REPORT

ON

FOOD FLOW LANDSCAPE ASSESSMENT FOR THE BMZ GROW ENRICH PROJECT

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Cover photo: https://adsnorthrift.org/ongoing-projects/grow-ENRICH-2/

ACKNOWLEDGEMENTS

We extend our deepest gratitude to all program participants in Kenya, Somalia, and Tanzania who generously gave their time and insights during the Food Flow Landscape Assessment for the BMZ Grow ENRICH Project. Your invaluable contributions, perspectives, and lived experiences have been fundamental in shaping this report and informing the policy recommendations outlined herein.

We also acknowledge the dedication and collaboration of the government, local communities, civil society organizations, and stakeholders who supported the assessment process. Your active participation in surveys, key informant interviews, and focus group discussions enriched the study's findings and helped highlight the diverse realities and challenges faced across the regions.

Finally, we thank the assessment teams and all partners for their commitment to ensuring this study's success, and we appreciate the unwavering support of the Federal Ministry for Economic Cooperation and Development of Germany (BMZ) and World Vision International.

This acknowledgement is endorsed by Move on Afrika.

Signed,

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EXECUTIVE SUMMARY

Context of the Study

The BMZ Grow ENRICH Project, funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) and implemented by World Vision in partnership with Anglican Development Services – North Rift Region (ADS- NRR), The Puntland Minority Women's Development Organisation (PMWDO) and Kivulini Women's Rights Organisation, addresses food insecurity and malnutrition in Kenya, Somalia, and Tanzania. This Food Flow Landscape Assessment was conducted to explore the complexities of food systems, supply chains, and value chains across these countries, focusing on vulnerabilities, policy gaps, and opportunities for improving food security. The goal of the study is to support the implementation of the African Union's Common Position on Food Systems Transformation and inform regional and national strategies for sustainable and inclusive development.

Methodology

The assessment adopted a mixed-methods approach, integrating both quantitative and qualitative data collection and analysis. A cross-sectional survey design was utilized, targeting diverse stakeholder groups, including producers, traders, and consumers. Data collection tools included structured questionnaires, key informant interviews (KIIs), focus group discussions (FGDs), and observation checklists. Sampling combined probability and non-probability techniques to ensure comprehensive representation. Ethical considerations, including informed consent and gender sensitivity, were central to the process. The study covered key geographic areas: Elgeyo Marakwet County in Kenya, Nuugal Region in Somalia, and Shinyanga Region in Tanzania.

Findings

Kenya: In Kenya, agriculture remains a primary livelihood source, with Elgeyo Marakwet County showcasing a mix of crop farming, livestock rearing, and subsistence practices. Challenges include climate change, limited access to quality inputs, and infrastructure deficits. Women play a critical role in food production and processing, but face systemic barriers such as inadequate access to resources. Food supply chains are characterized by inefficiencies, particularly in transportation and market accessibility. The integration of technology, such as biofortified crops and mobile banking, offers promising avenues for enhancing productivity and resilience. However, market competition and price volatility continue to undermine the stability of local food systems.

Somalia: Somalia's food systems are among the most vulnerable in East Africa, with the Nuugal Region heavily reliant on livestock farming and small-scale crop production. Key challenges include recurrent droughts, weak governance, and limited infrastructure, which exacerbate food insecurity. The fishing industry, despite its potential, remains underdeveloped. Women are integral to household food management but are disproportionately affected by systemic vulnerabilities. Local markets are constrained by poor integration and high transportation costs, limiting producers' access to buyers. Policy interventions are needed to enhance resilience, including improved water management, drought-resistant crops, and strengthened market systems.

Tanzania: Tanzania's Shinyanga Region demonstrates significant reliance on rain-fed agriculture and smallholder farming. Key crops include maize, cassava, and pulses, but erratic rainfall and pests like the Fall Armyworm present ongoing challenges. Livestock farming complements crop production but suffers from inadequate veterinary services and feed shortages. Women's participation in food systems

is pronounced, with their contributions spanning production, processing, and distribution. Market access is improving, but transportation costs and infrastructure deficits remain critical bottlenecks. The adoption of climate-smart agricultural practices and irrigation systems is gaining traction but requires further scaling to address systemic inefficiencies.

Biofortification enhances the nutritional quality of staple crops, thereby improving food security and public health across Kenya, Somalia, and Tanzania. Key biofortified crops, such as vitamin A-ENRICHed sweet potatoes, iron-fortified beans, and zinc- ENRICHed maize, contribute to addressing micronutrient deficiencies. However, adoption remains low due to limited awareness, inadequate seed distribution, and weak market linkages. While Kenya and Tanzania have made progress through government and NGO- and NGO-led initiatives, Somalia faces significant challenges due to weak governance and infrastructural deficits. Women also play a crucial role in biofortification, from seed selection to processing, yet systemic barriers such as land ownership disparities and restricted access to resources limit their full participation. Scaling up biofortification requires strengthened policies, enhanced awareness campaigns and improved supply chains to ensure equitable access and sustainable impact.

Cross-Border Dynamics: Cross-border trade significantly influences food systems in the region, with key commodities like maize, livestock, and pulses driving economic activity. However, inconsistent regulations, infrastructure gaps, and high transportation costs impede efficiency. Cross-border trade introduces competition that affects local pricing dynamics, sometimes to the detriment of small-scale producers. Conversely, it offers opportunities for diversifying markets and enhancing food availability. Addressing these challenges requires harmonized policies, improved infrastructure, and strengthened trade networks to ensure equitable benefits across borders.

Gender Dimensions: Gender dynamics play a pivotal role in shaping food systems in Kenya, Somalia, and Tanzania. Women are central to food production, processing, and distribution but face systemic inequities in access to resources, decision-making, and economic opportunities. In Kenya, women's groups promote the adoption of innovative practices, while in Somalia, women are crucial in managing household food security amidst systemic vulnerabilities. In Tanzania, women's roles extend to community engagement and informal market activities. Gender-sensitive interventions, such as capacity building, equitable resource distribution, and policy advocacy, are essential for fostering inclusive and resilient food systems.

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ACRONYMS

AfCFTA	African Continental Free Trade Area
ASALs	Arid and Semi-Arid Lands
ASDP	Agriculture Sector Development Program
ASTGS	Agriculture Sector Transformation and Growth Strategy
AU	African Union
AUDA-NEPAD	African Union Development Agency- New Partnership for Africa's Development
BMZ	Federal Ministry for Economic Cooperation and Development of Germany
CAADP	Comprehensive Africa Agriculture Development Programme
CCARDESA	Centre for Coordination of Agricultural Research and Development for Southern Africa
CO2eq	Carbon Dioxide Equivalent
CSOs	Civil Society Organisations
DAP	Diammonium Phosphate
EAC	East African Community
ELRP	Emergency Locust Response Program
ENRICH	Enhancing Nutrition Services to Improve Maternal and Child Health
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
FSRP	Food Systems Resilience Program
GAIN	Global Alliance for Improved Nutrition
GDP	Gross Domestic Product
GESI	Gender Equality and Social Inclusion
GHG	Greenhouse Gas
GPS	Global Positioning System
IGAD	Intergovernmental Authority on Development
IGRs	Insect Growth Regulators
ILRI	International Livestock Research Institute
KFC	Kentucky Fried Chicken
Kg/ha	Kilogram per hectare
KII	Key Informant Interview
KSH	Kenyan Shilling
LGBTQIA+	Lesbian, Gay, Bisexual, Transgender, Queer (Questioning), Intersex, Asexual, plus Other sexual orientations, gender identities, and expressions not specifically

	covered by the other letters, such as pansexual, gender non-conforming, or non-binary individuals.
LPG	Liquefied Petroleum Gas
M&E	Monitoring & Evaluation
MtCO2eq	Metric Tons of Carbon Dioxide Equivalent
MW	Megawatt
NACOSTI	National Commission for Science, Technology, and Innovation
NAPA	National Adaptation Programme of Action
NCPB	National Cereal and Produce Board
NCs	National Coordinators
NGOs	Non- Governmental Organizations
PMCs	Primary Milk Collectors
PwDs	People with Disabilities
RAs	Research Assistants
REC	Regional Economic Communities
SCAN	Supply Chain Analysis for Nutrition
SMCs	Secondary Milk Collectors
SMEs	Small and Medium-sized Enterprises
SOP	Standard Operating Procedures
SPS	Sanitary & Phytosanitary
SPSS	Statistical Package for Social Sciences
UAE	United Arab Emirates
UN	United Nations
UNICEF	United Nations Children Emergency Fund
USD	United States Dollar
WFP	World Food Programme

CHAPTER ONE : STUDY BACKGROUND

1.1 INTRODUCTION

The **BMZ Grow ENRICH Project**, funded by the German Federal Ministry for Economic Cooperation and Development (BMZ), addresses food insecurity and malnutrition challenges in Kenya, Somalia, and Tanzania. The project, running from September 2023 to August 2027, focuses on strengthening food systems, improving maternal and child health, and promoting gender-sensitive interventions. By targeting key regions such as Elgeyo Marakwet County in Kenya, Nuugal Region in Puntland Somalia, and Shinyanga Region in Tanzania, the initiative aims to enhance nutrition, resilience, and accessibility within food value chains. Implemented by World Vision and their partners Anglican Development Services- North Rift Region(ADS- NRR) in Kenya, The Puntland Minority Women's Organisation (PMWDO) in Somalia and Kivulini Women's Rights Organisations in Tanzania, the project supports over **506,000 direct beneficiaries, including 172, 833 women and 143,122 men**, addressing systemic barriers to food security and sustainability.

1.2 CONTEXT OF FOOD SYSTEMS IN AFRICA

1.2.1. AFRICAN UNION COMMON POSITION ON FOOD SYSTEMS

Africa's food systems face multifaceted challenges, including climate change, rapid population growth, socio-economic disparities, and weak governance. At the continental level, frameworks such as **the Comprehensive Africa Agriculture Development Programme (CAADP)** [1] and the **Africa Union Common Position on Food Systems**[2] aim to address these challenges by promoting sustainable, inclusive, and resilient agricultural practices. Equally important, since its inception, CAADP has evolved through various commitments including the Maputo Declaration (2003), and the Malabo Declaration (2014).

The most recent policy shift is outlined in the Kampala Declaration on CAADP (2023- 2033), adopted during the **Africa Fertilizer and Soil Health Summit in Uganda (2023)**[3], underscores the need for integrated agri- food systems that enhance productivity, address inefficiencies across food chains and improve soil health and fertiliser use. Moreover, this declaration emphasises inclusivity, resilience, and sustainability to safeguard future food security while enhancing regional trade under the **African Continental Free Trade Area (AfCFTA)** framework.

Additionally, the **AU Food Safety Strategy for Africa (2022-2036)**[4] complements CAADP's goals by focusing on food safety as a critical factor in agricultural transformation and trade. Addressing the high burden of foodborne illnesses and compliance with **Sanitary and Phytosanitary (SPS)** standards is vital for achieving the aspirations of the Kampala Declaration and the broader objectives of the African Union's Agenda 2063.

[1] Comprehensive Africa Agriculture Development Programme (CAADP). (2024). *CAADP Strategy and Action Plan 2026–2035*. African Union Commission.
[2] African Union Development Agency- New Partnership for Africa's Development (AUDA- NEPAD). 2021. *Africa Union Common Position on Food Systems*. Retrieved from:
3 African Union (2025)
4 Food Safety Strategy for Africa: 2022 - 2036. AU-IBAR

1.2.2. EAST AFRICAN COMMUNITY

In East Africa, regional efforts to strengthen food systems are guided by the East African Community's (EAC) Agricultural Sector Development Strategy and the Food Systems Resilience Program (FSRP) supported by IGAD[5] and the World Bank[6]. These initiatives focus on improving market access, integrating climate-smart practices, and addressing infrastructure gaps owing to East Africa's heavy reliance on rain-fed agriculture which exacerbates vulnerability to climate variability, threatening food security and rural livelihoods.

Programs like these are crucial to promoting trade under the African Continental Free Trade Area (AfCFTA), which seeks to boost intra-regional agricultural commerce[7]. Policies aim to align with the AfCFTA to facilitate regional trade while addressing food system vulnerabilities. Key interventions include investments in rural road networks, support for smallholder farmers, and the integration of technology to optimize supply chains. However, dependency on rain-fed agriculture and challenges in cross-border trade regulations remain significant barriers.

1.2.3. FOOD SYSTEMS IN KENYA

Kenya, a regional economic hub in East Africa, relies heavily on agriculture, which contributes about 30% of GDP and employs over 70% of the rural population[8]. Despite its agricultural potential, challenges like climate change, high production costs, and limited infrastructure hinder food security and market efficiency. National policies like the Agricultural Sector Transformation and Growth Strategy (ASTGS) focus on improving rural infrastructure and supporting smallholder farmers. Additionally, programs like the Emergency Locust Response Program (ELRP) focus on mitigating the impacts of climate-induced shocks, while investments in biofortified crops and agro-processing aim to enhance productivity and nutrition. In Elgeyo Marakwet, agriculture forms the backbone of livelihoods but faces issues such as soil erosion and poor road networks, which exacerbate inefficiencies in food supply

1.2.4. FOOD SYSTEMS IN SOMALIA

Somalia's food systems are among the most vulnerable in East Africa, largely due to prolonged conflict, weak governance and climate shocks. The factors disrupt supply chains and limit market access, resulting in acute food insecurity. Additionally, the lack of infrastructure and reliable data remains a significant barrier to policy and program implementation. Puntland, a semi-autonomous region in Somalia, relies heavily on livestock, which constitutes the primary source of livelihood and export revenue, yet is highly vulnerable to recurrent droughts and limited grazing resources. Key policy frameworks, such as the Puntland Development Plan[9] and Somalia's National Adaptation Programme

[5] IGAD. (2024). *Food Systems Resilience Program for East and Horn of Africa*
[6] World Bank. (2023). *Strengthening Food Systems for Resilience*
[7] World Bank. Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA). (2024). *Food Systems Resilience Program for Eastern and Southern Africa*
[8] Ministry of Agriculture and Livestock
[9] Puntland State of Somalia. (2020). *Five Year Puntland Development Plan-3: Progressive, Resilient, and Secure Puntland State of Somalia*. Puntland State of Somalia.

of Action (NAP) [10], emphasize resilience-building through improved water management, the promotion of drought-resistant crops, and the strengthening of livestock and fishing sectors.

1.2.5. FOOD SYSTEMS IN TANZANIA

According to the Integrated Food Security Phase Classification analysis conducted from November 2023 - April 2024, approximately 900,000 people (13 percent of the population of 7.1 million people) in 21 analysed district councils of Mainland Tanzania were experiencing high levels of acute food insecurity[11]. The food system is transitioning with initiatives like Kilimo Kwanza[12] and the Agricultural Sector Development Program (ASDP) emphasize irrigation, agro-processing, and climate-smart practices, but reliance on rain-fed agriculture[13] remains a significant limitation to productivity[14]. The country is generally a surplus producer of staple cereals and pulses and exports significant quantities of these commodities to neighbouring countries in East and Southern Africa including Kenya, Uganda, Rwanda, Burundi, Malawi, Zambia, and the Democratic Republic of Congo.

1.3 STUDY PURPOSE AND APPROACH

The Food Flow Landscape Assessment was conducted to examine the food flow, supply, and value chain across Kenya, Tanzania, and Somalia, aiming to uncover patterns, vulnerabilities, and areas for potential improvement. The ultimate goal was to generate policy recommendations based on these findings and present them within the AU Common Position on Food Systems Transformation framework to enhance nutrition and health outcomes. The assessment specifically focused on several objectives:

i. Performing a desk review of existing food flows and value chains in East and the Horn of Africa to identify previously recognized policy and strategic gaps.
ii. Mapping food flows and sources to pinpoint food system activities within targeted cross-border areas.
iii. Analysing market phases, including production, supply chains, processing, transformation, and selling.
iv. Identifying vulnerabilities, weaknesses, and strengths in food systems to contribute insights for the IGAD food and nutrition policy review and the CAADP Biennial Review process; and developing policy recommendations based on the assessment findings, tailored to support the IGAD region within the broader AU framework on food systems transformation.

The objectives of the Food Flow Landscape Assessment will focus on:

1. **Mapping Food Distribution** by identifying and mapping the pathways through which food moves from production to consumption, including supply chains, transportation routes, and distribution networks.

[10] Republic of Somalia. (2022). *Somalia's National Adaptation Plan (NAP) Framework.* Republic of Somalia.
[11] IPC Acute Food Insecurity Analysis November 2023 - October 2024
[12] Tanzania CAADP Compact. (2024). *Agricultural Development in Tanzania*
[13] African Union Development Agency- New Partnership for Africa's Development (AUDA- NEPAD). 2021. *Africa Union Common Position on Food Systems.*
[14] Tanzania CAADP Compact. (2024). *Agricultural Development in Tanzania*

2. **Evaluating Accessibility** by assessing how accessible food is to different populations, including underserved communities, and identifying barriers to access such as distance, cost, and availability.
3. **Assessing Sustainability** by evaluating the environmental impact of food flows, including energy use, waste generation, and carbon footprint, to recommend more sustainable practices.
4. **Identifying Inefficiencies or bottlenecks** in the food flow system that may lead to waste or increased costs and suggest improvements
5. **Enhancing Resilience** by analysing vulnerabilities and proposing strategies for better preparedness for improved resilience of the food system to disruptions, such as supply chain interruptions or natural disasters
6. **Supporting Policy Development** by providing data and insights to inform policy decisions and strategic planning aimed at improving food systems at local, regional, or national levels.

1.4 THE FOOD FLOW ASSESSMENT TECHNICAL APPROACH

The technical approach for the Food Flow Landscape Assessment is outlined in **Annex I** and combines quantitative and qualitative methods through a descriptive cross-sectional survey design and also highlights how we will utilize the **Gender Equality and Social Inclusion (GESI)** approach to ensure that the study is inclusive, considering the needs of women, youth, Persons with Disabilities (PwDs), and marginalized groups. It includes desk reviews, surveys, key informant interviews, focus group discussions, and observations, all guided by a human rights and gender-responsive framework. We will also use the **Supply Chain Analysis for Nutrition (SCAN).** This combined approach will provide a strong foundation for actionable policy recommendations to improve food security and nutrition outcomes in Kenya, Somalia, and Tanzania.

1.5 GEOGRAPHIC SCOPE AND CONTEXT

The Food Flow Landscape Assessment covered **Kenya, Somalia**, and **Tanzania** specifically **Elgeyo Marakwet County, Nuugal Region and Shinyanga Region** respectively. It analysed production, supply chains, processing, and trade while identifying vulnerabilities and cross-border food flows. This geographic scope provided insights into local and regional food systems, addressing infrastructure gaps, trade barriers, and sustainability challenges.

1.5.1. KENYA: ELGEYO MARAKWET COUNTY

Elgeyo Marakwet County, located in the Rift Valley, exemplifies the country's agricultural strength with mixed farming systems, including crop and livestock production. However, infrastructure challenges such as poor road networks hinder market access and efficiency, particularly in remote areas.

1.5.2 SOMALIA: NUUGAL REGION

Somalia's economic activities are dominated by livestock production, which forms the backbone of its economy, especially in the Nuugal region of Puntland. The region is characterized by arid and semi-arid conditions that limit agricultural activities but support livestock rearing and small-scale irrigation-based farming. Fishing along Somalia's coastline holds significant potential, but weak infrastructure and overfishing challenges undermine its contributions to the economy.

1.5.3 TANZANIA: SHINYANGA REGION

Tanzania's Shinyanga region showcases a semi-arid area with a strong reliance on smallholder farming and livestock keeping. Key crops include maize and cassava, which form staples for local and regional consumption. The region has made strides in integrating climate-smart agriculture and improving irrigation systems. Despite this, limited mechanization, reliance on rain-fed agriculture, and poor transport infrastructure, including roads, continue to challenge food production and distribution.

The map below shows the Grow ENRICH impact level and target areas:

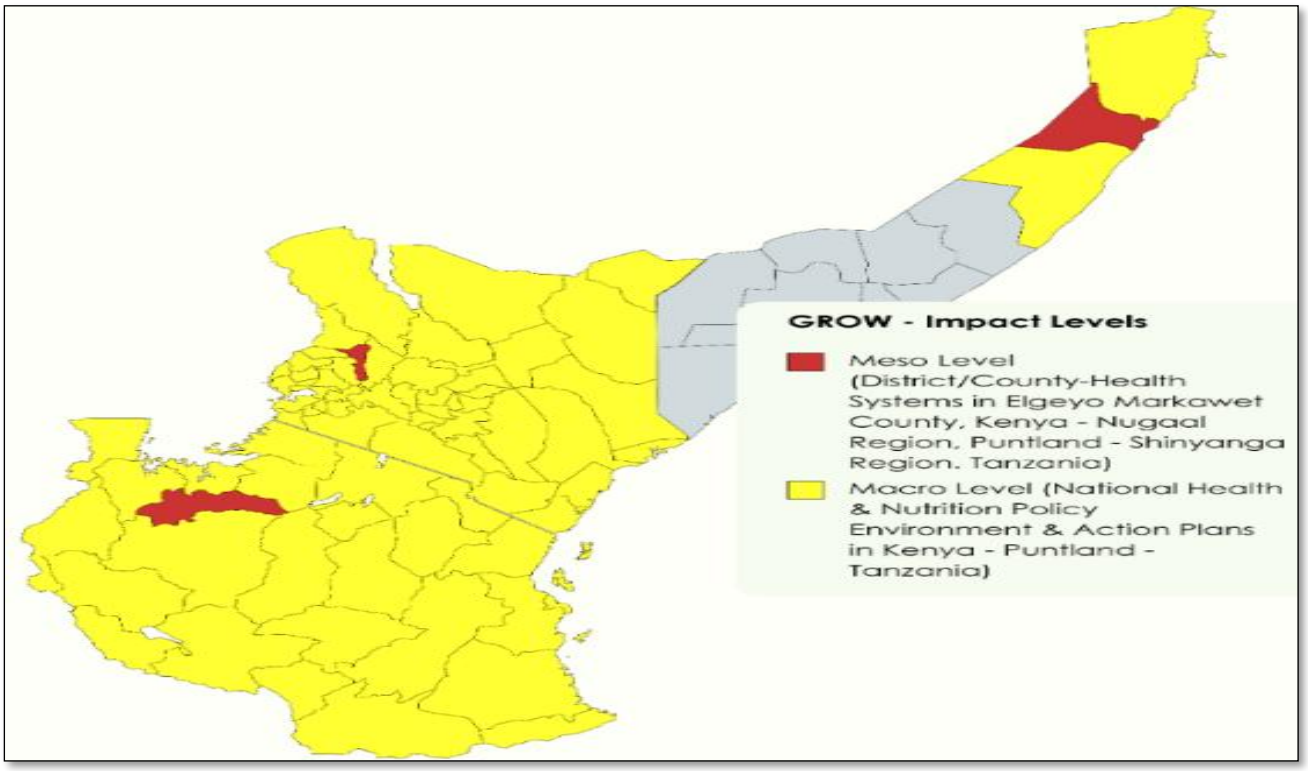

Figure 1: Grow ENRICH Impact Level and Target Areas

CHAPTER TWO: STUDY METHODOLOGY

2.0. STUDY DESIGN AND APPROACH

The Food Flow Landscape Assessment adopted a **mixed-methods descriptive cross-sectional design**, integrating quantitative and qualitative approaches to ensure comprehensive data collection and analysis. The study was guided by a human rights and gender-responsive framework, with an emphasis on the **Supply Chain Analysis for Nutrition (SCAN)**[15] model to evaluate the accessibility, desirability, and quality of food at different stages of the supply chain. The methodology was structured into five phases: **inception and planning**, **literature review**, **data collection**, **report development**, and **policy recommendations**, as indicated below:

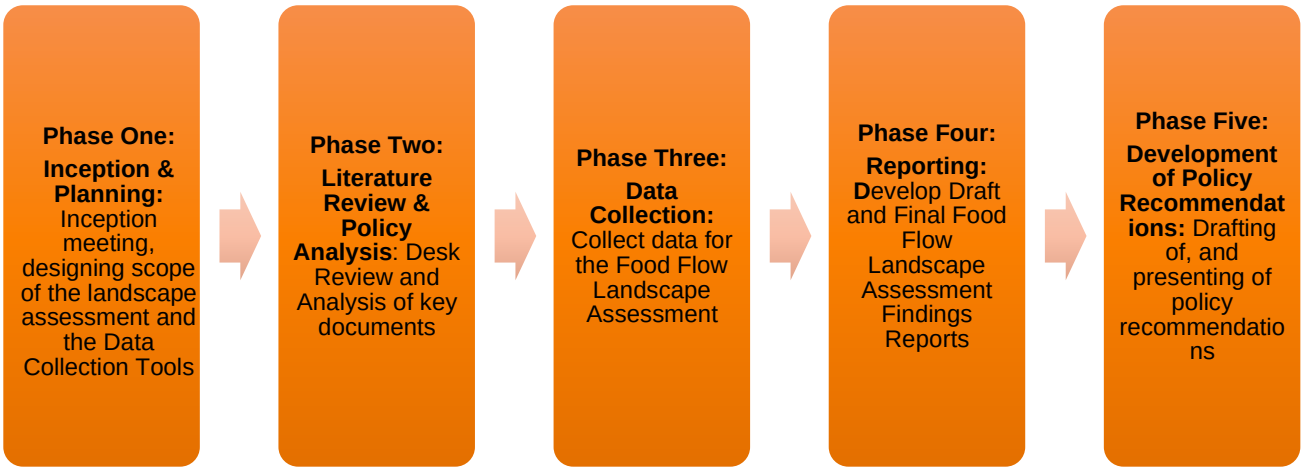

Figure 2: Phases of the Food Flow Landscape Assessment

2.1. STUDY SAMPLING DESIGN

The study employed both probability and non-probability sampling approaches.

I. PROBABILITY SAMPLING APPROACH

A multistage stratified sampling technique was used to ensure that the various segments of the population were adequately represented. The target areas were stratified in Kenya, Somalia and Tanzania based on factors such as geographical location, economic activity and demographic profile. With each stratum, a random sampling method was used to select specific communities, households, and individuals for participation in the exercise.

1. Consumers sampled at the household level.

A sample of consumer beneficiaries was calculated using Cochran's formula:

$$n = \frac{n_0}{1 + \left(\frac{n_0 - 1}{N}\right)}$$

Where:

n_o is the sample size for an infinite population (384)

[15] GAIN. (2020). Supply Chain Analysis for Nutrition

$$n_0 = \frac{Z^2 \cdot p \cdot (1-p)}{e^2}$$

n=384{1+(384-1)/409834}

n = 385

Country	Direct beneficiaries		Total direct beneficiaries	Sample
	Women	**Men**		
Kenya	40,270	39,944	80,214	98
Somalia	91,564	65,980	157,544	192
Tanzania	40,999	38,356	79,355	96
Total	**172,833**	**144,280**	**317,113**	**386**

Table 1: Sample Size for Consumers

2. Producers sampled at the community level

Since the number of producers was unknown, the formula for the infinite population was applied as indicated below:

$$n = \frac{Z^2.p.(1-p)}{E^2}$$

Where,

- n = required sample size,
- Z = z-value associated with the desired confidence level (e.g., 1.96 for 95 % confidence),
- p = estimated population proportion (use p=0.5 if unknown to maximize variability),
- E = margin of error or desired precision.

Therefore, the estimated sample size was **384** which was distributed per country as shown in Table 2

Country	Sample size
Kenya	128
Somalia	128
Tanzania	128
Total	**384**

Table 2: Sample Size for Producers

3. Traders sampled at the Market level

The number of traders was also unknown, so the formula for infinite population was applied as indicated below:

$$n = \frac{Z^2.p.(1-p)}{E^2}$$

Where,

- n = required sample size,
- Z = z-value associated with the desired confidence level (e.g., 1.96 for 95 % confidence),
- p = estimated population proportion (use p =0.5 if unknown to maximize variability),
- E = margin of error or desired precision.

Therefore, the estimated sample size was **384** which was distributed per country as shown in Table 3.

Country	Sample size
Kenya	128
Somalia	128
Tanzania	128
Total	**384**

Table 3: Sample Size for Traders

II. NON-PROBABILITY SAMPLING

For purposes of capturing qualitative insights and specialized knowledge, non-probability sampling techniques were used. Participants with specific expertise or experience relevant to the food flow assessment were deliberately mapped out and selected. Key informants such as food supply chain actors, government officials, relevant organisations and community leaders were targeted based on their roles in the supply chain. This allowed for in-depth consultative meetings that unpacked the nuances that would not be apparent in quantitative data.

2.2. DATA COLLECTION METHOD

Data collection was conducted using **survey questionnaires**, **key informant interviews (KIIs), focus group discussion (FGD) guides, observation checklists**, along secondary data from **literature reviews and policy analysis**. Recruitment and training of National Coordinators (NCs) and Research Assistants (RAs) took place for 2 days each between the 14th to 28th October in the three different countries. Following the training, tools were pre-tested and adapted for each country, and data collection commenced from the 21st of October to the 25th of November 2024.

2.2.1. SURVEY QUESTIONNAIRES

The total targeted number of questionnaires was 1,154 for all three countries. The number of respondents reached was 1,290 including 613 males, 676 females and 1 person from the LGBTQIA+ and Intersex Community. The number of respondents reached per country is disaggregated by gender in Table 4.

Country	Male	Female	Total Reached
Kenya	190	233	423
Tanzania	222	197	419
Somalia	201	247	448
Total	**613**	**677**	**1,290**

Table 4: Survey Questionnaire Respondents by Country

2.2.2. KEY INFORMANT INTERVIEWS (KIIS)

The targeted number of KIIs was 18 for Kenya, 28 for Somalia, 21 for Tanzania and 12 for regional, and cross-border Stakeholders. The number of KIIs completed was 38, 31, 31 and 15 respectively. The table below indicates the number of KIIs completed:

Country	Target	Number Reached
Kenya	18	38
Somalia	28	31
Tanzania	21	31
Regional & Cross Border	12	15
Total	**79**	**115**

Table 5: KII Respondents by Country

2.2.3. FOCUS GROUP DISCUSSIONS (FGDS)

The target for FGDs was 24 for Kenya, 21 for Somalia and 12 for Tanzania. The total reached as depicted in the table below was: 24 for Kenya, 21 for Somalia and 12 for Tanzania.

Country	Target	Number Reached
Kenya	24	24
Somalia	21	21
Tanzania	12	12
Total	**57**	**57**

Table 6: FGD Respondents by Country

2.2.4. OBSERVATION CHECKLIST

The target for observation checklists was 16 for Kenya, 13 for Somalia and 8 for Tanzania. The total observations done as depicted in the table below were 20 for Kenya, 15 for Somalia and 17 for Tanzania. The observation checklists were conducted in local communities.

County	Target	Number Reached
Kenya	16	20
Somalia	13	15
Tanzania	8	17
Total	**37**	**52**

Table 7: Observations by Country

2.3. DATA ANALYSIS AND REPORTING

The assessment team employed a mixed-methods approach for data analysis, integrating quantitative and qualitative techniques to ensure triangulation and robust findings. Data cleaning, weighting, and analysis were conducted from the 18th to the 29th of November 2024.

2.3.1. QUANTITATIVE DATA

a. **Survey Questionnaire:** The data collected through the ONA mobile data collection platform was securely stored and monitored in real-time, allowing early error detection and intervention. The data, segmented by target location, was prepared, cleaned, and analysed in SPSS, where descriptive and bivariate analyses identified key relationships within the dataset.
b. **Observation Checklist:** A data screen was created, and the observation checklists were entered. For storage, it was updated on ONA. The data was then analysed in SPSS as with the survey questionnaire.

2.3.2. QUALITATIVE DATA

Qualitative data from KIIs and FGDs underwent transcription and thematic coding to identify recurring themes, with a coding framework developed based on assessment objectives and quantitative insights. Microsoft Excel was used for coding and theme validation, enabling comprehensive triangulation of findings across both datasets.

2.3.3. REPORT DEVELOPMENT

The draft assessment report was prepared, integrating findings on food supply chains, market dynamics, vulnerabilities, and policy frameworks from Kenya, Somalia, and Tanzania. The report provided evidence-based insights and preliminary policy recommendations to enhance food security, nutrition, and resilience, forming a foundation for final stakeholder consultations and refinement.

2.4. ETHICAL RESEARCH PROTOCOLS

- Data security, quality, ethics, and inclusion were central to the assessment. Approvals were obtained from NACOSTI in Kenya, and entry meetings were conducted with gatekeepers in the three countries to facilitate access and ensure alignment with local contexts.
- Move on Afrika adhered to SOPs, using GPS-tagged data entries, multi-step verification, encrypted storage, and the ODK platform for secure collection. Rigorous quality controls included piloting tools, supervisor reviews, spot checks, and validation of data for accuracy.
- Ethical standards were maintained through informed consent, child protection compliance, and IRB approvals. The GESI approach ensured inclusive participation of women, youth, PWDs, and marginalized groups, addressing social disparities and promoting equitable outcomes.

2.5. STUDY LIMITATIONS

The study faced various challenges across Kenya, Tanzania, and Somalia.

- In Kenya, the limited availability of government officials hindered engagement; this was mitigated by adjusting schedules and using online methods.
- In Tanzania, language barriers and absent traders were addressed through training and expanded data collection areas.
- In Somalia, connectivity issues and delays due to political dynamics were managed with offline tools and alternative stakeholder engagement.
- For regional and cross-border KIIs, unresponsiveness was overcome through persistent follow-ups and leveraging networks. These measures ensured continuity and data integrity despite challenges

CHAPTER THREE : STUDY FINDINGS : KENYA

3.1. DEMOGRAPHIC PROFILE AND CHARACTERISTICS

3.1.1. GENDER OF RESPONDENTS

The gender distribution among producers is nearly balanced, with males constituting **50.7%** and females slightly behind at **49.3%**. In the consumer demographic, females dominate at **53.8%**, while males account for **46.2%**. The trader category exhibits the most pronounced gender disparity, with females forming a majority at **61.7%** compared to males at **38.3%**. This suggests that women are heavily involved in trading activities, particularly in small and medium-sized enterprises (SMEs) and informal markets.

	Male (%)	Female (%)
Producer (N=142)	50.7 %	49.3 %
Consumers (N=132)	46.2 %	53.8%
Traders (N=149)	38.3 %	61.7 %

Table 8: Gender of Respondents in Kenya

3.1.2. AGE OF RESPONDENTS

Producers: The majority of producers are younger age groups, with 37.3% falling between 18-25 years, and 26.1% between 26-35 years. 16.9%, are between 36-45 years. Only a small percentage 5.3% are above 66 years. **Consumers**: Consumers show a broader distribution across age groups. The highest proportion, 34.2%, are aged 26-35 years, followed by 29.5% in the 36-45 years range. Consumers between 18-25 years account for 10.4%. The elderly consumers above 66 years make up just 0.5% of the total. **Traders**: Traders are primarily concentrated in the 26-35 years (36.2%) and 36-45 years (31.5%) age cohorts. A smaller proportion, 8.1%, are aged 18-25 years, while 5.6% of traders are between 46-55 years.

	Producers (N=142)	Consumers (N=132)	Traders (N=149)
Below 18years	12.7%	1.6%	0.7%
Between 18-25years	37.3%	10.4%	8.1%
Between 26-35 years	26.1%	34.2%	36.2%
Between 36-45 years	16.9%	29.5%	31.5%
Between 46-55 years	5.6%	18.1%	18.1%
Between 56-65 years	1.4%	5.7%	4.0%
Above 66 years	5.3%	.5%	1.3%

Table 9: Age of Respondents in Kenya

3.1.3. MARITAL STATUS OF RESPONDENTS

The study established that 91.5% of producers reached during the study are married, while 7.0%, have never been married or single. Only 0.7% of the respondents were separated or in a domestic partnership. Among the consumers, more than three-quarters (78.8%) of the consumers were married, 15.9% of the respondents had never married or were single, while 3.8% and 2.7% are separated and widowed respectively. Only 0.8% is in domestic partnerships or cohabiting. Among the traders, nearly three-quarters (72.5%) of the respondents were married, 17.4% have never been married or are single, 4.0% were separated and only 0.7% were in a domestic partnership or cohabiting.

Marital Status	Producers	Consumers	Traders
Never Married/ single	7.0%	15.9%	17.4%
Married	91.5%	78.8%	72.5%
Separated	0.7%	3.8%	4.0%
Widowed	0.0%	0.8%	2.7%
Domestic partnership/cohabiting	0.7%	0.8%	0.7%
Do not wish to disclose	0.0%	0.0%	2.7%
Total	**100.0%**	**100.0%**	**100.0%**

Table 10: Marital Status of Respondents in Kenya

3.1.4. EDUCATION LEVEL OF RESPONDENTS

Producers: A majority of producers have completed primary education, accounting for 42.3%. 41.5%, have completed secondary education. The percentage of producers who have attended polytechnic institutions or received vocational training is modest, at 2.8%. University graduates make up 4.9% of producers. Adult education, which is typically aimed at those who did not complete formal education earlier in life, engages only 0.7% of producers.

Consumers: A substantial 35.6% of consumers have completed primary school education, while 34.8% have completed secondary education. 6.8% reported attending polytechnic institutions and 8.3% received training at vocational colleges. University graduates represent 8.3% of consumers.

Traders: 32.9% of traders completed primary education and 34.2% completed secondary education. Approximately 7.4% of traders attended polytechnic institutions, while 12.1% completed vocational training. University graduates in the trader category make up 8.1%.

	Producers (N=142)	Consumers (N=132)	Traders (N=149)
None	2.8%	5.3%	5.4%
Primary completed	42.3%	35.6%	32.9%
Secondary completed	41.5%	34.8%	34.2%
Polytechnic	2.8%	6.8%	7.4%
Vocational training college	4.9%	8.3%	12.1%
University	4.9%	8.3%	8.1%
Adult Education	0.7%	.8%	
Total	**100.0%**	**100.0%**	**100.0%**

Table 11: Education Level of Respondents in Kenya

3.1.5. DISABILITY STATUS

Traders: Among traders, the majority do not experience disabilities, with over 95% reporting no difficulty across all categories. Among the different types of disabilities, mobility disability has the highest prevalence, affecting 4.7% (7 respondents). Hearing, cognitive, and self-care each affect 1.3% (2), while visual and communication disabilities are the least common, each affecting only 0.7% (1).

	No disability	With disability
Visual impairment	148 (99.3%)	1 (0.7%)
Hearing impairment	147 (98.7%)	2 (1.3%)
Mobility impairment	142 (95.3%)	7 (4.7%)
Cognitive impairment	147 (98.7%)	2 (1.3%)
Self-Care impairment	147 (98.7%)	2 (1.3%)
Communication impairment	148 (99.3%)	1 (0.7%)

Table 12: Disability Status of Traders in Kenya

Consumers: The findings among consumers indicate that the vast majority do not experience disabilities, with all categories reporting at least 98.5% without difficulty. Visual and communication disabilities are the most common, each affecting 1.5% (2) of consumers. Hearing, mobility, and cognitive disabilities are slightly less prevalent, each affecting 0.8% (1). Notably, no consumers reported having a self-care disability.

	No disability	With disability
Visual impairment	130 (98.5%)	2 (1.5%)
Hearing impairment	131 (99.2%)	1 (0.8%)
Mobility impairment	131 (99.2%)	1 (0.8%)
Cognitive impairment	131 (99.2%)	1 (0.8%)
Self-Care impairment	132 (100.0%)	0 (0.0%)
Communication impairment	130 (98.5%)	2 (1.5%)

Table 13: Disability Status of Consumers in Kenya

3.2. FOOD SUPPLY CHAIN DISTRIBUTION

3.2.1. INPUT SUPPLY

Access to Farm Inputs: Findings from the assessment established that majority of the producers engaged from Elgeyo Marakwet during this study source their farm inputs from local markets (65.9%), government (34.8%), outlets (21.9%), companies (11.4%) and farmer groups (5.7%). However, the assessment findings also noted that despite the existence of these sources of farm inputs, 94.4% of the producers engaged reported that they experience challenges in access to farm inputs.

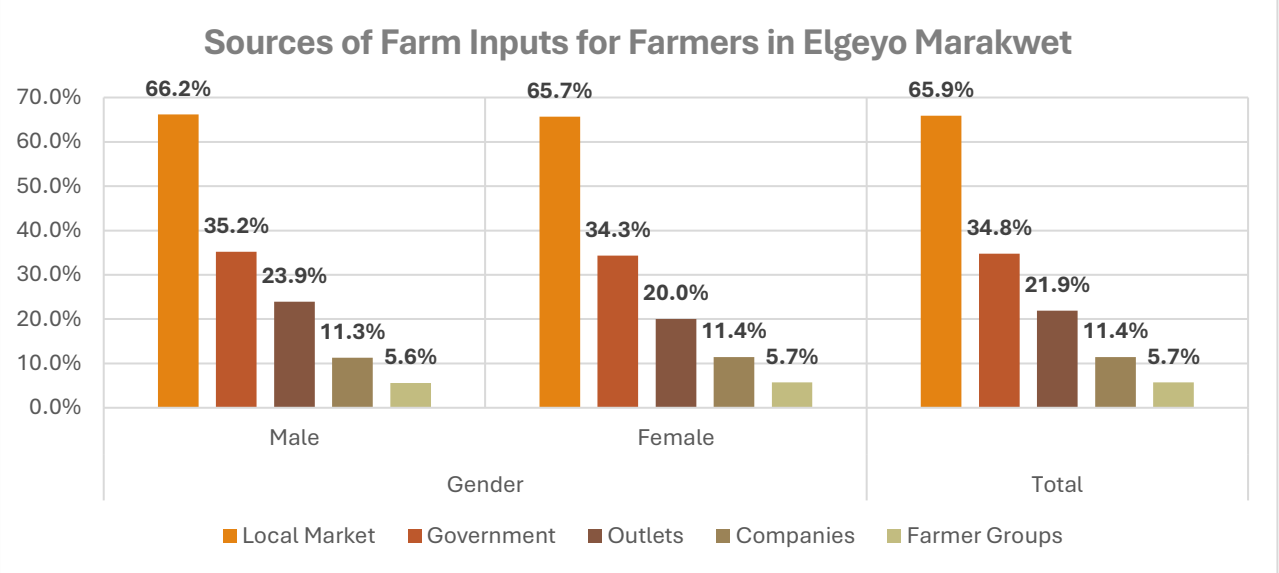

Figure 3: Sources of Farm Inputs in Elgeyo Marakwet

Access to Seeds: Discussions with producers from Elgeyo Marakwet during the assessment revealed that the availability of essential resources, such as quality certified seeds and agricultural inputs, is crucial for strengthening food production. The producers urged that the government needs to ensure a steady supply of quality seeds, especially for potatoes, which were highlighted as being of low quality in recent times.

*"The government should put certified seeds near for easy access by farmers. The government should also do soil research to know the best type of potato grade to plant. Supply of quality seeds for potatoes and pyrethrum is also needed. The shangi potatoes are nowadays of low quality hence the government should provide quality ones. The availability of seeds will be helpful to farmers in order to increase production."- **FGD with Producers, Embobut***

Access to Fertilizers: The findings noted that while some county governments provide fertilizer subsidies, information about targeting, quantity, pricing, fertilizer types, and mode of delivery is not publicly available. Lack of access to such information hinders proper planning by fertilizer market players.

Access to Pesticides: The findings established that local farmers have faced increasingly frequent pest and disease outbreaks, as a result of climate change, which has made the environment friendlier for some of the vectors, migratory pests, and also increased transboundary trade that makes countries with lax regulations a risk to others. Desk review findings noted that it has been estimated that pesticide use

in Kenya is less than 1 kg/ha. This is consistent with other sub-Saharan African countries that have very low use, such as Rwanda, Sudan, Zimbabwe, and Malawi[16].

Challenges in Access to Inputs: Some of the key challenges mentioned that limit access to farm inputs by producers included pricing where they mentioned that inputs like fertilizers, seeds, and seedlings are often expensive, making them unaffordable for many farmers. The producers also noted that input supply centres are often far from farms, leading to high transportation costs and delays in access and poor road networks increase transportation costs and delay the timely delivery of inputs.

*"There are usually long queues at government depots which are also not so many and this discourages some farmers from accessing the farming inputs. We also have poor roads here and large-scale producers have difficulties in moving from one point to another to access quality farm inputs on time. These are challenges that need to be addressed by the government – **FGD with Mango Producers***

3.2.2. PRIMARY PRODUCTION

Food Production Practices: The assessment findings established that local communities in Kenya engage in food production practices mainly focusing on crop, livestock and subsistence farming. Discussions with the sampled respondents from Elgeyo Marakwet revealed that most local communities engage in crop farming (81.7%) as a primary food production practice followed by subsistence farming (11.3%) and livestock farming (7%).

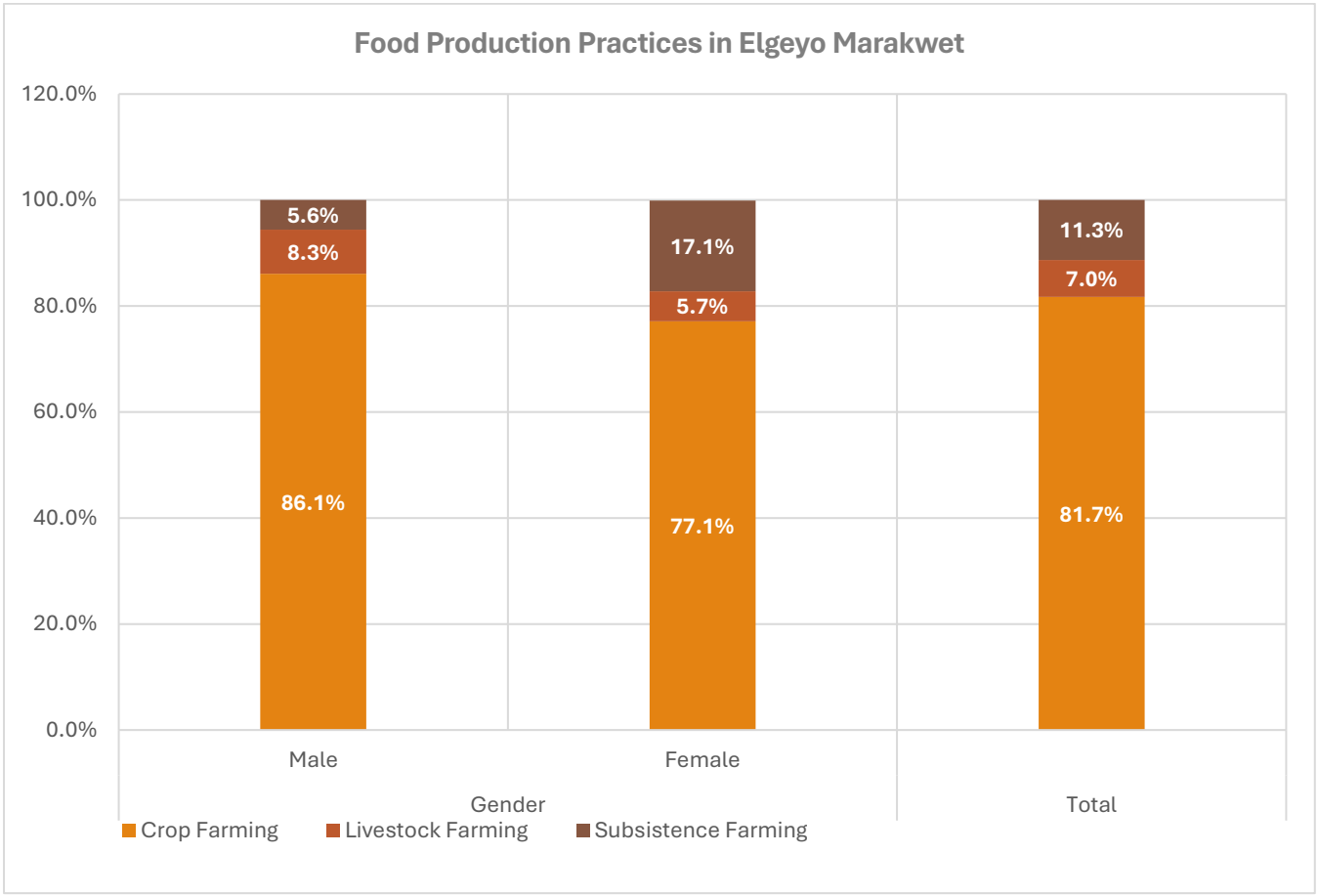

Figure 4: Food Production Practices in Elgeyo Marakwet

[16] Agricultural Inputs in Kenya: Demand, Supply, And The Policy Environment 2022: Lilian Kirimi, John Olwande, Jackson Langat, Timothy Njagi, Mercy Kamau, And Gideon Obare

Analysed responses during the assessment highlighted that 81.7% of the producers engaged were producing for market purposes and selling. About two-fifths (18.3%) of producers who indicated that they were not producing to sell cited various reasons like inadequate markets for crops like beans, limited availability of inputs leading to production only in quantities sufficient for personal consumption, inadequate land and inconsistent rainfall preventing producing enough for the market and limited access to productive resources such as land and inputs, which restrict production to just enough for consumption.

Common Foods Produced: The table below provides an overview of some of the common foods produced in Elgeyo Marakwet according to the respondents engaged.

Category	Types
Fruits	Mangoes, Oranges, Bananas, Avocados, Passion fruits, Lemons, Pawpaw, Guavas, Watermelon, Tree tomatoes, Plums, Pears
Vegetables	Sukuma wiki (kales), Managu (African nightshade), Cabbages, Spinach, Kunde (cowpeas), Nderema (vine spinach), Pigweed, Tomatoes, Onions, Beans, Sagaa, Sugar loaf
Cash Crops and Cereals	Maize, Potatoes, Green grams, Pyrethrum, Coffee, Mangoes, Sorghum, Beans, Millet, Wheat, Passion fruits, Avocadoes, Tree tomatoes, Cotton, Peas, Cassava, Carrots
Livestock	Cows, Goats, Sheep, Poultry (Chickens)

Table 14: Types of Foods Produced

Factors Promoting Food Production: Findings from the assessment established that the government of Kenya, through the Department of Agriculture and Livestock and the county government of Elgeyo Marakwet have facilitated various programs aimed at enhancing food production through the provision of quality seeds and livestock. For instance, the distribution of seeds like Nyota beans, avocado, and mango seedlings has been part of targeted interventions. Additionally, improved livestock breeds such as Dopa sheep and dairy goats were introduced, particularly to enhance productivity in livestock farming.

*"Through the Department of Agriculture and Livestock, we have programs that support the promotion of sorghum production, avocado production as well as mangoes. We also have fertilizer subsidy programs and provision of seeds e.g. Nyota beans through government projects like ELRP and Emergency Locust programs. We also support the improvement of sheep production through the issuance of improved breeds e.g. Dopa sheep and milk dairy goats."- **KII with Government Representatives from the Ministry of Agriculture and Livestock Development.***

Factors Affecting Food Production: The findings established that 76.6% of the producers engaged through FGDs in Elgeyo Marakwet cited that climate change was the key issue affecting food production in their locality followed by pests (70.9%), shortage of farming land (43.3%), soil (13.5%) and land degradation (7.1%), as shown in Table 15.

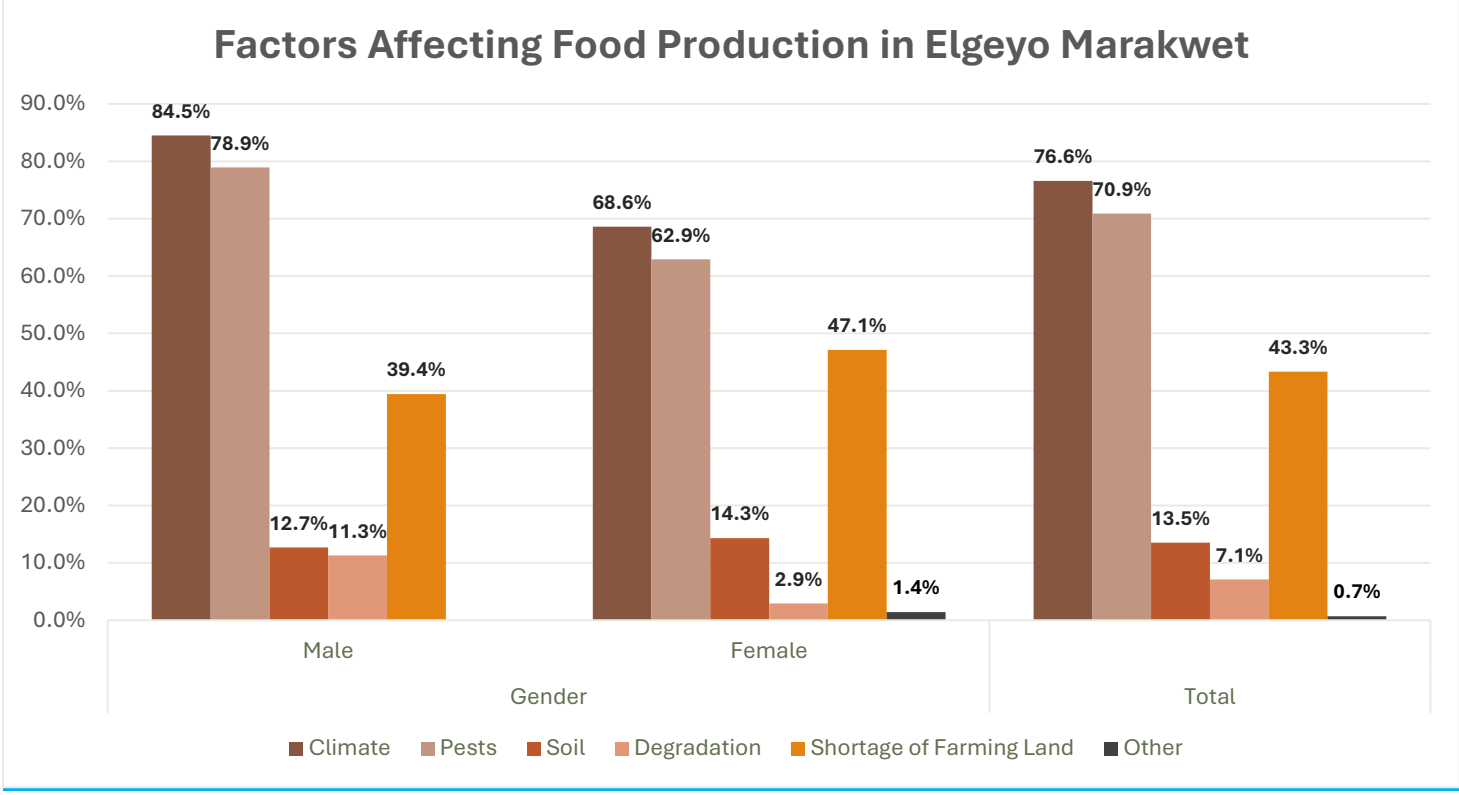

Figure 5: Factors Affecting Food Production in Elgeyo Marakwet

Role of Women in Food Production: Findings from the assessment revealed that women predominantly manage food production activities, including land preparation, planting, weeding, fertilizing, and harvesting. Women are not only the primary labour force in farming but also actively engage in obtaining farming inputs such as fertilizers through their groups. The findings revealed that women have been instrumental in promoting the adoption of innovative practices such as planting biofortified crops to improve yields and household nutrition. Further, it was highlighted that women's contributions extend to small-scale livestock rearing, such as keeping chickens and goats, which are critical for household food security and income generation.

*"Women play a huge role in food systems. They participate in the processes right from production. They participate more actively in production than men. It is women who do the planting, weeding, and harvesting. They also play a huge role in selling since they are the ones that usually go to the market. It is women who also do the milking of the cows."- **FGD with Producers, Sitot Village***

3.2.3. FOOD PROCESSING

Sources of Food for Processing: Discussions with producers during the FGDs and KIIs with processors established that the majority of the food produced in Elgeyo Marakwet is processed on-site (39.4%), outsourced (16.2%), and at factories (9.2%). Some of the steps involved in food processing cited by the processors engaged included washing, chopping, pasteurizing, freezing, fermenting, packaging, heating, milling, extruding and adding nutrients to foods. The findings further revealed that 83.5% of the producers were satisfied with the food processing practices in their locality.

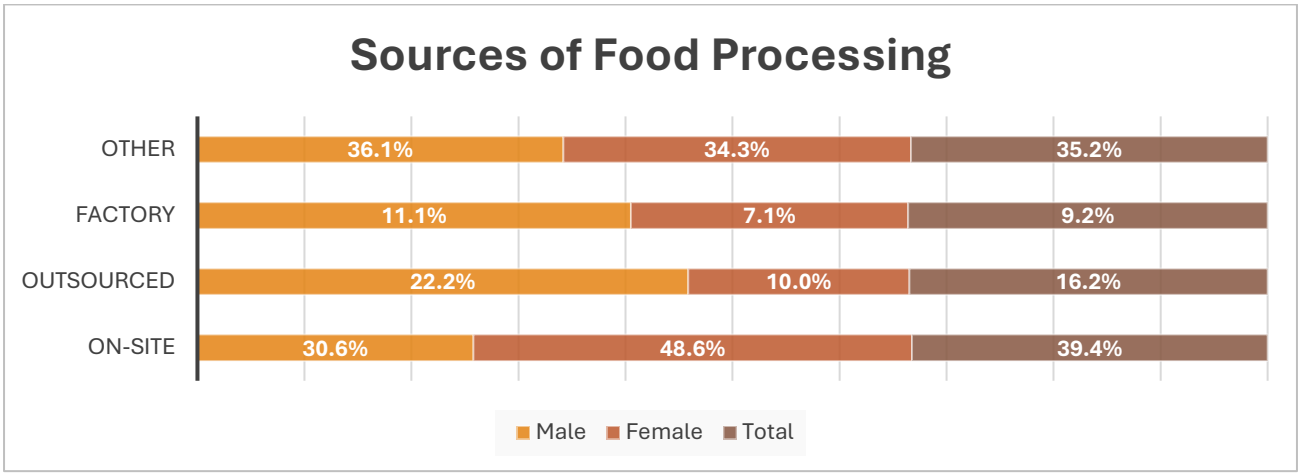

Figure 6: Sources of Food Processing in Elgeyo Marakwet

Conditions of Processing Facilities: Findings from the assessment established that a majority, 67% of the producers engaged noted that the condition of processing facilities in their localities was fair followed by 21.1% who reported that they were good, 2.1% noted they were excellent, while 9.2% confirmed that the conditions were poor.

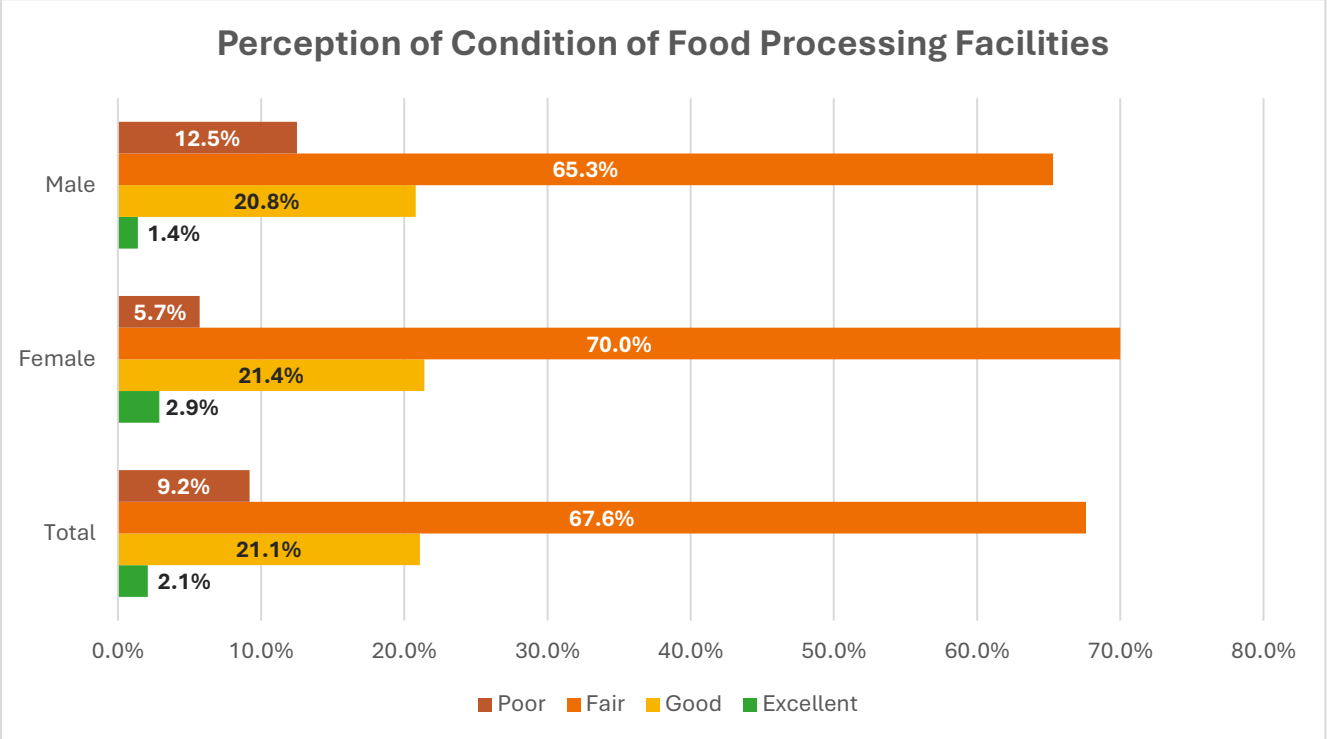

Figure 7: Perceptions on the Condition of Food Processing Facilities in Elgeyo Marakwet

The findings revealed that the majority of the processing facilities are privately owned and there have been significant efforts by these private actors to improve the general infrastructure and machinery of the existing food processing facilities. This is also evidenced by the 44.3% and 39.2% of processors who reported that they were somewhat satisfied and satisfied by the food processing processes respectively, as presented in Figure 7.

Key Actors in Food Processing: Discussion with processors and producers during the assessment established that local farmers are seen as the primary suppliers of raw materials in both milk and fruit processing. These farmers provide the core ingredients, whether milk or fruits, essential for the entire

processing cycle. The processors noted that establishing and maintaining strong relationships with farmers is critical for the business's operations, as they form the backbone of the supply chain.

*"Local Dairy Farmers are our primary stakeholders, providing the milk that we cool and store. Building strong relationships with them is essential for our success."- **KII with Milk Processor, Chesoi Ward***

Government agencies also play a significant role in the processing operations, particularly regarding compliance with health and safety standards. These regulatory bodies ensure that the processing plant operates within legal parameters, which is crucial for maintaining product safety and quality. KII with processors revealed that there were several community initiatives in place to actively engage farmers in the processing process. Regular workshops and training sessions are a key component of these initiatives, enabling farmers to learn best practices in dairy farming, pest management, and food processing stages.

*"Yes, we have several community initiatives aimed at ensuring farmer engagement. We regularly organize workshops and training sessions where farmers can learn about best practices in dairy farming and milk handling. These sessions also allow farmers to share their experiences and challenges, fostering a sense of community."- **KII with Milk Processor, Kapyego Ward***

Challenges in Food Processing: Infrastructure limitations were mentioned as a significant challenge across multiple sectors where producers and processors engaged cited that poor road conditions, particularly in rural areas, were a key barrier to efficient product transportation to processing facilities. Poor road networks result in delays in the delivery of raw materials to processing plants, leading to potential spoilage and financial losses. The findings also noted that limited suitable facilities, such as adequate processing structures in certain regions, also hamper business operations. Discussions with processors highlighted that rising operational costs, especially for utilities like electricity and fuel, are also major concerns in processing operations.

*"We face several challenges in the processing of milk: Lack of Infrastructure: Many rural roads are in poor condition, making it difficult for farmers to transport their milk to our plant. This can lead to delays and spoilage."- **KII with Milk Processors, Kapyego Ward***

Role of Women in Food Processing: The assessment findings confirmed that women play an essential and multifaceted role in dairy processing and farming activities, particularly in dairy farming. Women contribute significantly to the operational aspects of food processing, particularly in tasks such as sorting, cutting, packaging, and quality control. Women are not only key players in food processing operations but also serve as critical agents of community engagement. In many cases, women act as liaisons between food processing businesses and local farming communities, helping to promote best practices in food cultivation and processing.

*"Women play a significant role in our community's dairy processing and farming activities. Many women are involved in dairy farming, helping with milking and caring for the cows. Their contributions are essential for maintaining the quality of the milk."- **KII with Mango Processors, Kerio Valley***

3.2.4. TRANSPORT/LOGISTICS

Modes of Transport: The findings highlighted that in Elgeyo Marakwet, trucks (62.7%) and motorbikes (56.3%) were the most commonly utilized mode of transport in food transportation followed by

bicycles (4.2%) and hand carts (3.5%). The findings also noted a significant number (22.5%) of the respondents reported that their preferred mode for transporting food is through walking where they deliver in person to the respective outlets. The majority of the respondents (69.2%) engaged also confirmed that they were satisfied with the mode of transport they are using to move food from one point to another.

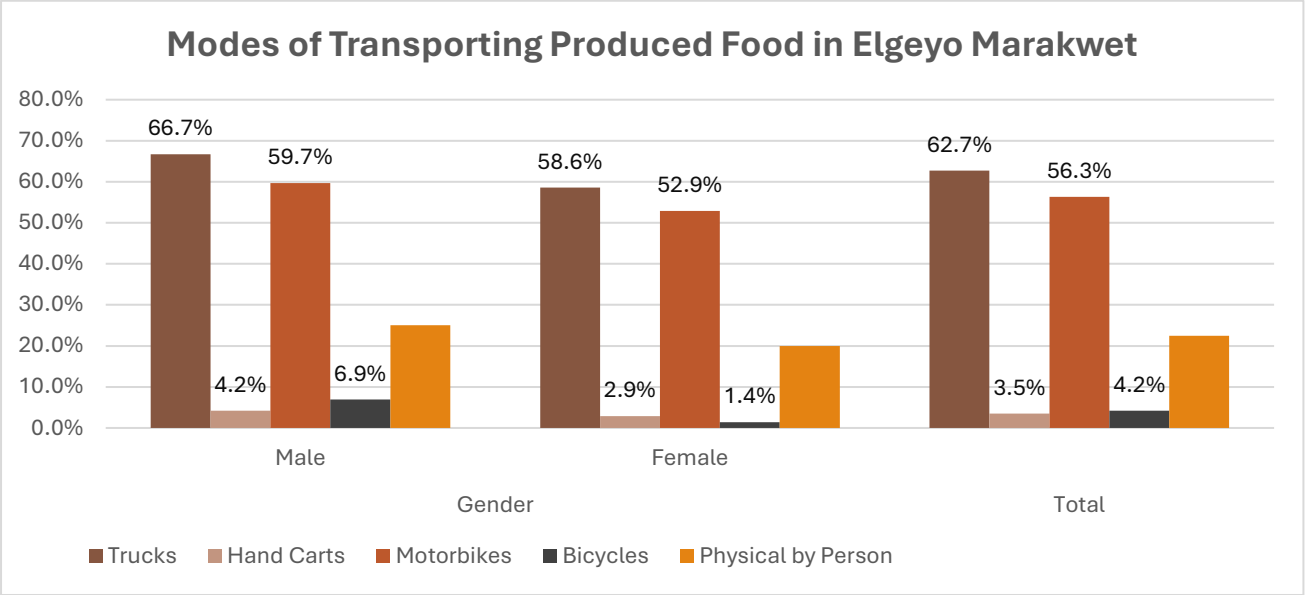

Figure 8: Modes of Transport of Food in Elgeyo Marakwet

Discussions with transporters indicated that trucks are essential for transporting larger quantities of food over long distances, especially for distributing bulk supplies to various markets. However, they also noted that trucks are also impacted by infrastructure challenges, such as poor road conditions and fuel costs, which can cause delays or increase transportation expenses.

The transporters further confirmed that in most regions in Elgeyo Marakwet, motorbikes are becoming the primary mode of transportation for food distribution over short to medium distances, particularly in areas with narrow paths or dense traffic. However, the transporters also indicated that just like trucks, motorbikes face challenges like traffic congestion in urban areas, rough rural roads, and the lack of proper infrastructure, which can lead to delays, accidents, or mechanical breakdowns.

*"In our food distribution system, various transportation methods are employed, but motorbikes are the most common choice for short to medium distances. They are agile and can manoeuvre through narrow paths or crowded areas that larger vehicles might struggle with. This flexibility allows for quick deliveries of fresh produce, which is crucial in ensuring that food reaches consumers while it's still fresh."- **KII with Transporters, Sambirir Ward***

Challenges in Food Transportation: Poor road conditions are a critical challenge in food distribution. Roads that are not well-maintained or are prone to damage cause significant delays and increase transportation costs. Transport vehicles, such as trucks and motorbikes, are often damaged, resulting in higher maintenance costs and longer delivery times. Rising fuel prices and vehicle maintenance costs significantly contribute to the high cost of food distribution. As fuel prices increase, the cost of transporting food rises, and these additional expenses are often passed on to consumers. This, in turn, makes food less affordable, particularly for low-income families.

Role of Women in Food Transportation: Findings from the assessment reported that women are highly active in the food distribution and transportation process, especially in market settings, where they serve as both sellers and buyers. Women not only help distribute food within their local communities but are also integral to the logistics of moving food from farms to markets. Whether through physically carrying produce and food from one point to another, women facilitate food flow in both rural and urban settings.

3.2.5. MARKET AND RETAIL

Access to Markets: The findings highlighted that 64.1% of the producers engaged confirmed that markets for their products are easily accessible within their localities. The findings also noted that the majority of the producers engaged sell their produce at local markets (72.6%), at home (54.1%), by the roadside (19%), regional markets (6.3%) and national markets (1.4%).

Types of Markets	Male	Female	Total
At home	62.5%	45.7%	54.1%
Roadside	22.2%	15.7%	19%
Local market	68.1%	77.1%	72.6%
Regional markets	9.7%	2.9%	6.3%
National markets	2.8%		1.4%
None	0.0	1.4%	0.7%
Other	1.4%	2.9%	2.2%

Table 15: Types of Markets in Elgeyo Marakwet

The findings further revealed that 83.8% of the producers engaged confirmed that the existing markets provide adequate business for their food products. Some of the key enabling factors are the existence of a steady demand for products, with buyers coming from different towns, the creation of market days, such as "Soko" which enhances access to customers and the availability of local loyal customers in large numbers.

Commodities Traded in Markets: Discussions with traders and consumers established that market conditions for food products in the area vary greatly depending on seasonality and product type. The findings revealed that certain food products, such as cereals and mangoes, experience an uptick in sales during specific seasons, with increased demand during harvest periods like mango seasons. Conversely, for traders dealing in groceries and vegetables, market conditions can be more volatile due to oversupply during peak production seasons, leading to lower demand and price fluctuations.

The traders reached further noted that livestock and dairy markets have experienced a positive trend, with increasing demand for both livestock and milk. This surge in demand is attributed to rising consumer interest and higher profits, especially for dairy producers who benefit from selling milk directly to consumers or local businesses.

Competition and Price Fluctuations: The traders engaged during the assessment noted that competition within the market for food products is a significant challenge, particularly for groceries, vegetables, and livestock. Several vendors face stiff competition from local producers and other market

players who offer similar products at competitive prices. In some instances, retailers struggle to maintain reasonable margins due to price fluctuations influenced by market forces beyond their control, such as transportation costs and market availability.

*"For me who sells produce from my farm and those I outsource from my neighbours mostly vegetables, I experience great competition because even the shop next to me sells similar produce thus leading to a better price to customers thus bringing more customers to my shop due to the good sales."- **FGD with Traders, Kapyego***

Role of Middlemen: Conversations with traders highlighted that middlemen are instrumental in connecting producers with a wider market. In cases like the potato farming and grocery business, brokers help farmers access larger wholesale markets, thus ensuring that their products sell faster and at competitive prices. These middlemen also provide valuable information regarding market trends and consumer preferences, which enhances the negotiation power of producers. The findings noted that while some middlemen add a markup on the prices of goods, their contribution to expanding market access outweighs the cost implications, benefiting both producers and consumers in the long term.

*"Goats rearing, I only engage middlemen when I need more goats to keep. I Source younger goats from them, and I read them for a year before selling them to local butcheries or individual buyers. The middlemen have made my work easier because, if I do it myself it could be time-consuming and I might miss my target they only charge around Sh100 to 200 per goat."- **FGD with Kakamiti Traders.***

Impact of Cross-Border Trade on Markets: The findings established that cross-border trade introduces significant competition, which affects local food prices and availability. When imported products are available, especially at lower prices, local products face increased competition, which could force businesses to adjust their pricing strategies to remain competitive. The findings revealed that during periods of high cross-border demand, prices in local markets can soar, as seen in the example of mangoes. In contrast, when low-cost imports from neighbouring countries, like Uganda, flood the market, the prices of staple foods like maize drop significantly. This creates a volatile pricing environment for traders, who may face losses when low-priced goods dominate the market.

*"There was a year that Maize was imported from Uganda and that year I had a big stock of maize, I Incurred a lot of losses because the Maize from Uganda came at a low price making food in Surplus. As a trader, I made a lot of losses but for our primary Consumer, there was a lot of Maize and beans supplied in Markets cheaply."- **FGD with Traders, Chesoi Centre.***

Challenges in Food Marketing: There were key challenges mentioned that affected food markets in Elgeyo Marakwet from poor regulations on pricing, taxes, poor infrastructure, fluctuation of prices and insecurity. The traders engaged through consultative meetings noted that there have been incidents where producers have reported the challenge of middlemen exploiting their produce as there is a lack of regulation around pricing and fair-trade practices. While some government efforts aim to link farmers with markets and help them negotiate prices, the absence of formal structures for consistent market access remains a significant challenge.

Challenges affecting Traders: Discussions with traders during the assessment revealed that some of the challenges they face in food marketing include lack of capital, credit costs, low or varying quality of produce, low or irregular quantity of produce, lack of means of transport, poor road infrastructure,

cost of transport, insecurity, inadequate storage facilities, low-profit margins, competition from other regional traders who might sell at cheaper prices and government regulations.

Challenge	Male	Female	Total
Lack of own capital	54.4%	68.5%	61.5%
Lack of credit/credit is too expensive	7.0%	13.0%	10.0%
Low or varying quality of produce (supply)	10.5%	12.0%	11.3%
Low or irregular quantity of produce (supply) including trade restrictions	8.8%	12.0%	10.4%
Lack of means of transport	17.5%	26.1%	21.8%
Poor road infrastructure/transport costs are too high	52.6%	51.1%	51.9%
Too much Insecurity	21.1%	16.3%	18.7%
Lack of storage	8.8%	9.8%	9.3%
Low-profit margin (low sales price, high purchase price)	28.1%	18.5%	23.3%
Lack of demand	7.0%	6.5%	6.8%
Competitors would not allow me to grow so much	24.6%	15.2%	19.9%
The government would not allow me / taxes too high	14.0%	6.5%	10.3%
Too much food assistance	0.0%	1.1%	0.6%

Table 16: Challenges Affecting Traders

Role of Women in Marketing and Trading: The findings established that women are highly active in the food distribution process, especially in market settings, where they serve as both sellers and buyers. Women not only help distribute food within their local communities but are also integral to the logistics of moving food from farms to markets. Whether through physically carrying produce or participating in harvest and packaging activities, women facilitate food flow in both rural and urban settings. The findings highlighted that women, as key players in the marketing and sales of food products, significantly influence market dynamics, helping to ensure that food reaches those in need efficiently.

3.2.6. CONSUMPTIONS

Consumption Patterns: Findings from the assessment established that 66.7% of the consumers engaged during this assessment were consuming organic food in their households. The majority of the consumers were consuming organic fruits and vegetables (87.5%) followed by organic cereals and pulses (77.3%), organic roots and tubers (22.7%), organic dairy products (14.8%), organic meat (10.2%) and organic bread and pasta (5.7%). Interestingly, the findings noted that only 29.5% of the consumers verify if the foods they purchase are organic. For the consumers who do not verify, some of the key reasons cited were lack of awareness on which food products are organic and availability.

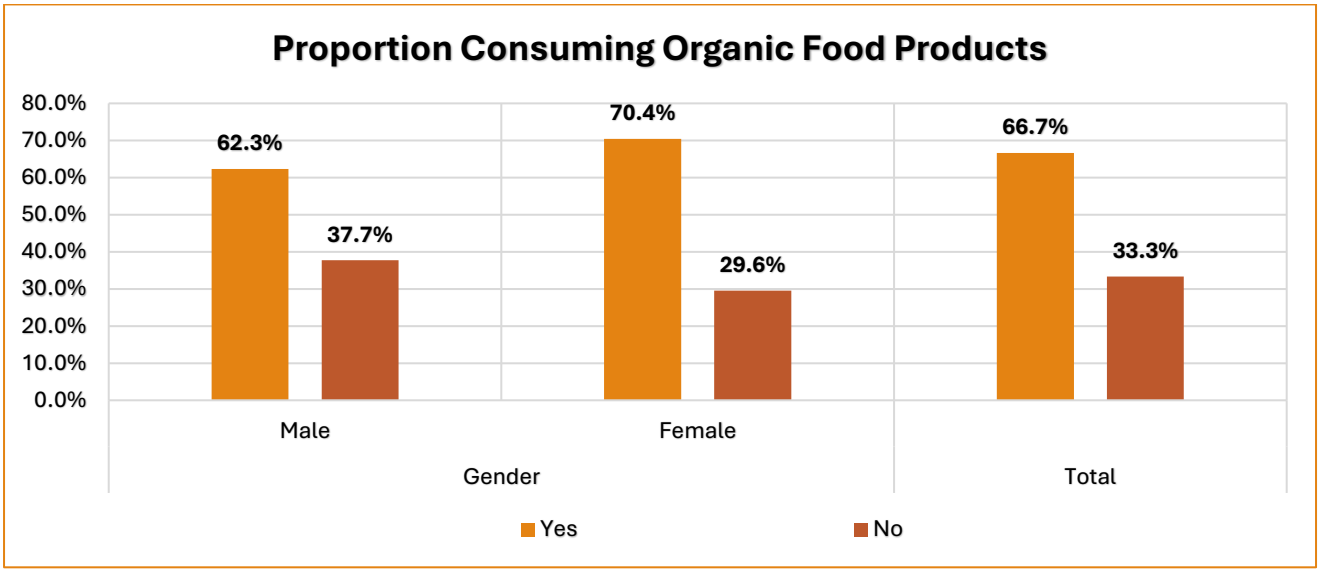

Figure 9: Proportion Consuming Organic Food Products in Elgeyo Marakwet

Dietary Quality: A very high proportion of the diet (73.5%) consists of cereals (corn, maize, rice, wheat, sorghum, millet, etc.), reflecting their staple food reliance. Consumption of dark green leafy vegetables and other vegetables is moderate (55.3% and 38.6% daily consumption, respectively). Vitamin A-rich vegetables and tubers show lower daily consumption rates (6.1%). Fruits and flesh meats are consumed less frequently than cereals and vegetables. Vitamin A-rich fruits show relatively low daily consumption (9.1%).A substantial portion of the diet (40.9%) includes oils and fats, indicating the use of fats for cooking. Sweets and spices contribute a smaller portion to the daily diet.

Dietary Patterns: The findings established that cereals, green leafy vegetables, oil and fats, spices and beverages were the food products that were regularly consumed by the majority of the consumers in Elgeyo Marakwet. The findings also noted that consumption of flesh meat, eggs, legumes, nuts and seeds scored the lowest in regards to regularity according to the consumers engaged during the assessment. Key factors that influenced diet diversification for the consumers included affordability, access to the products in local farms and availability in local markets. FGDs with consumers in Chugor noted that they also have limited awareness of the importance of diet diversification.

Food Group	Daily	Often	Sometimes	Never
CEREALS corn/maize, rice, wheat, sorghum, millet or any other grains or foods made from these (e.g. bread, noodles, porridge or other grain products) + insert local foods e.g. ugali, porridge	73.5%	22.0%	4.5%	0.0%
VITAMIN A RICH VEGETABLES AND TUBERS: pumpkin, carrot, squash, or sweet potato AND TUBERS pumpkin, carrot, squash, or sweet potato that are orange inside + other locally available vitamin A rich vegetables (e.g. red sweet pepper)	6.1%	29.5%	62.9%	1.5%
DARK GREEN LEAFY VEGETABLES: Dark green leafy vegetables, including wild forms + locally available vitamin A (managu, mrenda, terere) rich leaves such as amaranth, cassava leaves, kale, spinach	55.3%	27.3%	17.4%	0.0%

OTHER VEGETABLES: other vegetables (e.g. tomato, onion, eggplant) + other locally available coloured vegetables	38.6%	22.0%	38.6%	0.8%
VITAMIN A RICH FRUITS: ripe mango, cantaloupe, apricot (fresh or dried), ripe papaya, dried peach, and 100% fruit juice made from these + other locally available vitamin A-rich fruits	9.1%	44.7%	46.2%	11.5%
OTHER FRUITS Other fruits, including wild fruits and 100% fruit juice made from these	3.8%	28.0%	62.9%	5.3%
FLESH MEATS: beef, pork, lamb, goat, rabbit, game, chicken, duck, other birds, insects	3.0%	10.6%	81.1%	5.3%
EGGS eggs from chicken, duck, guinea fowl or any other egg	3.8%	10.6%	79.5%	6.1%
LEGUMES, NUTS AND SEEDS: dried beans, dried peas, lentils, nuts, seeds or foods made from these (e.g. peanut butter)	3.8%	34.1%	62.1%	0.0%
MILK AND MILK PRODUCTS: milk, cheese, yoghurt or other milk products	16.7%	21.2%	56.8%	5.3%
OILS AND FATS: Oil, fats or butter added to food or used for cooking	40.9%	18.9%	40.2%	0.0%
SWEETS sugar, honey, sweetened soda or sweetened juice drinks, sugary foods such as chocolates, candies, cookies and cakes	35.6%	12.1%	50.8%	1.5%
SPICES, CONDIMENTS, BEVERAGES: spices (black pepper, salt), condiments (soy sauce, hot sauce), coffee, tea, alcoholic beverages	40.2%	5.3%	52.3%	2.3%

Table 17: Dietary Patterns amongst Consumers in Elgeyo Marakwet

Types of Foods Consumed: The findings revealed that staple foods, particularly ugali and githeri, dominate the diet across the community. These are complemented by sukuma wiki, cabbages, milk, and occasionally fruits like mangoes and bananas. While some individuals supplement their diet with protein sources such as eggs or meat, these are less frequent due to affordability issues. The study noted that dietary diversity varies, with some households incorporating balanced meals, but others struggle due to economic constraints or lack of access to milk and other supplements during dry seasons.

Factors Influencing Consumption Patterns: The findings noted that dietary habits are also influenced by socioeconomic status and nutritional knowledge. Households with higher incomes or those engaged in livestock rearing reported more balanced meals, often including milk, eggs, and occasional meat. Low-income households primarily rely on staple foods and barely diversify their dietary patterns. The findings further revealed that limited nutritional awareness also plays a role, as some households do not prioritize dietary diversity even when affordable options are available.

*"We mainly take ugali and vegetables and milk. We also have access to beans and eggs. From time to time, we eat meat, although it is not so often. Our diets are balanced for the majority of people. Only a few people who lack the knowledge in those who cannot afford balanced meals frequently."- **FGD with Kamogo Women Group***

3.2.7. WASTE/DISPOSAL

Storage and Disposal: Findings from KII with processors highlighted that proper storage and distribution practices also significantly influence the pricing of food products. In both milk and fruit processing, storage is a crucial stage for preserving the quality of the products before they are distributed to markets. For instance, improper storage of milk can lead to spoilage, affecting both quality and price. Similarly, fruits and packaged products require controlled storage to maintain their shelf life.

Waste Management Practices: The findings noted that traders and consumers adopt creative methods to utilize produce that would otherwise spoil. For instance, surplus or slightly spoiled food is sometimes repurposed for cooking or processed into other items to sell, such as banana bread or baked goods. Traders leverage resources like spoiled fruits or vegetables by using them in-house, offering them at discounted prices, or donating them to local schools or neighbours to reduce waste.

Challenges in Storage and Waste Management: Discussions with producers, processors and traders also noted that spoilage of food products, particularly perishable items such as fruits and juices, is a common challenge due to low sales during off-peak seasons. The findings revealed that businesses often overproduce or misjudge demand, leading to wastage of up to 5%-10% of their products monthly. This occurs primarily with items that have a short shelf life, such as mangoes and fresh vegetables. The combination of low demand and overproduction increases the likelihood of waste.

*"On average, I estimate that about 5% to 10% of our produce can go to waste each month, particularly with highly perishable items like mangoes and watermelons. For instance, if we bring in 500 kilograms of mangoes, we might see about 25 to 50 kilograms spoiled if they don't sell within a few days."- **KII with Processor, Mango Processing Plant in Kerio Valley.***

Diversification of Waste Management Strategies; Findings from the assessment further revealed that some food vendors, especially those in the hospitality industry, use spoiled vegetables and meats for livestock feed, or repurpose excess products into lower-cost menu items. This approach helps businesses not only manage losses but also engage in responsible disposal or recycling practices. Findings from the assessment indicated that this adaptability in food management is crucial in reducing overall waste and optimizing business resources.

3.3. FOOD ACCESSIBILITY

3.3.1 FACTORS PROMOTING FOOD ACCESSIBILITY

Production Patterns: Findings from the assessment revealed that food availability in Elgeyo Marakwet is primarily dependent on small-scale farming, which is highly seasonal. Food scarcity often occurs between September and October, corresponding to the period between harvests. This scarcity is driven by the depletion of food reserves and the reliance on seasonal crops such as maize, beans, and potatoes. Households sell their harvests for necessities such as school fees, further exacerbating food shortages during this period. Additionally, regions with single cropping seasons experience longer food scarcity compared to areas with multiple cropping cycles.

*"We have food here in plenty. We plant maize, beans, potatoes, and milk. We have over 400 L of milk daily in our cooler. People who live along the valley depend on our maize a lot because they do not have rain. We have one season of maize, but we have three seasons of beans in a year. Many people planted the crops. As you can see, the farms are green with beans (especially maize) come only if the owner of crops sells their harvest to sort bills."-**KII with Agricultural Officer, Elgeyo Marakwet County Government***

3.3.2 BARRIERS TO FOOD AVAILABILITY

Affordability: Food access is a key constraint for Kenyan households, as poverty influences the type of food people buy. The findings revealed that staple foods, particularly ugali and githeri, dominate the diet across the community. These are complemented by sukuma wiki, cabbage, milk, and occasionally fruits like mangoes and bananas. While some respondents supplement their diet with protein sources such as eggs or meat, these are less frequent due to affordability issues. The findings noted that dietary diversity varies, with some households incorporating balanced meals, but others struggle due to economic constraints or lack of access to milk and other supplements during dry seasons.

Climate Change Effects: Climate change in Elgeyo Marakwet is evidenced by the increased frequency and magnitude of extreme weather events which cause loss of lives, diminished livelihoods, reduced crop and livestock production, and damage to infrastructure among others. The findings revealed that climate change significantly disrupts food availability and accessibility. The producers noted that erratic weather patterns, with heavy rains, usually lead to landslides, flooding, and crop destruction. Excess rainfall causes blight outbreaks in tomatoes and other crops, while cold temperatures during certain months destroy beans and potatoes.

3.4. ENVIRONMENTAL IMPACT AND SUSTAINABILITY

3.4.1. ENERGY USE, WASTE GENERATION AND CARBON FOOTPRINT

Energy Use: Over the last decade, the national electricity generation capacity has grown substantially, from 1,800 MW in 2014 to 2,990 MW in 2021. 'Renewable energies, such as geothermal, hydro, wind and solar energy, account for 80% of Kenya's electricity[17]. Despite the availability of electricity, firewood remains the main source of energy for the rural population.

Greenhouse Gas (GHG) Emissions: Food systems are responsible for roughly one-third of total GHG emissions in the world[18]. In Kenya, the food system is responsible for roughly 73% of the country's national net GHG emissions. Though emissions at a per capita level are low compared to the global average, GHG emissions from the food system have been rising rapidly in recent years, from nearly 30,000 kton in 2000 to nearly 65,000 kton in 2018[19].

Emission Reduction: To promote sustainable practices in reducing emissions, the findings proposed that actors in the food chain should continue reducing emissions from deforestation and forest degradation, and build and preserve forest carbon stocks as an insurance against further global warming, as well as a resource important to support livelihoods. Promotion of low-emission livestock

[17] ITA, 2022
[18] Crippa et al., 2022
[19] Marinus et. al., 2023

management through reduced emission intensities from enteric fermentation, improved livestock feed and manure management should also be prioritized.

Environmental Hazards: The findings highlighted that in Elgeyo Marakwet County, land degradation is primarily caused by uncontrolled deforestation, including illegal logging, where trees are cut down for firewood and farming on steep slopes, leading to severe soil erosion, landslides, and the destruction of important water catchment areas, particularly along the Kerio Valley escarpment. This is further aggravated by poor land management practices and lack of enforcement of environmental regulations.

3.5. INEFFICIENCIES IN FOOD VALUE CHAINS

Pest and Disease Management: Pests and diseases pose a significant challenge to food production and storage, particularly in agriculture. For example, in Elgeyo Marakwet, the storage of grains and vegetables is often compromised by weevil infestations, which shorten the shelf life of these products. In the case of potato farming, pests like blight and scab can greatly reduce yields and affect market supply.

There is a need for effective pest management strategies, including proper storage solutions and pest control treatments. Although we have implemented measures like using specific storage bags, challenges persist due to limited access to resources and effective pest control methods – ***FGD with Producers, Kapyego Cheptobot Village***

Operational Costs: Discussions with processors in Elgeyo Marakwet revealed that the rising operational costs, especially for utilities like electricity and fuel, are a major issue in processing operations. The fluctuating electricity prices and power outages significantly impact the ability to maintain cooling processes, affecting the quality and safety of products, such as milk and fruits. In addition, the high costs of raw materials and labour exacerbate financial pressures, particularly in times of price volatility.

Poor Infrastructure: Food producers and transporters in Elgeyo Marakwet emphasized that poor infrastructure, particularly roads, impedes the transportation of farm produce and access to services. During the rainy season, inaccessible farm roads force communities to hire manual labour to transport goods, which increases costs. Improving road networks especially in rural areas (rural-urban linkages) and rural electrification, would ease the transportation of farm produce to the end market. These are policy issues that the private sector and development partners can lobby on with the government.

Market Access: The distance between production areas and key markets poses a significant challenge for food producers. Many producers are located far from major markets, which increases transportation costs and delays the delivery of fresh produce. This geographical barrier further exacerbates the high costs of reaching profitable markets and impacts the freshness of produce. Additionally, the lack of nearby open-air markets limits the reach of local vendors, compelling them to travel to other markets in neighbouring regions and this increases their operational costs.

Consumer Awareness: The findings established that low consumer awareness of the unique benefits of certain products, such as mango juice or locally grown produce, presents a barrier to increasing sales. However, food vendors have made attempts to tackle this by conducting community outreach and

engaging in activities like tastings at local markets to educate the public about the health benefits and quality of their products.

Technology: Donors and governments focus on investing in interventions that enhance technology at the farm level mainly in cereals and horticultural crops and little is done for off-farm activities with processors, manufacturers and consumers. In addition, governments have not fully promoted innovations around local technologies, especially for cereal crops and existing storage facilities are not affordable, which greatly affects the shelf life of the products in local and export markets. Adoption of proper and locally available technologies across the food value chain should be encouraged to promote proper storage, processing and marketing of food products.

Government Regulation: Discussions with producers, traders, processors and consumers during the assessment noted that governments have not fully enforced the use of the right innovations and standards aimed at promoting the reduction of food losses at farm and market levels. For example, all the players in cereals and potato value chains in Kenya should be mandated by law to use the newly recommended storage bags and embrace the use of silos. Enforcement of the existing regulations on food production, processing, distribution and trade should also be prioritized.

Limited Funding: A review of literature confirmed that only 4% of the national budget goes to the agricultural sector in Kenya and 10% in Uganda yet it's the mainstay of the two countries' economies. This affects investment into food storage systems such as silos and other off-farm activities. Actors in the food value chain should lobby for increased resource allocation for the agriculture sector and advocate for the reduction of taxes and levies that increase the production, processing and distribution of food products.

3.6. FOOD SYSTEM VULNERABILITIES

3.6.1. SUPPLY CHAIN DISRUPTIONS

Climate Change: According to the Climate Risk Profile Elgeyo Marakwet County 2023, Climate hazards experienced in the county include intense rainfall, increased temperatures and extended drought periods. These hazards have affected crop and livestock yields, increased costs of production as well as increased vulnerability of women and youth.

Cost of Energy: Discussions with processors highlighted that despite the availability of clean energy, the cost of fuel and electricity has been on the rise over the last two years. The findings revealed that such costs significantly impacted both the farmers and processors within the food flow system. Reducing these charges would alleviate financial pressures and improve the efficiency of food processing operations.

Supply and Demand: The findings noted that while the market is vibrant, there are persistent challenges regarding supply and demand imbalances, particularly with livestock such as sheep and goats. Vendors and producers pointed out that while food products like mango juice and vegetables experience a steady flow, products like meat suffer from limited availability, affecting their ability to meet customer demand.

Inflation: Findings from the assessment established that inflation has had a profound effect on consumer purchasing power, influencing market demand for food products. As the cost of living rises, consumers tend to prioritize essential items such as food over non-essentials, leading to shifts in purchasing patterns. The overall economic climate has also made consumers more price-sensitive, which forces vendors to adjust their product offerings to remain competitive.

3.6.2. STRENGTHS AND WEAKNESSES OF THE FOOD SYSTEM

This section summarizes key strengths and weaknesses across food flow systems in Kenya

Strengths	Weaknesses
Variety of Crops and Livestock: Kenya benefits from a wide variety of agricultural products, including staple crops (maize, rice, sorghum), horticultural crops (fruits, vegetables), and livestock (cattle, goats, poultry). This diversity makes the food system more resilient to shocks such as disease outbreaks or droughts.	**Droughts and Flooding:** Kenya is highly vulnerable to climate change, which causes erratic weather patterns, leading to prolonged droughts and intense flooding. These affect agricultural productivity, particularly for rain-fed crops and livestock, reducing food availability.
Climate Variability: Different regions of Kenya have varying climates, which support the production of different types of crops. For example, the highlands are ideal for tea and coffee, while the semi-arid regions are suitable for livestock farming and drought-tolerant crops like millet and sorghum.	**Soil Degradation:** Unsustainable farming practices, including deforestation, overgrazing, and improper land use, have led to soil degradation. This reduces the land's fertility, affecting crop yields.
Improved Seed Varieties: Kenya has invested in the development and distribution of high-yielding, drought-resistant seed varieties, which help ensure better harvests, especially in areas that are prone to climatic stress.	**Food Safety and Hygiene:** Poor handling, storage, and transportation practices lead to contamination of food products, resulting in foodborne diseases. These issues undermine food security and public health.
Expanding Domestic and Regional Markets: The East African Community (EAC) market provides opportunities for Kenyan agricultural products to reach regional markets, with the country serving as a hub for food trade in the region. Kenya has also benefited from trade agreements, such as the African Continental Free Trade Area (AfCFTA), which increases access to broader markets across Africa.	**Poor Transportation Networks:** Limited and poorly maintained road networks make it difficult to transport food from rural areas to urban markets, leading to high food wastage, especially in perishable goods.
Strong Informal Trade: Informal markets play an essential role in food distribution, particularly in urban areas where small-scale traders provide access to fresh produce at affordable prices. These informal markets help connect rural producers with urban consumers.	**Inadequate Storage Facilities:** Inadequate cold storage and processing facilities result in significant food losses, particularly for fruits, vegetables, and dairy products. Farmers often lack access to affordable storage, contributing to food insecurity.
Resilient Smallholder Farming Systems: Smallholder farmers have adopted sustainable farming practices, such as agroforestry, integrated	**Poverty:** A significant portion of Kenya's population lives in poverty and lacks access to nutritious food. Rural areas, where most agricultural production

Strengths	Weaknesses
pest management, and conservation agriculture. There are also strong support systems from NGOs, government agencies, and development organizations that provide training, resources, and financial support to these farmers.	occurs, suffer from low purchasing power, hindering the ability of individuals to buy enough food. Rising food prices, partly due to inflation and supply chain issues, also make it difficult for many Kenyans to afford adequate, nutritious food.
Access to Markets: The rise of digital platforms like mobile money (M-Pesa) and market access platforms (e.g. Twiga Foods) has improved access to agricultural inputs, market prices, and distribution channels.	**Low Adoption of Modern Farming Techniques:** Despite the availability of improved agricultural technologies (e.g., drought-resistant seeds, mechanization), the adoption rate remains low, particularly among smallholder farmers due to high costs, lack of training, and limited access to credit.
Cooperative Movement: Farmers' cooperatives, particularly in sectors like dairy, tea, and coffee, have empowered local producers by pooling resources, enhancing bargaining power, and improving access to markets.	**Gender Inequality:** Women, who are key players in food production and nutrition, often face barriers in accessing resources like land, credit, and technology. Gender inequalities limit their productivity and contribution to the food system.

Table 18: Strengths and Weakness of Food System in Kenya

3.7. FOOD SYSTEM POLICY AND STRATEGIC GAPS

Kenya has drawn up several strategic documents and policies intended to guide the country towards achieving food security. These include the Elgeyo Marakwet County Integrated Development Plan 2023-2027, Vision 2030; the Agriculture Sector Transformation and Growth Strategy (ASTGS) 2019–2029, National Food and Nutrition Security Policy, Agriculture Policy 2021 and national adaptation plan and drought management strategies to curb drought emergencies at the national level.

Other key national laws in the food flow landscape are the Public Health Act Cap, 242 Laws of Kenya, and Food Drugs & Chemical Substances Act Cap. 254, Agriculture Act Cap 318, Plant Protection Act Cap 324 (in case of fruits & vegetables), Seeds & Plant Varieties Act Cap 326 (imported seeds or seed crops with a potential to grow when planted), Dairy Industry Act Cap 336, Meat Control Act Cap. 356 and the Fisheries Act Cap. 378. At the regional and continental level, there is the African Union Kampala Declaration and the United Nations post-2015 goals at the global level[20].

Gaps in Policy Implementation

Budgetary Allocation: The budgetary allocation to the agriculture sector is approximately 3%, with combined public investments at the national and the county level, falling short of the 10% targeted in the Kampala Declaration. The case is also the same for county governments, where agriculture is devolved. For example, Elgeyo Marakwet County only allocated 2.7% of their budget for Financial Year 2024-2025[21] to agriculture. Low budgetary allocations, low private sector investments and poor credit availability restrict the overall development of the sector and hampers the provision of adequate, safe and diverse food to the population[22].

[20] Mutea et al., 2022
[21] Elgeyo Marakwet County Budget FY 2024-2025
[22] FAO, European Union and CIRAD. 2023

Inadequate Policy Guidelines on Bio-Fortified Crops: The findings revealed that there is a general lack of clear government policies on bio-fortified crops and food fortification. Respondents expressed that they were unaware of any established policies, and in many instances, knowledge about policies was limited. The findings indicated that while there are initiatives, such as the provision of Nyota seeds and other bio-fortified foods, these efforts are not backed by formalized governmental policies at county and national levels.

Operational Gaps: The findings revealed that while there are some regulations in place to support livestock trade and forestry, there are operational gaps that need to be addressed. For instance, the introduction of inter-county transport permits has helped reduce cattle theft, but farmers face challenges with new taxation policies on grazing in government forests. While soil conservation policies exist such as tree planting initiatives, there is a lack of follow-up and support to ensure their practical implementation. Addressing these operational gaps will improve policy efficacy and help enhance food systems.

CHAPTER FOUR: STUDY FINDINGS- TANZANIA

4.1. DEMOGRAPHIC PROFILE AND CHARACTERISTICS

4.1.1. GENDER OF RESPONDENTS

The gender distribution among producers was 49.6% male, 50.0% female, and 0.4% intersex. The consumer category reported a gender disparity. 41.1% were male, while 58.9% were female. 74.4% of traders were male and only 25.6% were female.

	Male (%)	Female (%)	Intersex (%)
Producers (N=234)	49.6 %	50.0 %	0.4 %
Consumers (N=95)	41.1 %	58.9 %	
Traders (N=90)	74.4 %	25.6 %	

Figure 10: Gender of Respondents in Tanzania

4.1.2. AGE OF RESPONDENTS

Among the Producers, the majority of respondents were between the ages of 36-45 years, accounting for 24.8%, followed closely by those in the 26-35 years cohort, who made up 22.2%. Producers, aged 18-25 years, represented 9.4%, and those above 66 years were only 5.6%. The largest cohort of respondents among consumers was in the 36-45 years age range, representing 25.0% of respondents, followed by the 26-35 years group at 24.0%. 56-65 years, accounted for 13.5%. 18-25 years and Above 66 years each reported 9.4% and 6.3% respectively. In the case of Traders, 26-35 years and 36-45 accounted for 30.0% of traders. 18-25 years were 11.1%. However, the 56-65 years and Above 66 years categories had the smallest representation, at 6.7% and 1.1%, respectively.

Age category	Producers	Consumers	Traders
Between 18-25years	9.4%	9.4%	11.1%
Between 26-35 years	22.2%	24.0%	30.0%
Between 36-45 years	24.8%	25.0%	30.0%

Between 46-55 years	22.2%	21.9%	21.1%
Between 56-65 years	15.8%	13.5%	6.7%
Above 66 years	5.6%	6.3%	1.1%
Total	**100%**	**100.0%**	**100.0%**

Table 19: Age of Respondents in Tanzania

4.1.3. MARITAL STATUS OF RESPONDENTS

78.6% of producers were married. Never-married/single individuals represented 11.5% of producers, while widowed respondents were 5.6%. Smaller were separated (3.4%) or divorced (0.9%). Among consumers, 66.7% were married. The never-married/single group made up 16.7%. Widowed consumers represented 8.3%, while separated individuals were 5.2%, and divorced individuals made up 3.1%. The highest proportion of traders, 82.2%, were married. The never-married/single category represented 12.2% of traders. Widowed traders were 2.2%, with divorced (1.1%) and separated (2.2%) traders.

Marital Status	Producers	Consumers	Traders
Never married/ single	11.5%	16.7%	12.2%
Married	78.6%	66.7%	82.2%
Separated	3.4%	5.2%	2.2%
Divorced	0.9%	3.1%	1.1%
Widowed	5.6%	8.3%	2.2%
Total	**100.0%**	**100.0%**	**100.0%**

Table 20: Marital Status of Respondents in Tanzania

4.1.4. EDUCATION LEVEL OF RESPONDENTS

Producers: The majority of producers (71.8%) had completed primary school. A smaller percentage (17.1%) reported having no formal education. Only 9.4% of producers had completed secondary education, and 0.9% had attended vocational training or university.

Consumers: 67.7% of respondents had completed primary school. A slightly lower percentage (16.7%) of consumers reported having no formal education. Secondary school completion was reported by 12.5% of consumers, while vocational and university education were 2.1% and 1.0%, respectively.

Traders: 22.2% of traders had completed secondary school. The proportion of traders with no education was low (2.2%). In addition, 72.2% of traders had completed primary school. Only 2.2% had attended vocational college, and 1.1% had pursued a university education.

Education Level	Producers	Consumers	Traders
None	17.1%	16.7%	2.2%
Primary completed	71.8%	67.7%	72.2%
Secondary completed	9.4%	12.5%	22.2%
Vocational training college	0.9%	2.1%	2.2%
University	0.9%	1.0%	1.1%
Total	100.0%	100.0%	100.0%

Table 21: Education Level of Respondents in Tanzania

4.1.5. DISABILITY STATUS

Producers: The results among producers indicate that disabilities are relatively uncommon within this group, with all categories reporting at least 98.3% without difficulty. Visual disability is the most prevalent, affecting 1.7% (4), followed by mobility disability at 0.9% (5). Hearing, cognitive, and self-care disabilities each affect 0.9% (2), while communication is the least common, impacting only 0.4% (1).

	No disability	With disability
Visual impairment	230 (98.3%)	4 (1.7%)
Hearing impairment	232 (99.1%)	2 (0.9%)
Mobility impairment	229 (99.1%)	5 (0.9%)
Cognitive impairment	232 (99.1%)	2 (0.9%)
Self-Care impairment	232 (99.1%)	2 (0.9%)
Communication impairment	233(99.6%)	1 (0.4%)

Table 22: Disability Status of Producers in Tanzania

Traders: Data on traders indicate that disabilities are rare in this group. Visual and cognitive disabilities are the only reported challenges, each affecting 1.1% (1).

	No disability	With disability
Visual impairment	89 (98.9%)	1 (1.1%)
Hearing impairment	90 (100.0%)	0 (0.0%)
Mobility impairment	90 (100.0%)	0 (0.0%)
Cognitive impairment	89 (98.9%)	1 (1.1%)
Self-Care impairment	90 (100.0%)	0 (0.0%)
Communication impairment	90 (100.0%)	0 (0.0%)

Table 23: Disability Status of Traders in Tanzania

Consumers: The findings among consumers shows that disabilities are minimal within this group. All respondents reported no visual or communication impairments. Hearing, mobility, cognitive, and self-care each affect only 1.1% (1).

	No disability	With disability
Visual impairment	95 (100.0%)	0 (0.0%)
Hearing impairment	94 (98.9%)	1 (1.1%)
Mobility impairment	94 (98.9%)	1 (1.1%)
Cognitive impairment	94 (98.9%)	1 (1.1%)
Self-Care impairment	94 (98.9%)	1 (1.1%)
Communication impairment	95 (100.0%)	0 (0.0%)

Table 24: Disability Status of Consumers in Tanzania

4.2. FOOD SUPPLY CHAIN DISTRIBUTION

4.2.1. INPUT SUPPLY

Source of Farm Inputs: The study also ascertained that the majority of the farmers acquired their farm inputs from the local markets (88.3%), while from the government (12%), from companies (10.8%), outlets (7.9%) and farmer groups (2.8%) as shown in the table 25 below. The study established that the affordability of agricultural inputs, particularly seeds and fertilizers, is a major constraint for farmers. Subsidy programs helped to bridge the gap but were not always sufficient. Despite the huge subsidy program by the government, the majority of farmers (84.2%) reported facing challenges in acquiring inputs.

Source of Farm inputs	Male	Female	Intersex	Total
Local Market	88.3%	88.2%	100%	88.3%
Government	16.2%	7.8%	0.0%	12.0%
Supplier Outlets	8.1%	7.8%	0.0%	7.9%
Companies	9.9%	11.8%	0.0%	10.8%
Farmer Groups	2.7%	2.9%	0.0%	2.8%

Table 25: Sources of Farm Inputs

Access to Seeds: Discussions with farmers revealed that despite efforts from the government and other stakeholders supporting farmers acquire quality seeds, there is still a huge gap as the majority of farmers are still facing challenges of limited skills, financial constraints, accessibility etc. Availability of certified seeds has increased due to initiatives from the government and private sector. The study noted that there is a persistent challenge of limited access to high-quality seeds, significantly impacting crop resilience and productivity.

*"Government support that we see is through the agricultural officers. For the side of NGOs there is World Vision which has been very important in our community since it was introduced. World Vision has become more important for us since they have given us good support including the distribution of fortified sweet potato seeds and provision seminar about balanced diet. "- **FGD with Producers, Shinyanga District, Mwalukwa Ward***

Access to Fertilizers: Tanzania relies on imports for most fertilizers, leading to issues with timely availability and fluctuating prices. Efforts like the Fertilizer Subsidy Program aim to make fertilizers more accessible to farmers. The study established that the government played a key role in enhancing access to fertilizers by offering subsidies. Respondents reported that during planting seasons, the government registered farmers and provided fertilizers at 50% prices below the market price

Factors Promoting Access to Farm Inputs: This survey established that agricultural production in Shinyanga Region, Tanzania is currently receiving multi-stakeholder support from the government, non-governmental organizations (NGOs), and private companies. The Tanzanian government provide subsidies on fertilizers and seeds to enhance accessibility for smallholder farmers. NGOs and other private sector support farmers with inputs including both Indigenous and improved seeds.

Policies like the National Agriculture Policy and Kilimo Kwanza ("Agriculture First") aim to address systemic issues in input availability and use. Collaborations between the government, private sector,

and international organizations have helped improve the availability of inputs e.g. seed multiplication, and research.

Challenges in Access to Farm Inputs: The input supply chain in Shinyanga region, Tanzania is characterized by concerted efforts by many actors to respond to the farmers' increasing demands. Despite these efforts, the majority of farmers reported experiencing challenges in accessing farm inputs. Many smallholder farmers face difficulties in accessing high-quality seeds, appropriate fertilizers, and effective pesticides. This challenge is compounded by the limited presence of input suppliers in rural areas, where the majority of farming activities occur. Farmers often rely on local markets that may not offer a wide variety of inputs or may provide products of inconsistent quality.

High prices of seeds, fertilizers, and other inputs, lack of financial resources to purchase inputs, unavailability of quality seeds and fertilizers, long distances to input markets, delays in receiving farm inputs from government authorities, insufficient local suppliers or distributors, price fluctuations and lack of constant pricing, biased distribution of inputs by local authorities, lack of proper infrastructure for input access and counterfeit Products infiltrating local markets reducing trust among farmers – ***FGD with Producers, Mangu Village***

4.2.2. PRIMARY PRODUCTION

Food Production Practices: The study established that the majority of the farmers (91.5%) practised crop farming, while only (6.0%) practised livestock framing and subsistence farming (2.1%) respectively. Key agricultural produce from both crops and livestock farming in the Shinyanga region include watermelon, mangoes, pawpaw, bananas, cucumbers, spinach, Chinese cabbage, pumpkin leaves, cabbage, sweet potatoes, carrots, amaranth (*Mchicha*), eggplant, okra, cotton, sunflower, maize, rice, groundnuts, millet, sorghum, lentils, mung beans, green peas, cowpeas, green grams (*Choroko*), cows, goats, sheep, poultry, donkey, pigs etc

Type of Agricultural Production	Male	Female	Intersex	Total
Crop Farming	92.2%	91.5%	0.0%	91.5%
Livestock Farming	6.0%	6.0%	0.0%	6.0%
Subsistence Farming	1.7%	1.7%	100.0%	2.1%
Other	0.0%	0.9%	0.0%	0.4%
Total	100.0%	100.0%	100.0%	100.0%

Table 26: Type of Primary Agricultural Production in Shinyanga Region

Factors Promoting Food Production: The respondents revealed that the type and choice of crops being farmed were majorly influenced by; the climatic conditions (rainfall, temperature), soil fertility, availability of land, available capital, type of farm inputs (seeds, fertilizers) available, family consumption and market demand and cultural beliefs. The average land size per h/hold was 5.1026 acres, out of which the mean farm size per household under cultivation was 4.4145 acres.

N	Minimum	Maximum	Mean	Std. Deviation	Variance
234	0.00	37.00	5.1026	4.93544	24.359

Table 27: Average Farm Size Acreage per Household

The findings revealed that selling organic manure provides an important opportunity for generating additional income. Farmers reported that they can leverage the sale of manure as a by-product of their farming activities, creating a secondary revenue stream. This opportunity enables farmers to meet their basic needs while also improving soil quality, which contributes to enhanced food production in the long term.

Factors Affecting Food Production: The study revealed that the majority of the respondents felt that their production challenges were climate-related (97.85%), 88.4% felt it was pests related, 52.9 % soil related, while 15.9% and 15.1% degradation and shortage of farming land respectively as shown in the table 28 below. Discussions with producers revealed that inadequate water resources were a significant challenge, as reported during interviews with various respondents. Drought conditions and irregular rainfall exacerbate water scarcity, limiting the capacity for effective irrigation and crop growth. The absence of reliable water sources hampers farming efforts, making plants more vulnerable to diseases and pests.

	Male	Female	Total
Climate	99.1%	96.6%	97.8%
Pests	87.0%	89.7%	88.4%
Soil	47.8%	58.1%	52.9%
Degradation	9.6%	22.2%	15.9%
Shortage of Farming Land	16.5%	13.7%	15.1%
Other		2.6%	1.3%

Table 28: Factors Affecting Food Production in Shinyanga region

The study also noted that crop diseases and pests play a critical role in reducing food yields, contributing to food scarcity. Respondents shared experiences of pest infestations and disease outbreaks that significantly affected staple crops such as maize and beans. These challenges, coupled with limited access to pest control solutions, reduce overall food availability and exacerbate periods of scarcity, particularly from January to March.

*"Pests and Diseases, the rise in pest populations and plant diseases can devastate crops and now is a disaster to our area, hence to address it we buy fumigation and other inputs from outlets. Regarding soil degradation, to improve soil health we use organic manure because fertilizers are very expensive."- **FGD with Producers, Iboja Village***

Role of Women in Agricultural Production The study established that women play a central role in food systems, particularly in agricultural activities such as land preparation, planting, weeding, harvesting, and post-harvest processing. Women are considered the backbone of the agricultural workforce in the Shinyanga region, with many engaging in both subsistence and commercial farming. From the interviews held with community members, it was evident that women are the primary decision-makers in household food management, determining food preparation and distribution. However, this responsibility varies, as not all families rely on women in these roles, suggesting potential variations in gender roles within different households or communities.

*"Women are the backbone of the agricultural workforce, engaging in various tasks such as planting, weeding, harvesting, and post-harvest processing. Many women are smallholder farmers who cultivate crops for both subsistence and commercial purposes. Women are primary caretakers of household food, making decisions about food preparation and distribution but it's for some families, not all. "- **FGD with Youth Consumers, Mwakipoya Village***

4.2.3. FOOD PROCESSING

Sources of Food Processing: The study established that food in Shinyanga region is processed on site (22.6%), outsourced (6.4%), factory (40.6%) and other unnamed sources (30.4%). Key actors involved in food processing activities mentioned by the respondents engaged include farmers, brokers, processors, wholesalers, machinery owners, workers at milling factories and government officials.

	Male	Female	Intersex	Total
On-site	25.0%	20.5%		22.6%
Outsourced	5.2%	6.8%	100%	6.4%
Factory	40.5%	41.0%		40.6%
Other	29.3%	31.7%		30.4%
Total	100%	100%	100%	100%

Table 29: Sources of Food Processing

Types of Food Processed: The main processing done in the region is maize, and sorghum/ millet processing into flour and rice milling. Maize flour is one of the most common processed products, serving as a staple food in the form of "*ugali*". Rice milling is also significant, with local varieties being processed for both local consumption and external markets.

The findings also noted that most fruits whether grown in the area or imported from other regions are processed into juices mainly by small vendors as mango juice and passion juice. However, there is limited engagement in processing of dairy produce like fresh milk, butter, and cheese. This is mainly undertaken by small vendors who undertake the value addition to increase their profit margins.

Food Processing Techniques and Technologies: Traditional food processing is prevalent in rural areas, where methods like sun-drying, chopping, milling, sieving & sifting, packaging, washing/ cleaning, grading, cooking & heating, smoking, and fermentation are commonly employed to preserve food. In contrast, urban centres and commercial operations utilize modern technologies including canning, freezing, and vacuum packaging. Despite these advancements, the sector still faces challenges related to the adoption of new technologies, with many small and medium enterprises (SMEs) relying on outdated technologies and equipment due to financial constraints.

Factor Promoting Food Processing: The study revealed that processors play a significant role in adding value to raw agricultural products, primarily through methods like milling and packaging. These activities enhance the marketability of food, making it more accessible to larger consumer bases, including urban and international markets. Food processing also provides local employment opportunities, creating income sources for community members. By processing food, processors

contribute to boosting farmers' income by facilitating their access to wider markets. This value-added process is essential for bridging local agricultural production with broader economic growth.

*"We enhance the value of raw agricultural products through methods such as milling and packaging. This improves the marketability of food. Food processing creates employment opportunities in local areas, hence the source of income. By processing food, they enable farmers to access larger markets beyond local communities. Processed products can reach urban consumers and even international markets, which can significantly increase farmers' incomes. The milling process in our area includes cleaning, grinding, and packaging cereals like Maize into flour and threshing rice."-**FGD with Processors, Singita Village***

Challenges in Food Processing: The findings indicated that a key opportunity for supporting Food processing lies in providing training programs aimed at local processors to improve their knowledge and skills in modern processing techniques. Processors cited inconsistent quality and supply of raw materials as a major challenge. Inadequate infrastructure, particularly in rural areas, affects the efficiency of food processing operations. Issues such as unreliable power supply, poor road networks, and inadequate water supply were reported by processors to increase production costs hence reducing competitiveness.

Role of Women in Food Processing: The study indicated that women play a central role in food processing, with many engaged in both agricultural labour and post-harvest processing activities. Women are involved in a wide range of tasks, including harvesting, land preparation, sorting, and food processing such as milling, chopping, and washing. In addition, women often run small-scale processing businesses, turning raw products into value-added goods.

*"Women are the backbone of the agricultural workforce, engaging in various tasks such as planting, weeding, harvesting, and post-harvest processing. Many women are smallholder farmers who cultivate crops for both subsistence and commercial purposes. Women are primary caretakers of household food, food preparation, and distribution but it's for some families, not all. Small-Scale Processing, many women operate small-scale processing businesses, transforming raw agricultural products into value-added goods like flour, oils, and preserves."-**FGD with Processors, Singita Village***

4.2.4. TRANSPORT/ LOGISTICS

Modes of Transport: In Shinyanga, the agricultural sector's logistics are characterized by a network that connects rural production areas with urban markets. The majority of agricultural produce is transported by road due to the limited reach and capacity of rail and water transport systems. The main means of transportation as per the respondents are hand carts (59.3%), bicycles (48.9%), motorbikes (32.2%), physically by person (16.3%), and trucks (13.8%).

	Male	Female	Intersex	Total
Trucks	14.7%	12.8%		13.8%
Hand Carts	62.1%	56.4%		59.3%
Motorbikes	37.1%	27.4%		32.2%
Bicycles	44.8%	53.0%		48.9%
Physical by Person	15.5%	17.1%	100%	16.3%
Others	0.9%			0.4%

Table 30: Modes of Transport

Challenges Affecting Food Transportation: The findings revealed that poor road conditions significantly hinder food production and distribution. Interviews highlighted that roads in the area are mostly rough and poorly maintained, causing delays in the transportation of crops from farms to markets. This often leads to spoilage of perishable goods and increased transportation costs, negatively impacting the profitability of farming activities. Farmers struggle to access markets on time, reducing their earnings and motivation to engage in agricultural activities. Poor road connectivity limits the efficiency and timeliness of food flow along agricultural value chains.

"We rely on individual arrangements with small-scale transporters, which can be unreliable and inefficient. Furthermore, the absence of adequate storage facilities, such as cold chains for perishable products, exacerbates the risk of spoilage during transit. These logistical gaps not only lead to financial losses for us but also contribute to food insecurity by affecting the supply of food products in markets" – ***KII with Transporter, Mwalukwa town***

4.2.5. MARKET AND RETAIL

Access to Markets: The findings established that markets for Tanzanian agricultural products are diverse, encompassing local informal markets, formal retail chains, and international markets. The findings noted that majority, 64% of the traders were selling their products at local markets, followed by at home (62.3%), road side (18.1%) and regional markets (1.3%). At the local level, most agricultural products are sold in either developed designated markets, open-air markets or through roadside stalls. Respondents engaged during the study noted that these informal markets are crucial for smallholder farmers who depend on them to sell perishable goods directly to consumers.

	Male	Female	Intersex	Total
At Home	62.1%	62.4%		62.3%
Road Side	20.7%	15.4%	100%	18.1%
Local Market	70.7%	57.3%	100%	64.0%
Regional Markets	0.9%	1.7%		1.3%
International Markets		0.9%		0.4%
None	10.3%	19.7%		15.0%
Other	0.9%	4.3%		2.6%

Table 31: Types of Markets in Elgeyo Marakwet

Commodities Traded in Markets: According to the study, the majority of the traders were dealing with cereals (83.1%), other cash crops (28.0%), Fresh vegetables (16.8%), livestock products (11.1%), other vegetable oil-containing food commodities (8.1%) and fish/ meat at 2.2%.

	Male	Female	Total
Cereals	79.1%	87.0%	83.1%
Fresh vegetables and/or fruit	11.9%	21.7%	16.8%
Other vegetables, oil containing food commodities	7.5%	8.7%	8.1%
Other cash crops	34.3%	21.7%	28.0%
Livestock	17.9%	4.3%	11.1%
Fish and/or meat	0.0%	4.3%	2.2%
Other (specify	1.5%	0.0%	0.8%

Table 32: Commodities Traded in Markets

Source of Agricultural Products: The study also established that consumers preferred to purchase organic foods from local markets (58.3%), while 46.9%) purchased directly from farmers, 13.5% from retailers, 9.45% from suppliers and 6.3% from wholesalers. Discussions with respondents noted that the markets often lack proper infrastructure, which leads to significant post-harvest losses due to inadequate storage facilities and exposure to the elements.

Source Of Agricultural Products	Male	Female	Total
Local market	67.5%	51.8%	58.3%
Suppliers	17.5%	3.6%	9.4%
Wholesalers	10.0%	3.6%	6.3%
Retailers	7.5%	17.9%	13.5%
Direct from farmers	30.0%	58.9%	46.9%
Other (Own Farm)	22.5%	5.4%	12.5%

Table 33: Preferred Source of Agricultural Products

Role of Middlemen: The findings revealed that middlemen significantly influence the pricing of food products by adding markups on the prices paid to producers before selling to consumers. These additional costs reduce the profit margins for farmers, as middlemen often negotiate lower prices for producers while increasing prices for consumers. This dynamic is particularly noticeable when few middlemen dominate the market, giving them leverage to set prices that do not always reflect the actual costs of production or market demand. As a result, farmers may earn less for their produce, and consumers may face higher prices due to these intermediaries

Challenges in Food Marketing: Despite the marketing and retailing environment in Tanzania's agricultural sector offers significant opportunities for growth, it is currently hindered by structural inefficiencies and limited market access. Barriers to market accessibility for producers include; low prices from middlemen, inadequate transportation and poor infrastructure, shortage of buyers or customers, long distances to reach markets, lack of capital for transportation, high taxes in the market, and limited knowledge of marketing strategies for farm produce.

Role of Women in Food Marketing: This survey also established that despite women being the majority labour contributors in the production of agricultural products at the farm level, their male counterparts were responsible for the marketing of the products (66.7%), while only 8.9% of women had the opportunity.

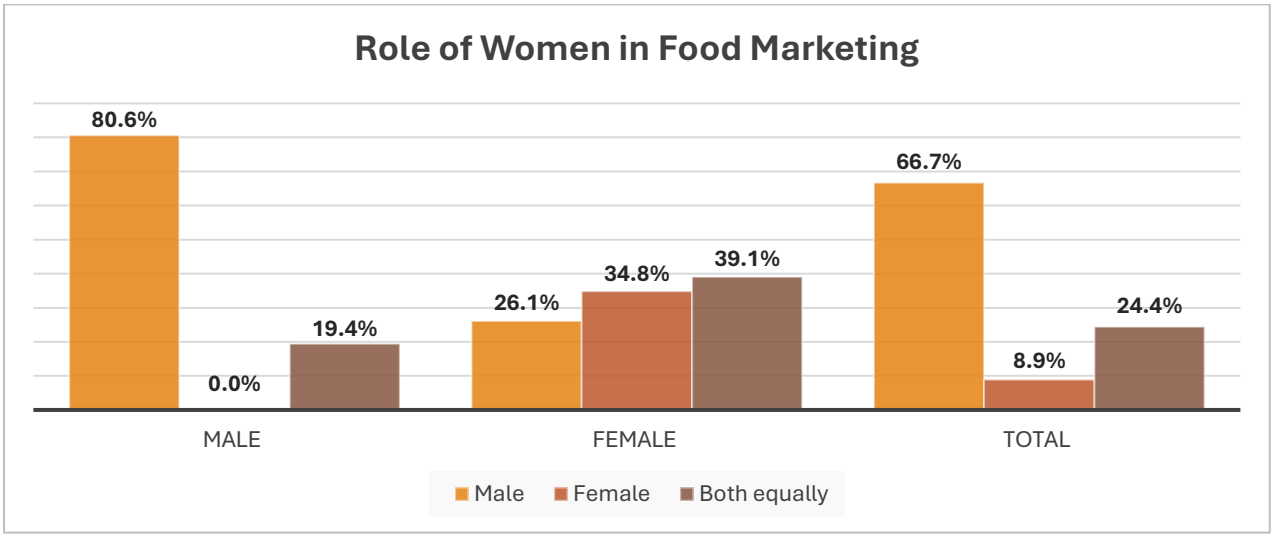

Figure 11: Role of Women in Food Marketing

4.2.6. FOOD CONSUMPTION PATTERN

Consumption Patterns: Consumption patterns of agricultural produce in Tanzania reflect a blend of traditional dietary preferences and modern influences, largely driven by socioeconomic factors, cultural practices, and demographic trends. The findings established that an overwhelming majority of the respondents engaged through survey questionnaires were consuming organic food. The respondents engaged cited that they were consuming organic cereals and pulses, fruits and vegetables, dairy products, meat, bread, pasta, roots and tubers.

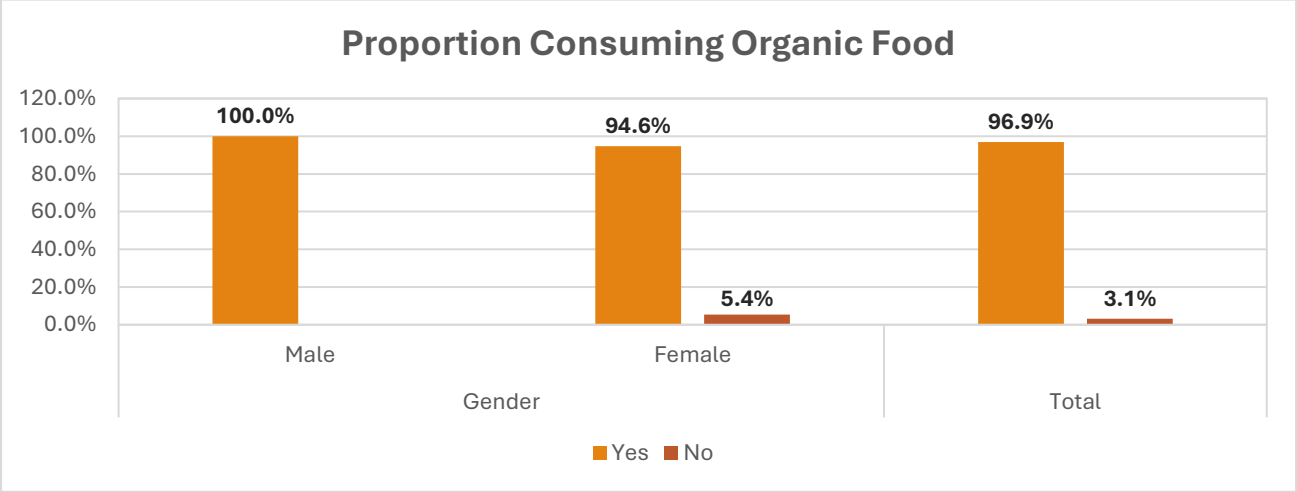

Figure 12: Proportion Consuming Organic Food

Dietary Quality: Similar to Kenya, cereals form a significant portion of the diet (80.2%), emphasizing their dietary importance. Consumption of vitamin A-rich vegetables and tubers and other vegetables is substantial (33.3% and 27.1% respectively), while other fruits are consumed less frequently (4.2%). Dark green leafy vegetables show moderate daily consumption (33.3%). Flesh meats and eggs represent a moderate portion of the daily diet. White roots and tubers (e.g. potatoes, yams) contribute more to the daily diet than in Kenya or Somalia.

Dietary Patterns: Cereals were the main staple foods for a significant portion of the population consumed daily by 80.2% of respondents. The major cereals consumed were maize, rice, sorghum, and

beans, which compose the daily diet staple across many households, especially in rural areas. Rice is both a staple and a ceremonial food, often featured in celebrations and special occasions. Other important staples include cassava, sorghum, and various types of beans and pulses, which are integral to the local diets.

Food Group	Daily	Often	Sometimes	Never
CEREALS: corn/maize, rice, wheat, sorghum, millet or any other grains or foods made from these (e.g. bread, noodles, porridge or other grain products) + insert local foods e.g. ugali, porridge	80.2%	9.4%	10.4%	0.0%
WHITE ROOTS AND TUBERS: white potatoes, white yam, white cassava, or other foods made from roots	11.5%	51.0%	36.5%	1.0%
VITAMIN A RICH VEGETABLES AND TUBERS: pumpkin, carrot, squash, or sweet potato AND TUBERS pumpkin, carrot, squash, or sweet potato that are orange inside + other locally available vitamin A-rich vegetables (e.g. red sweet pepper)	18.8%	33.3%	45.8%	2.1%
DARK GREEN LEAFY VEGETABLES: Dark green leafy vegetables, including wild forms + locally available vitamin A (managu, mrenda, terere) rich leaves such as amaranth, cassava leaves, kale, spinach	21.9%	33.3%	41.7%	3.1%
OTHER VEGETABLES: other vegetables (e.g. tomato, onion, eggplant) + other locally available coloured vegetables	24.0%	27.1%	45.8%	3.1%
VITAMIN A RICH FRUITS: ripe mango, cantaloupe, apricot (fresh or dried), ripe papaya, dried peach, and 100% fruit juice made from these + other locally available vitamin A-rich fruits		12.5%	76.0%	11.5%
OTHER FRUITS: Other fruits, including wild fruits and 100% fruit juice made from these	1.0%	4.2%	64.6%	30.2%
FLESH MEATS: beef, pork, lamb, goat, rabbit, game, chicken, duck, other birds, insects	1.0%	12.5%	67.7%	18.8%
EGGS eggs from chicken, duck, guinea fowl or any other egg	2.1%	5.2%	61.5%	31.3%
LEGUMES, NUTS AND SEEDS: dried beans, dried peas, lentils, nuts, seeds or foods made from these (e.g. peanut butter)	10.4%	24.0%	43.8%	21.9%
MILK AND MILK PRODUCTS: milk, cheese, yoghurt or other milk products		4.2%	65.6%	30.2%
OILS AND FATS: Oil, fats or butter added to food or used for cooking	21.9%	14.6%	57.3%	6.3%
SWEETS: sugar, honey, sweetened soda or sweetened juice drinks, sugary foods such as chocolates, candies, cookies and cakes	9.4%	7.3%	64.6%	18.8%
SPICES, CONDIMENTS, BEVERAGES: spices (black pepper, salt), condiments (soy sauce, hot sauce), coffee, tea, alcoholic beverages	13.5%	12.5%	50.0%	24.0%

Table 34: Food Consumption Patterns in the Shinyanga Region

Factors Influencing Food Consumption Patterns: The study noted that diets in the area are heavily reliant on staple foods such as maize, rice, and sweet potatoes. These staples form the bulk of meals due to their availability and affordability. However, this dependency often results in a lack of dietary diversity, as essential food groups like proteins, fats, vitamins, and minerals are underrepresented in daily meals.

*"We eat foods such as Rice, Sweet potatoes, dry sweet potatoes (Maphalage) and Ugali because foods that completely balanced diet are unavailable. Limited access to some foods, leads to stunted growth in our children and weakened immune systems hence there are issues of malnutrition in this area, also we don't have money to afford to buy all the foods to complete a balanced diet based on one type of food especially local food like Maphalage (dried sweet potatoes)."- **FGD with consumers in Shinyanga region.***

The study established that cultural practices significantly influence what and how food is consumed. For example, in some cultures within Tanzania, certain foods are considered taboo or are specifically consumed during particular life events or seasons. Additionally, traditional cooking methods and local cuisines play a role in shaping the demand for specific types of agricultural produce. The consumption patterns of food are shaped by a complex interplay of demographic shifts, economic factors, and cultural traditions.

4.2.8. WASTE/DISPOSAL

Waste Management Practices: Agricultural waste primarily consists of crop residues, livestock manure, and by-products from the processing of agricultural goods such as husks, shells, and pulp. Proper management of these waste streams is crucial, as they can contribute to environmental degradation if not handled correctly. Common issues include improper disposal methods, such as open burning of crop residues and uncontrolled dumping of processing waste, which can lead to soil degradation, water contamination, and increased greenhouse gas emissions.

Challenges in Waste Disposal Management: According to the study, one of the primary challenges in managing agricultural waste in the Shinyanga region is the lack of infrastructure and technology tailored to waste treatment and recycling. Many small-scale farmers and processors lack access to the facilities necessary to convert waste into valuable by-products, such as compost or biogas. This limitation not only affects environmental health but also represents a missed opportunity for enhancing agricultural productivity and generating additional income.

*"The challenge with waste management in our area is also inadequate awareness and knowledge about sustainable waste management practices among farmers and processors which results in the continued reliance on traditional disposal methods that are harmful to the environment and public health" –**KII with District Trade Officer, Shinyanga District Council***

Opportunities to Promote Waste Disposal: Despite these challenges, the Tanzanian government, along with various non-governmental organizations (NGOs) and community groups, has started to address these challenges through a variety of initiatives. These programs often focus on education and training to promote better waste management practices, such as composting organic waste or converting animal manure into biogas. For example, In the Shinyanga region, the government with the support of NGOs and the private sector are implementing projects aimed at building local capacity for

biogas production in some rural areas, providing a sustainable solution for energy production while managing livestock waste.

4.3. FOOD ACCESSIBILITY

4.3.1. FACTORS INFLUENCING FOOD ACCESSIBILITY

Food accessibility within Tanzania's agricultural production sector is a critical issue, influenced by a combination of infrastructural, economic, and environmental factors. Food accessibility varies significantly between urban and rural areas. While urban centres often have better access to diverse food options through formal markets and supermarkets, rural areas face more significant challenges due to poor infrastructure and limited market presence. The rural population primarily relies on locally produced food, which can be susceptible to seasonal fluctuations and climatic impacts.

The findings also revealed that farmers in the area are encouraged to store enough food for household use, ensuring self-sufficiency between harvests. Farmers have been sensitized on the importance of storing crops and managing food supplies better to mitigate scarcity. This local awareness effort is supported by community-driven programs aimed at enhancing food security. Livestock, which are typically sold during times of scarcity, also serve as a buffer to sustain families.

4.3.2. BARRIERS TO FOOD ACCESSIBILITY

Economic Factors: Economic constraints significantly affect food accessibility. The purchasing power of households, particularly in rural and impoverished urban areas, limits their ability to access a nutritious and diverse diet. High transportation costs and the expenses associated with processing and marketing agricultural products often lead to higher food prices, exacerbating food insecurity among the lower-income population.

Climate Impact: The impact of climate change on agricultural productivity is another critical factor influencing food accessibility. Unpredictable weather patterns, including prolonged droughts and excessive rainfall, affect crop yields and disrupt food production cycles. These disruptions lead to localized food shortages and increased reliance on food imports, which are not readily accessible to poorer communities.

4.4. ENVIRONMENTAL IMPACT AND SUSTAINABILITY

4.4.1. ENERGY USE, WASTE GENERATION AND CARBON FOOTPRINT

Energy Costs: The findings established that high fuel costs limit the use of tractors and other farm machinery, leading to reliance on manual labor which is less efficient and can hinder timely planting and harvesting, impacting crop yields. Pumping water for irrigation is energy-intensive, and high energy costs can discourage farmers from utilizing irrigation systems, making them vulnerable to drought conditions. The findings also noted that inadequate access to electricity for proper storage and processing facilities leads to significant post-harvest losses due to spoilage, further reducing food availability.

Deforestation and Land Degradation: Agriculture in the Shinyanga region often involves the clearing of forests for crop cultivation and grazing, which leads to significant deforestation. This not only results in loss of biodiversity but also contributes to land degradation. The removal of trees without adequate reforestation leads to soil erosion and reduces the soil's ability to retain water, further degrading the land and reducing its productivity over time.

Climate Variability: The study established that the Shinyanga region faces significant challenges from climate change, particularly the unpredictability of rainfall patterns. According to the study respondents, droughts and floods have become more frequent, significantly affecting crop production and livestock farming. The study found that the lack of consistent rainfall limits the availability of water for irrigation, which directly impacts the growth of crops.

Soil Degradation: The findings established that soil degradation undermines agricultural productivity, as poor soil health affects crop growth and yields. Farmers reported that expensive fertilizers limit their ability to rejuvenate soils effectively. Instead, they rely on organic manure as a cost-effective alternative to improve soil quality. This strategy, while helpful, is insufficient for large-scale farming, pointing to the need for broader soil management interventions.

Water Resource Depletion: Irrigation is a critical component of agricultural productivity in Tanzania, especially in arid regions. However, inefficient water use and management practices have led to the depletion of water resources. Discussion with respondents during the study noted that limited water sources and over-reliance on surface water and groundwater for irrigation without sustainable management practices have led to water scarcity, affecting not only agriculture but also drinking water supplies for local communities.

Greenhouse Gas Emissions: The study respondents also noted that agricultural activities are contributing to greenhouse gas emissions through various sources including enteric fermentation in livestock, rice production, and the burning of agricultural residues. These emissions contribute to global climate change, which in turn impacts agricultural productivity and food security.

4.5. INEFFICIENCIES IN FOOD VALUE CHAINS

Poor Production: Production inefficiencies primarily arise from the use of outdated farming techniques and a lack of access to modern agricultural inputs. Many farmers in the Shinyanga region still rely on traditional farming methods, which are often less productive and more susceptible to environmental stresses e.g. rain-fed farming which sometimes leads to serious crop loss during prolonged dry spells. According to the producers interviewed during the study, there is also a significant gap in the adoption of improved seed varieties, fertilizers, and integrated pest management practices, which hampers yield potential and increases vulnerability to pests and diseases.

Post-Harvest Losses: A major shortfall within the Tanzanian food value chain is the high rate of post-harvest losses. These losses are largely due to inadequate storage facilities, poor handling practices, and a lack of proper transportation infrastructure. Many farmers do not have access to facilities that can protect harvested crops from moisture, pests, and spoilage. Additionally, the lack of refrigeration facilities for perishable goods like fruits and vegetables leads to significant wastage before these products can reach the market.

Limited Access to Market Information: There is also a notable inefficiency related to access to market information. Many smallholder farmers in Tanzania lack access to timely and accurate market information, which affects their decision-making regarding crop choice, production volumes, and selling strategies. This disconnect often results in supply-demand mismatches, where farmers either produce too much of a product, leading to reduced prices, or too little, missing out on potential income.

4.6. FOOD SYSTEM VULNERABILITIES

4.6.1. SUPPLY CHAIN DISRUPTIONS

Climate Vulnerability: Tanzania's agricultural sector is heavily reliant on rain-fed agriculture, making it highly susceptible to climate variability and extreme weather events such as droughts and floods. These climatic conditions can lead to significant fluctuations in agricultural productivity. Periods of drought result in crop failure and water scarcity, while excessive rainfall leads to flooding that destroys crops and soil nutrients. The unpredictability of weather patterns due to climate change further exacerbates these vulnerabilities, impacting food availability and increasing the risk of food insecurity

Economic Constraints: Economic factors present another layer of vulnerability within the food systems. Many smallholder farmers in Tanzania who contribute to over 75% of the country's agricultural output lack the financial resources needed for investments in improved farming technologies or inputs such as quality seeds, fertilizers, and pesticides. This limitation not only affects their crop yields but also their ability to respond to market demands effectively. Additionally, fluctuations in global commodity prices were cited to affect local market prices, impacting farmers' incomes and consumers' ability to afford food. High transportation and storage costs further strain the economic viability of farming in rural areas.

Social and Policy Challenges: Social factors, including land ownership issues especially among women who comprise the majority small smallholder farmers and access to education, also contribute to the vulnerability of food systems. Land tenure insecurity was cited as discouraging investment in sustainable agricultural practices, while limited educational opportunities restrict farmers' knowledge of modern agricultural techniques and business skills. Policy gaps and the lack of coordinated agricultural support services exacerbate these issues, leaving farmers without the necessary support to improve their productivity and sustainability.

4.6.2. STRENGTHS AND WEAKNESSES OF FOOD SYSTEMS

Strengths	Weaknesses
Access to Regional Markets: Tanzania is part of the East African Community (EAC) and the Southern African Development Community (SADC), which enables better access to regional markets and supports food trade and cross-border collaboration in agricultural initiatives. With its extensive coastline and abundant freshwater lakes like Lake Tanganyika and Lake Victoria, Tanzania has rich	**Infrastructural Deficiencies**: One of the primary sources of supply chain disruption in Tanzania is the inadequate infrastructure, particularly in rural areas where the majority of farming occurs. Roads in these areas are often poorly maintained, leading to significant accessibility issues, especially during the rainy season. This not only delays the transport of agricultural goods

fishing resources that contribute significantly to its food systems, providing both local consumption and export opportunities.	but also increases the risk of spoilage, particularly for perishable products like fruits and vegetables.
Diverse Agro-Ecological Zones: Tanzania has a variety of climates and agro-ecological zones, making it suitable for the production of a wide range of crops. From maize, rice, and cassava to coffee, tea, and tropical fruits, the country's diverse environments support a rich agricultural base**.**	**Logistical Challenges***:* Logistical inefficiencies also play a crucial role in disrupting the agricultural supply chain. Lack of proper storage facilities, including cold storage, leads to high levels of post-harvest losses. Farmers often have limited options for preserving the quality of their produce, which affects their ability to sell their goods at favourable prices or even maintain the viability of their produce until it reaches the market.
Presence of Smallholder Farmers: A significant portion of Tanzania's food production comes from smallholder farmers, which creates opportunities for local food systems and markets. These farmers contribute to the country's food supply, and with the right support, they can improve productivity and resilience.	**Market Dynamics:** Market dynamics contribute to supply chain disruptions through fluctuating demand and price volatility. Smallholder farmers, who make up a large portion of Tanzania's agricultural sector, often face difficulties in predicting market demand, leading to either oversupply or shortages of key commodities.
Innovations in Agricultural Practices: Farmers in Tanzania have been adopting innovative agricultural practices, such as climate-smart agriculture, drip irrigation, and the use of better seeds and fertilizers. These technologies help improve crop yields and make farming more sustainable.	**Economic and Financial Barriers:** Economic and financial barriers further exacerbate supply chain disruptions. Many farmers lack access to credit and financial services, which limits their ability to invest in improving their agricultural practices or adopting new technologies that could mitigate some of the risks associated with supply chain disruptions.
Increasing Focus on Nutrition and Dietary Diversity: Efforts are being made to promote better nutrition and diversify diets, with increased attention to fortification, food diversification, and the integration of traditional foods into modern diets.	**Social barriers:** Due to the cultural practices upheld by many communities, women have limitations in accessing resources e.g. land ownership. The patriarchal nature of the societies also hinders women from accessing education, and decision-making at h/holds level e.g. marketing of produce.

Table 35: Strengths and Weaknesses of Food Systems in Tanzania

4.7 FOOD SYSTEM POLICY AND STRATEGIC GAPS

Tanzania's agricultural sector, pivotal for food security and economic stability, exhibits several strategic gaps that hinder its effectiveness and efficiency. Addressing these gaps is crucial for enhancing the resilience and sustainability of the country's food systems. Some of the key policy gaps identified during the study were;

- **Lack of Integrated Supply Chain Management:** One of the major strategy gaps in Tanzania's agricultural sector is the lack of an integrated approach to supply chain management. The supply chains are often fragmented and inefficient, with smallholder farmers facing difficulties in accessing markets due to poor infrastructure, lack of storage facilities, and inadequate transportation. This results in high post-harvest losses and reduced profitability for farmers.
- **Insufficient Value Addition:** Tanzania has limited facilities for value addition, particularly in rural areas where most agricultural production takes place. Most agricultural products are sold

as raw materials, which fetch lower prices than processed goods. The strategic gap in promoting value-addition processes such as milling, drying, and packaging reduces the potential income for farmers and limits the economic benefits of agricultural activities.

- **Food Security Financing:** Agriculture contributes to about 30% of Tanzania's GDP, 30 % of export earnings and 2/3 of national employment. Although smallholder farmers represent 15 million people and cultivate 90 % of the land, there is limited financing available to agriculture in Tanzania. The findings revealed that Tanzania allocates 5.9% of their budget on agriculture which falls short of the 10% required under the Kampala Declaration.

CHAPTER FIVE: STUDY FINDINGS- SOMALIA

5.1. DEMOGRAPHIC PROFILE AND CHARACTERISTICS

5.1.1. GENDER OF RESPONDENTS

Among producers, male and female respondents were 63.8% and 36.2% respectively. In consumers, more than two-thirds (68.9), were female, while makes were 36.2%. Among the traders, males and females were 46.9% and 53.1% respectively

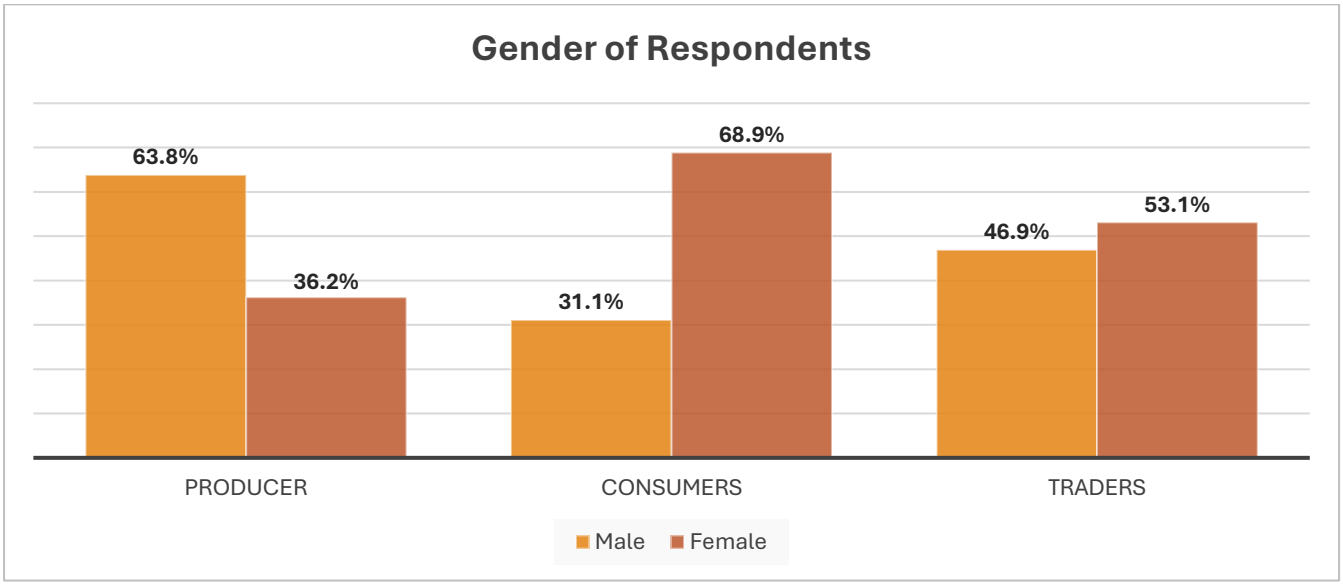

Figure 13: Gender of Respondents in Somalia

5.1.2. AGE OF RESPONDENTS

Table 38 below summarizes the age distribution of the respondents. Most of the producers were adults aged 34-45 years (30.7%). Among the consumers and traders, most of the respondents were aged between 26-35%, represented by 34.2% and 29.7% respectively. Amongst the three groups of respondents, people aged more than 66 years were the least respondents.

Age Category	Producer	Consumers	Traders
Below 18years	3.9%	1.6%	1.6%
Between 18-25years	6.3%	10.4%	17.2%
Between 26-35 years	22.0%	34.2%	29.7%
Between 36-45 years	30.7%	29.5%	28.1%
Between 46-55 years	27.6%	18.1%	15.6%
Between 56-65 years	7.9%	5.7%	7.0%
Above 66 years	1.6%	0.5%	0.8%
Total	100%	100.0%	100.0%

Table 36: Age of Respondents in Somalia

5.1.3 MARITAL STATUS OF RESPONDENTS

Producers: The majority of producers, (80.3%) reported being married. A smaller proportion of producers were separated (9.4%) or widowed (4.7%), while those who were never married were 5.5% of the respondents.

Consumers: Slightly more than two-thirds (69.9%) of the consumers were married while 14.0% were separated. Those who were widowed and never married were 7.3%, and 8.8% respectively.

Traders: A majority of traders (73.4%) were married. The proportion of traders who were separated was 12.5%, while 3.9% were widowed. Only 10.2% of traders never married.

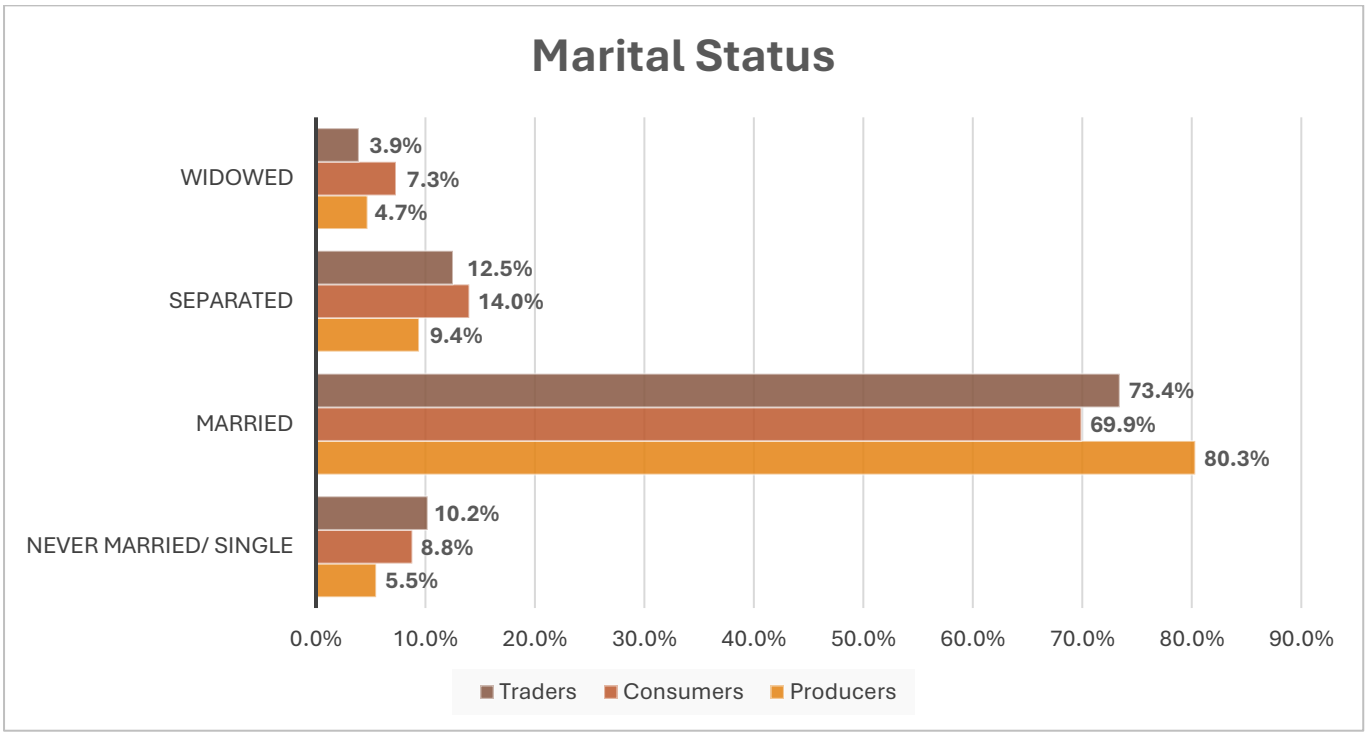

Figure 14: Marital Status of Respondents in Somalia

5.1.4 EDUCATION LEVEL OF RESPONDENTS

In summary, more than a third (37.8%) of the producers attended Madrasa education [23] as the primary form of learning, while 29.1% of producers had completed primary education. Only 6.3% had completed secondary education, and 3.1% had attained a university degree. Only 0.8% of the respondents had technical training, composed of polytechnic institutions while 1.6% had completed vocational training. Additionally, 6.3% of producers had accessed adult education. A third (30.1%) of the consumers had a Madrasa education. Completion of primary and secondary education was reported by 25.9% and 15.0% respectively. However, higher education levels were low, with only 5.2% of consumers having attained university degrees.

Participation in technical training programs was negligible, with 0.5% and 0.5% attending polytechnic and vocational training respectively. Adult education was reported in 1.6% of the consumers. A third of the traders (30.1%) had Madrasa education. Primary and secondary education were attained by

[23] Paul Brenton and Habtamu Edjigu (2021): A review of cross-border trade in the horn of Africa. horn of Africa regional economic memorandum background paper 3

25.9% and 15.0% of the traders, respectively. University education was attained by 5.2% of traders, technical training was attained by 0.5% of polytechnics or vocational programs. Adult education was accessed by 1.6% of traders.

Education Level	Producers	Consumers	Traders
None	15.0%	21.2%	21.2%
Primary completed	29.1%	25.9%	25.9%
Secondary completed	6.3%	15.0%	15.0%
Polytechnic	0.8%	0.5%	0.5%
Vocational training college	1.6%	0.5%	0.5%
University	3.1%	5.2%	5.2%
Adult education	6.3%	1.6%	1.6%
Madrasa	37.8%	30.1%	30.1%
Total	100.0%	100.0%	100.0%

Table 37: Education Level of Respondents in Somalia

5.1.5 DISABILITY STATUS

Producers: Findings on producers indicates that while most respondents do not experience impairment, visual disability is the most prevalent, affecting 11.8% (15). Hearing difficulty follows at 3.9% (5), while communication affects 3.1% (4). Mobility and cognitive impairment each impact 2.4% (3), and self-care is the least common at 0.8% (1).

	No disability	With disability
Visual impairment	112 (88.2%)	15 (11.8%)
Hearing impairment	122 (96.1%)	5 (3.9%)
Mobility impairment	124 (97.6%)	3 (2.4%)
Cognitive impairment	124 (97.6%)	3 (2.4%)
Self-Care impairment	126 (99.2%)	1 (0.8%)
Communication impairment	123 (96.9%)	4 (3.1%)

Table 38: Disability Status of Producers in Somalia

Traders: The data on traders shows that disabilities are relatively uncommon in this group. Visual impairment is reported by 1.6% (2), while hearing impairment affects 3.1% (4). No traders reported difficulties with mobility, cognitive function, self-care, or communication, with 100% of respondents in these categories indicating no disability.

	No disability	With disability
Visual impairment	126 (98.4%)	2 (1.6%)
Hearing impairment	124 (96.9%)	4 (3.1%)
Mobility impairment	128 (100.0%)	0 (0.0%)
Cognitive impairment	128 (100.0%)	0 (0.0%)
Self-Care impairment	128 (100.0%)	0 (0.0%)
Communication impairment	128 (100.0%)	0 (0.0%)

Table 39: Disability Status of Traders in Somalia

Consumers: Findings from consumers indicates that impairments are rare within this group, with at least 99% of respondents reporting no difficulty in all categories. Visual, hearing, mobility, and cognitive disabilities each affect only 0.5% (1). Self-care and communication challenges are slightly more prevalent, impacting 1.0% (2) each.

	No disability	With disability
Visual impairment	192 (99.5%)	1 (0.5%)
Hearing impairment	192 (99.5%)	1 (0.5%)
Mobility impairment	192 (99.5%)	1 (0.5%)
Cognitive impairment	192 (99.5%)	1 (0.5%)
Self-Care impairment	191 (99.0%)	2 (1.0%)
Communication impairment	191 (99.0%)	2 (1.0%)

Table 40: Disability Status of Consumers in Somalia

5.2. FOOD SUPPLY CHAIN DISTRIBUTION

5.2.1. INPUT SUPPLY

Accessibility to Farm Inputs: The study found that 83.9% of farm inputs were sourced from local markets. Other sources of farm inputs identified included government (17.5%), outlets (6.7%), farmer groups (8.8%), and directly from companies dealing with farm inputs (5.4%). The findings further revealed that 89.8% of the respondents reported that they have challenges in accessing farm inputs compared to 10.2% who reported no challenges. The major challenge was the prohibitive cost of the inputs and the lack of adequate knowledge of the existing appropriate inputs.

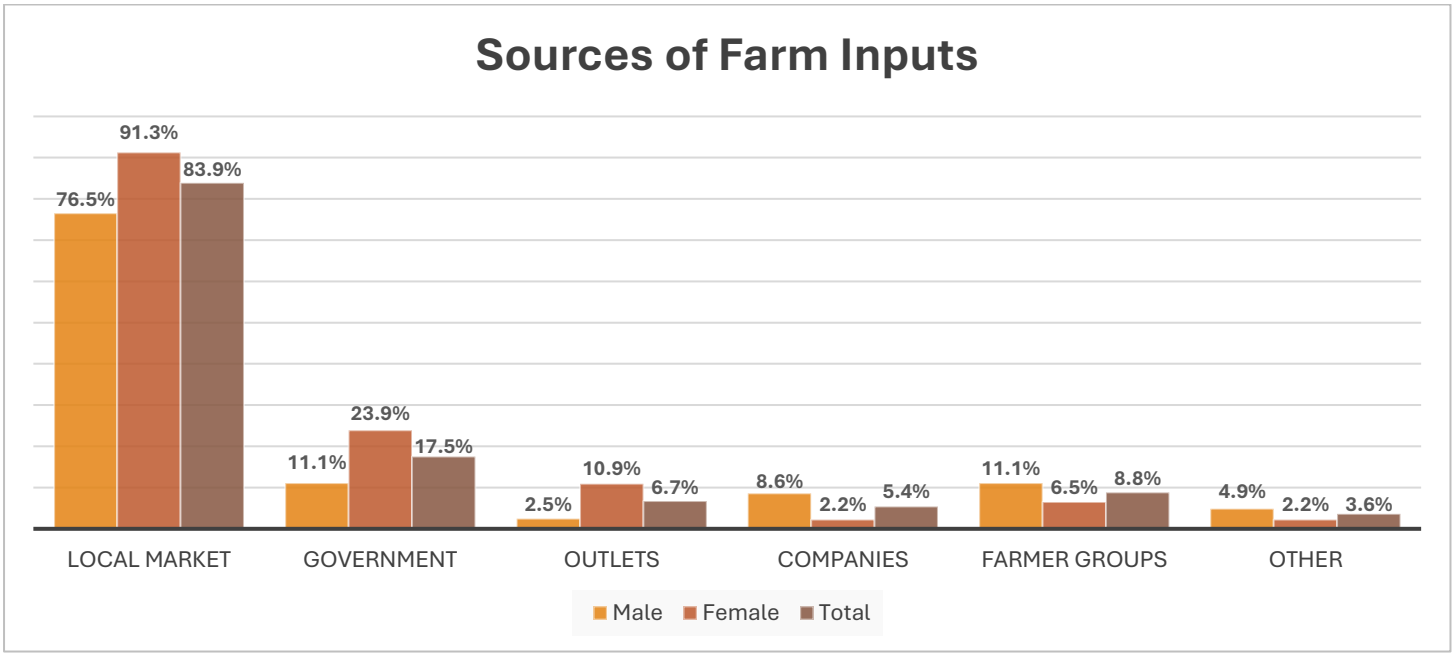

Figure 15: Sources of Farm Inputs for Farmers in Puntland

Access to Seeds: Discussions with producers during field visits revealed the farmers' limited access to quality seeds and fertilizers. Lack of drought-resistant or bio-fortified seeds hampered adaptation to climate-resilient farming, while lack of access to bio-fortified seeds in the local markets, made it difficult for farmers to improve agricultural production and food security.

"The availability of quality seeds, including drought-resistant and bio-fortified varieties, are limited due to their monetary value. Farmers tend to rely on traditional seeds that may not perform well under current climatic conditions. This lowers the yield. Also, fertilizers are expensive, hence some farmers settle for farming with animal wastes and wood ash." ***FGD with Producer – Eyl District.***

Access to Fertilizers: The study established that farmers relied on inorganic fertilizers which are obtained from agro-vets. The high cost of fertilizers forces farmers to underutilize them or avoid them all. There was a significant utilization of organic manure; however, due to limited knowledge and skills on the preparation of the organic manure among the farmers, its utilization is still low. Discussions with producers from the Dangorayo district indicated that most farmers depended on animal wastes and wood ash to improve soil fertility.

Access to Pesticides: Discussions with producers confirmed that agriculture in Puntland heavily relies on chemical pesticides purchased from agro-vets. The Government of Somalia, together with FAO, used bio-pesticides and Insect Growth Regulators (IGRs) exclusively to control pests. For instance, one fungus, *Metarhizium acridum*, used in Somalia has proven to be particularly effective in controlling locusts by feeding on the targeted insect, killing them in a week or two. However, the findings noted that despite the existence of these interventions to embrace bio-pesticides, their availability and utilization have not been cascaded to farmers, hindering the implementation of resilient agricultural activities.

Challenges in Access to Farm Inputs: The findings revealed that the lack of adequate tools, irrigation systems, and water sources greatly limits the production capacity of food crops. Insufficient access to water and equipment for irrigation makes it difficult to optimize crop production, especially in areas prone to water scarcity. The study established that while some basic seeds are available, they often lack drought resistance or bio-fortified qualities, which are essential for adapting to climate change. Fertilizer availability is also limited, with many farmers unable to afford or access the necessary fertilizers to enhance soil fertility and increase crop yields.

5.2.2. PRIMARY PRODUCTION

Food Production Practices: This assessment established that a majority of the producers (69.3%) practised crop farming, as was reported by 69.3% of the respondents, as compared with only 20.5% of the farmers practising livestock farming (Table 44). The findings revealed that local agricultural practices and livestock rearing are critical to food availability. In farming communities, crops and livestock provide the primary source of sustenance. However, during farming seasons, such as August to February, some farmers sell off their livestock to cushion against food scarcity. While these practices support immediate needs, they may undermine long-term food security, especially if livestock is depleted over time.

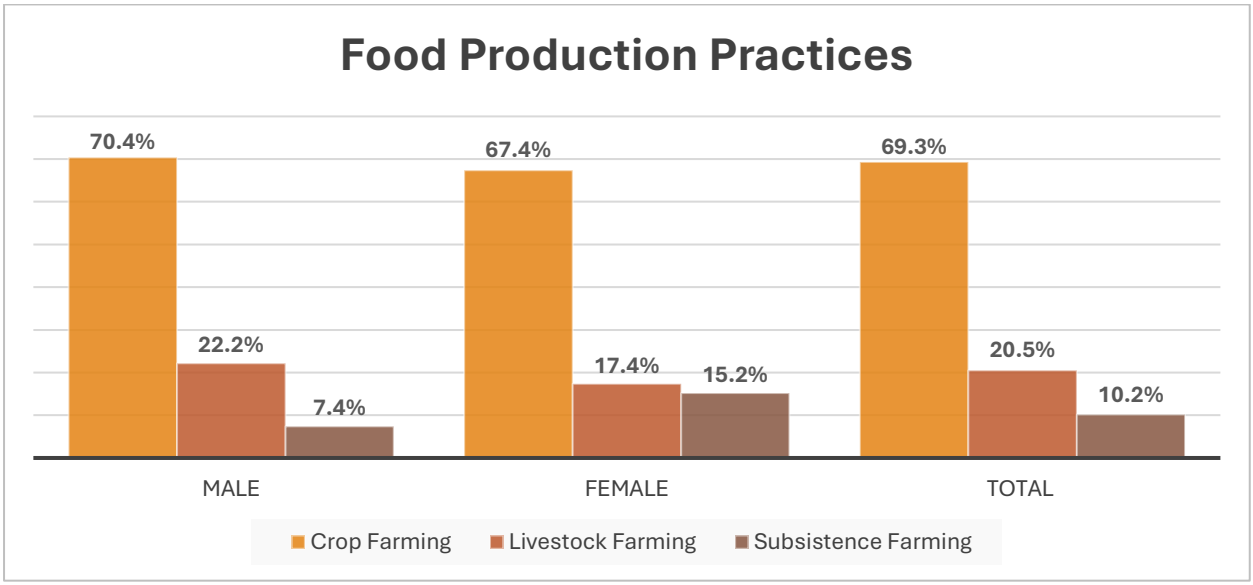

Figure 16: Food Production Practices

Factors Promoting Food Production: Pastoralism is the traditional practice in Puntland with most farmers keeping camels, goats and sheep. The animals provided a reliable source of protein such as milk and meat. Livestock production heavily depended on the seasons, with the availability of the products decreasing during times of drought. Discussions with producers revealed that camels, however, were adapted to the harsh climatic conditions and hence could go without water for long periods making them an ideal source of milk during the dry seasons.

The findings also noted that crop production is seasonal, with high productivity experienced during rainy seasons and low or no production during dry seasons. During the dry seasons, respondents reported heavy reliance on irrigation for farming. The study revealed that during the rainy seasons, the abundance of rainfall enables the cultivation of various crops such as maize, beans, and vegetables, and livestock production, especially of milk and meat, is at its peak.

*"During the Gu' and Deyr rainy seasons, we receive plenty of rain, which enables us to have a good harvest. Various important crops grow on the farms, and livestock produce milk and meat, providing complete nutrition that improves community health. Local crops include maize, watermelon, tomatoes, cabbage leaves, and chilli. During the rainy season, if farmers have adequate tools, it's easier to produce sufficient food."- **Producers in FGD, Dangorayo.***

Factors Affecting Food Production: The findings revealed that food availability in the region is heavily influenced by seasonal patterns and climate conditions. The study established that there are distinct periods of food scarcity that align with the agricultural calendar, particularly after the rainy season when floods affect farming activities.

*"Food availability often depends on the agricultural calendar. During harvest seasons, there is generally more access to fresh produce and staple foods. The Local markets typically offer a range of foods, but access can fluctuate based on season and supply. Just before harvest times, food stocks from the previous season may be depleted, leading to increased reliance on markets, which can drive up prices. Overall, while there are times of food abundance, challenges such as climate variability and resource constraints contribute to periodic food scarcity in the region."- **Producers in FGD, Burtinle***

The findings further revealed that the lack of adequate tools, irrigation systems, and water sources greatly limits the production capacity of food crops. Although vegetables and fruits like tomatoes, carrots, and papaya are grown, their quantities are not sufficient to meet the community's nutritional needs. Insufficient access to water and equipment for irrigation makes it difficult to optimize crop production, especially in areas prone to water scarcity.

Role of Women in Food Production: The study revealed that women play a pivotal role in food production, particularly in agriculture. Women are predominantly responsible for planting, tending, and harvesting crops like maize, sorghum, and vegetables. Their involvement in farming activities supports both family sustenance and market supplies, making them central to the agricultural workforce. Additionally, women's active participation in crop production ensures that food supply chains remain operational, even in rural areas where their contributions are often overlooked.

*"Women play an important role in the production of the country, especially in the fields of agriculture and animal husbandry. It is estimated that women make up more than 60% of the production workforce. Women mostly work in the fields, growing crops such as corn, millet, and vegetables. They play a major role in the production and care of crops, which contribute to families and markets."- **FGD with Women Consumers, Burtinle District***

5.2.3. FOOD PROCESSING

Sources of Food Processing: The study established that in Puntland, food was mostly processed on site (68.5%), outsourced (15%) and factory (3.9%). Key actors involved in food processing cited by the respondents engaged included local traders, transporters, food safety and technologists, agricultural cooperatives and associations, packagers, retailers, cooperatives and factory owners

	Male	Female	Total
On-site	**76.5%**	**54.3%**	**68.5%**
Outsourced	**12.3%**	**19.6%**	**15.0%**
Factory	**2.5%**	**6.5%**	**3.9%**
Other	**8.6%**	**19.6%**	**12.6%**
Total	**100%**	**100%**	**100%**

Table 41: Sources of Food Processing in Puntland

Condition of Processing Facilities: The findings revealed that nearly two-thirds of the producers (67.7%) perceived that the state of processing food was poor. Only 13.4% 19.2% and 8.7% of the respondents indicated that the processing was in a good and excellent state respectively. Discussions with food processors in Puntland highlighted that government and key actors involved in food systems have made little investment towards improving the infrastructure of food processing facilities and adopting to new technologies in food processing.

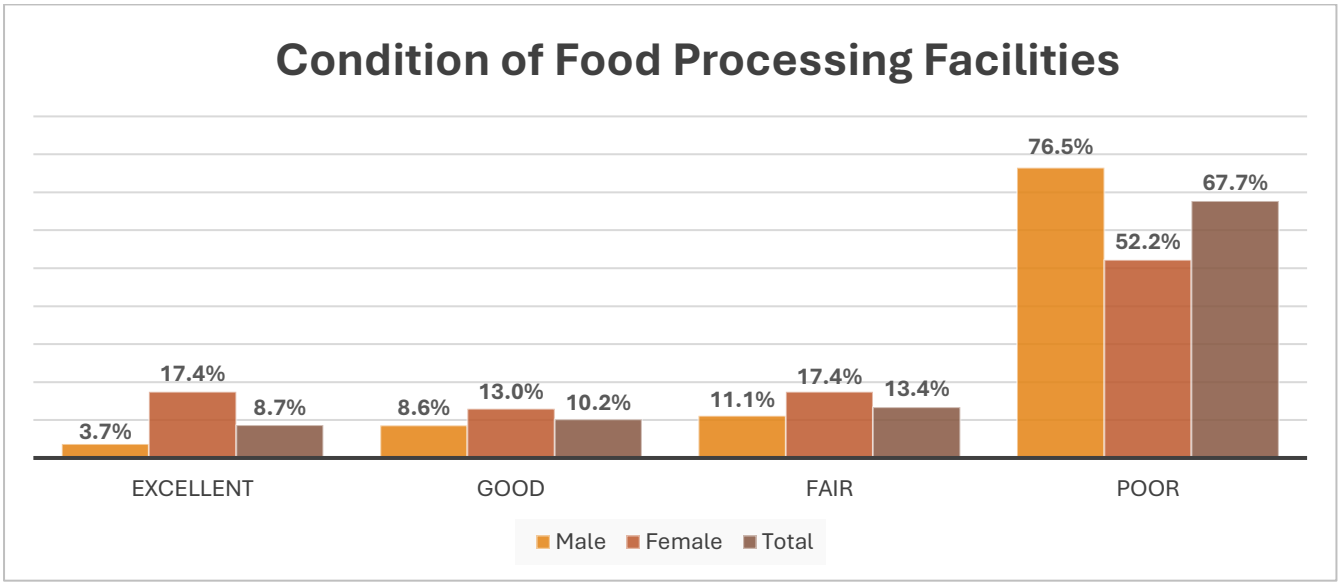

Figure 17: Condition of Food Processing Facilities

Challenges in Food Processing: The study found that there is a gap in food processing facilities within the region, which affects the availability of processed food items in local markets. Fruits and vegetables are mainly sold as fresh, while cereals are sold as whole grains. According to respondents, the absence of processing facilities for high-level value addition limits the product's shelf life and leads to increased post-harvest losses. The findings also noted that the lack of processing industries hinders the production of adequate food within the region. This increases the reliance on encouraging foods from different regions, such as Ethiopia and Russia, hindering the sale of other locally milled maize flour.

Roles of Women in Food Processing: The study established that women engage in food processing and value-adding activities, which are integral to the food systems. Women are responsible for transforming raw agricultural produce into marketable products, such as dairy items and preserved foods. The findings also noted that women are often responsible for grinding cereals like sorghum and maize into flour using traditional hand mills. This flour is used for making staple foods like *canjeero* or porridge. In pastoral communities, women are involved in drying and preserving meat, a crucial process, especially in rural areas where refrigeration is scarce.

5.2.4. TRANSPORT/LOGISTICS

Modes of Transport: The study revealed that more than a third of the farm produce (38.6%) of the farm produce was transported to the market by trucks followed by 33.1% of the producers who use handcarts. The other less utilized means of transport included motorbikes and bicycles 15.9% and 0.6% respectively. About 19.9% of the producers transport producers by manual carrying. On the perception of transporters on the quality of the transport network, 36.2% were somewhat satisfied, 33.9% were unsatisfied and only 0.8% of the respondents were very satisfied with the transport means.

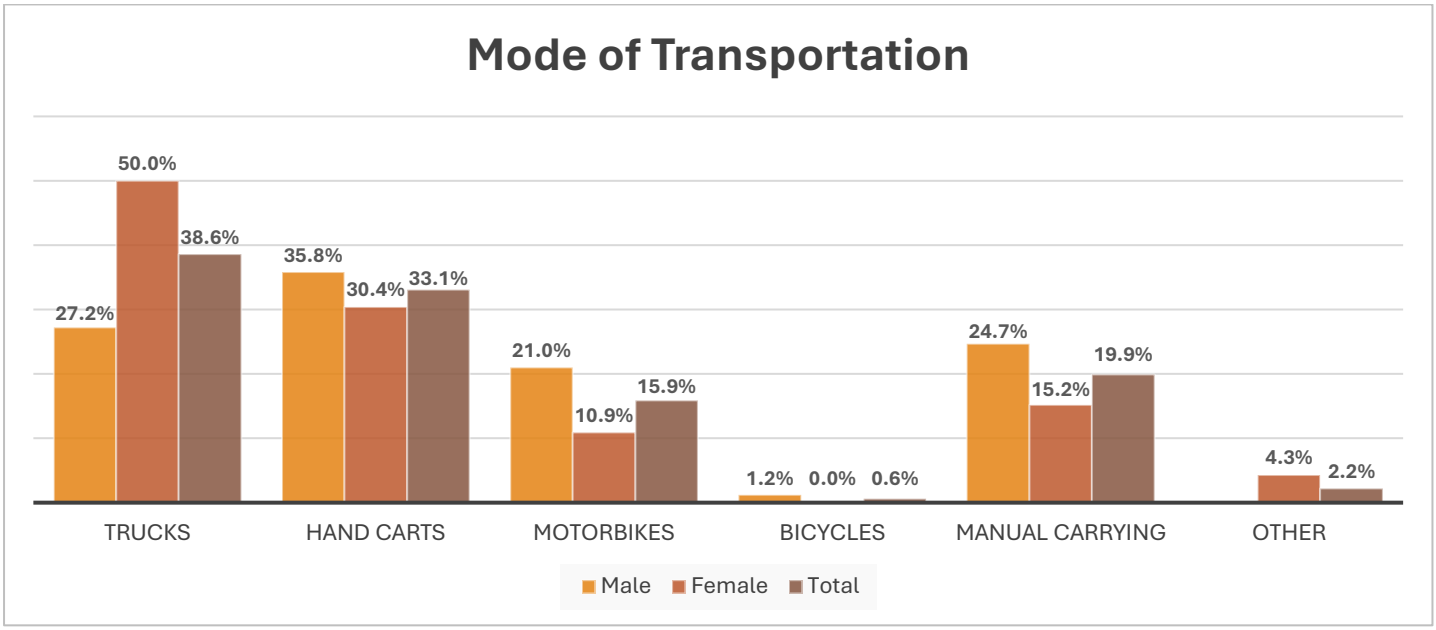

Figure 18: Mode of Food Transportation

This assessment revealed that trucks were heavily relied on for the long-distance distribution of the products to the markets. Some of the trucks are fitted with refrigerators to preserve perishable products such as dairy, vegetables and fruits. In the absence of trucks, smaller vehicles were often employed. Alternative transport methods such as hand carts are also used to transport the produce to the markets when truck transportation costs are high or when the roads are inaccessible due to bad weather.

Challenges in Food Transportation: The study established that 55.9% of the respondents believed that the state of the roads was poor. Only 16.5% of the respondents believed the roads were in an excellent state to support the efficient transport of farm produce. The findings also noted that extreme weather conditions such as high temperatures and floods, exacerbate the challenges, causing transportation disruptions and negatively impacting food quality. The findings further noted that security issues, including conflicts and instability which lead to the disruption of food supply routes.

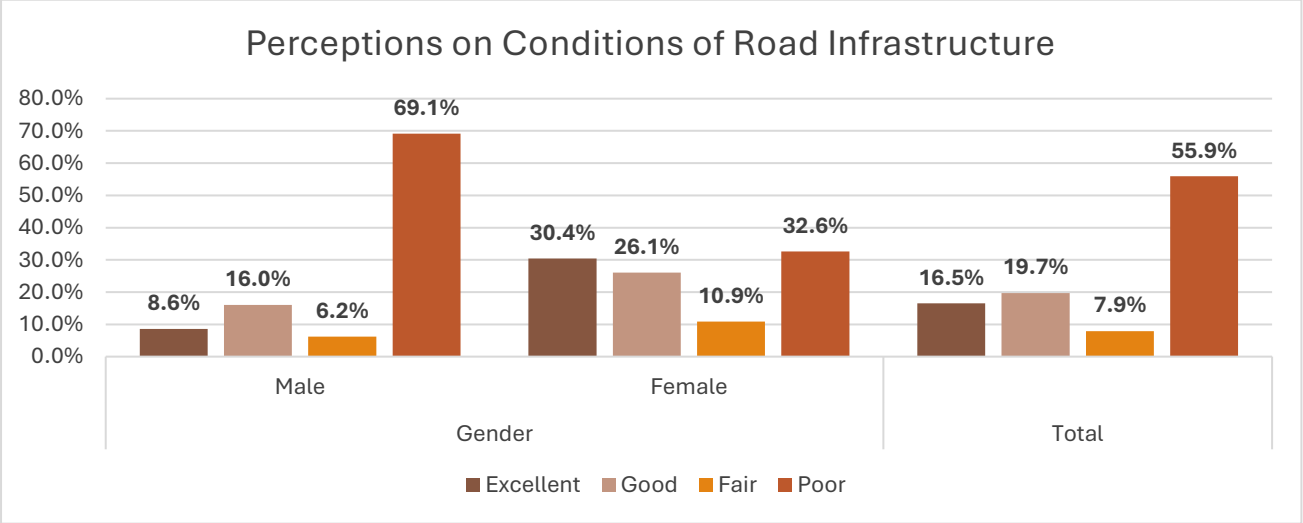

Figure 19: Perceptions on Conditions of Roads in Puntland

The study noted that inadequate road infrastructure delays transportation, making it difficult for farmers to access markets and sell their produce on time. This results in food spoilage, increased transportation costs, and a reduction in income for farmers. For instance, in villages near Baqbaq and

Burtinle, the reliance on goods from urban areas often leads to delays, affecting food freshness and availability

"The state of physical infrastructure and transportation modes for food distribution and delivery in the environment faces significant challenges that impact the efficient and safe delivery of food across the country. The environment has limited road networks connecting major cities with rural and remote areas. Many roads are in disrepair or unpaved, which makes transportation challenging, especially during rainy seasons when some roads become impassable. This hinders timely food deliveries, particularly in areas outside urban centres."- ***Transporters in FGD, Garowe.***

Role of Women in Food Transportation: Discussions with distributors from Dangorayo District highlighted that women are often involved in the local distribution of food, where they transport food from farms, markets, and food processing areas to households. In rural areas, women carry food on foot, by camel, or using carts to ensure that food reaches various communities. In pastoral communities, where livestock plays a key role, women also manage the transportation of food using donkeys and camels, especially to move perishable goods such as dairy products and meat from rural areas to more urban centers.

5.2.5. MARKET AND RETAIL

Access to Markets: This assessment found that farmers were likely to sell their produce to multiple markets. However, the most common market for farm products (91.9%) was the local market. The other markets included suppliers (18.1%) of the farm retail outlets (14.6%) and the export processing area (1.3%). The study revealed that respondents in Puntland were involved in buying raw food products directly from wholesalers or local markets, with a few focusing on niche roles such as milk vending or packaged food distribution. Traders buy fresh products like vegetables or grains from local markets and resell them to retailers or consumers. It was revealed that small retailers faced challenges such as market fluctuations and price variations that impacted the viability of the businesses

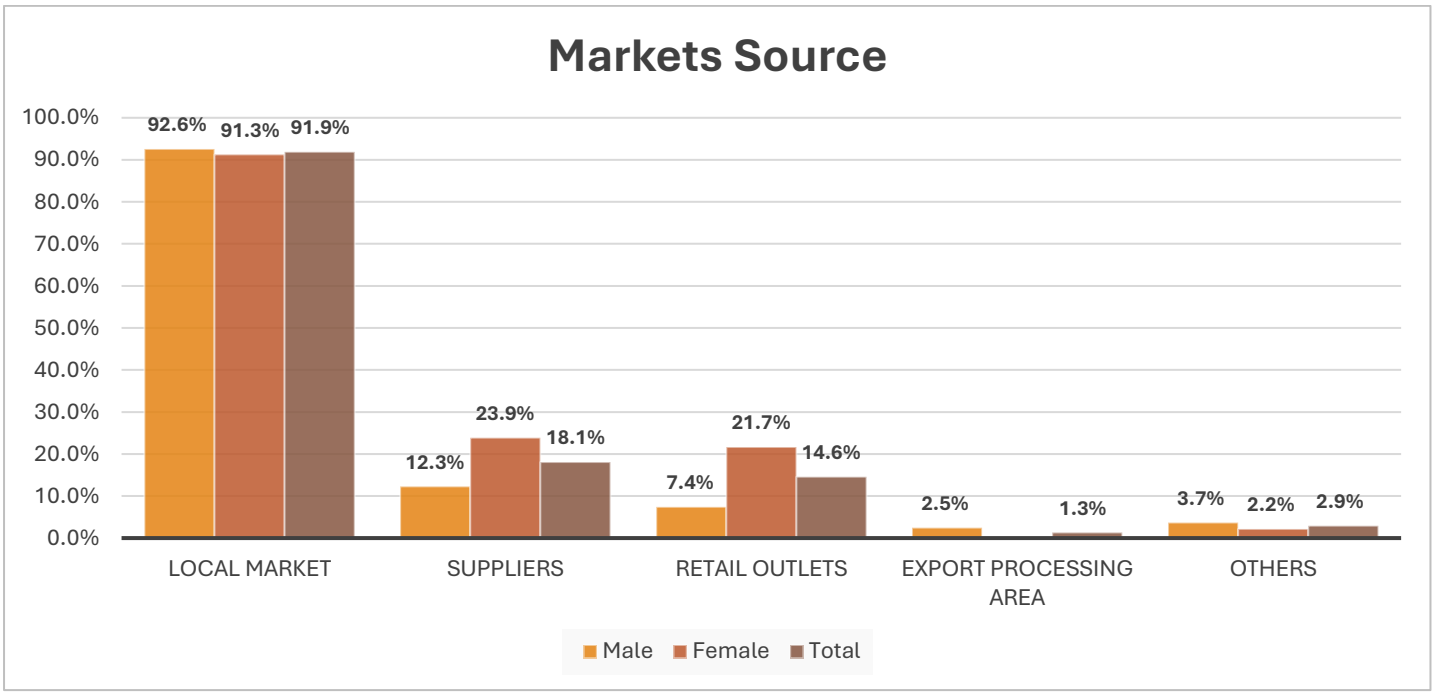

Figure 20: Food Market Sources in Somalia

The assessment further revealed that local markets are critical hubs for daily food access, including vegetables, fruits, grains, and dairy products for domestic use and businesses, like small eateries and hotels. Open markets are the primary space for buying and selling produce. These markets offer a wide range of fresh produce, grains, and other staple foods. However, it was found that the lack of proper infrastructure in these markets affects overall efficiency and food safety.

"Markets in Puntland are typically open-air or wholesale markets, where food is sold by vendors and retailers. Main market actors include local open-market vendors, small retail stores, and wholesalers, and some Demand may vary across markets, with more concentrated demand in urban centres. Small retail shops and grocery stores in towns and villages stock a variety of food products, including locally produced. Wholesalers operate on a larger scale, buying agricultural products in bulk from farmers, aggregators, or traders." ***FGD with Traders in Nugaal region, District of Dangorayo***

Commodities Traded in Markets: Camel milk is the major animal product sold within Puntland, alongside the seasonally available goat milk. A review of relevant existing documentation established the pathways taken to sell the milk from the producer to meet the market demands. Specifically, the herders milk the animals and store them in traditional containers, known as *haruub,* which are treated daily with charcoal to keep them hygienic. The findings also revealed that most of the crop products are produced on a small scale due to high dependence on human labour. The labour-intensive processes hinder large-scale production to meet the large market demands. Maize and Sorghum are the most preferred grains in Puntland.

Role of Middle Men in Markets: The findings revealed that middlemen acted as intermediaries between producers and consumers. The middlemen provided transportation, storage, and distribution of goods. They also bridged the gap between small-scale producers and larger markets, facilitating access to broader consumer bases. However, their involvement was likely to result in higher food prices. The study established that middlemen charge varying fees for their services, ranging from 5% to 15%. These fees are typically passed on to the final consumer, raising food prices. While the fees are necessary to cover transportation and storage, they result in higher costs for consumers and reduced income for producers

*"The presence of middlemen tends to increase the final price of agricultural produce by the time it reaches consumers. Middlemen mark up prices to cover transportation, storage (if available), and labour costs, as well as to ensure profit. This markup means that consumers end up paying more for the same products, while producers may receive a fraction of this final retail price. Middlemen generally have stronger bargaining power and often negotiate low prices with farmers, particularly when farmers lack other market access options."- **FGD with Traders, Garowe.***

Challenges in Food Marketing: The findings revealed that the pricing of food products is strongly influenced by production costs, which include the costs of seeds, fertilizers, pesticides, and labour. The study noted that transportation costs influenced food prices, especially when the market faces poor infrastructure. The findings indicated that when fuel prices rise or roads are in poor condition, the cost of transporting food products increases, which is subsequently reflected in the final product prices

"Pricing is influenced by production costs (e.g., seeds, labour, and water), seasonal supply, demand fluctuations, and government import/export policies. Higher production costs or poor harvests often drive up market prices, while policy changes in trade can also impact pricing stability. The Nugaal region's arid climate and limited

*rainfall affect the local agriculture sector, leading to the seasonal availability of certain foods. In good rainy seasons, local production can reduce dependency on imports, but droughts and inconsistent rains increase reliance on expensive imports."- **FGD with Traders, Burtinle.***

Role of Women in Food Marketing: The findings indicated that women often participate in local markets, selling fresh produce, dairy products, and processed foods. Their involvement in market activities not only helps to ensure household food security but also facilitates the distribution of goods, contributing to the local economy. Women's participation as market vendors allows for increased access to markets, helping to stimulate the local economy and generate income. This not only benefits the household but also enhances women's economic status and empowerment within the community.

5.2.6. FOOD CONSUMPTION

Consumption Patterns: The findings revealed that an overwhelming majority, 95.3% of the consumers engaged reported that they were consuming organic food products. The common types of organic food consumed by the respondents were organic cereals and pulses, fruits and vegetables, dairy products, meat, bread and pasta and organic roots and tubers. Key factors mentioned by consumers that influenced consumption of organic foods were availability of traditional food (locally grown, without chemicals), existing knowledge on the advantages of consuming organic food and general focus on improving and maintaining health.

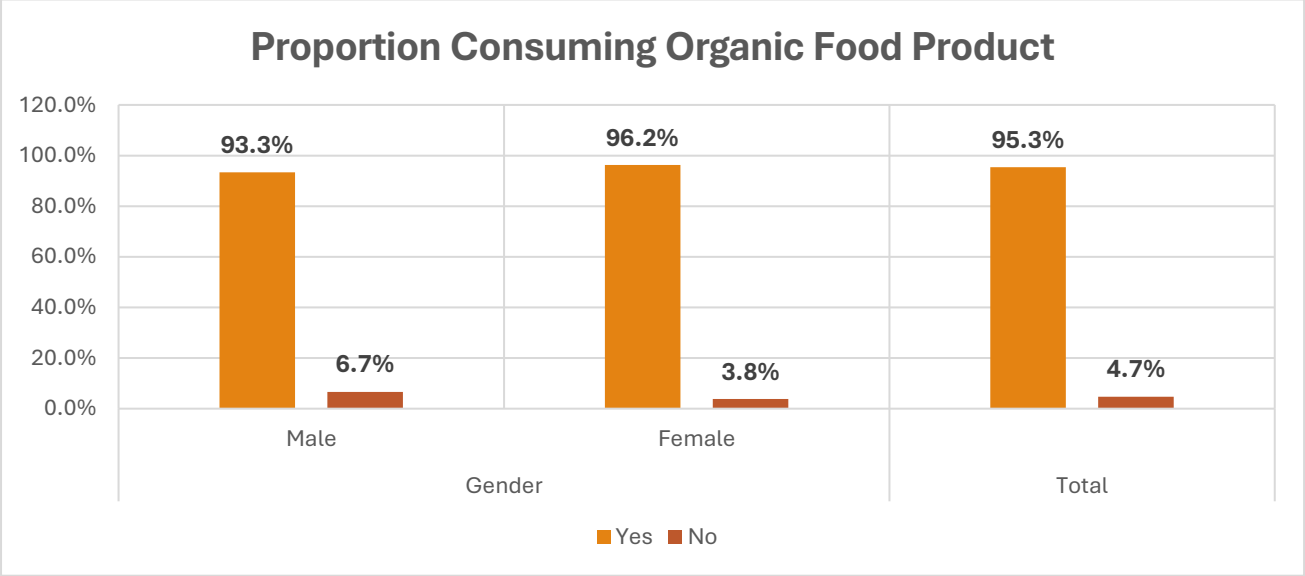

Figure 21: Proportion Consuming Organic Food Products

Types of Foods Consumed: The findings established that sorghum and maize are common grains in Somalia, often ground into flour and used for making flatbreads, porridge, or a popular dish called canjeero (a type of pancake-like bread, similar to Ethiopian *injera*). Rice is also a significant part of the Somali diet and is often served with stews or meat dishes. *Bariis* (Somali rice) is often cooked with spices like cinnamon, cardamom, and cumin. The findings also noted that Milk from camels is a key component of the Somali diet, and is often consumed fresh or used in various dishes like *maraq* (a soup or stew) or simply drunk on its own.

Dietary Patterns: The study found that the dietary intake varied, with more than a third of the respondents (36.3%) having a daily intake of cereals, oils and fats, and other green leafy vegetables.

The study noted that oil and fats were consumed daily by 45.1%. The sweets and sugary products daily consumption rate was 39.9%. The consumption of cereals and other locally available coloured vegetables followed closely, with daily consumption rates standing at 36.3% and 34.2%, hence reflecting a significant intake of plant-based foods. Other crucial food sources such as dark green leafy vegetables, vitamin A-rich fruits and other fruits had the lowest intake as 49.7%, 45.1% and 48.2% of the respondents reported that they never take these crucial food items.

Food Group	Daily	Often	Sometimes	Never
CEREALS: corn/maize, rice, wheat, sorghum, millet or any other grains or foods made from these (e.g. bread, noodles, porridge or other grain products) + insert local foods e.g. ugali, porridge	36.3%	17.1%	33.7%	13.0%
WHITE ROOTS AND TUBERS: white potatoes, white yam, white cassava, or other foods made from roots	8.8%	17.1%	37.8%	36.3%
VITAMIN A RICH VEGETABLES AND TUBERS: Pumpkin, carrot, squash, or sweet potato AND TUBERS pumpkin, carrot, squash, or sweet potato that are orange inside + other locally available vitamin A rich vegetables (e.g. red sweet pepper)	10.9%	19.2%	33.2%	36.8%
DARK GREEN LEAFY VEGETABLES: Dark green leafy vegetables, including wild forms + locally available vitamin A-rich leaves such as amaranth, cassava leaves, kale, spinach	10.4%	19.7%	20.2%	49.7%
OTHER VEGETABLES: Other vegetables (e.g. tomato, onion, eggplant) + other locally available coloured vegetables	34.2%	19.7%	28.0%	18.1%
VITAMIN A RICH FRUITS ripe mango, cantaloupe, apricot (fresh or dried), ripe papaya, dried peach, and 100% fruit juice made from these + other locally available vitamin A-rich fruits	12.4%	16.6%	25.9%	45.1%
OTHER FRUITS: Other fruits, including wild fruits and 100% fruit juice made from these	14.0%	13.0%	24.9%	48.2%
FLESH MEATS: Beef, lamb, goat, game, chicken, duck, other birds	28.0%	15.0%	16.6%	40.4%
LEGUMES, NUTS AND SEEDS dried beans, dried peas, lentils, nuts, seeds or foods made from these (e.g. peanut butter)	11.4%	14.0%	26.9%	47.7%
MILK AND MILK PRODUCTS: Milk, cheese, yoghurt or other milk products	19.2%	17.6%	34.7%	28.5%
OILS AND FATS Oil: Fats or butter added to food or used for cooking	45.1%	11.4%	25.4%	18.1%

SWEETS: Sugar, honey, sweetened soda or sweetened juice drinks, sugary foods such as chocolates, candies, cookies and cakes	39.9%	11.4%	26.9%	21.8%
SPICES, CONDIMENTS, BEVERAGES: Spices (black pepper, salt), condiments (soy sauce, hot sauce), coffee, tea, alcoholic beverages	24.4%	11.4%	20.2%	44.0%

Table 42: Dietary Patterns in Puntland

Access to Nutritious Food: The findings further noted that the community relies on foods like rice and pasta, which are less healthy, contributing to chronic undernutrition in the population. This lack of diversity contributes to an imbalanced diet, which is a common cause of malnutrition, especially among vulnerable groups such as children and pregnant women. The absence of sufficient protein sources, such as meat or legumes, further exacerbates the situation, leaving the community vulnerable to health issues such as stunted growth and vitamin deficiencies.

*"The typical food in this area mainly consists of traditional foods, such as rice. The foods consumed here do not offer a balanced diet as needed by the human body; the main items we eat are rice, pasta, flatbread, and sometimes corn-based foods, though we only get these occasionally. We don't have a balanced diet. The lack of a balanced diet has led to malnutrition issues, especially among children and pregnant women. Health problems related to malnutrition include extreme thinness, particularly evident in our community, caused by the drought that has affected both people and livestock."- **Producer in FGD, Dangorayo District.***

Factors Influencing Food Consumption: The findings indicated that dietary choices are heavily influenced by cultural practices and the types of crops grown locally. For instance, sorghum and maize are staple crops that dominate the diet, and traditional preparation methods, such as making porridge or flatbread, reflect the community's agricultural heritage. This cultural alignment, however, does not always ensure a balanced diet, as it limits the inclusion of nutrient-dense foods.

*"In our region, the foods consumed depend on the culture of the Somali community resources, and availability as the diet includes vegetables, fruits, meat, dairy, and grains. If there isn't a variety of food available, it can lead to an unbalanced diet. If there are issues related to malnutrition or health, some people may face challenges like nutritional deficiencies, especially among children and women. Certain foods, particularly those rich in vitamins and minerals, may not be sufficiently accessible, which can lead to health problems."- **KII with Community Leader, Burtinle District***

The findings further established affordability was also a key factor that influenced dietary patterns and this is evidenced by the nearly two-thirds 64.6% of the consumers who reported that they did not have disposable income. Due to the lack of disposable income, consumers selected less nutritious and less costly, but available foods, increasing the risk of malnutrition. The consumers engaged study highlighted that the local diet, which lacks sufficient diversity and balance, has led to significant health issues, particularly malnutrition and anaemia[24], largely affecting mothers and children.

5.2.8. WASTE/DISPOSAL

[24] UNHCR Somalia Operational Update, November 2024

Food Storage: The study findings further established that most community members still rely on traditional methods for storage of farm produce which are not effective for longer duration storage. Studies conducted by the World Bank & FAO (2018) report an average post-harvest and storage loss of crops of 20 to 30%[25]. The grain losses are associated with the use of traditional underground storage systems. The systems are highly prone to moisture contamination, particularly during the rainy season, as well as bacteria and fungi contamination.

Waste Management Practices: The study findings established that community members adopt various mechanisms to avoid wastage and loss of food. The findings noted that wilted but healthy vegetables and other fruits that are not suitable for human consumption are used to feed animals to avoid wastage. Additionally, organic food remains are used in farms as manure to improve soil fertility. Community members also reported consumption of fermented milk hence ensuring that when fresh milk curdles before it reaches the market, consumers utilize it for their protein needs, hence avoiding wastage.

Challenges with Waste Management in Somalia: The study revealed that many local roads connecting the markets and farmers are impassable, especially during wet seasons when heavy rains are experienced. During this period, floods are experienced hence making the roads unnavigable. This makes the transportation of farm products difficult. As a result, farmers keep their produce due to a lack of disposable routes to the market. This leads to spoilage of the farm products.

"Extreme weather events, such as floods, damages both crops and infrastructure, leading to increased food waste. Remote areas experience difficulty accessing larger markets due to damage and blockage of roads, resulting in local oversupply and spoilage." ***FGD with Traders, EYL District***

Despite there being regulations of waste management, there is limited implementation and legislation of the Waste Management and Urban Sanitation Law No.83 of 2018[26]. This has led to increased solid waste generation and the dumping of garbage into water bodies. This has resulted in a huge accumulation of garbage waste especially on the beaches harbouring Puntland.[27]

5.3. FOOD ACCESSIBILITY

5.3.1. FACTORS PROMOTING FOOD ACCESSIBILITY

The findings established that various varieties of foods are available to consumers within the local markets as a result of the existing imported food products as well as the locally produced foods. The findings also indicated that social and humanitarian aid programs play a crucial role in mitigating food scarcity. The significance of external aid, such as food distributions, in addressing shortages during droughts or economic crises. Community support systems also help alleviate food insecurity, as neighbours and local groups often share resources. However, the reliance on aid points to systemic issues that require long-term solutions, such as investments in sustainable agriculture and economic resilience.

[25] FAO, European Union and CIRAD. 2022. Food Systems Profile – Somalia. Catalysing the sustainable and inclusive transformation of food systems.
[26] FAO, European Union and CIRAD. 2022. Food Systems Profile – Somalia. Catalysing the sustainable and inclusive transformation of food systems.
[27] Somalia Pollution Report 2020

5.3.2. BARRIERS TO FOOD ACCESSIBILITY

Drought: Persistent drought conditions experienced in the Puntland region significantly contribute to food insecurity due to extreme damage to crops and pasture. Drought has led to poor livestock body conditions, lowering milk production and increasing animal deaths[28]. This results in decreased pastoral household's income from milk and livestock. It was revealed that drought hinders agricultural activities and limits the demand for agricultural labour as well as increasing food insecurity[29].

Pests and Crop Diseases: The study found that pests, such as locusts and other insect infestations, are recurring threats that harm crops and reduce food yields. As indicated in the FAO Desert Locust situation update of 25 August 2021, there were several immature swarms seen in the northeast as a result of arrivals from northwest Somalia and undetected local breeding[30]. Community leaders in Puntland confirmed that the level of engagement with the government-supported initiatives to combat pests was low, and there were limited strategies for pest control strategies.

*"Challenges include climate variability, pests, and soil degradation. Community initiatives like crop rotation and pest-resistant seeds are common responses. Pests and low rainfall are major issues. Government programs have promoted sustainable practices, though uptake remains low."- **KII with Community Leaders, Dangorayo District***

Climate Change: Puntland has experienced an increase in the intensity and frequency of natural disasters. Extreme droughts and floods, as the most frequent cyclic natural disasters have caused losses in crops and livestock. This has significantly increased levels of food insecurity. Floods have also contributed to creating a favourable environment for the breeding of desert locusts, deepening the food insecurity crisis in the country.[31] The study noted that the accelerated pattern of natural disasters experienced by the affected communities prevents them from having enough time for recovery.

Inadequate Financial Resources to Purchase Food: The findings revealed that economic challenges limited the accessibility of food, particularly during times of scarcity. Respondents indicated that food affordability remains a significant challenge for low-income households. High transport costs and market disruptions further exacerbate the situation. Discussions with consumers from the Burtinle district established that the economic strain is more acute due to limited income-generating activities.

Dependency on Food Imports: The study noted that due to erratic and unfavourable climatic conditions, most communities depend on the consumption of imported foods. The findings revealed that the dependency on imports makes the communities vulnerable to global supply chain disruptions and price fluctuations. The heavy reliance on imported food underscores the lack of local agricultural productivity, which further limits resilience during times of crisis, as reported by the KII with the Director of Quality Assurance in the Ministry of Commerce, Puntland.

5.4. ENVIRONMENTAL IMPACT AND SUSTAINABILITY

5.4.1. ENERGY USE, WASTE GENERATION AND CARBON FOOTPRINT

[28] Integrated Food Security Phase Classification, 13 December 2022
[29] SO-FSO-202110-final.pdf
[30] Desert Locust situation update 25 August 2021
[31] The role of climate_information_and_early_warning_systems_in_supporting_disaster_risk_reduction_in_somalia.pdf

Domestic Energy Consumption: The findings demonstrated that energy access for crisis-affected people in Somalia remains to be addressed. Modern forms of energy are only available to a small percentage of the population while the majority rely on wood fuel as a source of energy. According to various respondents reached during the study, the production of charcoal is a risky and unsustainable livelihood activity practised primarily by the poorest and most marginalized parts of the Puntland population.

Environmental Degradation and Soil Health: The study noted that the majority of the communities are agro-pastoralists, who both practice mixed crop production and livestock rearing. Pastoralists move from place to place in search of greener pastures, especially during the dry seasons. The large number of livestock leads to overgrazing on the available land, leaving soil vulnerable to soil erosion. In addition, there are cases of farming due to frequent tillage of land for crop production.

*"In many regions of Badey environmental degradation, particularly the depletion of fertile soil, has severely impacted agricultural productivity. As a result, food produced often lacks nutritional value. The loss of soil fertility can be attributed to several factors, including prolonged droughts, overgrazing, and unsustainable farming practices.***"- *FGD with Women Consumers, Eyl District***

Greenhouse Gas (GHG) Emissions: Somalia's baseline GHG emission is projected to increase from 41-million-ton CO2eq in 2020 to about 50 million CO2eq in 2030. Forestry and agricultural sectors are the greatest emitters contributing to a total of 92% of overall GHG emissions. Agricultural total emission in 2020 was determined to be 20.5MtCO2eq whereas forestry sector emission is 17.4MtCO2eq. The literature review showed that the energy sector emission accounted for 4% (1.5 MtCO2eq) of total GHG emissions while the waste sector contributed to 3% (1.2 million tCO2eq) of total GHG emissions[32].

5.5. INEFFICIENCIES IN FOOD VALUE CHAINS

Poor Infrastructure: Poor infrastructure, particularly roads, hinders the transportation of farm produce and access to services. During the rainy season, inaccessible rural roads force communities to hire manual labour and hand-cart transport providers to transport goods, which in turn increases costs. Improving road networks, especially in rural areas would be impactful in easing the transportation of farm produce to the end market.

Government Interventions: The study noted that the Puntland government has not adequately enforced the use of the right innovations and standards aimed at promoting the reduction of food losses at farm and market levels, as well as controlling food importation and exportation. This has created space for other retailers to import food products of low quality hence putting the lives of consumers in jeopardy. There is a need for the enforcement of critical regulations on the food supply chain to ensure quality standards are met.

Lack of Advanced Farming Mechanisms: Despite the utilization of modern technologies in farming, farmers reported their utilization of traditional methods in farming. For example, it was revealed by the findings that many farmers still plant seeds from the previous produce, especially cereals. This has frequently led to poor yields. This inconsistency in farming practices with the current trends

[32] UNFCC 2022

demonstrates the need for support to the communities on modern farming techniques and the provision of bio-fortified seeds.

5.6. FOOD SYSTEM VULNERABILITIES

5.6.2. FOOD SUPPLY CHAIN DISRUPTIONS

Economic Factors: Findings indicated that economic challenges, including rising fuel prices and inflation, are the major vulnerabilities that affect transportation and overall food distribution. High fuel costs increase transportation expenses, causing an increase in food prices for consumers. The exchange rate significantly dropped as a result of different factors including the decreased acceptance of the Somali shilling in favour of the US dollar, the decline in the US dollar flow into Puntland, underlying fiscal and monetary problems and the economic downturn caused by the COVID-19 pandemic. The decline in the value of the local currency led to an increase in the prices of imported foods, including rice, sugar, and vegetable oil. This made their accessibility difficult.[33]

Violence and Security Concerns: The findings established that security concerns in different areas within Puntland, particularly those affected by armed groups pose a barrier to food transportation to and from the local communities. Violence and insecurity are mainly caused by groups linked to Al-Shabaab. This group controls the main food supply routes in different regions within Somalia, such as the Bay region. The group also levies taxes on goods at checkpoints throughout central and Southern Somalia. Market accessibility and taxation on farming communities enforced by Al-Shabaab constrain farmers' ability to sell their produce to make a profit.[34]

Border Delays and Taxation: The findings revealed that border restrictions, customs delays, and high taxes are major barriers to efficient trade. Delays at borders cause food to spoil, and excessive taxes on agricultural products increase the overall cost, making it difficult for local farmers to remain competitive. These challenges affect not only food prices but also the stability of cross-border trade networks, leading to food shortages and price volatility.

Disruptions and Market Instability: The findings indicated that while cross-border trade can provide more food options, it is also vulnerable to disruptions, such as border closures or political instability in neighbouring countries. The evaluation noted that when borders are closed, either due to regulatory changes or security concerns, the local market faces food shortages, which directly affects prices. This creates an unstable market environment where the availability of food becomes unpredictable.

Competition and Price Fluctuations: The study revealed that cross-border trade introduces competition, which can lower prices for certain imported products but may raise prices for locally produced goods. The findings indicated that when cheap imports flood the market, local producers often struggle to compete, which can lead to a decline in the demand for domestic produce. In some cases, this increased competition results in lower prices for consumers, but it can also harm local agriculture.

33 FSNAU-Quarterly-Brief-May-2021.pdf
34 FAO

5.6.3. STRENGTHS AND WEAKNESSES OF THE FOOD SYSTEM

Strengths	Weaknesses
Informal Trade Systems: The study established that the market allows both financial payments as well as barter trade. This makes it possible for individuals to receive food either through exchange with other commodities or using cash. This expanded mechanism of payment ensures easy accessibility of food.	**Limited Infrastructure:** The study established that one of the major weaknesses of the food system in the area is limited infrastructure, especially concerning transportation and storage. Poor road networks and inadequate storage facilities create significant barriers to market access, leading to food waste. These infrastructure gaps not only affect food distribution but also exacerbate food insecurity, making it difficult for farmers to sell their products effectively.
Variety of Crops and Livestock: Findings established that community members depend on a variety of food products. These include cereals such as sorghum and maize as well as other locally produced green vegetables as their staple food. In addition, dependence on camel milk ensures the provision of milk even during the dry seasons. This boosts household food security.	**Droughts and Flooding:** Somalia is highly vulnerable to natural calamities which are significant signs of climate change. Frequent droughts and prolonged flooding especially in the northern Puntland regions. These affect rain-fed agricultural activities hence negatively impacting food availability.
Access to Markets: The existence of local markets ensures that community members can access food and sell their surplus commodities hence promoting food supply.	**Poor Transport Networks:** Limited well-maintained tarmac roads especially in the rural regions make it difficult to transport food within the rural regions. This leads to frequent delays and potential wastage and spoilage of perishable goods.
Livestock Industry: Somalia has one of the largest livestock populations in Africa, particularly camels. The livestock sector is a crucial component of food systems, providing meat, milk, and hides. Somalia is also one of the leading exporters of livestock to the Middle East and other regions.	**Low-Income:** The study established that pastoral households within Puntland face significant income-related challenges due to a lack of employment and over-reliance on farming which generates low income. This hinders their access to nutritious foods. Fluctuating food prices reduces the communities' access to foods during dry seasons when food production is low hence high prices to meet the high demand on the low supply.
Resilient Communities: Somali communities, especially those in rural areas, have demonstrated resilience in the face of challenges like droughts and conflict. Many continue to rely on traditional knowledge and practices for food production and sustenance, adapting their systems to local environmental conditions.	**Gender Inequality:** Women and Youth in Somalia face a significant challenge in accessing resources within the communities as they are limited to accessing land for agricultural production.
International Aid and Development Programs: While Somalia faces food security challenges,	**Limited Government and Institutional Capacity:** Somalia's government and institutions face significant

international organizations and NGOs have been working to improve food systems. These initiatives focus on enhancing agricultural productivity, improving market access, and providing food aid in times of crisis.	challenges in terms of capacity, governance, and coordination in the agricultural and food sectors. This limits effective planning, policy development, and the implementation of long-term solutions to address food insecurity.

Table 43: Strengths and Weaknesses of Food Systems in Somalia

5.7. FOOD SYSTEM POLICY AND STRATEGIC GAPS

The findings indicated that various legal frameworks and policies have been put in place to support food security and agricultural production. These policies aim to regulate food systems and promote agricultural sustainability. However, while these policies provide a structured approach, there are notable gaps in their implementation, especially concerning gender disparities and food quality control measures. Inadequate quality control acts as an impediment to the export of crops, livestock and other locally produced farm products as they fail to meet international standards.

Policy Implementation Gaps

The food systems in Somalia face several policy gaps that hinder progress in ensuring food security and addressing malnutrition. Some of the key policy gaps include:

Inadequate Agricultural Policy Framework: Somalia lacks a comprehensive and cohesive agricultural policy that addresses sustainable farming practices, efficient water management, and climate-resilient agriculture. Given that Somalia's agricultural sector is highly vulnerable to climate change, there is a need for policies that support farmers in adapting to changing weather patterns and promote irrigation techniques, drought-resistant crops, and agroforestry.

Lack of Investment in Research and Innovation: Research in agricultural technologies, crop varieties, and farming practices is often underfunded. There is a need for policies that prioritize research and development to improve agricultural productivity, pest management, and disease control, as well as to foster innovation in food processing and preservation techniques.

Inadequate Nutrition and Food Security Policies: Despite the frequent crises related to food insecurity and malnutrition, there is a gap in policies focusing on addressing both the availability and accessibility of nutritious food. Somalia needs stronger policies to address food insecurity and improve nutrition, particularly for vulnerable populations like children, pregnant women, and the elderly.

Lack of Integration Between Food and Health Policies: Food systems are closely linked with health, but in Somalia, there is insufficient coordination between food and health policies. Policies that integrate nutrition, food safety, and public health are critical for improving overall health outcomes and reducing diseases related to poor nutrition.

CHAPTER SIX: BIOFORTIFICATION IN FOOD SUPPLY CHAIN

Biofortification aims at addressing macronutrient deficiencies by enhancing the nutritional value of staple foods. This section explores the current state of biofortification in food production and food processing as well as looks into the role of women in biofortification in Kenya, Tanzania and Somalia, highlighting key developments, challenges and opportunities for scaling up these initiatives.

6.1. BIOFORTIFICATION IN FOOD PRODUCTION

Kenya: Kenya has mandatory food fortification regulation and quality standard for salt, wheat flour, maize flour, and edible oils and fats production. Under the Kenyan law, fortification of wheat flour, maize meal, fats, and oils has been made mandatory through the amendment of the Food, Drugs, and Chemical Substances Act of the Laws of Kenya CAP 254, Notice No. 62 of June 2012, and amended again in July 2015. The Kenya National Food Fortification Strategic Plan 2018-2022 was geared towards increasing industry and market compliance and household intake of key micronutrients through enhancing coordination, advocacy, production capacity, consumer awareness, and monitoring and evaluation of the fortification programme[35].

Discussions with producers revealed that biofortified crops such as Nyota beans and green grams and lemons, sweet potato vines are also present in their areas. The study noted that in certain urban regions, alternative markets for agricultural products and the promotion of biofortified foods have been key strategies to improve food availability. However, a significant amount of the respondents engaged during the assessment highlighted a lack of access to information and resources about biofortified crops. Those who were unaware of these crops cited the absence of agricultural extension services and limited outlets for certified seeds.

*"The maize seeds we planted are fortified. They are from Kenya Seeds Company. World Vision Kenya also gives us sweet potato vines and iron-fortified beans. We planted the vines and the beans and we do consume them. But the majority of the local communities lack relevant information regarding the biofortified crops and this makes it difficult for them to adopt them."- **FGDs with Producers, Kapyego Cheptobot Village.***

Tanzania: In Tanzania, food fortification, both industrial and home based, has been adopted as an approach to reach a large sector of the population through existing food delivery systems. The National Action Plan for the Provision of Vitamins and Minerals to the Tanzanian Population (URT, 2016) through the Enrichment of Staple Foods is operational and coordinated through the National Food Fortification Alliance (NFFA). The National Biofortification Guidelines 2020 were also developed to contribute to national efforts to reduce nutritional deficiencies as a significant public health problem among vulnerable groups[36].

However, the study revealed that one of the main challenges hindering the production of bio-fortified crops in the community is the limited availability of seeds. The respondents engaged highlighted that while there have been efforts to introduce bio-fortified crops like sweet potatoes and yellow maize, the distribution has been insufficient. This lack of access to seeds has caused adoption rates to remain low,

[35] Kenya National Food Fortification Strategic Plan 2018-2022
[36] Tanzania National Biofortification Guidelines 2020

with only a few people practising bio-fortified farming. Limited seed distribution programs have also faced issues such as delayed delivery, resulting in seeds missing the planting season.

*"Yes, Common examples include sweet potatoes and yellow maize but few people practice due to a lack of enough seeds. There are nutritious crops here, such as yellow maize, and nutritious potatoes. Some people are given these seeds by the agriculture officer, but we have never determined the criteria to get them."- **FGD with Producers, Mwamakalanga Village***

Somalia: Food fortification initiatives in Somalia are guided by the National Food Fortification Strategic Plan 2019-2024 whose objective was to improve nutritional status of people in Somalia, by combating micronutrient deficiencies through national food fortification for accelerated socioeconomic development. Lack of enabling basic structures together with other underlying constraints informed the development of the food fortification strategy[37].

However, despite having a strategy in place, food fortification in Somalia is still a challenge due to various factors. For example, there is no commercial or industrial fortification of commonly consumed foods in the country. This is mainly due to lack of appropriate infrastructure to carry out fortification, that is, there are no large-scale food industries with the capacity to fortify these foods, no standards on how much of fortification to add, no quality control agency to enforce the standards and check for compliance[38].

Another major obstacle to the widespread adoption of biofortified crops in Somalia is the difficulty in obtaining and affording biofortified seeds. Genetic engineering or advanced breeding methods are frequently used to create biofortified seeds, which raises production costs in comparison to conventional varieties. Discussions with respondents during focus discussions with producers indicated that many farmers are unaware of the health benefits associated with bio-fortified crops, which results in their reluctance to switch from conventional crops to bio-fortified alternatives.

6.2. BIOFORTIFICATION IN FOOD PROCESSING

Kenya: The study findings revealed that Food processors in Kenya are increasingly exploring fortified flour production, particularly in maize milling. Government- led initiatives alongside international partners such as HarvestPlus and the Kenya Agricultural and Livestock Research Organisation (KALRO, have contributed to promoting biofortified food products[39]. Despite these efforts, a key barrier remains consumer awareness, as many people still lack information on the benefits of biofortified foods. Strengthening policies to support smallholder farmers in the production and processing of biofortified crops is crucial for further progress.

Tanzania: Desk review findings established that Tanzania has made significant progress in biofortification, particularly in the production of vitamin A- Enriched maize and cassava. The Tanzanian government, in collaboration with research institutes like the Tanzania Agricultural Research Institute (TARI), has promoted the inclusion of biofortified foods in local food processing industries. Biofortified maize and cassava have been incorporated into flour milling and packaged food

[37] Somalia National Food Fortification Strategic Plan 2019-2024
[38] Somalia National Food Fortification Strategic Plan 2019-2024
[39] Nutrition International (2020)

products to enhance nutritional content of commonly consumed staples. [40] However, systemic challenges such as fragmented supply chains, limited farmer access to financial resources and inadequate market linkages hinder full scale adoption of biofortification.[41]

Somalia: The findings from the study noted that efforts to promote biofortification in food processing in Somalia have largely been driven by international organisations and NGOs working to address malnutrition among vulnerable communities. [42] However, Somalia faces significant challenges, including weak governance structures, limited access to improved agricultural inputs, and infrastructural deficits that hinder food processing. The processing of biofortified foods remains underdeveloped, as most agricultural products are consumed at the household level rather than being commercially processed. Traditional farming methods dominate and awareness of biofortification remains low among farmers and consumers.[43]

6.3 ROLE OF WOMEN IN BIOFORTIFICATION

Kenya: Women's role in biofortification has gained traction through community-led initiatives such as serving as the primary custodians of these crops, engaging in activities ranging from seed selection to post-harvest storage and processing. However, the adoption and utilisation of biofortified crops face challenges such as limited access to agricultural extension services, land ownership disparities, and the prevalence of cultural norms that restrict women's participation in decision-making.

Tanzania: The findings established that women constitute a significant portion of the agricultural workforce, particularly in subsistence farming, and are pivotal in driving biofortification initiatives. The cultivation and consumption of biofortified crops, such as vitamin A-Enriched orange maize and cassava, have been promoted and women are often responsible for cultivating these crops and ensuring their integration into household diets. Despite their active participation, systemic challenges such as limited access to agricultural resources, training, and land ownership rights hinder their full involvement and potential in biofortification efforts.

Somalia: The findings revealed that promotion of biofortification is still in its nascent stages, with limited but promising engagement from women. Initiatives to introduce biofortified crops, such as drought-tolerant and vitamin A-Enriched sweet potatoes, have targeted vulnerable households, many of which are headed by women. However, Somalia's protracted conflicts, limited infrastructure, and socio-cultural norms restrict women's access to agricultural resources and participation in decision-making processes, creating significant barriers to scaling up biofortification efforts.

[40] Ibid
[41] AU (2022)
[42] International Potato Centre (2018)
[43] African Union (2022)

CHAPTER SEVEN: FOOD SYSTEM ACTIVITIES ACROSS BORDERS

7.1. KEY COMMODITIES TRADED

Kenya and Tanzania: The findings established that Kenya and Tanzania trade a variety of food items, including maize, wheat, sugar, rice, and poultry. Kenya has historically exported poultry, including day-old chicks, hatching eggs, and processed poultry. The findings also noted that Tanzania exports edible vegetables, animal fodder, oil seed, oleagic fruits, grain, food industry residues and wastes to Kenya. The findings further noted that Tanzania also exported coffee, tea, spices, edible vegetables and roots and tubers to Kenya in 2023.

Somalia and Kenya: Desk review findings established that livestock is a primary commodity, with significant flows from Somalia to Kenya and Ethiopia, contributing to local economies and food security. Garissa in Kenya has emerged as a key hub for Somalia livestock[44]. The findings also noted that the smuggling of sugar between Kenya and Somalia highlights the intersection of illicit trade and political economies[45]. Kenya exports miscellaneous edible preparations, pharmaceutical products, coffee, tea, mate, and spices to Somalia.

Tanzania and Somalia: The desk review findings established that some of the common food items traded between Tanzania and Somalia include dry beans, rice, maize, wheat flour, sugar, and sorghum. The findings also noted that since 2022, Tanzania has been exporting fruit juice and flavoured water to Somalia while Somalia has been exporting processed crustaceans to Tanzania since 2017.

7.2. POLICIES ON CROSS-BORDER FOOD FLOW IN EAST AFRICA

Cross-border food flow policies in Kenya, Tanzania, and Somalia aim to promote food security, reduce trade barriers, and ensure the smooth movement of food commodities across borders. However, challenges like export bans, inconsistent regulations, and inadequate enforcement often undermine these goals.

Key Policies and Their Objectives

1. **East African Community (EAC) Common Market Protocol.** The objective of this policy is **to establish** the free movement of goods, services, and capital among EAC member states (Kenya, Tanzania, and others). It aims to eliminate tariffs and non-tariff barriers (NTBs) for regional trade, including agricultural goods like maize, rice, and processed food. The **Key Provisions are z**ero tariffs on agricultural goods traded within the EAC and harmonization of sanitary and phytosanitary (SPS) standards to facilitate cross-border food trade. The **Challenges are that i**mplementation is inconsistent due to national-level policies, such as Tanzania's periodic maize export bans to safeguard domestic food security. The Institution responsible is the EAC Secretariat which oversees policy coordination and dispute resolution. However, the **Policy Gap is l**imited to enforcement mechanisms to ensure compliance with agreed trade rules.

[44] FAO, 2021
[45] Jacob Rasmussen (2017)

2. **Regional Food Balance Sheet (RFBS) Initiative: The Objective of this policy is to i**mprove food security by monitoring and coordinating surplus and deficit food production across East Africa. The **Key Provisions are that it identifies** surplus-producing regions (e.g., Tanzania for maize) and connects them to deficit regions (e.g., Kenya). It also facilitates data-driven decisions on cross-border food trade. The challenges with this policy are that there is **i**ncomplete data and inadequate capacity in member states to operationalize food balance sheets effectively. This policy is coordinated by the East African Grain Council (EAGC) with support from governments and development partners. However, the policy gap is the lack of binding commitments by countries to act on RFBS recommendations.
3. **African Continental Free Trade Area (AfCFTA):** The objective of this policy is to **p**romote intra-African trade, including agricultural goods, by reducing tariffs and NTBs across Africa, including Somalia, Kenya, and Tanzania. The **Key Provisions are the g**radual reduction of tariffs on agricultural commodities and the simplification of trade processes, including border inspections and documentation. The c**hallenges are that** Somalia is still in the early stages of integrating into the AfCFTA and weak trade infrastructure and security concerns lead to slow implementation. The policy is facilitated by the **African Union (AU)** and national governments. The **Policy Gap** is the lack of tailored strategies for fragile states like Somalia to benefit from the AfCFTA framework.

7.3 INSTITUTIONS FACILITATING CROSS-BORDER FOOD FLOW

1. **East African Grain Council (EAGC): It p**romotes efficient grain trade by coordinating private sector stakeholders, advocating for policy harmonization, and providing market intelligence. Oversees platforms like the Regional Food Balance Sheet (RFBS).
2. **East African Community (EAC) Secretariat: It d**evelops trade agreements and harmonizes SPS standards to promote food security and trade. It Facilitates dispute resolution among member states.
3. **COMESA (Common Market for Eastern and Southern Africa): It a**dvocates for regional integration and trade facilitation beyond the EAC, including Somalia. Implements SPS programs to align with international food safety standards.
4. **National Institutions:** Ministries of Agriculture and Trade in Kenya, Tanzania, and Somalia are responsible for implementing regional trade agreements and ensuring food security policies are adhered to. E.g. **Kenya Plant Health Inspectorate Service (KEPHIS)** ensures SPS compliance for imported food. Tanzania: The **Ministry of Agriculture** oversees export permits for surplus food commodities.

7.4. DRIVERS OF CROSS-BORDER TRADE

Cross-border trade in East Africa is influenced by a combination of economic, social, and political factors. These drivers not only stimulate trade but also create diversity in their dynamics, given the varying conditions in countries like Kenya, Tanzania, and Somalia. The analysis below describes the broad and specific categories of the drivers that influence cross-border trade.

1. Economic Drivers

a. Comparative Advantage: Countries trade based on their ability to produce certain goods more efficiently than their neighbours. For example, Tanzania has a comparative advantage in maize

production, while Kenya is a net importer of maize. i.e. Tanzania exports agricultural produce like maize, rice, and beans. Kenya exports processed goods and industrial products like cement, beverages, and steel. Somalia's comparative advantage lies in livestock exports, particularly camels, goats, and sheep[46].

b. Market Size and Demand: Explanation: Regional trade is driven by the demand for goods in neighbouring countries. Kenya's large population and urbanization create demand for Tanzanian agricultural produce and Somali livestock. Kenya's urban centres demand processed food and grains. Somalia's reliance on imports for staples like rice and sugar drives its trade with Kenya. Tanzania benefits from exporting surplus food during harvest seasons[47].

c. Price Arbitrage Opportunities: Price differentials between countries motivate traders to move goods across borders. For example, maize and beans are often cheaper in Tanzania compared to Kenya, creating incentives for trade. Seasonal price fluctuations in food staples lead to variations in trade intensity. Informal trade thrives on price gaps, especially in regions with weak enforcement[48].

2. Policy and Institutional Drivers

a. Regional Trade Agreements: Policies like the East African Community (EAC) Common Market Protocol and African Continental Free Trade Area (AfCFTA) reduce tariffs and non-tariff barriers, making cross-border trade easier. Kenya and Tanzania benefit from EAC harmonized tariffs and standards. Somalia, being outside the EAC but part of IGAD and AfCFTA, faces challenges in aligning policies[49].

b. Institutional Support: Organizations like the East African Grain Council (EAGC), Kenya Revenue Authority (KRA), and Tanzania Revenue Authority (TRA) facilitate trade by providing market intelligence and customs services. Kenya benefits from better institutional capacity in customs operations. Tanzania emphasizes SPS compliance for agricultural exports. Somalia relies on informal trade networks due to weak institutions[50].

c. Tariff and Tax Incentives: Reduced or zero tariffs on goods within regional trade blocs encourage formal trade. Kenya and Tanzania trade food commodities duty-free within the EAC. Somalia's lack of harmonized tariffs creates inconsistencies in its trade policies[51].

3. Social and Cultural Drivers

a. Cross-Border Communities: Communities along borders often share cultural and linguistic ties, facilitating informal trade. For example, the Maasai in Kenya and Tanzania engage in cross-border livestock trade. Somali clans dominate trade routes in Kenya and Somalia. Maasai communities prioritize livestock, while coastal traders focus on fish and spices[52].

b. Informal Networks and Relationships: Trust-based networks enable trade in regions where formal structures are weak, particularly in Somalia. Kenya-Tanzania trade sees formal transactions through established markets. Somalia's informal trade dominates due to insecurity and weak institutions[53].

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[46] EAC Trade Reports
[47] African Development Bank (AfDB) Market Studies
48Regional Agricultural Trade Intelligence Network (RATIN)
49 EAC Common Market Protocol
50 EAGC Reports
51 AfCFTA Agreement
52 IGAD Livelihood Studies
53 International Trade Centre (ITC) Studies

4. Infrastructure and Connectivity

a. Transport Corridors: Explanation: Key corridors like the Northern Corridor (Kenya) and the Central Corridor (Tanzania) facilitate trade by reducing transport costs. Kenya's Mombasa port serves as a hub for regional trade. Tanzania's Dar es Salaam port is critical for inland countries like Zambia and Rwanda[54].

b. Border Infrastructure: One-stop border posts (OSBPs) streamline customs procedures, reducing delays. Kenya-Tanzania border posts like Namanga are well-developed. Somalia lacks comparable infrastructure, relying on informal border crossings[55].

5. Security and Political Stability

a. Security Concerns: Stability in trade regions encourages investment and cross-border activities. Kenya and Tanzania have relatively stable trade environments. Somalia faces disruptions due to insecurity and piracy risks[56].

b. Political Relations: Strong bilateral ties foster trade, while disputes create barriers. Kenya and Tanzania have occasional trade disputes (e.g., on sugar and dairy products). Kenya-Somalia relations are often strained, affecting trade[57].

7.5. CHALLENGES HINDERING CROSS-BORDER FOOD FLOW

Cross-border food flow in East Africa faces numerous challenges, stemming from policy inconsistencies, infrastructure deficits, and socio-political issues. These barriers disrupt trade efficiency, increase costs, and exacerbate food insecurity. Below is a detailed discussion of these challenges:

1. Policy and Regulatory Challenges

a. Export Bans: Countries like Tanzania occasionally impose export bans on staples like maize and rice during domestic shortages, disrupting regional food supply chains. This reduces the availability of food in importing countries like Kenya and encourages smuggling, leading to loss of revenue. An e**xample is when** Tanzania banned maize exports in 2022 to ensure local food security. The solution to this could be to establish regional food reserves to mitigate supply shocks.

b. Non-Tariff Barriers (NTBs): Inconsistent application of sanitary and phytosanitary (SPS) measures, lengthy customs procedures, and arbitrary roadblocks hinder smooth trade and delays at border points increase transportation costs. Traders resort to informal routes, reducing trade transparency. An e**xample is** Kenya-Tanzania disputes over milk and sugar imports due to SPS compliance disagreements. The solution to this could be to harmonize SPS standards across the East African Community (EAC).

54 TradeMark East Africa Reports
55 World Bank Logistics Reports
56 UNHCR Regional Reports
57 EAC Trade Relations Reports

c. Tariff and Tax Issues: Despite regional agreements like the EAC Common Market Protocol, some countries impose taxes on food imports, especially during shortages. This increases food prices for consumers and discourages formal trade. An example is Somalia levies inconsistent import tariffs due to weak governance. The solution could be to simplify and align tax regimes within trade blocs like the EAC and COMESA.

2. Infrastructure Deficiencies

a. Poor Transport Networks: Inadequate roads, railways, and ports increase logistical costs for food trade. Hence landlocked regions face higher food prices and perishable goods like fruits and vegetables experience losses during transit. For example, Somalia's limited road infrastructure hampers food imports from Kenya. This could be solved by investing in regional transport corridors like the Northern and Central Corridors.

b. Lack of Storage Facilities: Insufficient cold storage and warehouses lead to post-harvest losses, especially for perishables. This limits trade in high-value food products and increases food scarcity during lean periods. For example**,** Tanzania lacks adequate grain storage facilities near its borders with Kenya. This could be mitigated by developing shared storage hubs along key trade routes.

c. Limited Border Infrastructure: Inadequate facilities at border points delay clearance of food shipments. Hence traders face long queues and higher costs and it encourages informal trade, bypassing regulatory checks. E.g. The Kenya-Somalia border at Mandera lacks a fully operational customs office. It would help to establish and modernize One-Stop Border Posts (OSBPs).

3. Security and Political Challenges

a. Insecurity in Trade Corridors: Armed conflicts, banditry, and piracy disrupt food transportation. Traders, therefore, incur higher costs for security measures and some routes become inaccessible, reducing market access. An example is insecurity in Somalia limits cross-border food trade with Kenya. A solution to this could be to enhance regional cooperation on security through IGAD and EAC initiatives.

b. Political Tensions: Diplomatic disputes between neighbouring countries negatively affect trade policies. This leads to periodic trade bans or restrictions on certain goods and reduces investor confidence in regional trade. For example, Kenya and Tanzania have had disputes over sugar and dairy products. This could be alleviated by establishing an independent arbitration mechanism within the EAC.

4. Economic Challenges

a. High Transaction Costs: Bribes, informal fees, and fluctuating exchange rates increase trade costs. This reduces profits for traders and discourages formal trade channels. E.g. informal payments along Kenya-Tanzania routes inflate food prices. It would help to digitize customs systems to reduce human interference.

b. Limited Access to Financing: Small-scale traders struggle to access affordable credit for cross-border activities. This limits trade volumes and prevents traders from expanding operations. Limited finance institutions are willing to risk financing small-scale farmers which results in informal traders in Kenya and Tanzania relying on personal savings for working capital. It would introduce microcredit schemes tailored to cross-border traders.

6. Social and Cultural Barriers:

a. Language Differences: Variations in language and literacy levels create communication barriers during trade negotiations. This leads to misunderstandings in pricing and terms of trade and limits the integration of informal traders into formal systems. An example is Somali traders often face challenges in Kenya due to language differences. It would help to provide language training and translation services at border points.

b. Gender Disparities: Women, who dominate the informal food trade, face harassment and lack access to formal trade systems. This limits the economic potential of women traders and reinforces reliance on informal trade networks. This is seen among female traders at the Kenya-Tanzania border where they report frequent harassment by officials. It would help to implement gender-sensitive trade policies and provide legal support for women.

6. Data and Information Gaps

a. Lack of Market Information: Traders lack access to real-time data on food prices, demand, and regulations. This reduces the bargaining power of small-scale traders and increases the risk of over- or under-supply in markets. An example is that limited awareness of SPS requirements leads to rejected shipments. A solution is to expand the Regional Agricultural Trade Intelligence Network (RATIN) services.

7.6 OPPORTUNITIES FOR STRENGTHENING CROSS-BORDER FOOD FLOW

Cross-border food flow is critical to ensuring regional food security, economic growth, and market integration in East Africa. Despite existing challenges, various potential opportunities can be leveraged to enhance cross-border food trade. These opportunities arise from regional cooperation, technological advancements, infrastructure development, and policy reform.

1. Regional Trade Agreements and Harmonization

a. Leveraging Regional Economic Communities (RECs). Frameworks such as the East African Community (EAC), the Common Market for Eastern and Southern Africa (COMESA), and the African Continental Free Trade Area (AfCFTA) promote tariff-free or reduced-tariff trade for agricultural commodities. Harmonization of trade policies reduces non-tariff barriers and enhances market access for surplus food production. E.g. the EAC Customs Union has simplified trade procedures, enabling smoother maize trade between Kenya and Tanzania. The economic communities strengthened by implementing AfCFTA to expand regional markets for food products and build capacity for smaller economies like Somalia to integrate into RECs.

b. Harmonizing Sanitary and Phytosanitary Standards (SPS):

Standardizing SPS measures across borders minimizes delays and disputes over food quality and safety. The b**enefits are that it r**educes rejections of food shipments at borders and encourages formal trade by ensuring consistency in quality standards. E.g. Kenya and Tanzania have agreed to align maize SPS standards to reduce disputes. To s**trengthen it can be done by e**stablishing regional SPS laboratories and investing in capacity-building for border officials.

4. **Infrastructure Development:**

(a) Expanding Transport Networks by investing in roads, railways, and ports. This approach is likely to lower logistical costs improve the efficiency of food transport and reduce post-harvest losses. It also enhances market access for remote producers. The Northern Corridor (linking Kenya, Uganda, and Rwanda) has improved food flow across East Africa. To strengthen it; build feeder roads in rural areas to connect farmers to markets and upgrade the Lamu Port-South Sudan-Ethiopia Transport (LAPSSET) Corridor to facilitate regional trade.

b. Establishing Storage Facilities: Building cold storage and warehouses at strategic locations can minimize post-harvest losses. This increases the shelf life of perishable goods and stabilizes the food supply during lean periods. E.g. Tanzania's National Food Reserve Agency (NFRA) uses strategic storage to regulate maize trade with Kenya. To strengthen it; promote public-private partnerships (PPPs) to develop storage facilities at key border points.

3. Technological Innovations

a. Digital Trade Platforms: Digital platforms can connect traders, buyers, and regulators, reducing inefficiencies in trade. This provides real-time data on food prices, demand, and regulations and reduces transaction costs by eliminating intermediaries. E.g the Regional Agricultural Trade Intelligence Network (RATIN) shares market data to guide traders in East Africa. To strengthen it; expand digital literacy and access to mobile technology among rural traders.

b. E-Customs and Border Automation: Digitizing customs procedures can streamline food clearance at borders. This reduces delays and corruption at border points and enhances transparency and revenue collection. E.g. the Kenya Revenue Authority (KRA) has implemented e-customs systems at the Namanga One-Stop Border Post (OSBP). To strengthen it; roll out e-customs systems at all major border points and train officials on their use.

4. Economic and Social Opportunities

a. Supporting Smallholder Farmers: Empowering smallholder farmers through training, financing, and market linkages increases food supply for cross-border trade. This enhances productivity and incomes for rural communities and diversifies food supply chains. E.g. Kenya's Agricultural Sector Transformation and Growth Strategy (ASTGS) aims to commercialize smallholder farming. To strengthen support for smallholder farmers: facilitate access to credit and inputs for small-scale producers.

b. Promoting Gender Inclusion: Supporting women, who dominate informal cross-border trade, enhances their role in formal trade networks. This increases household incomes and food

security and reduces gender-based trade barriers. E.g the EAC Women in Cross-Border Trade Program provides training and legal support to female traders. To strengthen gender inclusion: promote legislation and implementation of gender-sensitive trade policies and create women-only trade zones at borders.

5. Regional Food Reserves

Establishing regional food reserves ensures a steady supply of staple foods during shortages. This reduces the need for ad-hoc export bans and stabilizes food prices across the region. E.g The African Union's African Risk Capacity (ARC) initiative supports emergency food reserves. To strengthen regional food reserves: scale up the ARC program and integrate it with national food security strategies.

6. Security and Governance

a. Strengthening Border Security: Enhancing security along trade corridors minimizes risks such as theft and armed conflict. This encourages formal trade by reducing reliance on informal routes and improves trader confidence in border regions. E.g Kenya and Ethiopia have jointly addressed insecurity along the Moyale border. To strengthen border security: increase investment in joint border patrols and regional security initiatives.

b. Political Stability and Cooperation: Resolving diplomatic disputes promotes consistent and predictable trade policies. This encourages private sector investment in cross-border food trade and builds trust among trading partners. E.g. Kenya and Tanzania have used EAC forums to address trade disputes. To strengthen political stability and cooperation: strengthen arbitration mechanisms within RECs to address trade conflicts.

CHAPTER EIGHT: GENDER AND FOOD SYSTEMS

Food systems in Kenya, Tanzania, and Somalia are affected by different gender dynamics that significantly affect women due to their central roles in food production, household management, and caregiving. Across all three countries, gender inequality in access to resources such as land, credit, and agricultural technologies and their participation in decision-making amplifies the vulnerabilities women face. Addressing these disparities is crucial to improving food system outcomes and enhancing resilience to seasonal vulnerabilities for entire communities.

8.1. PARTICIPATION IN DECISION MAKING

Kenya: Discussions with respondents from Elgeyo Marakwet established that a majority of the women engaged (95%) were participating in decision-making within the household and community on matters relating to food. The findings noted that women had more decision-making power on matters like household dietary consumption, types of inputs to be utilized on the farm and where to sell the produce. However, discussions with women in Elgeyo Marakwet established that women have little decision-making power on matters like types of crops to be planted on the farm, amount of produce to be sold and utilization of income generated from the sale of farm produce.

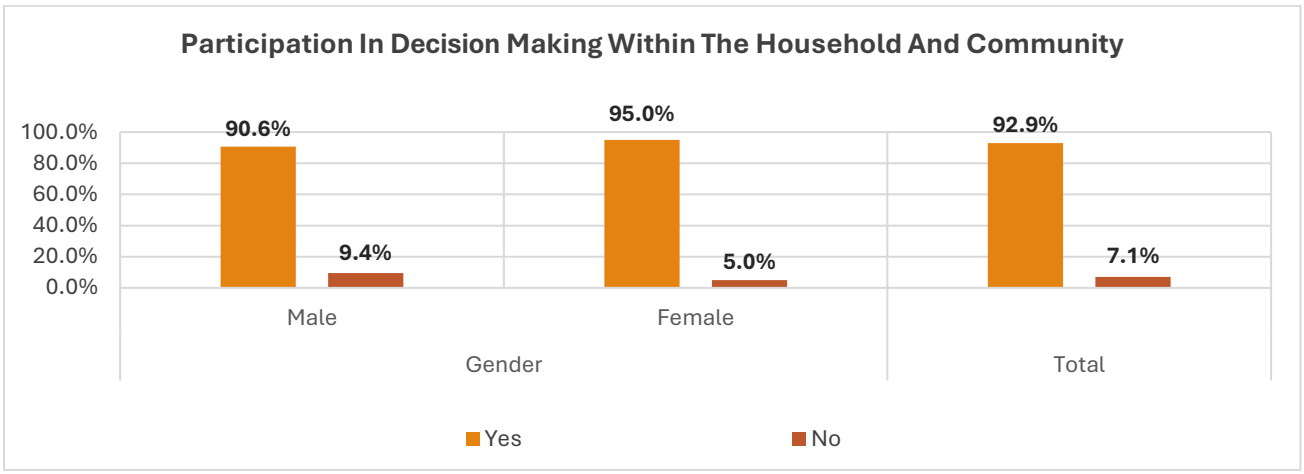

Figure 22. Participation in Decision Making at the Household and Community Level in Kenya

The findings noted patriarchal norms often restrict women's access to land ownership, and financial resources in comparison to men and this affects the extent to which they can make decisions at both household and community levels. Findings from Elgeyo Marakwet highlighted that women face additional barriers in agricultural leadership and decision-making, often being excluded from positions of influence in cooperatives and farming associations. While they contribute significantly to agricultural labour, their voices are rarely heard in policy discussions or strategic planning forums. This exclusion perpetuates inequalities and limits the development of gender-sensitive agricultural policies.

Tanzania: The findings established that 78.3% of the women and 88.1% of the men engaged were participating in decision-making at household and community level. The findings noted that women in Tanzania had more decision-making power on utilization of income generated from sales of produce

in comparison to Kenya while men had power over decisions regarding food production, amount of produce to be sold and household consumption.

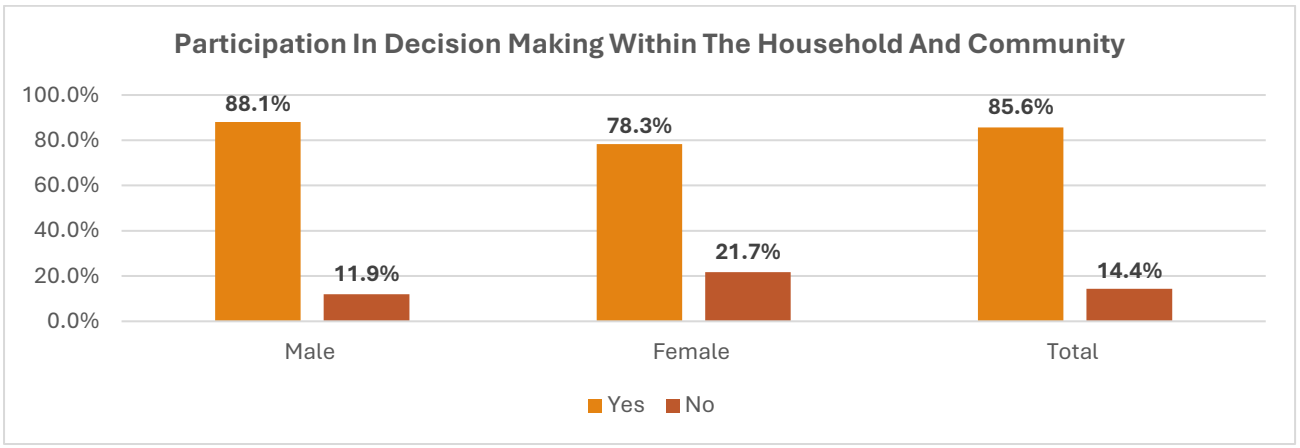

Figure 23. Participation in Decision Making at the Household and Community Level in Tanzania

Key factors affecting women's participation in decision-making cited were lack of confidence to express their opinions, traditional and cultural norms which exclude them from economic decisions, limited economic freedom that affects women's influence in household and community decisions and society's perceptions where in most local communities women are not seen as equal decision-makers and are expected to follow what men decide. Just like the case for Kenya, the findings noted women in Tanzania are often excluded from leadership roles in cooperatives, farmer associations, and policy-making bodies, which hinders the development of inclusive agricultural strategies.

Somalia: The findings noted that 88% of the women engaged confirmed to be participating in decision-making at the household and community level. However, in comparison to Kenya and Tanzania, the findings noted that men had the monopoly of decision-making in all activities involved in food systems from production, processing, amount of produce sold, management and utilization of income generated and household consumption.

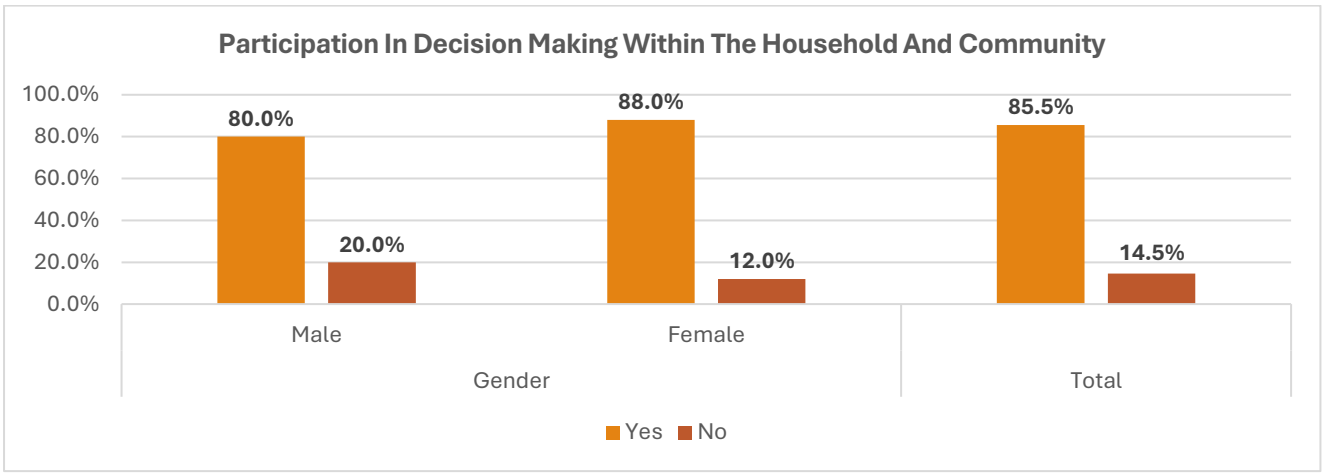

Figure 24. Participation in Decision Making at the Household and Community Level in Somalia

Key factors limiting women's decision-making power in comparison to men according to the respondents engaged in Puntland include patriarchal and cultural norms which are particularly

resistant to women's participation in decision-making. In most traditional communities within Puntland, the findings established that women are considered to be inferior and consumers of decisions made by men. While women in Puntland primarily engage in subsistence farming to support household needs, men often dominate decision-making on cultivation, sale of cash crops and control of the income generated. These barriers in decision-making limit women's ability to maximise their productivity and economic potential according to the women engaged through FGDs in Puntland.

8.2. ACCESS TO LAND AND RESOURCES

Kenya: The findings established that women in Elgeyo Marakwet face significant obstacles in accessing land, despite their extensive role in agriculture. Cultural practices often prevent women from owning or inheriting land, leaving them dependent on male relatives or spouses to secure access. This dependency impacts their ability to apply for credit or loans, as land ownership is a common requirement for collateral.

To address this issue, KII with government representatives from the county government of Elgeyo Marakwet noted that organisations such as the Kenya Land Alliance are advocating for the enforcement of gender-equitable land policies. In parallel, grassroots initiatives have introduced land leasing schemes that allow women temporary ownership rights, enabling them to cultivate crops more effectively.

However, these measures must be scaled up and integrated into national policy frameworks to achieve lasting change. Strengthening women's land ownership rights is vital for improving Kenya's agricultural productivity and creating more inclusive food systems.

Tanzania: The findings revealed that gender disparities remain pervasive, particularly in access to resources for women engaging in food systems in Tanzania. Cultural and systemic barriers restrict women's land ownership, leaving them dependent on male relatives or community leaders for access. This dependency affects their ability to secure loans or purchase farming inputs, limiting their productivity.

Discussions with an agricultural officer in Tanzania further highlighted that limited access to processing technologies and financial resources often leaves women reliant on traditional methods, which are time-consuming and less efficient. For instance, women involved in rice farming often lack access to modern milling equipment, resulting in lower-quality products that fetch reduced market prices. Barriers like limited access to credit, modern farming tools, and irrigation systems impede their productivity.

Somalia: The findings established that access to land is a critical barrier for Somali women in agriculture. Patriarchal inheritance practices and cultural norms often exclude women from owning or inheriting land, leaving them reliant on male relatives for access. This dependency undermines their ability to make decisions about land use or engage in large-scale farming activities.

Without land ownership, women are also excluded from accessing formal credit or financial services, as land often serves as collateral. This exclusion limits their ability to invest in agricultural inputs such as fertilizers, improved seeds, or irrigation systems.

Addressing this issue requires legislative reforms to strengthen women's land rights, coupled with awareness campaigns to challenge discriminatory cultural norms. In addition, introducing community land-sharing schemes could provide women with temporary access to land, enabling them to participate more effectively in agriculture according to respondents engaged from Puntland.

8.3. SOCIAL AND CULTURAL NORMS

Kenya: In Kenya, social and cultural norms strongly influence gender dynamics within food systems, often restricting women's participation and agency. Patriarchal practices are particularly entrenched in rural areas like Elgeyo Marakwet where societal expectations confine women to roles deemed less economically significant, such as planting and weeding. For example, male dominance in decision-making extends to land ownership, with cultural norms favouring men in inheritance. This denies women control over resources critical for farming and limits their economic independence.

Furthermore, women face social resistance when they attempt to enter male-dominated sectors, such as high-value cash crop farming or cooperative leadership roles. Changing these restrictive norms requires continuous community sensitization programmes and advocacy aimed at promoting gender equality in agricultural practices. Initiatives led by local leaders can play a vital role in challenging traditional expectations and enabling women to access economic opportunities within food systems.

Tanzania: Cultural norms play a pervasive role in shaping women's participation in the food system, often relegating them to tasks perceived as extensions of domestic work. Social expectations in regions like Shinyanga and TOT position women as labourers for food production while men oversee commercial operations, including trade and income management. Women's activities, such as weeding, harvesting, and carrying produce to market, are undervalued compared to men's roles in transportation or negotiating contracts for cash crops.

Moreover, cultural traditions discourage women from making key agricultural decisions or accessing larger markets dominated by male traders. To disrupt these norms, it is imperative to integrate gender-focused training into agricultural programmes and actively promote gender-balanced leadership within cooperatives and trade networks.

Somalia: Deep-rooted cultural norms restrict women's mobility and access to resources, significantly affecting their roles in the food system. In the Nuugal region, women are expected to prioritise domestic responsibilities, limiting their involvement in agriculture or market activities to the periphery. Their labour is typically confined to household food production or subsistence farming, where they face barriers such as minimal land ownership and lack of recognition for their contributions.

Clan-based systems also perpetuate gender disparities, favouring male members in resource distribution and market opportunities. For example, women are often excluded from community-level decision-making on agricultural planning and resource allocation. Implementing culturally sensitive

gender equity programmes that address these restrictions while respecting local values can help foster greater inclusion of women in Somalia's agricultural and livestock systems.

8.4. ROLES OF WOMEN AND MEN IN FOOD SYSTEMS

Kenya: Women in Kenya play indispensable roles across food systems. Discussions with respondents in Elgeyo Marakwet revealed that women are actively involved in planting, weeding, harvesting, and marketing agricultural produce. Beyond production, women play vital roles in the distribution and marketing of agricultural produce, yet their contributions are often undervalued. FGDs with consumers and producers in Embobut and Sambirir established that women dominate informal markets, selling fruits, vegetables, and other produce in local settings. Men also play similar roles but have more control over key productive factors like land, access to credit and international markets.

"Despite the significant contributions of women in food systems, cultural norms often restrict them from owning land or controlling household finances. For instance, women dominate food distribution but lack decision-making power regarding income allocation. They also face challenges such as high transport costs, limited access to market information, and unfair competition from male traders who control larger market shares" - ***FGD with Consumers Chemongor/ Marichor-Embobut Ward.***

Tanzania: In Tanzania, women perform similar roles, with additional responsibilities in small-scale livestock rearing and food processing. The findings highlighted that women are deeply involved in subsistence farming, growing staple crops such as maize, millet, and sorghum to feed their families. Women play crucial roles in production, storage, and distribution in comparison to men who are more actively involved in post-harvest processing, cross-border marketing and management of income generated from farm produce. FGDs with consumers in Mwakipoya Village further noted that women are also heavily involved in the local trade of food items and waste disposal compared to men.

"Women play a significant role in the food system but face challenges. For example, women bear a disproportionate burden of unpaid domestic labour, which limits their participation in agricultural production and value-added activities. In addition to farming, women are often responsible for household chores such as fetching water, cooking, and childcare. This dual workload reduces their time and energy for productive farming activities, ultimately impacting household incomes and food security"- ***FGD with Producers Bulambila, Shinyanga District***

Somalia: Discussions with respondents in Puntland established that women are heavily involved in agricultural production, particularly in subsistence farming. They cultivate staple crops such as maize, sorghum, and millet, which are critical for household consumption. In pastoralist communities, women are responsible for the care and management of small livestock, including goats and sheep, which provide milk and meat for daily sustenance. Women's roles in these activities are vital during periods of food scarcity, as they often ensure that households have access to basic nutrition. However, their contributions are often informal and unrecognized, particularly in male-dominated pastoralist systems where men typically control the sale of large livestock such as camels and cattle.

"In Puntland, women are heavily involved in agricultural production, particularly in subsistence farming. Women's roles are vital during periods of food scarcity, as they often ensure that households have access to basic nutrition. However, their contributions are often informal and unrecognized, particularly in male-dominated

*pastoralist systems where men typically control the sale of large livestock such as camels and cattle"- **KII with Community leader, Nugaal Region, Dangorayo District***

CHAPTER NINE: CONCLUSIONS AND RECOMMENDATIONS

9.1. CONCLUSIONS

9.1.1. KENYA

At the food production level, the findings noted that the supply of inputs is hampered by unreliable distribution networks and high costs. Hence, there is a need to improve transport infrastructure and eliminate nontariff barriers (for example, delays at roadblocks and weighbridges) and multiple and burdensome regulations, charges, and taxes. The presence of counterfeit products has affected the quality of inputs.

At the transportation level, the findings noted that the most common modes of food transportation in Elgeyo Marakwet were trucks, motorbikes, bicycles and hand carts. However, the sector is impacted by infrastructure challenges, such as poor road conditions and fuel costs, which can cause delays or increase transportation expenses. Roads that are not well-maintained or are prone to damage, especially in rural areas, cause significant delays and increase transportation costs

At the processing level, the findings noted that food processing adds value to raw agricultural produce by increasing its shelf life, enhancing its nutritional value, and improving marketability. For example, processing maize into flour or snacks provides higher profit margins than selling maize grain directly. However, the cost of inputs such as energy, labour, and packaging materials is often high, reducing the profitability of food processing businesses.

At the market level, the findings noted that informal markets, known as "kiosks," and street food vendors play a significant role in the distribution of food products, especially fresh produce, snacks, and quick meals. With the rise of new food brands and international companies entering the Kenyan market, competition has intensified. Distribution and logistics, especially in rural areas, is a challenge.

At the consumption level, the findings noted that food consumption in Kenya is influenced by a combination of traditional practices, economic factors, urbanization, and the availability of both local and imported foods. Economic pressures, especially among lower-income households, often lead to reduced food variety and reliance on cheaper staple foods like maize. Inflation and the rising cost of living have also made nutritious foods like meat and dairy products less accessible to many Kenyans, especially in rural areas.

On food waste, food waste often starts even before food reaches consumers. A large amount of food is lost due to poor post-harvest handling, inadequate storage facilities, and lack of proper infrastructure. Smallholder farmers, who form a significant part of Kenya's agriculture sector, suffer from these losses as they lack access to modern farming techniques and preservation methods.

Kenya's policy framework for food production is diverse and aims to address both the immediate and long-term challenges facing the agricultural sector. The key focus is on improving productivity, increasing food security, and ensuring that the agricultural sector is resilient to the impacts of climate change. The success of these policies, however, will depend on the effective implementation of strategies and the active involvement of all stakeholders, including government, private sector, farmers, and communities.

9.1.2. TANZANIA

At food production level, the findings noted that the type and choice of crops being farmed were majorly influenced by; the climatic conditions, soil fertility, availability of land, available capital, type of farm inputs (seeds, fertilizers) available, family consumption and market demand and cultural beliefs. Key challenges affecting food production in Shinyanga Region were inadequate access to water resources, limited access to high-quality biofortified seeds, significantly impacting crop resilience and productivity, high cost of agricultural inputs, particularly seeds and fertilizers, soil degradation, pests and diseases.

At the transportation level, the finding noted that the majority of agricultural produce is transported by road due to the limited reach and capacity of rail and water transport systems. The main means of transportation are hand carts, bicycles, motorbikes, physically by person and trucks. Key challenges cited that affect food transportation in Shinyanga include poor road infrastructure especially in rural areas and a lack of coordinated transport services and insufficient storage facilities along transport routes.

At the processing level, the findings revealed that food processing techniques vary widely, from traditional methods to modern, mechanized processes. Traditional food processing is prevalent in rural areas, where methods like sun-drying, chopping, milling, sieving & sifting, packaging, washing/ cleaning, grading, cooking & heating, smoking, and fermentation are commonly employed to preserve food. However, key challenges like unreliable power supply, poor road networks, and inadequate water supply resulted in increased production costs and which affect food processing processes.

At the market level, the findings noted that most agricultural products are sold in either developed designated markets, open-air markets or through roadside stalls. These informal markets are crucial for smallholder farmers who depend on them to sell perishable goods directly to consumers. Key challenges affecting food marketing in the Shinyanga region included inadequate transportation and poor infrastructure, shortage of buyers or customers, long distances to reach markets, high taxes in the market, and limited knowledge of marketing strategies for farm produce.

At consumption level, the findings noted that cereals were the main staple foods for a significant portion of the population. Common types of cereals consumed were maize, rice, sorghum, and beans, which compose the daily diet staple across many households, especially in rural areas. Factors like over reliance on staple foods, lack of nutrition awareness and cost of nutritious foods were affecting the dietary diversity of most consumers engaged in Shinyanga Region.

On food waste, the finding established that despite interventions by government and NGOs to promote better waste management practices, such as composting organic waste or converting animal manure into biogas, general lack of awareness and knowledge about sustainable waste management practices results in the continued reliance on traditional disposal methods that are harmful to the environment and public health.

The findings further concluded that strengthening policy frameworks and regulatory environments of food systems in Tanzania will support efficient market operations and encourage investment in the agricultural sector. By fostering regional and international trade, Tanzania can expand market opportunities and reduce dependence on imported foods, thereby stabilizing food prices and improving food security.

9.1.3. SOMALIA

At food production level, the findings noted that Puntland experiences prolonged droughts, which severely affect crop production and livestock. Droughts lead to water scarcity, crop failure, and the loss of livestock, which are crucial for food security. The findings also noted that most local farmers lack access to modern agricultural technologies, including efficient irrigation systems, machinery, and high-yield crop varieties. Limited extension services or agricultural training make it difficult for farmers to increase productivity.

At transportation level, the findings highlighted that the most common modes of transport for food in Puntland were trucks, hand carts, motorbikes and bicycles. Discussions with transporters noted that poor road infrastructure is a significant challenge affecting the timely delivery of food, particularly in rural areas. Insecurity and conflicts also results to inaccessibility of certain regions by food transporters. Extreme weather conditions such as high temperatures and floods were also causing transportation disruptions and negatively impacting food quality.

At processing level, the findings established that highly perishable food produce such as vegetables and fruits undergo value addition to gravitate food quality, taste, shelf life and even their nutritional value. However, Puntland is faced with processing challenges, as small-scale milling shops are the major available processing stations and this has led to frequent losses among the producers. Puntland is also highly dependent on food imports and this dependence makes the country vulnerable to global price fluctuations and supply chain disruptions. Local processing industries face difficulty in competing with imported goods due to the lack of subsidies or protections.

At market level, the findings noted markets in Puntland are typically open-air or wholesale markets, where food is sold by vendors and retailers. Main market actors included local open-market vendors, small retail stores, and wholesalers. Key challenges affecting food marketing in Puntland included poor infrastructure of available markets, poor road network which limits access and government policies such as import/export regulations, taxation, and customs duties.

On consumption level, the findings revealed that dietary choices were heavily influenced by cultural practices and the types of crops grown locally. For instance, sorghum and maize are staple crops that dominate the diet. However, the findings also noted that the local diet, which lacks sufficient diversity and balance, has led to significant health issues, particularly malnutrition and anaemia, largely affecting mothers and children. The scarcity of essential nutrients such as proteins, vitamins, and minerals has resulted in poor health outcomes and a high prevalence of malnutrition in the area.

On food waste, the findings revealed that many local roads connecting the markets and farmers are impassable and this makes the transportation of farm products difficult. As a result, farmers keep their produce due to a lack of disposable routes to the market which results to spoilage of the farm products. The findings also noted that most local farmers, processors are not aware of modern methods of waste management, and they result to traditional methods which often are a hazard to the environment.

On implementation of food policies, the findings revealed that despite agriculture and food security being prioritized in National Development Plans, the governments should facilitate implementation of a comprehensive and cohesive agricultural policy that addresses sustainable farming practices, efficient water management, and climate-resilient agriculture. There is a need for policies that support farmers in adapting to changing weather patterns and promote irrigation techniques, drought-resistant crops, and agroforestry.

9.1.4. BIOFORTIFICATION

Kenya: Kenya has made notable progress in promoting biofortified crops such as Nyota beans, sweet potatoes and fortified maize, with the support of organisations like KALRO. However, limited access to information agricultural extension services and certified seeds remains a significant barrier to widespread adoption. Additionally it can be concluded that women play a critical role in biofortification from seed selection to post- harvest processing, but cultural norms and limited access to resources hinder their full participation.

Tanzania: Tanzania has achieved significant milestones in biofortification, particularly with vitamin A- ENRICHed maize and cassava, supported by government and research institutions like TARI. However, fragmented supply chains and limited access to financial resources hinder full-scale adoption. Equally, women are central to the cultivation and integration of biofortified crops into household diets, but they face systemic challenges such as limited access to resources and training.

Somalia: In Somalia, efforts are still in their early stages, with limited awareness and adoption of biofortified crops due to traditional farming practices, weak infrastructure, and limited access to improved agricultural inputs. Of note, women, particularly in female- headed households, are key to the adoption of biofortified crops, but socio- cultural norms and limited resources restrict their participation.

9.1.5. GENDER

Kenya: Women in Kenya's food systems occupy a pivotal role, contributing extensively to agricultural production, food processing, and distribution. They manage key stages of production, including planting, weeding, harvesting, and post-harvest activities. Women are also actively engaged in informal trade, especially in local and regional markets.

However, these contributions are undermined by systemic gender inequities that limit their access to productive resources, such as land, quality farm inputs, and financial capital. According to the findings, cultural norms and legal frameworks significantly influence women's access to land, leaving many unable to secure ownership or long-term rights.

Somalia: In Somalia, women play an integral role in sustaining food systems, particularly in the household and community contexts. They are the primary managers of food security within their families, often ensuring the availability, preparation, and nutritional adequacy of food. Women are heavily involved in small-scale farming and livestock management, particularly in arid and semi-arid regions like the Nuugal Region.

Despite their critical contributions, Somali women face significant challenges due to systemic inequities and vulnerabilities exacerbated by conflict, weak governance, and recurrent climate shocks. The findings reveal that women have limited access to land and water resources, which are vital for agricultural productivity. Customary and Islamic laws often restrict women's rights to own or inherit land, leaving them dependent on male relatives.

Tanzania: Women in Tanzania's food systems are integral to agricultural production, food processing, and distribution. They participate actively in smallholder farming, which forms the backbone of the country's food supply, and are involved in cultivating staple crops such as maize, cassava, and pulses. According to the findings, women also play a significant role in informal market activities, where they act as vendors and traders.

Despite their contributions, Tanzanian women face systemic barriers, including limited access to land, credit, and agricultural inputs. The findings highlight that cultural and traditional norms often restrict women's land ownership, leaving them reliant on male family members for access to farmland. This dependency hinders their ability to engage in large-scale farming or adopt climate-resilient practices.

9.1.6. CROSS BORDER

While cross-border food flow in East Africa has significant potential, challenges such as policy inconsistencies, infrastructure deficits, and security concerns hinder its full realization. Cross-border food flow policies have made progress in reducing trade barriers and enhancing food security, but significant gaps remain in harmonization, infrastructure, and enforcement. Opportunities to strengthen cross-border food flow include policy harmonization, infrastructure investment, technology adoption, and empowering smallholder farmers and women traders.

Addressing these areas can create a more integrated, efficient, and resilient regional food trade system, enhancing food security and economic growth. Institutions like the EAC, EAGC, and AU must play a central role in bridging these policy gaps but stronger enforcement mechanisms and inclusive frameworks (e.g., Somalia's integration into EAC and AfCFTA) are essential for realizing the full potential of regional food trade.

9.1.7. POLICY GAPS & STRATEGIES

This assessment highlights critical policy gaps across Kenya, Somalia, and Tanzania that hinder the efficiency, equity and resilience of food systems.

In Kenya, key gaps include low budgetary allocations to agriculture (approximately 3%, below the Kampala Declaration's 10% target), inadequate support for biofortified crops, and insufficient infrastructure for food storage and distribution. Gender disparities also persist, with limited land ownership and credit access for women hindering their full participation in agriculture. Strategies should therefore focus on increasing infrastructure for food storage and transport and reforming land tenure policies to ensure women's rights to ownership. Equally important, expanding extension services and training programs for women, particularly in climate-resilient farming, can also address these gaps effectively.

In Tanzania, gaps include fragmented supply chains, inadequate irrigation infrastructure, and limited financial and technological access for smallholder farmers. Women are disproportionately affected due to systemic gender inequalities in resource allocation. Promoting integrated supply chain management, expanding rural irrigation systems and increasing access to financial services and agricultural technology are critical. Notwithstanding, supporting women-focused agricultural programs and enhancing climate-smart initiatives can help close the gaps.

Somalia faces significant gaps due to weak governance, lack of comprehensive agricultural policies, and limited resources for climate adaptation. Gender disparities are prominent, with women having limited access to land, markets and decision-making platforms. Addressing these issues requires strengthening governance structures, developing gender-inclusive policies, and investing in irrigation and drought-resistant crops. Collaborative efforts with NGOs and international partners can bolster infrastructure and provide training in sustainable agricultural practices.

9.2. RECOMMENDATIONS

9.2.1. KENYA

1. **Improvement of Infrastructure and Transport:** The findings indicated that investment in rural roads and transportation facilities would enhance farmers' access to processing plants. This would reduce delays in receiving raw materials, ensuring the timely and efficient transport of goods, ultimately improving the overall food supply chain. Improved infrastructure would also reduce the costs associated with transport, thus benefiting both farmers and processors and leading to a more efficient food processing system.
2. **Enhance Adoption of Biofortification Practices:** Government and CSOs working in the food security sector should support the development of biofortified varieties of staple crops such as maize, beans, sweet potatoes, and millet, which are crucial to the Kenyan diet. Research can focus on enhancing the levels of essential nutrients such as vitamin A, iron, zinc, and folate. They should also offer training to farmers on the benefits of biofortified crops and how to grow them. This includes field demonstrations, workshops, and agricultural extension services.
3. **Enhancement of Training and Skill Development:** There is a significant need for training programs targeting both farmers and processing staff. Continuous training on best practices in dairy farming, milk handling, and food processing could elevate the quality of the products. In particular, training on the use of new technologies and techniques in food processing was seen as a key driver for improving product quality and operational efficiency. Stakeholders in the food value chain emphasized that a skilled workforce is essential for minimizing waste and maximizing the potential of the food flow system, making it more sustainable and productive.
4. **Adoption of Modern Technologies and Innovation:** The respondents emphasized the importance of integrating modern technologies, such as biotechnology, to improve the yield and resilience of crops like maize, beans, and cassava. Genetically modified crops can withstand pests, diseases, and harsh climatic conditions. The findings indicated that implementing advanced cooling and storage systems, as well as modern processing techniques, would significantly reduce operational costs while improving product quality.
5. **Advocacy for Supportive Policies:** The stakeholders engaged highlighted the need for supportive policies that would enable a more favourable environment for food processors. Policies focused on reducing costs, offering subsidies for technological advancements, or improving access to funding for infrastructure projects would create a more conducive environment for growth in the food processing sector.
6. **Market Diversification and Targeting:** Findings from the assessment noted that understanding market dynamics is critical for improving food sales. Respondents suggested strategies like market research and segmentation to identify high-demand products and target specific customer groups. Seasonal discounts, bundles, and sourcing from local farmers were proposed to attract price-sensitive customers and reduce transportation costs. This approach would not only increase the appeal of food products but also enhance profitability by appealing to a wider consumer base.

9.2.2. TANZANIA

1. **Promote Climate-Smart Agricultural Practices:** Adopt and promote climate-smart agriculture practices across the sector to enhance productivity and environmental sustainability. This includes the use of drought-resistant crop varieties, improved water management techniques, and soil conservation practices. Supporting these initiatives with research and development can provide farmers with the tools and knowledge necessary to adapt to changing climatic conditions.
2. **Enhance Adoption of Biofortification:** Encourage research and development of biofortified varieties of staple crops, such as maize, cassava, sweet potatoes, beans, and rice, that are rich in essential micronutrients like iron, zinc, and vitamin A. Government, universities, and agricultural research institutes (e.g., Tanzania Agricultural Research Institute, TARI) can collaborate with international research organizations like HarvestPlus to develop and disseminate biofortified seeds and planting materials.
3. **Strengthen Market Connections and Supply Chain Integration:** Develop programs like use of farm-to-market digital platforms that connect farmers directly with buyers, including processors, retailers, and exporters, to improve market access and reduce the layers of intermediaries. Implementing supply chain integration initiatives such as cooperative farming models can help achieve economies of scale, improve bargaining power, and reduce costs. Additionally, establishing and promoting agricultural hubs or clusters can facilitate better access to shared resources and services such as packaging and marketing.
4. **Implement and Enforce Supportive Policies and Regulations:** Review and streamline agricultural policies and regulations to ensure they support the growth and sustainability of the sector. This includes policies that encourage investment in agriculture, streamline land ownership issues, and provide incentives for sustainable practices. It's also vital to enforce regulations that protect the environment and ensure the safety and quality of agricultural products.
5. **Foster Public-Private Partnerships:** Encourage partnerships between the government, private sector, and non-governmental organizations to leverage additional resources, expertise, and innovation. These partnerships can facilitate the transfer of technology, improve agricultural education and training programs, and help implement large-scale projects that individual farmers or small enterprises could not undertake alone. The private sector can facilitate financing for programs aimed to empower local farmers while CSOs could design programs to train farmers on adoption of modern techniques of farming and biofortification.
6. **Invest in Infrastructure Development:** Prioritize the development and maintenance of critical infrastructure such as roads, irrigation systems, and storage facilities. Improved roads will facilitate easier and more cost-effective transport of agricultural products, reducing post-harvest losses and helping farmers reach broader markets. Expanding irrigation infrastructure will decrease dependency on rain-fed agriculture, thus mitigating the impact of climatic variability
7. **Enhancing Irrigation and Water Storage:** The findings indicated that stakeholders should focus on enhancing irrigation farming and water harvesting to improve food security. The study recommended developing crop zones based on soil types to optimize agricultural productivity and suggested constructing water storage structures like pans and check dams to address water scarcity. Additionally, the promotion of value addition and improved marketing strategies would help farmers fetch better prices for their products.

9.2.3. SOMALIA

1. **Financial Support and Education for Farmers:** The evaluation established that providing financial support through subsidies, loans, and access to credit is a critical recommendation for enhancing food production. The findings indicated that many farmers lack the capital needed for inputs such as seeds, fertilizers, and tools. Additionally, education and training programs in agricultural best practices, financial literacy, and business management were repeatedly emphasized in the interviews as crucial for empowering farmers to improve productivity and profitability in the long run.
2. **Infrastructure Improvement and Access to Markets:** The findings indicated that improving infrastructure, particularly rural roads and storage facilities, is essential to reducing post-harvest losses and enhancing market access for farmers. The evaluation revealed that lack of reliable infrastructure hinders farmers' ability to transport goods efficiently and access markets. Interviews with local stakeholders emphasized that better roads, storage options, and irrigation systems could significantly improve productivity and ensure farmers can sell their products at fair prices.
3. **Adoption of Sustainable Agricultural Practices:** The study noted that promoting sustainable farming practices, including conservation agriculture and organic farming, is crucial for improving soil health and resilience against climate impacts. The findings revealed that such methods can boost long-term productivity and environmental sustainability. From interviews with community members, it became clear that there is a strong demand for training and resources that can help farmers transition to more sustainable practices, which would enhance food production in the region.
4. **Promoting Biofortified Varieties:** Local farmers and government should collaborate with agricultural research institutions (like ICARDA or CIMMYT) to develop genetically improved varieties of biofortified crops. These varieties should be drought-resistant, disease-resistant, and capable of thriving in Somalia's arid climate. Department in charge of Agriculture should also ensure that biofortified seeds are widely available and affordable to farmers across Somalia, especially in rural and conflict-affected areas, is crucial. Government and NGO partnerships can facilitate this.
5. **Promote Climate-Smart Agriculture;** Promote practices that are climate-friendly that minimize emissions or increase carbon sequestration where possible. Integrate renewable energy (e.g., solar pumps) into agricultural operations. Promote practices that conserve the environment and implement measures to protect water catchments and reduce land degradation.
6. **Develop a Participatory Monitor and Evaluation framework.** Develop key performance indicators (KPIs) to help farmers track key changes in production. Establish community-led monitoring mechanisms to ensure transparency and accountability.

9.2.4 BIOFORTIFICATION

Kenya: There is need to strengthen agricultural extension services and community awareness campaigns to educate farmers about the benefits of biofortified crops. Additionally, there is need to improve seed distribution systems to ensure timely access to certified biofortified seeds, particularly for smallholder farmers. There is also need to implement gender- sensitive policies that empower

women through access to land, training and decision- making opportunities in biofortification initiatives.

Tanzania: In Tanzania, there is need to establish integrated supply chains and provide financial support to farmers, particularly women, to enhance the production and processing of biofortified crops. Additionally, there is need to strengthen partnerships with private sector players to improve market linkages. Equally, targeted training programs for women farmers need to be developed to ensure equitable access to agricultural resources, including land credit and credit facilities, to enhance their role in biofortification.

Somalia: In Somalia, there is need to increase awareness campaigns and training programs to educate farmers and consumers about the benefits of biofortified crops. Strengthening partnerships with international organizations is recommended to improve access to drought- tolerant and nutrient- rich seeds. There is also need to promote women's involvement in biofortification through targeted initiatives that address cultural barriers and provide access to agricultural resources, training and decision-making opportunities

9.2.5. GENDER

Recommendations:

Kenya: To address gender inequities in Kenya's food systems, it is imperative to enhance women's access to land ownership and control. As highlighted in the findings, women's limited rights to land restrict their ability to engage in large-scale agricultural activities or use land as collateral for credit. Policy reforms should prioritize gender-sensitive land titling programs that recognize women's ownership rights and address discriminatory inheritance practices. Community-based initiatives, such as awareness campaigns and legal aid services, can further educate women and communities on their land rights, enabling them to advocate for equitable access.

Somalia: In Somalia, addressing gender inequities in the food system requires targeted interventions to improve women's access to land and natural resources. As highlighted in the findings, traditional and customary laws often prevent women from owning or inheriting land, which limits their ability to invest in agriculture or secure financial independence. Legal reforms that harmonize customary, Islamic, and statutory laws to protect women's land rights are urgently needed. Community-driven awareness campaigns should accompany these reforms to address cultural norms that discourage women's ownership of resources.

Tanzania: In Tanzania, improving women's access to land and agricultural resources is critical for fostering gender equity in the food system. As the findings highlight, women's land ownership is often restricted by cultural norms and traditional inheritance practices, leaving many women reliant on male relatives for access to farmland. To address this, policy reforms should focus on creating gender-sensitive land titling programs that ensure women can secure ownership rights. Establishing land banks that provide small plots to women farmers, especially in rural areas, can help them engage in productive agriculture independently.

9.2.6. CROSS BORDER AND REGIONAL TRADE

To improve cross-border food trade and enhance regional food security in East Africa, policymakers can implement a set of targeted strategies addressing existing challenges while leveraging

opportunities. These recommendations aim to reduce trade barriers, improve infrastructure, and foster regional cooperation.

1. Policy Harmonization and Regional Integration

a. **Fully Implement Regional Trade Agreements**. That is strengthen the implementation of the African Continental Free Trade Area (AfCFTA), East African Community (EAC), and Common Market for Eastern and Southern Africa (COMESA) agreements. This can be done by ensuring member states adopt agreed tariff reductions and non-tariff barrier (NTB) elimination measures and also develop a comprehensive monitoring framework to track compliance. The expected impact is reduced tariffs and NTBs will promote smoother food flow and lower trade costs.

b. Harmonize Sanitary and Phytosanitary (SPS) Standards. That is standardize SPS regulations across borders to minimize food rejections and delays. This can be done by establishing regional SPS laboratories for testing food quality and safety and train border officials on uniform SPS procedures. The expected impact is improved food safety compliance and increased trust in food imports and exports.

2. Infrastructure and Logistics Development

a. Invest in Transport Networks. That is upgrade and maintain roads, railways, and ports to enhance trade efficiency. This can be done by prioritizing the development of key corridors like the Northern Corridor and LAPSSET and by improving feeder roads connecting rural farms to major markets. The expected impact is reduced transportation costs and better access to regional food markets.

b. Develop Storage and Cold Chain Facilities. Establish strategic warehouses and cold storage at border points and key production areas and this can be done by promoting public-private partnerships (PPPs) for infrastructure development and providing subsidies or tax incentives for businesses investing in storage solutions. The expected impact will be reduction in post-harvest losses and better quality of perishable food commodities.

3. Trade Facilitation and Technology Adoption

a. Digitize Customs and Border Procedures. That is expand the use of e-customs systems and one-stop border posts (OSBPs) to streamline clearance processes. This can be done by training customs officials on using digital systems and implementing real-time monitoring of border delays and trade flows. The impact will be reduced clearance times and minimized corruption at border points.

b. Create Digital Market Platforms. That is develop platforms to connect producers, traders, and buyers across borders. This through supporting the development of mobile-based apps for market price tracking and logistics coordination and integrating platforms with government and regional trade monitoring systems. This will lead to increased market transparency and efficiency in food trade transactions.

4. Smallholder Farmer Empowerment

a. Provide Access to Credit and Inputs. That is offer affordable financing options and access to quality seeds, fertilizers, and tools for smallholder farmers. This can be done by establishing agricultural credit

schemes through microfinance institutions and partner with regional organizations to supply subsidized inputs. This will lead to enhanced productivity and greater participation of smallholders in cross-border trade.

b. Strengthen Farmer Cooperatives. That is promote farmer organizations to enhance collective bargaining power and reduce transaction costs. This can be done by providing training on cooperative management and market linkages and facilitating partnerships between cooperatives and regional buyers. This will lead to improved competitiveness and better access to cross-border markets.

5. Gender-Inclusive Trade Policies

a. Support Women Traders. This involves **a**ddressing challenges faced by women, who dominate informal cross-border trade. This can be done through establishing women-only trade zones at border points providing training on legal and financial literacy. This will increased participation of women in formal food trade networks.

6. Security and Governance

a. Enhance Border Security, i.e. strengthen security at trade corridors to reduce smuggling, theft, and violence. This can be through deploying joint patrols in conflict-prone border areas and establishing secure trade corridors with surveillance systems. This will lead to safer trade routes and increased confidence among traders.

b. Improve Policy Coordination and Dispute Resolution. i.e. foster political cooperation and create effective dispute resolution mechanisms. This can be through using EAC or COMESA platforms to address trade disputes amicably and by establishing trade facilitation committees involving all stakeholders. This will lead to stable and predictable trade policies that encourage private sector investment.

7. Establish Regional Food Reserves. That is create regional food reserves to address shortages during droughts or crises. This can be done by integrating reserves into the African Risk Capacity (ARC) framework and by encouraging regional funding mechanisms to sustain reserves. This will lead to reduced price volatility and better preparedness for food insecurity events

9.2.7. POLICY RECOMMENDATIONS

1. **Increase Budgetary Allocations for Agriculture:** It is crucial to advocate for an increase in national budget allocations to the agriculture sector across Kenya, Somalia, and Tanzania to meet the Kampala Declaration's 10% target. Currently, budget allocations are insufficient to support the growth and development of agriculture, particularly in areas such as infrastructure, irrigation, and climate adaptation. Governments in these countries must prioritize agricultural investments, not only to improve food security but also to support smallholder farmers who are integral to the economies. By enhancing funding, these nations can lay a strong foundation for long-term agricultural sustainability and resilience.
2. **Improve Infrastructure for Food Storage and Distribution:** The current lack of adequate infrastructure for food storage, transportation, and distribution in Kenya, Tanzania, and Somalia contributes to significant food losses and inefficiencies in the supply chain. Investment in robust

infrastructure is needed to ensure that food can be stored and transported effectively, reducing the reliance on fragile supply chains that are particularly vulnerable to climate change and market disruptions. Expanding storage facilities, improving roads, and enhancing transportation networks will facilitate better market access, ensure food security, and reduce post-harvest losses, especially in rural areas where infrastructure is often lacking.

3. **Reform Land Tenure Policies and Ensure Women's Land Ownership:** In Kenya and Somalia, land tenure policies often disadvantage women by restricting their access to land ownership, inheritance and credit, hindering their full participation in agriculture. It is vital to reform these policies to ensure that women have equal rights to land ownership, allowing them to secure the resources needed to enhance agricultural productivity. Legal frameworks must be put in place that protect women's rights to land, which would not only boost their involvement in agriculture but also contribute to broader socio-economic development. Addressing gender disparities in land tenure would empower women to make long-term investments in farming, driving improvements in food security and economic resilience.
4. **Promote Gender-Responsive Agricultural Policies:** To address the persistent gender disparities in agriculture, all three countries should implement gender-responsive agricultural policies. These policies must focus on addressing the systemic barriers women face in accessing resources, markets and decision-making platforms. In Kenya, Tanzania, and Somalia, women often lack the same access to training, finance, and market opportunities as their male counterparts. By prioritizing gender in agricultural policy, governments can create an inclusive agricultural sector that ensures women's participation in decision-making processes, enhances their access to critical resources, and boosts their economic independence. This shift would not only improve gender equity but also contribute to the overall efficiency and resilience of the agricultural sector.
5. **Expand Access to Financial Services and Agricultural Technology:** In Tanzania and Somalia, smallholder farmers face significant barriers to accessing financial services and modern agricultural technology. Women, in particular, are often excluded from financial systems due to systemic gender inequalities. Expanding access to financial services, such as microfinance, loans, and digital payment systems, is essential to enable farmers to invest in modern equipment, inputs, and technologies. Furthermore, promoting access to agricultural technology, such as high-yield seed varieties, precision farming tools, and mobile applications, can significantly increase productivity. Targeting women in these initiatives is particularly important, as it would enhance their capacity to engage in and benefit from agricultural innovation, contributing to greater food security and economic empowerment.
6. **Strengthen Irrigation Systems and Promote Climate-Smart Agriculture:** In Tanzania and Somalia, limited irrigation infrastructure and the effects of climate change severely affect agricultural productivity. Expanding rural irrigation systems is essential to mitigate the impacts of drought and ensure a stable water supply for farming. Additionally, promoting climate-smart agricultural practices—such as the use of drought-resistant crops, efficient water management, and sustainable farming techniques—can help farmers adapt to changing climate conditions. Training programs focused on these practices should be designed with women in mind, as they play a central role in agriculture but are often underrepresented in climate adaptation efforts. By empowering women farmers with climate-resilient skills, these countries can build more sustainable and productive agricultural systems.

7. **Enhance Extension Services and Training Programs for Women:** Agricultural extension services in Kenya, Tanzania and Somalia need to be expanded and tailored to meet the needs of women farmers. Currently, many women lack access to the necessary training and information to improve their agricultural practices. By enhancing extension services that focus on climate-resilient farming, sustainable agriculture, and innovative farming techniques, women can be better equipped to increase their productivity and income. Specialized training programs that address the unique challenges faced by women in agriculture, such as time poverty and limited access to resources, would empower them to become leaders in climate-smart farming initiatives, further boosting food system resilience.
8. **Support Integrated Supply Chain Management:** In Tanzania, the fragmentation of supply chains often prevents smallholder farmers from accessing broader markets, limiting their profitability and growth. To address this, there is a need to prioritize the development of integrated supply chain management systems that connect farmers to markets, reduce inefficiencies, and create stronger market linkages. These systems should also ensure that smallholder farmers, particularly women, have equal access to market opportunities. By promoting collaboration among farmers, government bodies, private companies, and development partners, countries can build more resilient and efficient food systems that benefit all stakeholders, including marginalized women farmers.
9. **Strengthen Governance and Policy Frameworks in Somalia:** Somalia faces significant governance challenges, including weak agricultural policies and limited resources for climate adaptation. Strengthening governance structures and improving the policy framework are critical to addressing these gaps. It is important to develop comprehensive and gender-inclusive agricultural policies that focus on food security, climate resilience, and rural development. These policies should ensure that women have equal access to resources, land, and decision-making platforms. Furthermore, investing in the training of government officials and strengthening institutional capacities can help improve policy implementation and create an enabling environment for sustainable agricultural development.
10. **Collaborate with NGOs and International Partners:** Collaboration with NGOs and international partners is crucial to addressing the complex challenges facing the agricultural sector in Kenya, Tanzania, and Somalia. By working together, governments, NGOs, and international organizations can pool resources, expertise, and knowledge to support infrastructure development, agricultural training, and policy advocacy. This collaboration is particularly important for addressing cross-border food system challenges and ensuring that interventions are inclusive, equitable, and effective. By fostering these partnerships, countries can leverage global support and expertise to bolster food system resilience, particularly for women farmers, and ensure sustainable agricultural practices that benefit all communities.

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