Feed the Future Innovation Lab for Food Security Policy

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New Alliance Policy Acceleration Support: Malawi Project (NAPAS: Malawi)

An Analysis of the Mango Value Chain in Malawi

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Introduction

The Government of Malawi (GoM) developed the National Agriculture Investment Plan (NAIP) whose effective implementation relies on identification and prioritization of key value chains to be targeted. The NAIP particularly highlights the need for studies and consultations to identify value chains with highest potential for growth and to inform private sector players interested in investing in agriculture about such value chains. This value chain study will inform government and private sector investors on the efficacy of the mango value chain as an investment option.

Mango (*mangifera indica* L.) is a tropical evergreen fruit tree that is grown in almost all districts of Malawi and provides valuable nutrition during the hunger season. Mangoes are known to be high in minerals, fiber, vitamins, and provitamins (Prospectiva 2015). As Calatrava-Requena (2014) noted, mangoes are the fifth most consumed fruit in the world after citrus, banana, grapes, and apples, and therefore, contribute to incomes of various value chain players.

Methodology and Data

Data for the study were collected through primary and secondary sources. The methodology included desktop reviews and conducting semi-structured and key informant interviews with mango industry players. Secondary data sources included the Agriculture Production Estimates Survey (APES), the Agricultural Market Information System (AMIS), the Fourth Integrated Household Survey, and FAOSTAT.

We followed a snowball sampling approach to identify value chain activities and players. A total of 112 stakeholders were consulted and included: two government officials, one input supplier, 28 smallholder local mango producers, six semi-commercial improved mango variety producers, 20 mango whole sellers, 47 mango retailers, six food chain store representatives, and two transporters.

Key Findings

- Most of the mangoes produced in Malawi (99%) are of local varieties. Only 1% is are of improved varieties.
- The majority of mangoes are traded informally and less than 1% enter food chain stores. Very few also get exported, primarily by the only large scale mango processing factory, Malawi Mangoes.
- Malawi Mangoes used to process both local and improved mango varieties for puree but has suspended puree production due to low profitability. It now exports fresh improved variety fruits to international markets and plans on producing dried mangoes.
- The largest global markets for mango (for fresh fruits and juice extracts) are in the USA, EU, and the Middle East. Malawi can take advantage of the African Growth Opportunity Act (AGOA) to export mangoes to the United States of America, duty free. Other markets that Malawi can exploit include India and South Africa.
- There is need to spur production of improved varieties demanded in these international markets through investments in research and extension.
- Smallholder farmers realize Gross Margins of close to MK300,000/ha or 78% profit margin, while semi-commercial farmers realize close to MK1.6 million/ha or 87% profit margin.
- Whole sellers make a Gross Margin of about MK63, 000 per month representing 12% profit margin while retailers make about MK289, 000 per month representing 52% profit margin.
- The biggest challenge in the local mango value chain in Malawi is spoilage and lack of reliable markets.
- There is need to improve handling and transportation of mangoes to reduce post-harvest losses.
- There is also need to invest in infrastructure development including electricity, irrigation, communication, and roads.
- The GoM constructed a horticulture shelter in Kanengo that can be used for packaging mangoes and other fruits and vegetables for the market, but the shelter is currently a white elephant.

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A Strengths, Weaknesses, Opportunities, and Threats analysis and profitability analyses at the farmer and trader levels were also conducted.

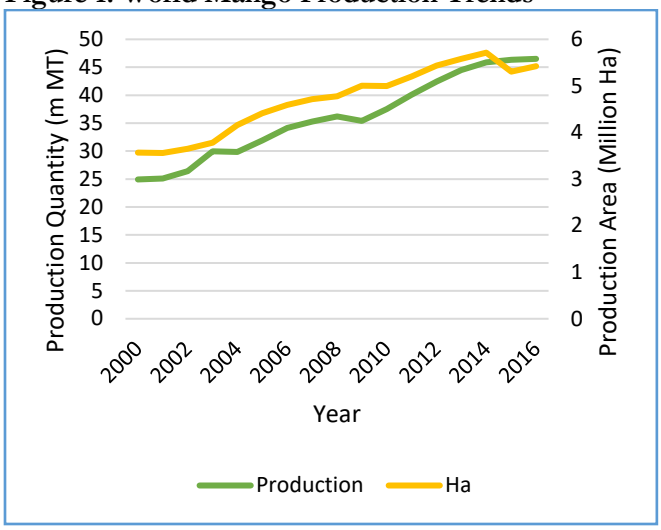
Mango Industry Overview

Mango Production

Statistics on mangoes within the region are scanty. The FAOSTAT data on mangoes includes mangosteens, and guavas but as Calatrava-Requena (2014) notes, 99% of that data is on mangoes giving us confidence to rely on this data. Within Malawi, statistics from the APES and AMIS provide a general picture of the mango industry.

On the global level, data from FAOSTAT shows an increasing trend in mango production (Figure 1). Both production and area under production have risen over the past decade.

Figure 1. World Mango Production Trends

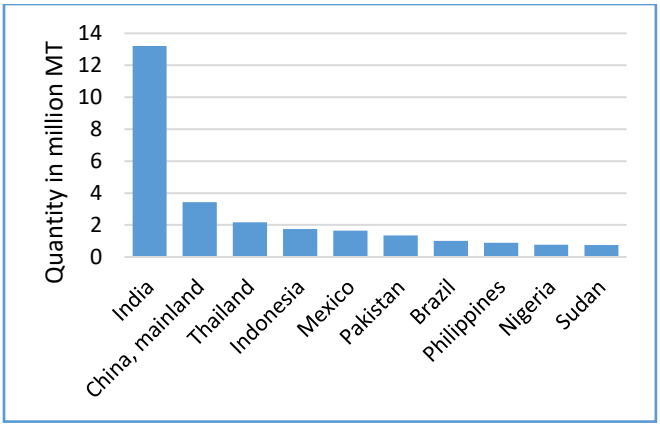


Source: FAOSTAT (downloaded Sept 2018).

The top ten mango producing countries include India, China, Thailand, Indonesia, Mexico, Pakistan, Brazil, Nigeria, and Sudan, in that order, see Figure 2. India dominates the world production with 13.2 million MT of mangoes in 2016 alone (28% of total world production). The biggest mango producers in Africa are Nigeria and Sudan contributing 1.7% and 1.6% respectively, to world production.

Within the region, Tanzania is the biggest mango producer followed by Malawi and South Africa. The FAOSTAT data shows an increasing trend in mango production for Tanzania, Malawi, and South Africa. Production has stagnated in Mozambique and Zimbabwe. In terms of mango production by variety, the Fourth Malawi Integrated Household Survey shows that 99% of mangoes produced in Malawi are local varieties and only 1% are improved varieties.

Figure 2. Top Ten Mango Producing Countries in the World

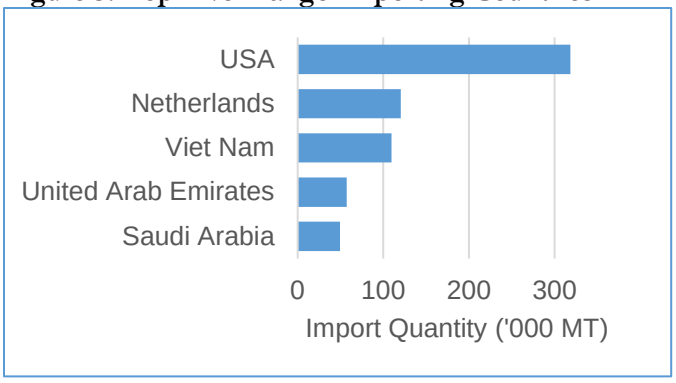


Source: FAOSTAT (downloaded Sept 2018)

Mango Marketing

The United States of America is the biggest importer of mangoes in the world followed by Netherlands, Vietnam, United Arab Emirates, and Saudi Arabia (Figure 3). This shows that opportunities exist for developing the mango value chain in Malawi to take advantage of such markets. The Ministry of Industry, Trade, and Tourism in Malawi has identified mangoes as one of the priority commodity value chains that the African Growth Opportunity Act (AGOA) strategy is promoting. The AGOA strategy identified 6,400 commodity lines that several African countries, including Malawi can export to the United States of America, duty free. It should be noted that the United States of America in not among the top ten mango producing economies in the world and therefore offers a unique opportunity to take advantage of.

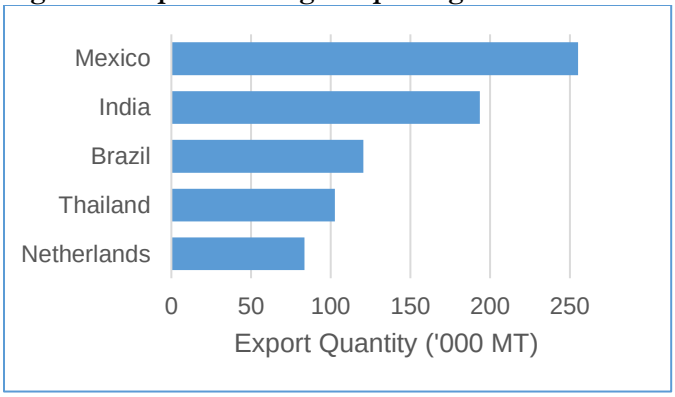
Figure 3. Top Five Mango Importing Countries



Source: FAOSTAT (downloaded September 2018).

Figure 4 shows the top five mango exporting countries in the world. Mexico is the highest exporter followed by India, Brazil, Thailand, and the Netherlands.

Figure 4. Top Five Mango Exporting Countries



Source: FAOSTAT (downloaded September 2018).

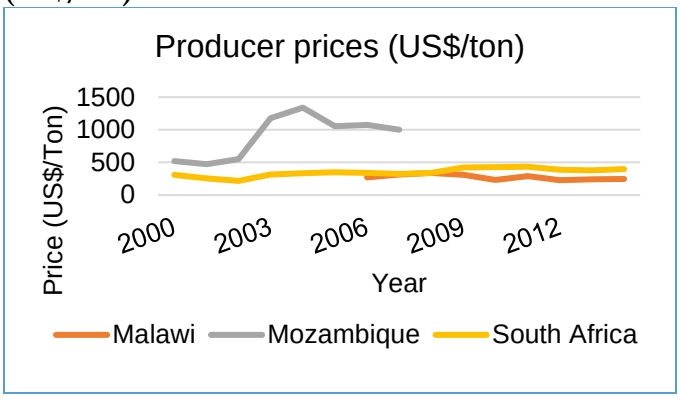
It should be noted that the Netherlands is involved in value addition and processing of imported mangoes into juices that are thereafter exported. As Prospectiva (2015) notes, Netherlands is the main market for mango commercialization. Another opportunity for exporting mangoes from Malawi exists with India as mangoes are off-season in India at the time they are in-season in Malawi. Malawi has been granted access to the Indian market since August 2018.

In terms of mango consumption, Keitt, Kent, and Tommy Atkins are the most highly demanded varieties in major fruit markets around the world, particularly in the United States of America and the European Union.

Mango Price Trends in the Region

In the region, mango producer prices were highest in Mozambique in the early 2000's. However, there is no data in FAOSTAT for Mozambique from 2007 onwards. For South Africa, the prices have remained around US$400 per ton since 2010. For Malawi, prices have stagnated around US$250 per ton and show a decreasing trend. Producer price data for Zambia, Tanzania, and Zimbabwe were not available in FAOSTAT.

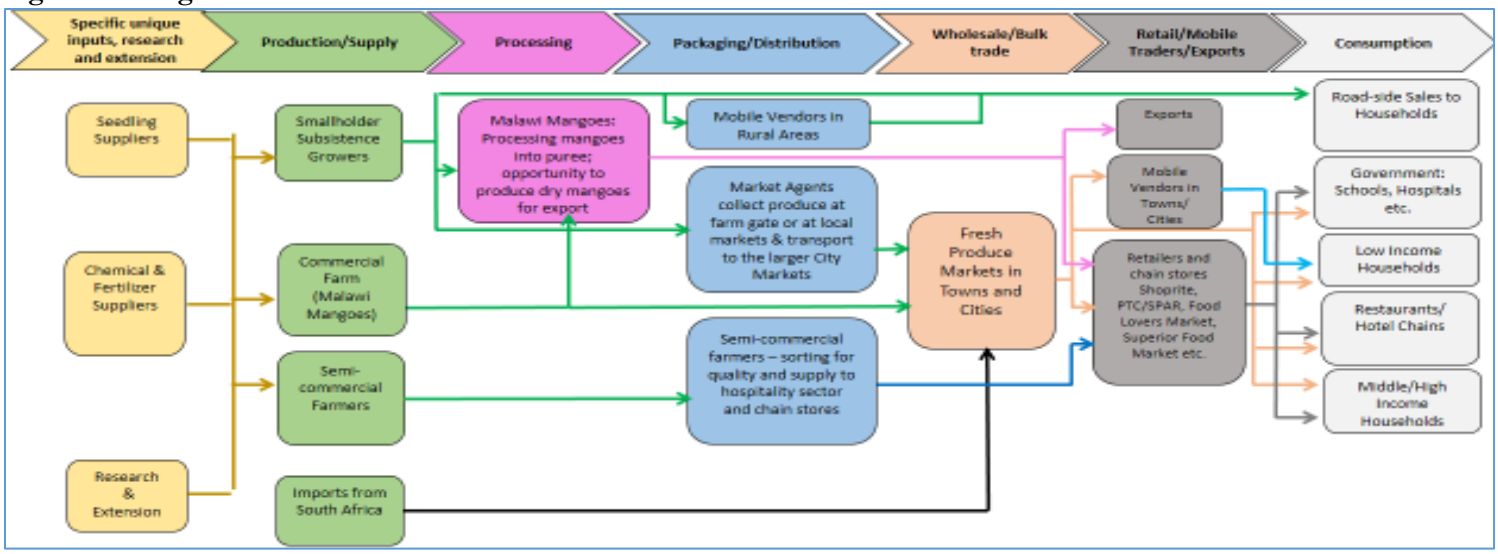
Figure 5. Mango Producer Prices in the Region (US$/ton)



Source: FAOSTAT (downloaded September 2018).

Data from the Agricultural Market Information System (AMIS) of the Ministry of Agriculture, Irrigation, and Water Development shows an increasing trend in retail nominal and real market prices for local mangoes between January 2009 and January 2018. Real mango market prices in Malawi were at an average of MK181 (25 US cents)/kg in September 2017.

Figure 6. Mango Value Chain



Source: Authors.

Real mango market prices in Malawi were at an average of MK181 (25 US cents)/kg in September 2017. The mango statistics presented above show that there is untapped potential for growth of the mango industry in Malawi. To fully take advantage of international mango markets, there is need to intensify production of improved mango varieties including top working existing local varieties with improved varieties. Figure 6 above shows the mango value chain map in Malawi. The subsequent sections highlight each of the value chain stages as presented in the value chain map.

Input Supply

Since the 1980, the Government of Malawi through the Department of Agricultural Research Services has been conducting research in evaluating and propagating high yielding mango varieties. However, there is lack of funding to have any significant impact. Furthermore, there is little dissemination of these high yielding varieties and agronomic knowledge especially on control of pests and diseases.

Malawi Mangoes (MM) has taken the initiative to evaluate and propagate high yielding mango varieties for its farm. They are also involved in a grafting/top-working programme for their mango out-grower farmers. MM is top-working improved varieties onto existing indigenous tree rootstocks. In addition, MM has 20 extension officers who provide farmers with advice on tree maintenance, chemical and manual pest and weed control, and supplementary irrigation techniques.

At the seedling level, there are a few farmers who produce mango seedlings in nurseries. Most of these use mango seedlings from local mango varieties and graft them with new high yielding varieties.

Mango Production

Mangoes are grown virtually throughout the whole country, mainly by smallholder farmers. Most trees are old (70 years) and not maintained in any way. Farmers rely solely on the annual rainfall for their trees' survival and production. The two main local varieties are Dodo/Boloma and Kalisere. Improved varieties of mango include Anderson, Kent, Tommy Atkins, Haden, and Erwin.

There are three types of producers: smallholders—mainly owning local varieties and a few improved varieties; semi-commercial—operating on private basis or out-grower arrangements and mainly growing improved varieties on less than 10 ha of land; and commercial farmers—growing improved mangoes on at least 10 ha of land. Table 1 shows the level of profitability from the farmers that we interviewed.

Table 1. Smallholder Farmer Gross Margin Analysis

	Smallholder	Semi-commercial private	Semi-commercial out-grower
Variable	MK/ha	MK/ha	MK/ha
Price per kg	102	750	740
Output	21,076	2,500	2,500
Weeding	16,995	16,995	28,800
Chemicals		66,000	50,000
Spraying			14,400
Irrigation			86,400
Mulching			14,400
Fertilizer			55,000
Harvesting	34,392	34,392	
Transportation		120,000	
TVC	51,387	237,387	249,000
Revenue	380,655	1,875,000	1,850,000
Gross Margin	298,292	1,637,613	1,601,000
Profit Margin	78%	87%	87%

Source: NAPAS Survey (November 2018 to January 2019).

Estimates presented in Table 1 do not include establishment costs as most trees were planted at least six years ago. The estimates however, include maintenance costs. The results show that smallholder farmers make a gross margin of close to MK300,000 per hectare while semi-commercial farmers make a gross margin of about MK1.6 million per hectare.

Mango Marketing

There are four main market channels for mangoes in Malawi. The first-market channel is informal and involves farmers selling to farm vendors/traders who in turn sell the produce to town/city market vendors. The second involves farmers harvesting mangoes by themselves and selling them at roadsides near their farms or homes. The third involves weekend/semi-commercial farmers selling directly to the chain stores at a premium price of about MK750/kg. These farmers transport their mangoes by themselves. The fourth involves Malawi Mangoes deploying trucks to collect mangoes at determined collection points near farmers' farms. In each of the market channels, when transporters are involved, they charge about MK70,000.00 for a 100km trip on a two ton truck. The transporters spend about MK30,000 on fuel and MK5,000 on the driver (representing a 50% profit margin/trip).

Whole Selling and Retailing

Approximately 70% of indigenous mangoes are sold to farm vendors/traders. The farmers themselves sell the remaining 30% directly to the public (along the roadside). A small amount of mostly exotic mango varieties, produced by weekend/semi-commercial farmers, are supplied to specific niche markets such as chain stores or the hospitality

industry. By the time of data collection, wholesale traders were selling their mangoes at an average price of MK83/kg while retailers were selling at an average price of MK151/kg. Table 2 below shows a gross margin analysis for wholesalers and retailers.

Table 2. Wholesaler and Retailer Gross Margin Analysis

Variable	Wholesale (MK/Month)	Retail (MK/Month)
Stock purchases	335,948.77	130,444.85
Transportation	83,444.44	91,868.09
Packaging	5,277.78	2,702.13
Labor	36,355.56	33,540.43
Market Fees	3,508.33	2,713.02
Storage	427.78	1,912.77
Other cost	611.11	85.11
Variable Costs	465,573.77	263,266.39
Monthly Revenue	528,508.45	551,897.00
Gross Margin	62,934.69	288,630.61
Profit Margin	12%	52%

Source: NAPAS Survey (November 2018 to January 2019).

Improved mango varieties are sold in the expanding retail chain-store network. On average, chain stores that we visited (Shoprite, PTC/Spar, Food Lovers Market (FLM), and Superior Food Market (SFM)) stock about 37MT per annum and 86% of this is sourced domestically and sold at an average price of MK367/kg, while the 14% is imported (mainly from South Africa) and sold at an average price of MK995/kg.

Mango Processing

Malawi Mangoes (MM) is the only large-scale fruit production and processing facility in Malawi processing mangoes into a concentrated puree from local and improved mango varieties for export to companies like Coca-Cola.

Figure 7. Malawi Mangoes Fruit Processing Factory

However, MM has suspended production of mango puree and is concentrating on exporting fresh improved variety fruits, and producing dried mangoes due to low profitability from mango puree.

There is also some small-scale processing of mangoes especially local mangoes in the communities. Farmers peel mangoes and cut them into slices that are dried for about 5 to 7 days and eaten as a snack. The mangoes are also cooked and eaten as a meal, especially during the lean seasons.

Challenges Faced by Value Chain Players

The major production challenge faced by farmers is theft followed by diseases and destruction of the trees/fruits by children or animals. Although not mentioned as a problem, at the time of data collection, most local mango farmers had their trees with ripened mangoes that had dropped to the ground and were just rotting. About 60% of the interviewed farmers indicated that their major challenge is the absence of stable markets. Traders highlighted perishability of mango as a major challenge they are facing. As one way of dealing with marketing and perishability problems, the Government of Malawi constructed a horticulture shelter in Kanengo, Lilongwe but the structure has remained a *white elephant* since its construction in 2016. Farmers and traders also lamented the high cost of transportation and low selling prices as traders are forced to sell their mangoes within 3 to 5 days of purchase before they start rotting. The study went further to understand the depth of the spoilage problem among farmers and traders. Table 3 shows the estimated quantity of mangoes that get spoiled.

Table 3. Post Harvest Losses

Postharvest losses	Quantity (Kg)	Value (MK)
Farmer/season	2,316	236,243
Wholesale/month	189	15,735
Retail/month	534	99,743

Source: NAPAS Survey (November 2018 to January 2019).

Our dataset also shows that farmers were harvesting an average of four tons of mangoes in a season. The loss at farmer level in Table 3 represents 58% of the total mango harvest in a single season. At the wholesale level, wastage was estimated at 3% per month and at the retail level it was estimated at 41% per month.

At the processor level, MM highlighted challenges with attracting development financing for hardware and financing expertise for training farmers to utilize technology effectively. MM also highlighted lack of government investment in targeted infrastructure such as roads, electricity, and irrigation. They particularly noted that it is

difficult to plan around electricity because of intermittent blackouts.

SWOT Analysis of the Mango Value Chain

The Strengths, Weaknesses, Opportunities, and Threats in the mango value chain are summarized below:

Strengths

- Good fertile soils and favorable climate
- Availability of new desirable varieties such as Tommy Atkins, Keitt and Kent

Weaknesses

- No structured market system
- Limited access to finance
- Lack of market information

Opportunities

- Presence of a large processing facility in Salima, Malawi Mangoes.
- Existence of Kanengo horticulture market shelter
- Slowly booming chain supermarkets that provide an opportunity for medium scale to large scale producers.
- Existence of international markets (USA, UK, India, South Africa) that Malawi can target.

Threats

- Lack of government funding for research and extension support.
- Lack of enabling environment (electricity, rail, roads, irrigation, access to finance, etc.).

Conclusions and Policy Implications

There is great potential to develop the mango value chain with existence of high value international markets and the Malawi Mangoes. There is therefore an urgent need to invest in production of high yielding improved varieties that are demanded in international markets. Investments in research and development and extension on mango production and marketing will be critical. There is also need for investments in infrastructure including transport, power, irrigation, and communication. In addition, there is need to expand value addition initiatives including mango drying and achar production to make full use of the many mangoes that get wasted during seasons of high supply. Lastly, there is need to improve harvesting and transport techniques to limit post-harvest losses.

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This brief is a summary of the mango value chain study that was undertaken by the NAPAS: Malawi Project to inform implementation of the National Agricultural Investment Plan (NAIP) of the Ministry of Agriculture, Irrigation and Water Development (MoAIWD).

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