Altogether, three meetings were held.

FINDINGS

Key Policies and strategies in Ethiopia with focus on agriculture

Nutrition Sensitive Agri-Food Systems Strategy (2024 – 2030)

In this strategy, it is noted that agriculture is one of the key sectors that plays a critical role in improving the nutritional status of the population and may contribute to the reduction of malnutrition in Ethiopia. Integrating nutrition into agriculture in the form of land and soil health and conservation, provision of improved inputs such as seed and fertilizers, farming practices including production of safe nutrient dense foods, diversification and inter-cropping, food storage, post-harvest management, marketing and food consumption and utilization, is crucial. This strategy gives guidance to the agriculture sector on addressing national and international priorities in agrifood systems and nutrition objectives. It focuses on enhancing food and nutrition governance and institutional arrangements, addressing programming and investment needs, establishing monitoring and evaluation systems, and ensuring accountability at all levels. The strategy incorporates emerging demands, such as food safety and quality, postharvest management, climate-smart agriculture, urban agriculture, social inclusion, and livelihood improvement. The key strategic objectives of the Nutrition Sensitive Agri-Food Systems Strategy are shown in Figure 1. The key principles for the strategy include community-centred and participation and ownership, gender consideration and inclusiveness of women, youth and children, planning and implementing need- and evidence-based program, inclusive programs which consider innovative and indigenous knowledge and are also inclusive of relevant stakeholders and working at all levels, allows multi-sectoral collaboration and coordination and promote competency-based capacity building of frontline service providers, transparency and accountability as well as strengthening resilience and sustainability.



Figure 1: Strategic Objectives of the Nutrition Sensitive Agri-Food Systems Strategy (Source: Authors compilation).

The National Nutrition Sensitive Agriculture strategy also focuses on women and youth empowerment and engagement, enhancing their role in nutrition sensitive agriculture through increased access to resources and inputs, creating job opportunities for them to generate income, promote labour and energy saving technologies to reduce women's workload as well as promoting gender sensitivity in nutrition sensitive

agriculture at all levels. One of the programmes that strives to integrate nutrition-sensitive agriculture into farming practices with the aim of improving the nutritional status of the vulnerable groups such as women and children is Ethiopia's National Nutrition Program. Some initiatives supported by the strategy include enhancing production and productivity of nutrient-rich food crops, livestock and fisheries, enhancing agro-ecology based sustainable and climate smart agriculture and encouraging nutrient dense commercial farming as well as promoting production and nutritious underutilised indigenous foods. The strategy also emphasises on strengthening research and extensions to ensure the accessibility of technologies and practices for healthy and nutritious foods with focus on agricultural inputs and services as well as strengthening risk management and building resilience in agricultural production, and improving livelihoods for vulnerable communities through income generating activities.

Horticulture Research Strategy 2016-2030

The Horticulture Research Strategy is a 15-year nationwide sectoral document aiming at achieving the government goal of utilizing the potentials of vegetable crops by developing the vegetable sub-sector through a long-term research program with the ultimate goal of enhancing food and nutritional security and income of all actors in the value chain and supply of raw-material for agro-industries. The strategy emphasises on research in agriculture, identifying, analysing and prioritising research gaps in the different crops sub-sector in order to generate sustainable need-based technologies, information and knowledge that increase productivity and products quality for both local and export markets with the aim of increasing incomes for both rural and growing urban populations and alleviate poverty. Thus, the technologies are targeted to benefit small-scale and commercial growers, agro-industries and consumers. The strategy highlights that increased productivity and improvements in the quality of crops can lead to improved health due to better nutrition and improved local economies and services. The eight different types of crops the strategy focuses on include cool season vegetables (including shallot, garlic, Ethiopian kale, broccoli, cauliflower, cabbage, radish, beetroot, lettuce and carrot), enset, potato, root crops, sub-tropical fruits, temperate fruits, tropical fruits and warm season vegetables (including tomatoes, different types of peppers, snap bean, egg plant, cucurbits, amaranths and okra). However, these need to be produced within their favourable agro-ecological conditions. The Horticulture Research strategy also looks at each of the above-mentioned crops and considers nine thematic research areas for each which are

- plant breeding and genetics for improved varieties with desirable traits such as higher yield, better resistance to pests and diseases to improve food security and enhance profits for farmers
- agronomy and crop physiology with emphasis on crop management, plant nutrition, irrigation practices and understanding the physiological responses of plants to different environmental factors
- soil and water management with focus on soil fertility and water conservation techniques
- Geographic Information Systems (GIS) and agrometeorology to identify suitable regions for different crop, collecting climate data and monitoring weather patterns, including predicting climate impacts on crop yield and enabling farmers to make data-driven decisions for production and marketing.
- technology multiplication and seed research including multiplication of agricultural engineering and crop technologies as well improving seeds varieties and the quality of seeds
- agricultural economics, extension and gender which emphasise market analysis, value chain development, knowledge transfer through agricultural extension services and ensuring the inclusion of vulnerable groups including women and youth;
- agricultural mechanisation which emphasises on the development and adoption of new technologies, tools and machinery that are labour intensive and increase efficiency in production, harvesting and post-harvest processing;
- agricultural quality and nutrition research laboratory looking at the nutritional aspects of the crops which aims at improving quality of diet and health through the consumption of nutrient-rich fruits and vegetables; and
- capacity building to enhance skills and knowledge through training of farmers in modern horticultural practices along the food value chain.

Food and Nutrition Policy 2018

Attaining food and nutrition security is a constitutional and human right of Ethiopians and hence the Government of Ethiopia has the responsibility to ensure that its citizens are food and nutrition secure. The Food and Nutrition Policy (2018) aims at attaining optimal nutritional status at all stages of life for Ethiopians that is consistent with a high quality of life, productivity and longevity of life, which is achieved through coordinated implementation of nutrition specific and nutrition sensitive interventions. The objectives of the policy include to

(i) ensure the availability and accessibility of adequate food to all Ethiopians at all times, (ii) improve accessibility, and quality of nutrition and nutrition smart health services at all stages of the life span in an equitable manner, (iii) improve consumption and utilization of a diversified and nutritious diet that ensures a citizen's optimal health throughout their life cycle, (iv) improve the safety and quality of food throughout the value chain, (v) reduce food and nutrient losses along the value chain, (vi) improve food and nutrition emergency risk management, preparedness and resilience systems and (vii) improve food and nutrition literacy of all Ethiopians. The Food and Nutrition Policy has seven policy directions (Figure 2) and the policy further emphasises on five key values which include:

- Community centered, thus giving priority to equal participation and benefits.
- Coordination to ensure participation of all stakeholders in the implementation of the policy in coordinated manner
- Accountability, ensuring commitment to and responsible for actions taken as well as transparency in communicating results
- Equity to ensure that vulnerability and inequalities with regard to sectoral, gender, disability, age, geography, social status and living styles are considered food and nutrition programmes
- Responsiveness to ensure timely and positive responses for food and nutrition demands of the community and build resilience capacity for food shortage and vulnerability.

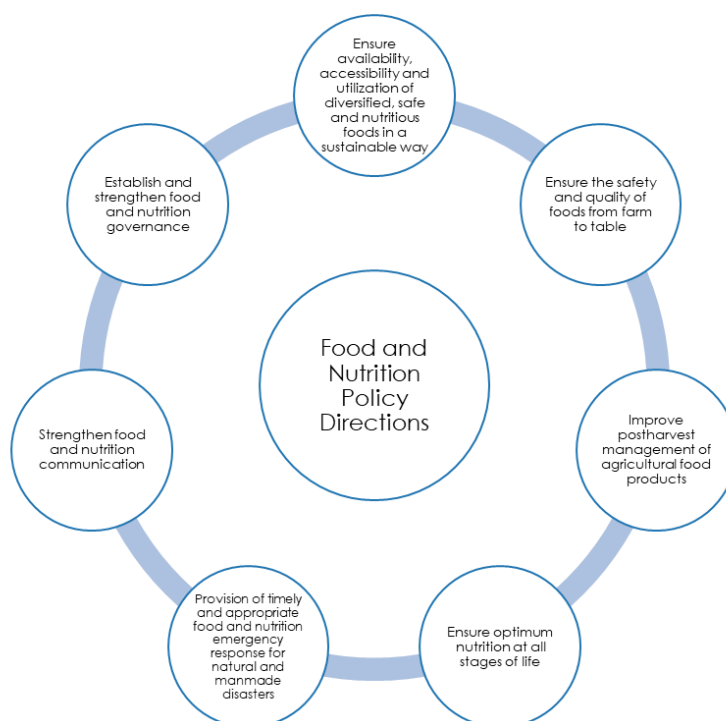


Figure 2: The Food and Nutrition Policy Directions (Source: Authors compilation).

Ethiopia's Agricultural Sector Policy and Investment Framework (2010-2020)

Ethiopia has embarked on an extensive programme of economic reforms in the past decades which have delivered strong economic growth in the country, thus improving measures of human development. Although the agricultural sector has been performing strongly with improvements in measures of human development, there is a need to sustainably improve productivity and market linkages which is critically important to economic performance and poverty alleviation as rates of poverty and food insecurity remain unacceptably high especially in rural areas where most households are chronically reliant on social safety net programmes and food aid. Therefore, the Agriculture Sector Policy and Investment Framework (PIF) provides a strategic framework for the prioritisation and planning of investments that drives Ethiopia's agricultural growth and development. It is a ten-year road map for development that identifies priority areas for investment and estimates the financing needs to be provided by the government and its development partners. The goal of the PIF was to help Ethiopia achieve middle-income status by 2020 by increasing rural incomes, improving food security, reducing poverty, and protecting the vulnerable from environmental shocks. Ethiopia's agricultural sector is dominated by

subsistence farming, relying on low-input, rainfed systems, which are vulnerable to drought and negatively impact productivity, food security and poverty.

The government has committed over 10% of its budget to boost agricultural productivity and economic growth, including expanding research into semi- and arid areas, training development agents, establishing farmer training centres, and strengthening research-extension-farmer linkages. These efforts, supported by development partners, aim to improve technology adoption and support rural development and farmers' livelihoods. Gender disparities significantly hinder women's empowerment in Ethiopia, and the policy emphasizes that addressing these disparities and promoting gender equality is essential for achieving accelerated economic growth and social development in the country. Women have fewer years of schooling, bear heavier farm and household workloads, and are often excluded from control of farm income and inheritance, despite constitutional rights ensuring gender equality and affirmative action (Beyene, 2015; MoANR, 2017; World Bank, 2020). Ethiopia lacks a comprehensive seed production and distribution system, which limits farmers' access to high-quality certified seeds, especially women farmers, which could hinder the successful implementation of STIBs. Similarly, limited availability of financial services restricts smallholder farmers from adopting improved agricultural practices, which STIBs emphasises. Therefore, to boost productivity, Ethiopian government must provide affordable high-quality certified seed and fertiliser to farmers, harmonise seed policies and certification systems for regional trade (including government and private sector participation) and improve credit access and long-term loan services for small-scale farmers, especially women who usually face difficulties in accessing financial services. Irrigation development and modernised crop production are considered crucial for increasing agricultural output, requiring active participation from households, especially women through cooperatives and farmer organizations. For STIBs innovation programs to be effective, it is essential to establish sustainable marketing systems and improve access to extension services that support skills development for farmers.

Growth and Transformation Plan II (GTP II) (2015/16 - 2019/20)

The second Growth and Transformation Plan is considered to be an important vehicle for Ethiopia's renaissance. The plan was formulated from the inputs drawn from the lessons on the implementation and evaluation of the first Growth and Transformation Plan (GTP I) (2010/11-2014/15). Therefore, the second Growth and Transformation Plan (GTP II) is built on sectoral policies, strategies and programs, lessons drawn from the implementation of GTP I and the 2015 Sustainable Development Goals (SDGs) and the tenets of Agenda 2063 "the Africa we want" into policies and programs to articulate the national priorities, opportunities and challenges to the pursuit of economic structural transformation. The GTP II focuses on agricultural transformation which include increased productivity and commercialization of agriculture to enhance food security, development of agro-industries and the promotion of export-oriented crops. It is primarily considered an important milestone towards achieving Ethiopia's vision of becoming a low middle-income country by 2025. It aims to sustain rapid, broad-based, and inclusive economic growth, focusing on agricultural and manufacturing productivity, improving production quality, and enhancing economic transformation while stimulating competition in the economy.

Additionally, GTP II emphasises effective public participation and coordinated efforts at all levels to ensure equitable development. The policy also highlights the importance of engaging women, youth, and other stakeholders to both contribute to and benefit from agricultural and economic development, ensuring public ownership of development outcomes and thus supporting the effectiveness of socio-technical innovation bundles (STIBs). The plan also emphasises human capital capacity development supported by technology and innovation, aiming to improve access to social services like education and health to create a motivated, innovative workforce that will enhance productivity and economic outcomes. Special attention is given to high value crops, industrial inputs and export commodities, with promotion of irrigation-based farming and marketing systems which supports the technological innovations for STIBs. The plan fosters inclusive and equitable economic growth, promoting community-based natural resource conservation and creating opportunities for rural women and youths to engage in sustainable agricultural practices such as conservation agriculture and climate smart agriculture, which enhance economic benefits.

Agricultural Extension Strategy of Ethiopia (2017)

Research-based agricultural extension services are provided to the surrounding farming communities in Ethiopia. The country has implemented several agricultural extension systems aimed at supporting rural

communities and farmers, and under Ethiopia’s current Agriculture Development-Led Industrialization (ADLI) strategy, these extension systems remain a critical tool to transform smallholder subsistence agriculture to commercial agricultural production system. The extension system which is effective and efficient has great potential to help farmers throughout the country by facilitating adoption and utilization of yield- and quality-increasing agricultural technologies. The Ethiopian extension system uses Farmer Training Centres (FTCs) based agricultural extension approach which is coupled with the formation of farmer groups, which is the entry point for the grass-roots extension services and for the bottom up extension approach. Participatory extension system has also been implemented since 2010 which also include the organisation of farmers in development groups and social networks, thus improving farmer participation. Additionally, Ethiopia has made efforts to design gender-responsive agricultural extension services which are tailored to make agricultural extension services able to meet the specific needs of women farmers who most often face distinctive challenges in accessing information and resources. The intended outcomes of the strategy are to make smallholder farmers, including women and youth become strong economic drivers who have access to and control over resources, extension and financial services and are active members of rural economic organizations to ensure food and nutrition security, reduce poverty through income generation and may have improved livelihoods; they have better access to production technologies, diversified and market-oriented advisory services as well as access to sustainable market systems.

The strategy also emphasises that farmers need to be more resilient to effects of climate change through adopting climate smart-agriculture and are also able to establish and operationalize their own self-help farmers’ groups to initiate farmer-to-farmer knowledge exchange and enhance local capacity. Furthermore, the strategy also aims to improve farmers' access to and management of agricultural knowledge and information through an ICT-based communication system. It enhances dynamic linkages among development actors and extension service providers by establishing effective and sustainable platforms for improved collaboration, information exchange, and feedback systems. However, many yield- and quality-improving technologies generated in the agricultural sector have not been reaching smallholder farmers and the agricultural sector has not reached its full potential of attaining food self-sufficient and reducing poverty. Further, although half of the population in Ethiopia are women, and they contribute approximately 70% of the food production, they still do not share equally in the fruits of development in the country. This is because the current agricultural extension approaches and methods are inadequate to address specific needs of women farmers as they lack a needs assessment or gender analysis as a basis of planning and program designing (Mekuriaw, 2022). Therefore, the implementation of STIBs in Ethiopia must ensure the integration of gender (including gender analysis), nutrition, and environmental considerations into extension service delivery to promote sustainable development. Further, the emphasis should be given to the key guiding principles of the Agricultural Extension Strategy of Ethiopia (Figure 3), which can inform successful implementation of STIBs.

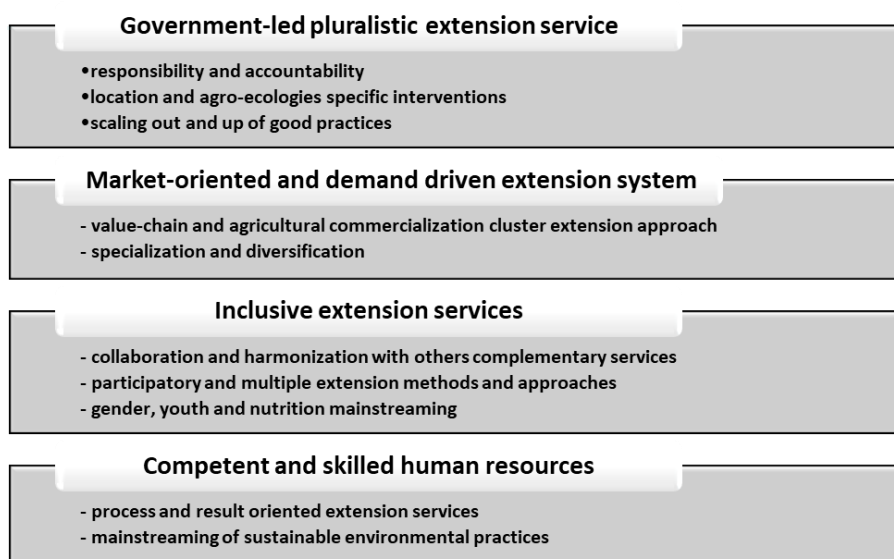


Figure 3: The key principles guiding the Agricultural Extension Strategy of Ethiopia which can inform STIBs implementation (Source: Authors compilation).

Rural Development Policy and Strategies (RDPS) (2002)

The Rural Development Policy and Strategies have been instrumental in guiding Ethiopia's efforts to reduce poverty, improve food security and promote sustainable economic development and growth in rural areas. The main objective of the policy is to *build a market economy in which a broad spectrum of the Ethiopian people are beneficiaries, eliminating dependence on food aid and assuring rapid economic growth*. This objective has four elements with accelerated economic growth incorporated as a fundamental goal and a point of departure, and extends to broad-based growth where the majority of the population benefits. The policy aims to improve Ethiopia's standing in the global economy by reducing its reliance on food aid and focusing on accelerated economic development within a market-oriented system. It recognises that rural development in Ethiopia is closely associated with agricultural development and thus emphasises the importance of addressing rural infrastructure and social development programs to support and facilitate agricultural growth. Accordingly, the agriculture-centred rural development programme has been adopted as a major strategy expected to assist in the realization of the country's economic growth and development, as a means of enhancing benefits to people, eliminating food aid dependency and promoting the development of a market-oriented economy. By fostering agricultural productivity and sustainability, this strategy creates the foundation for the successful implementation of STIBs, which integrate technological and social innovations to improve resilience and economic outcomes within rural communities.

The key strategies of RDPS include building up and improving farming skills and enhance labour initiatives, extensive use of improved technology with provision of training and information, and encouraging the adoption of modern farming techniques and use of improved agricultural inputs (seeds, fertilizers) as well as expanding irrigation and applying water conservation measures. In terms of the market-sensitive strategy, the aim is to build a free market economy where agricultural technologies enable farmers to produce products which are in demand on the market, sell these products at competitive prices, benefitting from the sales proceeds and are able to widen their market. Most importantly, strengthening market linkages between farmers and markets through provision of market information is highlighted in the policy. A marketing system with efficiently functioning market information helps farmers to obtain the best possible price for their produce, assist them to decide on what to grow and when to sell. It provides an opportunity to reduce market cost, especially transport cost, since price information tends to reduce marketing spread and access to information improves farmers' negotiating position in the case of pre-harvest or future sales.

The policy also emphasises on promoting and strengthening cooperatives, which is also strengthened in implementation of STIBs. Agricultural cooperatives play a significant role in creating an improved marketing system, including collective marketing, providing farmers with market information and improving their bargaining power. They also facilitate access to inputs, offer facilities to collect and provide storage services and standardizing products and packaging. Additionally, farmers' cooperatives mobilize community participation and encourages involvement in planning and decision-making, ensuring that agricultural development interventions are relevant and sustainable. Additionally, utilising land in a sustainable manner including soil conservation, which STIBs encourages also accelerates agricultural development. Sadly, land ownership remains a challenge in Ethiopia, especially for women and land tenure insecurity discourage investment in land and agriculture which ultimately affect productivity and effectiveness of the implementation of STIBs. Women are poor and they often lack productive assets particularly land, and are underserved with agricultural extension, credit, labour, oxen and farm implements.

Social and economic infrastructures is essential both for agricultural and rural development. The policy highlights the importance of expanding rural infrastructure including road and transport systems to improve access to markets, services and information; developing small-scale irrigation systems and improved access to clean water to support agricultural and human needs. Additionally, and expanding education and vocational training and healthcare increases the skills necessary for modern agricultural practices and rural entrepreneurship, thus improving living standards and address poverty and food insecurity. By improving access to markets, services, and information, as well as boosting human and institutional capacities, these efforts contribute to sustainable rural development and economic growth and STIBs implementation should target these target areas.

National Smallholder Irrigation and Drainage Strategy (NSIDS) (2016)

The National Smallholder Irrigation and Drainage Strategy (NSIDS) was developed by the Ethiopian government to enhance the productivity and sustainability of smallholder agriculture through improved irrigation and drainage systems. The government have emphasized both commercial and smallholder irrigation and drainage as major drivers of agricultural growth and transformation. As Ethiopia's economy is mostly dependent on agriculture with the sector highly dependent on rainfall, it is vulnerable to climate variability and droughts. However, Ethiopia has significant water resources that remain largely underutilized, especially in the context of smallholder agriculture. Therefore, the development of small-scale irrigation and drainage systems is key to mitigating the effects of rainfall variability and improve agricultural productivity, food security and poverty reduction for smallholder farmers through increasing household incomes which also improves rural livelihoods. Thus, this strategy aims at addressing the challenges faced by smallholder farmers, particularly those related to water scarcity, climate variability and low agricultural productivity and transform Ethiopia's agricultural sector by harnessing the potential of irrigation and drainage to boost smallholder productivity and resilience. The vision for the NSIDS is that smallholder farmers have widespread access to, take up and sustainably use irrigation and drainage services and technologies, enhancing agricultural production and productivity, food security, commercialization, and resilience to climate variability and change.

Therefore, the NSIDS' objectives are centred on increased smallholder agricultural productivity by providing reliable access to water through irrigation and reducing dependence on rain-fed agriculture; promoting sustainable water management and use of water resources through efficient irrigation practices and improved drainage systems, expand demand-driven research on irrigation and drainage technologies, enhance climate (climate change and variability) resilience to smallholder farmers through provisioning of reliable irrigation and drainage systems, increase awareness, availability, affordability and marketing of irrigation technologies and services such as pump, drip kits, sprinklers, well drilling and pump maintenance services to smallholder farmers; strengthening the capacity of farmers, including women farmers in using, managing and maintaining smallholder irrigation technologies and drainage systems as well as supporting the economic empowerment of smallholder farmers enhanced by increased agricultural yields and their income levels through marketing. Thus, the NSIDS has three main components which include irrigation development and drainage management, capacity building and empowerment and, inclusivity and community participation (Figure 4). However, the issues of climate variability and land tenure insecurities pose challenges for smallholder farmers, especially women to get credit to invest in irrigation infrastructure.

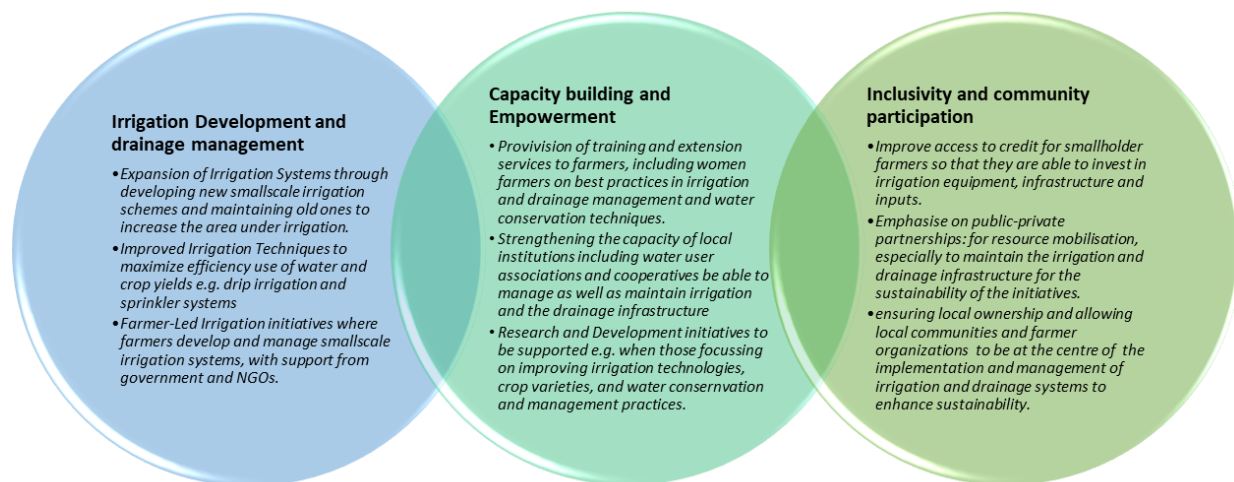


Figure 4: The key components of the National Smallholder Irrigation and Drainage Strategy that support STIBs implementation in Ethiopia (Source: Authors compilation).

Realizing the Potential of Household Irrigation in Ethiopia Strategy (2015)

Household irrigation is regarded as a transformative opportunity for smallholder farmers who depend on rain-fed agriculture as it enables cropping during the dry season, promoting growing of high-value crops and increase productivity. This significantly increases household income and promoting food security and economic growth. The strategy envisions creating a vibrant and self-sustaining household irrigation sector that **empowers** smallholder farmers through increasing the adoption and effectiveness of affordable household irrigation

technologies like water-lifting mechanisms (pumps, pulleys), water-harvesting methods (rainwater collection, river diversion), and water-saving technologies (drip irrigation, micro-sprinklers). These tools help farmers conserve soil, improve crop quality, and maintain water resources. This increases their **income**, improves **food security** throughout the year and catalyse **economic growth** and **improved livelihoods** in farming communities. Additionally, the strategy also highlights on the importance of **training** and **capacity building** programmes which includes farmer trainings on irrigation installation, operation and maintenance and best practices on using the technology for crop production and water management. Additionally, it strengthens the importance of extension services to offer technical advice and support farmers to effectively use the irrigation technologies. Improving market access for the smallholder farmers and fostering public-private partnerships are key for enhancing a platform for market linkages, while ensuring gender-sensitive approaches to enhance **women's participation** and well-being. That is, irrigation can improve women farmers' quality of life but the implementation of the technologies should be **gender-sensitive** with specific designs considering women's particular needs in mind.

Postharvest management strategy in grains in Ethiopia 2018

The Postharvest Management Strategy in Grains in Ethiopia guides, promotes and support actions at all levels in the agricultural value chain to significantly reduce postharvest losses in grains so as to contribute to improved food security and ultimately to poverty reduction through the attainment of food self-sufficiency in basic food commodities and enhance improved incomes of the Ethiopian people. The goal of the strategy is to improve food availability, food access, food safety and nutrition, and farmer incomes through reduced postharvest losses through the adaptation/adoption and implementation of appropriate postharvest management systems along the agricultural value chains of grains in Ethiopia. Specific aims of the strategy include reducing both quantitatively and qualitatively, food losses along the agricultural value chains of grains; improving agricultural input and output market efficiencies for grains with the view to enhancing postharvest management practices; improving access to financing and investment for improved postharvest loss management practices and to support sustainable value addition enterprises throughout the agro-industry. Additionally, the strategy also emphasises on the cross-cutting issues such as gender, youth, HIV/AIDS, environmental factors and agricultural information management.

Key Policies and Strategies in Ethiopia with focus on gender

National Policy on Ethiopian Women (1993)

This is a foundational policy in Ethiopia that aims to ensure women's participation in all areas of national economies and social life including agriculture. It recognizes the crucial role women play in food production and food security and it creates an enabling environment for women to participate in all aspects of social and economic development. The policy addresses the critical areas of concern in Ethiopia which include but not limited to poverty and economic empowerment of women and girls, human rights of women and violence against women and girls, education and training of women and girls, institutional mechanism for the advancement of women, empowering women in decision making and women's environment and reproductive rights and health.

Objective of the policy

- Facilitating conditions conducive to the speeding of equality between men and women so that women can participate in the political, social and economic life of their country on equal terms with men and ensuring that their right to own property as well as their other human right are respected and that they are not excluded from the enjoyment of their fruits of their labour or from performing public functions and being decision makers;
- Facilitating the necessary condition whereby rural women can have access to basic social services and to ways and means of lightening their work load; and
- Eliminating, step by step, prejudices as well as customary and other practices that are based on the idea of male supremacy and enabling women to hold public office and to participate in the decision-making process at all levels.

Contents of the policy

- Ensuring the full development and advancement of women and guaranteeing them the enjoyment of their democratic and human rights so that they can participate in the economic, social and political life of their country on equal basis with men,
- Modifying or abolishing existing laws, regulations, customs and practices which aggravates

- discrimination against women and facilitating conditions conducive to their participation in the decision- making process at all levels,
- Creating a situation whereby society's discriminatory attitude toward women and women's complacency about it are eliminated through an elevated awareness,
 - Making sure that women participate in the formulation of government policies, laws, regulation programmers, plans and projects that directly or indirectly benefits and concern women as well as in the implementation there of,
 - Encouraging research work on ways and means of lightening the work load of women as well as increasing their income and compiling the results thereof for use by others too,
 - Coordinating all government programmers that concern women and following up their implementation to make sure that they are free from duplication and that they do not involve unnecessary costs,
 - Incorporating women's affairs into the government structure and entrusting a government body with it as well as establishing branches thereof in all ministries and governmental organization,
 - Making sure that government policies, laws, regulations, plans and other activities are based on the following objectives:
 - Ensuring that distinction on the basis sex is not made that a special attention is given to rural women in view of the fact that they face particular problems and shoulder a heavier burden,
 - Ensuring that women are involved in the elaboration, implementation and decision-making process,
 - Making sure that women participate in the fields of development activity and enjoy the benefits thereof on an equal basis with men and guaranteeing them legal protection of the rights.

Some relevant strategies for implementation of the policy

- All appropriate measures shall be taken to ensure that the democratic and human rights of women are respected by guaranteeing them their freedom of speech, writing, peaceful assembly and forming associations as well as their right to work in governmental or non- governmental organization, their right to form and join lawful organizations and their right to vote or be elected,
- The Government shall facilitate conditions conducive to the participation of women in both the elaboration and decision-making process as regards to community developments, social welfare, division of land property, education and basic social services,
- All appropriate measures shall be taken to ensure that women are made beneficiaries on an equal basis with men of equal pay for equal work and of promotions, of appointments, of desirable transfers or termination of employment and of training,
- The Government shall take all appropriate measures, including legislation, to ensure that the right of women to work in the Civil service in any capacity they prove to be competent for, their right to equal pay for equal work and to perform public functions, including decision- making in both their local communities and at the national level, are respected,
- Maximum effort shall be made to eliminate, step by step, prejudices and customary practices based on the idea that women are inferior to men and to repeal all national penal provisions which constitute discrimination against women,
- The necessary conditions where by women can have effective legal protection of their rights shall be facilitated,
- Research shall be done on some ways and means of lightening the work-load of women, especially of those who live out in the rural areas; income generating projects, programmers' or other schemes shall be streamlined to them and they shall, through vocational training be made to increase their technical proficiency and thus develop self-confidence,
- The necessary conditions where by women can obtain training and education shall be facilitated, for the development of their potentialities cannot be achieved only through the existence of structures and organization responsible for promoting their interests,
- Appropriate support shall be extended to all women's associations formed with their initiative and full consent and those that will be formed in the future

Some progress in implementation of the policy and priority areas for STIBs implementation

- *Women and poverty*: Although women in Ethiopia significantly contribute to their households, food production and national economies, this has not been translated into better access to resources and/or decision-making powers as they remain to be the poorest of the poor globally. Women still face difficulties in accessing land, credit and other productive resources such as inputs. This is due to different roles and responsibilities men and women have in the society and thus the causes and experiences of poverty differ by gender.
- *Education and training of women*: This included developing a gender-sensitive curricula to reorient societies' attitude and value pertaining to contribution of women in development, providing educational finance to enhance girls' participation in education, open access to basic education, allowing enabling environments for women to participate in educational management and decision making on major education issues as members of Education and Training Management Board and/or Parent Teacher Association (PTA). Strategies and guidelines have been formulated to address gender-based violence in these platforms.
- *Women and health*: National Gender Mainstreaming Guideline for the health sector has been prepared and distributed to all stakeholders to be used as a guideline in planning, implementation, monitoring, and evaluation of the health issues in Ethiopia dominated by prenatal and maternal conditions caused by poor nutritional problems and other communicable and infectious disease like malaria, TB and HIV/AIDS. Health coverage and access to health services has also increased but the high illiteracy rate of women limits them from utilizing the available service and also high prevalence and deep-rooted poverty among the population distance to health services.
- *Women and economy*: Women in Ethiopia still have limited access to health, education and other productive resources. The government established the Ethiopian Women Development Fund to contribute towards bringing economic empowerment of Ethiopian women by providing financial and technical support to organized women groups including women entrepreneurs. The programme also supports women in the informal sector who are members from these association.
- *Women in power and decision making*: Ethiopian women are not adequately represented in leadership and decision-making at all levels due to their role in household work and agriculture and lack of education. Participation in leadership roles, especially senior positions are overwhelmingly dominated by men.
- *Human rights of women*: The majority of Ethiopian women face challenges in owning land for production, valuable products and property and thus lack the leverage that comes with property ownership including participation in the formulation of government policy or to holding public office at any level.

National Action Plan for Gender Equality (NAP-GE) (2006-2010)

The policy provides a framework for gender mainstreaming across all sectors, including implementing gender-responsive programs and policies in agriculture. The NAP-GE is used as a tool for the promotion of gender equitable development, and it works towards removing barriers to women's participation in agriculture, leadership and decision-making positions and promote women's access to land, credit and extension services as well as education and training. The goal of the NAP-GE is to contribute towards the attainment of equality between men and women in social, political and economic development, including recognising women's overall contribution to development.

General and strategic objectives relevant to the study

GO1: Enhanced Rapid Economic Growth

- SO1: Enhance women's and girls' economic empowerment
 - promote women's participation in developing economic policies and managing the economy
 - Enhance rural women's equal access to and control over productive resources and services (land, oxen, extension, credit) in order to make them food secure and come out of the poverty trap
 - Reduce women's workload
 - Provide Special social and economic safety and security to poor urban and rural as well as disabled women
- SO2: Enhance the role and benefits of women in environmental management and protection
 - Promote women's participation and empowerment at all levels
 - Increase women's access to information, improved technology, and alternative

livelihoods

- Create strong institutions and institutional mechanisms that guide and support efforts to address gender and environment issues

GO2: Improved Human Development

- SO3: Promote equal access and success in education and training for women/girls
 - build the capacity of relevant structures to promote girls' education
 - increase girls' access to science and TVET with emphasis on areas that are traditionally considered men's
 - strengthen NFE program to increase access and literacy level of women
 - forge partnership and collaboration with relevant sectors to address the problems girls/women encounter in accessing and succeeding in education
- SO4: Improve women and girls' reproductive rights, health and HIV/AIDS status
 - improve the health status of women and girls
 - provide/ensure access to gender sensitive health information by men and women

GO3: Democratization and Governance

- SO5: Reduce violence against women and girls and improve their human rights
 - carry out massive and systematic training and awareness campaigns on national laws, policies as well as international laws on gender equality
 - achieve strict application and enforcement of all laws protecting women's rights
 - promote constitutional guarantees of equality by removing the impediments of societal belief, harmful traditional practices and prejudices
- SO6: Increase women's access to all levels of decision making, in particular in political and public spheres
 - build women's and girls' capacity in leadership and managerial skills and in exercising their rights with a special attention to women in pastoral regions
 - initiate specific measures to increase gender balanced representation within the political and public sphere with a special attention to women in pastoral regions

GO4: Improved Public Institutional Performance

- SO7: Implement a gender-based analysis and approach in all government departments and support institutional mechanisms for gender mainstreaming
 - create/raise public and institutional gender awareness to facilitate wider involvement in gender work and mainstreaming
 - revise the women's policy
 - strengthen the national women's affairs machinery
 - generate and disseminate gender disaggregated data for planning and monitoring
 - integrate gender perspectives in all legislation, policies, strategies, programmes and projects
 - create/strengthen partnership, collaboration and networking among institutions working on gender
 - assign accountability for gender issues in all government institutions
 - initiate the creation and strengthening of women's association in rural and urban pastoral communities

Women's Development and Change Package (WDCP) (2015)

This policy has been designed to enhance women's access to agricultural resources such as land and credit, and technologies and also encourages women to participate in agricultural activities as well as promoting their role in productivity and food security in the country. The vision of the WDCP is to build a developed democratic society in which Ethiopian women are equal participants in and beneficiaries of the economic, social and political life of the country. The Development and Change Package have three objectives; (i) to ensure that women are active participants in our country's development and are equal beneficiaries of the economic progress, (ii) to ensure the social participation and benefits of women, to eradicate demeaning attitudes and harmful cultural practices and to alleviate women's household chores and (iii) to enable women to acquire equal political participation and decision-making powers at all levels, also to ensure their sustainable participation and benefits from democratization and respect for the Constitution.

The package identifies that *'the major force to solve women's problems are the women themselves'* and thus women must play a frontline role because in their absence, it would be impossible to expect that their challenges would be addressed properly. Therefore, different strategies have been designed for different activities to overcome challenges faced by rural women, which could be followed for the implementation of STIBs (Table 1) and paying attention to:

- *Ensuring adequate awareness regarding the importance of women's active participation in the development democratization and peace agenda.* This focuses on ensuring that all women have sufficient awareness that they are the strong force that can solve the problem of oppression, help women overcome the dependency syndrome and patronage that hinder their emancipation through their own efforts and struggle and help them overcome their inferiority syndrome and develop an attitude that affirms that they can perform any task to bring about change in all sectors, just like men.
- *Organizing fora with a view of encouraging women's participation.* In these fora, women can discuss the challenges they face and suggest solutions and may build a consensus for implementing solutions. Also, the focus is to ensure that these become platforms for effective dialogues and discussions to empower women, including farmers and those in small and medium enterprises.
- *Enabling women to competently participate in all endeavours.* This focuses on creating conducive platforms to develop women's capacity to solve their own problems and to make adequate preparation for the implementation of their objectives; also enabling them to fight tendencies that hinder their competent participation as well ensuring their effectiveness in promoting women's struggle and rights.
- *Creating a condition in which women are organized to be effective in their struggle* through the arrangements and facilitation of their effective organised participation where women are helped to organise, in various ways and to their interests to protect their common interests including women's capacity building activities.
- *Enabling women to competently implement the set directions and become beneficiaries of results,* and thus overcoming backward attitudes and the demeaning challenge of inferiority complex that they endure and are able to develop their confidence to ensure that they actively participate in the development and democratization processes in their communities and are able to develop their education capacities to become economically independent. Additionally, this strategy also focusses on young women to become role models for their peers and use all educational and training opportunities, adopt new democratic attitudes to become frontline leaders in eradicating harmful practices.
- *Pushing the Government to implement policies laws and plans in a compelling manner* where the design takes into consideration, women's participation and benefits at all levels, carrying out training and capacity building activities to enable women to actively and competently participate in designing and implementing special programs to enhance women's economic and social development.

Table 1: Relevant objectives designed for different activities to overcome challenges faced by rural women with specific focus on STIBs

Objectives for economic activities	Objectives for social activities	Objectives for political activities
<p style="text-align: center;">General Objectives</p> <ul style="list-style-type: none"> ○ Implement the government's developmental policy and strategy that is designed to ensure rapid and sustainable economic growth through the participation of all people who would benefit at all levels. ○ Enable women to participate effectively and competently in implementing the national developmental policy and strategy, and ensure their becoming beneficiaries of the achievements 	<p style="text-align: center;">General Objectives</p> <ul style="list-style-type: none"> ○ Effect the implementation of the government's education, health and other social programs in the rural areas, ensuring the participation and benefit of women in a competent manner. ○ Solve social problems of rural women through their own participation; creating a social environment that ensures women's equality by eradicating harmful and 	<p style="text-align: center;">General objectives</p> <ul style="list-style-type: none"> ○ Ensure the existence of good governance and democracy in the rural areas through the participation of the people. ○ Ensure a situation in which women make active and organized political participation in the rural areas to become real beneficiaries.

backward practices and attitudes.

Strategies	Strategies	Strategies
<ul style="list-style-type: none">○ Ensure land ownership○ To ensure that women's labour is properly utilized○ Gender mainstream all agricultural development plans, programs, extension packages etc and ensure women's equal participation <p>Help women (married or single as well as heads of households) to participate extensively in joint agriculture activities</p> <ul style="list-style-type: none">○ Organize women in cooperatives to ensure their benefits○ Assist women to increase their income by engaging in non-agricultural activities○ Enable rural women to benefit from credit and savings schemes.○ Promote market services that encourage women's diverse and active participation.	<ul style="list-style-type: none">○ Develop education and training to ensure women's participation, in particular assisting girls to have equal participation, with boys, at the primary level.○ Exert continuous effort to ensure that rural women enjoy better health services focusing on their overall wellbeing○ As rural women are burdened with heavy household chores programs shall be designed and promoted to alleviate this burden.○ Ensure the physical and psychological wellbeing of women by eliminating all harmful traditional practices○ To conduct continuous and focused activities that result in attitudinal and cultural changes among rural women	<ul style="list-style-type: none">○ Create a situation in which women's associations strengthen their struggle○ Strengthening leadership capacity and participation○ Ensuring that women's rights as provided in the Constitution the family law and other provisions are implemented and respected. Also strengthening the legal protection of women○ Ensure that the mass media give due attention to women's issues in their work

Source: Women's Development and Change Package (WDCP) (2015)

Sustainable Jobs for All: Plan of Action for Job Creation (2020-2025).

Over the past decade, Ethiopia has experienced rapid economic growth with the average GDP growth rate of 9.1% between 2000/01 and 2017/18 which has corresponded with the reduction of poverty, but unemployment and underemployment remained significant challenges, particularly in urban areas and among the youth and women. The need for sustainable and inclusive job creation has become a priority to harness the country's demographic dividend and reduce poverty, if Ethiopia is to meet its objective to become a middle-income country by 2025. The Plan of Action for Job Creation proposes holistic interventions to solve the employment and job creation challenges and provides a new vision of employment in Ethiopia. It is aligned with GTP II, Ethiopia's Home-Grown Economic Reform Agenda and the Sustainable Development Goals (SDGs), particularly Goal 8, which focuses on decent work and economic growth. Therefore, the Plan of Action for Job Creation is a key strategy in Ethiopia's efforts to reduce unemployment and promote inclusive economic growth with a focus on improving youth employment and promoting women's economic empowerment the plan emphasises skills development and education and resilience, self-employment and engaging the private sector by fostering innovation, and supporting small and medium-sized enterprises (SMEs). The plan also highlights the importance of improving rural-urban linkages through infrastructure development and rural-urban growth corridors It aims to enhance access to and use of land for farmers and businesses by allowing farmers' rights to use land,

encouraging commercial farming, and optimizing land use for youth and women in rural areas, while encouraging the establishment of commercial farms and designing tailor-made skills development programs.

The plan of action has six main strategic objectives and two cross-cutting objectives to support economic growth. The strategic objectives (SOs) of Plan of Action for Job Creation include adopting macro-policies that foster job-rich growth through financial sector improvements and public investments (SO1). It also focuses on strengthening the private sector by supporting MSMEs and enhancing quality business development services (SO2). Human capital development is a priority, aligning educational outcomes such as work-readiness of the labour force and ensuring its modern skills and improving labour market demands and entrepreneurship (SO3). The plan also aims at strengthening labour market intermediation and linkages by building modern employment centres and developing a better labour market information system (SO4), which is more inclusive, targeting vulnerable groups (SO5), and realizing job potential in agriculture through improved output by use of improved inputs and access to financial services and markets, and developing ICT as an enabler of the services and an inclusive digital economy (SO6). Cross-cutting objectives include effective governance through coordinated and well-aligned government structures (SO7) and securing adequate funding and resources for the implementation of different strategies and interventions (SO8); which also support STIBs.

National Technical & Vocational Education & Training (TVET) Strategy (2008)

The National Technical and Vocational Education and Training (TVET) of Ethiopia strategy aims 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*. The overall objective of the 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*. The guiding principles for the development and implementation of the TVET strategy include social inclusion, promoting equal access and equal opportunities for all including the informal, demand-orientation in relation to competence needs and qualification requirements for the labour market, life-long learning opportunities and adaptability which promote self-employment and, is gender sensitive and institutions equally accessible to female and not discriminating against through content. The national TVET strategy has several aims focussing on enhancing employment opportunities by providing practical and technical skills directly applicable to the labour market. The objectives of the strategy can be categorised into four themes such as developing a skilled workforce, enhance employability in the country, support economic growth and promoting inclusive education. The aims of the strategy include creating a decentralized, outcome-based TVET system, strengthening institutions to serve as centres for technology and skill transfer. It emphasizes improving quality and relevance, expanding opportunities crucial to national development through private training and also fostering private sector participation. Equal access for women and people with special needs, along with empowering rural populations through skills development is prioritized. The strategy encourages self-employment, job creation, and sustainable financing, with a focus on developing management capacity for efficient implementation. Collaboration among stakeholders in the TVET system ensures coherence, while building human resources for effective management. Improving the quality of TVET (formal and non-formal) at all levels and making it responsive to the needs of the labour market is vital for building the necessary human capacities to effectively manage and implement TVET and scaling up the programmes including the implementation of STIBs.

Cross-cutting Policies and Strategies in Ethiopia with focus on agriculture and gender

Gender Equality Strategy for Ethiopian Agriculture sector (GESA) Revised Version (2016-2020) EC/ (2023-2027) GC

In Ethiopia, gender inequalities are socially determined and maintained by deeply rooted attitudes and cultural traditions that define women as subordinates due to power imbalances between man and women. This exposes women to suffer from multiple disadvantages including being extremely poor and living under harsh conditions, having heavy work-load at outside their homes to sustain their families as well as carrying responsibility for all domestic chores at home, including taking care of the children and all household members. Additionally, women farmers often have less access to and control over land, limited access to credit, extension and advisory services and other resources than men farmers which limit their ability to invest in their farms and improve their productivity. Women also tend to have less access to education and training opportunities than men, which further limits their ability to adopt new agricultural technologies and practices that could help them improve their yields. Similarly, without access to agricultural inputs and support, women are less productive, and their

lower yields mean their households are more food insecure. Therefore, the Ethiopian government is dedicated to address the issue of gender inequality to honour its constitution, national laws and policies where there are highlights of specific references to gender equality. The revised strategy notes that gender inequality remains a major obstacle in the agricultural sector with women, who head 21% of smallholder households and contributing about 70% of food production facing significant gender disparities in access to resources, decision-making and agricultural services.

Gender stereotypes which elevate men as the householder and decision maker, and discriminate against women perpetuate unfair treatment for them within the households and communities, especially by not recognising their work at and outside their homes as well as denying them participation and decision making to raise productivity as farmers. Similarly, women farmers have unequal access to and control over resources like land and finance, including credit and limited access to agricultural extension services which are needed to boost agricultural production and improve food security. Mostly, extension services that provide seed, fertilisers, new tools, technology and training are usually accessed by men and for married women, there is an assumption that they receive these services through their husbands, which is not always true. Thus, cultural norms and attitudes including intra-household sharing of workloads which further hinder women's ability to fully participate in and benefit from the agricultural sector. Gender disparities have also been seen in agricultural technology provided and decision-making. The revised strategy therefore focuses on enhancing institutional accountability, enhance capacity to deliver gender-transformative services, improve coordination and partnership between the Ministry of Agriculture (MoA), public and private institutions, Civil Society Organizations (CSOs), Community Based Organizations (CBOs), and media to address the barriers to gender equality in agriculture, ensure that women farmers, pastoralists and agro-pastoralists are enabled to increase agricultural productivity and benefit from profitable economic activities through enabling them access to and control over land, access to extension services, training, agricultural inputs, credit and market information. Additionally, the strategy emphasises that their voice, influence and decision-making powers in agricultural development at the household and within community are increased and they are able to lead both formal and informal social and economic institutions, thus empowering women to be self-confident in agricultural productivity.

Information and Communication Technology (ICT) Policy 2009

The Ethiopian Government has made the development of information and communications technology (ICT) one of its strategic priorities, both as an industry and as an enabler of socio-economic transformation from a predominantly subsistence agriculture economy and society into an information- and knowledge-based economy and society which can effectively be integrated into the global economy. Some broad objectives of the ICT policy include (i) Creating the necessary conditions for the rapid development of ICT within the economy and society to accelerate Ethiopia's socio-economic development process, (ii) promoting and facilitating an extensive use of ICT in support of key sectors of the economy including agriculture, industry and the services sectors and (iii) to transform Ethiopia into a knowledge- and information-based society and economy. Some relevant strategies for ICT development include:

- Developing guidelines, procedures and organizational structures to integrate ICT into public sector development programs
- Promoting and facilitating the participation of civil societies and communities in ICT development.
- Developing effective and productive use of the national radio frequency spectrum resources.
- Designing and implementing information systems and applications for priority sectors such as agriculture, health and education.
- Promoting access to ICT for women, the disabled, and youth, ensuring gender equality and social inclusion. These efforts aim to eliminate gender disparities, particularly in education and societal participation, by building the capacity of women and girls and enhance their empowerment through ICT.

ICT Policy Goal specific to agriculture and supporting STIBs implementation is to modernize agriculture and radically increase output and productivity. This has several objectives which aim to:

- promote the application of ICT to improve agricultural efficiency and productivity to ensure food security.
- establish national agriculture database on the country's agricultural potential.
- create an integrated agricultural information system using ICT for the dissemination of data and information to farmers, including up-to-date information on market prices.
- encourage farmers' associations to advertise and sell their produce on the Internet.
- assist community-based information centres offering basic computer skills to farmers, extension workers and other beneficiaries in rural areas.

- provide farmers' associations and rural extension workers with natural resources management techniques and practices, and
- facilitate access to regional agro-meteorological database and early warning systems at federal, regional and district levels for farmers to be prepared for extreme weather conditions.

Therefore, the ICT policy highlights the importance of STIBs by facilitating farmers' access to technology through the establishment of rural multimedia centres and online agricultural portals that provide essential data and information. Additionally, it aims to equip farmers with strategic market-oriented information and develop training programs to enhance farmers' skills on the use of ICT in agriculture, ensuring they stay informed about commodity prices and market opportunities.

Environmental Policy of Ethiopia (1997)

The Environmental Policy is designed to address Ethiopia's environmental challenges while promoting sustainable development and to ensure that the country's natural resources are preserved for future generations while promoting economic growth and improving the quality of life for its citizens. This policy is very crucial as Ethiopia heavily rely on natural resources for livelihoods, economic activities and its population's well-being. The overall policy goal is to *'improve and enhance the health and quality of life of all Ethiopians and to promote sustainable social and economic development through the sound management and use of natural, human-made and cultural resources and the environment as a whole so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs'*.

The specific policy objectives relevant to the study focus on ensuring the sustainable use and regeneration of renewable natural resources, while protecting essential ecological processes and biodiversity. This includes incorporating economic, social, and environmental costs and benefits of natural resource development into planning by fully valuing the environment and its services, while empowering local communities and organisations to participate in environmental management activities. Public awareness and promotion of understating on the link between environment and development is also emphasised. Key guiding principles include the sustainability of renewable resources management, the adoption of affordable and appropriate technologies including their development and dissemination, creating conducive conditions for community-led resource management, ensuring social equity in resource use, and preserving genetic diversity in crops, livestock, and wild species as invaluable and inalienable national assets.

Some water resource policies objectives relevant to this study promote the protection of areas where water bodies and land meet, such as lake shores, river banks and wetlands, and to consider the opportunity costs of irrigating pastoral grazing lands and crop production. Local water users, especially women and animal herders, should be involved in the planning, design, implementation and monitoring and evaluation of water projects and policies to maintain ecological balance. Lastly, the policy promotes, through on-site training, effective water management techniques at the farm level for improved performance of medium to large-scale irrigation schemes. The policy also focuses on climate change mitigation and adaptation strategies to enhance the resilience of communities and ecosystems and promoting public awareness and encourage participation of communities and stakeholders in sustainable management of the environment. The policy emphasises on the importance of soil and water conservation programmes to combat soil erosion, to improve soil fertility and to manage water resources sustainably, especially in agriculture. The policy addresses social and gender disparities including eliminating inequalities by promoting inclusive education and training for both men and women in environmental resource management and integrating environmental awareness into public education programmes. It also highlights the need for women's participation in all areas of society, including formal and informal education, public awareness campaigns, and decision-making processes related to environmental and resource management.

Rural Job Opportunity Creation Strategy (2017)

The Ethiopian National Rural Job Opportunity Creation Strategy is a strategic framework that addresses the challenge of rural unemployment and underemployment by promoting both agricultural and non-farm employment opportunities. It primarily targets women and men over 15 years old with irregular and insufficient flow of income. The strategy aims to improve rural livelihoods through sustainable job creation, poverty

reduction, improved food security. The strategy supports rural economic development by promoting non-farm employment opportunities and the development of rural enterprises and small and medium enterprises (SMEs) such as rural tourism, handicrafts, and renewable energy, while providing vocational training to equip rural youth and women with the skills, including use of appropriate technology that are required for non-farm employment. Similarly, the strategy enhances social inclusion by promoting increased participation of marginalized groups, including women and the youth, and promote rural-urban linkages and expand market opportunities. The framework promotes community involvement where local communities are engaged in the planning and implementation of the job creation initiatives so that the jobs are tailored to address their needs and conditions. Collaboration with government, private sector, and international partners is crucial for technical and financial support.

Ethiopia's Capacity Building Strategy and Program 1994

The strategy focuses on addressing the skills gap by enhancing the capabilities of Ethiopian people, institutions and different systems to achieve economic growth and social development particularly in the agricultural sector (specifically agricultural extension), education and health. However, ensuring that the capacity building initiatives and programs that are inclusive for women, youth, rural populations and other marginalised groups and are need-specific remains a challenge.

Productive Safety Net Program (PSNP) (2005)

The Productive Safety Net Program provides direct support with food and/ or cash transfers to food insecure households in exchange for their labour offered through their participation in public works projects that provide food security and improve household and community assets, infrastructure and building resilience. Thus, the PSNP is the most significant social protection initiative in Ethiopia which enhances livelihoods of its beneficiaries through agricultural support to improve their productivity, income generating capacities to reduce vulnerabilities as households would be able to cope with shocks from the asset base they would have built and are able to reduce their reliance on emergency aid. The program has been successful due to it being adaptable and flexible, it enables spaces for extensive collaboration and has a mechanism of building capacity and resilience to vulnerable groups.

Ethiopia's Climate Resilient Green Economy Strategy (CRGE) (2011)

Ethiopia aims to achieve middle-income status by 2025 through boosting agricultural productivity, strengthening the industrial base and fostering export growth in a climate-resilient green economy. Ethiopia's Climate Resilient Green Economy Strategy promotes climate-resilient agricultural practices such as climate-smart agriculture and sustainable land management to mitigate the impacts of climate change on food security. Thus, it integrates climate resilience into agricultural development and production practices with the aim of transforming agriculture to ensure food security and higher farmer income whilst reducing greenhouse gas (GHG) emissions. One of the pillars of the CRGE is agriculture and forestry which focuses on (i) promoting sustainable agriculture through implementing climate-smart agriculture practices such as use of improved crop varieties, improved water management and agroforestry that increase productivity whilst reducing GHG emissions (ii) forestry development through protecting and expanding forest cover through practices such as reforestation, afforestation and sustainable forest management as forests are critical for carbon sequestration and biodiversity conservation and (iii) implementing soil and water conservation techniques to prevent land degradation and enhance soil fertility which may increase agricultural productivity in a more sustainable manner. Capacity building through training, knowledge sharing and technology transfer as well as communities' mobilisation and participation, and collaborations of different institutions including the public and private sector has been noted as critical for the success of the implementation of the strategy. However, the strategy has only highlighted gender in the form of producing rural energy-efficient stoves which are noted to have benefits by increasing rural household income, health and gender equality, women's empowerment and education while decreasing emissions.

Legislation in Ethiopia supporting agriculture and gender policies and strategies

The Constitution of the Federal Democratic Republic of Ethiopia (1995)

The Constitution of the Federal Democratic Republic of Ethiopia guarantees gender equality for women and men which include the right to equality in all aspects including employment, education and ownership of

property. Article 25 guarantees protection to all persons, *"All persons are equal before the law and are entitled without any discrimination to the equal protection of the law."* Furthermore, article 35 of the constitution addresses women's rights where it states that, *"Women have equal rights with men in marriage as prescribed by this Constitution."* Therefore, women have the right to equality in employment, education, property ownership and have the right to *"compete and participate on the basis of equality with men in political, social and economic life as well as in public and private institutions."* Thus, the constitution affirmatively addresses the issue of inequality and discrimination against women. These equality provisions stipulated in the constitution have been extended into other Ethiopian laws such as the Rural Land Administration and Land Use Proclamation (2005) which has provisions on women's equal right to land ownership.

Rural Land Administration and Use Proclamation No. 1324/2024

The Rural Land Administration and Use Proclamation ensures that women's rights (especially those who want to engage in agriculture) to access and use of land as well as land ownership and inheritance are observed, and promoting gender equality in access to agricultural resources. The proclamation also ensures that irrigation land re-distribution considers the land rights of women and *where land is jointly held by husband and wife that the holding certificate is prepared in the name of all the joint holders.* Further, in terms of the recognition of customary land administration and use systems, the proclamation highlights that customary land use and management rules and conflict resolution mechanisms have no effect if they contravene the constitutional rights of women rights and the rights and obligations provided by other laws. Women will be supported economically through the Communal Land Income Management which is critical for women to actively participate in agriculture as secure land tenure and financial services allow them to invest in and benefit from agricultural innovations and outcomes, as well as access to credit.

Agricultural Production Contract Proclamation No.1289/2023

The proclamation regulates agricultural production contracts between producers and processors through creating sustainable market linkages. It connects agricultural producers with processors, value adding agro-industries and larger buyers by transforming their operations to focus on market-oriented production while developing skills, knowledge and technology transfer. It gives provision incentives for contracting parties which include insurance, market linkages, capital, tax holiday or relief and farm machinery support. However, the proclamation is gender neutral and it does not mention how women and the youth would benefit from this as gender mainstreaming has been overlooked.

Development, Management and Utilization of Community Watersheds Proclamation No. 1223/2020

The Development, Management and Utilization of Community Watersheds Proclamation No.1223/2020 gives provision to women and people with special need the right to participate equally and benefit; also, to extent their capacity and vocation permits, in all beneficial watershed development activities.

Microfinance Business (Amendment) Proclamation No. 1164/2019

The Microfinance Business (Amendment) Proclamation No. 1164/2019 is significant legislative framework in Ethiopia that amends and strengthens the previous microfinance laws to enhance the regulation, operational environment and development of microfinance institutions (MFIs) in Ethiopia. The amendment supports financial inclusion and ensure that the MFIs also provide financial services to the underserved thus contributing effectively to poverty reduction and economic development. The proclamation expand access to financial services, for populations especially in rural areas and also supports the growth of small- and medium-sized enterprises (SMEs) through the provision of support as stipulated in article 3 paragraph g), *"Supporting income generating projects of urban and rural micro and small-scale operators or others engaged in productive activities"* and interest-free microfinance services as stipulated in article 4/ paragraph n). However, the proclamation is gender neutral and it does not mention how women and the youth would benefit from this as gender mainstreaming has been overlooked.

Ethiopian Horticulture and Agricultural Investment Authority Establishment Council of Ministers Regulation No. 396/2017

The Ethiopian Horticulture and Agricultural Investment Authority Establishment Council of Ministers Regulation allows for studying, identifying and facilitating access to agricultural investment lands suitable for horticulture,

commercial farming, livestock, and forestry investments in collaboration with regional states. The proclamation promotes the provision of documents and making them accessible to the users and investors and also support transfer of land as well as supporting agricultural investors to ensure proper land utilization and increase production and productivity; to improve logistics services, promote marketing of agricultural produce, encouraging horticulture exports and contributing to the growth of agro-industries and foreign currency earnings. Capacity building in terms of enhancing the knowledge and skills, technology transfer to investors, promoting market-oriented agricultural production and improved farm management, product handling is emphasised in the proclamation. However, the proclamation is gender neutral and it does not mention how women and the youth would benefit from this as gender mainstreaming has been overlooked.

Irrigation Water Users' Association Proclamation No. 841/2014

The Irrigation Water Users' Association Proclamation No. 841/2014 promotes efficient and sustainable use of irrigation water through the establishment and registration of community-based organisations such as Irrigation Water Users' Associations (IWUAs) to improve the management of irrigation water, regulation and distribution of water to and among users to promote efficient water use, sustainable agricultural practices and enhance food security. Active participation of local farmers is encouraged and thus local communities are empowered to make decisions and to take charge of their water resources, which is benefiting to farmers and significant for economic development. One of the objectives of the proclamation emphasise on all association members acquiring training in irrigation techniques, irrigation farming methods, water saving methods and new technologies of irrigation. Furthermore, the provisions of the proclamation highlight that the association should operate in fairness and equitably particularly in decision making and allocation of irrigation water, and should not discriminate members on the basis of gender, ethnicity or religion. Thus, all members of the associations have the rights to receive all the benefits that comes with the IWUAs. However, gender mainstreaming specific to women farmers' needs has been overlooked as the proclamation is gender neutral as it generalises the gender issue.

Investment Proclamation No. 769/2012 and No. 1180/2020

The investment proclamation is a legal framework that aims to improve the living standards of people of Ethiopia by realising a rapid, inclusive and sustainable economic and social development through increasing the role of private sector investment in all sectors of the economy, productive and enabling sectors to accelerate the economic development and ensure its sustainability by strengthening domestic production capacity. The Investment Proclamation No. 769/2012 highlights the importance of accelerating the country's economic development and developing the domestic market through the growth of production, productivity and services. The investment proclamation also aims to create more and better employment opportunities for all qualifying Ethiopians and advance the transfer of knowledge, skills and technology required for the economic growth of the nation. Similar to proclamation in 2.4.4. above, gender mainstreaming specific to women farmers' needs has been overlooked as the proclamation is gender neutral as it generalises gender issue.

Ethiopian Youth Revolving Fund Establishment Proclamation No. 995/2017

The main objective of this legal framework is to create an enabling environment for the active participation of the youth in the economic activities through the provision of financial and technical support to help them alleviate their economic and social problems through engagement in organized income generating activities. The fund helps the youth to employ their capabilities in creating job opportunities and it provides financial assistance for inputs or capital goods and running costs for their organized income generating activities which also require direct participation. Therefore, the youth would benefit from financial resources provided by the government which can enable them to realise their productive potential and become direct and active participants in the economic development activities. Gender mainstreaming specific to women and girls' needs in the youth age bracket has been overlooked as the proclamation is gender neutral as it generalises the gender issue.

Ethiopian Women's Development Fund Establishment Proclamation No. 240/2001

The Ethiopian Women's Development Fund (EWDF) supports the economic and social empowerment of women with low living standard in Ethiopia by providing financial support/ resources, capacity building, training and skills development, technical support for income generating projects that directly benefits women, thereby promoting gender equality and empowering women to contribute to their overall economic development. The

fund supports community-based projects and women's organisations, provides education and awareness, and encourages women to create and expand small-scale businesses which increase their participation in economic and social development while advancing gender equality and alleviating poverty. The fund also helps with bringing about change in the way women are perceived in Ethiopia, as stipulated in Part One, article 4.6, "...to bring about change of attitude in the society regarding gender equality, provide financial and technical support, information, education and communication services that increase awareness."

Investment Incentives and Investment Areas Reserved for Domestic Investors Council of Ministers (Amendment) Regulation No. 312/2014

The Investment Incentives and Investment Areas Reserved for Domestic Investors Council of Ministers (Amendment) Regulation No. 312/2014 is a regulatory framework that supports and promote economic development in Ethiopia through employment creation, and by attracting investment and promoting local businesses. It encourages businesses to invest in the industrial development zones by exempting them from paying tax for up to four years depending on the area, provided that the business exports at least 80% of the product from their manufacturing industry or supplies the product as production input. The regulation also provides an incentive such as duty-free import of capital goods which are necessary for the enterprise, if the enterprise has invested at least USD 200,000 and are employing at least 50 Ethiopian nationals.

Gender mainstreaming and possible strategic alignment in the Agricultural sector

There is a limited knowledge about gender mainstreaming in Ethiopia's National Statistics Systems and the sources of gender-disaggregated data remain unclear (UN Women, 2020). Collaborative efforts are needed to improve the production and use of gender statistics to fill these gaps in gender mainstreaming and implementation. Currently, the only available National Gender Mainstreaming Guideline is from 2020 for health sector but can be adapted for agriculture. Tsige (2019) noted that identifying and addressing the practical gender needs of women and their challenges from multiple identities and realities are essential prerequisites for the practicality of gender mainstreaming for gender equality in agricultural development. Therefore, there is a need to design and implement locally specific gender-mainstreaming strategies, monitoring and evaluating processes to address women smallholder farmers' needs, separating gender budgets to reach local contexts to achieve gender equality (WHO, 2011). The current National Gender Mainstreaming Guideline (2020) promotes gender equality and empowerment of women by ensuring that gender considerations (gender norms, roles and relations) are fully integrated into the country's development efforts where the impact of all policies and programmes on women and men are to be considered at every stage of the programming cycle, from planning to implementation through to monitoring and evaluation. The specific needs, realities, experiences and contributions of both women and men are recognized and should be addressed in national development efforts.

Key guiding principles of the guideline

Gender Analysis:

A core gender mainstreaming skill to generate and process relevant information needed for sectoral planning and programming as hidden information is retrieved from the process, thereby identifying inequalities that emanate from gender norms, roles and relations as well as power dynamics between and among men and women. Furthermore, information on the interaction of other contextual factors such as culture, education, employment and socio-economic status and access issues with gender can be identified. The guideline emphasises on a strategic approach of considering a multi-sectoral approach to gender mainstreaming which encourages collaboration between government institutions, NGOs, civil society and the private sector to achieve gender equality. Sector-specific gender mainstreaming strategies are crucial, requiring gender-transformative policies and programmes in areas such as agriculture, education, health, and governance. STIBs implementation should integrate gender considerations with principles of equity, inclusiveness, awareness, participation and accountability. The approach should emphasise capacity building through training in gender analysis and planning for policymakers, researchers, stakeholders and government officials to effectively equip them with skills to implement gender mainstreaming. Technical support to strengthen institutions in applying gender mainstreaming is crucial for developing tailored tools and methodologies for specific programmes.

Gender Audit:

The guideline emphasises on the importance of monitoring and evaluation of the impact of policies, legislation, programs and projects on gender equality using the developed gender-sensitive indicators to track progress, identify gaps and areas needing improvement and further interventions. This requires time and financial support which is a challenge in Ethiopia. Gender audit can be adopted in STIBs implementation to examine how the innovations are adopted, by whom and whose decision, and if the work is good enough to actualise gender equality. Stakeholders are then required to report on their gender mainstreaming efforts, the outcomes, challenges and limitations encountered during the implementation process of gender equality initiatives which promotes accountability and transparency.

Gender budgeting:

Gender-Responsive Budgeting is an important tool of applying of gender mainstreaming in the budgetary process to ensure that resources are allocated effectively based on identified needs, in a way that addresses gender disparities and supports the achievement of gender equality objectives. The implementation of STIBs need to consider a gender-based assessment of budgets for integrating gender considerations into all aspects of the budgetary process including analysis and restructuring of revenues and expenditures to promote inclusive development whilst contributing to the empowerment of women and the reduction of gender disparities promoting gender equality. Gender budgeting allows for the collection and analysis of gender disaggregated data which informs the impact of budgets on different groups and how different policies and programmes impact men and women as illustrated in Figure 5. This informs decision making and policy reforms on budget allocations to promote gender equality in specific sectors.

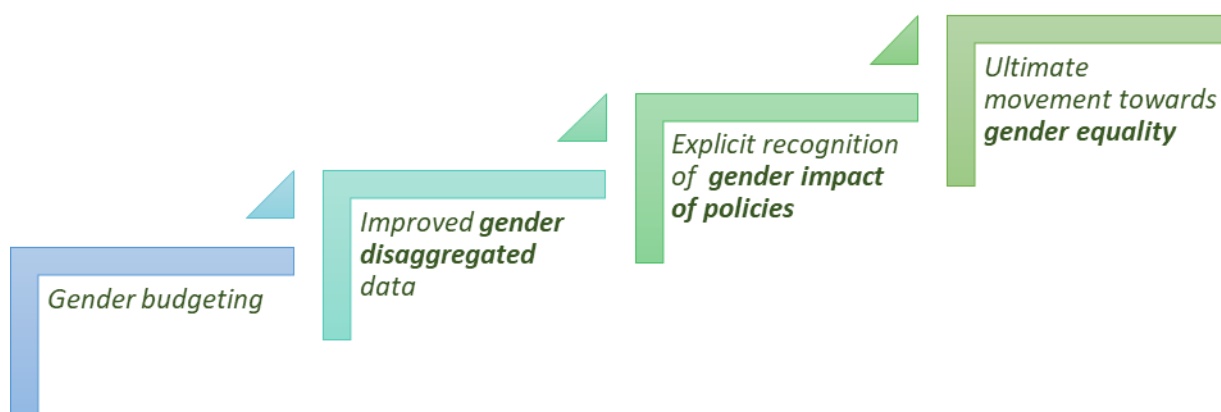


Figure 5: Gender-Responsive Budgeting goal and objectives (Source: Authors compilation).

HOW POLICIES, STRATEGIES AND LEGISLATION CAN SUPPORT STIBs IN ETHIOPIA

Socio-technical innovation bundles (STIBs) are a comprehensive approach to tackling complex challenges in agrifood systems by integrating sets of technologies, practices and social arrangements in a way that aligns technical solutions with social, cultural and institutional contexts. The approach ensures inclusivity which may build resilience and self-confidence in marginalised communities and small scale-farmers, particularly women farmers. Ethiopia's country vision is becoming a low middle-income country by 2025 through sustaining the rapid, broad based and inclusive economic growth which accelerates economic transformation, mainly focusing on effective public participation in a coordinated and structured manner at all levels, ensuring equitable development and building developmental political economy. The focus is mainly to ensure rapid, sustainable

and broad-based growth through *enhancing productivity of agriculture and manufacturing, improving quality of production and stimulating competition in the economy, gender equality and inclusivity which enables women and the youth and the public and private sector to participate in coordinated programmes so as to contribute to and also benefit from the agriculture and economic development outcomes*. Policies and strategies must consider the complex realities of local contexts, and a STIBs approach can address these complexities by uniting relevant sectors (such as Ministry of Agriculture (MoA), public and private institutions, Civil Society Organizations (CSOs), Community Based Organizations (CBOs) and media) and other stakeholders to collaborate in tackling the challenges of gender equality in agriculture, food insecurity, poverty and climate change which are mostly faced by smallholder farmers, particularly women and youth. Therefore, the implementation of STIBs in Ethiopia should be aligned with the policies, strategies and legislative frameworks' goals which promote the empowerment of women and achieving transformative change in gender norms and systems; also ensuring that women farmers, pastoralists and agro-pastoralists are enabled to increase agricultural productivity and benefits through enabling them access to and control over land, access to extension services, training, agricultural inputs, credit and market participation as well as receiving market information linked to their produce and are able to make decisions. These frameworks are essential in shaping the effective integration of STIBs in key areas, particularly the agrifood sector, rural development and economic growth, and promoting gender equality. Thus, STIBs are essential for promoting sustainable development, improving livelihoods, enhancing resilience to climate change and gender equity and equality, especially if the correct kinds of social and technical innovations are combined and are channelled into contextualized activities and interventions (Ogunlela and Mukhtar, 2009; Barrett et al., 2020). With some studies having been conducted in Ethiopia on STIBs on the vegetable value chain by Puskur et al. (2023); focus should be on evaluating the projects to identify challenges and gaps and exploring intervention measures, while disseminating the findings. There is a need to shift from 'gender-sensitive' and 'gender-responsive' approaches to a gender-transformative approach, aligning policies with empowering women, creating enabling environments to allow women participation in leadership; women's access to markets, postharvest technologies and irrigation technologies including water access and control of the resource as well as achieving transformative change especially in financial inclusion, technology provisions (including processing and packaging technologies), gender norms and harmful traditional practices that discriminate against women. In the current context of Ethiopia, the implementation of STIBs need to focus on the integration of bundles that will target market participation, financial inclusion, and women's empowerment as critical aspects of gender transformation. It has been noted that women in Ethiopia participate in seeding, farming and harvesting of the agricultural products but they are not involved in markets of the end-product, including livestock selling, thus they are limited to sell and get the proceeds of their labour. Therefore, the STIBs implementations should be gender-transformative throughout the programmes and the combinations should focus on:

- **Enhancing agricultural productivity and sustainability** to increase agricultural production, increases yields and quality of product, innovations that support nutrition-sensitive agriculture, using improved seed varieties that are also resilient to climate change. This should include innovations focusing on climate-smart agriculture (CSA), conservation agriculture and should enhance access to inputs and improved agricultural technologies for small-scale women and youth farmers. The programmes need to promote the adoption of sustainable agricultural practices and these innovative farming techniques and technologies to, build resilience in farmers, including women farmers. This helps them to adapt to climate change whilst maintaining productivity which strengthens food security and nutrition, and may also increase commercialisation of the agricultural products to increase economic empowerment while alleviating poverty.
- **Market engagement and economic empowerment** where the innovations will help farmers, specifically women farmers to have increased access to markets, access to credit and other necessary resources to start their own small businesses. Opportunities for collaborations between the government institutions, non-governmental organisations, community-based organisations, the public and the private sectors need to be considered. The STIBs bundles should also support market-oriented production systems, promoting the interaction of farmers with the markets to acquire information on inputs and product prices. This can be done through networking in organised farmer groups including women's groups, cooperatives, SMEs and agricultural extension services.
- **Participation of the private sector** needs to be heavily encouraged as the policies have also noted the importance of incentives for investment, especially for the private sector, which may promote investment and employment creation for the most vulnerable groups, particularly women and youths. This can support the scaling up of socio-technical innovations as public-private partnerships are crucial in bringing new

technologies and practices to the market, and are able to create employment. The STIBs approach should strengthen agricultural research institutions and extension services and should facilitate the development and dissemination of STIBs. Therefore, collaborations between research institutions, government institutions, non-governmental organisations, the public and the private sectors is vital for driving sustainable innovations in the Ethiopian agrifood sector.

- **Gender inclusion and capacity building** through education and training, also focussing on technology transfer. The activities need to be participatory with women and youth involved in the capacity building programmes to increase resilience, their level of self-confidence and empower them in all levels of development, with a strong focus on increasing production, improving food security and alleviating poverty through marketing and selling their produce. Promoting gender equality in agrifood systems provides women with access to and ownership of land, access to new agricultural technologies, training, markets and financial services that can enhance their agricultural productivity, economic independence and empowerment, and are able to make decisions concerning their farming activities. Secure land tenure allows for investors to also target women farmers, and which encourages women to invest in sustainable agricultural practices and new technologies. Therefore, a conducive environment needs to be created for women to fully participate and engage in the socio-technical innovations without fear of discrimination. While legally women have the right to access land with some having certification with both husband and wife's names and their children appearing on the certificate, customary practices and socio-cultural norms limit their control and decision-making, particularly in rural areas which highlights a gap between policy formulation and implementation. Thus, policies often include gender elements, but practical barriers, such as inadequate regulations and traditional practices prevent meaningful gender equality. Therefore, there is a need for commitment at various levels to close these policy implementation gaps and allow women to have full control of the land.
- **Needs- and context-specific activities and gender mainstreaming.** Attention should be given to the structural power relations, gender norms, roles and relations which may work against gender equality. There is a need for gender analysis as a basis of STIBs planning and program designing, and the planning need to consider all gender-sensitive indicators other than just sex-disaggregated target for the implemented activities. Therefore, there is need for training on gender mainstreaming for researchers and all stakeholders to avoid the generalisation or the perceptions that equal participation and/or equal opportunities of both men and women will automatically ensure equal outcomes and benefits from STIBs. Unfortunately, policies, strategies, legislations and most programs in Ethiopia do not follow the gender mainstreaming guidelines, they do not contain sex-disaggregated/ gender targets, needs specific activities and they overlook women's specific activities which may promote gender equality.

Therefore, the implementation of STIBs in Ethiopia should consider the importance of inclusivity and participation of farmers, especially women farmers and the youth in the design and implementation of the innovations. The combinations of socio-technical innovation bundles that are to be implemented should be context- and need- specific and also gender transformative for them to yield desired sustainable outcomes. These should also align well with seven strategic pillars of Ethiopia's 10-year Development Plan (2021-2030) which include (i) quality economic growth and shared prosperity, (ii) economic productivity and competitiveness, (iii) technological capability and digital economy, (iv) private sector-led economic growth, (v) resilient green economy, (vi) institutional transformation, and (vii) gender and social inclusion.

ALIGNMENT OF STIBS WITH ETHIOPIA'S NATIONAL DEVELOPMENT PLAN, POLICIES AND STRATEGIES

Components of STIBs and examples of innovations that align with Ethiopia's 10-year Development Plan strategic pillars

Table 2 highlights the components and examples of socio-technical innovation bundles which include technological and technical innovations; social and institutional; cultural and behavioral and policy and regulatory innovations.

Table 2: Components of STIBs and examples of innovations

Components of STIBs	Examples of innovations
Technological Innovations	<ul style="list-style-type: none"> ○ improved seeds and crop varieties which are drought-resistant, pest-resistant, or high-yield crop varieties ○ irrigation technologies that are affordable and efficient, e.g. drip irrigation or rainwater harvesting ○ digital tools including mobile apps for precision agriculture and market information
Social and Institutional Innovations	<ul style="list-style-type: none"> ○ farmer cooperatives including organizing farmers into cooperatives to enhance access to markets, resources, and training ○ microfinance and credit schemes to provide accessible financial services tailored to the needs of all small-scale farmers including women ○ extension services which are gender-sensitive and can provide technical assistance and knowledge sharing
Cultural and Behavioral Innovations	<ul style="list-style-type: none"> ○ supports community engagement to involve local communities in the design and implementation of innovations to ensure they meet cultural and local needs ○ gender equity programs with emphasis on initiatives that promote women's participation and leadership roles in agriculture and also ensuring that they have access to resources and are involved in decision-making
Policy and Regulatory Innovations	<ul style="list-style-type: none"> ○ supportive government policies that <ul style="list-style-type: none"> ● promote inclusive education and training ● promote the adoption of sustainable agricultural practices ● protect the rights of vulnerable groups ○ regulatory frameworks which are enabling and allow for conducive environments <ul style="list-style-type: none"> ● for the adoption of new technologies ● has standards and certifications that encourage sustainable practices

(Source: Authors compilation).

Alignment of STIBs with strategic pillars of Ethiopia's 10-year Development Plan and the policies and strategies

Possible bundles of innovations specific to Ethiopia and supporting policies should have measurable indicators and requires research, community engagement, alignment with the markets, includes innovations that enhance financial inclusion and should enhance use of technology (including digital tools) that can reach and empower women farmers especially those in rural areas where access to smartphones and digital literacy is low. Some activities should include identifying gender norms, barriers to gender equality, identify the behaviour of the farmers, encourage development of farmers cooperatives for both crop and livestock

farmers, especially small ruminants and poultry; use of radio programs for dissemination of information. Showcasing STIBs benefits and outcomes to policy makers and engaging them is crucial, as this can influence policy making and could drive a broader support for gender transformation. Table 3 below highlights some possible STIBs' components and implementation programmes recommended specifically for Ethiopia whilst Table 4 shows **relevant focus areas for possible STIBs implementation as aligned with the Ethiopian 10-year development plan and the supporting policies, strategies, programs and legislation.**

Table 3: Some specific STIBs' components recommended for Ethiopia

Possible implementation programmes	Objectives	Possible STIBs Components
Empowering Women in Agribusiness and Agro-processing	The objective should be to empower women through skills development, entrepreneurship, and value-added agro-processing, leading to economic growth, self-confidence and improved nutrition and livelihoods. This STIBs should also target postharvest management to reduce postharvest losses.	<ul style="list-style-type: none"> ○ Establishing women's nutrition groups for knowledge exchange (vegetable production, poultry projects (eggs +meat production), cooking, nutrition education) ○ Support for women-owned agro-processing units with affordable technology ○ Creating business incubators and accelerators for women in agribusiness ○ Labour-saving tools designed for women farmers ○ Establishing farmer cooperatives-private partnerships and agribusiness clusters ○ Market participation ○ mobile banking expansion ○ gender-sensitive financial literacy programs
Market Access and Cooperative Development for Women Smallholder farmers	The objective of this initiative should be to strengthen market linkages and resource-sharing for women farmers through farmers' cooperatives and partnerships with private sector and agricultural extension services, thus improving their access to markets, training and agricultural services and enhancing their economic empowerment, food security and improved livelihoods. The STIBs should also aim at improving access to knowledge, extension services and land, including control of land for women farmers.	<ul style="list-style-type: none"> ○ Development of women-only farmers cooperatives ○ Farmers dialogues on which agricultural production type to consider (crop and/or livestock) ○ Form partnerships between the farmers cooperatives and private sector and establish agribusiness clusters, market links and digital marketing ○ Creating enabling environments for equitable access to and control of land for women, increased access to credit and financial resources for agricultural production ○ Context and needs specific farmer training and increasing access to agriculture extension services, including training on marketing and mobile banking, digital literacy programs for women farmers
Climate-Resilient and Sustainable Farming Practices for Food and nutrition Security	The objective should be to promote sustainable agricultural practices to enhance food and nutrition security by improving crop resilience to climate change and optimizing water use, while integrating traditional and modern farming knowledge.	<ul style="list-style-type: none"> ○ plant breeding and adoption of climate-resilient crops ○ Sustainable farming practices (e.g., crop rotation, organic farming, mixed crop farming) ○ Rainwater harvesting and conservation ○ Smart irrigation techniques ○ Formation of women only water users' association and cooperatives ○ Incorporating traditional knowledge and practices to modern knowledge and technologies ○ Digital apps for access to climate information ○ Market participation for women farmers

**Inclusive Financial
Access and Digital
Literacy for women
smallholder
Farmers**

The objective should be to enhance financial inclusion and literacy, enabling smallholder farmers, particularly women and youth, to have increased access to agricultural resources including inputs, digital tools, new technologies and financial services to enable them to grow their agribusinesses.

- Needs specific programmes to support mobile banking expansion
- Digital literacy and training programs to empower women and youth to use technology for better resource management, improving market participation and decision-making power.
- Inclusive and gender-sensitive financial literacy programmes
- Increasing access to credit and financial resources
- Establishing farmer cooperatives-private partnerships and agribusiness clusters.

(Source: Authors compilation).

Table 4: Possible STIBs aligned with the Ethiopia’s development plan, policies and strategies

Relevant focus areas for STIBs implementation	Possible Socio-technical innovation bundles	Supporting policies, strategies, programs and legislation
<ul style="list-style-type: none"> ○ Improved Agricultural production ○ Climate-Smart Agriculture ○ Sustainable intensification ○ Nutrition-sensitive agriculture for improved food security and nutrition status ○ Alleviating poverty ○ Market access and linkages ○ Access to credit and inputs for all ○ access to agricultural inputs and technology ○ rural entrepreneurship and job creation ○ promote the development of rural enterprises and small and medium enterprises (SMEs) ○ Creating collaborative networks for knowledge exchange and shared resources ○ innovative production practices to improve productivity ○ Water resource management ○ Agricultural intensification and increased yields ○ Infrastructure development e.g. irrigation, market facilities and agribusiness ventures ○ Financial incentives for export revenues and import duty taxes ○ rural entrepreneurship and job creation ○ promote the development of rural enterprises and small and medium enterprises (SMEs) ○ Digital economy growth ○ Agribusiness development services ○ Value-added food processing ○ Financial services and inclusion with focus on access to finance ○ Education, training and capacity building ○ Gender-responsive agricultural technologies ○ Strong market-led partnerships between public and private sectors 	<ul style="list-style-type: none"> ○ Develop and promote use of improved seed varieties including biofortified crops ○ adoption of climate resilient crops ○ sustainable farming practices ○ Promote home gardening ○ fertilizer use, ○ Implementation of smart irrigation techniques ○ Increase access to agriculture extension services, ○ farmer training and cooperative development ○ Establishing community-based organisations ○ establishing women’s nutrition groups, for knowledge exchange on home gardening, cooking and nutrition education ○ Increase access to credit and other financial resources ○ Rainwater harvesting and conservation ○ Formation of Water User Associations to manage the resources ○ Establishment of public-private partnerships, farmer cooperatives and agribusiness clusters to increase access to markets and shared resources ○ Programmes to support expansion of mobile banking ○ Inclusive and gender sensitive financial literacy programmes and training centres to increase uptake of financial services, empower entrepreneurs to use digital tools for business growth ○ Create business incubators and accelerators especially for women in agribusiness; create network opportunities and access to markets for them ○ Support establishment of women-owned agro-processing units with affordable technology to process vegetables, fruits and grains into value added products ○ adoption of techniques like crop rotation and organic farming ○ incorporating traditional knowledge and practices ○ training and digital literacy programs for farmers, including women and youth ○ labour-saving tools designed for women farmers ○ Establishment of public-private partnerships, farmer cooperatives and agribusiness clusters to increase access to markets and shared resources 	<p>Key policies</p> <ul style="list-style-type: none"> ○ Growth and Transformation Plan II (GTP II), ○ Rural Development Policy and Strategies (RDPS) ○ Food and Nutrition Policy ○ Ethiopia’s Agricultural Sector Policy and Investment Framework ○ National Policy on Ethiopian Women ○ National Action Plan for Gender Equality (NAP-GE) ○ Women’s Development and Change Package (WDCP) <p>Key Strategies</p> <ul style="list-style-type: none"> ○ Agricultural Extension Strategy of Ethiopia ○ Nutrition Sensitive AgriFood Systems Strategy ○ Horticulture Research Strategy ○ Postharvest management strategy in grains in Ethiopia ○ Gender Equality Strategy for Ethiopian Agriculture sector (GESA) Revised Version ○ National Smallholder Irrigation and Drainage Strategy (NSIDS) ○ Realizing the potential of household irrigation in Ethiopia strategy ○ National Technical & Vocational Education & Training (TVET) Strategy ○ Ethiopia’s Capacity Building Strategy and Program ○ Ethiopia’s Climate Resilient Green Economy Strategy (CRGE) <p>Key Legislation</p> <ul style="list-style-type: none"> ○ The Constitution of the Federal Democratic Republic of Ethiopia ○ Rural Land Administration and Use Proclamation No. 1324/2024 ○ Agricultural Production Contract Proclamation No.1289/2023

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- support community and cooperative participation
 - Support for women’s development initiatives and organised women’s groups and leadership
 - Gender mainstreaming and needs specific activities
 - Fair participation of women and youth in both leadership and decision making
 - Gender empowerment
- Facilitation of multi-stakeholder dialogues including policy makers, women’s groups, civil society, private sector and NGOs to ensure gender consideration are integrated in national policies, strategies and programmes.
 - training and digital literacy programs for women and youth farmers
 - Equitable participation of women and youth
 - Gender equity in agriculture productivity, economic and social development
 - Access to and control of land for women farmers and youth
- Microfinance Business (Amendment) Proclamation No. 1164/2019
 - Irrigation Water Users’ Association Proclamation No. 841/2014
 - Investment Proclamation No. 769/2012 and No. 1180/2020 & Ethiopian Women's Development Fund Establishment Proclamation No. 240/2001
 - Development, Management and Utilization of Community Watersheds Proclamation No. 1223/2020
 - Ethiopian Horticulture and Agricultural Investment Authority Establishment Council of Ministers Regulation No. 396/2017
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(Source: Authors compilation).

Challenges and Opportunities

The government of Ethiopia is committed to achieve its vision of becoming a low middle-income country by 2025 through sustaining the rapid, broad based, and inclusive and sustainable economic growth which accelerates economic transformation, improves livelihoods, and enhances resilience of its people to environmental and climate-related challenges. The policies, strategies and programmes that has been implemented thus far, and its legislation are generally incorporating STIBs (indirectly) to address the complex challenges of poverty, unemployment, climate change, food insecurity and gender inequality, particularly in rural areas and targeting women farmers. However, these are not designed to address context and needs specific challenges being faced by small-scale farmers, specifically women and youth. Therefore, integrating context- and needs-specific technological innovations with the social and institutional components and implementing practical solutions that are inclusive, sustainable and culturally appropriate may enable the country to realise its vision by 2025. However, despite these opportunities of Ethiopia's Constitution and policies which promote inclusive economic growth and gender equality, women in Ethiopia still faces great challenges of access to resources. For example, women still struggle to access markets, extension services, agricultural resources including inputs, credit and technology as well as securing land tenure. This limits their participation in agricultural programmes and initiatives which makes them non-beneficiaries of agricultural productivity outcomes. In terms of capacity building, education and training, even though policies and strategies are designed to promote women participation, there is a need to continuously provide women with the skills and knowledge which are specific for their needs and are relevant for them to engage in modern agricultural practices and innovations, also taking leadership roles, involved in decision making and become economically empowered with self-confidence. Thus, women would be able to overcome the cultural norms and practices which define traditional gender roles that discriminate against them and inhibits their full participation in education and trainings, agricultural production, economic development, decision making and access to markets and resources including agricultural inputs and credit.

Even though the Constitution of Ethiopia and the existence of strong agricultural, economic development and gender policies and strategies exist in Ethiopia, there are policy implementation gaps particularly at local level which poses challenges in achieving the country's vision. Effective implementation and gender considerations including gender equity, gender analysis including sex-disaggregated data and gender responsive budgeting remain a nightmare as this is only theoretical and not fully practiced. Poverty levels, food insecurity and malnutrition remain high in the country, especially among women and children. Although there have been some significant improvements reported for child stunting from 58% in 2000 to 38% in 2016 and underweight from 41% to 24% during the same period, wasting in children only improved by 2% (Dorosh and Minten, 2020). A resilient and sustainable agrifood system in Ethiopia can only be achieved through integrating gender considerations in all aspects of agricultural policy and practice and addressing the gender dynamics to create a more inclusive, equitable and productive agrifood system that improves livelihoods, food security and promotes gender equality and fully harnesses the potential of both women and men in economic growth.

Therefore, opportunities for STIBs implementation in Ethiopia should include bundles that aims at strengthening land rights through community-level initiatives which may challenge discriminatory practices, improve access to inputs, credit and technology, especially for women farmers to boost their productivity and income and should attract the private sector to create employment opportunities. Gender-responsive extension services are significant in addressing women's specific needs and constraints and may enhance women's agency through creating conducive and safe environments to support women's leadership and participation in agricultural cooperatives, initiatives and decision-making entities, including being involved in policy-making processes to ensure that their needs and interests are catered for and women's voices are heard and respected. Also, introducing time-saving technologies to increase access to irrigation water and reduce women's domestic workload is crucial. Lastly, the bundles should promote gender-sensitive policy implementation with a gender perspective which is key to promoting gender transformation thus enhancing gender equality in the agricultural sector.

RECOMMENDED STRATEGIC AREAS OF FOCUS

The implementation of socio-technical innovation bundles (STIBs) in Ethiopia's agricultural sector will require a strategic approach which will use appropriate combinations that addresses the specific challenges and opportunities within the sector, including climate resilience, poverty, food security and gender equality and that are tailored to be context- and needs specific to the farmers. It is crucial to understand local contexts and distilling principles from other countries where STIBs implementation was successful like inclusion of local knowledge and community engagement, rather than directly replicating solutions. Below are some recommendations for a successful STIBs implementation in Ethiopia:

- Researchers and practitioners should prioritise **gender-transformative innovations** where they ensure that the socio-technical innovation bundles are designed and implemented with a strong focus on gender equality, embracing women's crucial role in agriculture and empowering women to have control of land (have ability to use, sell and transfer land), access to financial services and market participation. Thus, researchers and practitioners should incorporate gender-transformative strategies in STIBs to address the systemic imbalances between men and women, particularly in agriculture. Steps to follow may include conducting a gender analysis to identify the specific needs of women and their challenges, noting gender gaps, capital gaps, and providing data on these issues; integrating gender-sensitive technologies, education and training and creating safe and enabling environments for women's participation in leadership, extension services, decision making and promoting the establishment of women's groups and agricultural cooperatives. The role of women and youth, particularly in cooperative development and productivity programs, should be given more attention. This may also include identifying the behavioural barriers, gender norms and roles that hinder women's participation in agricultural innovations and establishing awareness programmes which may also engage men as gender champions.
- The implementation of STIBs should **enhance women's access to and participation in markets, and value chain transformations** by developing digital markets and facilitating better market access and integrating small-scale farmers into value added chains where they can directly connect farmers with buyers to reduce intermediaries and increase farmers income. The digital tools should address the needs of the farmers, should be accessible to all farmers even in rural areas and those with low literacy levels. That is, the researchers and practitioners should develop and implement technologies that can scale and adapt to the needs of the farmers, especially women farmers. Digital apps should also provide real-time information on market prices, best farming techniques and climate information.
- STIBs implementation should **consider financial inclusion and promote access to credit** for small-scale farmers, especially for women. This may include collaborating with the private sector and micro-financial services to increase women's access to credit and financial services and provide financial literacy training to support farmers in managing their savings and investments in agriculture.
- Focus should be on investing in **capacity development and training** to ensure that the adoption and scaling up of the socio-technical innovation bundles is successful. Training should focus on new technology transfers, sustainable agricultural practices, business skills and digital technologies, and these should be *tailored to address the needs* of different farmers, with emphasis on women and youth. As noted by the Ministry of Agriculture, there are technological gaps and limited economic opportunities in agriculture, especially for women and educated rural youth, despite recent agricultural progress. Technological advances and services have been insufficient, particularly in creating alternative livelihoods for women and rural youth due to significant gaps in training, land availability, finance, and the implementation of agricultural techniques. Therefore, STIBs implementation should consider closing these gaps, and also create alternative livelihoods for women and youths. Additionally, the implementation of STIBs should establish collaborations with educational institutions and agricultural extension services to facilitate curriculum development that can support the implementation of STIBs and is gender-sensitive; and should promote establishment of social learning networks where knowledge exchange and transfer occurs among farmers. It is also recommended to partner with local organisations to ensure smooth flow of information when providing training, including digital literacy training, especially for women and youth.

- Researchers should **strengthen institutional support** and should align proposed STIBs with Ethiopia's agricultural and gender policies for the government to support the implementation. That is, researchers should establish *multi-stakeholder collaborations* with government agencies, civil society, farmers and establish public-private partnerships to facilitate dialogue and coordination and to boost resource mobilisation, advocate for gender mainstreaming, create networks and establish policy support for the smooth implementation of STIBs. Most importantly, the private sector involvement is crucial as they have direct linkages to markets, finance services and digital innovations which complements government efforts, thus contributing to sustainable food systems. It is very important to also *involve local communities*, especially farmers including women and youths in the design and implementation processes of STIBs to ensure that the programmes will follow the local context and are widely accepted within communities.
- Implementation of STIBs in Ethiopia should **promote sustainable resource management** by the users and therefore should emphasise integrating sustainable agricultural practices into STIBs programmes such as climate-smart agriculture practices, conservation agriculture and water-efficient irrigation systems to increase resilience in farmers. It is important to integrate traditional and modern knowledge systems into land use and management systems to which is crucial for enabling smooth transition. Emphasis should also be on *supporting inclusive participatory approaches* and the establishment of *community-based resource management associations* such as Water Users' Association and also supporting women as well as ensuring equitable distribution of resources. This can help with easing pressure on the rural communities which has been caused by the widespread land degradation and recurrent droughts which has been worsened by climate change, leading to food insecurity and dependency on aid in the rural areas.
- Researchers and practitioners should not only focus on crop production when designing and implementing STIBs in Ethiopia, but should also consider livestock production as it has been noted by the Ministry of Agriculture that there has been a livestock and crop production imbalance where the agricultural extension system has overly focused on crops, neglecting livestock development, which limits comprehensive rural progress. Livestock production projects can follow ICARDA's community-based breeding and fattening programmes for small ruminants, and may also include poultry projects for breeding, egg production and meat (all for consumption and marketing).
- Researchers should implement a **monitoring and evaluation system** to keep track of the impacts made through the implementation of STIBs, identify gaps and adapt new strategies as needed. Firstly, the researchers and practitioners should *develop gender-responsive monitoring and evaluation tools* which include gender-disaggregated data and sustainability, resilience, poverty and food security and nutrition indicators. Secondly, researchers and practitioners should *do regular assessments to evaluate* if the implementation of STIBs was effective and should identify gaps/ areas which needs improvements. Thirdly, researchers and practitioners should always *use feedback from farmers and stakeholders* and should continuously improve as well as adapting the socio-technical innovations accordingly, especially with the changing global environment. Lastly, researchers and practitioners should *document and disseminate the success stories of STIBs*, identify areas for scaling up the implementation of successful socio-technical innovation bundles to achieve wider impact across the agricultural sector and should *create an enabling environment to facilitate the replication and scaling of STIBs in other regions*. However, this can only be successful through secure funding and support from the private sector, NGOs, government agencies and development agencies.

In conclusion, Ethiopia's agrifood sector holds significant potential for growth and development, but this potential can only be fully realized by addressing gender disparities and leveraging socio-technical innovation bundles. By aligning policies, strategies, and legislation with the goals of economic growth, empowerment and resilience, Ethiopia can create a more inclusive, resilient and sustainable agricultural sector that benefits all while contributing to the country's vision of becoming a low middle-income nation by 2025.

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