

MANGO CLEAN PLANTING MATERIAL BUSINESS PLAN



Republic of Kenya
Ministry of Industrialization, Trade
and Enterprise Development



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FOREWORD

Acknowledgement: Mango Procedural Manual for Clean Planting Material

The European Union (EU) in partnership with the East African Community (EAC) has launched the Market Access Upgrade Programme (MARKUP) to support member countries improve market access of agro-food products to the EU and regional markets. The main purpose of this project is to contribute to the economic development of Kenya by increasing the value of both extra and intra-regional agricultural exports in selected horticulture sub sectors; (snow peas and peas, mango, passion fruit, chilies, herbs and spices, and nuts [macadamia nuts and groundnuts]). According to MARKUP, agriculture (crop and livestock production) contributes to an average of 27.3% of the national GDP and provides a source of livelihood to most Kenyans. It also contributes about 26% indirectly to GDP through linkages with other sectors such as agro-based manufacturing, transport, wholesale and retail trade. This programme (MARKUP) is structured around two intervention levels: the EAC Regional Window and the Partner States National Window with country specific projects. United Nations Industrial Development Organization (UNIDO) is the implementation partner for the Kenya-Partner States window.

MARKUP requested KALRO expertise in developing procedural manuals for the production of clean planting materials for mango, passion fruit, groundnuts and macadamia nuts. The process involved a detailed analysis of the sectors in question and identifying the various roles played by KALRO and other partners and Competent Authority (CA) bodies such as Agriculture and Food Authority (AFA) under the Nuts & Oil Crops Directorate (NOCD), Kenya Plant Health Inspectorate Service (KEPHIS), among other players. The analysis identified the strength and weaknesses of the sector and what needs attention.

The agricultural sector growth is critical for transforming Kenya's economy and catalyzing rapid economic growth. It is the largest sector contributing towards development, provides raw materials for agribusiness and livelihood for over 70% of the population. The building blocks and foundation of agriculture are high quality planting materials. Seeds/seedlings are the most important input in all crop based agricultural value chains.

Mango (*Mangifera indica* L.) was ranked 2nd after banana in terms of value amongst fruits in 2020. This fruit is an important cash crop in Makueni, Machakos and Embu Counties. It is produced for both local and export markets. During the last 20-30 years, commercial mango production has developed based on locally adapted and newly imported cultivars. This has seen the area under mango cultivation in Kenya rise from 500 ha in 1970 to approximately 56,437 ha in 2020 (source: HCD 2021). It is a source of foreign exchange for the country and a source of employment for a seasonal labour force.

The project observed that most of the fruit tree nurseries are not registered or certified by the requisite authorities and thus poses health risks to producers. The development of an efficient and sustainable nursery system of certified and registered nurseries for supplying mango farmers

in potential areas with high quality mango planting material of commercial varieties is needed. Varieties planted in the wrong agro-ecological zones have contributed to low quality fruit and market prices.

The mango procedural manual describes the principles and practices in nursery production of quality and superior varieties mango planting material from seed to seedlings. The manual equips the nursery operators, farmers and institutional nurseries with the knowledge and techniques of plant propagation, establishment of small-scale nurseries and managing mango orchards. It also enable participants to translate such knowledge and skills into entrepreneurial action projects.

The mango business plan guides entrepreneurs to adherer to structures that will assure production of quality seedlings as per the existing standards and protocols for different plants propagated from seeds or vegetative materials. Thus, the procedural manual and business plan address shortfalls and interventions required in the mango seed system.

This procedural manual has been developed from extensive information from research and background data by KALRO. The business plan is meant to be used together with the procedural manual to ensure that both technical and business considerations are met during the production process. The design takes into consideration all the information that a nursery operator and extension service provider would need to develop and produce high quality clean mango seedlings for use by nursery operators and extension service providers across the country and beyond. I am greatly indebted to the KALRO commodity experts who participated in the preparation of the Business Plan, which is expected to epitomize a new way of operating propagation units where in addition to the technical considerations, the business aspects are also incorporated to ensure sustainability.

It is hoped that these manuals reach the intended users as Kenya strives towards sustainable quality mango seedling propagation that triggers increased production and productivity and subsequently improves livelihoods for the communities served by this crop system. Given its utility, KALRO recommends that this manual is translated into Kiswahili and several vernacular languages to benefit a wider section of the mango farming community.

Prof. Lusike Wasilwa, PhD,
Director Crop Systems
For Director General, KALRO

ABBREVIATIONS AND ACRONYMS

AFA	Agriculture Food & Authority
CAN	Calcium ammonium nitrate
DAP	Diammonium phosphate
EU	European Union
GAPs	Good Agricultural Practices
HCD	Horticultural Crops Directorate
HCDA	Horticulture Crops Development Authority
KALRO	Kenya Agricultural & Livestock Research Organization
KEPHIS	Kenya Plant Health Inspectorate Service
KES	Kenya Shilling
KFS	Kenya Forest Services
KRA	Kenya Revenue Authority
MARKUP	Market Access Upgrade Programme
MoAL	Ministry of Agriculture, Livestock, Fisheries & Cooperatives
NOCD	Nuts and Oil Crops Directorate
UNIDO	United Nations Industrial Development Organization

EXECUTIVE SUMMARY

The development of an efficient and sustainable nursery system for supplying interested farmers even in potential areas with high quality mango planting material of the most suitable varieties is needed. Unsuitable varieties appear to have contributed immensely to low market prices. As a result, most farmers have small uneconomical quantities of different mango varieties. This situation renders the farmer uncompetitive price and unable to take advantage where need be. Poor extension services and lack of technical advice has contributed to the above phenomenon. There are several nursery systems for supplying Kenyan farmers with quality mango seedlings. Selection of quality planting materials is determinant to yields and likely returns from the orchards. Lack of high quality planting material is a major hindrance to growth and productivity in the mango sub-sector.

These are some few governmental institutions dealing with agriculture/horticulture such as the Kenya Agricultural and Livestock Research Organization (KALRO), the prison farms, NGO-managed tree nurseries and private nurseries offering mango seedlings of high quality levels.

INTRODUCTION

Mango is an important cash crop in Makueni, Machakos and Embu Counties. It is produced for both local and export markets. During the last 20-30 years, commercial mango production has developed based on locally adapted and newly imported cultivars. This has seen the area under mango cultivation in Kenya rise from 500 ha in 1970 to approximately 56,437 ha in 2016 (source: HCD 2019- 2020). It is a source of foreign exchange for the country and also a source of employment for a considerable seasonal labor force.

Source of planting materials is very key in mango production. Grafted mango production aims at improving food security and enhancing household income. Access to information on technology in mango nursery establishment, orchard husbandry practices, pests and disease management offers a solution.

There are no standards for nurseries that guide entrepreneurs to put structures that will assure production of quality seedlings as per the existing standards and protocols for different plants propagated from seeds or vegetative materials. Therefore, majority of the producers acquire seedling from nurseries that do not meet the required sanitary and phytosanitary requirements. Most of these nurseries are not registered and certified by the requisite authorities and poses health risks to producers.

The most important things to consider in raising mango seedlings for business is the suitability of the climate, the soil, and the irrigation water in the proposed site of nursery. Choose the appropriate mango varieties that are best suited to the region and climate as well as the targeted market. Good Agricultural Practice(GAP) should be practiced in the plant nursery.

BUSINESS PLANNING

The first decision which needs to be made by the nursery operator or a farmers group, is whether investment in land, labor and capital investment in mango seedling nursery will make a 'good business' and return a profit to the owner. There are considerable planning and recording implications for running the business. This requires knowledge of what needs to be recorded, either for compliance with national laws or for Global GAP.

A nursery business plan helps to determine the type, market, location, site, design and size of operations. It also helps one to establish specific details on equipment employee requirements, operational costs, estimated pricing schemes, projected return on investment and asset availability.

When starting a new business it is important to look ahead and envisage what the returns on the initial investment are likely to be, before deciding to borrow money or invest personal savings in the business venture. Initial business planning will require the grower to:

- Identify all the types of inputs which will be required and the quantity of each input that will be needed for the size of the mango project planned (Appendix 1).
- Predict the potential number of seedlings to be sold from the nursery, the time it will take to peak sales and the value of the predicted sale of seedlings (Appendix 3).
- Calculate the difference between the cost of inputs and the value of outputs (sales of mangoes seedlings) to determine the profitability of the mango nursery business (Appendix 2)

BUSINESS MODEL

Through training of nursery operators we look at the cost of production of every seedling and a margin will be added on the cost hence the price for the seedling is discovered taking into account the forces of demand and supply in force within the market.

Quality control of all the seedlings being sold out will be highly checked to ensure that the products meet the required standards and fetch good prices.

LAUNCHING A NURSERY BUSINESS

A nursery business is a process that can be personally and financially rewarding, if done in the right way

Key issues; to enhance the Business

- Superior/ competitive seedlings
- Understanding the market
- Seedlings promotion

The above issues will enable the nursery operator to have profit from the business.

Key Skills required for plant nursery business

- Knowledge in gardening skills
- Understand plant growth, its needs and care
- Key pests and diseases; their management
- Landscaping skills
- Administrative skills
- Business skills
- Marketing skills
- Communication skills

CRITICAL RISKS OR SITUATION ANALYSIS

- Natural water disaster caused by prolonged drought; can be managed by expanding water sources
- Competition from other nurseries in the vicinity
- Outbreak of pests and diseases

TYPES OF NURSERY BUSINESSES

1. Wholesale nurseries

- Produces nursery seedlings in big acreages/ large quantities
- Sell in large batches at significantly reduced prices
- Target customers; exporters/ retailers

2. Retail Nurseries

- May decide to buy from wholesalers or grow own seedlings
- Sell in smaller batches at retail prices
- Target customers; individual farmers

3. Export Nurseries

- Produces specifically for export
- Acreage and quantities can be small or large depending on market size
- Must strictly adhere to export market requirements

MARKETING AND COMMERCIALIZATION

- Assesses market preference
- Advice the farmers on quality and quantity
- Price review and negotiations
- Market research
- Explore new markets

FINANCE AND AUDIT

This is done through;

- Financial reporting
- Management and monitoring expenses
- Crafting financial policies
- Interpreting policies

- Managing petty cash
- Evaluating proposed financial investments

PRODUCTION AND GRADING

Quality control

- Ensures supply of quality produce
- Produce seedlings according to market demand
- Price differentiation according to profitability
- Compliance with government health standards
- Explore and educate new farming technologies
- Receive information from agricultural centers

THE TARGET MARKET

This one depends on the target customer. This is partially influenced by the type of business one chooses and the location of one's operation, whether urban or rural.

Possible Approaches of Defining the Market

1. Customer Types

- Define the types of customers within your target market based on market available data and advice for example data from MoAL, HCD and KFS among others

2. Preferences

- Determine customer preferences for products and services by investigating in the local competition

3. Market Trends

- Determine market trends anticipated in future on the types and number of plants to grow
- May use local and national association and government data

4. Promotions

- Invest and use different channels (friends, media, exhibitions, ASK shows, Trade fairs) to promote the seedlings
- Attract as many customers as possible

Competition in the Business

Knowing the competition in the business is essential in developing a marketing strategy. There is competition from roadside nurseries which can be minimized by farmers increase in knowledge of the importance of establishing mango orchards with high quality mango varieties.

There are key issues to understand regarding the business competition.

- a) Understanding what other growers are producing for the market helps to develop a better competing position for products and services.
- b) Developing a competitive attitude helps to identify products that will sell, along with pricing strategies and promotions that are necessary for keeping the customer interested.
- c) One must have a product or service that others perceive as different and superior from everything else offered
- d) Understand what the market wants after the knowing, then produce the needed seedlings.
- e) Product selection, good quality, lowest price and fastest service defines a good nursery business

DEFINING THE MARKET

Defining the market involves answering the question:

Who is the customer? This is partially answered by the type of business you choose and the location of your operation (urban or rural).

Possible approaches to defining your market and customers are:

- Define the types of customers within your target market based on market available data and advice eg from MoA , HCD and KFS among others
- Determine customer preferences for products and services by investigating the local competition
- Use local and national association and government data to determine market trends and preferences anticipated in future on the types and number of plants to grow

MARKETING STRATEGY

Market research should be carried to ascertain the potential sales as compared to actual sales. This involves including performance in the following areas:

- Customer service
- Affordable prices
- Great location
- Quantity and quality of plants, seedlings, trees and saplings

REGISTRATION, INSPECTION AND CERTIFICATION FEES FOR THE NURSERY

A registered nursery business must pay annual nursery licensing fees and be subject to inspections. The costs of licensing and any other authority-mandated certifications must be included in the operational costs when budgeting.

They include;

1. KRA Pin registration (Free)
2. HCD inspection
3. KEPHIS inspection and certification
4. Mileage per kilometer

SALES STRATEGY

Factors that influence primary sales

- Excellent customer service
- Exceptional product knowledge
- Large and varied offer of seedlings and saplings
- Good nursery location
- Good quality of seedlings and saplings
- Affordable prices

RECORD KEEPING

- Nursery business plan budget
- Seeds/ seedlings sown in quantity
- Seedlings germinated/ dried up/ grafted/ took after grafting
- Total number of seedlings sold
- Labor wages
- Contacts/ age/ gender of the farmers (customers)
- Dates when all the above activities took place

Appendix 1: NURSERY STRUCTURE BUDGET OF 100,000 SEEDLINGS CAPACITY

Size of Nursery 50 x 100 ft. (1/8 acre)				
Item	Description	Quantity	Cost Per Unit (KES)	Total Cost (KES)
Posts (10 ft long)	9 ft	9	500	4,500
Timber (3x2")	ft	32	37	1,184
Plain Wire	kgs	2	500	1,000
Chain Link	6 ft	1	3450	3,450
Barbed Wire	Roll	1	4200	4,200
Shade Net (50-60% light intensity)	sq ft	313	85	26,605
Nails	4"	1	130	130
	3"	1	130	130
	2"	1	130	130
	Unails	1	200	200
TOTAL (KES.)				41,529

Appendix 2: Template for Costing Seedling Propagation

Template for Costing a seedling e.g. Mango

Item No	Item of cost	Units	Quantity	Rate per unit	Total	Cost per seedling
			(A)	(B)	(A*B)	(A*B)/C6
1	COST OF ROOTSTOCK PRODUCTION					
1.1	LABOUR					
	Seed fruit/stone loading/offloading	Mandays	1	433	433	0.433
	Seed extraction and processing	Mandays	2	433	866	0.866
	Seed/stone planting in beds	Mandays	2	433	866	0.866
	Forest soil collection	Mandays	2	433	866	0.866
	watering	Mandays	2	433	866	0.866
	spraying	Mandays	0.5	433	216.5	0.217
	weeding	Mandays	0.5	433	216.5	0.217
	soil potting and planting	Mandays	2	433	866	0.866
		Sub-total			5196	5.196
1.2	MATERIALS					
	Seed fruit/stone	bags	1000	2	2000	2.000
	Forest soil	tons	0.5	300	150	0.150
	Farm yard manure	tons	0.33	1,000	330	0.330
	Sand	tons	0.167	1,000	167	0.167
	Budding knives	pieces	1	500	500	0.500
	Seceatur	pieces	1	1,500	1	0.001
		Sub-total			3148	3.148
1.3	FERTILIZERS					
	DAP	kgs	1	85	85	0.085
	CAN	kgs	1	60	60	0.060
	UREA	kgs	1	60	60	0.060
	Foliar feed	litres	1	100	100	0.100
		Sub-total			305	0.305
1.4	CHEMICALS					
	Fungicides	gms/ml	1	60	60	0.060
	Insecticides	ml/gm	1	50	50	0.050
		Sub-total			110	0.110
1.5	POTTING PAPERS					
	Size 6*9	packets	5	1000	5000	5.000
		Sub-total			5000	5.000
1.6	TRANSPORT OPERATION					
	Forest soil collection	kms	40	40	1600	1.600
	Fruit seed/stone collection	kms	300	40	12000	12.000
	Purchase of stores	kms	200	40	8000	8.000
		Sub-total			21600	21.600
1.7	TRAVELLING AND ACCOMODATION					
	Forest soil collection	persons	2	1000	2000	2.000
	Fruit seed/stone collection	persons	2	1000	2000	2.000
		Sub-total			4000	4.000
1.8	Rootstock watering	Cubic mt	100	50	5000	5.000
		Sub-total			5000	5.000
2	Total costs per rootstock				44359	44.359

3	COST OF PROPAGATING THE SEEDLING					
3.1	LABOUR					
	Grafting	Mandays	10	433	4330	4.330
	watering	Mandays	1	433	433	0.433
	spraying	Mandays	0.5	433	216.5	0.217
	weeding	Mandays	1	433	433	0.433
	scion /buds cutting	Mandays	2	433	866	0.866
		Sub-total		2165	6278.5	6.279
3.2	MATERIALS					
	grafting strips	rolls	1	600	600	0.600
	scions	nos	1000	10	10000	10.000
	Wheels	pcs	1	500	500	0.500
	Hose Pipe		1	250	250	0.250
	Knapsack Sprayer		1	1000	1000	1.000
	Grafting Knife		1	300	300	0.300
	Labelling Wool	boll	1	100	100	0.100
		Sub-total			12750	12.750
3.3	FERTILIZERS					
	CAN	kgs	1	60	60	0.060
	UREA	kgs	1	60	60	0.060
	Foliar feed	litres	1	6.5	6.5	0.007
		Sub-total			126.5	0.127
3.4	CHEMICALS					0.000
	Fungicides	grams	1	60	60	0.060
	Insecticides	litres	1	50	50	0.050
		Sub-total			110	0.110
3.5	TRANSPORT OPERATION					0.000
	Scion /buds collection	kms	200	40	8000	8.000
		Sub-total			8000	8.000
3.6	TRAVELLING AND ACCOMODATION (Advisory services per year)					
	Scion /buds collection	persons	2	1000	2000	2.000
		Sub-total			2000	2.000
3.7	Seedling watering	Cubic mt	60	50	3000	3.000
	Sub total				3000	3.000
4	Total cost of grafting one mango seedling					
					32265	32.265
5	Total cost of grafted seedling (rootstock + grafting cost)					
					76624	76.624
6	OVERHEAD COSTS (CROSS CUTTING COSTS)					
6.2	Storage costs at 1% of nursery costs				766.2	0.766
6.5	Building maintainance and other renovations at 1.5% of nursery costs				1149.4	1.149
6.6	Staff wages at 10% of nursery costs				7662.4	0.077
6.7	Losses due to seedling mortality a t10% of the production cost				7662.4	0.077
		Sub-total			17240.4	2.1
7	Total unit Propagating cost of mango seedling (RS, Grafting, Overheads)					
					78.693	
7.1	Gross profit of seedling @ 38.8% of Total unit cost					
					44.388	
7.2	Selling price of the seedling Mango Seedling					
					130	

Appendix 3: ONE YEAR BUSINESS PLAN

CAPITAL COSTS YEAR 1	Quarter 1	Quarter 2	Quarter 3	Quarter 4	TOTAL
Capital items e.g. seed equipment etc)					
Depreciation on capital					
INPUT COSTS YEAR 1	Quarter 1	Quarter 2	Quarter 3	Quarter 4	TOTAL
Annual costs of licenses					
Annual costs of labour					
Annual costs of inputs					
Fertilizers					
Pesticides					
Commission to salesman					
Transport costs					
Tax					
Total Cost (KES.)					
REVENUE Yearr 1	Quarter 1	Quarter 2	Quarter 3	Quarter 4	TOTAL
Number of seedlings sold (No.)					
Predicted value					
Total Income Year 1					
Gross Profit Year 1	(total income minus total costs)				
Income tax	(contingency for 30% tax on gross profit)				
Net Profit Year 1	(gross profit minus income tax)				



MARKUP

EU-EAC MARKET ACCESS UPGRADE PROGRAMME



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