Department of Agriculture, Livestock, Fisheries and Cooperative Development

MAKUENI COUNTY TOMATO VALUE CHAIN STRATEGY 2024-2028

FORWARD

The Makueni Tomato Value Chain Strategy emerges from a comprehensive review and strategic analysis of Makueni County's agricultural potential and the pressing challenges facing tomato value chain. Framed by the strategic objectives of the National Agriculture and Value Chain Development Project (NAVCDP), this document aims to drive a transformative impact on the tomato industry, a sector that is both economically vital and deeply integrated within local livelihoods. The strategy is informed by a robust review of data, extensive stakeholder engagement, and a commitment to addressing the challenges that hinder productivity, such as limited access to high-quality seeds, pest and diseases, insufficient irrigation infrastructure, and suboptimal post-harvest handling practices. Furthermore, it underscores the need for public-private partnerships (PPPs) and data-driven agricultural practices to overcome these barriers.

This document sets forth a vision to position Makueni as a key player in Kenya's tomato market, advocating for a shift from traditional subsistence farming to market-oriented, sustainable production. Through the adoption of climate-smart and data-driven agricultural practices, the strategy emphasizes an inclusive and sustainable pathway to bridge production gaps and bolster competitiveness within domestic and regional markets.

Currently, less than 1% of locally produced tomatoes in the County are processed, revealing a significant gap in the market and an opportunity for potential processors to expand capacity and reduce reliance on imported tomato purees. The ultimate vision is a resilient, high-performing tomato sector that not only meets Makueni local demand but also competes effectively in regional export markets. This strategy invites all stakeholders to a shared commitment towards achieving a robust, inclusive, and sustainable transformation. Conclusively, by strategically addressing productivity, market access and improved policy frameworks, the tomato value chain will immensely support toward enhancing food and nutrition security both with the County and beyond.

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Joyce Mutua
County Executive Committee Member
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PREFACE

The tomato strategy aims to drive a transformative impact on the tomato industry, a sector that is economically integrated within local livelihoods.

This document sets forth a vision to position Makueni as a key player in Kenya's tomato market, advocating for a shift from traditional subsistence farming to market-oriented, sustainable production. Driven by the broader national aspirations of the National Agriculture and Value Chain Development Project (NAVCDP), this strategy aims to enhance productivity, sustainability, and profitability across the various stages of tomato production and distribution. The county's agriculture, marked by the participation of smallholder farmers and cooperative societies, reflects a critical economic landscape that supports both livelihoods and food security. The document equally acknowledges the multifaceted demands of Makueni tomato sector and strives to address key constraints, including limited irrigation infrastructure, pest and disease management challenges, and inadequate post-harvest handling practices.

The agro-processing and value addition of tomatoes in Makueni County present substantial opportunities for economic growth, job creation, and poverty reduction. This document provides a roadmap to reform, integrating critical investments in structured market systems, value addition, and policy reinforcement.

The potential of Tomato agro-processing and value addition in Makueni County goes beyond simply increasing the market value of tomatoes. It provides a pathway to employment creation, reduces post-harvest losses, and contributes to sustainable rural development. By strategically investing in tomato agro-processing, Makueni will build a resilient agricultural economy that delivers social and economic benefits to its communities, transforming challenges into lasting opportunities.

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ACKNOWLEDGEMENT

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I wish to acknowledge the tremendous efforts of the technical experts from the Department of Agriculture, Livestock, Fisheries and Cooperative Development and the private sector panel of experts for their active participation and contributions to the development of this strategy.

Finally, the contributions by NAVCDP staff not specifically mentioned are also appreciated.

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Mary Muteti
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ABBREVIATIONS AND ACRONYMS

AFA	Agriculture and Food Authority
ASAL	Arid and Semi-Arid Lands
AAK	Agrochemical Association of Kenya
B2B	Business-to-business linkages
CIGs	Common interest groups
DALFCD	Department of Agriculture, Livestock, Fisheries and Cooperative Development
FAO	Food and Agriculture Organization of the United Nations
FPEA	Fresh Produce Exporters Association of Kenya
FPC-K	Fresh Produce Consortium of Kenya
FPO	Farmer producer organizations
GAP	Good Agricultural Practices
Ha	Hectares
HCD	Horticultural Crops Directorate
KALRO	Kenya Agriculture and Livestock Research Organization
KEBS	Kenya Bureau of Standard
KEPHIS	Kenya Plant Health Inspectorate Services
KES	Kenya Shillings
KIAMIS	Kenya Integrated Agricultural Management Information System
MOALD	Ministry of Agriculture & Livestock Development
MRLs	Maximum Residue Limits
MT	Metric Ton
NARIGP	National Agricultural and Rural Inclusive Growth Project
PCPB	Pest Control Products Board
PHI	Pre-harvest Interval
PPP	Public-Private-Partnership
VC	Value Chain
WFP	World Food program

CHAPTER ONE

1.0 INTRODUCTION AND BACKGROUND

1. Global tomato production: Approximately 190 million metric ton (MT) of tomatoes are produced globally (FAO, 2023) per year. Production varies by continent, with each region contributing to the global tomato fruit supply. Asia produces 119,204,602 Ton, Europe 24,482,181, America 23,681,040, Africa 21,383,400, and Oceania 382,732 ton (FAO, 2023). The top ten leading countries in tomato production worldwide are listed in the Table 1 below.

Table 1 Global tomato production

Area	Production (MT)	Area
China, mainland	68,241,810.69	1,137,416.00
India	20,694,000.00	843,000.00
Türkiye	13,000,000.00	158,719.00
United States of America	10,199,753.00	106,757.00
Egypt	6,275,443.91	143,618.00
Italy	6,136,380.00	97,610.00
Mexico	4,207,889.22	90,696.00
Brazil	3,809,986.00	54,502.00
Nigeria	3,684,566.41	702,275.00
Spain	3,651,940.00	45,150.00

2. **Tomato production in Africa:** Egypt and Nigeria are the two leading producers of tomatoes in Africa. Kenya is ranked 9th, with a production of 658,888 MT under a production area of 28,330 HA (FAO, 2022). In 2022, Kenya was position 9 in Africa with approximate production of 658,000 MT (FAO, 2024).

Table 2 Tomato production in Africa

Area	Value (Ha)	Production (mt)
Egypt	143,618.00	6,275,443.91
Nigeria	702,275.00	3,684,566.41
Algeria	25,050.00	1,661,664.37
Mozambique	60,570.00	1,599,051.00
Morocco	14,956.00	1,388,542.00
Cameroon	66,977.00	1,219,046.16
Tunisia	19,374.00	1,160,000.00
Malawi	29,481.00	732,158.77
Kenya	**28,330.00**	**658,000.00**
Sudan	46,917.00	632,659.87

3. **Tomato production in Kenya:** Tomato is the top most promising commodity for horticultural expansion and development in Kenya. The fruit plays a critical role in meeting domestic food and nutritional requirements. It also generates income by creating employment for the country's rural and urban populations. By value, the crop contributed 29.5% of the total exotic vegetable produce in Kenya (AFA, 2023), valued at 22.5 billion.

4. Production in Kenya has been increasing in recent years up to 2019. However, there has been a decline in production since 2019, with figures dropping to **686,667MT** in 2021, **616,617MT** in 2022 and **536,821MT** in 2023 (AFA 2023). The

same period saw a fluctuation in value from KES 21.5 billion in 2018 to KES 25.1 billion in 2019, and eventually 23.1 billion, a factor that is influenced by the farm gate prices which are controlled by production volumes and influx of imports from neighboring countries (AFA 2023). This was despite the improved uptake of hybrid varieties and irrigation expansion. The under production also varies with years, with the last three years recorded as **30,882Ha, 28,331Ha** and **30,679Ha for** 2021, 2022 and 2023 respectively.

5. Tomato-producing wards in Makueni:

Tomato is predominantly in all the wards and mainly concentrated in upper zones of Kilungu and Mbooni and along the seasonal rivers and permanent rivers including Athi and Kibwezi rivers. There are 1,687 farmers involved in Tomato Production in the County (Fig.1, 2). The area under tomato has been decreasing from 1,272 Ha in 2020 to 375 in 2020 (Table 3).

Table 3: Performance of tomatoes in Makueni County 2020-2023:

County	Area (Ha)				Volume (MT)				Value (KES) million				% of Total Value
	2020	2021	2022	2023	2020	2021	2022	2023	2020	2021	2022	2023	
Makueni	1,273	702	721	375	34,229	20,710	17,231	9,803	1,126.39	663.11	516.9	281.35	1.2

Makueni tomato production status; National Agriculture validated data March 2024

6. The leading wards in Tomato production are Kilungu and Kithungo/Kitundu wards.

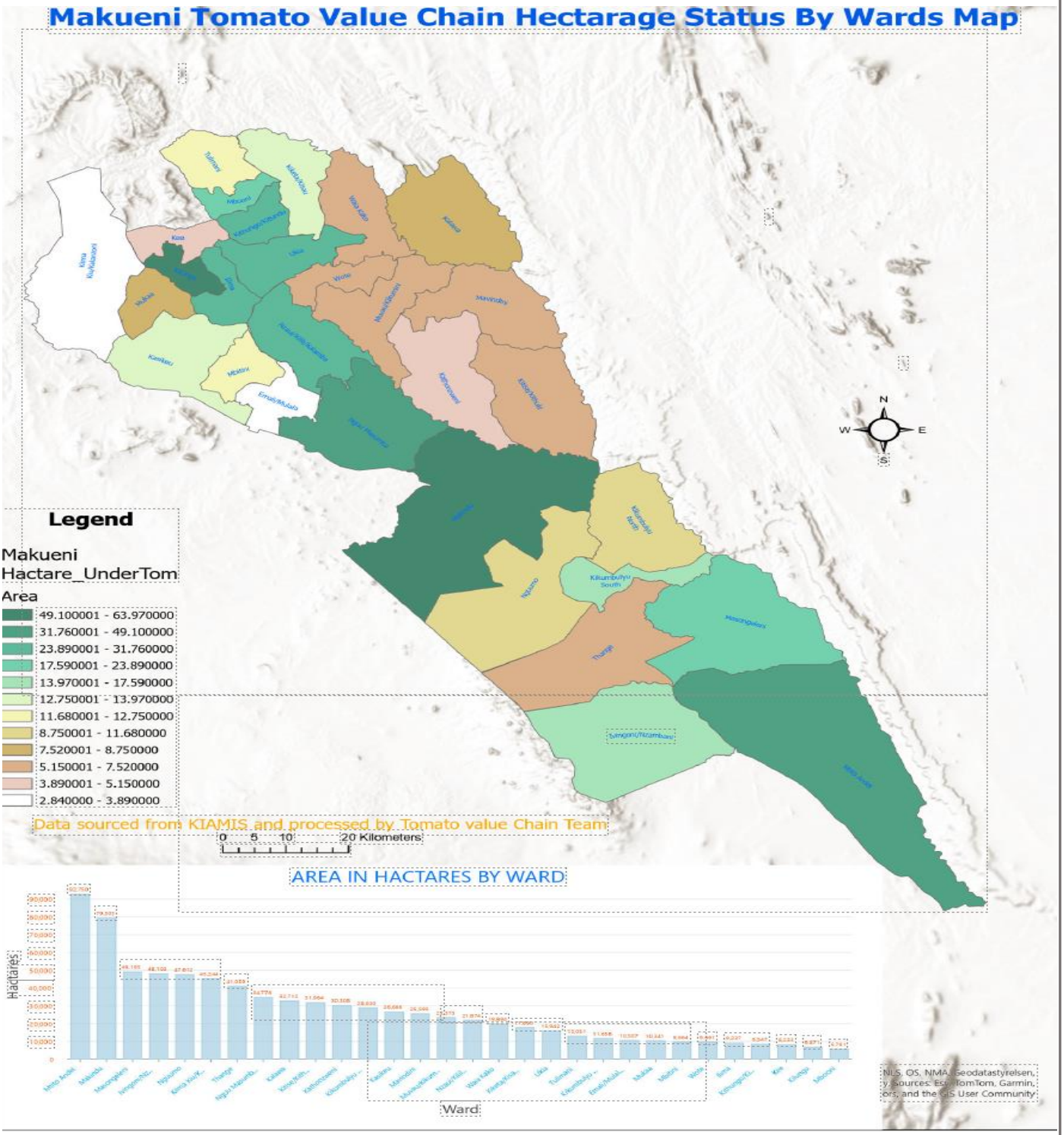

Figure 1: Hectares under tomato by Wards

Makueni Tomato production status by wards

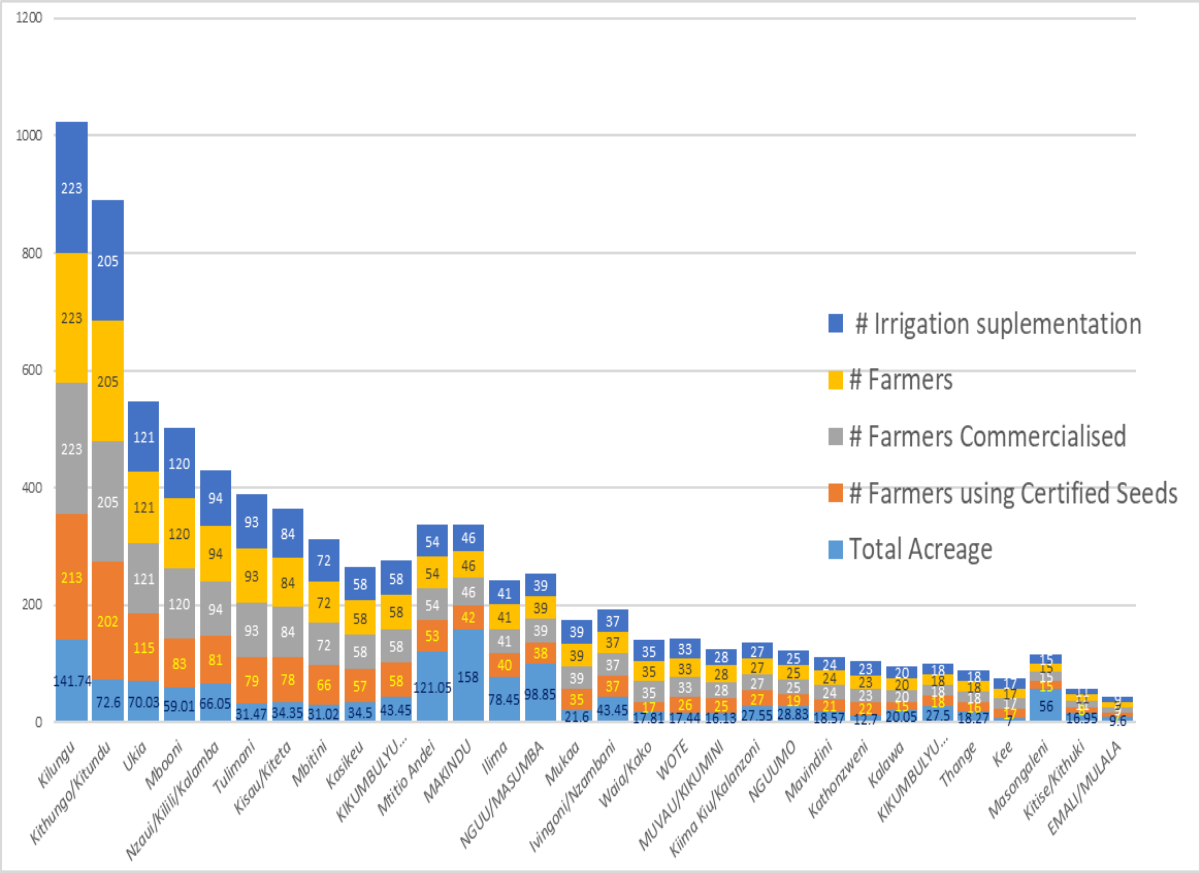

Figure 2: Tomato production status by Ward. Data source KIAMIS 2023

7. To a very small extent, tomatoes in Makueni are processed into other value-added products such as tomato sauce and paste. However, the processing companies prefer importing concentrate to produce their brands due to inadequate supply of processing varieties.

8. **Tomato marketing and processing:** Tomato in Makueni is predominantly grown for commercial purpose and for local consumption. Within the county there is high influx of tomatoes from Kajiando and Tanzania.

9. **Demand for products within the county and beyond.** Tomatoes

produced in the County are sold both within and outside the County. Most of the tomatoes are consumed locally with the surplus being sold to Nairobi and Mombasa. There are no structured marketing organizations in most tomatoes growing areas. Buyers and agents (middlemen) from Nairobi and Mombasa buy and transport the tomatoes from the main growing areas. The local trader either gets the tomatoes from the farms or farmers deliver the produce to them. However due to the perishability nature of tomatoes producers are forced to sell their produce at throw away prices when there is glut for they have no capacity to store or process the produce. This has occasionally led farmers to incur huge losses discouraging them from engaging in the value chain which has high potential in the county.

10. **Current gaps and justification:** Tomato is a high-value crop with a high potential for improving Makueni economy, livelihoods, and food security. However, the current production levels have not met the market demand for the regional and local markets. Many wards with the capacity to cultivate tomatoes have yet to consider it as a viable enterprise and a commodity for food security. Globally, tomato production is evolving and expanding due to advancement in technologies, changes in consumer preferences, and the global demand for vegetables. In Makueni, tomatoes can be grown in several agro-ecological zones under varying conditions. The ideal conditions for tomato cultivation include an altitude range of 800 to 1,800 metres above sea level, an annual rainfall exceeding 600 millimetres, and well-drained sandy loam or clay loam soils. In Makueni tomato is grown under irrigation – source of water being springs in upper zones, permanent such as the Athi river and Kibwezi river, seasonal rivers, dams, sand-dams, farm ponds, boreholes and shallow wells. Athi river is not adequately utilized for irrigation. Kwakyai Irrigation Scheme has 430 farmers but there is potential for expansion. Much of the farmers use basin irrigation, which is not an efficient way of water utilization/conservation. There is potential for drip irrigation and

expansion of area under irrigation. This initiative would not only increase production but also support the commercialization of tomatoes and their value-added products, contributing to economic growth and food security.

CHAPTER TWO

2.0 VALUE CHAIN ANALYSIS

11. Stakeholders undertook a value chain analysis, identified gaps and opportunities, and prioritized investment areas along the tomato value chain to make it more resilient and competitive. A corresponding value chain map to visualize the functions, actors involved, chain support services, and other chain contexts is shown below.

2.1 Tomato Value chain actors Map

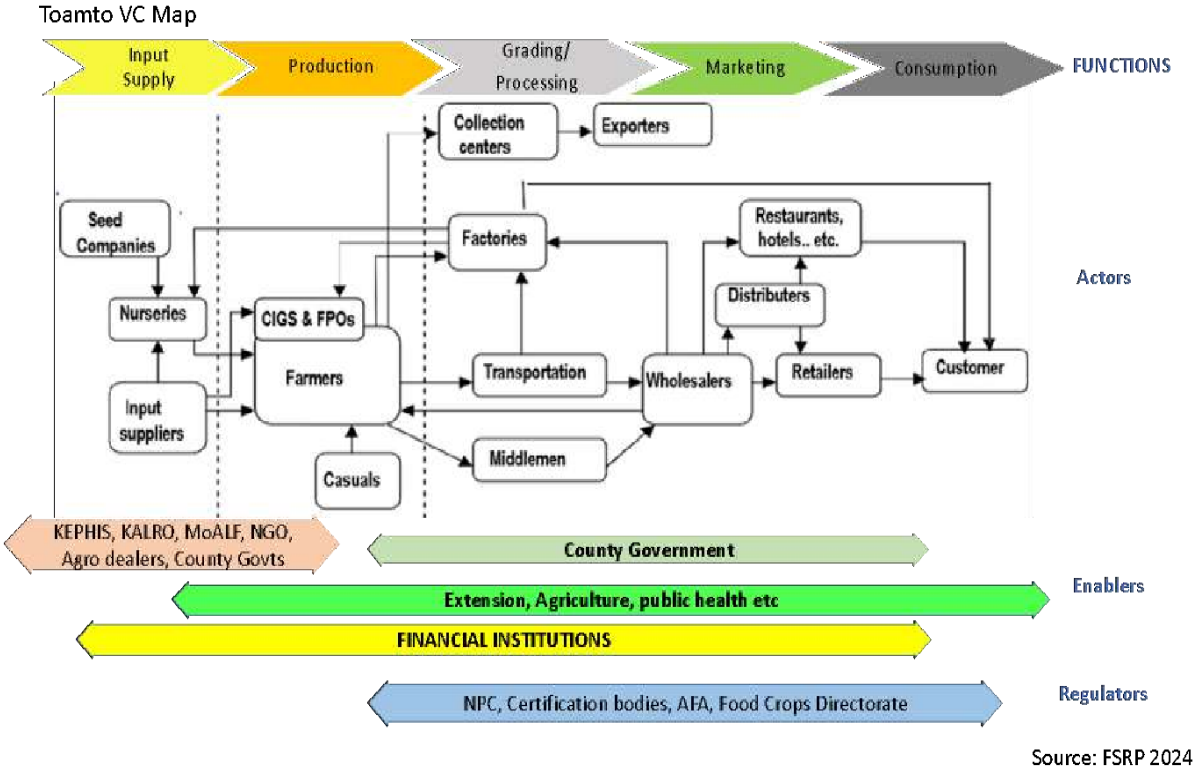

Figure 3: Major Players in the tomato value chain

12. **Input supply**: This includes suppliers of fertilizers, pesticides, seeds, seedlings, machinery, equipment, irrigation systems and greenhouses. The suppliers offer advisory/extension services to the farmers and establish demonstration plots for training and guidance on good agricultural practices (GAP). The nursery operators in Makueni County play a great role in providing the seedlings; however, many of them are not certified and registered by KEPHIS and AFFA. Kwakyai has a tomato nursery of capacity 90,000 seedlings and currently produce 15,000 tomato seedlings annually.

13. **Production:** There are 410,044 households involved in tomato farming in Kenya (KNBS, 2019) comprising small-scale farmers (below 1 acre), medium-scale farmers (1-4 acres), and large-scale farmers (above 4 acres). There are 1687 tomato farmers in Makueni, some of whom are organized into cooperatives, common interest groups (CIGS), and FPOs. The grower sources for farm inputs, meets production costs (from planting to harvesting and grading), and sell their produce directly to the traders. Some processing companies engage a few farmers/cooperatives in formal contracts, for example Kwakyai SACCO is contracted to produced certified fresh tomato by Ketchup group that process at Burton and Bamber Company Ltd for export to Netherlands. Currently the SACCO annually produces 249 metric tons. There are over 500 acres suitable for irrigation under Kyakyai irrigation scheme.

14. **Traders (wholesalers, retailers, processors**): Producers can sell directly to traders and consumers. Tomatoes are also sold through middlemen who play a role in linking the producers to the markets. Middlemen (brokers) have more access to customers and have more market information than farmers, especially on demand, supply, and value; and are significant determinants of tomato prices. In most cases, middlemen also act as wholesalers and retailers of tomatoes. Wholesalers aggregate tomatoes, sort, grade, and package for other markets such as processors, who

require large volumes of specific tomato varieties and quality for their end consumers. Processors can also buy directly from the farmers. Retailers sell small quantities of tomatoes to groceries (*Mama mbogas*) or the end consumer. Tomato market prices are determined by supply and demand, seasons, and locations from the production zones.

15. **Tomato processing:** Tomatoes can be processed into puree, sauce, ketchup, juice, dried powder, and paste. Nationally the estimated 93 processors import tomato purees from Egypt. Fresh tomato processing in Makueni is very low with less than 1% of locally produced tomatoes being processed. Producers have not embraced processing varieties. Processing and value addition of tomatoes is key to mitigating postharvest losses, increasing shelf life, enhancing distribution and export, and increasing tomato profitability and exports.

16. **Consumers**: Tomato demand and consumption in Makueni are mainly driven by individuals, households, institutions (schools and hospitals), and the hospitality industry. Tomatoes are used to make soups, ketchup, stews, tomato paste, tomato sources, salads, and juices. Customers choose tomatoes based on different combinations of attributes such as size, skin colour, price, quality, firmness, taste, and shelf life, among other factors.

2.1 Economic analysis

17. The average yields of tomatoes are estimated at 8.8 MT/acre. However, an acre has the potential to produce 60 MT under intensive management. Productivity depends on the following:

    i. **Variety**: Hybrids have higher productivity than Open-pollinated varieties (OPVs) varieties.

ii. **GAP**: Proper husbandry, from land preparation to harvesting, determines productivity levels.

iii. **Pest and disease management**: Adhering to recommended spray protocols will keep the crop healthy throughout the growing period.

2.1 Gross margin analysis

18. The gross margin of a farm business is the difference between its gross income (revenue) and its variable costs (input costs). The current farmer practice considers a farmer using open pollinated varieties (OPV) like Cal J with little consideration of production techniques. It is a practice that is mainly rainfall dependent, with little investment in pest and disease control. The commercialization practice puts into consideration the use of high yielding hybrid varieties, technology advancements, irrigation, greenhouse technology and the use of IPM. The returns and risks are higher on the commercialization front compared to normal farmer practice. Half of an acre is the recommended unit for an economically viable venture.

Table 4 Commercialization thresholds

Current practice		Commercialization	
Item	**Amount**	**Item**	**Amount**
Yield/Acre	7,000	Yield/Acre (kg)	18,375.00
Price/Kg	21	Price/Kg	21
Gross Revenue	140,000	Gross Revenue	385875.00
Total Production Cost	100,000	Total Production Cost	309,943.20
Net profit	**40,000**	**Net Profit**	**75,931.80**
The economic return unit is 0.5 acres, which will give a net profit of KES 225,000 per year			

2.2 Value share

19. Value share is expressed as a percentage of an actor's added value to the overall retail price or consumer price. The size of the value share reflects the amount of effort, cost and risk that an actor has put in the chain.

Table 5: Farmer, Trader, and Retailer value-share distribution

Chain actor	Variable costs	Revenue (Selling price)	Gross income	Gross income margin	Added Value	Added Value margins
	A	B	C=B-A	(C/B)*100	Revenue - Previous actors' revenue	Added value/Retail price*100
Farmer	16.5	30	13.5	45	30	43
Trader (wholesaler)	40	55	15	27	25	36
Retailer	60	70	10	14	15	21

20. Two distribution channels have been considered for the tomato value chain. The 'Farmer – Trader - Retailer' distribution channel is the most common in Kenya. It controls over 95% of the production. The distribution of value shares and profits across the channel is uniform and the farmer retains a majority of the profits. The farmer commands the highest value share of 43% in comparison to the trader/wholesaler and retailer who achieve 36% and 21 % respectively. These efforts appear to be rewarded equitably with the farmer retaining a gross margin of 45% while the trader/wholesaler and retailer retain 27% and 14% respectively. None of the value chain actors is disadvantaged.

Table 6: Farmer, Processor, and Supermarket Value Share Distribution

Chain actor	Variable costs	Revenue (Selling price)	Gross income	Gross margin	Added Value	Added Value
	A	B	C=B-A	(C/B)*100	Revenue -Previous actors' revenue	Added value/ Retail price*100
Farmer	82.5	95	12.5	13.1579	95	22
Processor (Paste)	140	390	250	64.1026	295	70
Supermarket	400	422	22	5.21327	32	8

21. Within the minor distribution channel, the sharing of profits across the market chain favors the processors. The unit of conversion used is 5 of the production to 1 of the processors. The processor has a value share of 70% in comparison to the farmer and supermarkets, who achieve 22% and 8% respectively. The processor retains a gross margin of 64% while the farmer and supermarket retain 13% and 5% respectively.

22. One reason this channel is not attractive to producers is the processors' preference for using "rejects" or over-ripened tomatoes, which provide farmers with low prices even though they are ideal for processing. Interventions to ensure an equitable sharing of the chain benefits along this marketing channel are needed.

23. The presence of public sector stakeholders in which the government will continues to offer service delivery. Private sector actors and civil society will be encouraged to leverage on investment into the tomato value chain. A detailed

stakeholder's analysis to identify their levels of power and interest in the tomato value chain will be carried out. The table below summarizes existing stakeholders and their role in the value chain.

Table 7 Stakeholders and their roles

S/NO	NAME OF STAKEHOLDER	ROLE IN THE VALUE CHAIN
1	KEPHIS	Regulatory/Certification of Nurseries
2	Department of Agriculture, livestock, fisheries and cooperative development	Coordination and provision of extension services
3	NAVCDP	Capacity building of Producer organizations
4	SIVAP	Support micro projects- irrigation and value addition
5	The University of Nairobi, Dry Land Field Station based in Kibwezi	Support youth tomato farmers to embrace new technologies
6	Sunculture Kenya limited	Support Solar installation for tomato irrigation
7	Chemical companies	Crop protection against disease, pest and nutritional disorders
8	World food program	Capacity building on tomato climate smart technologies/tomato hydroponic farming
9	AFA/HCD- Kibwezi branch	Registration of nurseries
10	Financial Institutions	Provision of Financial products suitable for tomato production
11	Kwa Kyai SACCO	Value addition, Marketing and production
12	Trade department	Weights regulation and marketing infrastructures

13	Seed companies	Provision of certified tomato seed
14	Makueni Agricultural training centre (ATC)	Tomato value chain demonstrations and trainings
15	Caritas Kenya	Promotion of CSA production and value addition through solar drying
16	Welthungerhilfe (WHH)	Promote livelihood improvement through irrigation infrastructures
17	Tomato farmers both open field and hydroponic farmers	Support production of tomato
18	Interior government, and department of devolution	Mobilization, public participation and subsidized inputs provision
19	KIRDI	Technology development
20	ATDC Katumani	Technology development

24. Inventory of available resources/facilities in the county. There is no tomato processing in the County. There is potential for utilization of the Mango processing plant at Kalamba for processing of tomato into products such as tomato juice, tomato ketchup, tomato sauce, tomato pickle, tomato chutney, tomato puree, tomato paste, dehydrated tomato slices, and tomato powder. Groups like Huruma Asili Foods, a local processor has the potential to processes Tomato Jam, Paste, Chilly Source, Juice, tomato drying but is not doing much due to lack of processing equipment and packaging machines. This has made their production to be done manually raising issues of hygiene and efficiency. Kwa Kyai Rural Sacco Limited, a processor of dried tomatoes is also not doing much despite the fact that they have export market opportunities for their products. This is also due to lack of drying equipment. This strategy will identify and support value addition infrastructures and initiatives to enable agro processing

25. **Past related investments (installed capacities verses current utilization):** Makueni government has invested in development of some cold rooms. Currently not being utilized in supporting the value chain

26. **Partners and potential for collaboration**. Public Private Partnership with the aim of linking Producer Organizations with local processors such as Ketchup Netherlands, Premier Foods Kenya, Kenya Orchards Ltd, Twiga Foods Ltd will be pursued to create alternative markets to tomato producers. Setting up a new processing facility is capital intensive and therefore creation of investor fora to attract investors in this sector will be given a priority. Since the uptake of locally processed products is low, this strategy will pursue to organize tomato value chain actors into group entities to tap into the available market opportunities.

CHAPTER THREE

3.0 VALUE CHAIN CONSTRAINTS

27. Despite the public and private sectors' investments in the tomato subsector, there are still issues facing the industry that must be resolved if the tomato sub-sector is to become more competitive. The following constraints were prioritized under different nodes.

3.1 Input Supply

28. **Inadequate research and development:** The agricultural sector relies on many factors to be efficient. However, a shift in technology, mutation of pests, climate change, demand and preference, among others, necessitate continuous research and development currently being suboptimal in tomatoes value chain.

29. **Low-quality seed**: Farmers still recycle seed from their produce, commonly called "kukamua". Open-pollinated varieties on the shelves are cheaper but low in production. A few (eg, Kenya Seed Company) commercial tomato seed breeding

companies in Kenya produce tailor-made seeds for the Kenyan market. Most seeds are imported from outside markets. Some information about the ability of the seed varieties to resist diseases is not verified, thus misleading the farmers. In addition, there is a serious problem of unscrupulous merchants repackaging seeds in the market.

30. **High cost of farm inputs:** The high cost of seeds, fertilizers, pesticides, machinery, energy, and labor in Kenya has resulted in low adoption and production.
31. **Poor seedling production systems**: Small and medium-scale farmers are the biggest producers in the country, yet many use old seedling techniques. This arises from low numbers of certified nurseries or the high cost of high-value seedlings. Using raised beds for seedling propagation is a significant source of disease spread. Further, the survival rate of the nursery beds produced by seedlings is low.

3.2 Production.

32. **Low adoption of Technology, Innovations and Management Practices (TIMPs):** Poor crop management practices are a major factor limiting good production. There is inadequate soil testing in the farming zones. The private soil test laboratories are few and expensive, resulting in the misinformed use of fertilizers and manure applications. Staking is necessary in most high-yielding varieties, but few farmers employ the practice. It is, however, expensive and promotes deforestation.
33. **Limited access to irrigation infrastructure**: In the county, tomato production is mainly under rain-fed conditions. Where irrigation is practiced, the methods used in the farms are mainly furrow and basin. This method is initially cheaper but less efficient in water utilization in large farms. High-potential irrigation infrastructure, which can unlock the vast production potential in these regions. Additionally, the affordability of modified greenhouses and shade net remains a challenge.

34. **Lack of tailor-made credit facilities**: Tomato farming is highly capital-intensive and has high setup costs because of the high input and labor costs required along the value chain processes. Most financial institutions lack tailor-made credit facilities for tomato farmers, forcing them to source credit from their savings or other sources. This limits their production capacity. Tomato farming has been a risky gamble lately, and the current credit products do not favor farmers. The minimal contractual tomato farming in Makueni limits the assurance of loan repayment to banks.

35. **Pest and disease management**: Tuta absoluta, fruit flies, bacteria wilt, and blights are the major pests and diseases in tomato production. Their prevalence leads to inappropriate and indiscriminate use of pesticides. Also, farmers rarely observe PHI (Pre Harvest Interval) after spraying chemicals, thus leading to high pesticide residue levels in the product, raising questions about food safety.

3.3 Post-Harvest management

36. **Lack of Cold chain facilities:** Tomatoes are a highly perishable product that requires preservation after harvesting. They have an average lifespan of 14 days. There exists no dedicated cold facility towards the tomato value. Cold chain facilities are vital in preservation, especially for high-end and export markets.

37. **Poor/inadequate post-harvest handling practices:** Poor handling of tomatoes along the supply chain accelerates their perishability and results in huge post-harvest loses. Handling practices such as using unstandardized packaging materials (boxes), poor transportation, and lack of pre-cooling facilities at production sites and cold rooms in urban markets contribute to spoilage.

38. **Lack of aggregation centers equipped with cold storage and grading facilities.** Aggregation centers would enhance the collection and marketing of tomatoes, storage, and setting prices for the produce. Makueni has only one aggregation center/pack house for tomatoes located at Kwakyai.

3.4 Processing

39. **Limited production of processing varieties:** Producers grow tomatoes primarily targeting the fresh market. Most farmers do not grow processing varieties because of the low prices offered by processors. Kwakyai Rural Sacco has a contract with Ketchup Netherlands for production of tomatoes at Burton and Bamber processor at Matuu town town in Machakos who then export. In 2023, the Sacco sold 83 MT of fresh tomatoes for Ketchup Netherlands.

40. **High cost of installing and running processing facilities and equipment:** Establishing processing facilities, purchasing equipment, and their operations and maintenance are generally expensive. This limits the number of investors in tomato processing. Access to finance and credit facilities would enhance investments in the processing of the produce.

41. **Value addition:** Lack of storage and value addition facilities in the County is a major contributor to the losses experienced by farmers. Producers lack standard pack houses for sorting, grading and packaging. Value added products fetch far much better prices than selling non-processed commodities at the domestic market arena. Most of the structures and equipment require high capital, whose accessibility and affordability is not attainable by small scale farmers or traders. Kwakyai Rural Sacco was supported by SNV Netherlands in 2016 on installation of solar drying facility of 100Kg/batch. The facility become ineffective particularly during cloudy weather and the drying capacity could not meet 7MT/week contract demand by Ketchup Netherthands with Kwakyai. Tomatoes are processed into other value-added products such as tomato sauce and paste. However, the processing companies prefer importing concentrate to produce their brands due to inadequate supply of processing varieties.

3.5 Marketing

42. **Uncoordinated markets and market systems** - Tomato producers ought to get up-to-date information on prices and market opportunities. Unstructured

marketing by producers gives other value chain players a competitive edge over the farmer and in most cases, the traders and wholesalers who conspire to control the prices. The absence of SACCOs and FPOs established impedes successful bargaining for the benefit of the producers. Any conflict resolution processes mostly favor the traders at the farmer's expense.

43. **Free cross-border trade.** This allows the movement of produce from Tanzania without control into Makueni – Emali Market. Production costs are higher in Kenya than in Tanzania. Uncontrolled trade gives imported produce an undue advantage over locally produced tomatoes. Further, Kenya regulates the use of chemicals, while the neighboring countries don't have the same checks. Some farmers in Makueni have access to farm inputs from Tanzania, which are cheaper but not registered in Kenya for tomato production.

44. **Lack of standardized metrics:** Lack of enforcement of packaging standards to guide tomato trade has led to exploitation of producers by brokers who use unstandardized boxes ('extended crates'), thus reducing the farmers' profit margin.

45. **Food safety concerns:** Consumer awareness of food safety issues related to chemical residues in tomatoes and their impact on human health has increased. Consumers are now demanding that food be produced safely and responsibly. The chemicals used in tomato production today greatly hinder the offtakers' uptake of the produce.

46. **Limited access to finance and market information:** Farmers depend on unverified and misleading information that sometimes promise quick returns. This compromises smallholder farmers' ability to grow crops that meet quality and safety requirements. Additionally, few platforms provide information on the distribution of the markets and trends.

47. **Limited market segmentation**- Low export and local markets: There is limited

venture into both export and local markets mainly due to low production volumes, low quality standards, high perishability, and low- value addition. Understanding requirements by each segment will be vital to establish market share for each.

48. **Regulation and Policy issues:** There is laxity in the implementation of the horticulture regulations 2020 and KS1758 standards among other agricultural policies. Enforcement of measures to ensure the proper use of pesticides and preventing the use of banned chemicals from porous borders is limited. In addition, food safety (Maximum Residue Limits (MRLs), packaging standardization, seed quality, and source/traceability) measures are not adequately implemented and enforced along the value chain processes. Handling and sanitary conditions in some of the open-air markets raise safety concerns. The quality of water for irrigation especially along the permanent rivers is not verified.

CHAPTER FOUR

4.0 STRATEGY DESIGN PRINCIPLES

49. The strategy is designed on the following principles:

50. **Government-led and private sector-driven.** Public-private partnerships (PPPs) are essential for advancing tomato production to address related challenges. The public through research and technology transfer help widen access to technology and link farmers to markets. The Government of Makueni County will formulate policies that make tomato value chain viable. The private sector would invest in processing as well in other nodes. By combining strengths, the partners can collectively make better progress than individually. Involvement of private sector players e.g., processors and traders, will ensure adoption of market driven approach that contribute to the alignment with the market demands that enhance competitiveness. Public-Private Partnerships will foster collaborations, contracts, and engagements, to leverage resources, knowledge, and networks for sustainable tomatoes initiatives.

51. **Climate Smart Agriculture (CSA).** The aim of adopting CSA practices in tomato production is to increase production, productivity and household incomes, strengthen the resilience of ecosystems and livelihoods to climate change, and reduce Green House Gases (GHGs). The strategy will institute mechanisms to reduce the impact of climate change through adoption of appropriate varieties, adopting new technologies in the management of pests and diseases, and efficient use of water.

52. **Data-driven and farmer-focused interventions.** The strategy relies on data to provide solutions and focus on challenges highlighted by farmers for formulation of interventions and policies.

53. **Gender Inclusivity**. There are a number of opportunities along the tomato value chain in the County that can be taken up by youth and women in order to fully mainstream them to offer services such as branding, aggregation, certified nurseries, spraying, pruning, staking, harvesting and grading. Identification of these opportunities in the tomato value chain, women and youth will be supported through training and mentorship to become engaged in targeted value chain activities. Youth and women will be made to appreciate tomato value chain as an income providing industry by engaging them to participate in the development of the value chain.

CHAPTER FIVE

5.0 INVESTMENT AREAS

54. The strategy for developing the tomato value chain will concentrate on three major areas of investment in order to fill the gaps found in the value chain analysis: (i) Increase production, productivity, and profitability of the tomato value chain; (ii) Development of structured market systems; (iii) Strengthen policy and regulatory framework.

55. The strategic objectives are to:

i. Increase production from 17,231 MT to 44,702 MT and productivity from 24 MT/ ha to 62 MT/ha by 2028
ii. Increasing access to profitable output markets by 2028
iii. Strengthen Policy and Regulatory framework by 2028

a. Objective 1: To increase the production and productivity of tomatoes from the current 17,231MT to 44,702 MT and 24 MT/ha to 62 MT/ha by 2028.

3.0. This objective will be achieved through the following activities:

Activity 1: **Increasing access to clean planting material**: The following steps will increase the production and productivity of tomatoes.

i. Profile tomato nurseries in the County
ii. Expand 1 existing nurseries (Kwakyai) and establish 6 commercial seedling propagation nurseries to produce clean and high-value seedlings. Production will be validated using certified seeds whose ecological requirements suit the specific region.
iii. Introduce 6 processing varieties with good market characteristics thus diversifying the target market for production. The current varieties are mostly grown for table

consumption. Varietal mapping will be done to classify varieties based on adaptability and optimal production. This will be achieved through the County tomato platform.

Activity 2: Build the capacity on TIMPs

A lot of published research information on tomato production exists. It is necessary to provide farmers and value chain support services with simpler versions of this information. There are also knowledge gaps between agro-companies and research institutions in Kenya. This will be addressed by having joint partnerships. This will be achieved through the following:

- Capacity building of 1600 tomato farmers on TIMPs. This will address *Tuta absoluta* menace, the biggest pest in tomato production. It will also address crop management practices such as soil testing, fertilizer, and irrigation management, among others, to increase production and productivity.
- Capacity building and sensitizing 50 extension service providers including extension staff and agro chemical companies on TIMPs
- Capacity build 10 agriprenuers/community based facilitators per ward on TIMPS.
- Procurement of mobile soil testing kits to enhance soil testing
- Promote at least 6 processing varieties based on maturity indices and quality requirements.
- Sensitization on food safety in the value chain. Stakeholders will be sensitized and informed of the importance of adhering to safety standards.

Activity 3: Establishment of irrigation infrastructure. Tomatoes are best suited for hot and wet climates. Climate change, irrigation, and off-season planting will unlock the potential of tomatoes production and productivity. Modern climate-smart technologies will reduce cost of production. The strategy will achieve this through:-.

- Expand Kwakyai Irrigation Scheme infrastructure to increase the area under irrigation.
- Carry out feasibility on potential irrigation areas.
- Establishing new irrigation infrastructures (20 sand dams) at the high tomato producing zones and along seasonal and perennial rivers.
- Promoting solar water pumps that are environmentally friendly to reduce the use of diesel or petrol pumps and subsequently the cost of production.

Activity 4: Build capacity of local artisans on modified greenhouse and shade net systems. Greenhouses or shade nets are controlled environments that assure maximum returns per unit production area. They are the best method of land utilization in tomato production. Greenhouse varieties have the potential to produce up to 160 MT/ha and will increase productivity at a relatively lower cost. This activity will be carried out in the following way.

i. Build capacity of 12 artisans to fabricate low-cost modified greenhouse/shade nets.
ii. Support 18 CIGs (3 per sub County) in constructing low-cost modified greenhouses/shade nets.

Activity 5: Increase gender inclusivity

The following activities will be carried out to improve gender mainstreaming in the tomato value chain.

a. Carry out mapping of women and youth already active in the tomato value chain and those not active but have potential to participate in the value chain;

b. Support identification of opportunities and innovations that enhance women and youth participation in the value chain;

c. Identify and map existing service providers and establish linkages for women and youth;

d. Support youth and women already active in tomato value chain through identifying entry points for young women and men in the value chain;

e. Facilitate market linkages for women/youth to increase economic benefits in the tomato value chain through B2B forums and cooperatives; and

f. Support interventions that increase access to productive resources that will include Improved Farm Inputs and mechanized farming equipment.

b. Objective 2: Development of structured tomato market systems

Smallholder farmers lose a lot of income due to market glut, poor prices, and poor postharvest handling systems. Restructuring market systems can be achieved through the following activities:-

Activity 1: Establishment/strengthen of tomato value chain platform.

A tomato Value Chain Platform will be established at the County Level, which will bring together the different Value Chain Actors and Stakeholders. The platform will play an important role in bringing the actors together, addressing their concerns. Onboarding of a systematic market data information system on the tomato value chain onto pre-existing marketing platforms like "KAMIS" and 'Mkulima Young'. This will improve market access and product distribution. The platform will meet on quarterly basis.

Activity 2: Strengthening Farmer Producer Organizations on marketing.

Tomato farmers mostly exist as individual entities, which increases the risk of exploitation by middlemen. Farmers will be supported to organize into CIGs to champion their agenda at the local level and further federate into an apex organization at the County level. The CIGs will help in moderating prices with marketers through collective negotiations. This will streamline the production and marketing of fresh and processing varieties by negotiating prices with buyers. The input from CIGs will help develop a structured discussion around policy and governance of the value chain.

Activity 3: **Establishment of aggregation centers with cold chain facilities**. Most farmers individually transport their produce to the market using various means, which increases post-harvest losses due to poor handling during transportation and lack of cold chain facilities at urban markets. The strategy supports farmers in establishing aggregation (collection) centers at production zones to enable them to aggregate their produce and facilitate collective marketing. Public-private partnerships (PPPs) will also support the construction of cold room facilities in urban markets to mitigate the problem of post-harvest losses. This will be done through operationalizing the Kikoko, Kavuthu, Kwakyai and Kalawani cold stores. A new cold chain installed aggregation centre will be established at Makindu with the highest number of hectares under tomato production but without a cold store to preserve the tomato vegetable.

Activity 4: **Establishment of a financial product to support established CIGs**. There will be established a revolving fund to finance tomato groups across all nodes to facilitate farmers to develop tomato products that will improve tomato value chain marketing targeting youth and women.

Activity 5: **Certification (KS 1758 standard) of farmers to improve access to formal markets.** There are increased public food safety concerns related to chemical residues and contaminants in fresh produce and their impact on human

health. Supermarkets, hotels, and other institutions now demand their suppliers to source produce from farmers who have food safety certification. The strategy through collaboration with AFA-HCD will support certification of producer groups to improve food safety in the domestic market and enable them to access formal-structured markets.

c. Objective 3: Strengthen the policy and regulatory framework

Activity 1: To support enforcement of horticulture regulations 2020. The following activities shall be undertaken in conjunction with AFA-HCD:-

i. Hold stakeholders' forums in Makueni in collaboration with AFA-HCD to sensitize the public on the horticulture regulations.
ii. Through the value chain platform create a multi-sectoral enforcement teams in the county. These teams will be based at the county and cascaded to the ward level to ensure sustainability in enforcing the policies.
iii. Encourage the insurance companies to offer insurance cover for tomato crop.
iv. Hold sub county and ward/cluster sensitization workshops Disseminate the regulations to value chain actor (agro chemical companies, seed companies, extension officers, farmers and administrators).

CHAPTER SIX

6.0. TARGET AREA AND BENEFICIARIES

70. The strategy will be implemented in all the wards in Makueni

Table 8: Tomato growing wards

Ward	Hectare	No of farmers
Emali/Mulala	3.88664	9
Ilima	31.76113	41
Ivingoni/Nzambani	17.59109	37
Kalawa	8.117409	20
Kasikeu	13.96761	58
Kathonzweni	5.1417	23
Kee	2.834008	17
Kiima Kiu/Kalanzoni	11.15385	27
Kikumbulyu North	11.1336	18
Kikumbulyu South	17.59109	58
Kilungu	57.38462	223
Kisau/Kiteta	13.90688	84
Kithungo/Kitundu	29.39271	205
Kitise/Kithuki	6.862348	11
Makindu	63.96761	46
Masongaleni	22.67206	15
Mavindini	7.518219	24
Mbitini	12.5587	72
Mbooni	23.89069	120
Mtitio Andei	49.0081	54
Mukaa	8.744939	39

Muvau/Kikumini	6.530364	28
Nguu/Masumba	40.02024	39
Nguumo	11.67206	25
Nzaui/Kilili/Kalamba	26.74089	94
Thange	7.396761	18
Tulimani	12.74089	93
Ukia	28.35223	121
Waia/Kako	7.210526	35
Wote	7.060729	33
Total	566.81	1,687

Source: KIAMIS, 2023

CHAPTER SEVEN

7.0 TOMATO STRATEGY IMPEMENTATION MATRIX.

Table 9 Implementation matrix

Narrative Summary	Units	TARGETS				
		2024	2025	2026	2027	2028
OBJECTIVE 1: INCREASE PRODUCTION FROM 17,231 MT TO 44,702 MT AND PRODUCTIVITY FROM 24 MT/ HA TO 62 MT/HA BY 2028						
Activity 1: To Increase access to clean planting material:						
Profile tomato nurseries in the County	1	1	-	-	-	-
Expand 1 (one) existing nursery(Kwakyai)	1	-	1	-	-	-
Establish tomato commercial certified nurseries	6	2	3	1	-	-
Introduction of processing varieties for diversified production	6	2	2	2	-	-
Activity 2: Build the capacity on TIMPs						
Capacity building of 1600 tomato farmers on TIMPs	1600	400	400	400	400	-
Capacity build and sensitize 50 extension service providers on TIMPs	50	50	-	-	-	-
Capacity build 300 agriprenuers/community based facilitators (10 per ward) on TIMPS	300	-	300	-	-	-
Procure mobile soil testing kits	30	6	6	6	6	6
Promote at least 6 processing varieties based on maturity indices and quality requirements	Continues through platform meetings	1	1	1	1	1

Sensitization on food safety in the value chain	sensitization meetings	1	1	1	1	1
Activity 3: Establishment of irrigation infrastructure						
Expand Kwa kyai Irrigation Scheme infrastructure	1	-	-	1	-	-
Carry out feasibility on potential irrigation areas.	1	1	-	-	-	-
Establish 20 new irrigation infrastructures (sand dam -micro projects) at the high tomato producing zones and along seasonal and perennial rivers.	20	4	4	4	4	4
Procure solar water pumps	50	10	10	10	10	10
Activity 4: Build capacity of local artisans on modified greenhouse and shade net systems						
Capacity build 12 artisans to fabricate low-cost modified greenhouse/shade nets	12	-	12	-	-	-
Procure 18 modified greenhouses/shade net to support 18 CIGs demo units	18	3	6	6	3	-
Activity 5: Increase gender inclusivity						
Carry out mapping of women and youth participation in the tomato value chain at all nodes	1	1	-	-	-	-
Support identification of opportunities and innovations that enhance	1	1	1	1	1	1

women and youth participation in the value chain						
Identify and map existing service providers and establish linkages for women and youth	1	1	1	1	1	1
Support youth and women already active in tomato value chain through identifying entry points for young women and men in the value chain	1	1	1	1	1	1
Activity 6: Support research and development	1	1	1	1	1	1
OBJECTIVE 2: DEVELOPMENT OF STRUCTURED TOMATO MARKET SYSTEMS BY 2028						
Establish and strengthen tomato value chain platform.	1	1	-	-	-	-
Support quarterly tomato value chain platform meetings	20	4	4	4	4	4
support organize farmers into CIGs to enhance aggregation and marketing	18	18	-	-	-	-
operationalize 3 aggregation centres with cold chain facilities for tomato kalawani, kikoko and kavuthu	3	-	1	1	-	-
Construct/establish 1 new	1	-	1	-	-	-

aggregation centres with cold chain facilities for tomato at lower Makindu and Kwakyai						
Establishment of a financial product (a revolving fund) to support established CIGs to develop tomato products to promote youth and women	1	-	1	-	-	-
Support training on Certification (KS-1758 standard) to farmers to improve access to formal markets	18	9	9	-	-	-
Support establish Tomato management information system	1	1	-	-	-	-
OBJECTIVE 3: STRENGTHEN THE POLICY AND REGULATORY FRAMEWORK						
Activity 1: To support enforcement of horticulture regulations 2020 in conjunction with AFA-HCD.						
Support annual stakeholders' forums in collaboration with AFA-HCD to sensitize the public on the horticulture regulations	6	1	1	1	1	1
Create a multi-sectoral enforcement teams in the county and carry out semi-annual field	1	2	2	2	2	2

inspections.						
Support engage insurance companies to offer insurance cover for tomato crop	Through Tomato VC platform	-	-	-	-	-

CHAPTER EIGHT

8.0 TOMATO STRATEGY FINANCING

Table 10 Budget

Narrative Summary	Units	2024	2025	2026	2027	2028	TOTAL
OBJECTIVE 1: INCREASE PRODUCTION FROM 17,231 MT TO 44,702 MT AND PRODUCTIVITY FROM 24 MT/ HA TO 62 MT/HA BY 2028							
Activity 1: To Increase access to clean planting material:							**37,000,000**
Profile tomato nurseries in the County through a survey	1	2.0M	-	-	-	-	2,000,000
Expand 1 existing nursery at Kwakyai	1	-	5.0M	-	-	-	5,000,000
Establish 6 new tomato commercial certified nurseries	6	10.0M	15.0M	5.0M	-	-	30,000,000
Activity 2: Build the capacity on TIMPs							**51,370,000**
Capacity building of 1600 tomato farmers on TIMPs	1600	5.4M	5.4M	5.4M	5.4M	-	21,600,000
Capacity build and sensitize 50 extension service providers on TIMPs	50	1.27M	-	-	-	-	1,270,000
Capacity build 300 agriprenuers/community based facilitators (10 per ward) on TIMPS	300	-	5.0M	-	-	-	5,000,000
Procure mobile soil testing kits	30	3.0M	3.0M	3.0M	3.0M	3.0M	15,000,000
Promote at least 6 processing varieties based on maturity indices and quality requirements through 6 demos	6	-	6.0M	-	-	-	6,000,000

Sensitization on food safety in the value chain through ward clusters	5	0.5M	0.5M	0.5M	0.5M	0.5M	2,500,000
Activity 3: Establishment of irrigation infrastructure							**125,000,000**
Expand Kwakyai Irrigation Scheme infrastructure	1	0	0	15.0 M	0	0	15,000,000
Carry out feasibility on potential irrigation areas.	1	0	5.0M	0	0	0	5,000,000
Establish 20 new irrigation infrastructures (4 sand dam -micro projects per year) at the high tomato producing zones and along seasonal and perennial rivers.	20	16M	16M	16M	16M	16M	80,000,000
Procure and install solar water pumps, 10 pumps per year	50	5M	5M	5M	5M	5M	25,000,000
Activity 4: Build capacity of local artisans on modified greenhouse and shade net systems							**22,320,000**
Capacity build 12 artisans to fabricate low-cost modified greenhouse/shade nets	12	0	0.72M	0	0	0	720,000
Procure 18 modified greenhouses/shade net to support 18 CIGs demo units	18	3.6M	7.2M	7.2M	3.6M	0	21,600,000
Activity 5: Increase gender inclusivity							**18,500,000**
Carry out mapping of women and youth participation in the tomato value chain at all nodes	1	1.2M	0	0	0	0	1,200,000
Support identification of	1	2.0M	-	-	-	-	2,000,000

opportunities and innovations that enhance women and youth participation in the value chain							
Identify and map existing service providers and establish linkages for women and youth	1	-	0.3M	-	-	-	300,000
Support youth and women already active in tomato value chain through identifying entry points for young women and men in the value chain (Revolving fund)	1	3.0M	3.0M	3.0M	3.0M	3.0M	15,000,000
Activity 6: Support research and development	1	2.0M	2.0M	2.0M	2.0M	2.0M	**10,000,000**
OBJECTIVE 2: DEVELOPMENT OF STRUCTURED TOMATO MARKET SYSTEMS BY 2028							**102,500,000**
Support formation of tomato value chain platform.	1	2.5M	-	-	-	-	2,500,000
Support quarterly tomato value chain platform meetings (4 per year)	20	1.5M	1.5M	1.5M	1.5M	1.5M	6,000,000
support organize farmers into CIGs to enhance aggregation	18	20.0M	-	-	-	-	20,000,000
Form tomato farmers apex body for marketing	1	2.0M					2,000,000
operationalize 4 aggregation centres with	4	-	10.0M	10.0M	-	-	20,000,000

cold chain facilities for tomato kalawani, kikoko kavuthu, and Kwakyai							
Construct/establish 1 new aggregation centre with cold chain facilities for tomato at Makindu	1	-	30.0M	-	-	-	30,000,000
Link 18 tomato CIGs to formal contractual markets	1	1.0M	1.0M	1.0M	1.0M	1.0M	5,000,000
Support training on Certification (KS-1758 standard) to farmers to improve access to formal markets	18	4.5M	4.5M	-	-	-	9,000,000
Support establish tomato management information system	1	10.0M	-	-	-	-	10,000,000
OBJECTIVE 3: STRENGTHEN THE POLICY AND REGULATORY FRAMEWORK							
Activity 1: To support enforcement of horticulture regulations 2020 in conjunction with AFA-HCD.							**12,000,000**
Support annual stakeholders' forums in collaboration with AFA-HCD to sensitize the public on the horticulture regulations	30	1.8M	1.8M	1.8M	1.8M	1.8M	9,000,000
Create a multi-sectoral enforcement teams in the county and carry out semi-annual field	10	0.6M	0.6M	0.6M	0.6M	0.6M	3,000,000

inspections.							
Support engage insurance companies to offer insurance cover for tomato crop		-	-	-	-	-	0
GRAND TOTAL							**378,690,000**

CONCLUSION

Implementing this roadmap will in five years increase productivity by 36% (from current 24MTs/HA to 62MTs/HA), structure market through improved marketing systems, increase value addition while minimizing postharvest losses and create an enabling policy environment. Through the established tomato platform there will be a convergence of stakeholders and partners to invest variously in the tomato value chain

A total investment cost of **Kes. 368,690, 000** will be required to operationalize this strategy. In five years period 40% of the value chain commodity will go to processing segment, this translates to 1,192MT processed commodities valued at **Kes. 953,642,600** (15kg of raw fresh tomato produce 1Kg of processed tomato product); 50% will go to fresh tomato market segments translating to 22,351MTs valued at **Kes. 894,040,000;** while 10% will go to household consumption translating to a saving from purchase of 4,470MTs of fresh tomato of value **Kes. 178,800,000** translating to a healthier society. Generally, the strategy will generate a value estimated at **Kes. 2,026,482,600.**

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10.0 ANNEXES

10.1:Annex: 1: Gaps at various Parameters

Table 11 Gaps at various parameters

	Parameters	Unit	Current Actual 2022	Targets for 2027	GAP ANALYSIS	% Increase
a	Global Population	No	8,000,000,000	8,335,977,671	335,977,671	4
b	Global Productivity	MT/acre	37	37	-	0
c	Global production	MT	43,400,000	54,500,000	11,100,000	26
d	Global per capita	kg/year	6	6	0	7
e	Global demand	MT	184,800,000		(184,800,000)	-100
f	Kenyan Population	No	56,215,000	62,544,000	6,329,000	11
g	Kenyan Productivity	MT/acre	9	20	11	122
h	Actual production of tomato in Kenya	MT	1,046,000	3,832,599	2,786,599	266
i	Local Demand	MT	1,067,000	1,310,686	243,686	23
j	Per capita consumption	Kgs/yr	19	21	2	10
k	Actual import	MT	21,000	-	(21,000)	-100

l	Export	MT	4,000	889,986	885,986	22150
m	Demand for processing	MT	-	1,533,039	1,533,039	
n	fruits produced per plant	Kgs	2	4	2	100
o	Average Number of plants per Acre		7,000	7,000	-	0
P	Total acreage under production	acres	78,715	86,907	8,192	10
q	Tomato farmers in Kenya	No	410,224	451,246	41,022	10
r	Average post harvest loss	MT	320,100	31,380	(288,720)	-90
s	varieties in the Market	No	60	65	5	8
t	Number of tomato processors	No	93	93	-	0
u	Actual volume of Puree imported					
v	Number of aggregation facilities/Cold stores	No	1	25	24	2400

Annex II: Gross Margin Analysis

10.2: Annex 2: Gross Margin analytics for an open field production system

Table 12 Gross Margin Analysis under open field system

Input/output	Units	No of plants	Kg/ plant	Total kg	Total revenue
Tomatoes	Number	7000	4	19,600.00x 40.00	784000
Total revenue	Ksh	784,000.00			
B. Cost of production					
Item		Unit	Unit cost	Total cost 1	
Pressure pump	1	1	30000	30000	
Pvc pipes plus connections (2")	1	20	1500	30000	
Depreciation	1	1	5000	5000	
Land hiring	1	1	10,000.00	10000	
Soil analysis	1	1	2,500.00	2500	
Water analysis	1	1	1,000.00	1000	
Clearing (md)	1	8	400	3200	
Ploughing	1	1	4,000.00	4000	
Manure	1	6	1,500.00	9000	
Furrowing	1	1	4,000.00	4000	
Seedlings	7000	1	3	21000	
Planting labour (man days)	1	10	300	3000	
Irrigation fuel	1	27	1,500.00	40500	
Irrigation labour	1	27	300	8100	
Insecticide against cutworms					

(profile NN0ec)	1	0.24	4,000.00	960	
Spraying labour (md)	1	1	300	300	
DAP	1	1.4	7,000.00	9800	
Starter foliar	1	0.4	500	200	
Starter foliar labour	1	2	672	1344	
Fungicide (early blight)	1	5	1,500.00	7500	
Fungicide (late blight & downy mildew)	1	5	2,200.00	11000	
Labour for fungicide applications	1	20	300	6000	
Insecticide	1	8	2,000.00	16000	
Foliar application	1	2	2,000.00	4000	
Pheromone lures (traps)	1	24	350	8400	
Labour for insecticide	1	40	300	12000	
1st weeding (md)	1	10	300	3000	
CAN	1	1.4	6,500.00	9100	
Labour for topdressing	1	2	300	600	
2nd weeding	1	10	300	3000	
CAN	1	2.1	6,500.00	13650	
Labour for topdressing	1	2	300	600	
Sticks and transport	1	1	5	5	
Staking labour	1	20	300	6000	
Foliar (fruits and flower)	1	2.4	1,500.00	3600	
Harvesting (md)	1	20	150	3000	
Transport	1	0	0	0	
Sub total cost				291359	
Management cost				14567.95	
Total				**305,926.95**	

Gross margin/acre			**478,073.05**	
Monthly profit/loss			39,839.42	
Production cost/kg			15.61	
Farmgate price			20.29	

10.3: Annex 3: Greenhouse tomato management:

Table 13 Gross Margin analysis under Green house system

Expenditure for 8*15 m GH	**Units**	**Quantity**	**Unit Cost**	**Total**
Seedling	Seedling	600	15	9000
Fertilizer NPK	50 Kg	1	5000	5000
Fertilizer CAN	0 Kg	1	6000	6000
Labor	Monthly	3	15000	45000
Pesticide		1	5000	5000
Fungicide		1	5000	5000
Transport		1	5000	5000
Total cost				**80,000**

Break-Even and Gross Margin Analysis

- Break-even total cost = KES 80,000
- Break-even contracted price per kg = KES 40
- What is the Break-even production for greenhouse production? KES 80000 = X Number of Kg* 40

X = 2000 kg

NB: A plant produces 15-20 kg per season Expected production: 15*600 = 9000

Profit margin: 7000*N0 = KES 280, 000

10.4: ANNEX 4: REQUIREMENTS FOR EXPORT

- HCD export license
- KEPHIS phytosanitary certificate
- Kentrade certificate
- Standards based on the target market (e.g. Global GAP and KS1758)
- Trade association membership
- County business permit (Based on location)

All the information is available in AFA website and can be acquired through registration for licensing on AFA-IMIS: https://imis.afa.go.ke/

11.0 LIST OF STRATEGY DEVELOPMENT EXPERTS

Table 14: List of Strategy development experts

No.	Name	Institution
1	John M Maluki	Agribusiness officer, DALFCD
2	Einstein Muli	DALFCD
3	Martin Munyao	Value chain development specialist, DALFCD