

CONTRIBUTION OF AGRICULTURAL GROWTH TO SECTORAL TRANSFORMATION IN ETHIOPIA

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Summary:

This publication narrates the summary reports of **ARICULTURAL GROWTH, TRANSFORMATION AND POVERTY REDUCTION IN ETHIOPIA: 2004-2021** project of Ethiopian Policy Study institute, Addis Ababa, Ethiopia.

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EXECUTIVE SUMMARY

Agriculture is an engine of Ethiopia's economy and crucial for meeting food security, poverty reduction, industrial development, and wealth creation. It accounts for about 33% of the country's GDP, 75% of export earnings, 73% of the employment opportunities, and the bulk of the country's raw material requirement for its agro-based industries (~70%) contributed from the sector. The sector is also essential for food and nutrition security for more than 110 million citizens. Hence, the country's desire for overall economic growth and development are highly linked to agriculture sector performance. Knowing this, the Government of Ethiopia has been given much emphasis on the next five-year development plans over the last two decades. In response, substantial growth was registered mainly over the 2004 to 2015 period though it declined in the later periods. The growth in the sector is credited for the subsequent improvement of welfare outcomes for the people of Ethiopia.

Agriculture sector also influences the path of the economy through its significant effect as a source of employment, income, and livelihood for most of the country's population that resides in rural areas. However, despite substantive progress registered, the country has been facing a number of fundamental challenges related to agricultural sector development including lower agriculture production and productivity to bring about the long-anticipated growth and transformation of the economy. In response, the government designed and implemented successive policies and strategies aiming at achieving agriculture and rural transformation. Achieving sustainable overall economic growth thereby sharing prosperity to wards to improvements of welfare outcomes of people largely depends on very good overall agricultural sector performance, favourable institutions, and structural changes within the sector over the coming years. Hence, transforming a country's agriculture sector is not an optional but rather mandatory policy action for kick-starting the Ethiopian economy on a path to middle-income growth.

The overall objective of the study is to assess the performance of the agriculture sector (crop and livestock), identify the main drivers, and provide a comprehensive understanding of its contribution to agricultural export, as a source of raw material for the industry, and nutrition security over the last two decades of Ethiopia. The subsequent sub-sections summarize the key findings of the main chapters of the book in their respective chapter order and then briefly synthesized their policy implications:

Introduction: The overall agriculture growth performance depicts promising progress since the mid-2000s resulting in direct and indirect impacts on the improvement of the welfare of citizens. However, the growth has been constrained by several factors. Crop production takes lion's share of the total value added to the agriculture sector, while the contribution from animal farming and hunting, forestry, and fishery has been minimal showing weak innovation, value addition, and diversification over the period. As a result, the overall performance of the agriculture sector was erratic, less predictable with declining margins of growth in some cases to sustain its stimulation and boost economic growth and bring about the desired structural changes to the overall economy. In response to these challenges, the government developed a Ten-Year Development Policy (TYDP) to provide sustainable solutions and achieve inclusive sustainable agriculture growth and transformation in the upcoming years which in turn calls for irrepressible commitments of government, private sector, NGOs, and development partners.

Agricultural growth performance in Ethiopia: The 2004/05–2018/19 period has demonstrated remarkable improvements in agriculture growth in Ethiopia through increased total crop

production. Results of the Agricultural Sample Survey data analysis has indicated that total crop output has grown from 14 to 37 MMT (2.6 fold increase). In the same period crop cultivated area increased from 10.11 in 2004/05 to 13.32 million hectares (34.8% increase) in 2018/19. About 85% of the growth in total crop output was mainly obtained from grain crops while the remaining is attributed to growth in horticulture crops. Rapid growth in grain yields with an annual growth rate of 8.1 percent while the low-level growth (1.36 percent) in horticulture crops characterizes the agricultural growth in Ethiopia from 2004/05 to 2018/19 and clearly shows that much remains to be done to bring the desired transformational growth in the upcoming periods.

Agriculture in Ethiopia is largely based on smallholder producers, low-tech, and rain-fed crop production systems. In the last two decades, the overall agriculture growth performances show promising progress. However, it's constrained by a number of factors: crop productivity growth of having been on the rise since 2004/05 but it did start declining in the GTP-II period, i.e. 2015/16 afterward. Cereals productivity increases for crops like maize, wheat, sorghum, soyabean, chickpea, and tef, but poor in crops such as sesame, cotton, fruits, and vegetables. Productivity trends of most vegetables and fruits declined over the past 15 years. The productivity gap between research results (experimental plots yield) and those obtained by adopting farmers and the national level averages are still very high. Policies in the past focused mainly on cereals and no particular stimulus for improving the productivity of horticulture crops. The majority of cereals are consumed by the producers themselves and only about 18% are sold out for urban consumption. The vegetable production mixes being produced is mainly dominated by red pepper and onion (less nutrient and vitamin-rich) and mainly supplied to cities and towns. The existing utilization of agricultural technologies for cereals needs to change through better technologies and farm management operations. Low utilization of irrigation and mechanization and their implementation levels are highly inefficient. Agricultural mechanization is not well incentivized for the adoption of smallholder farmers. Commercial farming through agricultural investment has not been well coordinated and the institutional support system to appraise commercial farmers and ensure sustainability was nearly lacking. Shortage of inputs such as good quality seeds, low level of professional engagement, and lack of use of good farm practices has contributed to lower productivity in the sub-sector.

During the 2004/05–2018/19 period, the crop output in Ethiopia grew annually an average year-to-year change in Total Factor Productivity (TFP) of 7.6 percent growth in output of which increased use of all inputs contributed about 5.7 percent. The main drivers of crop output growth have been primary inputs such as labor and land, and technological inputs such as fertilizer, improved seeds, pesticides, and irrigation in that order of real crop output growth. Estimates of average annual TFP growth in the crop output for three successive development plan periods((PASDEP and GTP-I & II) show a decline in the annual TFP crop growth rate over the period depicting a need for structural change in the agricultural sector reforms to maintain and further increase crop output growth. Further, the results of growth decomposition into its constituents reveal most of the real crop output growth was achieved through the increase in labor force deployed to agriculture, the area covered by modern agricultural technologies (the use of chemical fertilizer and improved seed), and increment of TFP, land and less contribution of factors like irrigation, agri-services, pesticide, and capital was relatively smaller. The more pronounced decline in TFP in the last period and less contribution of irrigation and agri-services are a warning sign for adequately addressing the issues of sustainability of crop output growth which requires agricultural sector reforms.

Crop growth showed a significant increment in production and productivity with total output growth of 12.0 percent and cereal growth of 9.9 percent per year with a corresponding increment of 2.12 percent of the cultivated area from 2004/05 to 2018/19. Productivity growth rates declined at later stages. Crop productivity also has registered remarkable growth in technical efficiency scores from 2004/05 to 2018/19. However, most of the growth output is contributed from grain crops only with steady increments of additional cultivated land and limited diversification towards horticulture crops. The elasticity of output is responsive to all main production inputs.

Analyses of efficiency across have shown varied responses in the elasticity of output for input allocated implying the necessity of differential intervention to maximize crop output for each crop group and specific crops. Elasticity coefficients estimates using panel fixed-effect stochastic frontier model of production function and its inefficiency covariates using longitudinal data sets indicate that the elasticity of output with respect to cultivated area, the area covered by local seed, labor, chemical fertilizer, and use of pesticide have a positive and significant effect on the crop output indicating the importance of these inputs to enhance production and productivity of crops. However, the elasticity of output with respect to capital (proxies by the number of livestock used to plow the land) and local seed have negatively and statistically significant effect on crop output at the national level from 2004/05 to 2018/19. The level of technical efficiency of farming improved with the increments of irrigated areas and improvements of agriculture extension service, and with an increment of the average temperature. However, technical efficiency declined due to a lack of adequate rainfall during Meher cropping seasons for all crops. Further, the result of cross-sectional stochastic frontier model was applied for estimating the level of efficiency scores of crops. The result shows 74% of the overall level of Technical efficiency (TE) of all crops, 84.48% for cereals, 85.94% for pulse, 77.76% for oilseeds, 85.35 for root crops, and 68.19 for vegetable crops. Besides, crop-specific estimates of efficiency scores show 89.66% for teff, 86.64% for barley, 85.97% for wheat, 83.58% for maize, and 82.93% for sorghum which indicates the existence of substantial levels of inefficiencies from 2004/05 to 2018/19. The result showed that there is room for further increasing the level of productivity from their current level without additional uses of inputs and/or application of modern agricultural technologies by working on the inefficiency factors which need more attention. However, the room for further boosting yield is not so wide for cereal, pulses, and oilseeds crops. Whereas, the technical efficiency value for vegetable crops shows more room for further improvement of productivity over the coming years. Technical efficiency improved with the increments in irrigated areas and improvements of agriculture extension packages or extension services and declined due to lack of adequate rainfall.

Livestock subsector growth and transformation: Despite the Ethiopian livestock sector being the largest in Africa, immense contributions to agricultural value-added, national GDP, and export signifies an increasing trend of both output and livestock owner's numbers for all livestock species, constrained by a number of limiting factors: rapid summary outlooks on livestock growths trends recorded over the last years, short supplies of animal feed due to the limited relaying crops residue followed by green fodder or grazing are registered as main animal feed sources. Whereas, purchased animal feed (by-products) and hay are recently emerging with growing tendencies, and rapidly growing domestic demand for animal origin foods, largely availability of indigenous origin and diverse animal genetic, promising and opening the export market for beef, live animals, prospect for processed feed, fast urbanization, rising per capita income and high government attention are regards as opportunities for the future livestock development initiatives.

Agricultural export performance: although there is increasing opportunity for Ethiopian agricultural commodity export sector in response to growing needs for high-value agricultural commodities in the global market. However, agricultural commodity export faced a number of constraints: Export earnings registered a substantial decline in value and volume of export during the GTP II period (2016-2019) till it recovers in 2020. Despite all the efforts to diversify export earnings, still export earnings from agricultural products account for three-fourths of the total. From agricultural commodities only the first five (coffee, oil crops, Khat, pulses, and flower) on average account for 80% of total agricultural export which implies high concentration. Besides, the contribution of manufacturing and mining products export earnings remained marginal. Only a few European, Asian and African countries' importer countries account for more than 80 percent of total export implying a high concentration of destinations. Despite the low export performance, the value of imports has substantially increased widening the trade balance gap over the last years. Progressive improvement was on widening trade imbalance in recent years. Agricultural commodity imports (e.g., wheat, edible oil, milk, meat products, etc.) account on average about 50 percent of total export earnings for the period 2004-2019 implying substantial weakness of the production system to promote import substitution. Exporters' survival rate indicates that on average 60% of exporters leave the market before celebrating their first birth year birthday making the system to be more fragile and to be dominated by a few incumbent firms.

The export diversification index of the country is concentrated in the extensive margin range. The overall diversification and the intensive margin haven't shown an improvement as the index is higher which shows lower diversification). A review of supply-side constraints indicates that due to low predacity and competing food demand for export products, the responsiveness of supply for price change, as well as marketable surplus as a share of total production has remained low indicating a low level of agricultural commercialization. Institutional failure to render effective services for export including lack of coordination among key actors for export promotion, lack of capacity and incentives, poor export logistics like transportation service for goods, and lack of stargazed quarantine service for live animal export are some of the core facts drawn from the review. A review of country experiences, mainly "Miracle in Soyabean production in Brazil" indicate that massive investment in Research and Development for producing verities fit for the local environment coupled with dedicated government policy support, continuous learning, linkage with high-value export market together with value-addition enabled to be from 0.06 MT in the 1960s to 133 million MT in 2020 is the leading global soybean exporter.

Agricultural growth contribution for food and nutrition security: despite significant progress in reducing the level of food and nutrition insecurity over the last years, still a significant concern as a significant number of people are incapable of meeting the daily life-sustaining needs of food. In view of these, the following constraints identified: During the last two decades, the total amount of food available in Ethiopia has shown increments. The total supply of food from different sources increased from 16.7 million MT in 2005 to 42.3 million MT in 2020 of which 89% of the food supply comes from domestic production. However, it has been insufficient to meet the rising food demand in Ethiopia. Ethiopia imports large amounts of food either commercially or as part of food assistance due to insufficient production. There is also unequal distribution, physical inaccessibility, and poor food utilization. On average, the quantity of food consumed per adult equivalent and calories consumed has increased considerably over time, but not for everybody.

The country is highly dependent on food aid and it accounted for 3.4% of the total food demand in the country. The country met the per capita energy requirement of 2100 kcal per day in 2007 but there is insufficiency since then in terms of supply as there is a problem of unequal distribution, physical inaccessibility, and poor food utilization across the country. The contribution of vegetables to total dietary energy increased from 87% in 2005 to 91.5% in 2020, while the contribution of livestock to total food energy decreased from 13% in 2005 to 8.5% in 2020 which may cause various micronutrient deficiencies despite the country's richness in livestock production. The proportion of macronutrients for food energy shows no progress over the last 15 years. Carbohydrate takes the lion's share (70%) in the energy supply that comes mainly from vegetable. The contribution of protein and fat was 14% and 16% respectively and vegetable products made up most of the protein and fat supply in the country. The food utilization dimension of food security showed improvements in the country, the rural population without improved water is large (45%) as compared to urban areas where only 3% of the population is without access to improved water. The share of households with improved sanitation remains stubbornly low which needs greater attention. The food instability of the country is highly affected by the increase in price from time to time. Real GDP per capita has almost tripled from 2000 to 2019 and on average it rose by 7% per annum. Women's nutritional status shows some progress over the last 15 years. There was a clear downward trend in the underweight and an upward trend in overweight and obesity. However, the prevalence of underweight is still high. Despite progress in child nutrition, the prevalence of stunting, wasting, and underweight is labeled as a "serious" public health problem.

Contribution of agricultural growth to industrial input supply: Ethiopia over the last two decades has made substantive efforts to promote agro-processing industrial development to ensure sustainable development through building strong forward and backward linkages between agriculture and industries. Indeed, one of the intended aims of promoting the agricultural sector in Ethiopia has been to ensure a sustainable supply of raw materials used as input for agro-processing industries with triple aims including import substitution, foreign exchange saving, and export promotion. The government formulated and implemented numerous policy packages. This section of the report thus evaluates the extent of contribution of agricultural growth registered over the last two decades in terms of meeting input demand from the industrial sector. As anecdotal findings indicate, currently agro-food processing industries obtain about 47 percent of their raw material demand from domestic agricultural production, and the 31 percent from import and 22 percent continued as a gap to meet their raw material demand for processing. In Ethiopia, despite the agricultural sector having registered success over the last decades, the country still remains a net importer of agricultural commodities including even those for which the country was expected to have a competitive advantage. The current low level of agricultural commercialization and a small supply of agricultural products due to low surplus production couldn't provide adequate raw material for newly established Integrated Agro Industry Parks.

The policy Implications drawn from each chapter of the book

The following are key policy implications demanding government attention:

1. Results from agriculture growth performance indicate the presence of a strong and favorable condition for Ethiopia narrowing the productivity gap between research and farmers through expanding the use of improved practices, production technologies, and input resources given farmer's resource endowment. This can be done through, the wise use of limited land (consolidation of land), deployment of the labor force, expanding irrigated areas, and rectifying the shortage of rainfall by

allocating an adequate public budget for the construction of irrigation schemes, strengthening the existing agricultural extension service providers in such a way that addresses the needs of crop types, and providing targeted affordable credit service for adopting agricultural technologies, strengthening dissemination and proper utilization of productivity-enhancing agricultural technologies such as improved seed, chemical fertilizer, and pesticides. Besides, providing strategic R and D on high-value crops, increasing investment in agricultural research efforts on specific agroecology and farming systems, and improving the quality and quantity of crop technology generation (supply) for cereal and horticultural crops, and broadening mechanization knowledge (agronomic practices).

2. The future crop area expansion in the highland is already severely limited and boosting crop production will only be driven by increasing efficiency of production as stated above. Ethiopia has a lot of catching up to do in cereals and horticultural crops relative to the higher yield levels experienced elsewhere. Technological change in cereals such as more intensive use of improved varieties and good quality seed replacing traditional varieties and optimizing crop management through aggressive promotion of packages for fertilizers with better and efficient water management and irrigation is required. The role of agricultural R&D and innovation systems and advanced sciences for faster information generation, retrieval, and analysis will be critically important. Research skills and facilities that use and integrate state-of-the-art technologies are becoming increasingly important for superior varieties development (yield and quality) and promotion of hybrid technologies in future agricultural development.
3. Undertake institutional/ innovation to establish land transfer services to activate land rental market and supporting policies, and to incentivize and speed up land consolidation. It is also important to strengthen/establish an institutional support system on land use and smallholder commercialization. Establish clear and up-to-date institutional guidelines for project approval, performance evaluation as well as investment appraisal.
4. The research should use more advanced science and technology to support better crop productivity growth targeting both small and commercial farming and all along the value chains. Ensuring the availability of high-yielding hybrids and varieties with superior genetic make-up continuously is a priority and needs to be supported with robust seed propagation and certification schemes. A dedicated and focused input delivery and extensions system is equally mandatory. Dedicated regulatory support, strict monitoring, and a paradigm shift in the use of available water through the integration of viable irrigation schemes are vitally supported with a range of mechanization suited to smallholders and commercial farms. Expanding on agro-processing, modern marketing and a variety of other technologies (biotechnology, IT, GPS, GIS, remote sensing, plant and soil sensing systems, etc.) are very necessary to fundamentally improve the old practices and modernize agriculture to supply enough products to the growing markets within and outside the country. Rural labor is mainly engaged in crop production. It will be extremely wise for Ethiopia to effectively utilize the excess workforce engaging it for maximizing crop production until the point of no return to the extra labor incurred. This brings intensive management and more labor engagement possible. This must be supported with improved technologies for nurseries, better seedbeds management for faster maturation of seedlings through the use of best farm practices, and so forth. Exploit best practices of existing export-oriented commercial protected farms to improve technologies use for nurseries, seed beds, and production management (spill over).

5. Evidence shows research support for horticulture is far more limited than the developmental needs in the sector and does not focus on developing the value chain in a coordinated manner. Access limitations and insecurities of input supply, production, and marketing are seen influencing output with elasticity values that were either negative or have no pronounced effect (low-efficiency values of inputs e.g. seed, fertilizer, pesticides). The lack of skilled professionals working to support the sub-sector (highly cereal-dominated R&D) and the lack of proper regulations, proclamations, and directives appear to challenge the utilization of the economic potential of horticulture in Ethiopia. Focused and extensive support in an integrated way (technology, extension, credit, market, logistics, etc.) is required through enhancing research, extension, and regulatory support along with the supply and demand value chain.
6. The extension programs need reform in many aspects and get focused on maximizing yield as well and be designed to produce innovations than only to provide advice on technological practices already available to farmers. Slightly better private sector participation in horticulture (e.g. in vegetable variety development and flower technologies had a role in the growth that needs to be highly encouraged. Better supply and marketing conditions of modern inputs is required and the public sector has important role to play in input supply and regulatory roles, however, a more active role of the private sector is highly desirable for a robust system to build up in the near future.
7. Experience shows farm size dynamics plays a key role in small-scale farming transformation through carefully designed policies, institutional arrangement in establishing land transfer service to activate land rental market and supporting policies to incentivize and speed up land consolidation and farm mechanization services can be a major driving force, in reversing farm size decline (fragmentation) that otherwise would have a long term negative implication in productivity growth and allowing agriculture modernization to speed up.
8. Poor availability of investment and skills needed to intensify irrigation, mechanization, post-harvest processing, and cold chains present challenges to production growth and marketing, particularly in the horticulture sector. A considerable shift is required in these areas all of which are currently at alarmingly low levels of application or performance. An early and quicker engagement is necessary to provide policies that are needed to make sure the right machines and spare parts are available at affordable prices for mechanization, irrigation, and cold chain expansion in the country. Encouraging local manufacturing factories for producing such production inputs is required.
9. The investment licensing and land transfer process requires clear institutional reform and guidelines for project approval and performance evaluation, as well as investment appraisal, is required to save the shaky and risk-prone sector and enable it to contribute to the national development goals.
10. Improve coordination among institutions by integrating support on technology, extension, credit, market, logistics, etc through enhancing institutional relations along the supply and demand value chain.
11. The result of growth accounting model analysis shows, the changes in input such as labour, land, fertilizer, improved seeds, pesticide and irrigation of real crop output growth showing strong measures needed to intensify and expand these inputs.
12. The higher growth rate of all crops indicates the presence of strong and favorable conditions for Ethiopia to increase the production and productivity of crops. Focused detail interventions within the cereals and horticulture domains and with specific priority commodities are needed to boost production for food, feed, and export interests. More intensification of grain crops and diversification of production towards horticulture crops are required to transform production. While the area and

production share of horticultural products is still very low by any standard, there seems to exist a huge potential for improvement if proper policy incentives are put in place.

13. The study suggests increasing the supply and proper utilization of agriculture production inputs; better land use plans, improving labor efficiency, professionally supported extension services, and providing targeted affordable credit services for achieving higher input targets in selected commodities. The use of agricultural technologies such as improved seed, chemical fertilizer, and pesticides is apparently far from optimum but differs among cereals, pulses, and horticultural crops. The negative and significant elasticity of output with respect to seed for all crops relates to poor seed system, improper use of seed and its packages as well a considerable gap in the tracking of seed in the national seed databases. Taking quick measures to correct flaws in seed systems and enable the provision of improved seeds in most cereals, vegetables, roots, and tubers are required. The use of fertilizer and pesticides along with improved use of irrigation will help to create a new crop growth trajectory.
14. Nurturing private sector engagement through improving input supply systems with the more active involvement of the private sector and robust public sector regulatory support. Broaden the understanding of critical features in commercial farming and overhaul to strengthen the commercial agriculture support system through employing performance appraisal to improve the performance of commercial farms.
15. Strengthen the implementation capacity of government institutions at federal, regional, zonal, and woreda levels that building capacity of key nodes remains a critical area of attention.
16. Incentivise main actors through promoting healthy output and input market system. In this regard, smallholder producers, input suppliers, output dealers, transporters, and others in the value chain should get a proper share of proceeds from the market.
17. Lack of policy and institutional framework for the livestock subsector that have clear vision for the livestock subsector development is one of the persistent gaps. Briefly, inadequate livestock institutions and structures, technology input uses, animal health services, mechanization, feed/nutrition, and water management, animal breeding, product quality and safety, land unfavorable investment policies, etc are recognized as policy gaps.
18. Research generated animal production technologies and their large-scale dissemination to farming communities, more effort on systematic crossbreeding establishing selection programs, improving animal health services and animal feeds and nutrition schemes to enhance the productivity and production of livestock. This could be done through establishing and strengthening Artificial Insemination (AI) facilities, largely training AI technicians while supporting the transitioning of AI technicians to the private sector, better livestock extension and service delivery systems, better access to input and output markets for livestock producers, and improved education and awareness levels of farmers owning livestock.
19. Livestock sector requires adequate and quality supplies of vaccines and drugs; efficient animal health services, strengthening animal health regulatory capacity, establishment of high safety, quality, and welfare standards, producing nutritious food, preserving environmental sustainability, and protecting producers' and consumers' health and engaging the private sector for the production of vaccines and veterinary drugs. Besides, introducing activities like improving the quality, quantity and availability of drinking water, roughage feeds, rehabilitating rangeland/grazing land, introducing better use of crop residues, the establishment of flour mills, legislation for forage production contracting out an agreement, forage seed certification guidelines and procedures are highly recommended.

20. Livestock sector also requires developing domestic production of supplements and feed additives and intervention to solve the problem of prices of feed ingredients and compound feeds as well as policy interventions on the removal of the VAT on key feed ingredients and compound feeds targeted for livestock are critical.
21. Investment in key focused agricultural export commodities, infrastructure, and agricultural research and development. Ethiopia should learn from Brazilians how to manage and raise the production, productivity, and value addition of soybean. They invested in the value chain not only in one node. Productivity growth alone cannot lead to success rather linkage with agro-processing industries together with the international market coupled with pragmatic policy support led to exploit opportunities. If Brazilians failed to link soya bean production with edible oil and animal cake production, they wouldn't have succeeded in ensuring sustainable progress of soybean production, productivity, and export. Hence investment in agricultural technologies and infrastructure falls at the center.
22. The Ethiopian government has made substantive policy reform measures, multiple incentive packages, coordination system for agricultural export support implying policy commitment. However, the Ethiopian system lacks "Implementation Commitment" – a dedicated system working day and night for the success that rethinking on how to improve institutional quality and dictation will remain an unresolved challenge.
23. A comprehensive capacity-building program needs to be initiated to beef up the capacity of key institutions responsible for the export sector (both short- and long-term tailored training. In addition, a complementary investment is required in building infrastructure such as internationally recognized quarantine service for live animal export, and information technology in order to provide effective services to exporters.
24. Establishment of dedicated central institution for agricultural export promotion. There is a need to establish a central institution responsible for handling export-related activities in the country, i.e. export promotion activities be streamlined through establishing an export development and promotion agency, with clear duties and responsibilities. The proposed institution is expected to coordinate the various export promotion initiatives and eliminate unnecessary duplication and inefficiencies.
25. Improvement of agricultural export sector also requires ensuring the substantial engagement of private sector together with sufficient incentives. At any measure promoting effective engagement of private sector through continuous support and nurturing, monitoring and performance-based support will remain key areas that need to be promoted.
26. Boosting agriculture export requires the following commodity-specific recommendations; i) Creating a good image by consumers or branding of the products, ii) Ensuring a supply of single origin and traceability, iii) Enhancing the producer's share of the export price through strengthening Producers Cooperative Unions, iv) Maintaining the quality of export agricultural commodities, and v) Managing high price risks facing actors.
27. Policy related to defining the function and governance of land and water resources:
 - i. Based on strategic food priorities and production potential of the area, defining the function of land and delineating for agriculture, industry, urban development, and forestry is needed. Besides, there should be a governing system for preserving and improving the fertility of the soil and surrounding in a sustainable means.

- ii. *Urban agriculture*: A significant amount of food can also be produced in urban areas. However, in urban areas, the type of food produced and the means of production might be quite different from its rural counterparts. And hence, there should be specific policy support for urban agriculture, i.e., the type of food produced, requirements for its production (including its land and water requirements), processing, and marketing should clearly be defined.
 - iii. *Appropriate water use*: Currently, the distinction between water for agriculture and other uses is not clear. For ensuring sustainability and water use efficiency, there should also be a clear governance system for agricultural water resources.
28. Establishing a clear institutional alignment, monitoring, and evaluation system at federal, regional, and kebele levels, there should be a comprehensive institutional synergy and alignment of government institutions working on food and agricultural issues suggested for constituting various institutions such as food production, storage, processing, and marketing. These institutions can also be categorized into research and extension, food reserve, irrigation, and agricultural investment sub-teams.
 29. Food systems are crucial for addressing problems of food insecurity, malnutrition, and diet-related health problems. To this end, supporting strategic grain production, promoting food access through food trade policies and creation of food reserves, assuring the quality of foods, promoting and supporting consumer behavior change towards a healthy and sustainable diet, and supporting the collection, generation, and dissemination of food information systems.
 30. There should be a concerted effort on changing the food consumption patterns of Ethiopians toward diverse and healthy foods. In this regard, promoting and supporting the development of nonconventional foods that are nutritious, environmentally friendly, and labor-intensive foods such as mushroom cultivation and horticulture crops.
 31. This study suggests that the future success of strengthening back and forward linkage between agriculture and industry depends on innovative investment in agriculture to boost the production and productivity of strategic agricultural commodities required as input for industries. The innovative approach followed by the local beer industry to replace imported malt with local production could be one typical approach required to be upscaled for agro-food processing sector improvement.

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