THE UNITED REPUBLIC OF TANZANIA

The Agenda 10/30 Investment Roadmap for Accelerating Agricultural Growth in Tanzania

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LIST OF ABBREVIATIONS

AfCFTA	African Continental Free Trade Area
AGRA	Alliance For a Green Revolution in Africa
AGRA/HAPA	Alliance For a Green Revolution in Africa/Hub for Agricultural Policy Action
AIDA	Agricultural Investment Data Analysis
AMHs	Agricultural Mechanisation Hubs
ASDP II	Agricultural Sector Development Programme II
ASPIREs	Agriculture Sector Policy and Institutional Reforms Strengthening
ASR	Agriculture Sector Review
BBT	Building a Better Tomorrow
BBT-YAI	Building a Better Tomorrow - Youth Initiative for Agri-Business
CAADP	Comprehensive Africa Agriculture Development Programme's
DADPs	District Agricultural Development Plans
EAC	East African Community
FYDP II	Five Year Development Plan
GDP	Gross Domestic Product
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
LGAs	Local Government Authorities
LMIC	Low-Middle-Income Country
M&E	Monitoring and Evaluation
MoA	Ministry of Agriculture II
MoFP	Ministry of Finance and Planning
NBS	National Bureau Statistics
NPHMS	National Post-Harvest Management Strategy
NPHMS	National Post-harvest Management Strategy
NSA	Non-State Actors
PHLs	Post-Harvest Losses
PORALG	President's Office – Regional Administration and Local Government
RC	Roadmap Coordinator
RCT	Roadmap Coordination Team
RIAPA	Rural Investment and Policy Analysis
SAGCOT	Southern Agricultural Growth Corridor of Tanzania
TADB	Tanzania Agricultural Development Bank
TAHA	Tanzania Horticultural Association
TAIDF	Tanzania Agro-Industries Development Flagship
UNIDO	United Nations Industrial Development Organization

EXECUTIVE SUMMARY

Tanzania's economy has grown steadily over the past two decades, leading to the country's reclassification as a low-middle income nation in 2020. The country’s real Gross Domestic Product (GDP) growth rate was approximately 6.5% for the eleven years from 2008-2019. The agriculture sector accounts for approximately 61.1% of total employment, 65% of the industrial sector's raw resources, and nearly all domestic food requirements. The sector is therefore the key pathway to industrialisation and poverty alleviation. However, the sector's growth rate, of **5.4%** percent, has fallen short of targets set by development plans. Low farm level productivity (yield) has been identified as the primary bottleneck to the growth of the sub-sector.

Tanzania has hardly exploited its agricultural potential. To position agriculture as the country’s economic development engine, the government has launched "Kilimo Biashara" Roadmap – *Agenda 10/30, by the Ministry of Agriculture*. The Initiative aims of the initiative is to transform agriculture into a business **to boost economic growth and drive the crop sub-sector growth rate to 10% by 2030 from the current rate of 5.4%**. The initiative aims to increase public and private investment in the sector, thus increasing household income, exports, food self-sufficiency, and employment opportunities for young people.

This *Agenda 10/30* Roadmap espouses the ambitions of the government to unlock productivity bottlenecks and deliver crop subsector growth **and identifies strategic pathways to achieve the 10 percent goal**. The *Agenda 10/30* Roadmap is not a new development programme in the sector; instead, it is a plan showing the *general and crop-specific strategic government investments* needed to accelerate the ASDP II targets for the crop subsector, which will see the growth rate of the subsector's GDP at 10% by 2030.

The *Agenda 10/30* Roadmap focuses on 13 crops that will collectively contribute to increased GDP growth of 10%, leading to improved food security, poverty reduction and nutrition quality in Tanzania. These crops include *Maize, Rice/ paddy, Cotton, Sunflower, Cashew, Cassava, Sorghum, Pulses/beans, Coffee, Avocados, Soya bean, Sisal (fibre) and Wheat.*

Historically, increased productivity has been driven by the expansion of farming areas rather than increased productivity, leading to low price competitiveness and profitability for smallholder farmers. The *Agenda 10/30* Roadmap identifies the following fundamental issues affecting the productivity of the crop subsector.

- **Use of modern inputs –** The vast majority of smallholder farmers in Tanzania do not use modern agricultural inputs (improved seeds and fertiliser), limiting their productivity and efficiency.
  Seeds - the supply of improved seeds in Tanzania is below 15% and over 76% of the cultivated area is planted with local seeds. Restrictive regulatory mechanisms, the high cost of improved seeds, and the preference for indigenous varieties for their good taste and/or aroma are the leading causes of low use.
  Fertiliser - The use of industrial fertiliser has oscillated between 9 Kg/ha and 16 kg/ha in the last decade, far below the CAADP target of 50 kg/ha or global best practices that exceed 150 kg/ha.
- **Mechanisation -** Agricultural mechanization significantly increases the amount of cropland cultivated (extensification) and is also accompanied by input intensification and a significant increase in productivity. Over 95 percent of farmers (smallholders) use animal-powered ploughs and hand hoes on their farms. The proportion of farmers using tractor ploughs has stagnated at 7 percent in the decade between 2010 to 2020. Reliance on manual, as opposed to motorised labour, leads to low efficiency in utilizing inputs and land.

- **Irrigation -** only 2.5% of the potential of 29.4 million ha that can be irrigated is under irrigation. This is not tenable, given the increasing frequency of extreme weather events (especially droughts) caused by climate change.
- **Extension services -** Tanzania's extension officer to crop farmer ratio is about 1:1172, which falls short of the World Bank recommended standard ratio of 1:200-500 as well as the Ministry of Agriculture's standard of two extension officers per village. Low extension services coverage limits knowledge transfer and farmers' access to information and best agriculture practices. New participatory and digital extension methods provide an opportunity to expand farmer reach per extension officer.

Computable General Equilibrium (CGE) analysis integrating micro-simulation (the RIAPA–AIDA model system) to determine the most optimal investment options showed that combining improved inputs with extension is associated with the highest impact on productivity. The findings show no single intervention area is the most effective at achieving all four development outcomes. The top-ranked intervention is fertiliser, seeds, and extension provisioning for cash crops and cereals, which is mainly driven by the importance of this intervention in promoting employment and diet quality. Inputs and extension provisioning for horticulture also rank highly. These are all high-value products and highly tradable in domestic and export markets.

The Vision, Mission, and Goals of the Roadmap

Vision

Enhanced food security, wealth creation, (youth) employment and nutritional quality achieved through increased productivity and market linkages to accelerate crop sub-sector GDP growth rate from 5.4% in 2021 to 10% in 2030. This vision is aligned to the ministry vision: "Feed ourselves, feed others commercially."

Mission

To harness the untapped potential for increased productivity and market linkages, driving the crop sub-sector GDP growth rate from 5.4% in 2021 to a robust 10% by 2030 through strategic initiatives and partnerships, innovate agricultural practices, and creating an enabling environment for investment in the sector."

Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Raise the productivity of major crops in Tanzania to at least 70% of yield potential	Reduce post-harvest losses	Improve access to local and international markets for crop produce	Implement policy and regulatory reforms to facilitate trade and value addition	Increase youth involvement in agriculture
↓	↓ Intervention areas	↓	↓	↓
• Mobilisation and registration of farmers • Improved use of modern inputs (fertiliser and improved seeds) by smallholder farmers • Mechanization of farm activities	• Expansion of storage infrastructure and equipment. • Education and awareness creation on postharvest management • Value addition and processing	• Improve and expand market infrastructure. • Improve packaging and branding of produce from Tanzania. • Attain international market standards and quality especially	• Removal of non-tariff barriers to trade • Reduction of tax burden on farmers traders. • Tax incentives for local processing and value addition	• Implementation of the Building a Better Tomorrow – Youth Involvement in Agriculture (BBT-YIA) Program • Enable youth access to production factors – land, inputs, and finance.

• Expansion of land area under irrigation. • Improved access to extension services		GAP, sanitary and phytosanitary.		

The value chain level targets and interventions are based on the following 13 crops:

Crop	Current yield and production status and Agenda 10/30 targets
Maize	Production in Tanzania stands at 7 million tonnes at an average yield of 1.75 tons/ha, compared to the potential of 7.5 tons/ha under rainfed conditions and 13.87 tons/ha under irrigation conditions. Agenda 10/30 aims to increase maize yield to 6 tonnes/ha by 2030. To achieve the level of yield, the use of improved seeds should be increased from the current 2 kg/ha to 22 kg/ha (maximum coverage), while fertiliser application by maize farmers should be increased from the current 17kg/ha to about 250kg/ha.
Rice	Tanzania has a yield potential (under optimal conditions) of 10.34 tons/ha and 13.50 tons/ha for irrigated and rainfed rice respectively. The agenda 10/30 seeks to increase yields by up to 4.43 tons/ha and 7.34 tons/ha for irrigated and rainfed rice respectively and increase land under rice farming by 2 percent annually to 1.7 million hectares. This will be achieved by exploiting large untapped land and water resources and the enormous potential for increasing yields. Agenda 10/30 investments are expected to almost triple rice production by 2030, rising to over 10 million tons.
Wheat	Tanzania's annual demand for wheat is estimated at over 1.1 million tons, of which only 10 percent is produced locally. Wheat is harvested from just about 78,274 hectares at yields of 1-1.4 tons/ha, compared to a yield potential of 4.13 tons/ha under rainfed conditions and 7 tons/ha under irrigated conditions. To meet the demand gap, Tanzania should put 356,681 hectares of land under wheat cultivation and increase yield to over 2.5 tons/ha. Agenda 10/30 seeks to increase wheat yield to 2.7 tons/ha and increase land under wheat cultivation by 20 percent annually to reach 152,533 hectares by 2030. This will increase annual wheat production to over 300,000 tons in 2030.
Sorghum	Sorghum is a drought-tolerant crop and can, therefore, be cultivated in drought-prone areas. The current yield of about 1.45 tons/ha is low compared to a potential of 3.17 tons/ha under rain fed and 4.5 tons/ha under irrigation conditions. Agenda 10/30 seeks to increase sorghum yield to 2.2 tons/ha and to increase the land under sorghum production by 1 percent every year, translating to 479,852 hectares of harvested area by 2030.
Cassava	Cassava is a major subsistence crop in Tanzania, especially in semi-arid and frequently drought-stricken areas and is sometimes considered a famine reserve when cereals fail. Cassava productivity in Tanzania stands at about 7 tonnes per hectare which is far below the estimated potential yield of 20 tonnes per hectare. Agenda 10/30 seeks to increase cassava yield to 16 tonnes/ha by 2030 to meet the growing demand for human consumption and industrial needs locally and in the export market.
Cotton	Cotton is grown as a fibre crop for lint, and mainly for export, while the seed by-product is a source of oil and livestock feed. The average yield of cotton in Tanzania is about 1.34 tons/ha, which compares poorly to leading producers in Africa such as Egypt and South Africa at between 2.5-3 tons/ha. The total production is estimated at 332,000 tons, from 246,534 hectares of land. Agenda 10/30 seeks to raise cotton productivity to 3 tonnes/ha by 2030 and increase the area under cotton production by 1% per year, to reach 344,985 hectares in 2030. The total annual production is expected to rise to 1,034,955 tonnes.

Sunflower	Despite the increasing demand for sunflower oil in the country, the area under sunflower production and yields have stagnated in recent past. Production is estimated at 504,000 tons at a yield of 1 ton/ha compared to leading producers at 3 tons/ha. Under Agenda 10/30 Tanzania targets to raise sunflower yield to 2.25 tonnes/ha and area under production to 516,384 hectares, translating to production of over 1.1 million tons per year by 2030. This will be achieved by increasing fertiliser use to at least 100kg of nitrogen per hectare, planting hybrid varieties, and improving agronomic practices. Assuming a 1% annual increase in land under sunflower production (to reach 516,384 hectares by 2030), production will rise to over 1 million tons per year by 2030.
Coffee	Coffee is among the four largest export crops in Tanzania. From 2018, the government has supported the distribution of high-yielding arabica coffee seedlings which replaced older varieties in existing plantations. Coffee production has stagnated in the last two decades with average production of 80,000 to 120,000 tonnes annually, while yields are relatively low, estimated at 1 ton/ha. Large private estates reach yields up to 2.5 tons/ha because of intensive cultivation using irrigation and fertilizers, and smallholders reach an average up to 0.25 - 0.3 tons/ha. Through the agenda 10/30 initiative, the government aims to increase the average coffee yield to 1.37 tons/ha by 2030.
Sisal	Global demand for natural fiber has increased, fueled by the global ban on the manufacturing and use of plastic products due to environmental. It is estimated that at least 100,000 tons of fibre will be needed in Tanzania alone by 2025. Tanzania is currently the second largest producer of Sisal in the world after Brazil. Production ranges between 33,000 to 62,000 tons per year at a yield of 1.38 tons/ha. Compared to leading producers such as China which has a yield of 5 tonnes per hectare, Tanzania's current sisal yield is very low. To meet the growing demand for local consumption and export, Agenda 10/30 targets to double yield to 2.76 tons/ha and increase the area harvested by 7 percent from 44,517 hectares to 47,728 hectares by 2030.
Soya bean	Soya bean is a major source of oil and protein in livestock feeds and human consumption and is in input in industrial products such as soy inks, non-toxic adhesives, candles, and paints. Demand for soya by the animal feed industry is higher than domestic supply, forcing animal feed processors to import soya cake from India, China, and Zambia. Production is estimated at 44,106 tons at an average yield of 1.7 tons/ha. Tanzania has the potential to reach yields of over 3 tons/ha through the choice of proper varieties, proper application of farm inputs, use of good agricultural practices, and improvement in farmers' organisation. The agenda 10/30 seeks to increase soya bean yield by 70 percent to 2.87 tons/ha by 2030.
Pulses (dry beans, cowpeas, chickpeas)	Tanzania has experienced an increase in the production of pulses, attributed mainly to the increase in demand for pulses from India, and the government's drive to improve food and nutrition security. Production stands at 2.2 million tons, with an average yield of about 1.6 tons/ha, compared to an average yield potential of 2.8 tons/ha under rainfed conditions. Agenda 10/30 seeks to increase pulse yield to reach 2.28 tons/ha by 2030 translating to production of 3,188,048 tons per year in 2030.
Avocado	Avocado is a relatively new crop that Tanzania started exporting in 2009. Global demand is growing steadily. The popular avocado varieties produced in Tanzania are Hass, Fuerte, Pinkerton, and, to some extent, Puebla. Tanzania's avocado yield at 6 tonnes per ha is very low relative to leading producers such as South American countries above 15 tons/ha and Kenya which averages 10-15 tons/ha. Through the Agenda 10/30 initiative, Tanzania targets

	to raise yields to 10.8 tonnes/ha by 2030 and increase the area under avocado cultivation by 10 percent annually to reach 43,000 hectares by 2030.
Cashew nuts	Despite increasing local production and rising international demand for cashew nuts, farm gate prices have remained generally low. More than 80% of Tanzanian cashews are exported as raw cashew nuts to Vietnam and India for processing, before entering the global market. Total production is estimated at 390,413 tons from an area of 560,728 hectares, translating to a yield of 0.7 tons/ha. Leading producers in the mid-latitude climate zones record a yield between 2-3 tons/ha. Yields of between 2-3 tons/ha can be achieved through proper tree management and higher-density planting. Through Agenda 10/30, the government targets to increase cashew nuts yield to 2 tonnes/ha by 2030.

Coordination: The Ministry of Agriculture (MoA) will lead the implementation of the Roadmap and will utilize the existing Decision-Making Organs of the Ministry and in The President's Office – Regional and Local Government (PO-RALG) at different levels of implementation. The Ministry will appoint a Roadmap Coordination Unit. The Unit will comprise a Roadmap Coordinator (RC), (ii) 13 Value chain/crop champions, (iii) an M & E Specialist, (iii) a Specialist in crop Agriculture Transformation, and iv) a Specialist – Resources Mobilisation for Agricultural Transformation.

Funding for the Initiative: Agenda 10/30 is expected to cost an estimated 39 trillion Tanzania shillings. Given the magnitude of investment required to implement Agenda 10/30, the government will implement strategic measures to increase funding for the Initiative from public sources, development partners, and the private sectors.

Public funding: the government will increase public investments in the agricultural sector of Tanzania, particularly in public goods such as research, extension services, irrigation, and resilience to climate change. Further, the government will partially reallocate the agriculture budget towards the most cost-effective and highest-return spending options (budget rightsizing). Budget reallocation scenario modelling showed that reallocating current resources towards higher-return investments could increase cumulative gains in GDP and agricultural GDP by one-third (from $9.2 billion to $11.9 billion) and two-thirds (from $3.8 billion to $7.5 billion), respectively.

Development Partners: the government will encourage Development Partners (DPs) to progressively align assistance with national programmes, using national processes, enhancing the predictability of financing, and unifying procedures and reporting systems to decrease transaction costs.

Private sector funding: the government will create a conducive investment environment to attract private investment in the selected priority value chains through fiscal incentives and removing regulatory bottlenecks to investment and business. The government will also mobilize farmers to invest in improved farming techniques, including use of modern inputs (seeds and fertilizers), and machinery for improved storage. The government will put in place credit guarantee schemes and partner with financial institutions to provide affordable financing packages to farmers and other value chain players.

1 INTRODUCTION

1.1 The Background to Agenda 10/30

Tanzania Macroeconomic status and trends

Over the past two decades, Tanzania's overall economy has exhibited robust growth, macroeconomic stability, and significant investment inflows exceeding 30 percent of GDP for the past decade[1], resulting in an early reclassification of the country as a low-middle-income nation (LMIC) on July 1, 2020. According to the National Bureau of Statistics, the real Gross Domestic Product (GDP) growth rate was approximately 6.5% for the eleven years from 2008-2019. However, due to the impact of COVID-19, the GDP growth rate in 2021 declined to 4.9% (National Economic Survey 2021) and thousands of jobs were lost (World Bank, 2022). It is estimated that about 140,000 formal jobs were lost in June 2020, and another 2.2 million nonfarm informal workers suffered income losses due to COVID-19 pandemic impacts (World Bank and FAO. 2022). Other factors that have contributed to the recent slowing down of economic growth include the war in Ukraine which escalated production costs, and climate change impacts which are affecting agriculture production in some regions.

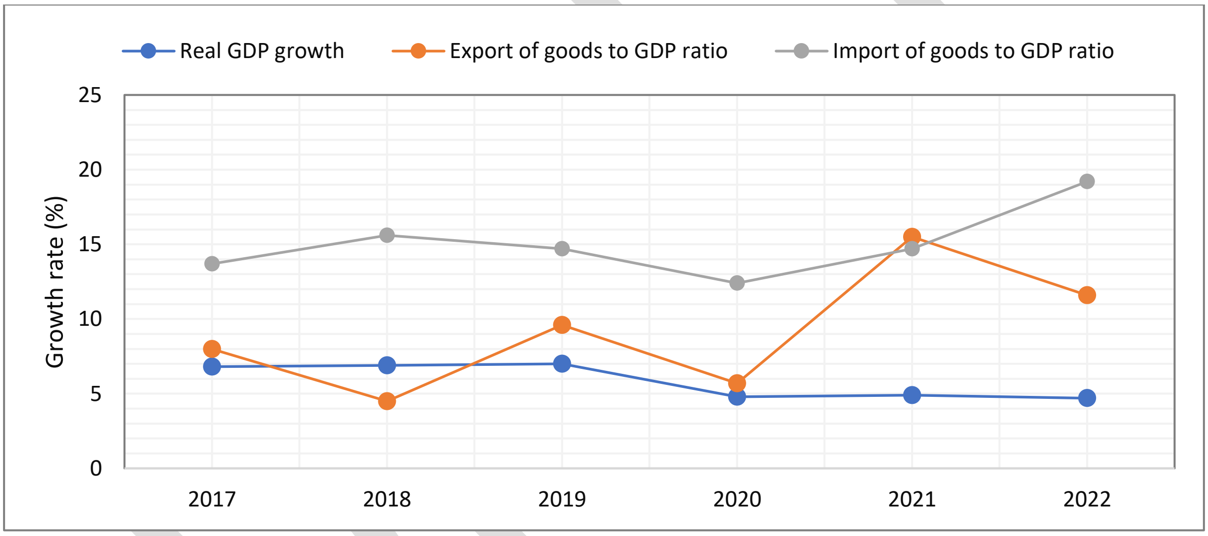


Figure 1: Trend of macroeconomic indicators (2016-2022)

Source: Developed from Economic Survey 2022 data

Tanzania's Vision 2025 aims to transform the country's economy from a predominantly agricultural one with low productivity to a diversified and semi-industrialized economy with a modern rural sector and high productivity in agricultural production (Government of Tanzania (GoT), 2020). It is estimated that Tanzania needs to achieve an annual GDP growth rate of 8 percent and create 8 million jobs to reach the ambitious goals of its Vision 2025 (World Bank, 2022). Poverty levels remain high, especially in the rural areas that are predominantly agricultural. Further, there is growing inequality between urban and rural areas, exacerbated by the COVID-19 pandemic and ongoing conflicts in the world that continue to push up inflation. Poverty levels are expected to decline as the impacts of COVID-19 diminish.

[1] World Bank and FAO. 2022. Tanzania Agriculture Public Expenditure Review. © World Bank and FAO.

The Agriculture Sector

Tanzania's agriculture and food systems are dominated by small-scale farmers, who account for around 70 per cent of the agricultural population. The sector accounts for around 26.2% of the country's GDP and 30% of overall export revenues (Figure 2).

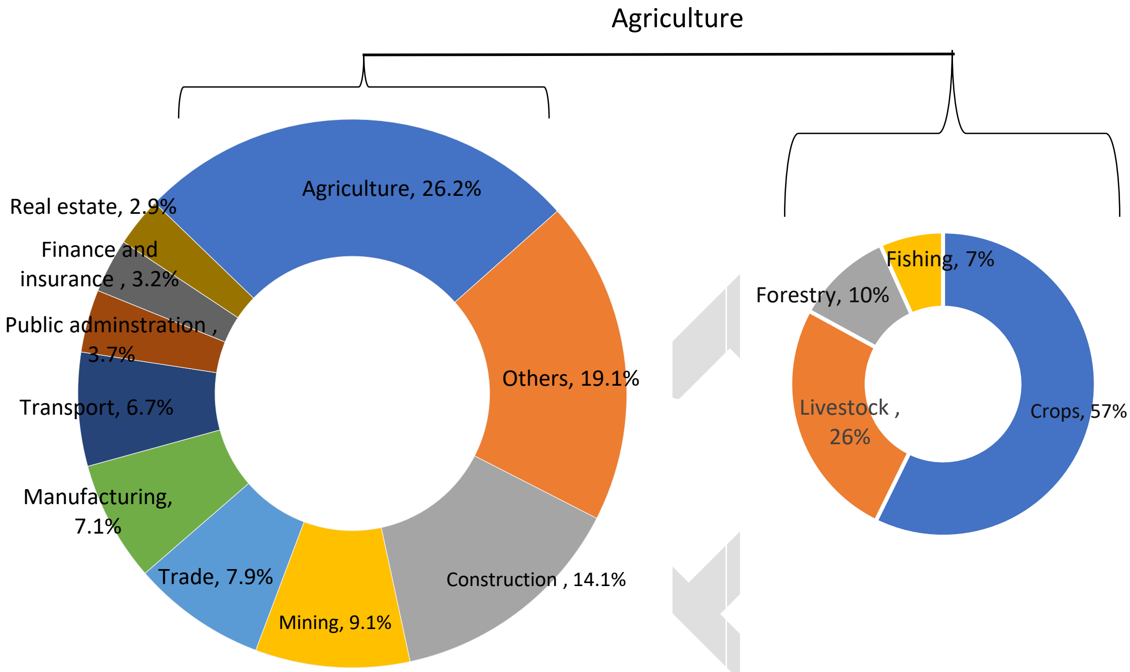


Figure 2: Share of Economic and agricultural Activities to GDP and share of GDP in 2022.

Source: Economic Survey 2022

In addition, agriculture accounts for approximately 61.1% of total employment and 65% of the industrial sector's raw resources. During the last decade, the sector was responsible for nearly all domestic food requirements. As the sector contributes about 65 per cent of industrial raw materials, it has the most significant potential to speed up industrialization. Due to its importance to most of the rural population and its strategic contribution to the economy's overall performance, the agriculture sector can mitigate poverty levels among the rural poor and contribute to the nation's development goal of advancing to the upper income of the middle-income category by 2025. However, Tanzania has hardly exploited its agricultural potential.

Despite being a significant sector in the economy, the average annual agricultural GDP growth rate has lagged the national GDP growth. Between 2016 and 2020, the agricultural GDP growth was 5.4% (Joint Sector Review Report, 2021), below the 6% growth target in the second Five Year Development Plan by 2020/21 (FYDP II) and the Comprehensive Africa Agriculture Development Programme (CAADP) 's minimum growth rate target of 6 per cent. Aggravated by inadequate and untimely rainfall in some production areas, agriculture activities (crop cultivation, livestock keeping, forestry and fishing) grew by 3.3 percent in 2022, compared to a growth of 3.9 percent recorded in 2021 (GoT, 2022). **The current agricultural growth rate is relatively low to contribute significantly to wealth**

creation and poverty alleviation. The annual agricultural growth rate should be about 6 to 8 per cent to adequately contribute to poverty alleviation.

The country has a vast area of 94.5 million hectares, of which 45 million hectares are arable land.[2] Only 23% of the available arable land (10.1 million hectares) is under cultivation. There is potential to maximise production through intensification, land expansion and irrigation. Again, large-scale farming also, which is rarely practised, requires more emphasis in the future (**Table 1**). According to the review by the World Bank[3], the expansion of market-oriented small and medium-sized farms during the past decade has contributed to growth in the agricultural sector. The farms increase employment in upstream industries by raising demand for agricultural inputs, financial services, capital purchases and rents, and transportation services. As such, they mitigate poverty levels.

Table 1: The proportion of small farms vs large-scale ones in Tanzania

Crop	Total Planted Area (hectares)	Smallholder Farmers (hectares)	Large-scale Farms (hectares)	Percentage of Total Area
Maize	4,946,799	4,931,111	15,688	69.1%
Paddy	1,700,701	1,688,241	12,460	23.7%
Sorghum	514,435	512,888	1,547	7.2%
Total	**7,161,935**	**7,132,213(99.6%)**	**29,695 (0.4%)**	**100%**

Source: 2019/20 National Sample Census of Agriculture

A recent analysis of employment dynamics in agriculture and the agri-food system in Tanzania by IFAD in 2019[4] found that the average age of persons engaged in farming as own-farm labour in Tanzania is 34 years, and 59% of rural Tanzanian youth are consistently engaged in farming. Relatively few educated and skilled youth engage in agriculture. Therefore, the need to diversify the rural economy by developing economic prospects inside the agri-food sector to promote skilled youth employment, who can engage in innovative commercial agribusiness. To increase youth participation, the government has embarked on a new programme targeting youth, the Building a Better Tomorrow-Youth Involvement in Agriculture (BBT-YIA) programme. The BBT-YIA programme seeks to address barriers hindering the youth from gainfully participating in agriculture, including negative perception, limited skills, poor access to land, financial services, markets, and modern agricultural and digital technologies.

1.2 The Concept and Rationale for the Agenda 10/30 Roadmap

The Agenda 10/30 Initiative is the Government's response to turn around the perennial low performance of the crop's sub-sector, relative to potential, given Tanzania's abundant land, rainfall, and water resources. The Initiative seeks to drive the crop-sector GDP growth from the current average of 5.4% per year to 10% by 2030. The government is rallying public and private sectors to invest in agriculture and has significantly increased budgetary allocation to agriculture. In FY2022/23, the government increased budgetary allocation from USD 130 million to USD 414 million, an increase of 68%.

[2] https://www.yieldgap.org/tanzania

[3] World Bank (2022); Tanzania Agriculture Public Expenditure Review

[4]https://www.researchgate.net/publication/332937214_Who_Works_in_Agriculture_Exploring_the_Dynamics_of_Youth_Involvement_in_the_Agri-Food_Systems_of_Tanzania_and_Malawi

The expected outcomes of Agenda 10/30 include increased production of crop products; increased value of export of crop products; food self-sufficiency in the country and surplus for export; increased contribution of the irrigation sub-sector to the production of crop products; increased participation of youth in the Agricultural Sector; and availability of raw materials in value-adding industries from the current 65 per cent to 100 per cent.

The *Agenda 10/30* Roadmap is not a new development programme for the Crop's sector. Rather, it is a plan showing the strategic investments needed to accelerate the ASDP II targets on the crop subsector that will see the growth rate of the subsector GDP reaching 10% by 2030. The *Agenda 10/30* Roadmap is a comprehensive analysis and projected investment plan for the crop sub-sector to drive growth and boost the sector's contribution to the country's economy.

A thorough examination of the agriculture sector was done, including a review of the historical performance of key carefully selected priority value chains, investment patterns, production levels, and yield potential and yield gaps. The analysis covers local and global best productivity improvement practices and identifies opportunities for improvement. It also assesses the current performance of the agriculture sector and its sub-sectors, including trends in output, changes against investment targets, and contributions to the agriculture GDP. It identifies key bottlenecks at the value chain level and proposes interventions to address the bottlenecks, lessons, and opportunities for improvement. The roadmap also considers the spill-over effects of increased agriculture sector growth on allied sectors, particularly manufacturing and industry, and their implications on structural economic transformation.

Overall, the *Agenda 10/30* Roadmap is a comprehensive, data-driven plan that outlines a pathway for growth and success in the crop sector in Tanzania, with a timeline trajectory of the investment plan and expected outputs. Accompanied by a funding mechanism and functional monitoring and evaluation framework, the Roadmap provides a solid foundation for sustainable success in the agriculture sector.

1.3 Methodology

The Roadmap was prepared through a desk review, strategic inputs from a sector-wide analysis by IFPRI and close consultations with the Ministry of Agriculture, ASPIREs and AGRA HAPA personnel. Two major types of analyses informed the development of the Roadmap: situation and technical analysis.

Situation Analysis

The process entailed a comprehensive analysis of the historical and current performance of the general agriculture sector, including trends in outputs and inputs, thereby identifying the growth-enabling and constraining factors with a view to unlocking opportunities for accelerating growth. The analysis provided an understanding of the strengths, weaknesses, opportunities, and threats, identifying main constraints/challenges and their root causes, establishing what is already being done to tackle the challenges (initiatives, policies, projects, etc.) and the way forward. A crop-based analysis for each of the selected 13 priority value chains - focussed on the whole value chain, SWOT analysis, potential for increased performance, strategic goals and interventions and expected benefits.

Technical Analysis

Data was obtained from various primary and secondary sources and analyzed using various methods. Yield gap data was obtained from the Global Yield Gap Atlas (www.yieldgap.org). The yield gap database provides high-quality agronomic data with local to global relevance covering up to 13 major food crops across 70 countries and six continents with the following data. The data available on the database includes actual and potential yield and yield gap, actual and potential water productivity, actual and minimum nutrient requirement, underlying data on weather, soil and cropping systems, and climate zones and technology extrapolation domains (TEDs). Yield gap data was used to estimate current production against potential performance under both rain fed and irrigated conditions for the different regions and value chains in Tanzania.

The Rural Investment and Policy Analysis (RIAPA)[5] economywide model linked with the Agricultural Investment Data Analysis (AIDA)[6] to prioritize agricultural interventions and expenditure portfolios that reflect the broader agri-food system. It also assessed the effect of alternative public investment options on development outcomes. The analysis covered the ten years of ASDP II (2017 to 2028) and answered the following strategic questions:

(i) Which investments are most cost-effective at promoting inclusive agricultural transformation? Are there trade-offs and synergies in targeting different outcomes? (e.g., growth, jobs, poverty, diet quality)

(ii) What is the contribution of agricultural and rural development expenditure on the performance of the economy?

(iii) Is there room for reallocating scarce public resources for agricultural investments to maximize outcomes? How does the 'optimum' reallocation compare with the current and planned spending structure?

Stakeholder consultations

The drafts of the Roadmap document were shared and discussed with stakeholders at several key forums: 1) A meeting of the Ministry of Agriculture Management Team; 2) Two workshops of technical experts and stakeholders organized by AGRA; 3) the 9th Annual Agricultural Policy Conference; and 4) The Parliamentary Committees responsible for Industries, Trade, Agriculture and Livestock Committee and Budget.

[5] RIAPA model is a computable general equilibrium (CGE) model developed by IFPRI that simulates the functioning of a market economy, including markets for products and factors, i.e., land, labor and capital.

[6] AIDA is another IFPRI developed online, user-friendly tool that uses an economy-wide model to assess the impact of agricultural investments on economic growth, job creation, and household welfare, and perform complex investment analysis. The Agricultural Investment Data Analysis (AIDA) tool is embedded in IFPRI's Rural Investment and Policy Analysis (RIAPA) modeling system.

2 The Status of the Crop Sub-sector in Tanzania

The crop sub sector is the largest of the agriculture subsectors and contributed 15 percent to national GDP and accounted for 57 percent of agriculture GDP in 2022 (see Figure 2). Data shows that production of major food crops dropped by 8.1 percent between 2021 and 2022 due to inadequate rainfall in most production areas. Nevertheless, the country maintained a food self - sufficiency ratio of 114 percent (GoT, 2022).

2.1 Crop Production and Productivity

In terms of production volumes, the leading crops produced in Tanzania are maize, rice, legumes and cassava. The four crops also account for the largest share of value. Maize, rice, pulses, cashew nuts, and sunflower also occupy the largest size of land (Table 2). Over 6.5 million tons of maize was produced from approximately 4.3 million hectares of land, making maize by far the most popular crop in the country. Maize accounts for about 11 percent of the value of crop produce. While the volume of rice and legumes is lower than maize, the value is higher, due to the relatively higher prices of the two crops.

Table 2: Status of production of selected crops in 2021

Crop Commodity	Ha of land planted ('000)	Total Production ('000 tons)	% of crop GDP
Maize	4,345	6,536.32	11.00%
Rice/ Paddy	1,485	3,443.61	16.00%
Pulses/Beans	1,398	2,236.00	13.40%
Cassava	255	1,770.81	7.00%
Sorghum	448	650.5	0.70%
Sunflower	482	504.42	1.90%
Cashew Nuts	561	391.12	2.30%
Cotton	247	331.52	1.10%
Avocados	23	135	1.00%
Coffee	125	116.57	2.50%
Wheat	78	93.18	0.50%
Sisal	45	61.35	0.90%
Soya Beans	26	44.11	0.40%

Except for beans, cotton, cashew nuts, and sisal, most of the crops experienced negative average growth in the last 5 years (Figure 3). Production of major cash crops increased by 8.3 percent to 973,436 tons in 2022 compared to 898,967 tons in 2021. This was attributed to increase in production of cotton, pyrethrum, tobacco, cashew nuts, sisal, and sugar. Cashew nuts, sugar, and cotton are the leading cash crops in production volumes. Production of horticultural crops is on an upward trajectory (5 percent growth in 5 years) as the government continues to unlock market opportunities for horticultural crops in European Union, United Arab Emirates, Asia and South Africa. Under oilseeds, production of sunflower dropped by 11 percent in 2022, mainly because of inadequate rainfall in producing regions.

Tanzania's productivity for the majority of crops is between 20-30 percent of its potential and of the best producers in the world. This implies that only one third of potential is exploited. Except for pulses and soya beans, the rest of the crops fall below 40% of the yield potential. This, on the one hand, provides a big room for a potential increase in productivity to reach the best practice levels; on the other hand, it indicates the challenge of breaking all the constraints to reach the uphill level of productivity.

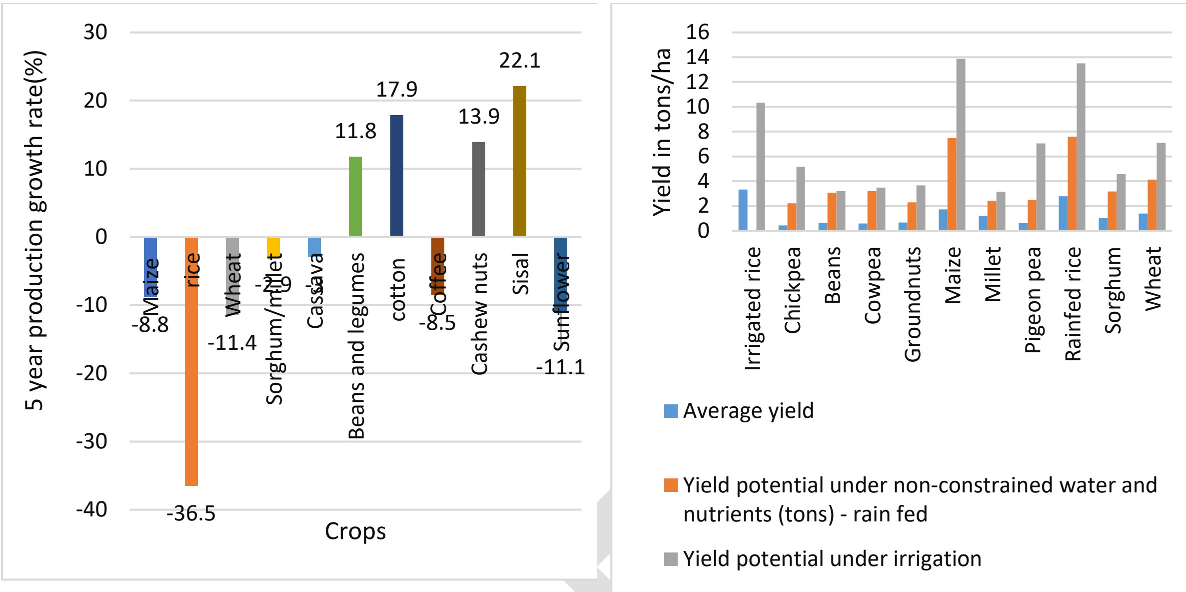


Figure 3: Production growth rate (percent) of specific crops and current yields against potential yield under irrigated and rainfed conditions

2.2 Public and Private Investment in Agriculture

Public investments in the agriculture sector are essential for unlocking private investments. Public investments in irrigation, mechanisation, and input supply (fertilisers and improved seed varieties) can increase yields and profitability. The government estimated that the first phase of the Second Agriculture Sector Program (ASDP II) (2017/18 - 2027/28) requires an estimated TZS 13.8 trillion (USD 6.0 billion) to implement prioritize programs on enhancing agricultural productivity and profitability, commercialization and value addition, sustainable water and land use management, and strengthening sector enablers. Based on the said target, ASDP II has been perennially under-resourced. Public agriculture expenditure review shows review shows that the budget for agriculture (including livestock, fishery and forestry) increased by 5.2 percent between 2011/12-2015/16 before plummeting by -29.8 percent in 2016/17[7]. The budget allocation rebounded in 2017/18 and has varied around an average of 750 TZS billion, with minimal increase over the last five years (Figure 4). Agricultural budget is a meagre 0.5 percent of GDP. With agriculture getting 2.25 percent of the national budget over 2017/18-2021/22, and about 2.25 percent of the national budget. This compares poorly to regional peers.

[7] World Bank. 2022. Tanzania Agriculture Public Expenditure Review. © World Bank

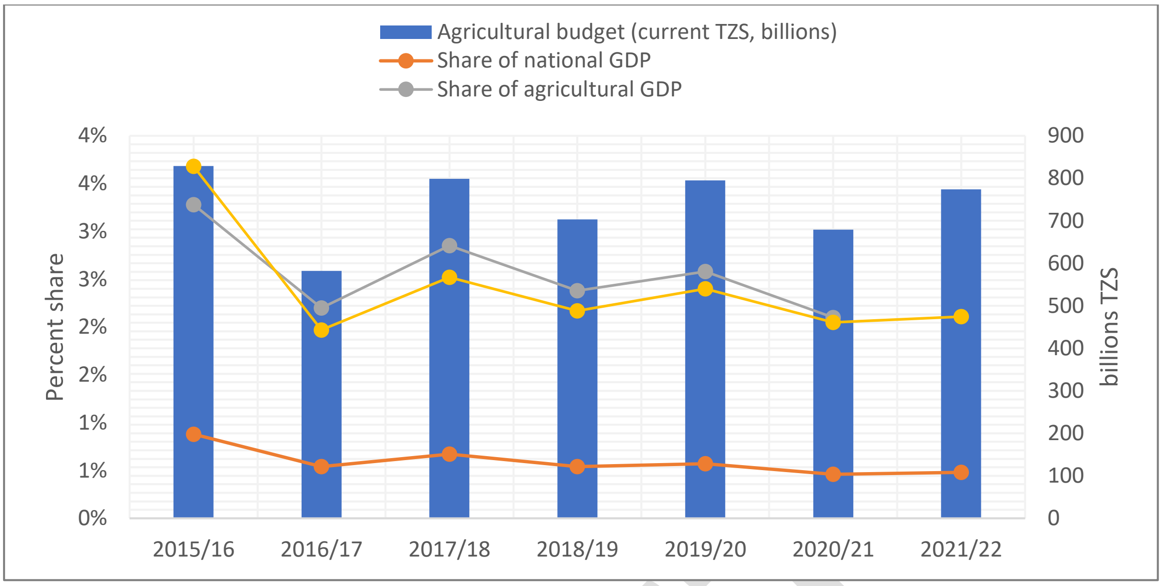


Figure 4: Agriculture budget allocation trends

Source: Data from Tanzania Agriculture Public Expenditure Review.

Allocation to agriculture (excluding livestock, fishery and forestry) in FY 2020/21 was TZS 202 billion, a 2% decrease from TZS 207 billion the previous year. Almost 70 percent of the budget is allocated to development, and the rest to recurrent. To correct this trend, the government in the fiscal year 2022/23, raised budgetary allocation to the sector by 68 percent, from TZS 299 billion to TZs 331.2 billion, signalling a commitment to give the sector greater impetus.

Private investments into agriculture and agribusiness are important in complementing public funding, especially in commercially viable opportunities, and therefore reducing pressure on public resources. There is vast investment potential to expand irrigation, climate-smart agriculture, agro-processing, logistics, mechanisation, input production and supply, and other value-chain operations. The level of private investments into agriculture and agribusiness in Tanzania remains limited, curbing the sector potential to meet country's economic and social targets. Therefore, over 90 percent of agriculture products are sold as primary commodities. Private sector investment is constrained by an unfriendly business environment that raises production and transaction costs. The prevailing weak enabling business environment increases production and transaction costs and discourages private investments. Only 4 percent of foreign direct investments went into agriculture, fisheries, and forests in the decade before 2017, while only 8 of commercial bank lending went to agriculture. The numbers have rebounded since 2018, but a lot of potential remains unexploited.

2.3 Export and Import of Agricultural Commodities

Traditional crop exports decreased from USD 1021.82 million in 2017 to USD 808.1million in 2020; which represents a decrease by 21 percent for the period, contrary to the FYDP II set target of increasing export by 30 percent by 2020 (Table 3 & Figure 5). Export of agricultural commodities was greatly affected by COVID 19 pandemic, although prior to the pandemic, there was a huge plunge in exports (32.16 percent) in 2018.

Table 3: Export value of traditional export crops

Year	Traditional Export Crops (values in million USD)							Growth (%)
	Coffee	Cotton	Sisal	Tea	Tobacco	Cashew nuts	Total	
2016	153.69	46.76	17.23	44.79	339.2	320.24	932.38	
2017	126.27	36.76	28.73	49.13	195.81	529.7	1021.82	-32.16
2018	148	68.38	32.54	45.82	269.95	109.56	674.61	20.57
2019	152.2	91.8	19.3	45.7	146.5	353.1	817.7	-1.67
2020	145.2	87.5	17.6	32.4	148.7	359.6	808.1	-13.26
Average Growth 2016 – 2017	5.15	38.53	-12.1	-12	-2.12	48.27	-4.65	-4.42

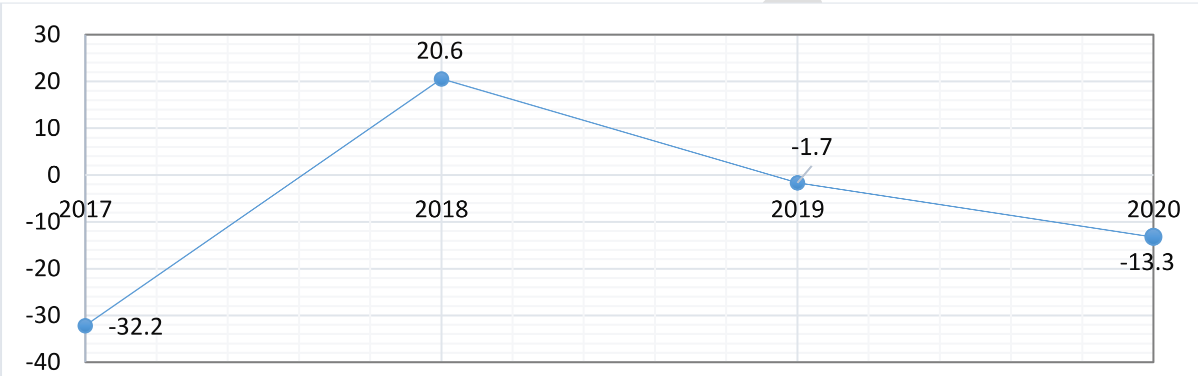


Figure 5: Export trends of Traditional Crop Exports
Source of Data: Annual Economic Survey Report for 2020

Export of food crops commodities increased by 6 percent during the period 2017 – 2020; from USD 1,830.73 million in 2017 to USD 1,940.18 in 2020; an increase of an annual growth rate of about 2.11 percent (Figure 6).

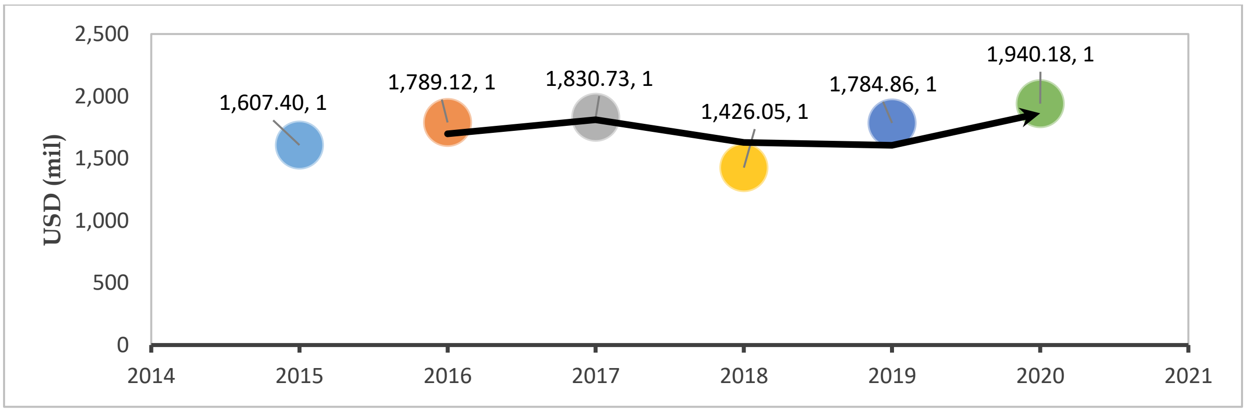


Figure 6: Export trends of food commodities
Source of Data: MoA, Biennial Review Report for the Malabo Declaration Goals, 2021

Export of horticultural crops increased from USD 24.8 million in 2016 to USD 274.1 million in 2020; an increase of more than ten times, surpassing the FYDP II target of increasing export by 30 per cent by 2020 (Figure 7). The increase was due to improved productivity, applying GAP and resolving several constraining policies.

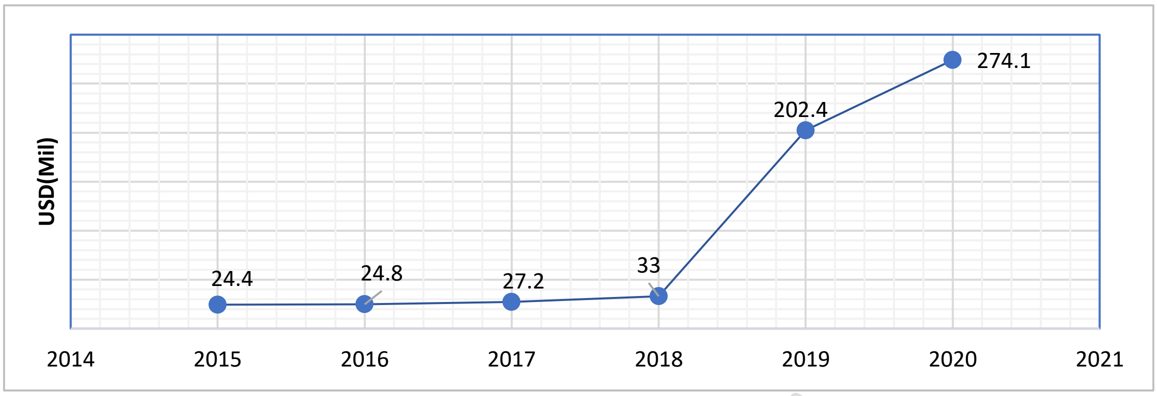


Figure 7: Horticultural Export trends
Source of Data: NBS, Tanzania in Figures 2020

The proportion of the food import bill relative to total imports decreased from 5.3 per cent in 2016 to 4.9 per cent in 2020 (Figure 9), with an average annual decrease of 4.3 per cent, which is like the growth rate of food crop production (4.7 per cent) and livestock products (4.5 per cent). This suggests that fluctuations in domestic agricultural production directly impact the food import bill. The percentage of the food import bill as part of the total import bill reached its lowest point of 3.3 per cent in 2018 before rebounding to 4.9 per cent in 2020 (ASR, 2021).

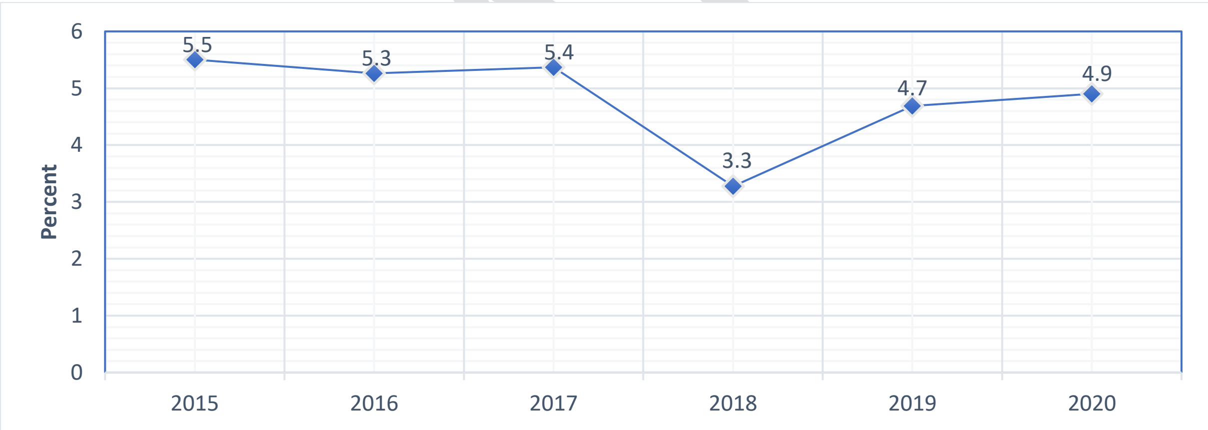


Figure 8: Food import bill as a percent of total imports
Source of Data: Annual Economic Survey Report for 2020

2.4 Intra-regional Trade on Crop Products

Tanzania has opportunities and drivers to expand inter-regional commodity trade. These include the potential to expand exports to neighbouring nations, especially those in the East African Community (EAC). Figure 10 analyses the country's performance in inter-regional trade, revealing a consistent upward trend from 512.65 TZ billion in 2017 to 1,068.79 TZ Billions in 2020, representing a growth of 108.5 per cent and an average annual increase of 36.3 per cent (ASR, 2021). Yet, there is still a huge opportunity to be explored by the country in inter-regional trade.

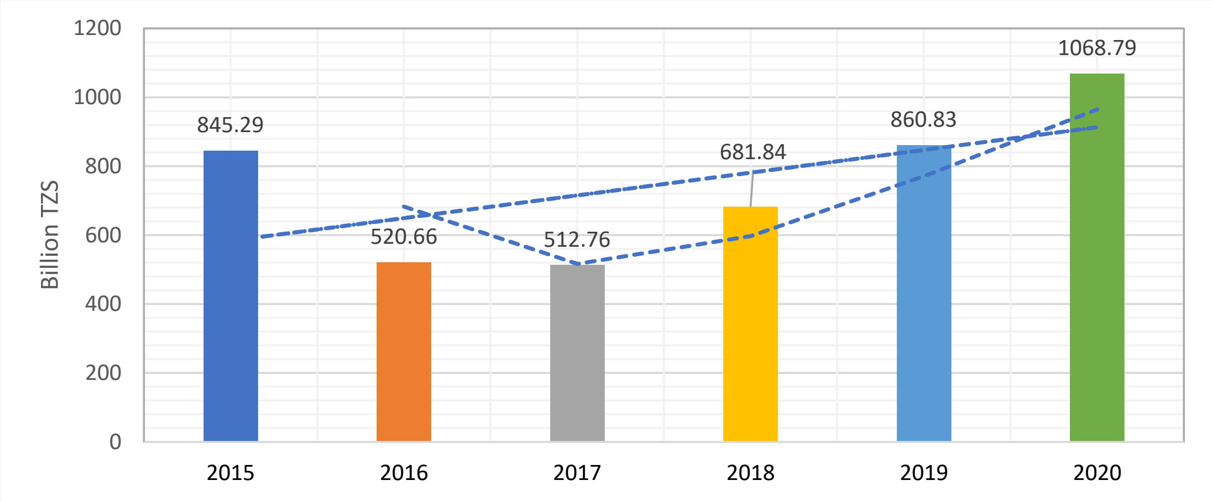


Figure 9: Intra Africa Export of Goods and Services
Source: Tanzania Bureau of Statistics

Generally, Tanzania exports staple cereals and pulses to neighbouring Eastern and Southern African countries, such as Kenya, Malawi, Zambia, Uganda, Rwanda, Burundi, and the Democratic Republic of Congo. Among the commodities prioritised in TAIDF, maize and rice are the leading exports from Tanzania to the Region through formal and informal channels. Tanzanian rice is particularly popular in some markets in Kenya, Uganda, and Rwanda because of its aroma and high-water absorption, which causes it to swell (USDA, 2019). Given the existing demand and Tanzania's potential to increase rice productivity, the government is committed through this roadmap to implementing a strategy to promote rice exports to neighbouring countries.

However, there are obstacles to cross-border food trade within the region, including the recurrence of export bans (recently abolished), policy and regulatory challenges, and low price and quality competitiveness of Tanzanian maize and rice in the regional market. Enhancing competitiveness, adding value, and improving the business environment should expand opportunities for agricultural entrepreneurs to benefit more from intra-African trade.

3 Investment Prioritization and Analysis of Yield Targets

3.1 Selection of Investment Priorities for Driving Inclusive Agricultural Transformation

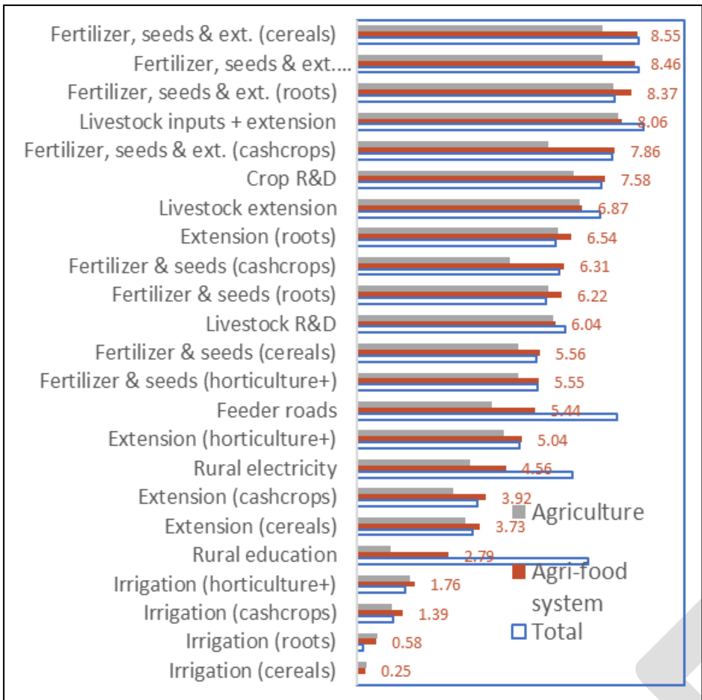
The findings of the 2023 IFPRI study[8] on assessing investment priorities for driving inclusive agricultural transformation in Tanzania that used a computational general equilibrium model integrating micro-simulation (the RIAPA–AIDA model system) informed the prioritisation of investments under the Agenda 10/30 Roadmap. The findings underscored the need for the roadmap to focus on high-value adding crops – cereals and cash crops; a thrust on increased productivity (improved seeds, fertiliser, and extension services for cereals, cash crops and horticulture) for substantive positive impacts on GDP rate, jobs, poverty, and dietary quality (See Figures 11 and 12).

Figure 11 reports the ranks of investments based on their returns per every dollar spent on each. Combining improved inputs with extension is associated with the highest GDP returns since the impact on productivity is higher when the farm inputs are provided to farmers with advice due to interaction effects. Investments targeting cereals, horticulture, and roots impact agricultural GDP more. Regarding job creation efficiency, cash crops and livestock investments perform better than interventions targeting cereals. Meanwhile, the poverty effect ranks cereal-oriented spending on seed, fertiliser, and extension at the top, livestock and cash crop scenarios only moderate poverty. In contrast, interventions targeting horticulture and livestock, which lower the prices of products of these subsectors, are highly effective at improving the quality of household diets due to high consumption gaps. Joint provision of fertiliser, seed, and extension for cash crops also ranks highly.

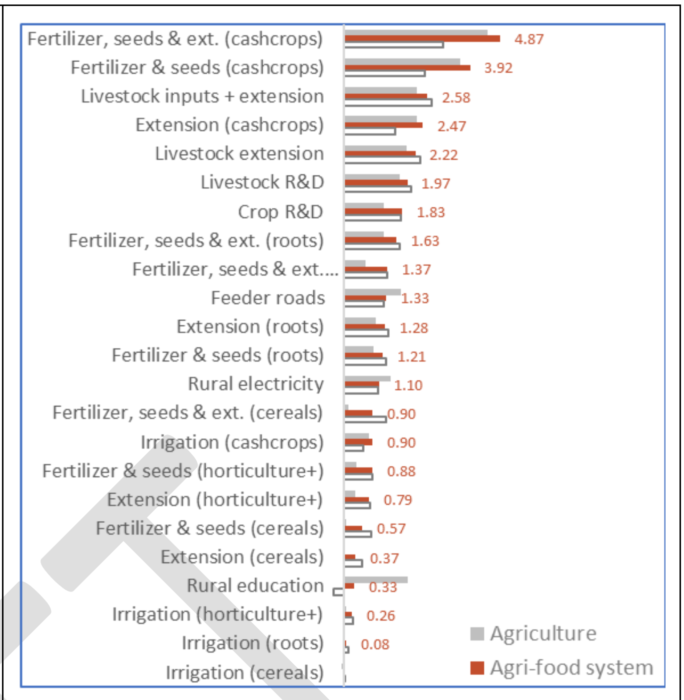
The findings show no single intervention area as the most effective at achieving all four development outcomes. Figure 11 attaches equal weight to all four development indicators – growth, employment, poverty, and diet diversity – and creates a composite ranking of the interventions. The top-ranked intervention is fertiliser, seeds, and extension provisioning for cash crops, which is mainly driven by the importance of this intervention in promoting employment and diet quality. Inputs and extension provisioning for horticulture and livestock also rank highly. These are all high-value products and highly tradable in domestic and export markets.

The result aligns well with the implications of the situation analysis results. For many of the critical crop commodities, the necessary interventions to underline the roadmap revolve around improved seeds; improved fertiliser, pesticides, use of gaps (extension services), irrigation; and mechanisation, Others are related to acreage expansion but for large farm sizes, financing, storage and logistics, agro-processing, reliable markets and marketing systems and policy consistency, predictability and facilitation.

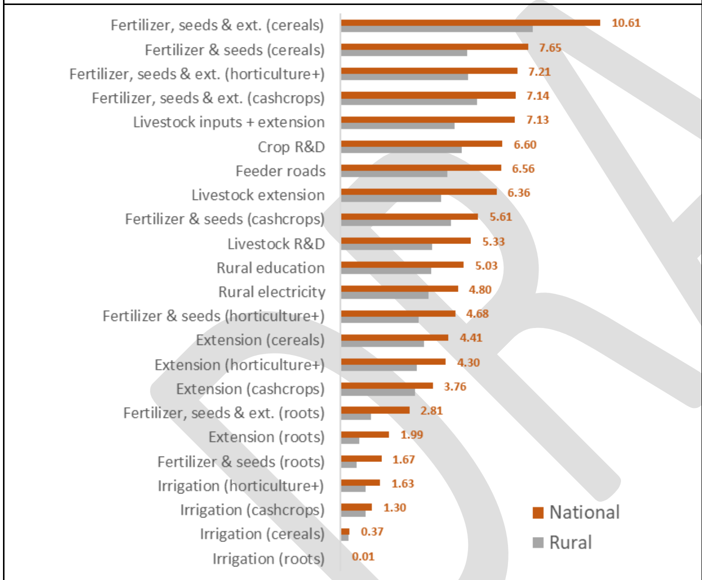
[8] Aragie, E., Benfica, R., Pauw, K., Randriamamonjy, J., & Thurlow, J. (2023). Assessing investment priorities for driving inclusive agricultural transformation in Tanzania. Intl Food Policy Res Inst. https://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/136687/filename/136898.pdf



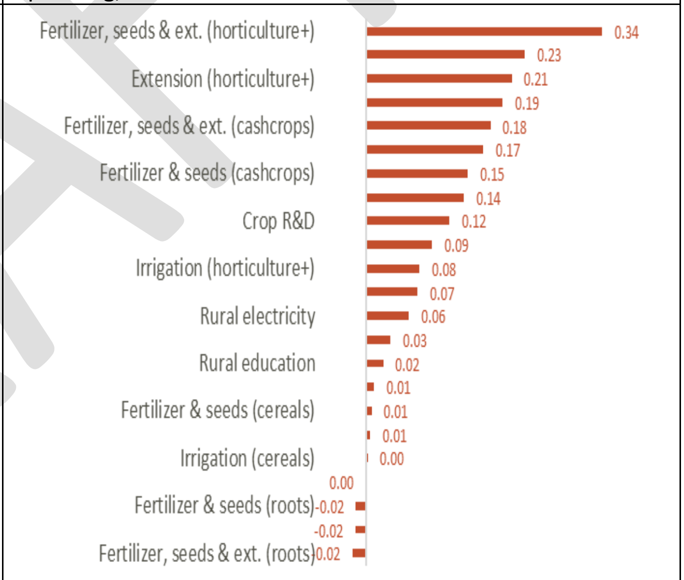
US dollar increases in GDP per dollar of spending, 2018–2028



Changes in the number of people employed per US$1,000 of spending, 2018–2028



Changes in the number of poor per $1,000 of spending, in 2018-2028



Changes in diet quality index per $1,000 of spending, 2018–2028

Figure 10: Changes in GDP, poverty, employment, and diet per dollar spending in Agriculture

Source: Aragie et al, 2023

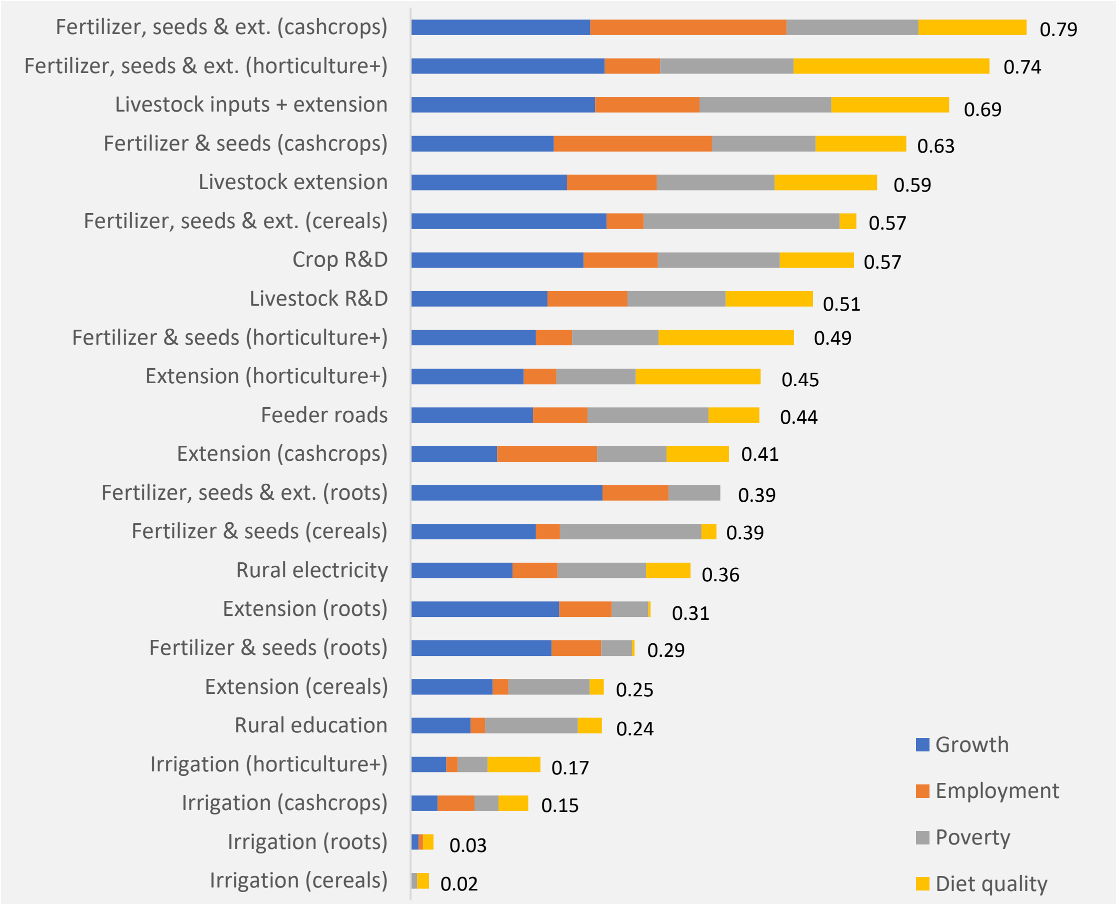


Figure 11: Weighted impact score of expenditures and investments on the four development outcome indicators (equal weighting of each outcome indicator)
Source: Tanzania-RIAPA model.

3.2 Selection of Priority Crops

Tanzania has a diversified agricultural output, but a few crops are currently considered to have the highest market value, such as cashew nuts[9] and coffee.[10] While agriculture is the most viable pathway for the country to escape poverty, unemployment, malnutrition, and food insecurity, the set targets of the ASDP II of a 7% growth rate of the agricultural sector by 2022/2023 and the set ambition of 10% growth rate for the crop sub-sector by 2030 (Agenda 10/30) will be challenging to achieve *without focused interventions on clearly identified and prioritized **crops** value chains,* addressing binding constraints related to persistent low production, productivity, and marketing challenges.

In principle, Agenda 10/30 would have included all crop commodities in the country, but this is impossible due to various limitations, including financial resources, human resources, time, etc. Secondly, the selection of crops had to observe the contribution to the total planned impact on food

[9] See "Tanzania Cashew Nut Industry: Prospects for Development and Competitiveness" by Tukae Mbegu, International Journal of Agriculture Innovations and Research, Vol. 4, Issue 2, pp. 231-236, 2016. See also "Tanzania Cashew Nut Market - Growth, Trends, and Forecast (2020-2025)" by Mordor Intelligence, published on ResearchAndMarkets.com, October 2020.
On coffee in Tanzania:

[10] see "Tanzania Coffee Industry: An Analysis of the Value Chain" by Josaphat Kweka, International Journal of Economics, Commerce and Management, Vol. III, Issue 2, February 2015. See also: "Coffee in Tanzania: A Case Study" by Mwatima Juma, Sustainable Commodity Initiative, published on unido.org, December 2018.

sufficiency and Gross Domestic Product or GDP. Crops with a marginal contribution to the expected change were not included because some are already doing very well and contributing significantly. With time, the left-out crops will be considered for increased contribution to GDP accordingly.

The prioritisation of crops started with those crops identified in the country's main development frameworks/programmes (i.e., FYDP II & III, Integrated Industrial Development Strategy; Agriculture Sector Development Programme (ASDP II); Tanzania Livestock Master Plan, TAIDF and Agenda 10/30). Additional considerations came from the findings of the IFPRI (2023) study report,[11] proposing an emphasis on high-value agriculture, including cash crops, horticulture, and cereals as other criteria.

The crops resulting from the above analysis were further subjected to the following prioritisation criteria: i) the share of crop GDP and value of agricultural production; ii) contribution to national food and nutrition security; iii) contribution to the reduction of food import bill; iv) contribution to export revenues including regional trade; v) contribution to employment (with a particular focus on generating youth's employment); and vi) potential of reducing national and rural poverty (potential impact to smallholder farmers/livelihood improvement) and vii) contribution to the national development agenda (industrialization). From the analysis, a list of 13 crops was selected for the roadmap. The selected crops are maize, rice/ paddy, wheat, pulses/ beans, cashew nut, avocado, sunflower, cassava, sisal, cotton, soya beans, sorghum, and coffee. The 13 crops collectively contribute 58.6% of the national crop GDP, indicating their strategic value in attaining the aspirations of Agenda 10/30.

3.3 Crop Level Yield Gap Analysis and Potential for Intensification

3.3.1 Maize

Maize is the staple food for the majority of Tanzanians. Maize contributes about 60 percent of cereals production in the country (URT 2021)[12] and about 35 percent of the daily calorific intake in Tanzania.

Table 4: SWOT analysis of the maize sector in Tanzania

Strengths	**Weaknesses**
• Availability of favourable soil and climate • Maize is a dominant crop in the country. • Existence of research and innovation centers • Availability of affordable labor • Presence of farmer organizations and supporting NGOs	• Low levels of technology use - dominantly hand hoes • Low level of usage of improved seeds and fertilizer application • Inadequately empowered commercial farming • Insufficient and low-quality grain storage facilities • Weak or lack of farmers' organizations
Opportunities	**Threats**
• Growth of urban population creating more demand • Available market from neighbouring countries • Development of processing and distribution services • Demand from the feed industry • Political willingness and support	• Limited (or no) access to market information • Some sporadic bans effected by the Government. • Limited reach to appropriate extension and business development services • High transaction costs • Quality issues along the value chain

[11] https://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/136687/filename/136898.pdf

[12] URT (2021). National Sample Census of Agriculture 2019/20: National Report, The United Republic of Tanzania, Dodoma

Up to 80 percent of the maize produce is consumed within the producing households, while the rest is sold in local and export markets. In Tanzania, the maize value chain is poorly coordinated, and production is mainly by small-scale farmers under low input, rainfed conditions. The strengths, weaknesses, opportunities, and threats (SWOT) analysis across the maize value chain in Tanzania is outlined in Table 4.

Potential for Intensification of Maize production

Maize production in Tanzania has significantly increased over the past 10 years, largely through expansion of planted areas rather than increased yields[13]. Maize is planted on over 4 million hectares of land across the country. Current production is estimated at 7 million tons at an average yield 1.75 tons/ha. Globally, the USA and New Zealand record highest yields of maize, averaging 12 tonnes per hectare. Under optimal agronomic management (input, seed, and crop management), Tanzania has a yield potential of 7.5 tons/ha under rainfed conditions and 13.87 tons/ha under irrigated conditions[14]. Figure 12 shows that the Southern highlands and the lake region areas have the highest potential to increase yields.

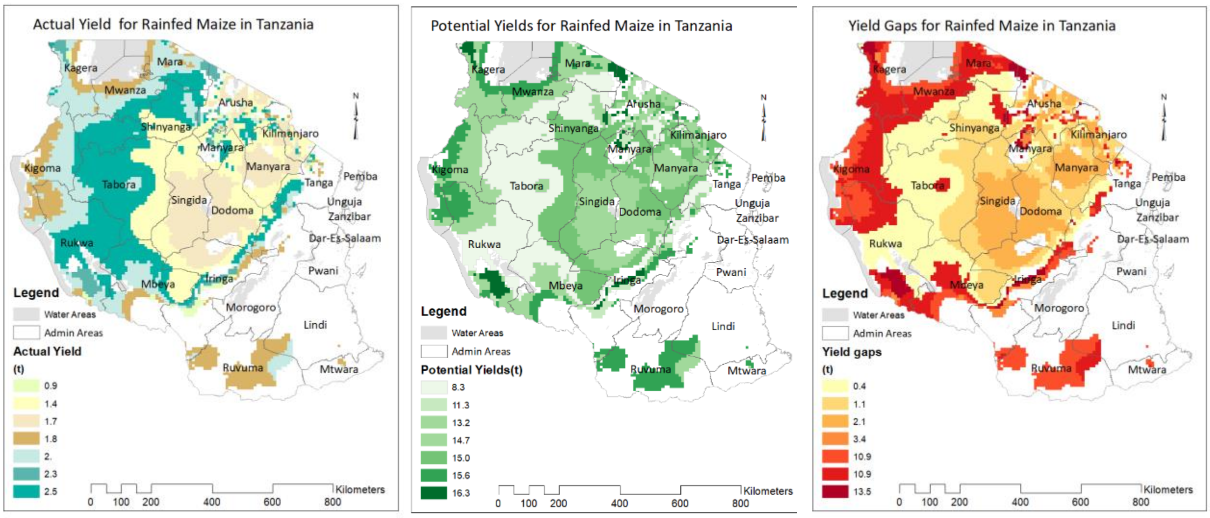


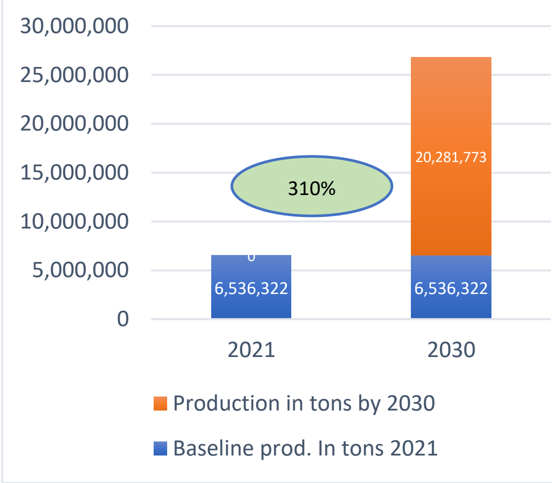
Figure 12: Yield gaps and potential for intensification of maize production
Source: compiled from Global Yield Gap Atlas data

Given variation across regions and the diminishing returns of yield input response, Tanzania can achieve a yield of 6 tons/ha across the country. Agenda 10/30 aims to increase maize yield to 6 tonnes/ha by 2030 (Table 5), which implies an increase of about 20% year on year. The projected growth represents over 300% increase in yields, production and value over the Agenda 10/30 period.

[13] FAO, 2015. The MAIZE Value Chain in Tanzania. A report from the Southern Highlands Food Systems Programme.
[14] https://www.yieldgap.org/tanzania

Table 5: Current and Target Performance of Maize

	Current	Potential	Agenda 10/30 Target
Yield (Tons/ha)	1.50	7.50	5.76
Harvested area (Ha)	4,345,266	6,067,996	4,658,713
Total production (tons)	6,536,322	45,491,804	26,818,095
Price (TZS/per ton)	424,336	424,336	424,336
Total value (Billion TZS)	2,773.60	19,303.84	11,379.90



Source of Data: URT (2021), URT (2017) and author's calculations

To achieve the optimal productivity by of 6 tonnes/ha by 2030, the use of improved seeds should increase from the current 2 kg/ha to 22 kg/ha (maximum coverage), while fertiliser application should increase from the current 17kg/ha to about 250kg/ha among maize farmers. Consequently, the total cost of improved seeds and fertiliser (combined household and government expenditure) will increase from the current 42 billion and 247 billion per year respectively, to 440 billion and 4,225 billion respectively. Combined with increasing area under irrigation, mechanization, access to extension services, and safe storage equipment and infrastructure, it is expected that the level of investment will attain the set target. Assuming a 1 percent growth of area under maize, annual production will grow to 27 million tonnes by 2030. This will result in a surplus of 8 million tons that would be available for export, bringing in approximately USD 2 Billion in export earnings[15].

Strategic Interventions to improve productivity of maize.

- Increase the supply, access, and affordability of fertilisers and improved seed varieties.
- Increase irrigation coverage for maize production.
- Increase access to machinery (tractors, threshers) and equipment to increase farm efficiency.
- Improve access to extension advisory services.
- Improve early warning systems regarding pest infestation and control measures including access to pesticides and training of farmers particularly targeting fall army worms and aflatoxin.
- Promote the use hermetic bags and silos to protect maize from larger grain borers and weevils.
- Expand research and production of high yielding, drought tolerant, and disease-resistant varieties maize seed varieties for various agro-ecological zones in Tanzania.
- Promote free and fair competitive markets, including opening new export markets.

3.3.2 Rice

Tanzania is the leading producer of rice in East Africa and ranks second in Sub-Saharan Africa after Madagascar. Rice is consistently the second leading food crop and cash crop in Tanzania after maize, and like maize it is largely produced by smallholder farmers on farm size that ranges from 0.5 to 3 hectares. Its annual production, estimated to be 3-3.5 million tons, accounts for about three-quarters

[15] At the current price of USD 250 per ton.

of the total rice produced in East Africa. The rice sub sector is a significant source of food and nutrition security, employment and income to many households, and a potential source of foreign exchange earnings to the country. The government of Tanzania is implementing several value-addition initiatives through the 2019-2030 National Rice Development Strategy towards enhancing rice production and trade competitiveness. The country has a political ambition to sustain rice self-sufficiency, and surplus to export to neighbouring countries, through raising productivity and expanding production to areas with high potential for rice production[16]. A summary of the strengths, weaknesses, opportunities, and threats across the rice value chain in Tanzania are outlined in table 6.

Table 6: SWOT analysis of the rice sector in Tanzania

Strengths	Weaknesses
• Availability of land suitable for rice cultivation • Availability of water suitable for irrigation • Significant investment in embankments and irrigation/drainage • Improvement in road conditions in rice growing fields and regions. • Strong government support and initiatives	• Inadequate irrigation and drainage systems, resulting in risk averse behaviour in using inputs. • Limited provision of inputs, mainly fertiliser and improved seeds • Low levels of mechanisation due to high cost of equipment and lack of financing. • Inadequate storage in rural areas • There is limited value addition (branding, grading, traceability, use of hulls/bran etc.). • Fragmented and unorganized value chain
Opportunities	**Threats**
• Growing domestic, regional and global demand due to increased urbanization • Production of high-value rice for niche markets. • Implementation of crop insurance programmes against climate change risks.	• Reduction in labour supply (youth leaving rural areas). • Trade restrictions such as export bans. • Poor road conditions at the farm level • Poor quality of paddy: moisture, foreign matter content, other impurities. • Fragmented land discourages use of machinery. • Insufficient and high cost of credit. • Climate change impacts causing water scarcity

Potential for Intensification of rice Production

During the agricultural year 2019/20, rice was planted on 1.7 million hectares and harvested from 1.49 million hectares. The total amount harvested was 3.4million tons, translating to a yield of 2.32 tons/ha (Table 7). Compared to leading producers of rice and Tanzania's rice yield potential, current observed yields of 2.5-3.5 tons/ha are extremely low. Data from Global Yield Gap Atlas shows that Tanzania has a yield potential (under optimal conditions) of 10.34 tons/ha and 13.50 tons/ha for irrigated and rainfed rice respectively. Tanzania has the potential to increase yields by up to 4.43 tons/ha and 7.34 tons/ha for irrigated and rainfed rice respectively, when factoring variations in crop species, cultivar, climate, soil type across regions and diminishing marginal returns of yield response to applied inputs.

[16] National Rice Development Strategy Phase II (NRDS II) 2019-2030. Government of Tanzania.

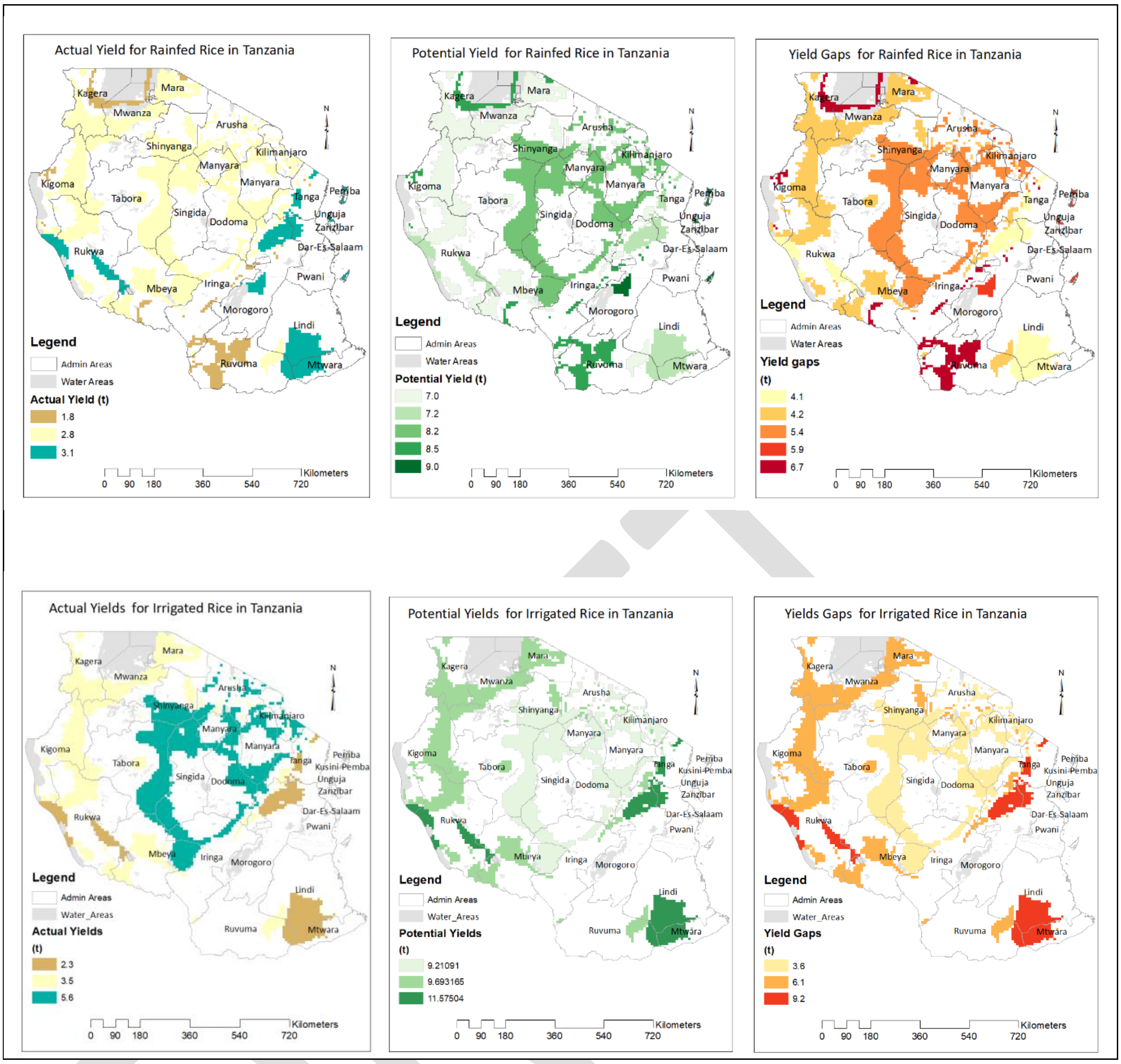


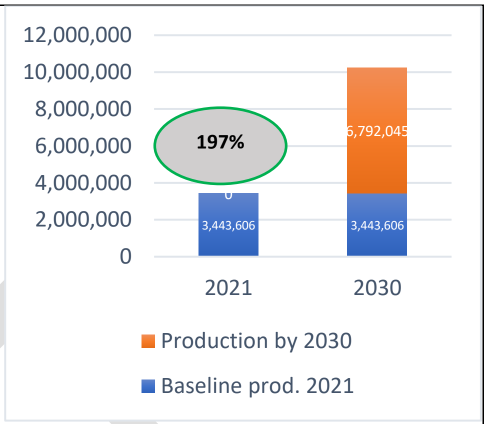
Figure 13: Yield gap and potential for intensification of rainfed and irrigated rice in Tanzania
Source: Compiled from Global Yield Gap Atlas data

In addition to intensification, there is a huge potential for extensification – expansion of land under rice (Figure 13). Tanzania plans to meet the regional demand for rice by exploiting large untapped land and water resources and the enormous potential for increasing yields. An estimated 2.3 million hectares of high development potential and 4.8 million hectares of the medium could potentially be put under irrigation given the abundance of water resources for irrigation from underground sources, rivers, and lakes[17]. The Agenda 10/30 seeks to increase rice yield to 6 tonnes/ha by 2030 and increase land under rice farming by 2 percent annually to 1.7 million hectares. This is expected to almost triple rice production by 2030, rising to over 10 million tons (Table 7).

[17] National Rice Development Strategy Phase II (NRDS II) 2019-2030. Government of Tanzania.

Table 7: Current and target yield and production of rice

	Current	Potential	Target
Yield (Tons/ha)	2.32	10.90	6.00
Harvested area (Ha)	1,485,125	2,300,000	1,705,941
Total productio n (tons)	3,443,606	25,070,000	10,235,650
Price (TZS/per ton)	1,166,047	1,166,047	1,166,047
Total value (Billion TZS)	4,015.41	29,232.80	11,935.25



Source of Data: URT (2021) and author's calculations

Strategic interventions to increase the production of Sorghum.

- Expand the area under rice cultivation by expanding and rehabilitating irrigation schemes and promoting rainfed rice in suitable regions.
- Promote mechanization by enhancing access and affordability of farm machinery including (tractors, planters, combine harvesters and rotary weeders).
- Improve the access and affordability of inputs (improved seeds, fertilizers, and pesticides) to smallholder rice farmers by providing subsidies and incentives.
- Invest in research, development, and distribution of climate resilient varieties of rice for both irrigation and rainfed production systems.
- Increase the number of extension officers and enhance their effectiveness through regular in-service training on modern production practices and technologies.
- Promote private and public investment in modern post-harvest storage and processing technologies and equipment that reduce losses and improve quality of locally produced and processed rice.

3.3.3 Cotton

Cotton is a strategic and major cash crops in Tanzania, as it contributes substantially to export revenues and employment. Cotton is grown as a fibre crop for lint, and mainly for export, while the seed by-product is a source of oil and livestock feed. Cotton is grown predominantly by smallholder farmers under rainfed conditions, limited use of modern inputs, and minimal mechanisation. Production (as measured in quantities) fluctuates significantly from one season to another as smallholders regularly move in and out of cotton cultivation due to rainfall patterns and prices. Table 8 summarizes the strengths, weaknesses, opportunities, and threats across the cotton value chain in Tanzania.

Table 8: SWOT analysis of the cotton sector in Tanzania

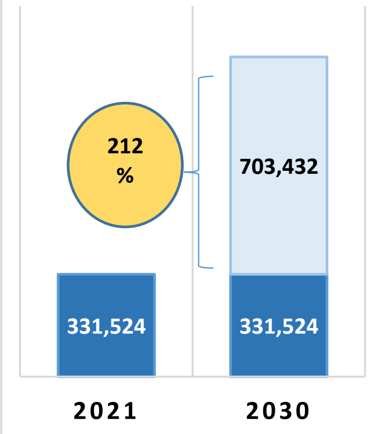
Strengths	Weaknesses
• Availability of affordable land and labour. • Presence of the TARI-Ukiliguru research institute in Mwanza which coordinates research and technology transfer on cotton. • The technology is available to increase production. • Availability of processing industries and required skills that can be improved. • Availability of credit schemes and financial services for cotton farmers.	• High dependence on rain. • Falling volume, stagnating productivity and poor-quality seed. • Inappropriate use of pesticides and fertilizers • High processing costs • Low ginning capacity utilization and technological obsolescence. • Inadequate organization and linkage of farmers to markets and processors. • Inadequate linkages between actors. • Weakening of cotton farmers' cooperatives.
Opportunities	**Threats**
• Export market available. • Availability of several valuable by-products • Improved price of cotton and by-products in the world market. • Government willingness and support	• Inadequate and uncertain water availability • High dissatisfaction with the prices by farmers • Competition to cotton seed oil by products from cheaper imported palm oils and other edible oils. • Limited business development, extension, and advisory services. • High processing costs. • Poor quality management along the value chain

Potential for Intensification of Cotton production

The government of Tanzania intends to promote growth of the cotton sector as an industrial crop, household income source and foreign exchange. During the 2019/20 agricultural year, cotton was planted on about 246,534 hectares of land. The total harvest amounted to 332,000 tonnes at average yield is about 1.3 tonnes of per hectare. Tanzania's cotton yield of 1.34 tonnes per hectare represents about 27% of the 5 tonnes per hectare yield in leading countries such as China, Australia, Turkey. In Africa, leading producers such as Egypt and South Africa report yields of between 2.5-3 tonnes per hectare. Agenda 10/30 seeks to raise cotton productivity to 3 tonnes/ha by 2030, an increase of close to 200% (Table 9). To utilise idle arable land, the government will promote cotton production in potential areas, targeting to grow the area under cotton production by 1% per year, to reach 344,985 hectares. Given the productivity of 3 tonnes/ha, total production is expected to rise to 1,034,955 tonnes.

Table 9: Current and Target Performance of Cotton

	Current	Potential	Target in 2030
Yield (Tons/ha)	1.34	6.00	3.00
Harvested area (Ha)	246,534	397,491	344,985
Total productio n (tons)	331,524	2,384,946	1,034,955
Price (TZS/per ton)	800,000	800,000	800,000
Total value (Billion TZS)	265.22	1,907.96	827.96
Households	152,190	381,020	



Source of Data: URT (2021), URT (2017) and author's calculations

The western regions of Simiyu, Shinyanga, Geita, Tabora, Mwanza, Mara, Kigoma, Kagera and Singida accounts for 97-99% of the total cotton production in the country. There is potential for expanded production in Simiyu, Shinyanga, Tabora, and Geita (Figure 14).

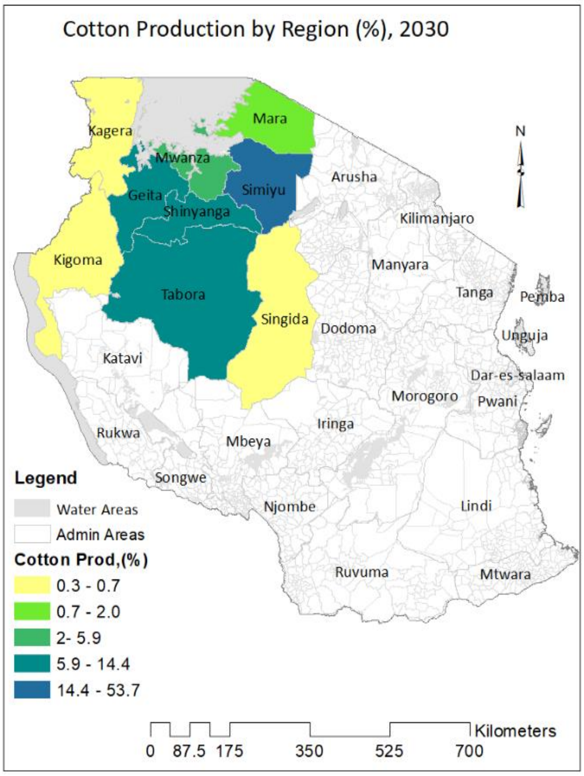


Figure 14: Potential cotton production expansion by region

Source of Data: URT (2021), and author's analysis

Strategic Interventions to improve productivity of Cotton.

- Increase access and affordability of industrial fertilisers by cotton farmers.
- Increase the supply of and affordability of climate-appropriate and high-yielding seeds of cotton varieties.
- Improve access to extension services.
- Strengthen farmer groups and cooperatives and link them with cotton off takers and processors through MoUs, contracts and other legally enforceable conditions.
- Promote access to pesticides and train farmers on proper application of insecticides.
- Improve and expand processing facilities for cotton through modernization and upgrading of ginning facilities to improve efficiency and capacity utilization.
- Identify and eliminate or minimise the policies and regulations negatively affecting production and marketing of cotton in Tanzania.

3.3.4 Sunflower

Tanzania ranks second in the production of sunflower seeds in Africa and the tenth in the world (Kombe et al., 2017). Sunflower production is an important source of livelihood, especially in the central regions of Tanzania and production is dominated by small-scale farmers. Small-scale farmers mainly use hand hoes and still rely on traditional practices, owing to insufficient extension advisory services and the high cost of inputs. On the other hand, medium and large-scale farmers use tractors and ox-plough. The development of contract farming in the sunflower sector is considered essential to match producers' capacities with processors' needs (HAPA, 2022).

Currently, Tanzania imports over 60% of the country's cooking oil valued at over USD 250 million per year[18]. Production and processing of sunflower seeds in the country has the potential to reduce dependency on imported edible oil. Despite the increasing demand for sunflower oil in the country, the area under sunflower production has declined since 2015, with minimal improvement in yield. The government of Tanzania intends to promote the growth of the sunflower sector to reduce reliance on imports, expand agro-industrialization, and as a source of household income and foreign exchange. Recently, the government has made deliberate decisions to transform the sunflower sector by offering tax incentives as well as making tariff changes favouring domestic sunflower production and encouraging industrial investments in the sunflower oil sector. Table 10 provides a summary of the strengths, weaknesses, opportunities, and threats across the Sunflower value chain in Tanzania.

Table 10: SWOT Analysis of the sunflower Sector in Tanzania

Strengths	**Weaknesses**
• Many private sectors and government institutions are involved in producing hybrid seeds. • Availability of tax incentives • Presence of sunflower associations such as TASUPA (processors), and TCCIA (businesses) support. • Strong political will and support.	• Inadequate production of quality seeds • Expensive quality inputs • Poor agronomic practices leading to low yields • Very high post-harvest losses • Limited availability of financial resources • Weak warehousing system. • Weak promotion and branding of sunflower products • Poor enforcement of weighing scales. • Low management capacities of farmers' associations.
Opportunities	**Threats**
• Sunflower oil is a high value product. • Increasing domestic demand. • Use of technology (mobile phones) to deliver agronomic advice. • Favorable policies and regulations • Cottage and household-level processing • Very high export demand	• Pests and diseases • Reliance on rainfall • Poorly coordinated smallholder producers • Weak public infrastructure (railways and road networks) to transport produce to the market. • Cheap imported edible oil and inadequate processing technology • Food safety issues and costs of compliance • Quality and certification challenges

Potential for Intensification of Sunflower Seed Production

Tanzania's sunflower harvest is estimated at 504,000 tonnes, with a yield level of 1(one) ton/ha, compared to 3 tons/ha produced by leading producers such as Ukraine, Egypt and Argentina. Sunflower growth depends more on nitrogen than any other nutrient. The plant requires 150 kg of nitrogen per hectare to produce 3 tons/ha[19]. Other nutrients such as phosphorous, potassium, boron, magnesium and molybdenum are also needed to achieve the best yields.

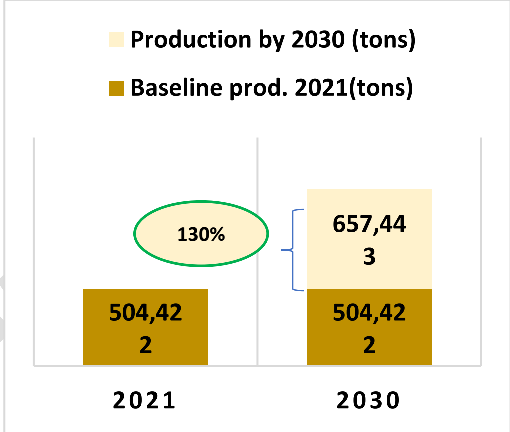
[18] HAPA.2022. Fiscal Reform Options and their Effects on the Edible Oil Sector in Tanzania: A Cost Benefit Analysis. The Hub for Agricultural Policy Action (HAPA), AGRA, Nairobi, Kenya.

[19] Potential performance is based on FAO (2010). Agribusiness handbook. Sunflower Crude and Refined Oils. FAO, Rome

Under Agenda 10/30, Tanzania intends to raise sunflower yield to 2.25 tonnes/ha, and to increase area under sunflower seed production by 1% per year, to 516,384 hectares by 2030 (Table 11). Production is expected to rise to over 1.1 million tons. This will be achieved by increasing fertiliser use to at least 100kg of nitrogen per hectare, planting hybrid varieties, and improving agronomic practices and increasing land under production through the Building a Better Tomorrow (BBT) program.

Table 11: Current and Target Performance of sunflower

	Current	Potential	Target
Yield (Tons/ha)	1.05	3.00	2.25
Harvested area (Ha)	481,641	706,926	516,384
Total production (tons)	504,422	2,120,778	1,161,864
Price (TZS/per ton)	937,648	937,648	937,648
Total value (Billion TZS)	472.97	1,988.54	1,089.42
Households	661,520	661,809	



Source of Data: URT (2021), URT (2017) and author's calculations

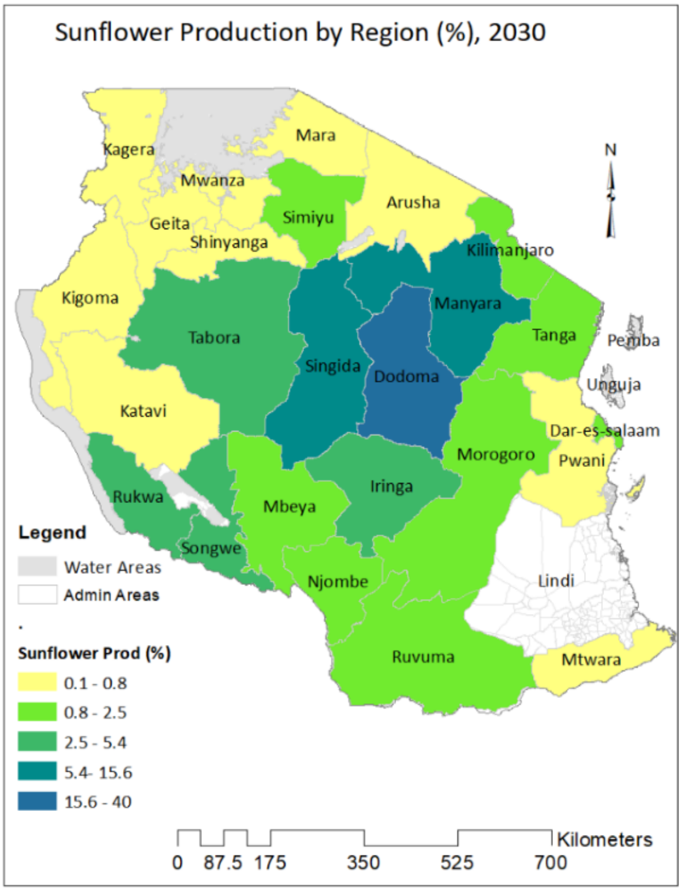


Figure 15: Potential sunflower production expansion by regions

Source of Data: URT (2021), URT (2017) and author's calculations

The government will target to increase production in the central regions of Dodoma, Singida and Manyara that have the highest potential for expansion (Figure 15). It is expected that the increased production will be absorbed by local processing factories, thus contributing to Tanzania's agro-industrialization drive, reducing the importation of edible oil, contributing to employment creation, and earning export income from the export of sunflower oil and by-products.

Strategic Interventions to Expand the Sunflower Seeds Sector

- Increase access and affordability of nitrogen fertilisers, high-yielding and drought-resistant sunflower seed varieties and necessary machinery.
- Provide training and extension advisory services on the proper sunflower agronomy and use of inputs.
- Increase coverage of irrigation on sunflower production.

- Improve and expand storage facilities for sunflower seeds and the adoption of improved post-harvest handling practices and storage techniques among farmers and processors to minimize losses.
- Promote complementary beekeeping to increase income, enhance pollination and increase yields.
- Encourage commercial farming by setting aside land for medium and large-scale farms and block farming. This entails reducing bureaucracy in accessing communal/village land for commercial farming.
- Improve access to sunflower markets by providing market information, organizing farmers into groups or cooperatives and linking them with off-takers through MoUs, contracts, and other legally enforceable mechanisms.
- Establish and enforce the use of standards and measures (weighing scales) and awareness campaigns to enhance quality along the value chain.
- Support the establishment of collection and aggregation centres to streamline the supply chain.
- Promote contract farming by putting in place by-laws that enhance compliance and create awareness of the importance of contract farming in hedging both farmers and processors against price risk.

3.3.5 Sisal

Sisal production in Tanzania is mainly done on large-scale farms, with small-scale farming contributing below 25 percent of total production. The main product derived from sisal is fibre, which is 2% of the sisal plant, while the other 98% is regarded as waste. The fibres are then used to produce twine, cordage for hay, packaging, baling, building and many other uses including carpets, wall coverings, doormats, car mats, buffing cloth used for polishing of metal and furniture, fine yarn, bag cloth, padding, mattresses and handicrafts. New products developed from the sisal plant include pulp and paper mainly for making boxes for packaging. Recent studies shown animal feed and biogas can be produced from the waste (FAO, 2023; Kivaisi & Mshandete 2017). The global ban on the manufacturing and use of plastic products due to environmental concerns has increased the demand for natural fibres These other biproducts have not been developed in Tanzania and provide the potential to utilise the sisal value chain better.

Tanzania is currently the second largest producer of Sisal in the world after Brazil. The sisal industry employs over 100,000 people, with a production volume ranging between 33,000 to 62,000 tons per year. The government of Tanzania has identified sisal among the country's strategic crops because of its potential to support agro-industrialization and as a source of household income and foreign exchange. Table 12 is a summary of the strengths, weaknesses, opportunities, and threats across the sisal value chain in Tanzania.

Table 12: SWOT analysis of the sisal sector in Tanzania

Strengths	Weaknesses
• Country's comparative and competitive advantages in sisal, such as the weather, soil, and human capital • Drought resistance properties of sisal • Government support and intent to increase sisal production	• Available machinery produces low-quality sisal products • Lack of value-addition technology • Soil exhaustion due to monoculture leading to low and poor-quality yields • Poor marketing systems in place • Inadequate research and development • Large capital investment is required, especially when harvesting
Opportunities	**Threats**

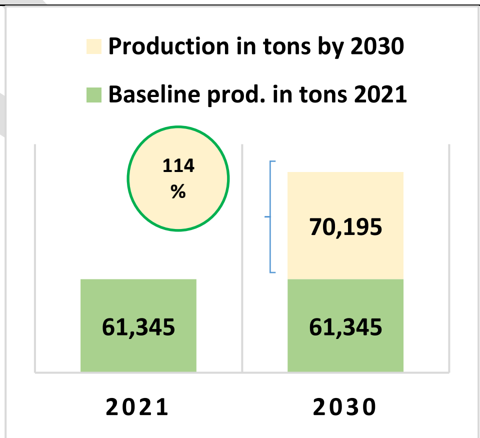
• Demand for natural fibre to replace synthetic and plastic products for environmental arguments. • Several valuable by-products • The diverse use of sisal products • Favorable policies and regulations • The availability of power in rural areas supports processing	• Compromised soil fertility due to monoculture • Weak public infrastructure (railways and road networks) • Unfavourable weather conditions, especially heavy rains which cause rotting. • Competition from synthetic fibers e.g., nylon • Prevalence of diseases such as honeydew • Unfavorable world market prices • Scarcity of labour, especially during the harvesting period

Potential for Intensification of Sisal Production

Tanzania's annual production of sisal is estimated at 61,245 tons with a yield of 1.38 tons/ha. Compared to leading producers such as China which has a yield of 5 tons/ha, Tanzania's current sisal yield is very low. The government announced reforms in sisal estate and land management in 2020, as part of the Government's plan to increase sisal production to 120,000 tonnes per year by 2024. Tanzania Investment Corporation estimates that by 2025 at least 100,000 tons of fibre will be needed in Tanzania alone[20]. To meet the growing demand for local consumption and export, Agenda 10/30 targets to double yield to 2.76 tons/ha and increase the area harvested by 7 percent from 44,517 hectares to 47,728 hectares by 2030 (Table 13). This is expected to increase production to 131, 540 tons per year by 2030.

Table 13: Current and Target Performance of Sisal

	Current	Potential	Target
Yield (Tons/ha)	1.38	5.00	2.76
Harvested area (Ha)	44,517	81,197	47,728
Total production (tons)	61,345	405,985	131,540
Price (TZS/per ton)	3,730,600	3,730,600	3,730,600
Total value (Billion TZS)	228.85	1,514.57	490.72
Households	10,302.00	10,302.00	



[20] https://www.tanzaniainvest.com/sisal

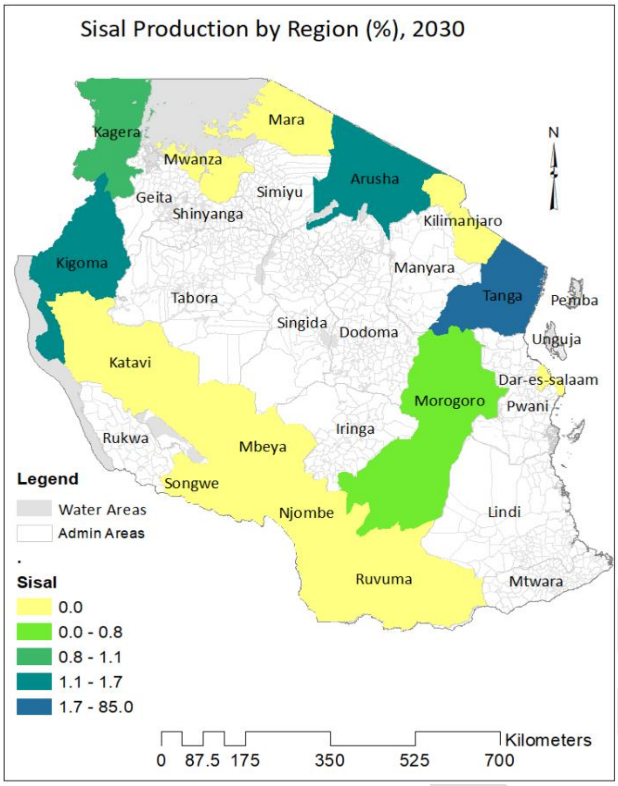


Figure 16: Potential sisal production expansion by regions
Source of Data: URT (2021), URT (2017) and author's calculations

Tanzania's export of sisal in 2019 was worth TZS 66,700 million. Increased production is expected to meet local needs and double exports. Further, it is expected that this will increase the utilization of local processing capacity and contribute to Tanzania's agro-industrialization agenda. Further, it is expected to create employment opportunities in the farm and processing sectors.

Sisal thrives in semi-arid areas with temperatures ranging from 24°C to 36°C and an altitude of between 5-1,500 metres above sea level. It produces more fibre when cultivated in areas with a low average rainfall per annum. The regions with the biggest potential for expansion, given their suitable climate and supporting infrastructure for sisal farming in Tanzania are Tanga, Pwani, Arusha, Kigoma, Morogoro, and Singida (Figure 16).

Strategic Interventions to Increase Sisal Production

- Facilitate access to credit facilities for sisal value chain actors to acquire farm equipment and processing machinery.
- Organize farmers into groups or cooperatives and link them with off-takers through MoUs, contracts and other legally enforceable conditions to ensure that they are not marginalized in the chain.
- Improve access to extension services to train farmers and traders on improving quality, grading, inspection and traceability.
- Support market research and value chain analysis to identify new market opportunities for sisal-based products and incentivise diversified use of sisal fibre to create alternative markets.
- Undertake marketing campaigns and strategies that showcase and the eco-friendly and sustainable nature of sisal compared to synthetic fibers.
- Partner with industries that use natural fibers to promote sisal-based products.
- Promote investments in modern and efficient processing machinery, technology and practices (such as hammer mills and mobile decorticators) to improve the quality, reduce losses in fibre, and utilize less water and energy.
- Provide fiscal incentives to attract investments in sisal production and processing.

3.3.6 Cashew nuts

Tanzania is among the world's largest producers of raw cashew nuts and accounts for 75% of the total production in East Africa. Production is estimated at 390,413 tons from an area of 560,728 hectares, translating to a yield of 0.7 tons/ha (2019/20 figures). The cashew nut crop is among the leading cash crops in Tanzania, with exports accounting for 10-15 percent of the country's foreign exchange earnings. The crop supports the livelihoods of over 250,000 farmers. Approximately 85 percent of cashew nut farmers in Tanzania are small-scale. Cashew nuts are mainly cultivated in the southern coastal regions of the country which together account for 80-90% of Tanzania's marketed cashew crop. Despite increasing local production and rising international demand, farm gate prices have remained generally low, sometimes forcing the Government of Tanzania to intervene through purchasing and marketing of the produce. More than 80% of Tanzanian cashews are exported as raw cashew nuts to Vietnam and India for processing, before entering the global market. The lack of domestic processing firms costs the country significant foreign revenues and thousands of jobs. Table 14 further summarizes the strengths, weaknesses, opportunities, and threats across Tanzania's cashew nut value chain.

Table 14: SWOT analysis of the cashew nut sector in Tanzania

Strengths	Weaknesses
• Government political will and support • Availability of land. • Availability of research centers. • Cashew tree's resilient against drought and climate change.	• Over-aged plantations. • Inadequate accessibility and affordability of inputs. • Predominance of a subsistence mindset among cashew farmers. • Limited availability of market information • Limited investment and working capital. • Weak coverage and quality of extension services. • Inadequate technological innovation. • The limitations of the auction system as the only legal channel for marketing disincentivizes domestic processing. • Weak development of the processing industry. • Inadequate incentives for potential investors
Opportunities	**Threats**
• Existence of diverse cashew by-products such as oil, butter, cashew milk and skin care products. • Expanding market for plant-based consumers • Harvest time for Tanzanian cashews. Corresponds to off-season in India and West Africa which is good for higher market prices. • Linkages between small and medium processors to scale up production of cashew kernels.	• Over-regulations and unpredictable supplies of Raw Cashew Nuts. • Multiple taxation and levies are faced by processors. • Low involvement of the youth in the sub-sector. • Lack of quality sensitivity in domestic markets.

Potential for Intensification of Cashew Nut Production

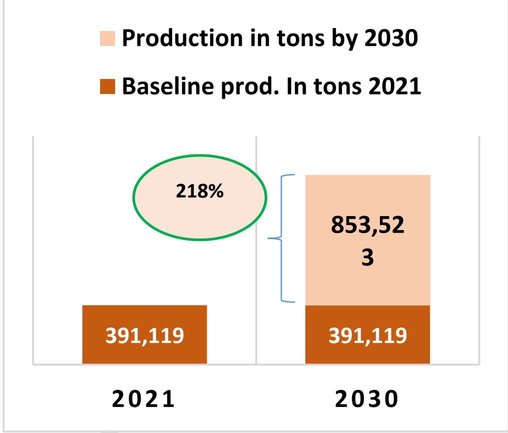
Tanzania's cashew nut yield is low compared to the leading producers of cashew nuts such as Philippines, which record a yield of up to 8 tonnes per hectare. Ivory Coast, which is a global leader in production records a production of over 800,000 tons of cashew nuts[21]. Leading producers in the mid-latitude climate zones record a yield between 2-3 tons/ha. Studies from India show that yields of between 2-3 tons/ha can be achieved through proper tree management and higher-density planting[22]. Through Agenda 10/30, the government target is to increase cashew nuts yield to 2 tonnes/ha by 2030 through targeted investment in the sector, improved farm management practices and to increase the area under production by 10 percent (Table 15).

Table 15: Current and Target Performance of Cashew nuts

[21] FAOSTAT data

[22] Nayak et al (2018). Recent technologies for cashew production towards zero hunger. Indian Farming 68(10): 52–55; October 2018.

	Current	Potential	Target
Yield (Tons/ha)	0.70	8.00	2.00
Harvested area (Ha)	560,728	811,733	622,321
Total production (tons)	391,119	6,493,864	1,244,642
Price (TZS/per ton)	1,500,000	1,500,000	1,500,000
Total value (Billion TZS)	586.68	9,740.80	1,866.96
Households	667,437	667,437	



Source of Data: URT (2021), URT (2017) and author's calculations

Tanzania produced cashew nuts worth TZS 586 billion in 2019/20. From the targeted yield and expanded area under cashew nut production, it is expected that the value of production increase to close to 2(two) billion Tanzania shillings. Tanzania exported cashew nuts worth TZS 533 billion (USD 232 million) in 2019, this figure is expected to at least double (to more than TZS 1,113 billion (USD 464 million) in 2030 if production doubles.

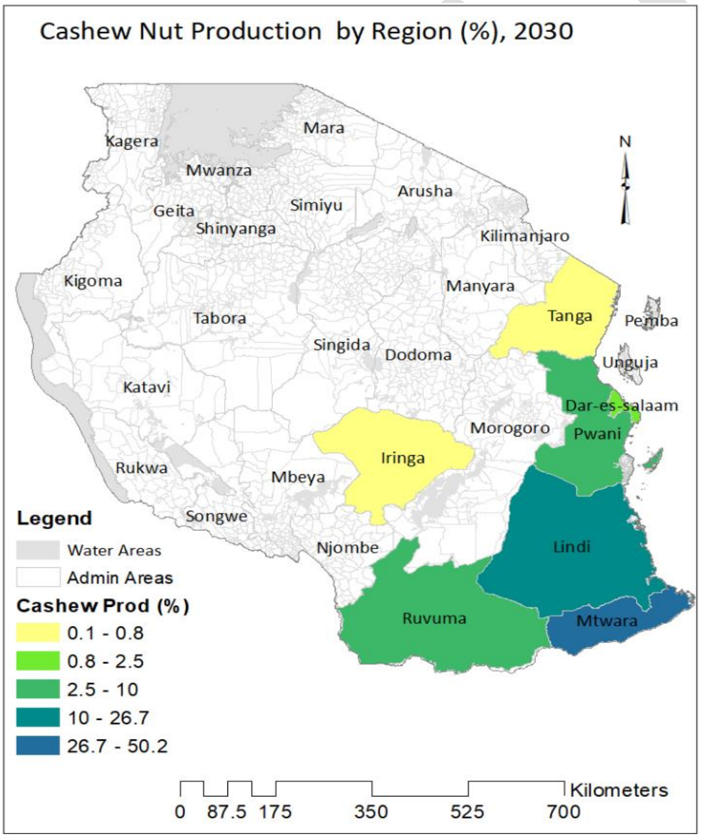


Figure 17: Potential cashew nuts production expansion by regions.

Source of Data: URT (2021), URT (2017) and author's analysis.

Cashew nuts are grown in the Southern parts of Tanzania, on the opposite side of the border of the cashew-growing region of Mozambique. Over 90% of cashew nuts are produced in Mtwara, Lindi, Pwani, Ruvuma and Tanga. Production is expected to grow in these regions based on favorable climatic conditions, availability of land for expansion, and processing infrastructure, some regions have been selected since they have the largest potential for expansion (Figure 17). The regions identified with the largest potential for expansion include Mtwara, Lindi, Pwani and Ruvuma.

Strategic interventions to increase cashew nut production.

- Implement a replanting and rejuvenation program to replace over-aged cashew plantations with high-yielding and disease-resistant varieties.
- Improve farmer education through access to more effective extension advisory services, farmer field schools and demonstration plots promoting proper tree management practices, particularly rejuvenation and top working, high-density planting, pest and disease management, and proper feeding of cashew trees.

- Promote high-yielding and disease-resistant cashew varieties suitable for various agroecological zones in Tanzania.
- Establish market information systems to provide real-time data on cashew nut prices and demand trends.
- Develop a branding strategy for Tanzanian cashew nuts Support cashew processors in adopting better packaging practices to improve product presentation and appeal.
- Incentivize and promote value addition and domestic processing of cashew nuts.
- Reform the policy and regulatory environment particularly to streamline the existing auction system or liberalize markets to ensure transparency and efficiency.

3.3.7 Pulses

The production of pulses in Tanzania is dominated by four main products: dry beans, cowpeas, chickpeas and pigeon peas. Pulses are important for food and nutrition security in most of the rural regions where almost half of the production is used for household consumption. In the past decade, Tanzania has seen an increase in the production of pulses, attributed mainly to the increase in demand for pulses from India, and the government's drive to improve food and nutrition security. The pulse sector in Tanzania stands to benefit from the expanding demand for legume-based proteins; low yields in the production of pulses by major consumer countries; and the established links to India as well as new market opportunities in South Asia, the Middle East and Europe. Table 16 further outlines a summary of the strengths, weaknesses, opportunities, and threats across the pulses value chain in Tanzania.

Table 16: SWOT analysis of the pulses sector in Tanzania

Strengths	Weaknesses
• Better adapted to climate extremes • Lower demand for irrigation water due to efficient use of residual moisture in the soil • Pulses disrupt pest and disease life cycle. • Easy to grow/produce. • Pulses can be intercropped with other crops, especially cereals.	• Inadequate marketing linkages • Most pulse farmers are not organized in groups or cooperatives. • Inadequate access and cost of improved seeds and fertilizers especially for smallholders • Insufficient storage facilities • Limited extension services • Poor harvesting and post-harvesting practices
Opportunities	**Threats**
• Increased adoption of improved practices may lead to increased production. • Good Sources of micro and macronutrients • Expanding global market for pulses • Presence of medium-scale pulse processors	• Emerging pests and diseases • Climate change and extreme weather conditions • Unstructured trade and price uncertainties • Minimal access to credit facilities • Inadequate government funding for research • Pulses are not given much importance compared to cereals

Potential for Intensification of Pulses Production

Tanzania's pulse yield potential is among the highest in the world, due to good climatic conditions. Pulses can survive harsh climatic conditions and can be produced under rain-fed conditions. During the agricultural year 2019/20, pulses were harvested from about 1.4 million hectares of land. The total production volume was 2.2 million tonnes, with an average yield of about 1.6 tons/ha (Table 17). The observed yield level is low compared to Tanzania's potential of 2.8 tons/ha under rainfed conditions[23] (Figure 19). Agenda 10/30 seeks to increase the average pulse yield to reach 2.28 tons/ha

[23] www.yieldgap.org

by 2030 (Table 17). This will increase total production by 43% by 2030, from 2.2 million tons to 3.2 million tons per year in 2030. Under current prices, it is expected that the value will increase to TZS 4,791.64 billion per year.

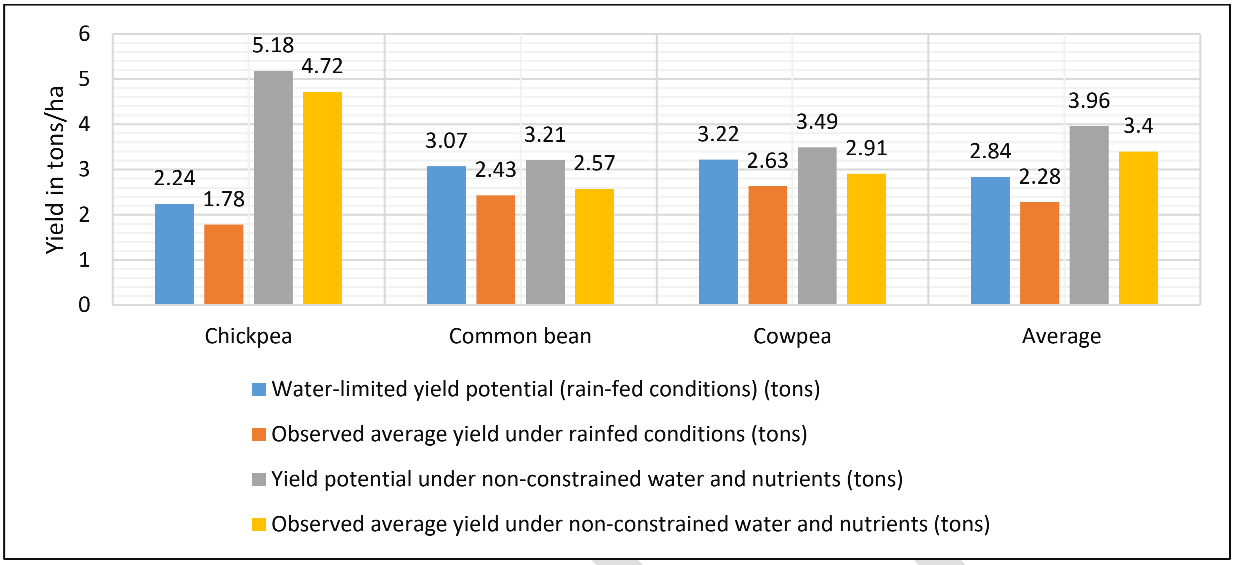
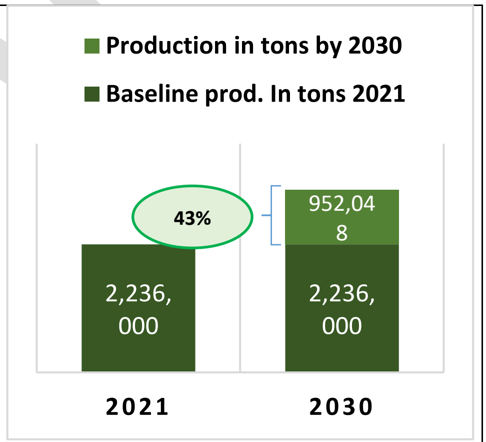


Figure 18: Yield potential of pulses in Tanzania

Source of data: Global Yield Gap Analysis

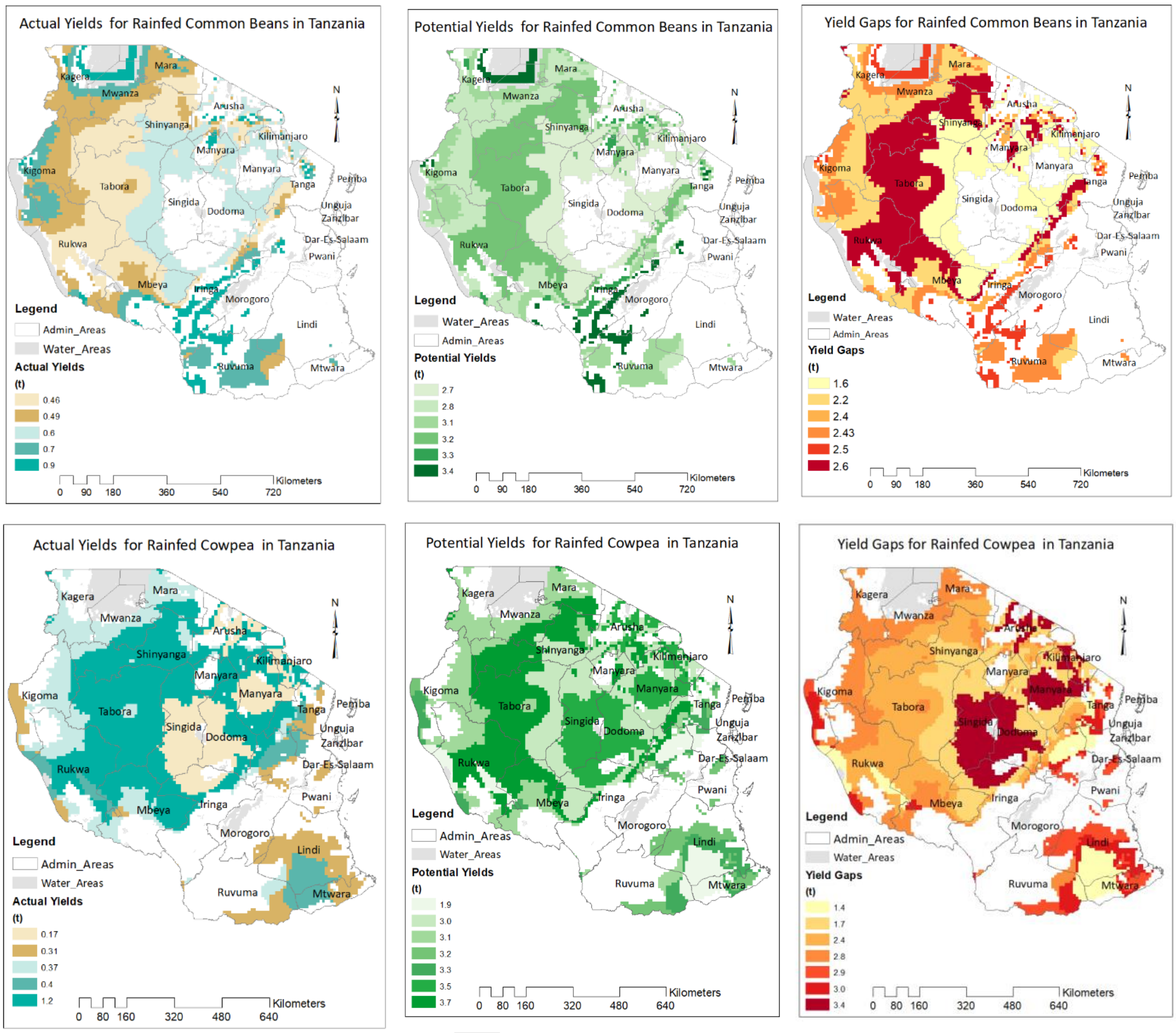
Table 17: Current and Target Performance of Pulses

	Current	Potential	Target
Yield (Tons/ha)	1.60	2.80	2.28
Harvested area (Ha)	1,397,500	1,426,783	1,397,500
Total production (tons)	2,236,000	3,994,992	3,188,048
Price (TZS/per ton)	1,503,000	1,503,000	1,503,000
Total value (Billion TZS)	3,360.71	6,004.47	4,791.64



Source of Data: URT (2021), URT (2017) and author's calculations

Pulses are mainly produced in four main zones in Tanzania, namely Lake, Central, Southern and Northern. Figure 19 shows that regions with the biggest potential for intensification of rainfed production of pulses in Tanzania.



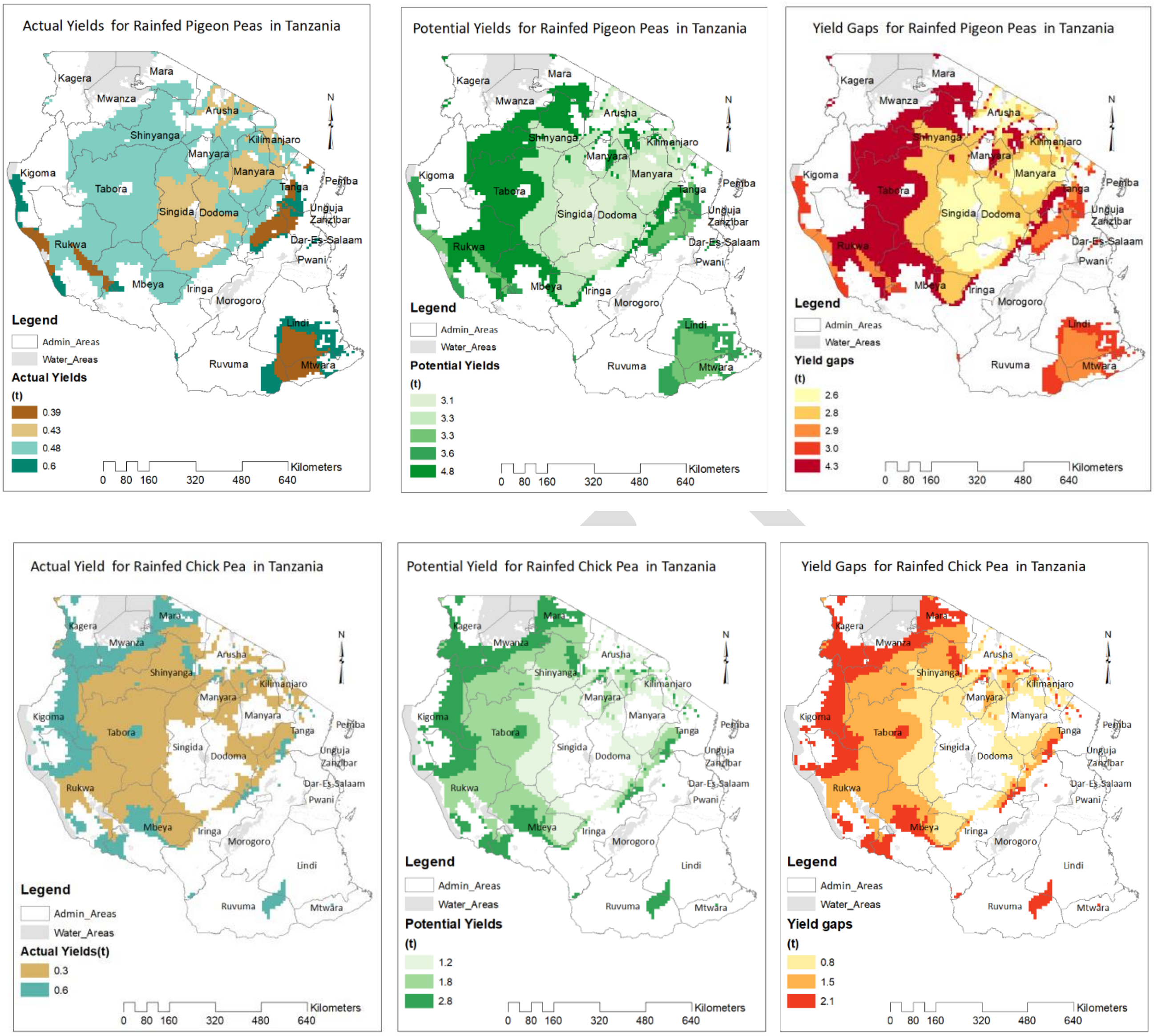


Figure 19: Potential pulses production expansion by regions
Source of Data: URT (2021), URT (2017) and author's calculations

Strategic interventions to increase the production of Pulses

- Increase supply and access to affordable fertilizer and improved seeds.
- Increase access to mechanization particularly tractors and components including power tillers and to farmers.
- Invest in modern and efficient storage facilities that reduce levels of humidity, and contamination, and reduce post-harvest losses from pest infestation.
- Support research and development of high-yielding and disease-resistant pulses varieties suitable for various agro-ecological zones in Tanzania.
- Invest in market information systems to provide up-to-date information on pulse prices.
- Strengthen Agricultural Marketing Cooperative Societies (AMCOS) as an avenue to mobilize farmers, bulk produce, and negotiate with the traders and exporters' agents.
- Establish a commodity exchange for pulses to link producers, off-takers, traders, and exporters, reduce transaction costs and reduce credit risks.

- Promote investment in the processing (cleaning and packaging) of pulses before export to increase value and reduce wastage.

3.3.8 Sorghum

Sorghum is the third most-grown cereal in Tanzania after maize and rice. Approximately 650,000 tons of sorghum are produced every year, mainly from the semi-arid regions of the country. It is used primarily as food, animal feed, and for making alcoholic beverages and biofuels. A significant quantity (about 83%) is used at home, while the rest is utilised for commercial purposes. Recently, there has been increased demand from breweries as well as consumption as people become increasingly aware of the health benefits. Sorghum is mostly grown by smallholder farmers who use local seed varieties due to their affordability and easy accessibility compared to improved varieties. Sorghum produced in Tanzania hardly competes in both local and international markets because of the low-quality grain. A long-term lack of a consistent commercial market has also limited investment in sorghum and hence average yield has stagnated for a long time. Table 18 below gives a summary of the strengths, weaknesses, opportunities, and threats across the sorghum value chain in Tanzania.

Table 18: SWOT analysis of the sorghum sector in Tanzania

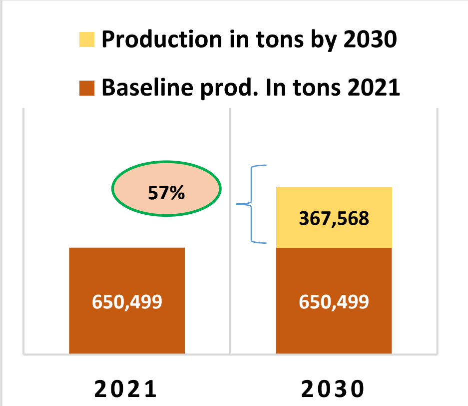
Strengths	**Weaknesses**
• Sorghum is a drought-tolerant crop. • High-yielding and early maturity traits of the crop • High nutrition value • Availability of cereal research institutions and centres • The diverse use of sorghum as food, feed & breweries	• Poor soil fertility and poor agronomic management • Limited extension advisory services • Poor marketing strategies and infrastructure • Inadequate availability of improved seed varieties • Inadequate access to production inputs e.g., fertilizers, insecticides, fungicides and herbicides • Reliance on traditional harvest techniques
Opportunities	**Threats**
• Collaboration between research centres, seed companies and processors to commercialize research outputs. • Increased demand for sorghum	• Adverse effects of climate change including drought • Limited access to information • Prevalence of birds, pests & diseases that damage the crop. • The perception of crop growers is that sorghum is an inferior crop. • Low prices of sorghum produce

Potential for Intensification of sorghum Production

Sorghum is a drought-tolerant crop and can, therefore, be cultivated in drought-prone areas. Average production of sorghum is estimated at 650,499 tonnes at an average yield was about 1.45 tons/ha (2019/20 figures). Tanzania's sorghum yield potential under rain fed conditions is estimated to be 3.17 tons/ha and 4.5 tons/ha under irrigation conditions. Agenda 10/30 seeks to increase sorghum yield to 2.2 tons/ha, an increase of about 46 percent (Table 19). Given the abundance of land suitable for sorghum production and especially semi-arid areas, the government aims to increase the land under sorghum production by 1 percent every year, translating to 479,852 hectares of harvested area by 2030. The combined increase in yield and land under sorghum production will result in production of over 1 million tons per year by 2030, translating to a 57 percent increase in production and value.

Table 19: Current and Target Performance for Sorghum

	Current	Potential	Target
Yield (Tons/ha)	1.45	3.17	2.12
Harvested area(Ha)	447,567	835,042	479,852
Total produ-ction (tons)	650,499	2,646,652	1,018,066
Price (TZS /per ton)	275,487	275,487	275,487
Total value (Billion TZS)	179.20	729.12	280.46



Source of Data: URT (2021), URT (2017) and author's calculations

Sorghum is mainly grown in semi-arid regions due to its drought tolerance nature. The main regions that can be targeted for sorghum production are Dodoma, Songwe, Singida, Simiyu, Lindi, Mwanza and Mara. Data shows that these regions have the highest yield improvement potential due to their climatic suitability (Figure 20).

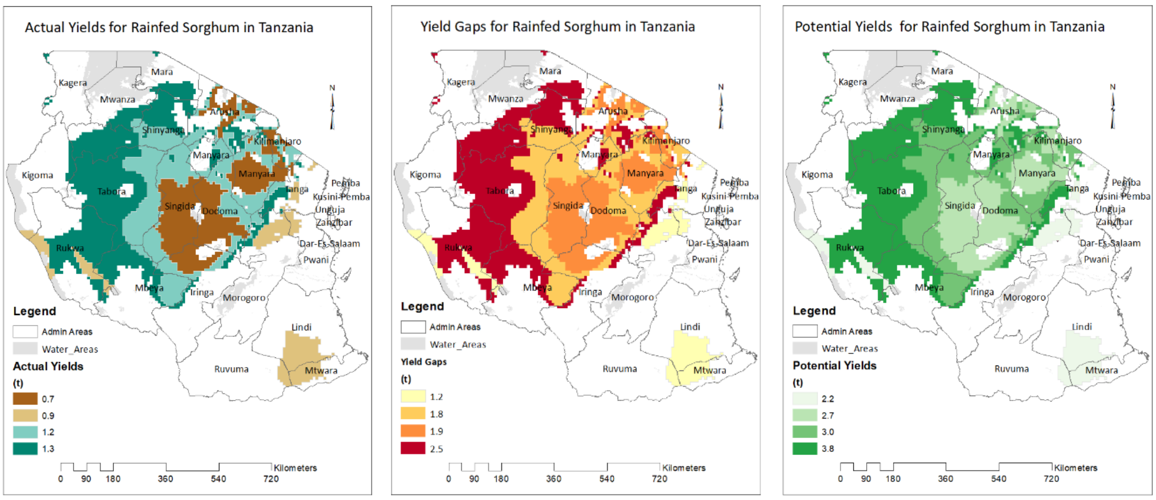


Figure 20: Potential production expansion by region

Source of Data: URT (2021), URT (2017) and author's calculations

Strategic interventions to increase the production of Sorghum.

- Promote the planting of sorghum varieties containing market-specific qualities in human food, animal feed and malting end uses.
- Re-vamp extension services to train farmers on Good Agronomic Practices (GAPs) seed production and post-harvest handling.
- Support mechanization among farmers by promoting access to machinery such as tractors for planting and locally fabricated mechanical threshers to ease the workload, especially for women, and improve grain quality.

- Promote alternative uses and methods of preparing sorghum meals and products such as cakes, biscuits, pop sorghum, porridges, chapati, mandazi, noodles, wine, flour-blending policies, and poultry/fish feeds.
- Promote the use of aggregator model that has been proven successful in aggregating marketable volumes and supporting downstream services (inputs access, mechanization, land preparation and threshing)[24].

3.3.9 Cassava

Cassava is a major subsistence crop in Tanzania, especially in semi-arid and frequently drought-stricken areas. Due to its drought tolerance, cassava is sometimes considered a famine reserve when cereals fail. Cassava is mostly produced for human consumption (84%), and the rest (26%) is used for animal feed, alcohol brewing, and starch production. Largely, the crop is still perceived as a food security crop, rather than a raw material for industries.

In 2019 Tanzania was the 11th largest cassava producer in the world and the 6th largest in Africa after Nigeria (top producer in the word), Ghana, the Democratic Republic of Congo, Angola, and Mozambique. Unlike other major food crops like maize, rice and wheat, cassava has not evolved from a subsistence to a commercial crop. This stagnation of cassava as a subsistence crop limits its integration into mainstream market and technology chains in local, national, and regional markets. Table 20 below is a summary of the strengths, weaknesses, opportunities, and threats across the cassava value chain in Tanzania.

Table 20: SWOT analysis of the cassava sector in Tanzania

Strengths	Weaknesses
• Cassava is a cultural commodity with several uses. • Presence of TARI-Ukiliguru research institutions which coordinates research and technology transfer on root crops technological innovations in the country. • High-yield, early maturity, pest, and diseases resistant varieties have been gradually introduced. • Easy to grow, with farming techniques and knowledge passed-by through generations. • Cassava is relatively weather tolerant; it is able to grow in poor and damaged soils under erratic rainfall. • Cassava can be intercropped	• Cassava and its derivatives are still considered as traditional foods hence, there is a lack of product modernization and standardization. • Some cassava diseases such as root rot, mosaic and whiteflies hinder production. • Some cassava varieties are highly perishable thus high post-harvest losses. • The sector's full dependence on rainfall • Farmers only use local planting materials. • Poor harvesting techniques which leave many cassava roots unharvested • Poor processing technologies • Cassava fields are fragmented
Opportunities	**Threats**
• Increasing demand for cassava traditional derivative products in several parts of the world. • The growing demand from industrial sector: agro-industries, food industries, distilleries, breweries, paper mills, pharmacies, packaging industries, beauty products, bioenergy, animal feeds • Demand for cassava in neighbouring countries	• Government plans, initiatives and policies do not yet pay enough attention to the cassava sector. • Limited research - research centres that focus on cassava are few. • Less interest in cassava with more focus on rice, maize and cash crops. • Low price of substitute foods such as rice, potatoes and maize

Potential for Intensification of cassava Production

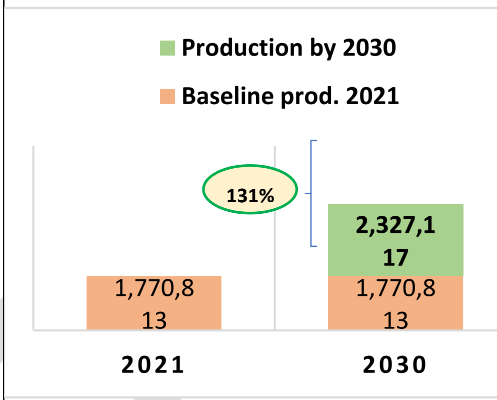
In Tanzania, cassava is cultivated on small, fragmented farms, and often cropped on poor soils and in mixed cropping systems. The increase in cassava production in Tanzania in recent years could be attributed to an increase in land cultivated rather than an increase in yield. Cassava production in

[24] IFAD (2020). Strengthening sorghum and millet value chains for food, nutritional and income security in arid and semi-arid lands of Kenya and United Republic of Tanzania (SOMNI).

Tanzania occupies about 741,059 hectares of land. Production is estimated at 1,770,813 tons at a yield of 7 tons/ha. The yield potential is estimated at 20 tons/ha under good farm management practices. The agenda 10/30 seeks to increase cassava yield to 16 tonnes/ha by 2030. This will increase total production by 131 percent in a period of seven years (Table 21).

Table 21: Current and Target Performance for Cassava

Description	Current	Potential	Target
Yield (Tonnes/ha)	6.94	25.90	16.07
Harvested area (Ha)	255,005	888,355	255,005
Total production (tonnes)	1,770,813	23,008,394	4,097,930
Price (TZS/per ton)	1,000,000	1,000,000	1,000,000
Total value (Billion TZS)	1,770	23,008	4,097



Source of Data: URT (2021), URT (2017) and author's calculations

Cassava production in Tanzania is concentrated in the southern zone (Mtwara and Lindi regions), Lake Victoria zone (Mara, Kagera, Geita and Mwanza regions) and the Coast (Figure 21). Further, hotspots for cassava production and commercialization have been identified in five regions, namely Mtwara, Lindi, Mara, Mwanza and Pwani.

Surplus production can be processed and exported to emerging markets such as China. In 2019, Tanzania exported cassava worth of TZS 21,574 million (USD 9.38 million). With increased production, it is targeted that exports will more than double, rising to reach at least TZS 45,024 million (USD 18.76 million) by 2030. Increased production will not only contribute to the food security of many rural communities but also agro-industrialization agenda as it is a raw material in the production of several industrial products.

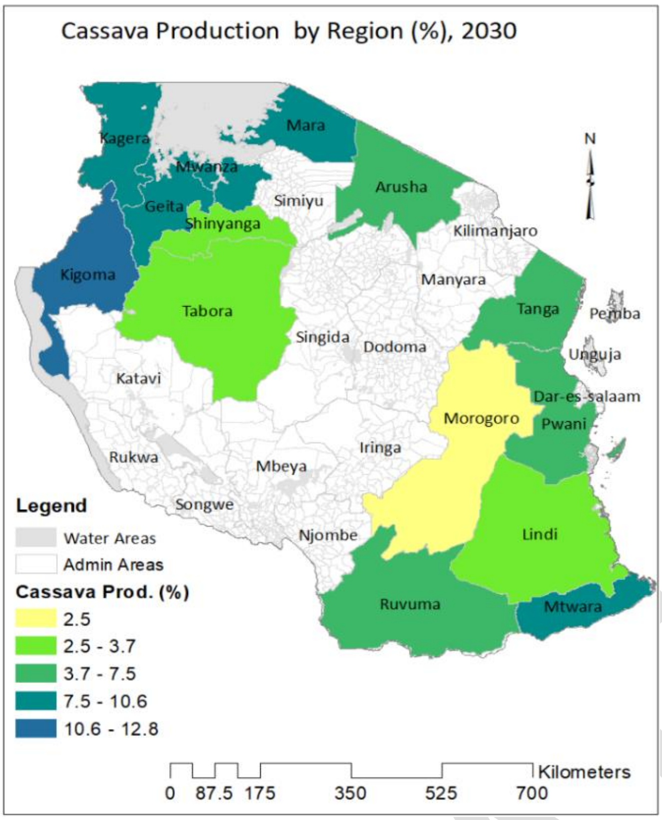


Figure 21: Potential cassava production expansion by regions

Source of Data: URT (2021), URT (2017) and author's calculations

Strategic interventions to improve the production of cassava.

- Scale up commercialization programs for multiplying, distributing, and selling high-quality and improved stem cuttings to small-scale farmers.
- Invest in research, development and improved cassava varieties that are drought and disease-resistant, with high levels of starch.
- Partner with the private sector to establish and expand modern cassava processing facilities clusters to facilitate substantial growth in commercial production and encourage vertically integrated production and processing.
- Improve extension services especially focussed on improved agronomic practices control of cassava pests and diseases such as the mealybug, cassava mosaic, and brown streak.
- Promote the emerging processing technologies and new intermediate shelf-stable cassava-based raw materials and new cassava food products and byproducts such as animal feed.
- Increase access to basic mechanization equipment in the production (land preparation, weeding, and harvesting) and processing segments of the cassava value chain to reduce operating costs and increase the profit margin of smallholder farmers.
- Prioritize cassava as a strategic crop by increasing financing to credit facilities for cassava farmers and processors, research institutes to promote the development of new varieties of cassava, extension services to train farmers on Good Agricultural Practices (GAP) and rural infrastructural development including road, water, and electricity to mitigate the perishability of cassava.

3.3.10 Wheat

Wheat consumption in Tanzania ranks fourth after maize, rice, and cassava. More than 90 per cent of wheat produced in Tanzania comes from either large-scale commercial farms in the Northern highlands or small and medium-sized family farms in the Southern highlands. Tanzania's consumption is estimated to be slightly above one million tons per year, but domestic production can meet only 10 percent of the demand. Consequently, Tanzania imports about 90 per cent of its wheat from Russia, Australia, Canada, Germany, and Brazil. The private sector and large commercial millers and farms dominate the sector's operations. As a result, smallholder wheat production is a rather small and dispersed industry. Wheat breeding and research efforts are minimal which makes it difficult for smallholder farmers to access improved seeds. A summary of the strengths, weaknesses, opportunities, and threats across the wheat value chain in Tanzania is outlined in table 22.

Table 22: SWOT analysis of the wheat sector in Tanzania

Strengths	Weaknesses
• Willingness of smallholders to engage in wheat production. • The willingness of industries to engage in funding research and development, especially on seeds and soil. • Strong political will to expand production	• Inadequate availability and low adoption of improved seeds • Poor farming practices • High post-harvest losses • Labour-intensive production with low profit margins • Inadequate enforcement mechanism for contract farming. • The wheat produced is of low-quality • Insufficient capital to expand and mechanize farming
Opportunities	**Threats**
• Availability of large land suitable for wheat production • Increasing domestic and foreign demand for wheat flour • Increased demand for animal feeds and associated food varieties and flour	• Absence of legislation to safeguard contract farming and favourable farm gate prices. • Weak public infrastructure • Competition from imported wheat • Uncertainty in the availability of sufficient rainfall • Pests and diseases, including desert locusts

Potential for Intensification of Wheat Production

The government intends to make Tanzania self-sufficient in wheat and has therefore initiated strategies to promote the production of wheat in the country. The area under wheat cultivation and production have shown decreasing trends, while yield levels have varied. During the agricultural year 2019/20 wheat was planted on an estimated 91,659 hectares and harvested from 78,274 hectares (figure 25).The total production of wheat in 2019/20 was 93,184 tons at a yield of 1-1.4 tons/ha. Compared to leading producers in the mid-latitudes such as Namibia, Zambia and Mexico with a yield of 6 tonnes per hectare, yields in Tanzania are very low. Data from the Global Yield Gap Atlas shows that Tanzania has a wheat yield potential of 4.13 tons/ha under rainfed conditions and 7 tons/ha under irrigated conditions (Figure 22).

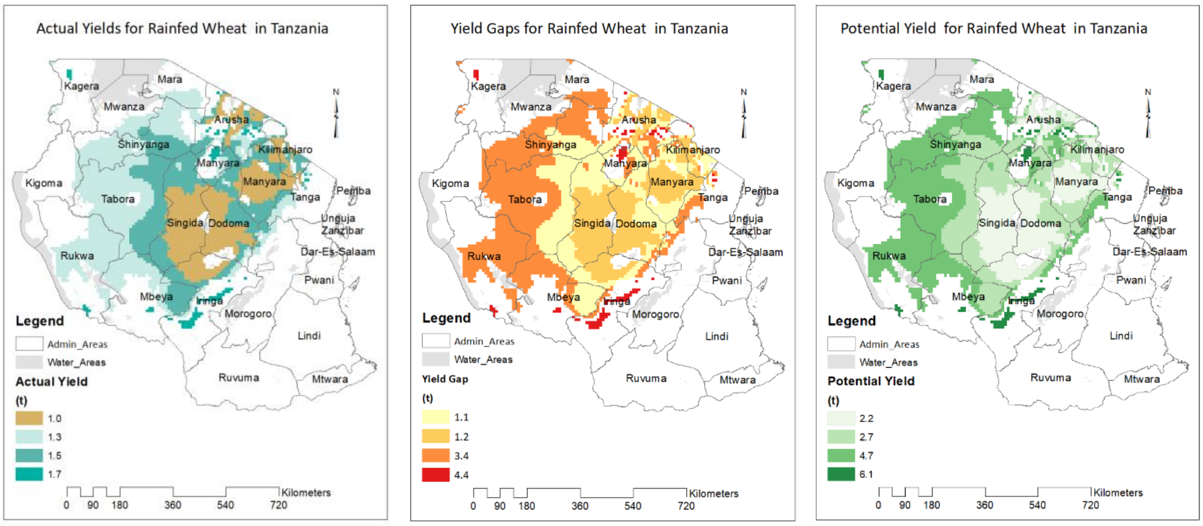
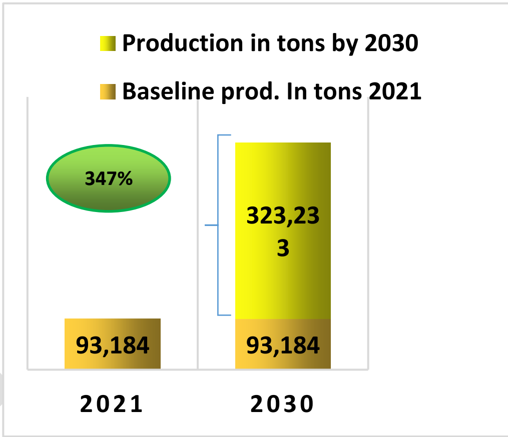


Figure 22: Potential wheat production expansion by regions.
Source of Data: Global Yield Gap Atlas

There is a huge gap between the government target and the amount currently produced. To meet the demand gap, Tanzania should put 356,681 hectares of land under wheat cultivation and increase yield to over 2.5 tons/ha. Agenda 10/30 seeks to increase wheat yield to 2.7 tons/ha and increase land under wheat cultivation by 20 percent annually to reach 152,533 hectares by 2030. This will increase total wheat production by 347 percent in a period of seven years to an annual production of 300,000 tons (Table 23).

Table 23: Current and Target Performance for Wheat

	Current	Potential	Target
Yield (Tons/ha)	1.40	4.13	2.73
Harvested area (Ha)	78,274	400,000	152,533
Total produc tion(tons)	93,184	1,651,471	416,417
Price (TZS /per ton)	1,336,040	1,336,040	1,336,040
Total value (Billion TZS)	124.50	2,206.43	556.35
Households	30,254	30,254	



Source of Data: URT (2021), URT (2017) and author's calculations

Strategic interventions to expand wheat production.

- Expand area under wheat cultivation by providing incentives, and particularly streamlining procedures for access to land and expanding irrigation infrastructure.
- Promote mechanization by enhancing access and affordability of farm machinery including tractors for planting and combine harvesters.
- Improve the access and affordability of inputs (improved seed varieties, fertilizers and pesticides) to smallholder wheat farmers by providing subsidies, incentives, and improving access to finance.
- Invest in research, development, and distribution of climate-resilient varieties of wheat suited for various agroecological zones in the country.
- Increase the number of extension officers and enhance their effectiveness through regular in-service training on modern production practices and technologies.

3.3.11 Coffee

Coffee is among the four largest export crops in Tanzania and has consistently accounted for about 5% of total export value over the past three decades, generating export earnings averaging TZS 240 billion annually. The coffee sector is estimated to provide employment to 465,000 people and affect more than 3 million people directly. More than 90 percent of the country's coffee output is produced by smallholder farmers. Coffee production has stagnated in the last two decades with average production of 80,000 to 120,000 tonnes annually. Coffee yields have continued to decline. Local consumption of coffee is very small due to its relatively high price compared to tea and the preference for tea over coffee. Compared to larger estates, smallholder farmers often lack access to finance and depend more on family labour for production. The quality potential has not been fully exploited, thus contributing to low farm gate prices, and low welfare to the farmers A summary of the strengths, weaknesses, opportunities, and threats across the coffee value chain in Tanzania are outlined in table 24.

Table 24: SWOT analysis of the coffee sector in Tanzania

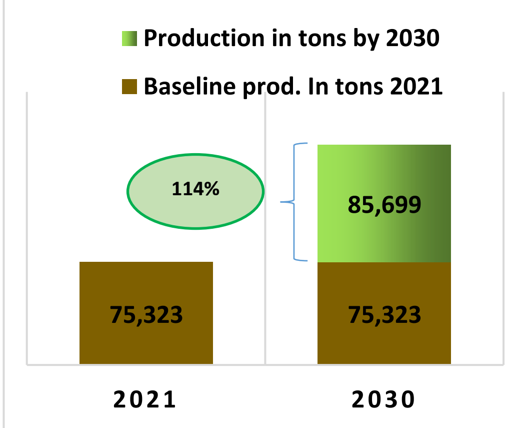
Strengths	Weaknesses
• Presence of information sharing of modern farming techniques • Provision of pesticides to farmers and fertilizers • Availability of government institutions that provide support such as policy, technological innovation etc. • Unique quality of beans from Northern Tanzania - aroma, size etc. due to nutrients in the volcanic soils • Existence of the Tanzania Coffee Research Institute	• Prevalence of old coffee trees • Low productivity and economic profitability of coffee farms • Poor agronomic practices e.g., intensive intercropping with trees • Inadequate extension advisory services • Low farm-gate prices as a result of the non-optimal functioning of internal markets • Prevalence of pests and diseases, especially coffee berry disease (CBD) • Under-exploited quality potential due to low levels of value addition • Limited access to finance to invest in the value chain
Opportunities	**Threats**
• Branding of coffee beans in the world market increases value • Potential unexploited local demand • Shift of demand to at-home coffee from carbonated drinks • Empowering women who majorly contribute to coffee-related labour	• Blending with other brands reduces value in the international market. • Volatile global prices • Climate change effects - rising temperatures and rainfall fluctuations

Potential for Intensification of Coffee Production

During the agricultural year 2019/20, 116,568 tons of coffee were harvested from about 117,534 hectares, translating to a yield of about 1 ton/ha (Table 25). Large private estates reach yields up to 2.5 tons/ha because of intensive cultivation using irrigation and fertilizers, while smallholders reach an average up to 0.25 - 0.3 tons/ha. The average yield is low compared to other best producers that reach a yield of 2.4 tons/ha. Through the Agenda 10/30 initiative, the government aims to increase coffee yield to 1.37 tons/ha by 2030. This will result into 114 percent increase in total production.

Table 25: Current and Target Performance for Coffee

	Current 2019/20	Potential	Target
Yield (Tons/ha)	0.64	2.40	1.37
Harvested area (Ha)	117,534	159,280	117,534
Total production (tons)	75,323	382,272	161,021
Price (TZS /per ton)	5,457,263	5,457,263	5,457,263
Total value (Billion TZS)	411.06	2,086.16	878.74
Households	465,216	465,216	



Source of Data: URT (2021), URT (2017) and author's calculations

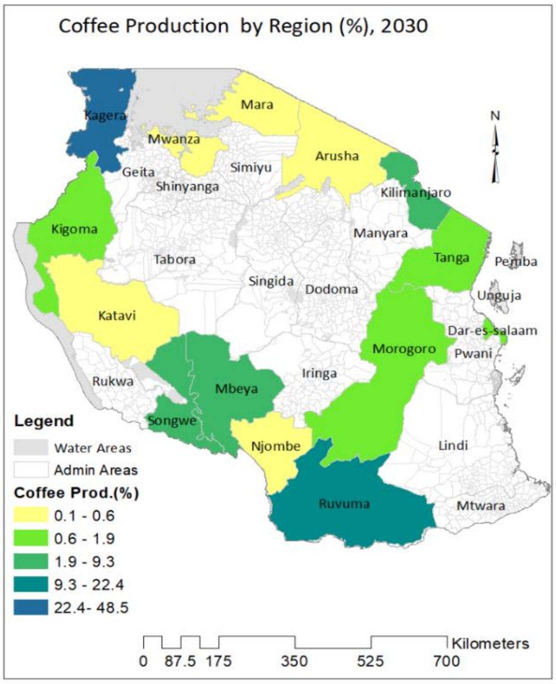


Figure 23: Potential coffee production expansion by regions

Source of Data: URT (2021), URT (2017) and author's calculations

Tanzania's exported coffee worth TZS 568.8 billion in 2022/23. Increased production from agenda 10/30 investments is expected to raise the value of exports to over TZS 800 billion annually by 2030, estimated at constant prices.

From 2018, the government has supported the distribution of high-yielding arabica coffee seedlings which replaced older varieties in existing plantations. Some of the seedlings have since matured and are poised to enter the highest-yielding period of their three-year cycle. The government has set ambitious goals to increase overall coffee production; most of its efforts have focused on improving yields in existing plantations as opposed to expanding acreage. Traditional coffee production regions of Kigoma, Kagera, Kilimanjaro, Arusha, Tarime, Mbeya, Songwe, Iringa and Ruvuma are expected to contribute significantly to the projected growth (Figure 23).

Strategic interventions to increase coffee in Tanzania.

- Scale up the production and supply of climate-smart and high-yielding coffee seedling varieties.
- Promote the rejuvenation and replanting of old coffee trees with improved and disease-resistant varieties.
- Improve access and effectiveness of extension advisory services focussed on training farmers on modern technologies, and good agricultural practices, including proper pruning and shade management, to improve coffee quality and yield.
- Strengthen the capacity of Coffee Research Institute and support other research institutions to scale up research in high-yielding and disease-resistant coffee varieties suitable for various agro-ecological zones in Tanzania.
- Develop and implement programs aimed at strengthening the capacity of coffee cooperatives to support farmers in production, and investment in value addition and marketing.
- Improve access and affordability of financing through cooperatives to support farmers in purchasing inputs.
- Establish market information systems and fair and transparent coffee pricing mechanisms to ensure farmers receive fair prices for their produce.

3.3.12 Avocado

Avocado is a relatively new crop that Tanzania started exporting in 2009. Currently, there are only two companies that produce avocados commercially, both located in the Kilimanjaro region and jointly producing more than 5,000 tonnes per year. The rest of the growers are smallholder farmers. The popular avocado varieties produced in Tanzania are Hass, Fuerte, Pinkerton, and, to some extent, Puebla. Table 26: SWOT analysis of the avocado sector in Tanzania below is a summary of the strengths, weaknesses, opportunities, and threats across the avocado value chain in Tanzania.

Table 26: SWOT analysis of the avocado sector in Tanzania

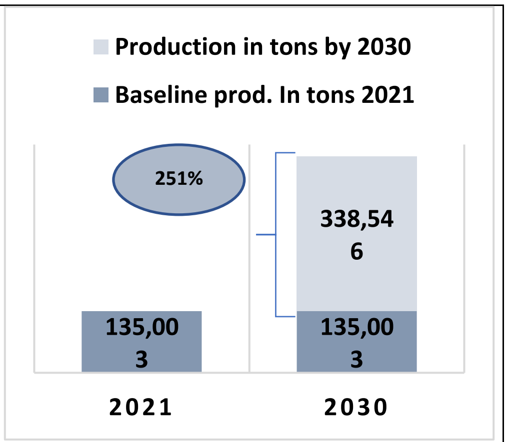
Strengths	Weaknesses
• Suitable climate to support avocado production. • Presence of research institutes to develop high-yielding seedlings – TARI-Tengure that promotes and coordinates all horticultural crops. • Avocados are commercially valuable and attract investment.	• Low farmers' understanding of Good Agricultural Practices (GAPs) that are paramount to the export market. • High cost of compliance (taxes/fees/levies, standards) • Lack of quality packaging materials in the country. • Low quality relative to required international standards. • Lack of production inputs like processing and packaging machinery • Unavailability and poor cold storage facilities • Haulage-related non-tariff barriers (NTBs) • Low entrepreneurship skills in the sector
Opportunities	**Threats**
• Availability of export market in Asia, Europe, America and other African countries • Several uses for the fruit, including integration with other sectors like assorted salads (foodstuffs), cooking oil, cosmetics, soap products	• High supply to the world market from South America • Complex and difficult international food and social standards

Potential for Intensification of Avocado Production

Tanzania's avocado yield at 6 tonnes per ha is very low relative to leading producers such as South American countries above 15 tons/ha and Kenya which averages 10-15 tons/ha. Through the agenda 10/30 initiative, Tanzania targets to raise yields to 10.8 tonnes/ha by 2030 and increase the area under avocado cultivation by 10 percent annually to reach 43,000 hectares by 2030(Table 27). This will result in an increase by 251 percent compared to the current level of production.

Table 27: Current and Target Performance for Avocado

	Current	Potential	Target
Yield (Tons/ha)	6.00	16.00	10.80
Harvested area (Ha)	22,500	811,733	43,847
Total product ion (tons)	135,003	12,987,728	473,548
Price (TZS/per ton)	1,800,000	1,800,000	1,800,000
Total value (Billion TZS)	243.01	23,377.91	852.39



Source of Data: URT (2021), URT (2017) and author's calculations

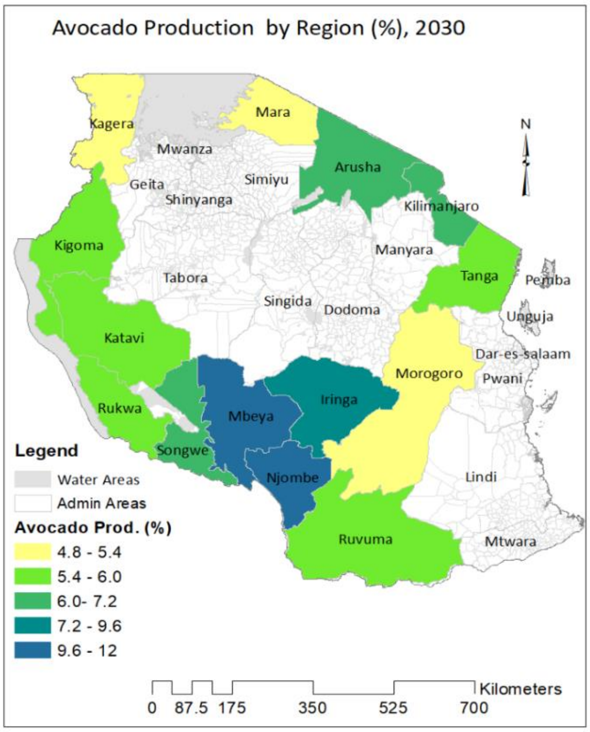


Figure 24: Potential avocado production expansion by regions.

Source of Data: URT (2021), URT (2017) and author's calculations

In Tanzania, avocados are grown in middle and highland areas with cool temperatures ranging from 10 to 23 degrees Celsius, rainfall ranging from 600 to 1600mm, and altitude of between 600 to 3000 meters above sea level. Avocados are mostly grown in Arusha, Kilimanjaro, Mbeya, Songwe and Njombe. Tanzania's prominent avocado-producing areas are in the regions of Mbeya, Njombe, Songwe, and Iringa in the southwest, as well as in Kilimanjaro, Arusha, and Tanga in the northeast of the country. The other regions are Kigoma and Kagera in the northwest and Morogoro in the east of Tanzania (Figure 25).

Strategic interventions to increase avocado production.

- Implement a nationwide avocado campaign to popularise avocado production and to train farmers on the proper production and management of avocado trees.
- Support and certify village youth entrepreneurs to provide farm services (spraying, grafting, pruning) and multiply grafted avocado seedlings and link them to buyers (cooperatives and farmers).
- Establish a system for certification and quality control systems for production, transportation, processing (sorting, cleaning, grading, packaging), sanitary and phytosanitary, and storage to ensure avocados meet international standards.
- Provide incentives and affordable financing to the private sector to expand avocado value chain infrastructure, particularly cold storage and transportation, processing, and packaging machinery.
- Streamline tax and levy structures as well as haulage-related non-tariff barriers (NTBs) to reduce the compliance burden for avocado farmers and exporters).
- Establish and empower farmer cooperatives to support farmers in production, access to inputs, and marketing of produce outside the country.

3.3.13 Soya Beans

Soya bean is an important crop due to its nutritional value and its wide utilization for household as well as industrial uses. It is a major source of oil and protein in livestock feeds and human consumption. Soya also provides inputs in industrial products such as soy inks, non-toxic adhesives, candles and paints. Soya bean-fortified products are considerably cheaper than other sources of high-quality protein, such as fish, meat, milk, and other protein-rich legumes. Therefore, soya bean is suitable for areas where other protein sources are unavailable or too expensive. Demand for soya beans by the animal feed industry is higher than domestic supply, forcing animal feed processors to import soya cake from India, China and Zambia.

Soya bean production in Tanzania is dominated by smallholder farmers characterised by minimal commercialisation, non-use of machinery, limited adoption of improved seeds and limited applications of pesticides to control diseases. This leads to low efficiency and high labour costs which in turn makes the cost of soya production unnecessarily high. Addressing the constraints in the soya bean value chain can enable Tanzania to tap the opportunities that are not utilised. **Table 28**: SWOT analysis of the soya bean sector in Tanzania summarizes the strengths, weaknesses, opportunities, and threats across the soya bean value chain in Tanzania.

Table 28: SWOT analysis of the soya bean sector in Tanzania

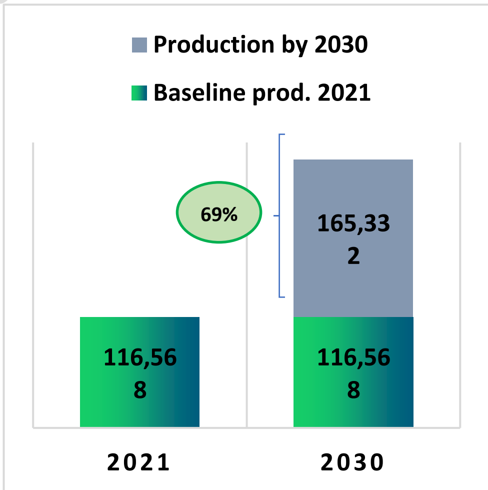
Strengths	Weaknesses
• Near organic production makes Tanzanian soya suitable for niche markets • Soya is suitable for 'fortifying' traditional staple foods and for therapeutic foods. • High dry matter yield production • High nutritional value • Soya is resilient to climate variabilities and can survive on soil residual moisture. • Some ability to disrupt the life cycle of pests and diseases	• Inadequate supply of improved, adapted varieties • Inadequate use of good farming practices such as the application of fertilisers • High post-harvest loss due to poor postharvest practices and inadequate warehouses • Limited labour supply especially for harvesting • Low soybean processing capacity • Low research funding for soya beans • Inadequate institutional and policy support for farmers adopting legume systems
Opportunities	**Threats**
• High prices during periods of shortage • Substitutability of sardines and fish meals for soya beans in poultry feed manufacturing • Low-cost production compared to other crops	• Climate change effects • Prevalence of pests and diseases • Low-cost imports that have a negative effect on local production

Potential for Intensification of Soya bean production

In the agricultural year 2019/20 a total of 44,106 tons of soya beans were harvested from about 26,000 hectares of land, translating to an average yield of 1.7 tons/ha. Despite having a favorable climate for soya bean production, Tanzania's yield compares poorly to leading producers such as Russia and the USA which have a yield of 3.89 tonnes per hectare. The agenda 10/30 seeks to increase soya bean yield to 2.87 tonnes per hectare, thereby increasing production by 69 per cent (Table 29).

Table 29: Current and Target Performance for Soya Beans

Description	Current	Potential	Target
Yield (Tonnes/ha)	1.70	3.89	2.87
Harvested area (Ha)	25,944	500,000	25,944
Total production (tonnes)	44,106	1,945,000	74,383
Price (TZS/per ton)	2,000,000	2,000,000	2,000,000
Total value (Billion TZS)	88.21	3,890.00	148.77
Households	100,000	500,000	



Source of Data: URT (2021), URT (2017) and author's calculations

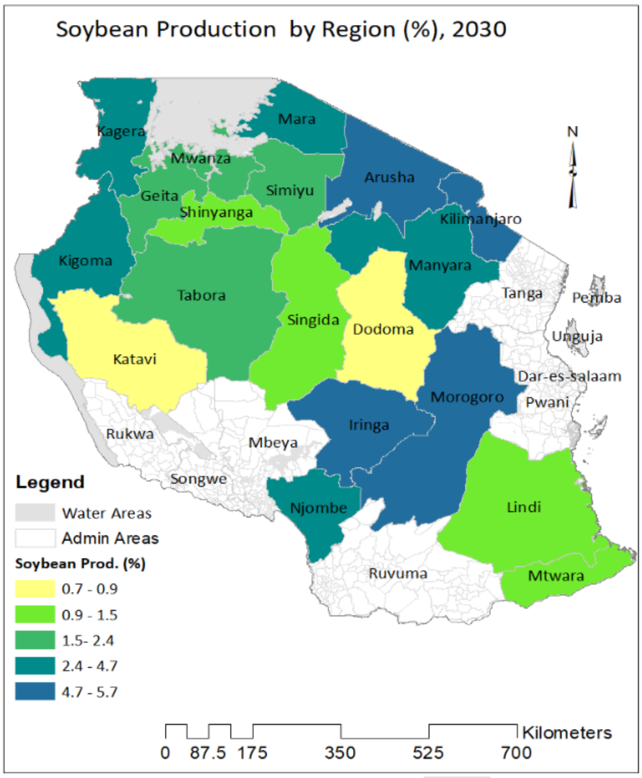


Figure 25: Potential soya beans production expansion by regions.

Source of Data: URT (2021), URT (2017) and author's calculations

To realize the best yield of soya beans, choice of proper variety, proper application of farm inputs, use of good agricultural practices, and improvement in farmers' organisation are crucial factors. Soya beans can grow in almost all areas of the country provided there is adequate moisture and the right varieties. However, there are variations in the potential of the different regions to support soybean with Mbeya, Ruvuma, Mbeya and Rukwa regions having very high potential; Morogoro, Tanga, Songwe, Morogoro, Arusha, and Kilimanjaro regions offering high potential; and Iringa, Manyara, Kigoma, Njombe and Kagera regions being of medium potential (Figure 26).

Strategic interventions to increase production of soya beans.

- Increase supply and access to affordable fertilizer and improved seed varieties.
- Increase access to mechanization particularly tractors and components including power tillers and threshers and to farmers.
- Invest in modern and efficient storage facilities that reduce levels of humidity, and contamination, and reduce post-harvest losses from pest infestation.
- Prioritize funding and capacity improvement in research and development of high-yielding and disease-resistant soya bean varieties suitable for various agro-ecological zones in Tanzania.
- Invest in market information systems to provide up-to-date information on soya bean prices.
- Strengthen Agricultural Marketing Cooperative Societies (AMCOS) as an avenue to mobilize farmers, bulk produce, and negotiate with the traders and exporters' agents.

4 Vision, Mission and Strategic Interventions of Agenda 10/30

4.1 The Vision and Mission of Agenda 10/30

Vision

Enhanced food security, wealth creation, (youth) employment and nutritional quality achieved through increased productivity and market linkages to accelerate crop sub-sector GDP growth rate from 5.4% in 2021 to 10% in 2030. This vision is aligned to the ministry vision: "Feed ourselves, feed others commercially."

Mission

To harness the untapped potential for increased productivity and market linkages, driving the crop sub-sector GDP growth rate from 5.4% in 2021 to a robust 10% by 2030 through strategic initiatives and partnerships, innovate agricultural practices, and creating an enabling environment for investment in the sector."

4.2 The Goals and Key intervention areas

Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Raise the productivity of major crops in Tanzania to at least 70% of yield potential	Reduce post-harvest losses	Improve access to local and international markets for crop produce	Implement policy and regulatory reforms to facilitate trade and value addition	Increase youth involvement in agriculture
		Intervention areas		
• Mobilisation of farmers • Improved use of modern inputs (fertiliser and improved seeds) by smallholder farmers • Mechanization of farm activities • Expand the land area under irrigation. • Improve access to extension services	• Expand storage infrastructure and equipment. • Education and awareness creation on postharvest management • Value addition and processing	• Improve and expand market infrastructure. • Improve packaging and branding of produce from Tanzania. • Attain international market standards and quality especially GAP, sanitary and phytosanitary.	• Removal of non-tariff barriers to trade • Reduction of tax burden on farmers • Tax incentives for local processing and value addition	• Implementation of the Building a Better Tomorrow (BBT) Program • Enable youth access to production factors – land, inputs, and finance.

4.2.1 Objective 1: Raise the productivity of major crops in Tanzania to at least 70% of yield potential

The productivity of the majority of crops in Tanzania is significantly below potential and comparable countries, especially in the mid-latitude zones (Figure 27). Recorded yields for the majority of crops is between 20 and 30 percent of the potential, with the exception of sorghum and soya beans that record above 40 percent.

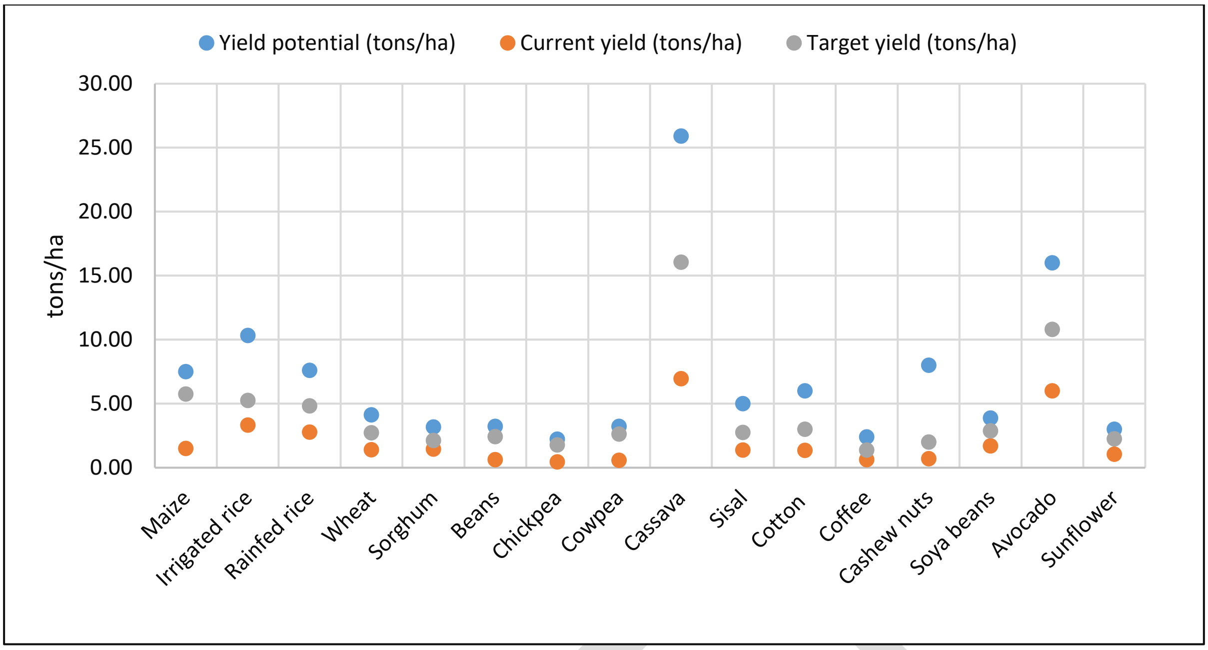


Figure 26: productivity of major crops relative to potential.

Source: Global yield gap atlas and author compilation from various sources

The vast majority of smallholder farmers in Tanzania do not have access to extension and advisory services and do not use modern and efficient machinery, agricultural inputs and technologies, limiting their productivity and efficiency.

Strategic Agenda 10/30 interventions to improve the productivity of key crops.

1. Farmer mobilisation and registration

The Challenge

Although smallholder farmers form the backbone of the agricultural sector in the country, they face a significant challenge due to their limited orientation towards an agri-business mindset. Many small farmers primarily approach farming from a subsistence perspective, focused on meeting immediate family needs rather than viewing it as a scalable business opportunity. This mindset, often rooted in traditional practices and limited exposure to modern agricultural business practices, impedes their capacity to optimise profits, access broader markets, and capitalise on emerging agricultural trends. Without the shift towards an entrepreneurial approach, these farmers remain vulnerable to market fluctuations, have limited bargaining power, and often miss value-added opportunities that can enhance their livelihoods. The transformation from mere producers to agripreneurs is imperative for the sustained growth of the agricultural sector.

Farmer registration

The government will develop and implement an electronic system for registering all farmers and the crops they produce, land sizes, location, and production systems. The database will be used for targeting services such as input supply and subsidy, extension services, soil testing, as well as tracking and ensuring effective implementation of the Agenda 10/30 Initiative.

Farmer groups and organizations

The government will strengthen the cooperative movement and rally farmers to join various groups and cooperatives to increase their collective bargaining power. The groups will be empowered to aggregate and market members' produce.

The government will establish farmer's centres for farmer cooperatives and equip them with infrastructure and capacity for produce aggregation, mechanisation, storage, and value addition. Extension officers and services will be attached to farmers through the farmer's centres.

The government will review the Cooperatives Act No. 6 of 2013 for cooperative accountability and strengthen the capacity of leadership.

Proposed flagship Project - Farmer Mobilization and Registration Project - design and implementation of an integrated electronic farmer registration system to form a comprehensive and streamlined database of farmers in the country.

2. Increased access to affordable fertilisers

The Challenge

Tanzania has one of the lowest rates of fertilizer use in the world. The use of industrial fertiliser has steadily increased over the past few years but is still far below targets and best practice (ASR 2021 & NBS, 2020 & MoA Annual Report (2021). World Bank estimates that fertiliser consumption in the last decade have oscillated between 9 Kg/ha – 16kg/ha, far below the CAADP target of 50 kg/ha. Industrial fertiliser was applied on only 20 per cent of the total cultivated in 2019/2020, while 22 per cent of households used organic fertilisers.

The government has over a long period been providing subsidised inputs to small scale farmers in an effort to improve the productivity of major crops. The National Agricultural Input Voucher Scheme (NAIVS), a market smart input subsidy program designed in response to the sharp rise in global grain and fertilizer prices in 2007 and 2008, provided smallholder farmers with a 50 percent subsidy on a one-acre package of maize or rice seed, and chemical fertilizer. The provision of the subsidy (voucher system) through commercial agro dealers encouraged the development and expansion of sustainable wholesale to retail input supply channels. However, it opened channels for fraudulent activities. The design of 50% subsidy also locked out the poorest farmers who could not afford to top up. Studies have showed that input subsidies are not sustainable if not accompanied by other measures such as correct application (e.g. through better targeting of nutrients, timeliness and improved weed control), and improved farmgate prices . The ongoing government subsidy is expected to increase access and stimulate demand. The current model of subsidy involves direct provision of subsidy a TZS 52,000 subsidy per bag of fertiliser.

Strategic interventions to increase access to affordable fertilisers for smallholder farmers.

Scale up provision of subsidised fertiliser to reach at least 50% of small-scale farmers.
The government will partner with development organisations and the private sector to scale up the fertilizer subsidy and use private wholesale to retail input supply channels while devising mechanisms to prevent fraudulent activities. The subsidy will be partial price support, while identifying the most vulnerable farmers to receive full subsidy.

Provide fiscal incentives (tax cuts and funding) to support the expansion of private sector investment in fertiliser and lime industries to manufacture and blend fertilisers in the country to reduce prices and shocks from global markets.

Promote integrated soil health and expand soil testing services by provision of mobile soil testing kits through extension service providers. The government has so far purchased 143 soil health testing equipment (Soil Scanner) that are being used by extension officers for mobile soil testing. The results of the soil testing will be input into a data base for analysis and recommendation for the right mix of inputs (seeds and fertilisers) based data on soil patterns and nutrient levels. This will facilitate development of input packages and agronomic practices tailored to specific agro-ecologies[25].

Support the introduction of trade credit guarantee schemes for agro-dealer hubs to increase the supply of affordable fertilisers to smallholder farmers.

3. Increase the use of improved seed and seedling varieties among smallholder farmers.

The Challenge

The supply of improved seeds in Tanzania is below 15% for the prioritised crops. About 76% of the cultivated area is planted with local seeds, 20% with improved seeds, and 2.5% with both local and improved seeds[26]. For example, of the over 70,000 MT of maize seed used each year in Tanzania, only 12 percent are hybrid seeds (FAO, 2015). There is a huge potential for private sector investment in the seed production sector, however, various studies (FAO, 2015; AGRA, 2019) show that existing regulatory mechanisms and structures are restrictive and involve multiple processes which hinders the innovation, adoption, and expansion of investments in the Seed Sector. The government is reforming the regulatory environment and some of the challenges are addressed in the Seed (Amendments) Regulations, 2023. Further, the cost of improved seeds is largely out of reach of many smallholder farmers. For some varieties households prefer indigenous varieties for their good taste and/or aroma, suggesting the need for R&D to develop varieties that meet such preferences.

Strategic interventions to increase the use of improved seed among smallholder farmers.

Expand the production of improved seeds and planting materials through increased funding to the agricultural Seed Agency (ASA) to scale up seed production through irrigation.

Promote Public Private Partnerships and provide credit guarantees to encourage private sector - investment in large-scale seed production, including through irrigation in seed multiplication farms.

Reform the policy and regulatory framework to eliminate bottlenecks to regulatory rules that limit investment in research, production, and commercialization of improved seed varieties.

[25] Studies have showed that input subsidies are not sustainable if not accompanied by other measures such as correct application (e.g. through better targeting of nutrients, timeliness and improved weed control), and improved farmgate prices .

[26] ASR 2021 and the NBS Agricultural Census Survey for 2019/2020

Promote the participation of the youth and women by supporting them to establish and operate certified nurseries of improved varieties of crops such as cashew, and fruit trees (avocado, citrus, mango). The operators of the nurseries will be linked to research centers to obtain improved varieties and with farmers and cooperatives to access buyers of their seedlings.

Scale up training of farmers on the use of improved seed varieties and planting materials through the extension system, farmer centers, cooperatives and farmer groups, mass media, and demonstration plots/farmer field schools to support farmers in adopting new seed varieties and using them properly.

Expand research and development of high-yielding, disease-resistant, and climate-adaptable seed varieties through the financing of agricultural research and seed multiplication and partnerships with the private sector.

Proposed flagship project - National Hybrid Seed Development and Distribution (NHSDD) Project – to enhance the supply, uptake, and distribution of improved seed varieties across Tanzania, expand seed production, enhance seed quality, and tackle prevailing challenges, including limited awareness and seed availability.

4. Agricultural mechanisation.

The Challenge

Agricultural mechanization significantly increases the amount of cropland cultivated (extensification) and is also accompanied by input intensification and a significant increase in productivity[27]. Unfortunately, mechanisation in many African countries including Tanzania has stalled over time (Figure 28)[28].

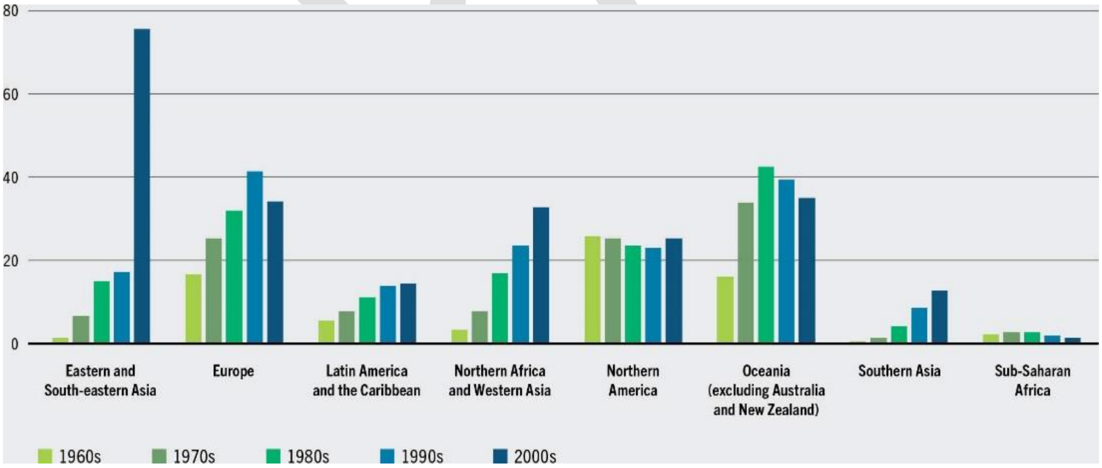


Figure 27: Tractors in use Per 1000 Hectares of Arable Land

Source: FAO. 2022.

The ASR (2021) report shows that majority of farmers (smallholders) use animal-powered ploughs and hand hoes in their farms. FAO data shows that only about 4 percent on households have access to

[27] Kirui, O. 2019. The agricultural mechanization in Africa: Micro-level analysis of state drivers and effects. ZEF-Discussion Papers on Development Policy No. 272. University of Bonn.

[28] Daum, T. & Birner, R. 2020. Agricultural mechanization in Africa: Myths, realities and an emerging research agenda. Global Food Security, 26: 100393. https://doi.org/10.1016/j.gfs.2020.100393

tractors (own plus rent) (Figure 29). Coverage of tractors is less than 1.5 tractors for 1,000 hectares of land in Tanzania. Importation of 2-wheel tractors has increased in recent years through government support. Two-wheel tractors have the potential to spur mechanization in Tanzania like happened in Asia because of their efficiency, less cost, and availability of local skills.

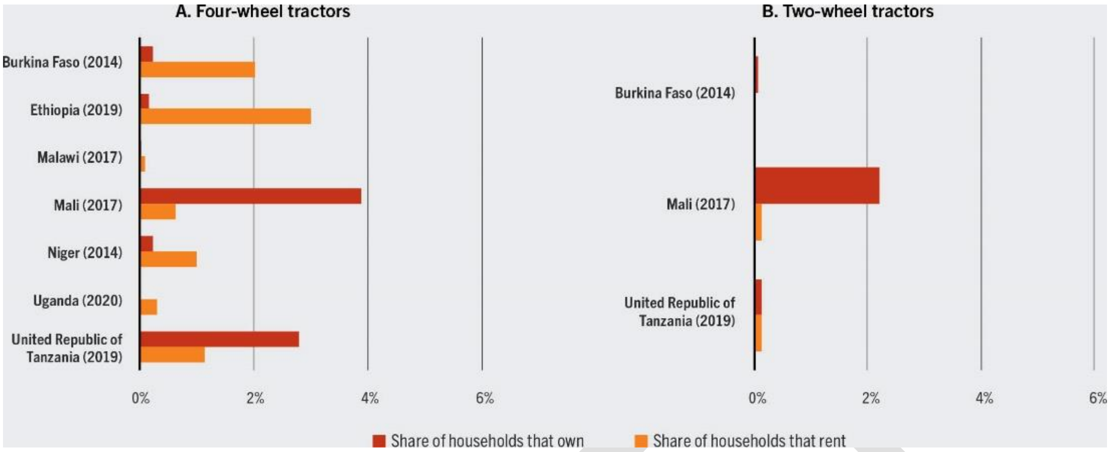


Figure 28: Share of agricultural households with access to tractors
Source: FAO, 2022[29]

Most of the agricultural machinery used in Tanzania is imported. To reduce the cost, the government has waived import tariffs and exempted from import duties as well as value-added tax (VAT) on agricultural machinery and implements.

The government aims to increase the coverage of tractors in the country from the current 1.4 tractors for 1000 hectares of land to at least 5. This will require an increase of a minimum of 5,000 tractors (both 4 and 2-wheelers) every year. As a result, the number of tractors in the countries will grow from the current 13,146 tractors to about 51,841 tractors in 2030 (Table 30). This will require the government to incentivize not only low-cost importation but also local production, especially for spare parts and components. The total spending on mechanization by the government and the private sector is expected to rise to 155 billion TZS.

Table 30: Investment requirement for agricultural mechanization to 2030

	2023	2024	2025	2026	2027	2028	2029	2030
Tractor coverage (tractors per 1000ha)	1.4	1.9	2.4	2.9	3.4	4.0	4.5	5
Number of tractors	13,146	18,674	24,202	29,730	35,257	40,785	46,313	51,841
Additional tractors		5,528	5,528	5,528	5,528	5,528	5,528	5,528
# of new 2-wheel tractors		3,870	3,870	3,870	3,870	3,870	3,870	3,869
# of new 4-wheel tractors		1,658	1,658	1,658	1,658	1,658	1,658	1,658
Cost of two-wheel tractors (billion TZS) @ 10 million TZS per tractor		38.695	38.695	38.695	38.695	38.695	38.695	38.695
Cost of 4 wheel tractors (billion TZS) @ 70million TZS per tractor		116	116	116	116	116	116	116

29 FAO. 2022. The State of Food and Agriculture 2022. Leveraging automation in agriculture for transforming agrifood systems. Rome, FAO. https://doi.org/10.4060/cb9479en.

Total cost of tractors (billion TZS)		155	155	155	155	155	155	155

Strategic Interventions to improve the level of agricultural mechanisation.

Provide tax incentives and subsidies to the private sector to scale up the supply of affordable and innovative technologies and agricultural machinery for farmers.

Engage the private sector and development partners to invest in Agricultural Mechanisation Hubs (AMHs) - centres that provide required machinery and processing services to a cluster of farmers in specific areas under supervision. From the AMHS, farmers can hire machinery such as ploughs, planters, weeders, sprayers, harvesters, and on-farm postharvest processing equipment as and when required.

Proposed flagship project - Integrated Agriculture Mechanization Hubs (IAMHs) Project – establishing a network of integrated centres that will operate a synchronised machinery rental system to provide farmers with consistent, affordable, and reliable access to pivotal equipment like tractors, power-tillers, harvesters, and planters. The hubs will be coordinated by the government and co-owned and operated by the private sector.

5. Reform and equip the agricultural extension services.

The Challenge

Extension and advisory services play an important role in such transformation and can assist farmers with advice and information, brokering and facilitating innovations and relationships, and dealing with risks and disasters[30]. Tanzania's extension officer to crop farmer ratio is about 1:1142 (table 33), which falls short from World Bank recommended standard ratio of 1:200-500 as well as below the Tanzania ministry of agriculture's standard of two extension officers per village (Busungu et al, 2019)[31]. The ASR 2021 and NBS Agriculture Sample Survey (2019/2020) showed a significant increase in the proportion of farmers with access to extension services. In 2017/2018, 31.4 percent of farmers had accessed extension services. But by 2019/2020, this number had risen to 68 percent. However, the physical presence of an extension officer in an agricultural community does not guarantee that farmers will have access to quality advisory services and improve productivity and profitability. Thus, the quality of extension and advisory services still need to be improved. New participatory and digital extension methods provide an opportunity to expand farmer reach per extension officer.

The Government has continued to expand the delivery of extension services. In the period 2021/22, the government purchased 7,000 Motorcycles for extension officers to facilitate travel, 384 tablets and 6,700 technical boxes (Extension kits) to equip extension officers for better service delivery.

Table 31: Current and target coverage of extension services

Number of farming households	**7,657,185**
The current number of extension officers	6,704
Farmer extension officer ratio	1,142

[30]

[31] Busungu, Constantine & Gongwe, Anne & Naila, Daniel & Munema, Laura. (2019). Complementing Extension Officers in Technology Transfer and Extension Services: Understanding the Influence of Media as Change Agents in Modern Agriculture. International Journal of Research.

Target farmer extension ratio	500
Total number of extension officers needed to meet national target	15,314
Additional number of extension officers required to meet the national target	8,610

Strategic Interventions to improve access to extension and advisory services.

Employ more extension officers to reduce the extension officer-farmer ratio to 1:500.
The government will employ more extension officers to reduce the extension officer-farmer ratio from the current 1:1172 to 1:500. Extension officers will be linked to farmer support centres to provide advisory services and facilitate knowledge sharing on best practices among farmers.

Table 32: Cost of achieving target extension coverage

Description	2023	2024	2025	2026	2027	2028	2029	2030
Extension officers required to meet 2030 targets	6704	7,934	9,164	10,394	11,624	12,854	14,084	15,314
Annual change in the number of extension officers		1,230	2,460	3,690	4,920	6,150	7,380	8,610
Total cost per year (billion TZS)	0	13	23	33	43	54	64	74

Equip extension officers with means of transportation and communication to increase their efficiency, effectiveness, and outreach.
The government will equip extension officers with means of transportation (motorcycles), soil testing equipment, tablets, and cell phones to facilitate the delivery of services. Training of extension officers will be expanded and tailored to specific crops.

Promote digital extension.
Digital extension methods provide an opportunity to expand farmer reach per extension officer. The Government will promote e-extension (digital extension methods) and group methods to reach more farmers and implement an electronic system of monitoring and tracking. The Government will continue to register farmers on digital platforms such as M-Kilimo to enable extension staff and other actors to access and reach farmers more efficiently.

Proposed flagship project - Strengthening Extension Services Project (SESP) – to equip and digitalize extension services by equipping extension officers with soil health testing equipment, extension kits and motorcycles fitted with GPS devices motorcycles for monitoring**.**

6. Expand Irrigation services.

The Challenge

Rain-fed agriculture is by far the most common production method in the country. According to the ASR (2021) the total arable land under irrigation reached 695,045 ha in June 2021 from the baseline of 475,052ha in 2017/2018: representing an increase of 46.3 per cent during the period vs the set FYDP II target of 1,000,000 ha by 2020. By 2022, the area under irrigation had expanded to 727,280.6 ha. Although this is already 60.6 percent of the 1,200,000-ha target by 2025, it is still only 2.5% of potential of 29.4 million ha that can be irrigated. This is not tenable, given the increasing frequency of extreme weather events (especially droughts) caused by climate change. The Government plans to irrigate 1.2 million hectares by 2025 in a programme to be implemented by the Tanzania Irrigation Commission. The Agenda 10/30 target for irrigation is to double the area under irrigation from the current 727,280 hectares to a minimum of 1.4 million hectares. Given the estimated cost of installing irrigation infrastructure of TZS 12.88 million per hectare, the expansion of irrigation is expected to cost a total of approximately 9 trillion TZs. This will require an annual allocation of 1,237 billion TZS from public and private sources.

Table 33: Cost of expanding irrigation coverage under Agenda 10/30

	2023	2024	2025	2026	2027	2028	2029	2030
Current irrigation coverage (000' hectares)	727.3							
Area under irrigation (000' hectares)		823.4	919.5	1,015.6	1,111.7	1,207.8	1,303.9	1,400
Cost of setting up new irrigation infrastructure (TZS billion)		1,237.8	1,237.8	1,237.8	1,237.8	1,237.8	1,237.8	1,237.8

Strategic Interventions to expand irrigation coverage.

Revising and updating the national master plan to align with crop priorities, water resources, and growth corridors and to identify optimal locations for irrigation schemes considering the local water sources and the country's existing end-envisaged agricultural corridors.

Development of new irrigation schemes and infrastructure, and improved maintenance existing irrigation schemes. This will include financing infrastructure for new schemes, improving water pump supply chains, completing, rehabilitating, and promoting effective use of existing irrigation schemes through commercialization to generate resources for expansion and maintenance.

Incentivize private sector investment in irrigation projects and large-scale irrigation agriculture for commercial sectors such as horticulture and seed multiplication for sunflowers, soybeans, and wheat. The incentives are aimed at reducing early investment expenses to make irrigation systems more affordable by offering price incentives for drilling equipment, irrigation kits, water tanks, and solar irrigation systems.

Invest in rainwater harvesting technology and storage infrastructure such as dams, water pans and tanks and supporting and encouraging water conservation in conventional irrigation systems. The government will incentivize investment in the production and supply of climate-smart irrigation technologies and equipment such as drip and smart irrigation systems and greenhouse farming to conserve water.

Proposed flagship to expand irrigation coverage - Strategic Irrigation Infrastructure Development (SIID) Project- The SIID Project will enhance the country's irrigation system, addressing current gaps and leveraging untapped potential to combat climate change vulnerabilities through coordinated strategic scheme planning, technology, and sustainable practices, ensuring increased productivity, resilience, and commercial viability.

4.2.2 Objective 2: Reduce Post-harvest losses

The Challenge

Pre- and post-harvest losses in Tanzania make up 30-40 percent of the total annual crop production (figure 31). The largest losses occur in fruits, vegetables, root and tuber crops, because of the perishability and the poor post-production infrastructure for handling perishable produce across the country. According to the National Post-harvest Management Strategy (NPHMS) for 2019 – 2029, post-harvest losses (PHL) in Tanzania are caused by factors such as pest infestation, poor transportation infrastructures, improper storage practices, improper harvesting and drying, improper weighing and packaging, unpredictable markets, improper processing and farmers little knowledge on post-harvest handling practices along post-harvest chain. Although farmers are are aware of the causes of PHL, they are constrained by limited capacities, including finances, to mitigate the losses.

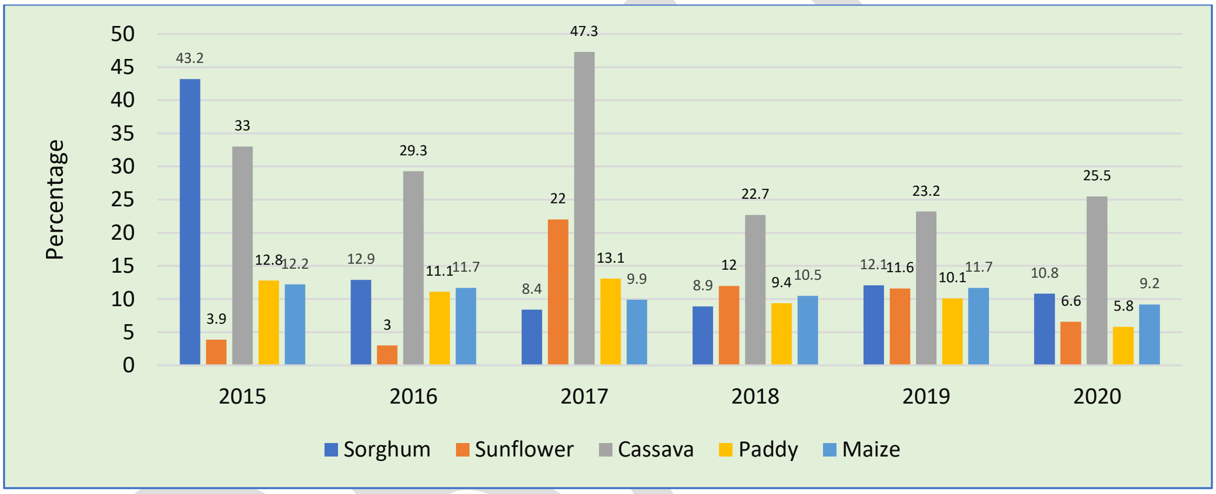


Figure 29: Post-Harvest losses (%) for selected crops in Tanzania

Source: ASR report 2021

Further, agro processing remains low, considering the country's potential to produce large quantities of agricultural raw materials. As a result, most agricultural products are sold in their raw state, and the existing agro-processing capacity is underutilised (TAIDF, 2020) due to the unreliable supply of quality raw materials; weak institutions to aggregate small farmers' production into viable volumes for off-takers/processors; low level of agro-processing infrastructure, particularly among SMEs; and, insufficient domestic demand (TAIDF, 2020; UNIDO, 2017; Mbele and Kabanda, 2018).

Strategic Interventions to reduce postharvest losses.

Construction and refurbishment of storage facilities, including silos, warehouses and micro storage units (cribs), at national, district and village levels. Some of the warehouses and storage units will be constructed in farmer centers and managed and operated by farmer groups and cooperative societies.

Promote the adoption of technologies and practices that mitigate post-harvest losses, such as the use of hermetic bags and the establishment of cold storage chains. This will be achieved through direct financial assistance to farmers and groups and by offering fiscal incentives to incentivize local manufacturing of the technologies by the private sector.

The government will support the private sector to invest in crucial logistical facilities like cold storage chains for perishable products by providing tax incentives and financing through credit guarantees and affordable finance.

The government will roll out education campaigns and programs to raise awareness of practices and management systems that prevent and control food losses across the value chains. The program will make use of the extension agents by expanding their scope and training to include post-harvest management.

Value addition and processing
Processing techniques such as canning, drying, freezing, or fermentation can extend the shelf life of perishable produce and allow for long term storage, while at the same time, diversifying markets, increasing quality and value, and increasing storage and transportation efficiency.

The government will continue to implement the **Tanzania Agro-Industrialization Development Flagship (TAIDF)** and expand the processing capacity by providing incentives to the private sector to establish and expand processing infrastructure. The government will support expansion of the cottage industry in select sectors such as sunflower and support cooperative societies to establish small to medium size processing facilities in the production zones.

4.2.3 Objective 3: Improve access to local and international markets for crop produce

The Challenge
The food crop markets in Tanzania face several challenges. These include insufficient rural infrastructure to support effective and efficient agricultural marketing, a lack of critical facilities like cold chain and storage infrastructure, the absence of well-defined marketing structures, poor linkages due to informal marketing arrangements, and inadequate communication. These factors collectively hinder access to crucial marketing information and contribute to high levels of post-harvest losses.

Moreover, recent studies in Tanzania have revealed that the majority of smallholder farmers (approximately 95 percent) lack access to proper storage facilities, resorting to storing their produce in their homes. Only a small fraction, around 5 percent of farmers, have access to improved storage facilities. Additionally, many of them are compelled to sell their grains through unscrupulous middlemen due to limited alternatives. For example, the majority of grain transactions, over 80 percent, occur through informal channels.

Strategic Interventions to improve access to markets.

1. Improve and expand market infrastructure.

The government will construct modern and well-maintained markets and storage facilities, including warehouses, cold storage units, and silos, in strategic locations throughout the country and strengthen farmer cooperatives to enable them to establish and manage storage and processing facilities.

Through Public-Private Partnerships (PPPs) and incentives, the government will promote investment in cold chain logistics, including refrigerated trucks, cooling facilities, and refrigerated storage to preserve the quality of perishable agricultural products such as fruits, vegetables, and dairy products.

2. Improve packaging and branding of produce from Tanzania.

The government will support improved packaging by offering financial incentives or subsidies to agribusinesses to invest in equipment and materials used in modern and packaging. This will include grants or low-interest loans to support the adoption of modern packaging practices and research and development to create innovative, cost-effective, and eco-friendly packaging solutions that meet international standards, while still being tailored to Tanzanian agricultural products.

The government will roll out international marketing campaigns that promote Tanzanian agricultural products with a strong emphasis on branding and encourage farmers and producers to create unique, recognizable brands that convey the quality and origin of their products.

The government will develop packaging standards and regulations to ensure that all agricultural products meet certain quality and safety criteria such as labelling, size, materials, and hygiene. This will be complemented by education on international quality and safety standards for packaging.

3. Support to farmers and agribusinesses to meet international market standards and quality.

The government will provide technical assistance and training to Tanzanian businesses to meet the standards and requirements of global certifications like organic, and fair trade, and add geographical indications that increase the value of Tanzanian agricultural produce.

The government will facilitate market access by negotiating favorable trade terms/agreements with trade partners, supporting export promotion, and connecting agribusinesses with domestic and international markets. This will include supporting trade missions and participation in international trade fairs.

4.2.4 Objective 4: Policy reforms to facilitate trade and value addition

The challenge

The existing policy frameworks pose a challenge to value chain actors, affecting their efficiency, access to production factors, and access to markets[32]. In addition, frequent changes in agricultural (especially trade) policies and regulations regularly creates uncertainty for farmers and investors as they affect long-term planning and investment. In addition, the lack of secure land rights can discourage farmers from long term investments and adoption of modern, large-scale farming practices. Further, the general procedures and challenges faced by the traders in obtaining export permits related to the institutional framework whereby the trader requires permits from several institutions such as the Ministry responsible for Agriculture, the Crop Boards, Local Government Authorities, Ministry responsible for Trade, Tanzania Revenue Authority, Tanzania Bureau of Standards, Tanzania Foods

[32] AGRA. (2019). Agricultural Policy Reforms in Tanzania : reform on registration and access for new seed propagation, fertilizer industry regulations on registration and supply, contract farming and agricultural marketing.

and Drugs Authority and the Tanzania Atomic Energy Commission (TAEC). Most of the institutions are located in Dar es Salaam leading to delays and higher travel costs. On seed, the national regulatory mechanisms and structures for access to the Registered Public Varieties, seed certification and release and quality assurance involve multiple processes among different organs of the government. Consequently, it hinders the growth and expansion of investments in the Seed Sector.

Strategic Interventions to reform policies and laws that hinder the growth of the agriculture sector.

Streamline the process of issuance of export permits.
The government will enact a policy and law to streamline and support marketing and in particular the export of agricultural commodities. The legislation will aim at streamlining the issuance of export permits with a view to making the process more efficient, fair, transparent, and closer to the traders and the export points. Further, the law will eliminate non-tariff barriers, remove bureaucratic hurdles, and provide for a predictable and friendly trading environment.

Provide incentives to support mechanisation and value addition.
The government will provide tax incentives, including tax breaks or reductions in import duties and taxes on farm machinery, equipment, and raw materials used in value addition processes. Further, the government will allocate finances to support low-interest loans, credit guarantees, or grants for value addition infrastructure, machinery, and research and development on value addition technologies, product development, and process optimization.

4.2.5 Objective 5: Increased youth participation in agribusiness

The Challenge
In Tanzania, approximately 75% of the population is comprised of youth (individuals aged between 15 and 35) and children (those under 15 years old). Among this demographic, youth make up 67% of the active labor force. However, a significant portion of them face challenges related to unemployment, underemployment, or precarious work conditions.

Agriculture provides an opportunity to create decent jobs for the youth. However, their meaningful engagement in the sector is constrained by factors such as limited access to land, inadequate infrastructure, restricted credit opportunities, subpar access to improved agricultural inputs, limited market access, insufficient skills, an unfavorable business environment, and negative perceptions regarding the role of agriculture in fostering sustainable livelihoods.

Strategic Interventions to Increase Youth Participation in Agriculture.

Implementation of the Building a Better Tomorrow – Youth Involvement in Agriculture (BBT-YIA) program that identifies and promotes youth engagement through technology, innovation, entrepreneurship and the adoption of advanced farming practices. It is estimated that implementation of the BBT Program will cost TZS 180 billion.

The interventions to be implemented under the BBT program are:

Development of youth agri-parks as centers of excellence in modern agriculture, agro-processing, and value-addition.

Establishment of youth agribusiness incubation centres that provide training, mentorship, and access to resources and technologies necessary for modern commercial agriculture.

Roll out of financial products and incentives targeted to young farmers to young individuals engaging in modern commercial agriculture, agro-processing, and input supply. This will include grants, low-interest loans, and tax breaks tailored to youth-led agribusiness ventures.

5 Implementation Framework for the Agenda 10/30 Roadmap

5.1 Institutional Framework

The ASDP II institutional framework[33] will support the implementation to achieve Agenda 10/30. The centre of activities will be in the Ministry of Agriculture (MoA). As such, all government ministries, agencies and departments under the ASDP II that focus on the crop sector will be involved in the Roadmap, particularly in connection with the selected 13 priority crops.

5.1.1 Coordination of Implementation

The *Roadmap 10/30* mainly focusses on the crops sector. Hence, it will be implemented by the MOA. This will utilize the existing Decision-Making Organs of the Ministry and in PORALG at different levels of implementation.

The MoA will oversee and drive the implementation of the roadmap, prepare detailed annual plans and budgets as part of the Ministry's Annual Budget and involve and appreciate the investments to be made by other partners, including the development partners and the private sector, including farmers; Review and approve operational plans, budgets, implementation, monitoring and evaluation reports; Facilitate and approve the establishment of Roadmap of Agenda 10/30 funding strategies; driving and coordinating the effective implementation of the Roadmap with all actors and stakeholders; seeking and reviewing and scrutinising the implementation and performance of the Roadmap to achieve Agenda 10/30 performance and recommend to the Government on courses of action.

MoA in the implementation will partner with various Government Ministries, Departments and Agencies (MDAs), the private sector, farmers' organisations and development partners depending on the relevance of their mandates and capacity to support the various KRAs and activities and leveraging on the available resources.

The President's Office – Regional and Local Government (PO-RALG) will be an essential active partner in implementing the Roadmap 10/30. PORALG will coordinate Regions have clear plans to implement the Roadmap. The Regional Commissioners, with the active support of the Regional Consultative Committee (RCC), will play a critical role: To consider and ensure that Local Government Authorities include developing respective interventions and plans to implement the roadmap to achieve Agenda 10/30; To mobilise the local authorities to implement their Roadmap activities; To monitor and ensure the activities are efficiently and effectively coordinated in the Region and LGAs are well backstopped. The District Agricultural Development Plans (DADPs) will be a key tool for implementing the activities of the LGA. Therefore, the LGAs are tasked to include the relevant activities in the DADPs and their annual budgets.

Implementation of the Roadmap to achieve Agenda 10/30 at LGA will be in accordance to the established vertical coordination from PO-RALG to RSs and LGAs. At the district level, the District Consultative Committee (vi) Full Council, (vii) Ward Development Council, (viii) Village Council Meeting, and (ix) Village Assembly will all play their expected roles in the implementation of the roadmap. All these levels will be appropriately sensitised and informed on the roles during the mobilisation stage of the roadmap implementation. The levels will have their performance monitored and evaluated against the performance targets set for each Region, District and Ward by the Government (MoA).

[33] See the ASDP II implementation manual.

Effective coordination of the roadmap implementation will be done at two levels: national and by crop. Coordination at the national level shall be as described in this document in a later section. It seeks to align with other initiatives and efforts and to align, mobilise and leverage public resources and private investments needed to achieve the desired results. All the Ministry's departments, agencies, and other relevant sectors will be actively engaged/involved.

Coordination at the crop level will adopt a whole value chain approach. It will enable stakeholders to identify and solve significant concerns, such as pests and diseases, and to design strategies to increase crop productivity and quality in line with the roadmap's focus. The coordination will involve crop associations and other actors in the value chain.

The main strategic actions to enhance national and crop-level coordination of the roadmap:

1. **Establish a Roadmap Coordination Unit in the MoA.**
2. **Appoint a MoA coordinator for each of the 13 crops in the roadmap:** He/she should be knowledgeable of and experienced in the value chain and shall be responsible for supervising the implementation of the crop-specific action, ensuring adequate resources are mobilised, and detecting and addressing any coordination concerns.
3. **Develop a detailed implementation approach and action plan for each of the 13 crops**: This will outline crop-specific objectives, timetabling, implementing actors and coordination measures and structures, etc.
4. **Enhance monitoring data collecting and evaluation:** This should allow policymakers and other stakeholders to make informed decisions and target interventions and adjustments effectively. It should also promote collaboration and knowledge sharing among farmers, extension officers, lower and higher local government, MoA, and other stakeholders. It should also facilitate identifying and sharing new knowledge and best practices for enhancing farm productivity and profitability.

5.1.2 Quality Assurance, Deployment and Roles of Extension Officers

The roadmap's success highly depends on getting farmers to actively apply improved inputs and GAPs and operate in a business manner. Through the Roadmap, the government is implementing measures designed to ensure competent and motivated extension officers are deployed to support each priority crop in every targeted location. The government will provide regular training and capacity-building opportunities for crop extension officers to keep them up-to-date on the latest technologies, farming practices, policies and how to build farmers' business and entrepreneurial skills. It will ensure they have the knowledge and skills to effectively communicate with farmers and provide them with the necessary support. Recruitment and deployment of more crop extension officers to rural areas where they are most needed will help improve the reach and effectiveness of agricultural extension services in the country. The necessary resources, such as transportation, communication tools, and office equipment, shall be provided to the extension officers to facilitate efficiency.

The Government will urgently establish a system for monitoring and evaluating the performance of crop extension officers to ensure that they are meeting their targets and providing the necessary support to farmers, particularly regarding the Roadmap to achieve Agenda 10/30.

The government will also create incentives and motivation schemes for crop extension officers to encourage them to perform their duties effectively. This could include performance-based bonuses, recognition programmes, and opportunities for career advancement.

The crop extension officers will be required and expected to collaborate with farmers and involve them in the development and implementation of agricultural extension programmes to ensure the services provided are relevant and responsive to the needs of farmers.

The Government shall deploy a digital platform to track and follow up on the performance of all extension officers and participating farmers. The system, which will entail integrating tools such as mobile applications and online platforms, will likewise facilitate communication and knowledge sharing between crop extension officers and farmers. This is crucial to ensure the efficiency and effectiveness of the agricultural extension services and farmers.

The quality of the produce is vital to enhance marketing. The value chain actors shall be trained on ensuring good quality products, and in some cases, traceability aspects shall be incorporated for a few niche markets.

5.1.3 The Roadmap Coordination Team (RCT)

A Roadmap implementation Coordination Team (RCT) will be formed in the MoA. RCT shall report to the Permanent Secretary of MoA. It will provide a professional platform for overall planning, coordination, and facilitation of the roadmap activities. Specifically, it will maintain overall responsibility for management and supervision of the Roadmap to achieve Agenda 10/30, including i) preparation of the Annual Work Plans and Budgets for approval by the Ministry, ii) execution of the approved work plan and budget, iii) procurement of goods, works and services; iv) financial management and accounting; v) monitoring and reporting; vi) knowledge management (preparation of reports and other knowledge products related to the Roadmap implementation); vii) resource mobilisation for the Roadmap and viii) facilitating compliance with environmental, gender and other social safeguards. It will also review and update an implementation manual for the Roadmap.

The **composition of the RCT** will include (i) a **Roadmap Coordinator** (RC), (ii) **13 Value chain/crop champions,** (iii) an **M & E Specialist**, (iii) **a Specialist in crop Agriculture Transformation**, and iv) **Specialist – Resources Mobilisation for Agricultural Transformation.** This staffing structure will ensure that the implementation of the roadmap to achieve Agenda 10/30 is well supported by specialists and coordinators who can advise and drive the implementation. Furthermore, MoA will enable RCT to use Ministerial staff to support the Roadmap's administrative, procurement, communication, and accounting activities.

The actual implementation of the Roadmap will be by the MoA, MDAs under MoA, PORALG, RAS, LGA and Ward-level organs responsible for implementing and facilitating crop agriculture. The RCT will work with all these levels to ensure that each level and agency has defined annual roles/agenda to implement the national Roadmap 10/30. Likewise, the RCT will work with other partners, including development partners, private sector organisations and civil society organisations.

5.1.4 Coordination by Value Chain Champions as Part of RCT

The Government will provide each of the 13 commodity value chains with a national coordinator/champion – located in the MoA (under the oversight of the RCT) but facilitated (transport-wise and funding) and empowered to link with all Regional Secretariats and LGAs implementing the Roadmap to achieve Agenda 10/30 for the particular crop. The coordinators will support efforts to enhance value chain performance. They will assist in providing training and support to extension officers, farmers groups, cooperatives, farmers and other value chain stakeholders. They will link with research institutions to enhance the research on the crop. They will also develop and enhance alliances and networks with other stakeholders in the value chain, such as farmers, extension officers, policymakers, and researchers.

5.1.5 The BBT Implementation Committee

The Ministry of Agriculture will work modalities for coordination between the RCT and the BBT coordination team.

5.2 Risks and Mitigation Strategy

The implementation of the roadmap to achieve Agenda 10/30 faces significant context and operational risks (Table 34). These must be well mitigated throughout the duration of the roadmap.

Table 34: Assessment of the Major Risks to Success of the Flagship

No	Risk	Probability of Occurrence	Mitigation Measures
1	Slow and inadequate efforts to enhance farm productivity for priority commodity value chains due to logistical and mindset challenges	H	• Ensure effective and continuous mobilisation of inputs and stakeholder participation. • Train trainers who will be engaged in periodic mindset, sensitisation and capacity-building initiatives targeted at various key actors • Institute a tracking system (preferably an e-system) to facilitate the following up actors and activities, especially the distribution and utilisation of inputs
2	Climate change and weather variability (droughts and floods) may be more prevalent, significantly impacting crop production and leading to crop failures.	H	• Promoting climate-smart agriculture practices that increase the resilience of crops to changes in weather patterns. • Stepping up irrigation interventions as part of the roadmap.
3	Outbreaks of pests and diseases could quickly spread and decimate crops, causing significant financial losses to farmers.	H	• The pest and disease management intervention in the roadmap includes integrated pest management techniques.
4	Uncertain product markets and prices result in low prices and limited income.	H	• Strengthening market linkages and development of market information systems and marketing associations are interventions in the roadmap.
5	Limited access to finance, especially for small-scale farmers who do not have access to reliable and affordable financing.	M	• Access to finance: Providing small-scale farmers with access to finance, including through the development of microfinance programs and credit schemes with the private sector, is an intervention in the roadmap.
6	Reluctance of private sector investment	M	• The roadmap is conceived to create an enabling environment for private sector investment to crowd in productive and profitable crop production. This will incentivize the private sector to play an active role. At the same time, the government is implementing other various measures to improve the regulatory
4	Capacity gaps across most stakeholders in the sector	H	• The Roadmap has a strong component in the mobilization of farmers and other actors.
6	Inadequate commitment of partners to release	H	• The Government (i.e. MOFP) – through the PMO - supported by the MoA, will implement resource

No	Risk	Probability of Occurrence	Mitigation Measures
	earmarked funding for the Road’s implementation		mobilization activities to ensure constant engagement with all committed and potential sources of funding for the successful financing of the Roadmap.
7	Administrative export restrictions, especially for agricultural products, following government concerns about food security.	M	• The government has, in recent years, committed to stopping the frequent issuing of export bans
9	Coordination challenges	M	• A coordination framework managed under the MoA has been presented in the Roadmap. This is elaborated in detail in the roadmap’s implementation manual.

5.3 Monitoring, Evaluation, Reporting and Learning

Monitoring and Evaluation (M&E) is a crucial component of the Roadmap to achieve Agenda 10/30 and should be applied throughout the whole implementation period and afterwards. The purpose of monitoring is to offer the Government and key stakeholders feedback on the implementation and detect problems and successes as early as feasible to enable prompt adjustment to the program plan. M&E is also essential for confirming the achievement of the envisaged results.

Notably, the Roadmap’s monitoring and evaluation cannot be conducted in isolation from the current Government (ASDP II) and MoA’s monitoring and evaluation system and institutional arrangements; however, the Roadmap’s Coordination Unit includes an M&E specialist to support/complement the Ministry in the M&E processes. The section describes the monitoring and evaluation framework that will be used to establish and facilitate the Roadmap’s monitoring and evaluation procedures.

5.3.1 Activity and Results Monitoring Framework

Achieving the goal of accelerating crop GDP to 10% by 2030 requires a well-defined activity and results monitoring framework. Monitoring progress is key to ensuring that the strategies and interventions put in place yield the desired results. This helps to ensure that efforts and resources are directed towards the most effective interventions, implementation arrangements and modalities and that progress is made towards the desired outcome. Equally important, the framework will ensure that all stakeholders, especially farmers and extension officers, are actively and productively involved in implementing the roadmap and can be held accountable for their roles and responsibilities and that there is transparency in the decision-making and implementation processes. If these aspirations are achieved, they will build the necessary momentum for the sustainable transformation of Tanzania’s agriculture.

The framework includes two components: activity monitoring and results monitoring. Activity monitoring involves tracking the various interventions' inputs, processes, and outputs to achieve the set targets. On the other hand, results monitoring involves tracking the actual outcomes achieved about the targets set. As the activity monitoring will be continuous/very frequent, the information generated will be used as a basis for assessing the implementation and efficiency of the various interventions, while the results monitoring, which is more period, will provide a basis for evaluating the effectiveness of the interventions on the overall goal of accelerating crop GDP to 10% by 2030. Table 37 provides the input/activity/output monitoring framework. And Table 38 provides the outcomes monitoring framework.

Table 35: Inputs/Outputs Monitoring Framework

Indicators
Real state of production of selected priority crops (Crop product in tones, Price per ton in TZS, Crop value in Billion TZS, Hectares of land planted, & % of crop GDP
Productivity of selected priority crops compared to the best performer
% increase in productivity of the selected priority crops
Planned production, the value of production and growth in production between 2023-2030
BBT impact on crop production
Projected Costs of inputs for the planned increase in productivity by 2030 (For the Roadmap without BBT and BBT) vs. planned costs
Actual other costs of Implementation (Roadmap BBT inclusive) by 2030 in Billion TZS vs. planned costs
Projected cost of mechanisation and irrigation
The annual cost of Fertilizers (50% subsidy) 2024-2030 in Billion TZS vs. planned costs
Annual cost of improved seeds 2024-2030 vs. planned costs

Table 36: Outcomes Monitoring Framework

Selected Indicators
Actual Crop GDP 2024-2030 in Billion TZS (using 2022 prices) vs. Planned GDP
Profitability per hectare vs. planned
Number of Households and People who will benefit directly from the Roadmap and Regions and Districts to be covered
Annual impact of the roadmap on poverty reduction and dietary quality and jobs

5.3.2 M&E implementation manual

The Ministry, through the RCT, will immediately develop a manual for the M&E. The manual will guide the operationalisation of the framework, and it should include methods and tools for data collection, analysis, and reporting, as well as methods for monitoring and evaluating the progress of the roadmap. The manual should outline the key indicators to be tracked and provide the tools and techniques required for monitoring and evaluating the roadmap's success. The manual will also provide guidance on how to identify and address potential challenges and obstacles that may arise during the implementation of the roadmap. A feedback loop is critical, and a transparent approach to sharing lessons learned should be included in the manual.

5.3.3 Evaluations/Assessments, Reports and Reporting

Monthly internal reporting on progress and challenges will constitute process monitoring. These reports will be used by RCT and the Ministry management, and they will include potential resolutions and mitigation steps to prevent larger problems.

Compliance monitoring will review the performance of the roadmap implementation biannually for each of the seven years of the roadmap. The focus will be on whether and the extent to which stakeholders are adhering to the roadmap as designed and behaving in the day-to-day activities in support of the roadmap's implementation.

Completion report: This will be performed towards the end of the roadmap period. An independent, adequately experienced consultant shall undertake the completion report. The roadmap must be declared complete once the completion report has been concluded and any remedial actions emerging from the report have been implemented. At this point, options for the future will be assessed.

Ex-post evaluation (or post-roadmap evaluation): An external evaluation will be done three years after the roadmap to assess the impact and effectiveness of the roadmap. It should provide a thorough analysis of the results achieved by the roadmap, identify any externalities (positive /negative) and provide valuable insights into the implementation process, highlighting any challenges or successes that can be used to inform future initiatives to transform the crop sector in Tanzania.

6 Funding of the Roadmap

Implementation of Agenda 10/30 Initiative is projected to cost 39 trillion Tanzania shillings (see annexe 2). The government will finance 56 percent of the Roadmap costs (22 trillion TZS over the life of the Initiative. The private sector will finance 43 percent (equivalent to 17 trillion TZS) and donors will finance 1 percent (equivalent to 371 billion TZS. The largest proportion of government funding will be allocated to subsidies for fertilizer and improved seeds. The government will also finance in the form of subsidies for interventions such as mechanization. It is also expected that the government will finance about 80 percent of irrigation cost. The private sector (including farmers) will incur costs of fertilizer and improved seeds, mechanization, pesticides and storage. The government will rely on donors to finance a significant proportion of the costs towards mobilisation and registration of farmers, extension services, marketing and branding, and research.

The following strategies shall be used to catalyse public and private investment in selected crop sectors.

6.1 Improved targeting of public funding.

The Government will ensure that public funding for the crop subsector is better targeted and prioritised. The IFPRI (2023)[34] analysed in detail budget reallocation (budget rightsizing) for improving the effectiveness of agricultural expenditures in Tanzania. The consequence of a budget right-sizing exercise in which budgetary resources are progressively reallocated from the least effective to the highest return possibilities until the greatest weighted outcome is achieved. The budget reduction was evaluated during the ten years between 2018 and 2028 using the expenditures of $124 million that rise annually by 5%. It was shown that the country might achieve considerable advantages for the four development objectives of growth, poverty reduction, employment creation and nutrition quality by reallocating these funds most cost-effectively. For instance, the neutral weighted ranking results indicate that reallocating current resources towards higher-return investments could increase cumulative gains in GDP and agricultural GDP by one-third (from $9.2 billion to $11.9 billion) and two-thirds (from $3.8 billion to $7.5 billion), respectively (Figure 33, 34 &35). *Thus, in funding the roadmap, the Government will ensure that financing resources are allocated most cost-effectively.*

34 https://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/136687/filename/136898.pdf

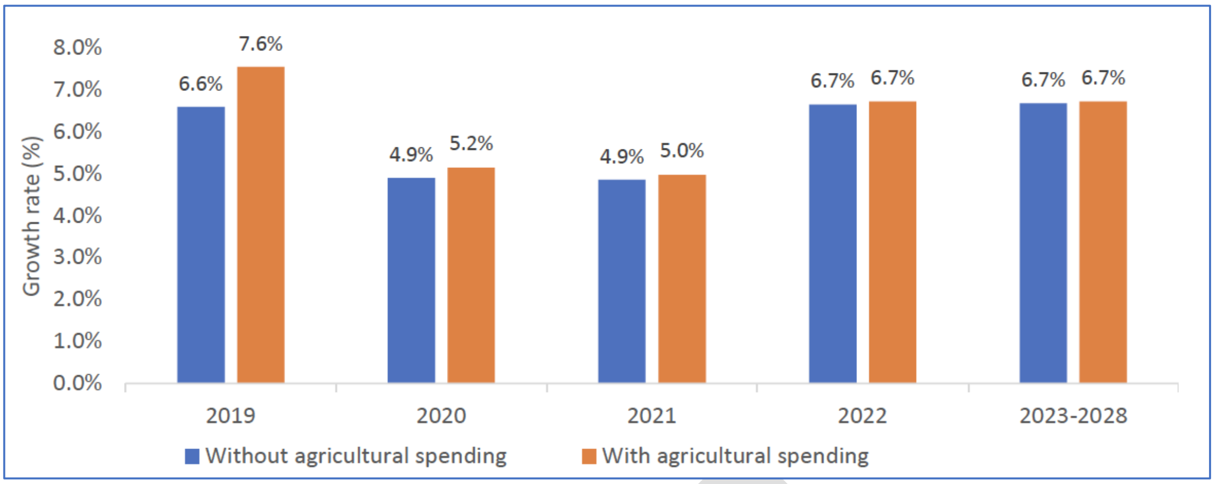


Figure 30: Growth in GDP with and without increased agricultural expenditure, 2018-2028.

Source: Tanzania-RIAPA model.

Note: The study increased agricultural and rural expenditure by $124 million from the base level. This fund increases by 5% annually.

a) Gains in GDP and other development indicators due to the budget

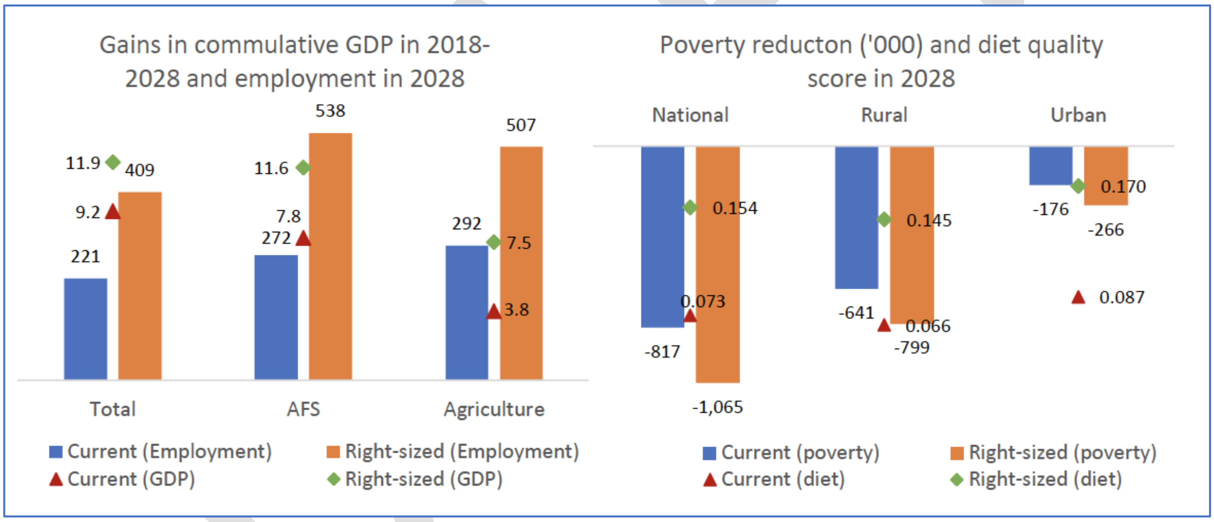
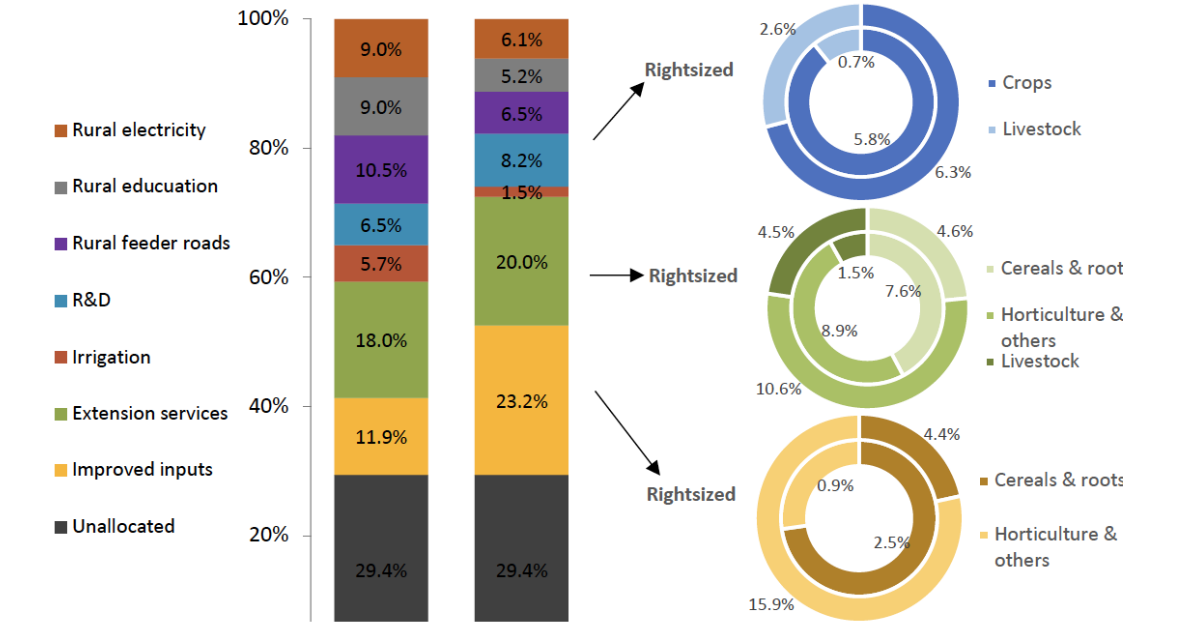


Figure 31: Rightsizing the budget for the greater weighted outcome

Source: Tanzania-RIAPA model.

b) Reallocation of the total budget



Source: Tanzania-RIAPA model.

Figure 32: Rightsizing the budget for a greater weighted outcome
Source: Tanzania-RIAPA model.

Moreover, the Government will increase public investments in the agricultural sector, particularly in public goods such as research, extension services, irrigation, and resilience to climate change. By increasing public investments in these areas, the sector's development can become more equitable and sustainable, thus allowing Tanzania to meet its Vision 2025 goals. Although the overall public expenditures on agriculture are modest, most of the budget targets promoting sector development through public goods. However, due to the constrained agricultural budget, essential public services required to spur farm transformation have been underfunded, which calls for an increase in financing to meet the levels required for their realisation.

6.2 Promote Government and Development Partners Collaboration

Given the magnitude of the investment required for adequately funding the Roadmap for agenda 10/30, the government and development partners will fund facilitative investments, while the private sector will fund productive investments. The Government and development partners will promote the mobilisation of facilitative investments and create an environment conducive to private investment in the selected priority value chains. It is thus paramount to have effective Government and Development Partners' collaboration to fund the roadmap's facilitative investments. This will be accomplished using the present institutional structure of ASDP II and MoA.

The Funding Mechanisms to be adopted for facilitative investment will include government budgetary funding, basket funding, and extrabudgetary project assistance. Development Partners (DPs) are progressively aligning their assistance with national programmes, using national processes, enhancing the predictability of financing, and unifying procedures and reporting systems to decrease transaction costs. Public sector resources will be channelled to implementing partners via the government budget. A portion of DP financing will also be allocated via the government's budget, with the remainder allocated off-budget.

The government will consider incentivising private-sector agricultural investment through tax measures and subsidies for agricultural inputs. Additionally, the government will focus on creating an enabling environment for businesses in the agricultural sector.

6.3 Enhance private sector investment mobilisation for the crop subsector.

Private sector investment mobilisation/deployment will be facilitated through various measures, including catalytic funding, patient capital, credit guarantees and development finance.

Government catalytic funding: The Government will create a catalytic fund to support the implementation of the Roadmap for agenda 10/30, focusing on attracting private sector investors into commercial crop production. The fund will provide co-investment to private-sector investors interested in commercial crop production. This is expected to reduce the investment risk for private sector investors and encourage them to invest in commercial crop production. The fund will also provide technical assistance to private-sector investors interested in commercial crop production. In collaboration with the development partners, the government will provide seed capital funds to support the acquisition and finance bridging loans for crop production up to processing.

Patient Capital: The government would help development partners prepare to create institutions to offer patient capital - long-term, low-cost, subordinated seed funding to promote commercial agricultural production focusing on priority crops. The patient capital is anticipated to spur more private-sector investments in crop production, processing, and marketing by decreasing the costs and risks of commercial agriculture.

Credit Guarantee Schemes: Government will strengthen existing credit guarantee schemes to promote commercial agricultural production. The schemes will be designed and supported to increase loan guarantees' availability to help leverage domestic banking sector capital into crop production, processing, and marketing.

Development Finance: The development banks in the country, especially Tanzania Agricultural Development Bank (TADB) and Tanzania Investment Bank (TIB) will be engaged in providing increased financing for commercial crop production, processing, and marketing activities to promote economic development. The support will be for long-term financing for development projects. In this case, loans will be provided to farmers, processors, and marketers to invest in equipment, infrastructure, and other inputs needed to grow their businesses. TADB and TIB will be guided to have specific lending criteria and guidelines that borrowers align with the priorities of the roadmap.

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8 Annexes

8.1 Annexe 1: Agenda 10/30 summary production and productivity targets

Description	Maize	Rice	Wheat	Sorghum	Cashew nuts	Sun-flower	Sisal	Cassava	Pulses	Coffee	Cotton	Avocado	Soya bean
Current production ('000 tons)[1]	6,536.32	3,443.61	93.18	650.50	391.12	504.42	61.35	1,770.81	2,236	75.32	331.52	135.00	44.11
Current yield (tons/ha)[2]	1.50	2.32	1.40	1.45	0.70	1.05	1.38	6.94	1.60	0.64	1.34	6.00	1.70
Current area under production ('000 ha)[3]	4,345.27	1,485.13	78.27	447.57	560.73	481.64	44.52	255.01	1,397.50	117.53	246.53	22.50	25.94
Current hybrid seed use ('000 tons[a]/seedlings[b]/cuttings[c])[4]	10.43[a]	1.61[a]	9.78[a]	0.17[a]	84,109[b]	1.33[a]	20.76[b]	8,111[c]	0.15[a]	20,000[b]	3.96[a]	4,500[b]	0.22[a]
Target yield (tons/ha)[5]	5.76	6.00	2.73	2.12	2.00	2.25	2.76	16.07	2.28	1.37	3.00	10.80	2.87
Target production with increased yield and land ('000 tons)[6]	26,818	10,235	416	1,018	1,244	1,161	131	4,097	3,188	161.02	1,034.96	473.55	74.38
Target area under production ('000 ha)[7]	4,658.71	1,705.94	152.53	479.85	622.32	516.38	47.73	255.01	1,397	117.53	344.99	43.85	25.94
Target hybrid seed use ('000 tons[a]/seedlings[b]/cuttings[c])[8]	93.17[a]	59.71[a]	19.07[a]	4.08[a]	94,668[b]	4.97[a]	44,517[b]	2,550,050[c]	139.75[a]	117,534[b]	8.62[a]	8,769[b]	2.59[a]
Target fertilizer rate by 2030 (kgs/ha)[9]	250	300	200	150	-	100	100	200	150	100	80	250	200

Notes

[1]Current production data was obtained from the National Sample Census of Agriculture 2019/20 and other government sources.

[2]Current yield data was calculated from data from the National Sample Census of Agriculture 2019/20 and other government sources.

[3] Current area under production data was obtained from the National Sample Census of Agriculture 2019/20 and other government sources.

[4] Current hybrid seed use was obtained from the Ministry of Agriculture ([a] represents tons of seed, [b] represents number of seedlings of cashew, sisal, avocado, and coffee).

[5] Target yield data is based on estimated yield potential for the various crops under rain fed conditions in Tanzania. Estimation for rice includes irrigated rice. The data for yield potential was obtained from the Global Yield Gap Analysis (https://www.yieldgap.org/).

[6] Target production with increased yield and land is based on target yield and land by 2030.
[7] Target hybrid seed use is based on 100% coverage of hybrid seeds by 2030 ([a] represents tons of seed, [b] represents number of seedlings of cashew, sisal, avocado, and coffee).
[8] Target fertilizer rate by 2030 is the optimal fertilizer use in kgs/ha to attain the target yield in [5] for the various crops.

8.2 Annexe 2: Estimated costs of program implementation

Description	2024	2025	2026	2027	2028	2029	2030	Total
Estimated cost of Fertilizers for the Programme (billion TZS)	830.17	1,392.16	1,964.42	2,546.95	3,139.76	3,742.84	4,356.20	**17,972.49**
Estimated of improved seeds for the Programme (billion TZS)	475.00	840.60	1,206.19	1,571.79	1,937.39	2,302.98	2,626.85	**10,960.81**
Estimated cost of pestisides (billion TZS)	13.05	22.33	31.71	41.19	50.77	60.46	69.83	**289.33**
Cost of Expansion of Mechanization in TZS billion	154.78	154.78	154.78	154.78	154.78	154.78	154.78	**1,083.46**
Cost of additional extension services to reach 1:500 ratio (billion TZS)	12.78	22.97	33.15	43.34	53.52	63.71	73.89	**303.38**
Irrigation (billion TZS)	1,238	1,238	1,238	1,238	1,238	1,238	1,238	**8,664.63**
Estimated costs of mobilization, sensitization of farmers and follow ups,etc (billion TZS)	6.53	11.16	15.85	20.59	25.39	30.23	34.92	**144.67**
Costs of developing and expanding storage infrastructure (billion TZS)	13.05	22.33	31.71	41.19	50.77	60.46	69.83	**289.33**
Proposed improvements in value chains and marketing including branding, promotions, etc (billion TZS)	6.53	11.16	15.85	20.59	25.39	30.23	34.92	**144.67**
Crop R&D to cost 0.5% of the cost of inputs (billion TZS)	6.53	11.16	15.85	20.59	25.39	30.23	34.92	**144.67**
Total Cost (Billion TZS)	**2,756.22**	**3,726.46**	**4,707.32**	**5,698.82**	**6,700.95**	**7,713.72**	**8,693.93**	**39,997.42**
Government - public sector funding (billion TZS)	1,715.15	2,198.22	2,686.55	3,180.14	3,678.99	4,183.10	4,671.11	**22,313.29**
Private sector funding (billion TZS)	1,013.90	1,492.53	1,976.46	2,465.70	2,960.24	3,460.07	3,943.68	**17,312.58**
Donor/development partner funding (billion TZS)	27.17	35.70	44.30	52.98	61.72	70.54	79.14	**371.55**

8.3 Annexe 3: Agenda 10/30 Flagship Projects

8.3.1 Farmer Mobilization and Registration Project

Although smallholder farmers form the backbone of the agricultural sector in the country, they face a significant challenge due to their limited orientation towards an agri-business mindset. Many small farmers primarily approach farming from a subsistence perspective, focused on meeting immediate family needs rather than viewing it as a scalable business opportunity. This mindset, often rooted in traditional practices and limited exposure to modern agricultural business practices, impedes their capacity to optimise profits, access broader markets, and capitalise on emerging agricultural trends. Without the shift towards an entrepreneurial approach, these farmers remain vulnerable to market fluctuations, have limited bargaining power, and often miss value-added opportunities that can enhance their livelihoods. The transformation from mere producers to agripreneurs is imperative for the sustained growth of the agricultural sector.

The government will design and implement an integrated digitised/electronic farmer registration system to form a comprehensive, streamlined database of farmers in the country. The data to be collected will include farm sizes, types of crops grown, as well as farmer demographics.

The approach of the Project is rooted in leveraging and augmenting the existing government initiatives and structures. The project will operate within established government systems and structures. A significant component will be to ensure that farmers are seamlessly registered on the electronic farmer registration system while concurrently refining this system for better functionality and accessibility.

The data collected will be crucial for targeting of interventions such as input subsidies, extension services, and communication of extension and market information.

8.3.2 Strengthening Extension Services Project

The government has strengthened the extension services through equipping and digitalising extension services. Extension officers have been equipped with soil health testing equipment, extension kits and motorcycles fitted with GPS devices motorcycles for monitoring. Moreover, have been distributed to equip officers with essential tools. The Agricultural Communications Centre (a farmer service centre) has been rolled out to provide farmers with accessible extension services and crucial marketing information. Agricultural Training Colleges and Farmers' Training Centres are undergoing infrastructure renovations to provide optimal learning environments.

The Project aims to enhance and scale up existing initiatives to mobilise smallholder farmers for agri-business and to improve access and uptake of extension services.

Promoting farmer services centres will be pivotal, positioning them as key touchpoints for farmers to access resources, expert advice, and vital information. Furthermore, a strong emphasis will be placed on capacity-building, equipping farmers with the knowledge and tools necessary to excel in their practices. Last but not least, MoA will ensure all key institutions are well coordinated to play their role up to the local government level.

The main components of the program will include:

- Tailored training programmes for modern agricultural practices.

- Specialised training for extension officers based on specific crops.
- Equipped extension officers with necessary digital tools and transportation.
- Introduction and advancement of e-extension methods.
- Upgraded digital monitoring and accountability systems for extension services.

8.3.3 Integrated Agriculture Mechanization Hubs (IAMHs) Project

The main hindrance to increased mechanisation is the costliness of farming machinery, making it inaccessible for many small-scale farmers, who form the bulk of the agricultural community. Compounding the challenge are limited financial resources and inadequate facilities for machinery upkeep.

The **IAMHs** project will involve establishing integrated centres that will be a one stop shop where farmers can access and hire modern agricultural machinery at affordable machinery. The hubs will be coordinated by the government and co-owned and operated by the private sector. The network will operate a synchronised machinery rental system to provide farmers with consistent, affordable, and reliable access to pivotal equipment like tractors, power-tillers, harvesters, and planters.

The government's coordinating role will link other stakeholders financial institutions, machinery suppliers, spares suppliers, equipment repair service business, cooperatives, local government authorities and others.

In addition to being centers for machinery hire, the **IAMHs** will:

- Offer standardised yet adaptable training modules for farmers.
- Partner with researchers and agricultural experts to promote innovation, .
- Test, validate, and promote agricultural technologies suitable for the country’s conditions.
- Hold field days and inter-hub events will foster a culture of shared learning and innovation dissemination.
- Provide resources, training, and support to local entrepreneurs keen on contributing to the mechanisation industry.

8.3.4 Strategic Irrigation Infrastructure Development (SIID) Project

Tanzania boasts vast tracts of land suitable for irrigation, as well as vast water resources from rivers, lakes, and underground sources. However, only 2.4% of the country's potential 29.4 million ha is under irrigation, leading to a heavy reliance on rain-fed agriculture. In the 2022/2023 fiscal year, a budget of Tsh361.5 billion was set aside for crucial irrigation initiatives. These priorities encompassed the construction of 25 new scaffolds covering 53,234 hectares and 14 rainwater dams with a cumulative capacity of 131,535,000 cubic meters. Additionally, 30 existing scaffolds spanning 41,771 hectares were to be renovated and completed. Comprehensive designs were to be finalised for 22 strategic valleys and 42 scaffolds, covering 306,361 hectares and 91,357 hectares, respectively.

The **SIID** Project will aim to enhance the country’s irrigation system, addressing current gaps and leveraging untapped potential to combat climate change vulnerabilities. It seeks to do so through coordinated strategic scheme planning, technology, and sustainable practices, ensuring increased productivity, resilience, and commercial viability. The project will involve the following interventions:

- Revising and updating the national master plan to align with crop priorities, water resources, and growth corridors.
- Identification of optimal locations for irrigation schemes considering the local water sources and the country's existing end-envisaged agricultural corridors.

- Feasibility assessments, development of business plans, and Environmental and Social Impact Assessments (ESIA) for irrigation projects.
- Undertake extensive development of new irrigation schemes and rehabilitation of existing schemes.
- Increased integration of schemes with water resources management, infrastructure development (roads and power), agricultural extension, and linkages with agricultural markets.
- Increased commercialization of irrigation projects and water resources to generate resources for expansion and maintenance.
- Price incentives for drilling equipment, irrigation kits, water tanks, and solar irrigation systems to improve affordability.

While the Government will own each scheme created under the project, a fundamental principle will be their operation on a commercial basis, ensuring they generate sufficient revenue to cover all associated costs, promoting sustainability and self-sufficiency.

8.3.5 National Seed Development and Distribution (NSDD) Project

The use of improved seeds in Tanzania is under 15% for majority of crops. The government is investing seed production through irrigation and area expansion, partnership with the private sector, and regulatory reforms to attract private sector investment in seed production.

The **NSDD** project aims to enhance the supply, uptake, and distribution of improved seed varieties across Tanzania, expansion seed production, enhancing seed quality, and tackling prevailing challenges, including limited awareness and seed availability. Recognising the constraints smallholder farmers face, the government, under this project, will facilitate seed price subsidies, and optimise distribution channels.

The main components of the NSDD project are:

- Expanded research on improved seed varieties.
- Infrastructure enhancements for seed development and irrigation.
- Establishment of an efficient seed distribution system.
- Strengthening of institutions like ASA, TARI, TOSCI, and MoA for advanced seed development, production, and uptake.
- Capacity building programs for extension officers to enhance their knowledge and outreach capabilities in promoting improved seeds.
- Comprehensive seed subsidy programs to aid farmers in accessing improved seeds.
- Widespread education and training initiatives to bolster awareness of seed regulations and benefits.
- Encourage private sector investment in large-scale seed production and PPP in seed multiplication.