
**GOVERNMENT OF MALAWI**

**MINISTRY OF AGRICULTURE, IRRIGATION AND WATER DEVELOPMENT**

# SHIRE VALLEY IRRIGATION PROJECT

## Agricultural Development Planning Strategy (Final Report)

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# Abbreviations and acronyms

| | |
|---|---|
| ACP | Africa, Caribbean and Pacific countries |
| ACP | Agricultural Commercialisation Project |
| ADD | Agricultural Development Division |
| ADMARC | Agricultural Development and Marketing Corporation |
| AEDO | Agricultural Extension Development Officer |
| AfDB | African Development Bank |
| AGOA | Africa Growth and Opportunity Act |
| AgDPS | Agricultural Development Planning Strategy |
| AGRITT | Agricultural Technology Transfer |
| AHCX | Auction Holdings Commodity Exchange |
| AHL | Auction Holdings Limited |
| AI | Artificial Insemination |
| APMC | Agriculture Produce Marketing Committee |
| ARET | Agricultural Research Extension Trust |
| asl | Above Sea Level |
| ASWAp | Agricultural Sector-wide Approach |
| AVO | Area Veterinary Officer |
| AWF | African Water Facility |
| BAI | Booker Agricultural International |
| BARS | Bvumbwe Agricultural Research Station |
| Bt | Biotechnology |
| CAADP | Comprehensive African Agricultural Development Programme |
| CADECOM | Catholic Development Commission in Malawi |
| CAGR | Compound Annual Growth Rate |
| CAP | Common Agricultural Policy |
| CAS | Controller of Agricultural Services |
| CBI | Centre for the Promotion of Imports from Developing Countries |
| CBO | Community Based Organisations |
| CFB | Corrugated Fibre Board Boxes |
| CGIAR | Consultative Group on International Agricultural Research |
| CICOD | Circle for Integrated Community Development |
| CCM | Clark Cotton Malawi |
| CCPLT | Communication, Community Participation, Land Tenure Resettlement Framework |
| CDH | Continental Discount House |
| CGAL | Cotton Ginners Africa Limited |
| CGIAR | Consultative Group on International Agricultural Research |
| CIAT | International Centre for Tropical Agriculture |
| CICOD | Circle for Integrated Community Development |
| CIMMYT | International Maize and Wheat Improvement Centre |
| CIP | International Potato Centre |

| | |
|---|---|
| CMO | Common Market Organization |
| CP | Central Poultry Feeds |
| COMESA | Common Market for Eastern and Southern Africa |
| COOPI | Cooperazione Internazionale |
| CSO | Civil Society Organisations |
| CV | Co-efficient of Variation |
| DADO | District Agricultural Development Officer |
| DAES | Department of Agricultural Extension Services |
| DAHLDO | District Animal Health and Livestock Development Officer |
| DAHLD | Department of Animal Health and Livestock Development |
| DANIDA | Danish International Development Agency |
| DARS | Department of Agricultural Research Services |
| DC | District Commissioner |
| DCD | Department of Crop Development |
| DCGL | Dwangwa Cane Growers' Limited |
| DCGT | Dwangwa Cane Growers' Trust |
| DDPD | District Director of Planning and Development |
| DEC | District Executive Committee |
| DF | Department of Fisheries |
| DfID | Department of International Development |
| DIS | Director of Irrigation Services |
| DIO | District Irrigation Officer |
| DM | Dry matter |
| DoI | Department of Irrigation |
| DRC | Democratic Republic of Congo |
| DWS | David Whitehead and Sons |
| DWO | District Water Officer |
| EAC | East African Community |
| ECA | East and Central Africa |
| EPA | Extension Planning Area |
| ERS | Expected Recoverable Sucrose |
| ESP | Extension Service Provider |
| Et | Evapotranspiration |
| EU | European Union |
| FAO | Food and Agricultural Organisation |
| FAOSTAT | FAO Statistical Programme of Work |
| FCR | Feed Conversion Ratio |
| FDH | Financial Discount House |
| FDI | Foreign Direct Investment |
| FGD | Focus Group Discussion |
| FINCA | Foundation for International Community Assistance |
| FISP | Farm Input Subsidy Programme |

| | |
|---|---|
| FMD | Foot-and-mouth disease |
| FPO | Farmer Producer Organisations |
| FTA | Free Trade Area |
| FUM | Farmers' Union of Malawi |
| GA | General Assembly |
| GATT | General Agreement on Tariffs and Trade |
| GBI | Green Belt Initiative |
| GBV | Gender Based Violence |
| GDP | Gross Domestic Product |
| GK | Gopi Krishna (as in GK Aqua Farms) |
| GLCC | Great Lakes Cotton Company |
| GM | Gross Margin |
| GMO | Genetically Modified Organisms |
| GoM | Government of Malawi |
| GPS | Global Positioning System |
| GSP | Generalised System of Preferences |
| GTPA | Grain Traders' and Processors' Association |
| GVH | Group Village Head |
| Ha | Hectares |
| HACCP | Hazard Analysis Critical Control Points |
| HIV | Human Immuno-deficiency Virus |
| HMS | HMS Foods and Grains Limited |
| HOPCOMS | Horticultural Produce Cooperative Marketing and Processing Society Limited |
| HWSD | Harmonised World Soil Database |
| ICLARM | International Centre for Living Aquatic Resources Management |
| ICRAF | International Centre for Research in Agroforestry |
| ICRISAT | International Centre for Research in Semi-arid Tropics |
| ID | Identification Documents |
| IFAD | International Fund for Agricultural Development |
| IFDC | International Fertiliser Development Centre |
| IFPRI | International Food Policy Research Institute |
| IHS | Integrated Household Survey |
| IMPIF | Irrigation Master Plan and Investment Framework |
| IRLAD | Irrigation and Rural Livelihoods Agriculture Development Project |
| IRRI | International Rice Research Institute |
| ISP | Implementation Service Providers |
| ITFC | Integrated Tamale Fruit Company |
| IWRM | Integrated Water Resources Management |
| JICA | Japanese International Cooperation Agency |
| KAMA | Katunga-Maseya Sugar Cane Cooperative Society |
| KCGL | Kasinthula Cane Growers' Limited |
| Kg/ha | Kilogrammes per hectare |

| | |
|---|---|
| KRCC | Korean Rural Community Corporation |
| KRS | Kasinthula Research Station |
| LCGA | Lakeshore Cane Growers' Association |
| LDC | Least Developed Countries |
| LSCGA | Lake Shore Cane Growers' Association |
| MALDECO | Malawi Development Cooperation |
| MBS | Malawi Bureau of Standards |
| McP | Miller-cum-Planter |
| MDFVL | Mother Dairy Fruits and Vegetables Limited |
| MERA | Malawi Energy Regulatory Authority |
| MFN | Most Favoured Nation Status |
| MGDS | Malawi Growth and Development Strategy |
| MHL | Mtalimanja Holdings Limited |
| MITC | Malawi Investment and Trade Centre |
| MK | Malawi Kwacha |
| MoAIWD | Ministry of Agriculture, Irrigation and Water Development |
| MOC | Mumias Outgrowers Company |
| MOST | Malawi Oil Seeds Sector Transformation |
| MP | Member of Parliament |
| MSC | Mumias Sugar Company |
| MSME | Micro, Small to Medium scale Enterprises |
| MUSCCO | Malawi Union of Savings and Credit Cooperatives |
| MT | Metric tonne |
| MW | Megawatt |
| NAC | National Aquaculture Centre |
| NAP | National Agricultural Policy |
| NAS | National Adaptation Strategy |
| NASFAM | National Smallholder Farmers' Association of Malawi |
| NBS | New Building Society |
| NCIC | National Construction Industry Council |
| NEPAD | New Partnership for Africa's Development |
| NERICA | New Rice for Africa |
| NES | National Export Strategy |
| NFRA | National Food Reserve Agency |
| NFS | National Fertiliser Strategy |
| NGO | Non-Governmental Organization |
| NIP | National Irrigation Policy |
| NIPDS | National Irrigation Policy and Development Strategy |
| NLP | National Land Policy |
| NPDS | National Price Development Strategy |
| NRA | Nominal Rate of Assistance |
| NRP | Nominal Rate of Protection |

| | |
|---|---|
| NSO | National Statistical Office |
| NT | National Treatment |
| NTB | Non-tariff barriers |
| OFSP | Orange Fleshed Sweet Potatoes |
| O & M | Operation and maintenance |
| PC | Project Coordinator |
| PCGC | Phata Cane Growers' Cooperative |
| PCL | Press Corporation Limited |
| PCU | Project Coordination Unit |
| PM | Physiological Maturity |
| PmP | Pest Management Plan |
| PPP | Public-Private Partnership |
| PRIDE | Programme for Rural Irrigation Development |
| PTT | Project Technical Team |
| PTTC | Project Technical Team Coordinator |
| PwC | PricewaterhouseCoopers |
| RBM | Reserve Bank of Malawi |
| REFLECT | Regenerated Freirian Literacy through Empowering Community Techniques |
| RH | Relative Humidity |
| SACCO | Savings and Credit Cooperatives |
| SADC | Southern African Development Community |
| SAFEX | South African Commodity Exchange |
| SGS | Service Guarantee Strength |
| SEDOM | Small Enterprises Development Organization of Malawi |
| SME | Small and Medium Scale Enterprises |
| SOYAMA | Soya beans Association of Malawi |
| SPV | Special Purpose Vehicle |
| SPS | Sanitary and Phytosanitary |
| SRBMP | Shire River Basin Management Programme |
| SSA | Sub-Saharan Africa |
| SSTGAT | Sukambizi Smallscale Tea Growers' Association Trust |
| SSI | State of Sustainability Initiatives |
| SUGAM | Sugar Growers' Association of Malawi |
| SVCGT | Shire Valley Cane Growers' Trust |
| SVIP | Shire Valley Irrigation Project |
| SVIP-PCU | Shire Valley Irrigation Project – Project Coordination Unit |
| SVISU | Shire Valley Irrigation Service Unit |
| TA | Traditional Authority |
| TAs | Technical Assistants |
| TFS | Technical Feasibility Study |
| t/ha | tonnes per hectare |
| TIPs | Trade, Industry and Private Sector |

| | |
|---|---|
| TIP SWAp | Trade, Industry and Private Sector Development Sector-wide Approach |
| ToR | Terms of Reference |
| TRIPS | Trade-related Aspects of Intellectual Property Rights |
| UAE | United Arab Emirates |
| UI | Universal Industries |
| UK | United Kingdom |
| UNCTAD | United Nations Conference on Trade and Development |
| UNICEF | United Nations Children's Fund |
| USA | United States of America |
| USAID | United States Agency for International Development |
| VDC | Village Development Committee |
| VSL | Village Savings and Loans Programme |
| VSL | Value of Statistical Life Approach |
| WARDA | Africa Rice Centre of the West Africa Rice Development Association |
| WASWAP | Water and Sanitation Sector Wide Approach |
| WB | World Bank |
| WTO | World Trade Organization |
| WUA | Water Users' Association |

# EXECUTIVE SUMMARY

Malawi's economy is heavily dependent on the agricultural sector while at the same time the sector is dominated by the smallholder sub-sector. The smallholder sector relies mainly on rain-fed crop production. To address this weakness in the economic foundation of the country the Government of Malawi (GoM) has, since the 1940s, expressed an interest in developing the lower Shire Valley with the intention to exploit the huge potential that exists in the region for irrigated crop production.

The Agricultural Development Planning Strategy (AgDPS) is meant to lay the foundation for the implementation of this vision. The underlying objectives of the strategy are, to:

- develop a market oriented and private sector-led initiative;
- encourage a change of mindset to facilitate the transformation of the smallholder sector from a focus on subsistence production towards a commercial production mode;
- contribute towards real value addition;
- establish the institutional and contractual arrangements required to facilitate the transformation towards efficient; professional and market oriented agricultural production; and,
- identify the different building blocks; the timing; and, investment levels required to achieve the objectives of the strategy.

## Status of agricultural development

Several policies, strategies and regulatory instruments have been crafted to establish a suitable framework for the success of agriculture in Malawi. It is envisaged that these will facilitate the development of irrigated agriculture in the lower Shire Valley. The key policy and strategy documents that will influence the implementation of the AgDPS include, amongst others: the National Constitution; Vision 2020; the Malawi Growth and Development Strategy (MGDS); the National Export Strategy (NES); the National Agricultural Policy(NAP); the National Irrigation Policy (NIP); the National Environmental Policy (NEP); the Green Belt Initiative (GBI); the National Land Policy (NLP); the National Fertiliser Strategy (NFS); the Seed Policy; the Cooperative Development Policy; the Livestock Policy; the National Water Policy; and, the New Alliance for Food Security and Nutrition in Malawi. In addition, the country is well integrated with others at both the regional and international levels allowing it to pursue various options to access markets in the wider community of nations.

Although the natural environment in the lower Shire Valley is well endowed to support the production of various crop and livestock commodities, progress in exploiting this potential has been very slow resulting in generally low productivity and low overall production being realized due mainly to the inability to provide adequate water to support the production of crops. As a result, the country as a whole and the lower Shire Valley in particular, currently faces recurring periods of food insecurity. The lower Shire Valley experiences climatic conditions (temperature, humidity and sunlight) and has soil conditions which are conducive for the production of a wide variety of crops provided that water can be harnessed to support the production of crops under irrigation. The country also enjoys ready access to the markets in southern, central and east Africa.

The combination of palatable grass species that dominates large tracks of grazing areas in the lower Shire Valley and the fairly large number of livestock currently raised in the project area present an opportunity for the development of a strong livestock sector. The improved availability of water that will be made possible by the Shire Valley Irrigation Project (SVIP) presents opportunities for enhancing the productivity of the grazing areas by establishing irrigated pastures.

Despite the availability of large surface water bodies in the country Malawi has witnessed a rapid decline in the availability of fish and fish products. The SVIP presents an opportunity for the resuscitation of the fishing industry and the Kasinthula Fish Farm, in particular.

**Service provision**

The low productivity levels currently achieved by farmers in the lower Shire Valley points to the need to ensure that the development of irrigation under the SVIP be supported by the strengthening of the institutions involved in supporting the smallholder farmer in his quest to achieve the envisaged transformation. Currently, most of the smallholder farmers operating in the project area rely on a seriously underfunded public sector. As a result, for all intents and purposes, the smallholder farmer has been left to fend for him/herself resulting in the common practice of adopting a low input-low return production system. However, the experience gained on the sugar estates currently operating in the project area shows that service provision can be enhanced with the active participation of other key stakeholders such as: developmental partners; non-governmental organisations; farmers' organisations (including clubs, associations and cooperative societies); and, private sector companies.

**Farmers' Organisations**

The development of the lower Shire Valley will require substantial investments to be made to establish and strengthen farmer organisations to ensure that the envisaged transformation is realized. The experience gained in the project area at Kasinthula, Phata and to lesser extent at Katunga-Maseya Sugar Cane Cooperative (KAMA) point to what can be achieved in working with smallholder farmers to develop institutions that can support their entry into the commercial agricultural sector. Lessons have been drawn from this experience in developing the institutional framework that has been proposed for the SVIP.

**Options for scheme development**

From the list of over twenty crops that have been identified as being suitable for production in the lower Shire Valley six have been selected for inclusion in the cropping programme proposed for the SVIP. These are: sugarcane; dry beans; pigeon peas; cotton; soya beans; and maize. It is worth noting that, in addition to the short-listed crops other high value crops have been identified which can be introduced at a later stage as the necessary support services become readily available in the project area to ensure that farmers have ready access to: inputs; training and technical expertise; and, the logistical support required to access the lucrative markets available in the developed countries. These other crops include: tomatoes, baby corn, sweet corn, paprika, commercial hemp, bananas, citrus and mangoes.

It is likely that by the time the SVIP is fully developed and the farmers are able to respond to the identified opportunities the market dynamics could have changed to a significant extent. For this reason the approach in formulating the AgDPS must be forward looking. In identifying the crops to be included in the cropping programme the following market opportunities were identified for the major commodities:

a) Chillies

Processing companies in Malawi include Nali Limited; Africa Investment Malawi; Cheetah Malawi Limited; Duconti Produce. Major export destinations include Singapore; the European Union (EU mainly to Germany, Spain, the United Kingdom (UK) and the Netherlands) and the Asia countries of Vietnam; Malaysia and Sri Lanka.

b) Cotton

The average annual production in Malawi is estimated at 50,000MT. The existing ginning capacity in the country is estimated at 215,000MT. The major ginneries include: the Great Lakes Cotton Company; Clark Cotton Malawi and Iponga Cotton. The major export destinations for Malawian cotton include: the United Arab Emirates; South Africa; China; Singapore; the UK and Zimbabwe.

c) Dry beans

The main buyers of dry beans in Malawi include Rab Processors; Muli Brothers and Transglobe. The major export destinations in the Southern African Development Community (SADC) region include Angola, the DRC and South Africa. Other potential importers are located in the EU (Italy, the UK and Spain) and, the Asian region (Bangladesh, China and India).

d) Maize

Maize meal is a staple food for the majority of the population in Malawi. The main buyers include the Agricultural Development and Marketing Corporation (ADMARC); several milling companies and a myriad of small-scale millers operating in the smaller towns and villages right across the whole country. In the SADC region the major export destinations include Mozambique, South Africa, Tanzania and Zimbabwe.

e) Mangoes

The major markets for mangoes within Malawi are located in Balaka, Dedza, Ncheu, Lilongwe and Blantyre. Malawi Mangoes have recently established a state-of-the-art juice extraction plant in Salima. On the international market the major markets are in North America, the EU, the Persian Gulf and the rest of Asia.

f) Oranges

Most of the oranges sold through the local supermarkets and similar outlets in urban areas are imported mainly from South Africa. On the international market the EU and the United States offer the largest markets for fresh oranges.

g) Pigeon peas

The major processing companies operating in Malawi include Transglobe Limited, Rab Processors and Bharat Trading Company. The National Smallholder Farmers' Association of Malawi (NASFAM) and many other small traders acting as middlemen are involved in the value chain since they buy directly from the smallholder farmers for onward sale to the processors. Ninety percent of the crop grown in Malawi is exported and the remainder is consumed locally. The major export destinations are India and the UK. The SADC region accounts for less than one percent of the international pigeon pea market.

h) Soya beans

The major buyers of soya beans in Malawi have traditionally included NASFAM, ADMARC and several vendors, retailers and wholesalers. Over 50 percent of the crop is currently purchased by vendors for onward sale to processors. In the SADC region the major markets for soya beans grown in Malawi are Botswana and Zimbabwe.

i) Sugar cane

Illovo is the only company processing sugar cane into sugar in Malawi. On the other hand PressCane have established a plant at Chikwawa for processing molasses into ethanol. Over 50 percent of the sugar produced in Malawi is consumed locally and the rest is exported to neighbouring countries, the EU and the United States of America (USA).

j) Fruits and vegetables

Malawi's agro-ecological conditions are suited to the production of fruit and vegetables such as tomatoes, baby corn, fine beans and mangoes. The existing markets for the various fruits and vegetables include both the formal (retail shops) and the informal markets (local consumers and roadside stalls). Several big South African supermarket chains have entered the local market (including Game, Shoprite and Spar) to compete with the established chains such as People and Superior Food Markets. The major export destination for vegetables grown in Malawi include India and the United Arab Emirates.

**Development strategies**

The requirements to support the implementation of the strategy have been framed to be implemented in a three stage process to enable smallholder farmers in the lower Shire Valley to transform their status from the current low-input/low-output farming system based on rain-fed agriculture to a system based on irrigated farming. The three stages are: farm organization development; farm investment and operational management support; and, development of supporting institutions. This process supported by the SVIP will be implemented in parallel with investment in water conveyancing and reticulation infrastructure in the lower Shire Valley.

The cropping programme developed is based on the following selection of crops:

- summer annual crops (cotton; soya beans and pigeon peas);
- winter crops (maize; dry beans and soya beans); and,
- perennial crops (bananas, citrus and mangoes).

The proposed unit of organization of the farmers is based on a 500ha Farm Model. The allocation of land to the various cropping enterprises will vary during project implementation in response to changes in the viability of the different enterprises as well as the availability of markets locally, regional and international.

In addition to the cropping programmes described above, models for the development of livestock (beef and dairy) and aquaculture have been developed to provide viability indicators for the two enterprises. Strategies for improving the productivity of the livestock sector include the establishment of irrigated pastures and feedlots. In addition, the organization of farmers could be improved to facilitate the realization of economies of scale in: input procurement, machinery acquisition; crop production; management of livestock and aquaculture enterprises; and, the marketing of aquaculture and animal products.

For the successful implementation of the SVIP to be realized, measures need to be taken to create a conducive environment for private investors to come into the project area. Potential investor opportunities have been identified at various points along the value chains of the key commodities identified for inclusion in the cropping programme for the proposed SVIP.

# CHAPTER 1 : INTRODUCTION

## 1.1. General description of the economy

The economy of Malawi is heavily dependent on the agricultural sector. The sector is the country's main foreign exchange earner with tobacco, sugar, tea, coffee and cotton as the major export products followed by manufacturing and tourism. Agriculture accounts for more than 80 percent of export earnings, contributes 38 percent of gross domestic product (GDP), and provides a livelihood for 85 percent of the population. However, the majority of the population has for long depended on rain-fed agriculture to achieve food security, increased income and ensure sustainable socio-economic growth and development. Smallholder farmers contribute about three-quarters of agricultural production with cropping systems dominated by a low-value, maize-based rain-fed cropping system. The country's dependence on the agricultural sector renders its economy vulnerable to shocks hence there is a desperate need to diversify. In recent years, several efforts have been launched to diversify the economy by encouraging investment in other sectors such as mining, tourism and the services sector. As a result, the contribution of these other sectors to GDP has increased over the years with agriculture's contribution declining from 38 percent in 1994 to about 27 percent in 2010.

In 2006, the GoM launched the Malawi Growth and Development Strategy (MGDS) to serve as Malawi's overarching development agenda and the programme was revised and extended in 2012 by a successor programme, the MGDSII. Malawi's development agenda is centred on nationwide poverty reduction, economic empowerment and ensuring food and healthcare security for the population. The objective of the new strategy is: "to continue to reduce poverty through sustainable economic growth and development".

## 1.2. The Shire Valley Agricultural Development Planning Strategy

Since the 1940s the GoM has, at various stages expressed an interest in the implementation of the SVIP as a vehicle for the development of the lower Shire Valley. Several studies have been carried out to determine the feasibility of the project, the latest of which was done by CODA and Partners in 2008. The development objective of the proposed SVIP is, to: "sustainably enhance incomes and hence food security of about 100,000 households in Chikwawa and Nsanje Districts through increased agricultural productivity and profitability by establishing market-linked smallholder farming ventures and professionally operated irrigation services on 42,500 ha of land".

## 1.3. Key elements of the strategy

The key elements of the Agricultural Development Planning Strategy (AgDPS) as spelt out in the terms of reference are:

- organizational options to clearly map out the relationship among the various stakeholders, including linking the irrigation scheme management side and the agricultural production side;
- the various options to develop appropriate contractual arrangements between smallholder producers and agro-processors, to support an out-grower production scheme or any form of contract farming;
- the various institutional and contractual arrangements for the provision of agricultural services, including:
    - the various ways and means of minimizing post-harvest crop losses starting from timely harvesting of the produce in the field and appropriate drying techniques, chemical application and development of appropriate storage structures;

- appropriate methods of value addition with a view to improving the marketing potential of the agricultural commodities;

- an appropriate and equitable mechanism to integrate larger private agri-business investors, in the development of the project area;
- a phased roll out of the strategy, including clearly identified activities for follow up work by different actors, including their objectives, linkages, indicative costs and respective timing; and,
- identify specific reforms/conditions that need to be in-place to facilitate the roll out of the strategy, as well as other actions required to facilitate investment and smallholder engagement as detailed in the plan.

## 1.4. Objectives of the strategy

This strategy will inform future phases of the SVIP, when the focus will be on: putting in-place the enabling environment; capacity enhancement of the different players; as well as, attracting private investment to complement the public irrigation investment.

The purpose of the AgDPS is to provide a clearly prioritised road map for improving Malawi's productivity through investment in irrigation infrastructure in the lower Shire Valley. The AgDPS aims to maximise the direct contribution of the lower Shire Valley to economic and social development as outlined under the thematic area of sustainable economic growth in the MGDSII. It aims to do this through the development of the lower Shire Valley in the manner that is balanced with the direct involvement of the private sector and the empowerment of the rural poor, smallholder farmers, the youth and women.

The underlying objectives of the strategy are, to:

- develop a market-oriented and private sector based agricultural development project;
- encourage a change of mind-set so that smallholder farmers from the very beginning move out of the business as usual rain-fed and maize-based subsistence farming system to enter into a commercially oriented production mode;
- contribute to real value addition in agricultural production with respect to the costs of the irrigation investment;
- help clarify some of the institutional and contractual arrangements to ensure an efficient, professional and market-oriented agricultural production and to avoid conflicts; and,
- identify the different building blocks, the timing and the investment levels (financing and human capacity) required.

# CHAPTER 2 : STATUS OF AGRICULTURAL DEVELOPMENT

## 2.1. Key national policies guiding agricultural development

Malawi has the basic relevant laws, policies and strategies that can spur agriculture and agribusiness development. Accelerated agricultural and agribusiness growth represents the best way out of poverty for the millions still living below the poverty line in the lower Shire Valley. Experience gained in East Asia has shown that agricultural-based growth is 2 to 3 times more effective at reducing poverty than a similar level of growth originating from other economic sectors.

The development of the agricultural sector in Malawi has largely been guided by several national and sectoral policy and strategy documents including: the Malawi Constitution; the Vision 2020; the Malawi Growth and Development Strategy (MGDS) I and II; the Agricultural Sector-wide Approach (ASWAp).

In addition, Malawi is party to a number of regional and international agreements and commitments that have an influence on the formulation of agricultural sector development and food security guidelines that are adopted at national level. The major regional and international agreements that are likely to influence the formulation of the Shire Valley AgDPS include those entered into with the following organisations: the Common Market for Eastern and Southern Africa (COMESA); the Southern Africa Development Community (SADC); the World Trade Organization (WTO); and, the partnership agreements between the European Union (EU) and the countries of the African, Caribbean and Pacific (ACP) regions.

This section identifies and presents summaries of the major statutes, policies, strategies, international agreements and commitments, which are relevant to the agriculture and food security sectors in Malawi and therefore need to be taken into account in the formulation of the AgDPS.

### Malawi Constitution

After attaining independence in 1964, Malawi adopted a republic constitution in 1996. Since the Constitution has been amended several times with the current version having been adopted in 2010. The right to food is enshrined in Malawi's Constitution, which states that, access to *"nutritionally adequate and safe food in the right quantities is a right of each individual"*. Hence, the GoM has identified *a*gricultural development and food security among the key priorities to achieve sustainable economic growth and poverty alleviation. The SVIP will contribute towards the realization of this objective by improving the productivity of the existing land as well as increasing employment opportunities for the communities residing in the lower Shire Valley.

### Vision 2020

Malawi's Vision 2020 framework identifies agriculture and food security as key priority areas to foster economic growth and development. Specifically, this long-term development strategy, which was adopted in 1998, envisions a high level of agricultural productivity, diversification, and commercialization to ensure equity, household food security, income, employment, and the sustainable use of natural resources by the year 2020 (GoM 1998). The GoM has translated this long-term vision into a medium-term policy framework for social and economic development, commonly known as the Malawi Growth and Development Strategy (MGDS).

The AgDPS is aligned to the Vision 2020 as it seeks to promote significant improvement in production, productivity and the commercialization of agricultural activities as well as value addition in the lower Shire Valley.

**Macroeconomic policies**

The macroeconomic policies adopted by the GoM are of particular importance in influencing the economy as a whole. The macroeconomic tools consist of:

- *fiscal policies*--the level of government spending and the balance between taxation and spending
- *monetary policies*--the control of the availability of money and access to credit; and
- *Exchange rate policies*—the control of the availability and access to foreign exchange

***Fiscal policy***

The GoM adopted strong fiscal consolidation measures in 2014/15 to contain expenditure within available resources and reduce domestic borrowing. The 2014/15 budget framework assumed a zero aid budget, reflecting the uncertainty surrounding resumption of external budgetary support. On the revenue side, fiscal policy has focused on strengthening revenue mobilisation and improving efficiency in tax administration through tax reform and the introduction of electronic fiscal devices. Fiscal conditions, however, deteriorated markedly between 2013/14 and 2014/5 following the withdrawal of donor budgetary support to Malawi in the wake of the "Cashgate" scandal. The suspension of budgetary support led to a shortfall in both general budget support and dedicated external grants. Although the domestic revenue performance was strong in 2014/15 at 20 percent of GDP, it was insufficient to compensate for the shortfall in external grants. Despite adjustments through curtailing development expenditure and travel costs, and through other austerity measures, overspending in the recurrent budget occurred. This was mainly because of higher than budgeted interest payments on the domestic debt. Interest payments on domestic debt doubled from 2 percent of GDP in 2013/14 to 4 percent of GDP in 2014/2015, crowding out budgetary resources for development projects and constraining the funding of basic service delivery. Total expenditure as a share of GDP, therefore, fell only marginally, from 30 percent in 2013/14 to 26 percent in 2014/15. Consequently, the fiscal deficit including grants stood at 4 percent of GDP in 2014/15 to an estimated 5 percent in 2015/16. The fiscal deficit was financed largely through domestic borrowing, which stayed just under 1 percent of GDP.

Malawi's budget framework continues to prioritise pro-poor spending. Around 70 percent of the 2014/15 budget was allocated to Malawi Growth and Development Strategy (MGDS II) priority areas, including social development, infrastructure, food security, and social protection. The challenge ahead lies in sustaining fiscal discipline while creating the fiscal space for key poverty and growth-oriented spending. The fiscal risks remain significant largely because of recourse to domestic borrowing (which triggers high inflation and interest rate) as well as the uncertainty regarding the availability of donor financing of the budget. Nonetheless, fiscal deficits are projected to remain low in 2015/16 as fiscal consolidation efforts take hold and budget control and oversight mechanisms are enhanced as part of PFM reform.

Following the droughts in 2004 and 2005, GoM significantly increased the allocation for the agriculture sector to increase maize production. On the one hand, public expenditure in agriculture was considerably increased to reach about 19 percent of total expenditure and the launching of Farm Input Subsidy Programme (FISP) in 2005/06 induced a strong maize production increase allowing the country to recover food self-sufficiency at national level until 2013. On the other hand, the country now finds itself blocked in a situation in which the

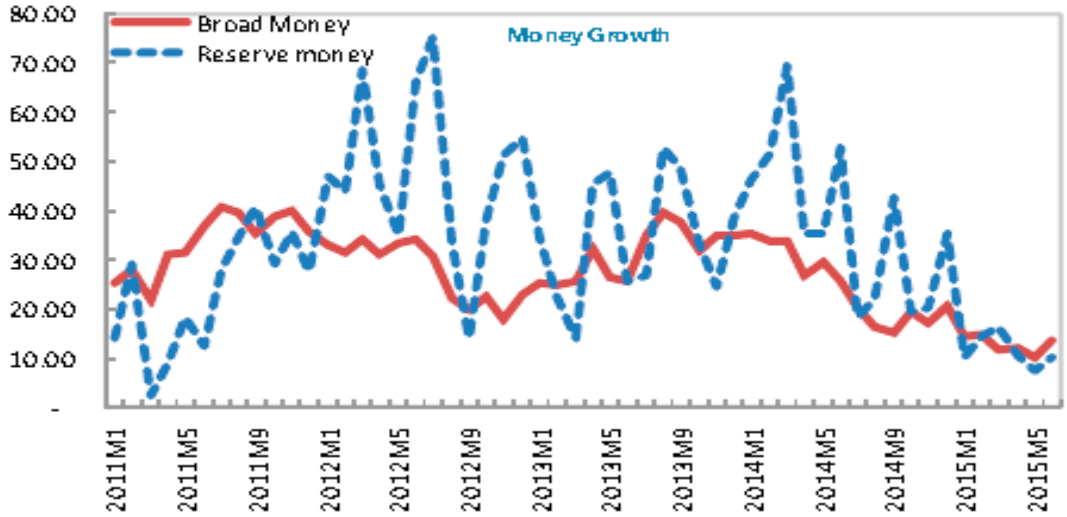
Ministry of Agriculture, Irrigation and Water Development (MoAIWD) has very little fiscal space: FISP absorbs the lion's share of the Ministry's financial resources averaging nearly 50 percent of total public spending in agriculture over the 2005/06-2014/15 period). This means that other activities such as research and development, agriculture extension services and agricultural infrastructure have to scramble for the balance.

### *Monetary policy*

Monetary policy is aimed at maintaining price stability, whilst ensuring availability of sufficient credit to the private sector. This objective has been compromised by government's recourse to the domestic market to finance the deficit which crowded Reserve Bank of Malawi lending to the private sector. Similarly, the stubbornly high inflation contributed to higher interest rates and greater exchange rate volatility. These factors in turn impacted Malawi's budget and increased the cost of servicing its domestic debt. Figure 2.1 show a steady decline in money supply growth rates as the authorities seek to control the rate of inflation.

Inadequate fiscal adjustment following the "cashgate" scandal affected the financial sector through several channels. Non-performing loans, for one, increased due to the accumulation of domestic payment arrears to private suppliers who experienced difficulties in servicing loans. Credit risk has since emerged as the most significant threat to the banking sector.

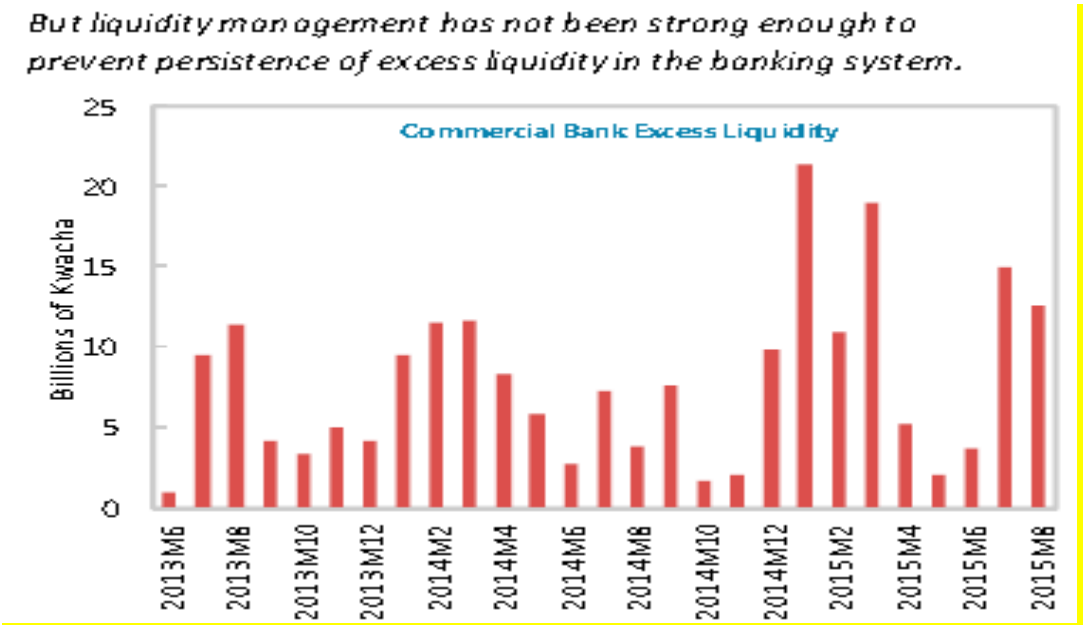
*Broad money and reserve money growth rates have been steadily declining.*




**Source:** *IMF*

***Figure 2:1: Broad money and reserve money growth patterns***

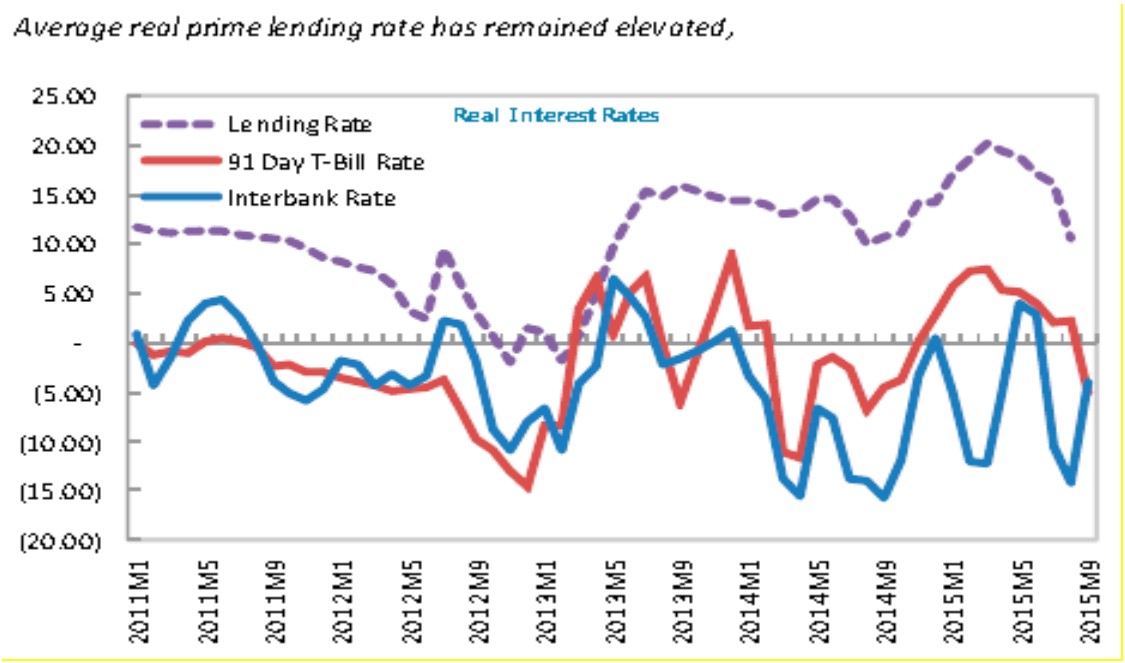
Figure 2.2 shows that the measures adopted to manage the liquidity have not been strong enough to prevent the persistency of excess liquidity in the market leading to the high levels of inflation experienced over the years in Malawi.




***Source:*** *IMF*

***Figure 2:2: Commercial Bank liquidity trends***

As a result of the persistently high levels of inflation the authorities have maintained the lending rates at a high level as shown in Figure 2.3.

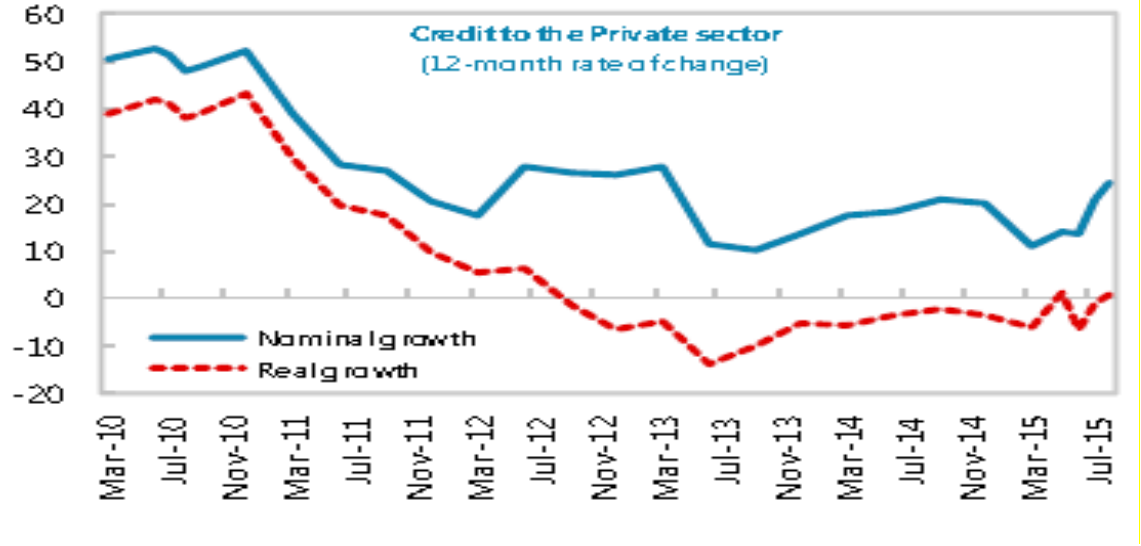



***Source:*** *IMF*

***Figure 2:3: Real interest rate trends***

As a result the availability of credit to support the private sector has been low contributing the lowering of credit growth rates as shown in Figure 2.4.

*which contributed to lowering credit growth to negative levels in real terms.*




***Source:*** *IMF*

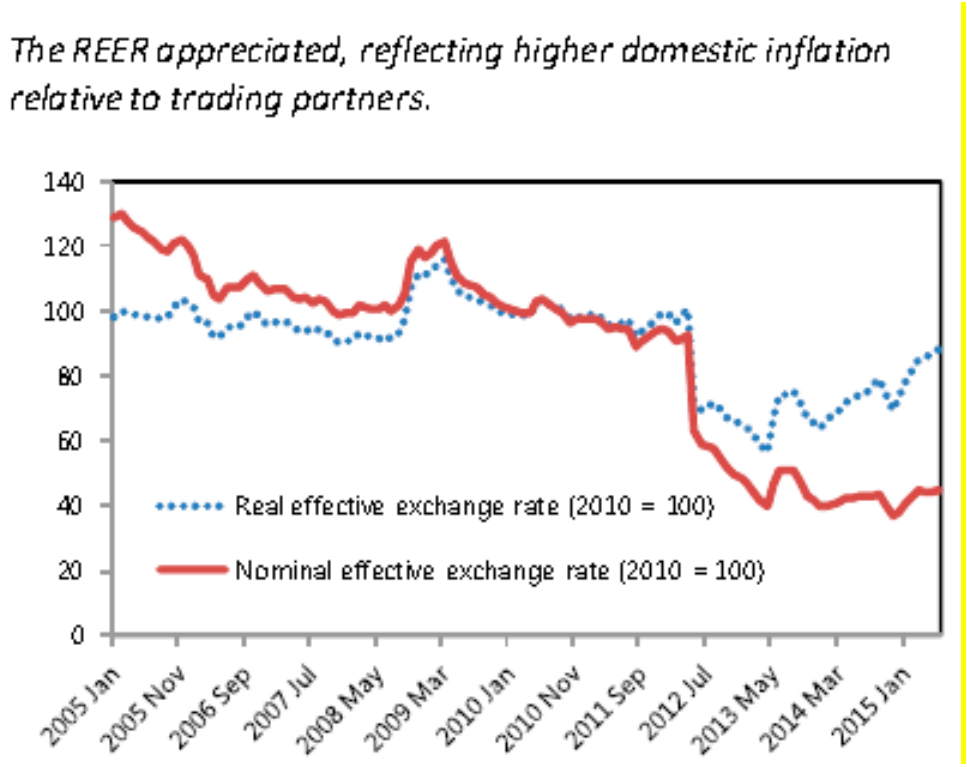
***Figure 2:4: Trends reflecting supply of credit to the private sector***

There is scope to improve Malawi's monetary policy architecture and to increase the RBM's capacity to fight inflation. In particular, price and interest rate reduction and stability should be the primary objective of monetary policy over the medium term in order to prevent tensions in meeting competing objectives. Currently the Reserve Bank of Malawi operates a reserve money program but is also mindful of the potential impact of interest rate policy on aggregate demand. In this context the policy rate is publicly announced to convey its policy stance. However, building policy credibility requires the active use of open market operations in order to align short-term market determined rates with the policy rate. However, there are large and frequent differences between the *de facto* policy stance (represented by short-term money market rates) and the policy rate which undermine the credibility of monetary policy and weakens the monetary transmission mechanism.

### *Exchange rate policy*

The flexible exchange rate regime has served Malawi well in addressing structural balance of payments problems. The real effective exchange rate has depreciated over long periods through the end of 2013 as shown in Figure 2.5. The GoM's commitment to the flexible exchange rate regime mechanism have helped Malawi to respond to external shocks. The kwacha which depreciated by more than 35.6 percent from July 2015 to early March 2016—a trend mirroring that of neighbouring countries— begun to stabilize during the first quarter of 2016. This in part reflects efforts by the central bank to absorb excess liquidity from the banking system, greater fiscal discipline, and the advent of the tobacco season.

There is a sense that the real exchange rate is broadly in line with fundamentals at the end-2014.




***Source:*** *IMF*

***Figure 2:5: Trends in changes of real and effective exchange rates***

Nevertheless, there is scope to improve competitiveness through the implementation of structural reforms and to increase reserve cover due to Malawi's susceptibility to large external shocks. In some instance, authorities use of moral suasion in determining the exchange rate of commercial banks has ceased, thereby removing the official action that gave rise to the multiple currency practice identified in August 2006 and manifested by the significant spread between the commercial bank and foreign exchange bureau rates.

**Malawi Growth and Development Strategy**

The first MGDS covered the period 2006-2011, and its successor, MGDS II, extended the period covered to 2012-2016. One of the key objectives of the MGDS is to "reduce poverty through sustained economic growth and infrastructure development". Agriculture and food security is one of the priority areas identified under the MGDS. The Strategy seeks to increase agricultural productivity and diversification with a view to achieving sustainable economic growth. Other areas of focus include: building links between agriculture and non-agriculture sectors; agro-processing as a core element of trade development; and prioritization of water resource development; and, expanding the land area placed under irrigation. The AgDPS is aligned to the MGDS II as it seeks to increase both water resource development and the area under irrigation as well as promote agro-processing as a means of improving value addition. It is envisaged that the project will contribute towards the reduction of poverty through improved and sustained economic growth and infrastructure development.

**The Agricultural Sector-Wide Approach**

Malawi has been implementing the ASWAp since 2011 with the aim of increasing agricultural productivity, improving food security, diversifying food production to improve nutrition at household level and increasing the level of household incomes realised by people residing in the rural areas. The ASWAp is a priority programme under the Malawi Growth and

Development Strategy (MGDS) and its implementation is consistent with the Comprehensive African Agricultural Development Programme (CAADP) under the New Partnership for Africa's Development (NEPAD). It is an investment framework that operationalizes commitments made by the GoM and its development partners in the agricultural sector as a whole.

The current ASWAp, which covers the period of 2011-2016, advocates for and drives strategic investment toward programmes and initiatives that fall under three distinct pillars, namely:

- food security and risk management;
- commercialization of agriculture, agro-processing, and market development; and
- sustainable agricultural land and water management.

These are complemented by two key support services: technology generation and dissemination; and, institutional strengthening and capacity building.

The ASWAp targets a minimum average growth rate for the agricultural sector of 6 percent per annum as well as raising annual household agricultural incomes from US$280 to US$600. Currently, the bulk of resources mobilized under ASWAP are channeled towards crop production (50-70 percent), leaving limited resources for other components of the ASWAp. The ASWAp targets a large number of commodities and groups of commodities which are critical to the attainment of food security and these include: maize, pulses, horticulture crops, tubers, livestock (including milk), and fish. It also focuses on export commodities such as tobacco, tea, sugar, and groundnuts and, high value-addition crops such as rice, fruits, horticulture, livestock, and dairy products. The AgDPS is aligned to the ASWAp as it places emphasis on the commercialization of agriculture in general, market development and the processing of agricultural commodities to ensure enhanced value addition prior to the export of commodities produced in the lower Shire Valley.

**National Export Strategy**

The goal of the National Export Strategy (NES, 2013-18) is to build productive capacity in the country to ensure that exports can match imports in the long-term. The NES, which complements the MGDS II, essentially provides a prioritised road-map for developing the country's productive base to allow for both export competitiveness and economic empowerment of the poor, farmers, women and other vulnerable groups. Four priority areas have been identified under the NES:

- *Export clusters:* development of priority clusters that have the potential to complement tobacco and drive exports through value addition. These clusters are oil seed and sugar cane products and other manufactured products. The relevant manufactured products include beverages and agro-processing (such as by-products of dairy, maize, wheat, pulses and various horticultural crops);
- *Conducive environment* to economic competitiveness and economic empowerment of youth, women, farmers and micro, small and medium enterprises;
- *Supportive economic institutions to build the productive base of the economy:* invest in supportive economic institutions, specifically on consumer, financial and market information systems, and improve communication and dialogue; and,
- *Competencies, skills and knowledge:* invest significantly in competencies, skills and knowledge development as a foundation for improvement of Malawi's productive base and its overall export capacity.

The National Export Strategy (NES) focuses on a limited number of products, namely:

- oil seed products (sunflower, groundnuts, soya and cotton);
- sugar cane products; and,
- manufacturers (in terms of commodities this includes dairy, maize, wheat, horticulture and pulses).

The AgDPS is aligned to the NES as it will promote the production of commodities currently included under the export cluster as well as places emphasis on agro-processing by creating a conducive environment for investors to establish manufacturing facilities in the lower Shire Valley.

**The National Agricultural Policy**

The National Agricultural Policy (NAP, 2016) is aligned to Malawi's Vision 2020 and the MGDS II which are the overarching long and medium-term development strategies, respectively. The specific objective of the NAP is to guide Malawi to achieve the transformation of the agricultural sector. More specifically, the policy seeks to guide the nation towards increasing production, productivity and real farm incomes. The NAP seeks to sustainably transform the agricultural sector from a subsistence to market oriented approach in order to increase overall production, marketed surpluses of commodities and real incomes. With respect to food security, the principal responsibility of agriculture is to produce sufficient, diverse and nutritious foods, provide reliable food markets and increase agricultural incomes. The AgDPS is aligned to the NAP as it seeks to commercialise the operations in the smallholder sector in order to optimise resource allocation to the smallholder sector. The NAP's recognition that all sectors have a role to play in facilitating the increase in scale and quality of production while promoting pro-poor linkages between large-scale estates and the smallholder sector is applicable to the AgDPS as well.

The NAP is aligned with several international agreements and protocols on agriculture including CAADP; the New Alliance for Food Security and Nutrition; and several regional commitments entered into by the GoM under SADC and COMESA.

**The National Environmental Policy**

The Government of Malawi first adopted a National Environmental Policy (NEP) in 1996 to provide guidance and set standards for the development of sector policies that address issues encountered in environment and natural resource management. The Policy sought to:

- promote the efficient utilisation and management of natural resources;
- facilitate the rehabilitation and management of essential ecosystems and ecological processes;
- enhance public awareness of the importance of sound environmental management; and,
- promote cooperation between Government, local communities and women groups, non-governmental organisations and the private sector in the management of sustainable utilisation of the natural resources and the environment.

The revised National Environmental Policy of 2004 recognises the importance of creating an enabling policy and legal framework for cross-sector coordination, participation of non-state actors, strengthening the enforcement machinery and decentralising natural resources and environmental management and governance. The AgDPS is aligned with the NEP which is used as a key instrument and standard for environmental and natural resources management policies and legislation. The NEP will be referred to as a guide in the implementation of the various components of the AgDPS.

## The National Irrigation Policy

The National Irrigation Policy (NIP, 2016) seeks to address critical issues affecting the irrigation sector that include: spatial and temporal water shortages; customary land tenure disputes; and, operation and maintenance of infrastructure. The development of the NIP was preceded by a review of the National Irrigation Policy and Development Strategy (NIPDS) a process which led to the incorporation of new developments in the sector such as public-private partnerships (PPPs), matching grants, climate change and shifts in natural resource (i.e. land and water) management. The revised policy recognises the need to view irrigation in the broad context of national development so that it contributes to the socio-economic advancement of the population. The role of government in irrigation development and management is that of a facilitator in a market oriented economy. The new policy is intended to support the migration of farmer organizations from subsistence to commercialisation. The AgDPS is aligned to the NIP as it is predicated on the transformation of the smallholder sector from a subsistence orientation towards commercialisation. In addition, the AgDPS is premised on the assumption that the government will play a significant facilitating role in a market oriented economy.

## Green-Belt Initiative

The Green Belt Initiative (GBI, 2011-16) is aimed at achieving and sustaining an agricultural revolution in order to provide a sound footing for sustained economic growth and development. The GBI is designed to ensure that the investors/farmers have access to large tracts of land for the development of agricultural projects at a scale that will enable them to achieve the highest possible economies of scale. The specific objectives of the GBI include:

- increase production and productivity for crops, livestock and fisheries;
- increase agricultural exports;
- increase diversification and the level of operations managed by large-scale farmers;
- improve value chain linkages and operations;
- increase private sector participation in agricultural production;
- add value through processing of raw materials; and
- create rural growth centres along the green belt corridors.

The highlighting of the listed objectives under the GBI presents a very good framework for the AgDPS. However, it is important to point out the need for effective communication with the local communities to facilitate the entry of large scale private sector investors in the project area, going forward. Preliminary consultations with representatives of the local communities suggest that large companies are generally viewed with suspicion and this is attributed to the negative legacy issues associated with the entry of the existing sugarcane estates into the project area. The experience gained by Agricane and PressCane at Phata and KAMA presents useful lessons that can be used to shape the conversations between the local communities and the potential private investors.

The GBI has six components, namely:

- irrigation development and rehabilitation;
- improving access to credit;
- natural resource management;
- research-based technology development;
- capacity building, infrastructure and market development; and
- dissemination and utilization of new technologies.

These components are aligned to ASWAp, which is regarded as the main institutional framework for implementing the GBI. The ASWAp refers to the GBI in Focal Area 3

"Sustainable land and water management", acknowledging that irrigation infrastructure is key to increasing agricultural production and productivity, increasing agricultural exports and promoting crop diversification. The GBI aims to expand the area under irrigation from 78 000 ha to a million hectares. The AgDPS is closely aligned to the GBI objectives, specifically relating to: increasing production, productivity, exports and diversification; improving value chain linkages and operations; and, adding value through the processing of agricultural produce realised from the efforts of farmers involved in irrigation activities.

**National Land Policy**

The National Land Policy (NLP) covers the following core components:

- the clarification and strengthening of customary land rights and formalizing the role of traditional authorities in the administration of customary land which covers some 80 percent of the country;
- providing for all customary land to be registered and protected against arbitrary conversion to public land;
- encouraging all customary landholders (entire communities, families or individuals) to register their holdings as private customary estates in ways that preserve the advantages of customary ownership but also ensure security of tenure;
- allowing private leases to be created as subsidiary interests out of any private land, including registered customary estates, without relinquishing the underlying ownership of the customary landholder; the strengthening of the land rights of women and orphans; and,
- the regulation of land access by non-citizens.

The NLP was developed in response to: a general outcry arising from the perceived inadequacies of existing laws; delays in the implementation of land administration procedures; arbitrary applications of the public interest criteria; constraining inheritance laws; and, uncertainty in dealing with the prevailing pressure for land. Malawi has about 3 million hectares of cultivatable agricultural land, of which more than 99 per cent remains under rain-fed cultivation. There is an additional pressure on land due to rapid population growth and the increasingly unpredictable climatic conditions.

The delays in the crafting and adoption of a comprehensive amendment to the Land Act (1967) to address the shortcomings listed above coupled with weak institutional capacity have hampered the adoption and full implementation of the Land Policy. However, a Land Bill has been tabled before Parliament, which among other things, is expected to regulate the adjudication of rights and interests in customary land, and to promote the democratic, transparent and accountable management of customary land. The realisation of the objectives of both the GBI and the SVIP will be influenced to a great extent by the ease with which the project will be able to harmonise the social and commercial interests around the land issue. While the local communities will need to be protected against the vagaries of land grabbing, the private investors on their side, will require the establishment of an arrangement that guarantees them security of tenure wherever they will have invested their resources. The lack of clarity in the existing land tenure framework militates against the objective of attracting private investors into the SVIP project area. This has to be addressed under the AgDPS to facilitate access to land for the establishment of key value chain actors such as those involved in the production of inputs, establishment of processing and marketing facilities.

## National Fertilizer Strategy

In an effort to improve the productivity and profitability of smallholder agriculture, the GoM has developed a National Fertilizer Strategy (NFS) with the purpose of addressing issues affecting the adoption and utilization of fertilizer technologies through short-medium- and long-term actions for developing private sector-led fertilizer markets. In implementing the NFS thus far, the GoM has primarily focused on the less capital- and time-intensive actions, namely: the enactment of a legal and regulatory framework; enhancing the skills and knowledge of agro-input dealers through development partner support programme collaboration; and, implementation of a subsidy programme. Given the heavy fiscal burden associated with the subsidy programme, other actions that could increase fertilizer market development have been neglected (International Fertiliser Development Center, IFDC, 2013). The AgDPS will be aligned with the NFS with a view to encouraging the use of inorganic fertilisers while being mindful of the importance of guarding against any negative impacts on the environment. Where necessary, the use of organic fertilisers will be promoted to enable the farmers in the project area to access niche markets for organically produced commodities.

## Seed Policy

The National Seed Policy was formulated in 1993 and it recognizes the contribution of good quality seed to diversification and overall agricultural production. Through the policy GoM created a conducive environment for the development of the seed industry. This policy has facilitated the establishment of strong linkages between the GoM agencies involved in research and extension and, other service providers (such as those involved in extension and commercial seed producers). The policy promotes, strengthens and supports the commercial sector while ensuring the needs of the farmers are met, satisfactorily. However, the main thrust of the Seed Policy has been overtaken by events since the onset of the democratic dispensation in Malawi in 1994. Since then the liberalization of the economy has made it possible for several new participants to enter into the seed production sector. This has resulted in several collaborative research efforts being established between the Department of Agricultural Research and private companies which seek to have their seed products released through the GoM controlled Technology Release Committee. As a result the various stakeholders involved in the seed industry including Monsanto, SeedCo and Pannar have developed their business strategies on the basis of the policy guidelines provided. However, the seed policy does not explicitly provide for linkages with the Farm Input Subsidy Programme (FISP) which commenced in 2005. Prior to 2004 the poorly resourced farmers did not receive any farm input subsidies. The recurring drought conditions require the development of new strategies to ensure the availability of seed even when other natural disasters associated with climate change are experienced. As a result, the seed that is currently available on the market is not well adapted to the changing climatic conditions. There is therefore, a need to review the current research programmes with a view to incorporating activities that address problems encountered in contemporary society. The AgDPS seeks to provide guidance on how the SVIP will contribute towards the capacity building of organisations involved in research and technology generation for the benefit of the farming communities in the lower Shire Valley. It is envisaged that this will have an impact on the work carried out by the various companies involved in seed production and multiplication.

**Cooperative Development Policy**

The Cooperative Development Policy (1997) was developed to create an enabling environment that will encourage the sustainable development of cooperatives with the ultimate aim of enhancing the economic and social well-being of the members of the societies.

When the policy document was reviewed, the following issues were identified as being of great importance to producers and traders in agriculture products:

- encourage farmers to establish cooperatives;
- encourage farmers to organize the procurement and distribution of farm inputs through cooperatives;
- encourage cooperatives to facilitate the acquisition of credit for procuring farm inputs and purchase of produce from members;
- encourage the use of market information in order to determine the best prices for commodities and inputs;
- assist cooperatives to access knowledge and skills available from various agricultural research and extension institutions in order to raise productivity;
- assist cooperatives in setting up efficient storage facilities where produce can be stored while awaiting favourable adjustments to commodity prices;
- encourage the creation of wholesale and retail market facilities;
- assist cooperatives to establish external and internal markets for their produce;
- encourage cooperatives to deliver services competitively and coordinate research and extension services;
- facilitate training of members in leadership and management;
- encourage processing of produce in order to add value and enhance prices for commodities; and,
- encourage diversification into non-traditional crops by providing information on production, processing, storage, packaging, marketing and other related value chain activities.

The AgDPS is aligned to the Cooperative Development Policy as it seeks to encourage the establishment and strengthening of farmer organizations to enable the smallholder farmers in the lower Shire Valley to play a meaningful role in the commercialization of their operations.

**Livestock Policy**

The GoM approved the Livestock Policy (2006) with the aim to increase the availability of quality livestock and livestock products by promoting local production through encouraging the enhancement of service delivery. The specific objectives of the Policy are, to:

- liberalize marketing and involvement of non-governmental organizations (NGOs) and farmer groups to facilitate capacity development in the livestock sub-sector;
- tailor the livestock development strategies to contribute towards addressing the challenges of poverty reduction and improvement of rural livelihoods in Malawi;
- coordinate and network the roles of the various stakeholders in the livestock sub-sector, and in particular the private sector (commercial producers), NGOs, farmers' associations, cooperatives and the public sector;
- prevent and control animal diseases in order to create an enabling environment for the improvement of livestock production; and,
- protect the public from zoonotic and other food-borne diseases.

The AgDPS is aligned to the Livestock Policy as it seeks to promote the production of various types of livestock in the lower Shire Valley. While it is widely acknowledged that livestock play a significant role in the farming system adopted by smallholder farmers in the lower Shire Valley, the implementation of the SVIP presents an opportunity for the commercialization of the operations with a view to improving the level of income realized by the participating farmers through value addition.

**National Water Policy**

The GoM developed the National Water Policy (2005) to guide the country in the management and development of its water resources based on the Integrated Water Resources Management (IWRM) principles, which are: improving the institutional and legal framework; ensuring sustainable delivery of water supply and sanitation services; effective involvement of the private sector; protection of the environment; and, conforming with the regional and international conventions and agreements in the management of shared water resources.

The Policy, *inter alia*, is aimed at:

- achieving sustainable and integrated water resources management and development that make water readily available and equitably accessible to all Malawians in pursuit of their socio-economic development and for environmental sustenance;
- ensuring the availability of water of acceptable quality for all the needs in Malawi;
- achieving sustainable provision of water supply and sanitation services that are equitably accessible and used by individuals and entrepreneurs for socio-economic development at affordable cost;
- promoting efficient and effective utilization, conservation and protection of water resources for sustainable agriculture and irrigation, fisheries, navigation, eco-tourism, forestry, hydro-power and disaster management and environmental protection;
- undertaking the rehabilitation, upgrading, extension and construction of water infrastructure;
- promoting international cooperation in the management of trans-boundary and cross-boundary waters without compromising the country's sovereignty, security and territorial integrity;
- dealing with challenges facing water resources management which include: the need to adopt IWRM Principles; the need to conform to current regional and international agreements and protocols on shared water resources, catchment protection and management, and water resources monitoring;
- promoting the participation of the private sector in water resources development, management and service delivery;
- strengthening and building capacity in the water sector; and,
- clarifying the roles of the Ministry for Water Affairs and other stakeholders in the water sector.

The AgDPS is aligned with the National Water Policy as it seeks to, among other things, promote efficient and effective utilization, conservation and protection of water resources for sustainable agriculture, aquaculture and irrigation development in the lower Shire Valley.

## New Alliance for Food Security and Nutrition in Malawi

The New Alliance for Food Security and Nutrition in Malawi is a mechanism through which the G8 member countries intend to provide support to the agriculture sector to accelerate implementation of the ASWAp and the Trade, Industry and Private Sector Development Sector Wide Approach (TIP SWAp). This will be accomplished through the Grow Africa platform, with the overall goal of facilitating an increase in private sector investment and up-scaling the adoption of innovations. The G8 member countries intend to engage the relevant agencies in each member state to bring to bear appropriate enabling actions to accelerate progress in the areas of: finance and markets; science and technology; and, risk management. To address the underlying causes of food insecurity, the G8 member states intend to focus key resources and other contributions on high priority, high-impact investments within the ASWAp and the TIP SWAp, particularly in the three growth product clusters identified in the National Export Strategy and in priority areas of the Scaling-up Nutrition Strategy.

The GoM has committed to consulting with the private sector on key policy decisions that may affect the private sector. The GoM intends to:

- create a competitive environment with reduced risk in doing business for private sector investments in various value chains related to food security and nutrition, while also ensuring consistency and coherence in policies;
- improve access to land, water and basic infrastructure to support food security and nutrition;
- re-organise extension services targeting nutrition, agribusiness and cooperative programmes focusing on priority crops in their primary growing areas; and
- reduce malnutrition by promoting production and utilization of diversified foods with high nutritive values.

The G8 New Alliance gives priority to maize, groundnuts, soya, sunflower, cotton, pigeon peas, sugar cane and dairy. These identified national priorities will inform the choice of enterprises that will be promoted under the SVIP. In addition, the project will also seek to provide support towards promoting the livestock sector (beef and dairy) and the fish farming industry.The AgDPS is aligned to the New Alliance for Food Security and Nutrition in Malawi as it seeks to promote an increase in private sector investment and the up-scaling of technology adoption required to facilitate the transformation of agriculture in the smallholder sector in the lower Shire Valley towards a more commercial orientation.

## Economic co-operation, regional integration and trade

Malawi continues to pursue regional integration within COMESA, SADC and the SADC-ECA-COMESA Tripartite framework. Malawi remains committed to these regional integration agreements, and continues to benefit from increased access to these regional markets. The country is a member of the Southern African Development Community (SADC) and Common Market for Eastern and Southern Africa (COMESA). It is a signatory to the COMESA Customs Union and the SADC Free Trade Area. Malawi has removed tariffs on trade with SADC member countries in line with its commitments under regional trade protocols. The exception is trade with South Africa on which 85 percent of the tariffs have been liberalised. Malawi has, among other measures, adopted a simplified tariff regime for small traders to boost regional trade. Despite the progress, non-tariff barriers (NTBs) continue to frustrate efforts at regional trade expansion. Currently, potential exporters face obstacles in trading with neighbouring countries as some agricultural crops are still subject to export bans. Additionally, stringent rules relating to phytosanitary standards act as a NTB. The frequent road blocks that transporters encounter along major transport corridors also hinder free movement of goods. All these factors add to the high cost of trade, and constitute an impediment to export diversification. Malawi has, therefore, embarked on efforts to reduce NTBs to regional trade.

As part of trade reforms, the GoM is currently developing a national NTB elimination strategy anchored on the national export strategy. At present Malawi's regional trade accounts for less than 30percent of its total external trade volume, with South Africa by far the country's largest trading partner, accounting for 70 percent of its regional trade.

Apart from market access opportunities, cooperation in the spheres of transport, energy and other economic infrastructure development initiatives provides a window for the mitigation of some of the major constraints faced by a land-locked economy. Accordingly, significant potential exists for Malawian producers to expand regional trade and exploit market opportunities created by trade liberalisation and fast growing economies in the region. As a landlocked or landlinked country, Malawi faces high transport costs which are exacerbated by delays in transit and clearance of goods at the border. Such constraints impede its external competitiveness. Malawi is developing regional transport corridors in collaboration with neighbouring countries and is also implementing regional programmes aimed at harmonising trade regimes and transit procedures. The development of the Nacala transport corridor with Mozambique (both road and rail) is expected to reduce transport costs significantly and improve connectivity to regional and global markets. In addition, the GoM is implementing trade facilitation measures within the framework of SADC and COMESA. They include establishment of one-stop border posts and a national single window. The single window aims to reduce the cost and time of trade transaction through simplification and harmonisation of documents.

The promotion of regional integration is a vital ingredient for the successful implementation of the AgDPS as it presents an opportunity for the expansion of the market available for commodities produced in the lower Shire Valley. The pursuit of the priorities set under the NES will enable the SVIP to contribute towards meeting the national objectives of promoting value addition and the overall growth in export volumes.

**Multilateral Trade Arrangements**

The GoM has signed agreements with the European Union, World Trade Organization and the United States to promote trade and development. Notable among these agreements is the Africa Growth and Opportunity Act (AGOA) which facilitates access onto the US Market. The AgDPS is aligned to these multilateral trade agreements as it is meant to capitalise on the opportunities presented by their existence which will enable the farmers to target a much wider market than is currently available in Malawi.

**Malawi-EU Partnership**

Malawi is a member of the Africa-Caribbean-Pacific (ACP) country grouping that has benefitted from the preferential access accorded some selected commodities to the EU market under the Lomé Convention and its successor, the Cotonou Agreement, which was signed in June 2000. These agreements have provided these developing countries with vital access to markets in Europe for their agricultural and other exports. At the Doha Ministerial Conference in November 2001, WTO member states agreed to grant a waiver to parties to the Cotonou Agreement from the obligations under Article 1.1 of the General Agreement on Tariffs and Trade (GATT) 1994 most-favoured-nation status (MFN) for a period up to 31 December 2007. Thereafter, new trade compatible trading arrangements will need to be concluded to progressively remove barriers between the parties and enhance cooperation in all areas relevant to trade, including the formation of Free Trade Areas (FTAs), within a transitional period. Accordingly, it was decided that from September 2002, the EU would enter into negotiations with ACP countries to establish Economic Partnership Agreements (EPAs) on a bilateral basis or with regional groupings, to commence by January 2008. The EPAs involve the establishment of reciprocal market access into the ACP countries for the EU, with a possible transition period of 10–12 years for phasing out barriers between the parties (in

accordance with Article XXIV of the GATT 1994). Other trade-related elements will also be included in the EPAs.

Not all ACP countries have opened the duty-free markets to EU products after 2008. Some least developed countries, including Malawi, have continued to benefit from either the cooperation arrangements under Lomé or the "Everything-But-Arms" regulation. Non-LDCs, on the other hand, who are not in a position to enter into EPAs can benefit from the provisions under the EU's Generalized System of Preferences (GSP), or the Special Incentive Arrangement for Sustainable Development and Good Governance (GSP+).

**Malawi and the World Trade Organization**

Malawi is a member of the World Trade Organization (WTO) and the GoM has signed the relevant agreements. Through these agreements WTO members operate a non-discriminatory trading system that spells out their rights and their obligations. Each country receives guarantees that its exports will be treated fairly and consistently in other countries' markets. Each promises to do the same for imports into its own market. The system also gives developing countries some flexibility in implementing their commitments. The WTO deals with the global rules of trade between nations. Its main function is to ensure that trade flows as smoothly, predictably and freely as possible.

The fundamental principles which are the foundation of the multilateral trading system are MFN and National Treatment (NT). The MFN entails equal treatment. Hence, under the WTO agreements, countries cannot normally discriminate between their trading partners. In the event that a country chooses to grant another a special favour (such as a lower Customs Duty rate for one of their products) it has an obligation to extend the same favour to all other WTO members. The NT requires that imported and locally-produced goods should be treated equally — at least after the foreign goods have entered the market. The same should apply to foreign and domestic services, and to foreign and local trademarks, copyrights and patents. This principle of "national treatment" (giving others the same treatment as one's own nationals) is also found in all the three main WTO agreements (Article 3 of GATT, Article 17 of GATS and Article 3 of Trade-related Aspects of Intellectual Property Rights (TRIPS), although once again the principle is handled slightly differently in each of these. The NT only applies once a product, service or item of intellectual property has entered the market. Therefore, charging Customs Duty on an import is not a violation of national treatment even if locally-produced products are not charged an equivalent tax.

**Malawi and the African Growth and Opportunity Act**

The AGOA is a United States Trade Act, enacted on 18 May 2000 to enhance market access to the US for qualifying Sub-Saharan African (SSA) countries including Malawi. The AGOA builds on existing US trade programmes by expanding the benefits (duty-free) previously available only under the country's GSP programme. Duty-free access to the U.S. market under the combined AGOA/GSP programme stands at approximately 7,000 product tariff lines, including the roughly 1,800 tariff lines that were added by the AGOA legislation. Notably, these newly added "AGOA products" include items such as apparel and footwear, wine, certain motor vehicle components, a variety of agricultural products, chemicals, steel and many others. After completing its initial 15 year period of validity, the AGOA legislation was extended on 29 June 2015 by a further 10 years, to 2025.

The regional and multilateral trade arrangements discussed in this section highlight the opportunities that could be exploited by various interest groups in the development of the lower Shire Valley once project implementation commences. While it is commendable that a comprehensive policy framework has been developed by the GoM to support agricultural development in the country as a whole, it is worth noting that further efforts are required to

achieve harmonisation in policy implementation. Of particular concern at the moment is the lack of clarity on how private investors can access land in the project area without upsetting the local inhabitants who have, in the past, been adversely affected when their lands where expropriated to create room for the establishment of large scale sugar plantations. The AgDPS is intended to provide the necessary guidance in this regard to ensure the successful implementation of the SVIP.

## 2.2. Overview of crop production

Malawi has a total land area of 9.4 million ha and an additional 2.4 million ha covered by the waters of Lake Malawi and other smaller surface water bodies. The total population is currently estimated at 17 million people, 90 percent of whom live in the rural areas (National Statistical Office, 2008). The agricultural sector is divided into two main sub-sectors, namely: the relatively large scale, modern estates, located in high potential areas and primarily engaged in the production of export crops; and, smallholder farms operating on customary land or leasehold estates, engaged in small scale mainly subsistence, rain-fed farming.

It is estimated that of the 5.3 million ha that are arable, 3.7 million ha (70 percent of the land) are cultivated by smallholder farmers, engaged mainly in subsistence farming. Maize, cassava and rice are the major food crops and tobacco (particularly burley) is the major cash crop accounting for nearly 43 percent of the country's export earnings. Food crops that are grown in the country include: millet, potatoes, pulses, sorghum, sweet potatoes and various types of fruit trees. Other important cash crops grown in the country include: cotton, sugar cane, tea, and tree nuts such as macadamia. The crops grown are mainly rain-fed with a small proportion of the agricultural land benefiting from the advances in irrigation practices[1].

Landholdings used for crop production are generally small and densely populated, particularly in the southern and central regions. About 85 percent of all households are involved in agriculture and 95 percent of rural households are engaged in small scale farming carried out on landholdings ranging in size from 0.5 to 0.8 ha. The agricultural sector grew by an annual rate of 5.1 percent between 1994 and 2014 compared to only 4.1 percent per annum between 1970 and 1993. The improvement in the economic growth rate was attributed to an increased use of fertilizers and improved seed varieties both of which were promoted under the Farm Input Subsidy Programme (FISP).

### 2.2.1. National context

Malawi has a maize based cropping system with the crop being the staple food for the majority of the population in most parts of the country. Maize is normally intercropped with beans and pigeon peas and it has been reported that about 31 percent of plots are intercropped (Integrated Household Survey, 2012). Due to the relatively small land holding very little crop rotation is practiced. Smallholder farmers encounter several problems and crop productivity is relatively low. Crop production is also characterised by:

- lack of mechanization;
- little focus on high value crops even where irrigation schemes have been developed;
- poor selection of crop enterprises resulting in low overall returns; and,
- low productivity (even on irrigation schemes).

The low proportion of high value crops in the cropping programmes adopted on most irrigation schemes is blamed for the viability problems encountered and the subsequent failure of most of these schemes.

[1] www.wfp.org/countries/malawi

#### 2.2.1.1. Constraints to smallholder crop production

Despite the gains recorded under the FISP the smallholder farmer in Malawi is still faced with an array of constraints, including socio-economic, biological and physical constraints, the major ones being:

- erratic rainfall patterns and recurrent droughts;
- inadequate incentives and support to produce crop surpluses;
- low and declining productivity on the dryland areas;
- lack of capital to purchase inputs and farm implements;
- high cost of credit due to the perceived high risk associated with the sector;
- relatively poor marketing channels and marketing information systems;
- inadequate extension advice;
- inadequate supply of seeds of improved varieties;
- high cost of inputs (the FISP only supplies fertilizers and seeds);
- inadequate village-level storage and processing facilities;
- poor road infrastructure;
- lack of investment to support the development of marketing infrastructure;
- inadequate support in water management and participatory methodologies; and,
- inadequate logistical and financial support.

It has been postulated that crop productivity improvements can be realised by addressing the above constraints through the adoption of the following strategies:

- good crop husbandry practices – use of improved seeds, inorganic fertilizers, pesticides, and related inputs;
- providing adequate overall investment support;
- crop diversification and adoption of appropriate rotation patterns;
- adoption of good land husbandry, and;
- use of irrigation water either as a supplement or for applying full irrigation.

#### 2.2.1.2. Cropped area, production and productivity at national level

The analysis of cropped area, production and productivity is based on agricultural production estimates made by the MoAIWD for the 2010/11 to 2014/15 agricultural seasons. A total of thirteen crops that are commonly grown by smallholder farmers under rain-fed conditions are covered in this analysis. The analysis also assesses the cropped area and production segregated by Region and the Agricultural Development Divisions (ADD).

Table 2.1 presents the thirteen crops and the area established under each crop over a period of five seasons. The total area under the thirteen crops is estimated at 3.3 million ha. The dominance of maize in the farming system is clearly illustrated by the fact that it covers about 45 percent of the area allocated to the thirteen crops. This is followed by groundnuts, beans (*P. vulgaris* L.), pigeon pea and cassava which are cultivated on 10.3, 7.5, 6.5 and 6.4 percent of the cultivated land respectively. A comparison of the area under the main food crops (maize, sorghum, millets and cassava) and the other crops which are mainly grown as cash crops shows that food crops occupy 55.5 percent of the area. This clearly indicates that the farming system is food based with a focus on meeting subsistence requirements.

***Table 2-1: Crop area established by smallholder farmers under rain-fed conditions***

| Crop | Total crop area by agricultural seasons (ha) | | | | | Mean (ha) | Percent of total area (%) |
|---|---|---|---|---|---|---|---|
| | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | | |
| Maize | 1,500,549 | 1,497,829 | 1,438,529 | 1,461,760 | 1,455,094 | 1,470,752 | 44.9 |
| Rice | 57,665 | 55,889 | 61,311 | 62,985 | 61,187 | 59,807 | 1.8 |
| Groundnuts | 290,907 | 336,577 | 345,567 | 359,444 | 359,975 | 338,494 | 10.3 |
| Tobacco | 162,714 | 71,249 | 110,006 | 122,515 | 115,163 | 116,329 | 3.6 |
| Cotton | 59,616 | 250,388 | 183,848 | 148,900 | 122,620 | 153,074 | 4.7 |
| Sorghum | 89,602 | 79,780 | 89,355 | 92,077 | 93,858 | 88,934 | 2.7 |
| Millets | 46,351 | 45,158 | 48,756 | 49,598 | 50,407 | 48,054 | 1.5 |
| Beans | 232,638 | 243,611 | 238,452 | 249,066 | 268,877 | 246,528 | 7.5 |
| Pigeon pea | 196,516 | 203,369 | 217,000 | 22,3151 | 228,738 | 213,754 | 6.5 |
| Cowpeas | 64,103 | 61,618 | 67,154 | 70,044 | 73,477 | 67,279 | 2.1 |
| Soya beans | 70,955 | 97,430 | 108,490 | 115,935 | 135,741 | 105,710 | 3.2 |
| Cassava | 197,732 | 207,008 | 208,615 | 213,815 | 220,500 | 209,534 | 6.4 |
| Sweet potato | 140,599 | 150,617 | 154,617 | 162,429 | 172,454 | 156,143 | 4.8 |

***Source:*** *MoAIWD, Agricultural Productivity Estimates and PwC analysis*

Table 2.2 presents the area cultivated under the thirteen main crops in the different ADDs and Regions. The Central and Southern Regions have the largest area under cultivation. Area under maize in the North, Central and South Regions is about 13, 45 and 42 percent respectively.

***Table 2-2: Total area planted to the 13 main crops in the different Regions and ADDs***

| Region/ ADD | Total crop area planted under the 13 main crops by region, ADD and season (ha) | | | | | Mean area (ha) | Percent of total area (%) |
|---|---|---|---|---|---|---|---|
| | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | | |
| **North** | **423,547** | **442,175** | **430,210** | **445,002** | **446,328** | **437,452** | **13.4** |
| Karonga | 110,206 | 124,029 | 128,027 | 133724 | 132,656 | 125,728 | 3.9 |
| Mzuzu | 313,341 | 318,146 | 302,183 | 311,278 | 313,672 | 311,724 | 9.6 |
| | | | | | | | |
| **Central** | **1,406,290** | **1,473,128** | **1,449,214** | **1,487,358** | **1,512,797** | **1,465,757** | **45.0** |
| Kasungu | 610,844 | 624,544 | 614,203 | 631,662 | 652,584 | 626,767 | 19.3 |
| Salima | 129,683 | 156,877 | 150,985 | 147,657 | 144,177 | 145,876 | 4.5 |
| Lilongwe | 665,763 | 691,707 | 684,026 | 708,039 | 716,036 | 693,114 | 21.3 |
| | | | | | | | |
| **South** | **1,278,014** | **1,367,222** | **1,312,276** | **1,399,359** | **1,398,966** | **1,351,167** | **41.5** |
| Machinga | 529,591 | 581,340 | 509,128 | 580,374 | 576,090 | 555,305 | 17.1 |
| Blantyre | 588,498 | 608,992 | 630,786 | 644,728 | 645,685 | 623,738 | 19.2 |
| Shire Valley | 159,925 | 176,890 | 172,362 | 174,257 | 177,191 | 172,125 | 5.3 |

***Source:*** *MoAIWD, Agricultural Productivity Estimates and PwC analysis*

Table 2.3 presents production of the major crop, maize, in the different ADDs and Regions. Maize production averaged over the five seasons is about 2.9 million MT and the Central Region produces most of the maize grown in the country followed by the Southern Region. As

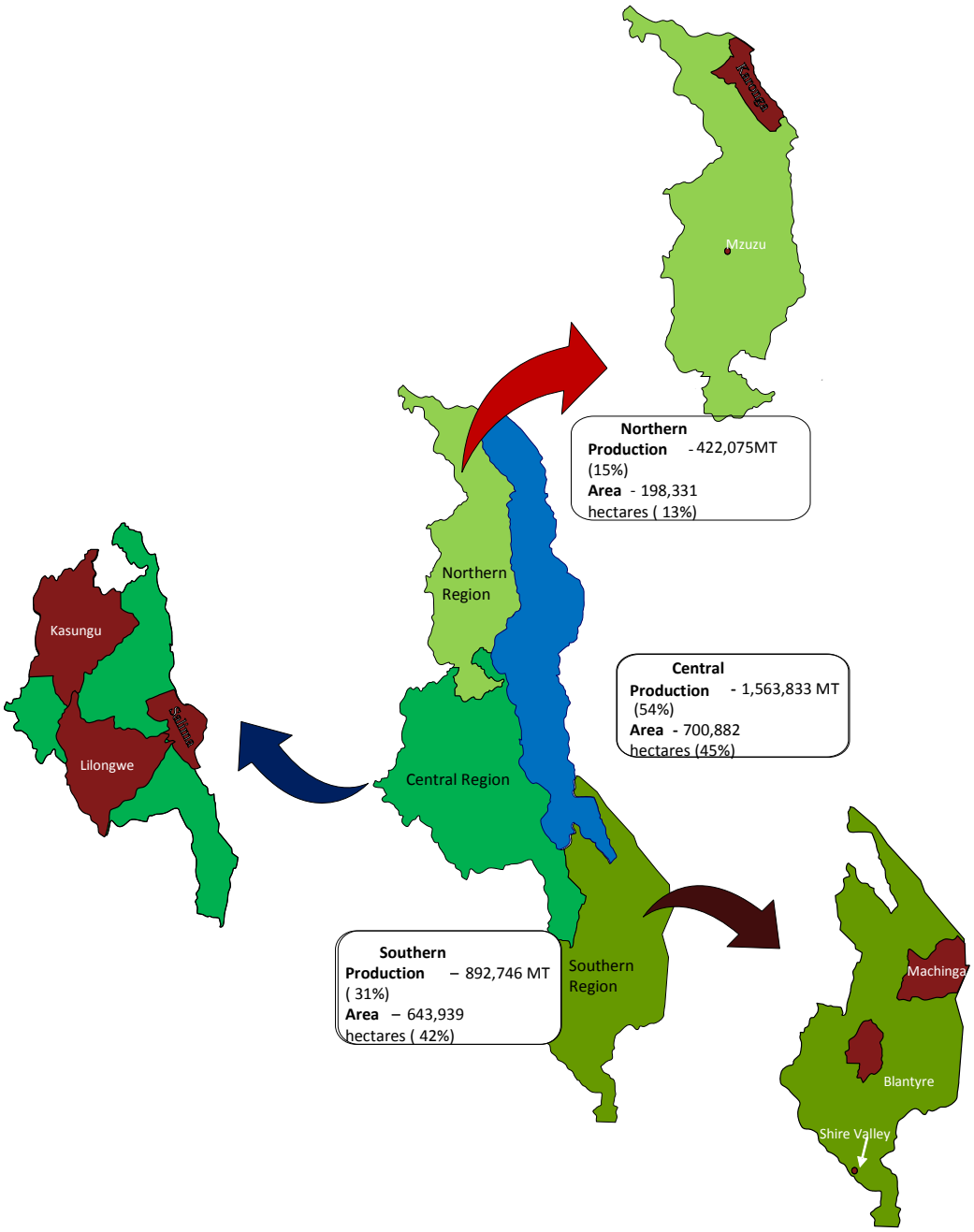
a proportion of the whole country, the Shire Valley ADD produces the least amount of maize, 5.6 percent and 18.2 percent of production in the Southern Region.

***Table 2-3: Maize production at national level in the different ADDs and Regions over a five year period***

| ADD/Region | Annual production by season in MT | | | | | Mean (MT) | % of total production |
|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | | |
| **North** | **495,024** | **471,933** | **391,308** | **426,089** | **326,020** | **422,075** | **14.7** |
| Karonga | 137,578 | 127,381 | 145,047 | 132,030 | 119,772 | | |
| Mzuzu | 357,446 | 344,552 | 246,261 | 294,059 | 206,248 | | |
| | | | | | | | |
| **Central** | **1,745,512** | **1,678,047** | **1,498,144** | **1,683,503** | **1,213,960** | **1,563,833** | **54.3** |
| Kasungu | 804,331 | 814,454 | 636,806 | 735,673 | 524,618 | | |
| Salima | 157,168 | 124,322 | 128,129 | 170,419 | 111,298 | | |
| Lilongwe | 784,013 | 739,271 | 733,209 | 777,411 | 578,044 | | |
| | | | | | | | |
| **South** | **952,808** | **756,012** | **1,030,268** | **1,104,813** | **619,827** | **892,746** | **31.0** |
| Machinga | 382,004 | 296,374 | 379,462 | 437,496 | 203,618 | | |
| Blantyre | 542,210 | 438,895 | 617,310 | 618,393 | 385,777 | | |
| Shire Valley | 28,594 | 20,743 | 33,496 | 48,924 | 30,432 | | 5.6 |

***Source:*** *MoAIWD, Agricultural Productivity Estimates and PwC analysis*

The area under maize and estimated production figures for the different Regions are also presented diagrammatically in Figure 2.6.




***Source:*** *MoAIWD, Agricultural Productivity Estimates (2010/11 to 2014/15) and PwC analysis*

***Figure 2:6: Major maize producing areas***

Table 2.4 presents the yield level estimates for the thirteen major crops grown under rain-fed smallholder farming conditions from 2010/11 to 2014/15 agricultural seasons. It is apparent that for all these crops there has been a stagnation of yield levels attained over the five year period. The reported yields are still much lower than the potential yields implying that there has been little adoption of improved technologies despite the availability of improved maize seed varieties and fertilizers provided under the government sponsored FISP.

***Table 2-4: Productivity trends recorded for the major crops grown under rain-fed conditions***

| Crop | Crop yield estimates by season (t/ha) | | | | | Mean yield (t/ha) |
|---|---|---|---|---|---|---|
| | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | |
| Maize | 2.13 | 1.94 | 2.03 | 2.20 | 1.48 | 1.96 |
| Rice | 1.77 | 1.69 | 1.79 | 1.82 | 1.53 | 1.72 |
| Groundnuts | 1.05 | 1.03 | 1.05 | 1.06 | 0.79 | 1.00 |
| Tobacco | 1.08 | 1.02 | 1.07 | 1.13 | 1.00 | 1.06 |
| Cotton | 0.88 | 0.87 | 0.86 | 0.89 | 0.64 | 0.83 |
| Sorghum | 0.82 | 0.85 | 0.96 | 1.01 | 0.85 | 0.90 |
| Millets | 0.71 | 0.74 | 0.81 | 0.85 | 0.66 | 0.75 |
| Beans | 0.53 | 0.52 | 0.54 | 0.54 | 0.50 | 0.53 |
| Pigeon pea | 1.12 | 1.17 | 1.33 | 1.43 | 1.46 | 1.30 |
| Cowpeas | 0.45 | 0.41 | 0.47 | 0.48 | 0.42 | 0.45 |
| Soya beans | 0.98 | 1.00 | 1.01 | 1.07 | 0.87 | 0.99 |
| Cassava | 21.54 | 22.13 | 22.78 | 23.56 | 22.48 | 22.50 |
| Sweet potato | 17.34 | 17.70 | 18.10 | 18.73 | 17.86 | 17.95 |

***Source:*** *MoAIWD, Agricultural Productivity Estimates and PwC analysis*

### 2.2.1.3. Crop productivity on irrigation schemes

The major crops grown under rain-fed and irrigation conditions by smallholder farmers across the country are maize, rice and beans. Table 2.5 presents yield estimates for maize, rice and beans under rain-fed and irrigated conditions reported for the agricultural seasons 2008/09 to 2014/15. The reported yields show that the use of irrigation technology contributed to an increase in yields for maize, rice and bean crops estimated at 49, 122 and 67 percent respectively.

***Table 2-5: Maize, rice and bean yields under rain-fed and irrigated conditions***

| Crop | Yield attained by agricultural season (t/ha) | | | | | | | Average yield (t/ha) |
|---|---|---|---|---|---|---|---|---|
| | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | |
| **Rainfed** | | | | | | | | |
| Maize | 2.20 | 1.87 | 2.13 | 1.94 | 2.03 | 2.20 | 1.48 | 1.98 |
| Rice | 2.31 | 1.72 | 1.77 | 1.69 | 1.79 | 1.82 | 1.53 | 1.80 |
| Beans | 0.69 | 0.46 | 0.53 | 0.52 | 0.54 | 0.54 | 0.50 | 0.52 |
| **Irrigated** | | | | | | | | |
| Maize | 2.98 | 2.83 | 2.89 | 2.96 | 2.99 | 3.10 | 2.91 | 2.95 |
| Rice | 4.36 | 4.13 | 3.99 | 3.72 | 3.94 | 3.96 | 3.83 | 3.99 |
| Beans | 0.85 | 0.80 | 0.82 | 0.86 | 0.92 | 0.93 | 0.90 | 0.87 |

***Source:*** *MoAIWD, Agricultural Productivity Estimates and PwC analysis*

However, a comparison of the crop yields for irrigated and the potential yields shows that even under irrigation the smallholder farmers are still far from attaining the potential yields. According to the Guide to Agricultural Production and Natural Resources Management handbook the potential yields of medium maturity high breed maize, rice and beans are 8.0, 6.0 and 2.5 t/ha respectively (MoAIWD, 2012).

The figures presented in Table 2.5 show that, generally the farmers cultivating on smallholder irrigation schemes have failed to realise significant improvements in yields to close the gap between those attained for irrigated crops compared to the potential yields as determined by the various seed manufacturers. This gap in yield achievement suggests that there is huge scope for improvement in productivity in Malawi for most of the major crops grown.

The major characteristics of smallholder irrigation schemes in Malawi are that the crops grown are of low value and show a seasonal production pattern. The focus is mainly on maize, tomatoes, onions and cabbages with very little produced for the export market except for a limited quantity of rice. Typically, for a short spell during the year tomatoes, onions and cabbages are observed to flood the local market leading to a significant drop in prices. There are very few, if any crops, grown for the high value export market. Generally, the quality of the crop produce is poor and as a result cannot access the more lucrative marketing outlets. Concomitantly the viability of most irrigation schemes is weak.

The preliminary report on the views expressed by stakeholder representatives in the lower Shire Valley states that the District Irrigation Officers estimate that the failure rate of smallholder irrigation schemes is about 60 percent (COWI, 2016). It was also reported that nine irrigation schemes constructed under the Smallholder Irrigation Project failed. The reason given for the failure of these schemes is that they were using motorized diesel pumps for irrigation. What this suggests is that the income realised from the crops grown on these schemes is not adequate to meet the cost of running and maintaining the motorized diesel pumps.

The lessons learnt from these observations points to the need for stronger extension and other support services if the SVIP is to perform any better than the existing irrigation schemes. This would be required to facilitate the selection and inclusion of higher value crops in the cropping programmes as well as the adoption of better farming methods.

#### 2.2.1.4. Irrigation sub-sector

The irrigation sector, a sub-sector of the agricultural sector, falls under the jurisdiction of the Department of Irrigation (DoI) in the Ministry of Agriculture, Irrigation and Water Development (MoAIWD). The history of irrigation in Malawi dates back to the 1930's when the tea estates in the Shire Highlands first began irrigation operations. This was further boosted in the 1960's and 1970's by the establishment of smallholder schemes (funded by the GoM and its development partners) and, the development of commercial irrigated sugar cane estates in the lower Shire Valley. The farming operations pursued on the smallholder schemes tend to be mainly focussed on the production of maize, rice and a variety of vegetable crops.

The total land area with good potential for irrigation development has been estimated at 408,000ha, located largely in the south of the country including the lower Shire Valley (NIP, 2016). At present, the total area developed for irrigated crop production in the country (mainly under sugar cane estates and rice schemes) is estimated at 104,634ha representing 25 percent of the potential area. The smallholder agricultural sub-sector is characterised by: a focus on subsistence farming; low productivity levels; and, a high vulnerability to recurring droughts, crop and livestock diseases.

The National Irrigation Policy (2016), provides a clear statement of the Government's aspirations of developing the irrigation sector and attaining its development objectives. It also emphasizes the importance of: incorporating irrigation for both food and commercial purposes; provides for the establishment of an Irrigation Fund; and, for developing linkages with other partners. The policy strives to ensure that the environment is given due consideration in all irrigation development and management as provided for in the Environmental Impact Assessment Guidelines for Irrigation and Drainage Projects (2002). The overall NIP goal is to contribute to sustainable national economic growth and development through enhanced irrigated agricultural production and productivity.

In this regard the policy objectives are, to:

- increase land under sustainable irrigation farming;
- facilitate crop diversification and intensification;
- create an enabling environment for irrigated agriculture;
- optimize investment in irrigation development taking into account climate change;
- enhance capacity for irrigated agriculture; and,
- promote a business culture in the small-scale irrigated agricultural sector.

In order to achieve these objectives the policy focusses on three priority areas, namely: sustainable irrigation development; sustainable irrigation management; and, capacity building. The DoI is implementing a number of strategies, in each of the identified priority areas, namely:

- Sustainable irrigation development, entails carrying out the following:

    - providing support and encouraging the mobilisation of financial resources for irrigation development through arrangements such as the irrigation levy, public-private partnerships (PPPs) and matching grants;
    - facilitating the establishment of the Malawi Irrigation Board that shall advise Government and stakeholders on policy matters relating to irrigation and drainage;
    - facilitating the establishment and operationalisation of the Irrigation Fund to finance irrigation development projects;
    - providing support towards the implementation of the Irrigation Master Plan and Investment Framework (IMPIF);
    - providing support and encouraging the application of environmental and social impact assessments and implementation of environmental management plans as provided for in the Environmental Management Act;
    - facilitating in a coordinated manner, the formalisation of land tenure rights that will ensure tenure security and minimise resettlement;
    - supporting and encouraging the private sector, civil society organisations (CSOs) and beneficiary community participation in irrigation development through provision of irrigation development support and extension services in such areas as feasibility studies, design and construction; and
    - facilitating the development of water resources for sustaining water availability throughout the irrigation season.

- Sustainable irrigation management, entails carrying out the following:

    - encouraging the adoption of catchment management practices for the benefit of irrigation and non-irrigation communities;
    - developing farmer organisations through technical and administrative empowerment to ensure effective community participation;

- exploring alternatives to handling and marketing of farmers' produce for maximum profitability of irrigated crops;
- facilitating in a coordinated manner, the formalisation of land tenure rights that will ensure tenure security;
- strengthening extension services for irrigated agriculture through awareness and outreach of irrigation technologies; and,
- supporting beneficiary communities where major rehabilitation, upgrading or modernisation of irrigation infrastructure are required.

- Capacity development entails carrying out the following:

  - developing and improving training programmes (including on-the-job) to address capacity gaps in the public and private institutions including training institutions;
  - developing irrigation standards, code of practice and irrigation development guidelines and ensuring that these are adhered to by all irrigation stakeholders;
  - ensuring that there is greater presence of irrigation experts at district or lower levels;
  - developing and adapting irrigation technologies and best practice taking into account the financial beneficiary limitations and disseminating through a robust extension system;
  - encouraging irrigation stakeholders to acquire the necessary equipment, plant and irrigation technologies;
  - encouraging the registration of irrigation service providers (i.e. consultants and contractors) with relevant professional bodies such as the National Construction Industry Council (NCIC); and,
  - facilitating farmer training programmes so as to transform the mind-set of farmers from subsistence to commercial irrigation.

Funding to support irrigation development in Malawi has been provided through assistance received from a number of major development partners, including: African Development Bank (AfDB), Danish International Development Agency (DANIDA), UK's Department of International Development (DfID), Food and Agricultural Organisation (FAO), International Fund for Agricultural Development (IFAD), Japanese International Cooperation Agency (JICA); and the World Bank.

### 2.2.2. Crop production in the lower Shire Valley

The lower Shire Valley is largely occupied by smallholder subsistence farmers who engage in the production of both crops and livestock. The main crop grown is maize and this dominates the farming system. It is cultivated twice per year by families living close to the Shire River and once, annually by those living further away from the river or on the upland areas. Communities residing along the river also plant maize after the main rainy season taking advantage of the residual moisture left by the receding waters of the Shire and other rivers (such as the Mwanza). While the floods tend to have a devastating immediate impact on the project area including the loss of human lives, livestock and crops, the residual moisture allows the smallholder farmers to establish more crops during the months following the main rain season. Due to the increasing incidence of flooding during the main rain season, most farmers now rely more on the residual moisture to sustain their crop production activities. This also enables them to benefit from the floods which also deposit additional nutrients eroded from the upland regions thus reducing the need for additional fertilizers required to maintain soil fertility.

Maize is the main staple in Malawi but in the lower Shire Valley sorghum and millets are also grown as food crops. Other common crops grown in the area include: cotton, rice, pulses, groundnuts, sweet potatoes, sesame, and cassava. Fruit trees such as mangoes and bananas

are often found scattered around homesteads and vegetables such as cabbages and tomatoes are grown on irrigated gardens established on the banks of the major rivers or their tributaries.

Pulses are also widely grown, with pigeon peas and cowpeas as the most preferred crop types. Cotton is generally the major cash crop among the smallholder farmers unlike in other parts of Malawi where tobacco dominates. Sorghum is mainly grown as a food crop but is also used as a cash crop and the lower Shire Valley produces most of the sorghum grown in Malawi.

**Subsistence rain-fed crop production** in the lower Shire Valley is characterized by fragmented small land holdings, continuous cultivation of crops particularly maize on the same land without adding organic or inorganic fertilizers, low productivity, and high dependence on rainfall. However, farmers use two sources of water: direct rainfall and the residual moisture following the regular flooding of the Shire and other rivers, which allows a second maize crop to be grown on strips of land along the river banks.

#### 2.2.2.1. Land holding and area under different crops

On average arable land holdings in Malawi range from 0.5 to 0.8 ha per household. The Report on Land Tenure Diagnostic, Allocation and Consolidation Strategy for the SVIP (COWI, 2016) reported an average land holding in the project area of about 2 ha per household. This land holding is split into three plots covering on average 0.58 ha each. About 81 percent of the land holdings are controlled by men and 15 percent by women while 4 percent is said to be jointly owned.

Table 2.6 presents the area put to different crops in the lower Shire Valley under rain-fed conditions during the past 5 years. In every year, among the food crops, the area put under maize was the largest and ranged from 17.9 percent in 2011/12 to 24.9 percent in 2015/16. Nationally maize is grown on two-thirds of the country's arable land. In 2011/12 and 2012/13 cotton occupied the largest area, 39.8 and 26.1 percent respectively, but has since dropped to 11.3 percent in 2015/16. This has led to a drastic fall in cotton production in the lower Shire Valley. In every year, except 2011/12, the area put to the main food crops (maize, sorghum and millet) was above 50 percent. In 2011/12 the other crops that are grown mainly for cash accounted for 59.6 percent and cotton alone was 39.8 percent.

These figures illustrate that farming in the lower Shire Valley is currently mainly subsistence and targeted towards food production. The decline in cotton production has been attributed to the low prices on both the local and international markets and farmers not respecting the contract farming arrangements resulting in the reluctance by banks and agribusiness firms to fund cotton production. Among the cash crops the area established to pigeon pea is on the increase. The area planted to sorghum is also on the increase as the crop is increasingly used as both a food and cash crop. The area planted to groundnuts is very small constituting only 1.9 percent of the total area on average, and this is attributed to the dominance of heavy soils in the project area that make it difficult to lift the crop at harvesting time.

#### 2.2.2.2. Crop management

Farming in the lower Shire Valley and indeed in the whole country is dominated by smallholder farmers who comprise over 90 percent of the agricultural sector and operate under a low-input rain-fed system. It has been reported that due to uncertain rainfall patterns farmers choose to adopt low-input, low-returns farming practices to minimize their exposure to risk (Tchale, 2009). The low-input, low-returns activities include the use of unimproved seed and applying low levels of bought-in inorganic fertilisers. However, it has been proved beyond doubt that the use of improved seed significantly improves technical efficiency, such

that farmers who plant improved seed gain, on average 9 percent higher efficiency than those who do not (Tchale, 2009).

***Table 2-6: Crop area established in the lower Shire Valley under rain-fed conditions (2011/12 to 2015/16 seasons)***

| Crop | Crop area established by season in the lower Shire Valley under rain-fed conditions ('000ha) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2011/12 | | 2012/13 | | 2013/14 | | 2014/15 | | 2015/16 | |
| | Area (ha) | % of total | Area | % of total | Area | % of total | Area | % of total | Area | % of total |
| Maize | 31.89 | 17.9 | 36.13 | 20.7 | 40.21 | 22.7 | 37.29 | 21.6 | 42.02 | 24.9 |
| Sorghum | 23.25 | 13.0 | 31.45 | 18.0 | 33.33 | 18.8 | 33.57 | 19.4 | 37.38 | 22.1 |
| Millets | 16.91 | 9.5 | 22.22 | 12.7 | 22.73 | 12.8 | 23.27 | 13.5 | 25.25 | 14.9 |
| Rice | 4.69 | 2.6 | 4.74 | 2.7 | 5.48 | 3.1 | 5.92 | 3.4 | 4.23 | 2.5 |
| Groundnuts | 2.73 | 1.5 | 3.07 | 1.8 | 3.59 | 2.0 | 3.59 | 2.1 | 3.74 | 2.2 |
| Cotton | 70.98 | 39.8 | 45.60 | 26.1 | 38.45 | 21.7 | 35.88 | 20.8 | 19.06 | 11.3 |
| Pigeon peas | 11.69 | 6.6 | 12.16 | 7.0 | 12.19 | 6.9 | 12.56 | 7.3 | 13.13 | 7.8 |
| Cowpeas | 10.32 | 5.8 | 12.18 | 7.0 | 12.91 | 7.3 | 12.74 | 7.4 | 12.93 | 7.7 |
| Sesame | 1.75 | 1.0 | 2.35 | 1.3 | 2.87 | 1.6 | 3.06 | 1.8 | 7.15 | 4.2 |
| Cassava | 1.35 | 0.8 | 1.49 | 0.9 | 1.35 | 0.8 | 1.29 | 0.8 | 1.17 | 0.7 |
| Sweet potato | 2.64 | 1.5 | 3.28 | 1.9 | 4.01 | 2.3 | 3.62 | 2.1 | 2.98 | 1.8 |
| **Total** | **178.19** | **100** | **174.66** | **100** | **177.12** | **100** | **172.77** | **100** | **169.05** | **100** |

***Source:*** *MoAIWD: Agricultural Production Estimates*

Given that land holding sizes are unlikely to increase due to the finite nature of the available land resources, the only plausible way to improve agricultural production is to enhance efficiency through the use of improved crop varieties, application of appropriate fertilizers at the right rates, adoption of appropriate pest management and weed control measures. Several studies carried out in Malawi have shown a positive relationship between technology adoption (e.g. the use of fertilizers) and land sizes among smallholder farmers. There have been several efforts by government to promote the adoption of fertilizers, hybrid seed varieties and other modern methods of farming as well as the provision of price incentives through progressive market reforms.

Despite all these measures, government and NGO initiatives, the methods of cultivation used remain largely traditional and non-mechanised. Fertilizer use (as reflected in terms of kilograms applied per hectare of arable land) in Malawi was 39.9kg in 2012. Its highest value over the past 10 years was 41.7kg in 2007, while its lowest value was 29.5kg in 2011 (www.indexmundi.com, FAO). By comparison, while the 10 year mean application rate for Malawi was 37.5 kg/ha for South Africa, India and Brazil it was 58kg/ha, 158kg/ha and 176 kg/ha respectively. However the mean for Malawi is comparable to its regional neighbours Zimbabwe (at 37 kg/ha) and lower than for Zambia (at 42 kg/ha). Although comparative figures are not available for the lower Shire Valley it is most likely that they will be much lower given the general trend of attaining low yield levels that is prevalent in the project area.

Cash constraints and high prices for improved maize seed and fertilizer are some of the factors limiting the adoption of improved crop management technologies, and these continue to be a challenge for sustainable intensification of crop production in Malawi as a whole.

### 2.2.2.3. Yield analysis of current smallholder crops

The major limiting factors to crop production in the lower Shire Valley are the high temperatures (up to a maximum of 40 $^{o}$C in November) and the unreliable rainfall pattern (ranging from 170 to 968 mm per year) resulting in low crop water availability. Although farmers grow some drought-resistant crops such as sorghum, millets and cotton which can withstand climate variability due to droughts and floods, the farming system's dependence on rainfall means that it remains vulnerable to variations in weather patterns. As a result crop

productivity is well below the potential of the area, in the absence of irrigation facilities. The gap between potential and actual average farm crop yields suggests a huge scope for improvement in productivity and it is envisaged that the development of irrigation under the SVIP will facilitate the bridging of the gap.

Table 2.7 presents the yields of crops that are currently grown in the lower Shire Valley under rain-fed and irrigated conditions. Sugar cane is a major crop grown on a large scale but the Shire Valley ADD does not report on sugar cane yields. In Dwangwa smallholder sugar cane growers achieve yields of between 95 and 120t/ha.

***Table 2-7: Yields of irrigated and dryland crops grown in the lower Shire Valley***

| **Irrigated** | **Average yield in t/ha (2010 to 2015)** | **Rain-fed** | **Average yield in t/ha (2010 to 2015)** |
|---|---|---|---|
| Bananas | 14.6 | Cassava | 14.7 |
| Beans | 1.0 | Cotton | 0.9 |
| Cabbage | 15.2 | Cowpeas | 0.4 |
| Hybrid maize | 2.8 | Green gram | 0.4 |
| Mangoes (t/tree) | 0.9 | Ground beans | 0.3 |
| Onion | 17.3 | Groundnuts | 0.5 |
| Oranges (t/tree) | 0.4 | Paprika | 0.5 |
| Pawpaw | 0.1 | Pigeon pea | 0.9 |
| Rice | 2.9 | Sesame | 0.3 |
| Sweet potato | 15.8 | Sorghum | 0.8 |
| Tomato | 19.8 | Sweet potato | 11.8 |

***Sources:*** *Shire Valley ADD annual crop yield estimates*

Crop yields as reported by the Shire Valley ADD are generally lower than what could be expected under large scale commercial production. The dryland crop yields reported can easily be doubled or trebled under irrigation.

It is important to note that although crop productivity is low, farmers in the lower Shire Valley have some experience of growing a variety of crops under both rain-fed and irrigated conditions.

It is envisaged that the yields attained for the other crops can also be improved substantially under commercial farming conditions. The yields attained for beans, tomato, cabbage, onion and sweet potato can be double those presented in Table 2.7. For example the highest yield for a bean irrigation experiment at Kasinthula Research Station was recorded at 3 t/ha whereas the mean yield was reported as 1.7 t/ha. Tomato and cabbage hybrids have potential to yield 60 t/ha. With good management, cotton yields of between 2.5 and 3.0 t/ha are achievable while the yield potential for available varieties ranges from 3.0 to 3.8 t/ha (MoAIWD, 2012). For sesame, an irrigation experiment in Pakistan showed that a well irrigated crop can yield 0.75 t/ha (Nadeem et al, 2015). In Nigeria a sesame yield of about 2.0 t/ha was obtained in a manure experiment (Haruna et.al, 2012). Current sesame yield estimates for a crop grown under rain-fed conditions in Malawi is 0.3 t/ha.

The average banana yield of 14.6 t/ha is much lower than the 25.8 t/ha reported by Fandika et al (2014) at Kasinthula Research Station (KRS). However, the 25.8 t/ha is also much lower than yields attained under commercial production in Mozambique, South Africa and Zimbabwe where yields of 35 to 45 t/ha have been reported. Varieties grown in Zimbabwe, Mozambique and South Africa are mainly Giant Williams and Williams.

The reported yield estimates for mangoes and oranges appear to be exaggerated. Assuming a plant spacing of 8 x 8 m (144 plants/ha), the reported mango yield gives a per hectare yield of 129.6 tonnes. This appears to be too high even for 20 to 40 year old trees. Reports from India

(www.srinidhifarm.com) show that yield per tree ranges from 2 – 3, 10 – 15, 100, and 200 – 600 kg/tree for 3 – 4, 5 - 8, 10, and 20 – 40 years respectively. So, generally 10 year old trees would yield 14.4 t/ha. Yields of 25 t/ha (variety Keitt) and 33 t/ha (variety Tommy Atkins) have been achieved in South Africa (Mpumalanga Province).

#### 2.2.2.4. Coping and adaptive mechanisms to mitigate food deficits

Since the crop yields attained are generally low in most seasons and food deficits occur frequently, observations made at district level suggest that the incidence of prolonged food deficit episodes stretching over seven or more months are common in the lower Shire Valley districts of Nsanje and Chikwawa. As a result of such incidents the proportion of the affected population in the two districts is estimated at approximately 36 and 30 percent respectively (Integrated Household Survey 2010-2011). The national food security assessment also showed that the two districts have the highest proportion of their populations adversely affected by very low food security at 78 and 75 percent respectively compared to the national average of 32.5 percent. These statistics clearly show that most households in the lower Shire Valley need to device robust coping mechanisms to survive the hardships they face on a daily basis. Such coping strategies meant to address the negative effects of recurrent crop failures experienced in the lower Shire Valley include:

- fragmentation of land holdings practiced to reduce the risk of complete crop failure on a single piece of land;
- buying and transporting food sourced from elsewhere in line with the duration of the drought period every year;
- eating wild tubers (nyika) found growing on the banks of the Shire River;
- selling livestock starting with smallstock and later the larger stock as the drought period is extended;
- temporary migration to seek off-farm employment, or to secure food and water in the event that the drought period is extended;
- engaging in casual labour (ganyu), which entices people to migrate to other places outside the district in search of alternative sources of income;
- resorting to rudimentary irrigation technologies as the drought period is extended especially for communities living along the Shire River;
- increased use of wetlands as a livelihood diversification strategy linked to the increasing incidence of droughts and the worsening of the economic situations;
- relying on the less expensive or less preferred food types;
- reducing the size of food portions at meal times;
- reducing the number of meals taken per day;
- reducing the proportion of meals offered to adult members of the family; and,
- relying on the neighbours, friends and relatives as a social safety net at times of food shortages.

Existing coping strategies for spreading the risks of low food security effects depend on the duration of the low food security event and range from eating wild tubers (nyika) from the Shire River to temporary migration out of the area to seek food and water. However, the most common strategy is engaging in casual labour (ganyu) that involves entering into short-term rural employment arrangements to secure an alternative source of income, which could be used to buy food. Seasonal employment and permanent employment on the sugarcane estates provides a very good source of income for thousands of people in the lower Shire Valley. The ganyu strategy is common and tends to be practiced independent of the duration of the low food security period. However, during short drought incidents, household members may resort to replanting on the same fields where the crops will have failed. However, to cope with droughts experienced over longer periods different strategies might have to be considered such as migration out of the area or initiating irrigation activities using the available

rudimentary technologies. The adoption of irrigation practices is especially common for communities residing along the Shire River.

The fragmentation of landholdings can also be used as a coping mechanism. The current landholding patterns in the lower Shire Valley reveals that, on average, each farmer has 3.4 separate plots each covering an area of 0.58 ha to give a total farming area of approximately 2.0 ha (COWI, 2016). Typically, each of these plots is located in an area which ensures they all have different agronomic characteristics such as soils, drainage and fertility. In some villages, one plot may be located close to the Shire River and liable to regular flooding. The fragmentation of holdings and separation of plots is usually attributed to the rationalisation measures adopted by the traditional authorities in the past, who sought to distribute fertile and less fertile land equally among the various members of the community. This strategy also promotes agricultural diversification and thus mitigates against the livelihood risk of single crop failures. Farm fragmentation, however, is often viewed as a constraint to improved agricultural productivity because of the spatial distribution of fields and long distances separating them, which becomes an impediment to the mechanisation and intensification of land use. The National Agricultural Policy (NAP) 2010-2016 highlights the importance of agriculture to the economy of Malawi, but notes that productivity is low. The policy attributes this to small and fragmented holdings with yields lower than the estate sector. The Malawi ASWAp also identified small land holding sizes and fragmentation among the key constraints to agriculture.

The range of strategies currently adopted by farmers to withstand droughts shows how the current farming system is struggling to cope with the adverse effects of droughts and floods (climate change) and indicates that new and additional measures will need to be employed to generate effective adaptation. The SVIP is one of those developments that can bring about positive sustainable change or improvement to the livelihoods of people in the lower Shire Valley.

#### 2.2.2.5. Existing commercial crop enterprises

Land is allocated to private sector companies through a leasehold tenure arrangement, as applicable to those lands used by Illovo, Agricane and Kasinthula Cane Growers. Table 2.8 shows that in total about 36.1 percent of the SVIP area is privately owned as opposed to only 11 percent as an average for Chikwawa and Nsanje districts. In Phase I, 48.2 percent of the SVIP area is privately owned (COWI, 2016).

***Table 2-8: Land area under private leasehold in the project area***

| Description | Total area | Net area | Private leasehold | Part of leases within SVIP | Percentage |
|---|---|---|---|---|---|
| Phase 1 | 25,057 | 21,410 | 15,430 | 12,067 | 48.2 |
| Phase 2 | 24,750 | 21,090 | 8,353 | 5,905 | 23.9 |
| Total | 49,807 | 42,500 | 23,783 | 17,972 | 36.1 |

The existing commercial enterprises are dominated by Illovo's sugarcane production on about 10,000 ha of land. Illovo Sugar (Malawi) Limited is the country's sole producer of sugar and plays a significant role within the national economy in general, providing permanent as well as seasonal employment for 10,000 people. In addition to its own sugarcane production, Illovo procures sugarcane from outgrower farmers carrying out their operations under the auspices of Kasinthula Cane Growers Limited and Phata Cane Growers Cooperative. Illovo's experience in growing sugar cane in the area and their willingness to partner with the local communities gives the SVIP great potential particularly with respect to the production of sugar cane.

Another commercial enterprise, which is relatively new in the area, is the production of mangoes by Crown Mangoes, a division of Polypack. Currently the area under mango is about 7 ha with a total tree population of 3,500 trees whose produce (fresh fruits) are sold in Blantyre. The immediate target is to extend the area under the mango orchard to 250 ha. It is envisaged that the whole project will culminate in the establishment of a juice extraction factory in the lower Shire Valley. Crown Mangoes is also involved in the processing of oil from the seeds of the Neem tree. The Neem trees although not indigenous to the area are now commonly found all over the lower Shire Valley mainly around the homesteads.

#### 2.2.2.6. Summary of crop farming in the lower Shire Valley

Table 2.9 summaries the status of crop farming in the lower Shire Valley focusing on issues confronted, opportunities, challenges and risks. The most significant opportunity presented by the launching of the SVIP is the availability of larger quantities of water at a lower cost and this will enable the further exploitation of the vast tracts of good soils available in the project area. The current farming system is characterized by low input, low output crop production that fails to support the farmers, who are then forced to depend on several coping mechanisms that include eating wild tubers and temporary migration from their traditional homes. There are several opportunities that could be exploited with the establishment of a viable irrigation scheme as summarized in Table 2.10.

***Table 2-9: Status of crop farming in the lower Shire Valley***

| Issues | Opportunities | Challenges | Risks |
|---|---|---|---|
| 1. Need to increase crop productivity and production for the development of the country and the project area. | 1. There is lots of water in the Shire River which can be used for irrigation<br>2. Land is available and most land holders are prepared to consolidate their pieces of land for the irrigation project<br>3. Support is available from the government and development partners<br>4. Large tracts of good irrigable soils<br>5. Farmers have the basic experience of growing crops | - Conflicting interests<br>- Need to resettle some affected persons<br>- Livestock is a major enterprise in the area and the irrigation scheme will take up grazing land<br>- Some areas are sodic and not suitable for irrigation and must be properly identified<br>- Some markets are controlled by cartels | • Saline conditions – need for close monitoring and use of appropriate irrigation systems<br>• Failure to secure access to lucrative markets on a sustained basis<br>• Recurrent flooding of the project area |
| 2. Improve the viability of irrigation schemes by diversifying into high value crops such as horticultural crops and spices for export. | 1. European, American and Asian markets available<br>2. Crops can be grown during the off-season in Europe<br>3. The climate in the lower Shire Valley allows all year production of a number of crops | - Most high value crops are very perishable<br>- Freight out of Malawi – Chileka airport in Blantyre cannot accommodate large cargo planes<br>- The Malawi Bureau of Standards (MBS) is not internationally accredited<br>- Stiff competition with other countries in the region and Kenya | • Diversification into non-food crops could be at the expense of food security. |
| 3. Sugar cane to be the key enterprise | 1. Sugar processing plant located in the area<br>2. Ethanol plant located in the area<br>3. The quantity of ethanol available in the country is inadequate to meet the national requirements for blending purposes | Existing sugar plant is reaching its maximum capacity | • Sugar market in Europe is becoming doubtful<br>• Increased competition on local and regional sugar markets<br>• Declining oil prices on the international market due to excessive supply |
| 4. Ensure a vibrant crop research agenda to support cropping in the irrigation scheme. | 1. A government agricultural research station at Kasinthula, is located in the project area.<br>2. Several international research organizations such as ICRISAT, CIMMYT, CIAT, International Potato Centre carry out research in Malawi<br>3. Private seed companies such as Seed Co and Pannar conduct crop variety testing trials in the country | - The government research stations are facing resource and human capacity constraints resulting in inadequate capacity to undertake strategic research such as biotechnology.<br>- The international research organizations seem to focus more on smallholder farmers | • Lag behind in the use of biotechnology to enhance yield as has happened in other countries.<br>• No clear scientifically backed policy on GMOs |

## 2.3. Overview of livestock production

The livestock industry in Malawi contributes about 8 percent to the GDP and about 36 percent to the total value of agricultural products. In the smallholder sector livestock serve multiple purposes including providing food, income, manure, animal traction and social security. Livestock serve as security for the poorest households: in times of crisis, animals are sold to raise cash for food and other needs. As a result, the actual contribution to GDP can be as high as 11 percent when all the additional roles of livestock are taken into account.

The ratio of cattle to human population is around 1 to 17, and cattle ownership in the smallholder sector is confined to fewer than 10 percent of farming families. Among this minority of livestock owners, an average of seven Malawi Zebu animals are kept in each herd. In 2002, the estimated per capita domestic supply of meat was 5.44kg and for milk it was 4.0 litres. In 2007 the numbers had risen to 9.45kg and 5.51 litres respectively. Although the share of beef in the total meat supply was much higher than for poultry, pigs, goats and sheep in 1997 and 2002, since then the beef share of the meat consumed has declined significantly. The share of beef declined from over 45 percent in 1997 to just 22 percent in 2007. Goat meat supply increased from 10 percent to 16 percent and that of pigs from 14 to 27 percent. The contribution of chicken meat increased from 29 percent to about 36 percent. The consumption (not actual demand) and supply analysis indicates that there will be a gap of between 15 and 30 percent among the various livestock products by the year 2017. At these production and demand levels, Malawi may continue to import meat, milk and eggs to satisfy the local demand.

The major reasons given to explain these poor trends are: the low overall livestock populations; low productivity; lack of access to improved breeding stock; high incidents of disease and parasite outbreaks; stock theft (insecurity); non-availability of livestock marketing facilities due to closure, or dis-repair; poor quality feeds and feeding; poor husbandry practices; poor institutional and macro-economic policies; biased economic development policies; inadequate manpower; decline in funding for livestock programmes; poor and costly technologies; insufficient infrastructure; and, unavailability of support services.

### The role and contribution of livestock

The actual and potential contribution of livestock farming to food security, sustainable livelihoods and agricultural development in Malawi is higher than suggested by the statistics relating to the provision of meat and milk. There are additional livestock non-food outputs and uses such as, manure, skins/hides and draft power, savings/investment and providing security as collateral, and diversifying sources of income, that are difficult to quantify and are therefore usually left out in evaluating the importance of livestock. The role of livestock in mitigating the impacts of drought cannot be ignored.

### 2.3.1. National livestock production

During the 1980s and 90s, the population of cattle had been decreasing while that of pigs and goats had been increasing, whereas that of sheep and poultry was static over the same period. However, since 2002/03, the population of chickens, goats and pigs has been increasing as shown in Figure 2.7. Correspondingly, the production of red meat, chicken meat and milk has been increasing at different levels. An analysis of the current trends also shows that the country has been experiencing a steady growth in overall livestock numbers. Significant increases are being witnessed in the populations of chickens, goats and pigs.

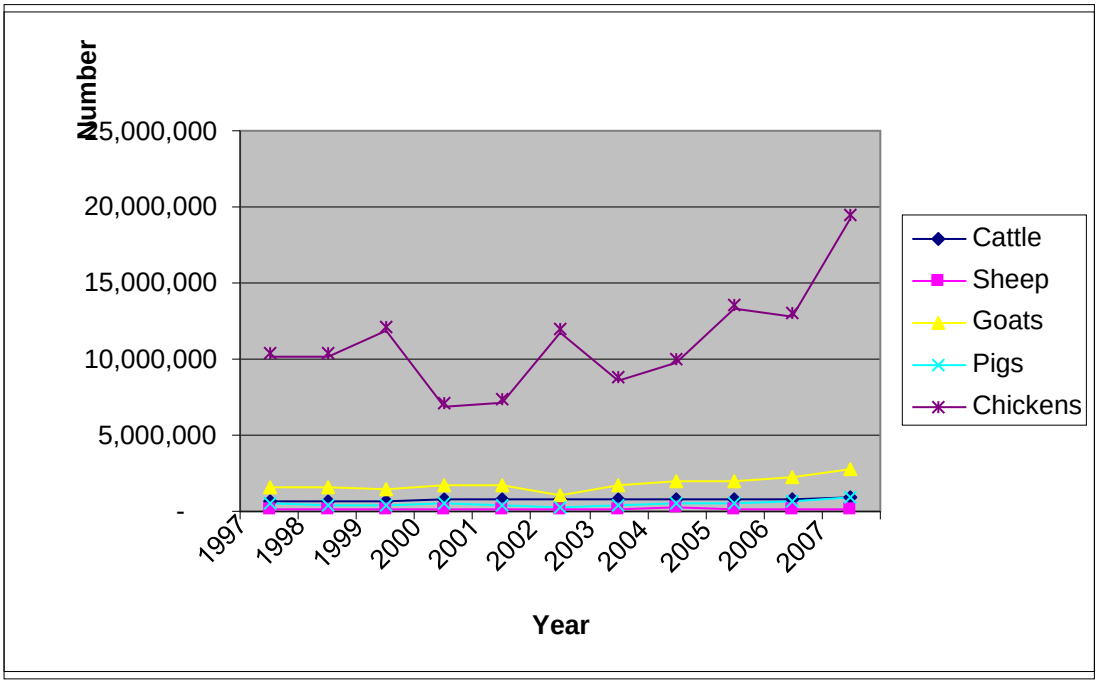



***Figure 2:7: Livestock population changes between 1997 and 2007***

***Source:*** *Banda, 2008*

This is attributed to the fact that consumers nowadays prefer chicken, goat and pig meat, in that order, as reported by Munthali (unpublished). Consumption of beef is rated fourth and this was attributed to the scarcity of beef and the resulting high prices prevailing on the local market. The SVIP will facilitate the provision of support services in the project area and it is envisaged that the livestock sector will benefit from the improved availability of water, grains and crop residues that can be used to improve the availability of stockfeeds.

## Livestock production trends

***Table 2-10: Livestock production trends for the past five years (2010-2015)***

| Livestock Type | Livestock population by type and season | | | | | Last year % change |
|---|---|---|---|---|---|---|
| | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 | |
| All cattle | 1,110,560 | 1,164,438 | 1,241,749 | 1,316,799 | 1,398,376 | 6.14 |
| Beef cattle | 1,060,221 | 1,106,737 | 1,181,025 | 1,252,420 | 1,326,524 | 5.92 |
| Dairy pure | 11,136 | 12,247 | 13,284 | 14,710 | 16,274 | 5.96 |
| Dairy crosses | 39,203 | 45,454 | 47,337 | 49,669 | 55,578 | 11.90 |
| Goats | 4,442,907 | 4,929,808 | 5,356,545 | 5,882,106 | 6,545,306 | 11.27 |
| Sheep | 228,649 | 240,269 | 255,928 | 269,830 | 275,537 | 2.12 |
| Pigs | 2,160,670 | 2,493,172 | 2,754,414 | 3,128,599 | 3,645,626 | 16.53 |
| Chickens | 44,672,086 | 58,752,354 | 61,868,912 | 68,177,602 | 78,121,449 | 14.59 |

**Source:** *Data from DAHLD, 2016*

An analysis of the livestock production trends for the past five years shows positive trends for the species of livestock. A comparison in the percentage change between years 2013/2014 and 2014/2015 has shown that pigs are the fastest growing at 16.53 percent followed by chickens

at 14.59 percent, goats at 11.27 percent while the cattle population has increased by 6.14 percent (see Table 2.10).

*Malawi is registering significant growth in livestock numbers. While the SVIP is primarily aimed at increasing the production of irrigated crops, it is envisaged that specific components will be incorporated in the project to boost livestock production. This will include the production of grains and legumes for use in producing stockfeeds as well as the establishment of irrigated pastures to improve the productivity of the grazing areas.*

### 2.3.2. Livestock production in the lower Shire Valley

In 2006 it was estimated that there were about 1.2 million farm families who owned one or more of the various types of livestock, in Malawi as a whole. Table 2.11 shows that the proportion of households who own livestock in general and more specifically cattle, goats and sheep is higher in the lower Shire Valley that in the rest of the country. A recent stakeholder consultation exercise revealed that, in Chikwawa District 35 to 40 percent of all households own cattle; 35 to 40 percent own goats; 35 percent own pigs; 10 percent own rabbits or other small stock; and, almost 98 percent own chickens (COWI, 2016). It is worth noting that a high proportion of households in the project area (33 to 42 percent) do not own any livestock (Table 2.12)

***Table 2-11: Proportion of households who owned major classes of livestock, 2006/7 agricultural season***

| Area covered | Proportion of H/H who owned or kept livestock or poultry | Proportion by livestock type | | | | |
|---|---|---|---|---|---|---|
| | | Cattle | Goats | Sheep | Pigs | Chicken |
| Malawi | 57 | 6 | 24 | 2 | 9 | 49 |
| Shire Valley | 60 | 9 | 31 | 4 | 7 | 45 |
| Chikwawa | 58 | 11 | 31 | 4 | 7 | 43 |
| Nsanje | 63 | 7 | 32 | 4 | 6 | 50 |

***Source:*** *National Census of Agriculture and Livestock Report (2010)*

For the 2014/15 season, a total of 90,439 out of 134,775 households (67.10 percent) were reported to own or kept livestock or poultry in Chikwawa district. However, even for those households that do not own any livestock some do depend on livestock keepers for wage employment, trade and service provision and these tend to face declining incomes when a drought occurs due to falling demand for labour and other goods and services.

*Economic shocks, drought, livestock losses due to animal diseases, lack of financial resources to purchase improved breeding stock, poor livestock management, inadequate capacity and, or slaughter houses or abattoirs to support the processing of cattle products into various consumer products and declining efficacy of delivering of livestock services to poor people are identified as major sources of vulnerability in the lower Shire Valley.*

The majority of cattle owners in the project area fall within the small-scale sector. The classification system used by the authorities recognizes three main categories of cattle farmers, namely: small-scale with a herd size of between one and 200 cattle; medium scale with a herd size of between 200 and a thousand cattle; and, commercial with over a thousand cattle. Tbale 2.12 shows that as the number of cattle rises there is also an increase in the number and quantity of related products such as beef, milk, skins and hides.

***Table 2-12: Number of cattle and cattle products in the lower Shire Valley (2012/2015)***

| Enterprise | Number of all cattle in Shire Valley ADD | | |
|---|---|---|---|
| | 2012/2013 | 2013/2014 | 2014/2015 |
| Census | 165,859 | 180,512 | 184,914 |
| Slaughters | 47,745 | 48,969 | 49,608 |
| Beef (tons) | 5,839 | 5,220 | 5,347 |
| Milk (tons) | 2,167 | 2,353 | 2,404 |
| Hides | 47,745 | 48,969 | 49,608 |

***Source**: Data from DAHLD, 2016*

Table 2.13 shows a steady increase in the cattle population in the project area. This observation was confirmed by the Government livestock officials in the area who reported increases in the cattle numbers. Further analysis of the statistics shows that the growth in the major livestock species except dairy crosses assumes a general upward trajectory. This trend is similar to previously reported trends at the national level in which all animal species are showing significant growth in numbers.

***Table 2-13: Trends in livestock populations in the lower Shire Valley (2010 – 2015)***

| Category | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 |
|---|---|---|---|---|---|
| Beef cattle | 142,731 | 146,172 | 165,815 | 180,475 | 184,885 |
| Dairy crosses | 74 | 63 | 44 | 37 | 29 |
| Goats | 279,765 | 312,534 | 352,612 | 387,533 | 414,661 |
| Sheep | 5037 | 6030 | 6,556 | 6,950 | 7,746 |
| Indigenous pigs | 94,352 | 103,863 | 120,265 | 132,348 | 134,789 |
| Exotic pigs | 665 | 500 | 644 | 483 | 752 |
| Indigenous chickens | 755,242 | 747,364 | 808,300 | 1,066,077 | 1,089,188 |
| Broilers | 35,225 | 3,566 | 3,624 | 5,492 | 5,611 |
| Layers | 8,497 | 62,363 | 2,203 | 3,137 | 4,153 |
| Black Australorp | 36,203 | 39,725 | 49,526 | 49,250 | 46,038 |
| Rabbits | 3,200 | 4,431 | 5,882 | 5571 | 5853 |
| Guinea fowls | 103,045 | 129,473 | 124,260 | 122,428 | 122,264 |
| Turkey | 433 | 453 | 405 | 490 | 550 |
| Guinea pigs | 2,409 | 5,974 | 6,164 | 3,620 | 4,144 |
| Doves/Pigeons | 68,973 | 102,954 | 117,967 | 137,432 | 152,439 |
| Ducks | 91,835 | 110,850 | 121,315 | 152,497 | 134,036 |

**Source:** *Data from DAHLD, 2016*

The main non-governmental organizations (NGOs) involved in promoting the livestock sector are: Catholic Development Commission in Malawi (CADECOM), Eagles Relief, Red Cross, the Food and Agricultural Organisation (FAO) and the Circle for Integrated Community Development (CICOD). All these organisations facilitate the distribution of livestock (mainly goats), by implementing pass-on schemes that are meant to enable households that do not own any livestock (or have lost them as a result of natural disasters such as flooding) to acquire some.

Large animals are mainly held as assets and they are rarely sold in numbers that would contribute significantly to augmenting household income. The sale of small stock (including poultry) provides cash to meet emergency household needs and therefore plays a significant role as a safety net particularly in female-headed households which are among the most vulnerable groups in the project area. This is especially true for the lower Shire Valley because

for two consecutive seasons, farmers have failed to harvest enough crops or any crop in some instances because of the twin evil effects of flooding and recurrent droughts.

*On market days, we process movement permits for at least 3 truckloads of goats sold from the lower Shire Valley being transported to Blantyre markets for slaughter (DAHLDO, Chikwawa District)*

Information available from secondary sources suggests that livestock farming is the second most important source of livelihood after crop production and sale in the lower Shire Valley. In Chikwawa and Nsanje, cotton is listed as the major cash crop in the smallholder sector. Table 2.14 shows that livestock sales during the 2014/15 season accounted for between 10 and 13 percent of the total population of cattle, goats and sheep whereas the numbers slaughtered for consumption at household level was much lower at between 0.27 and 2.65 percent.

The effects of extreme climate conditions are multi-dimensional and generally tend to adversely impact on the livestock sector. For example, droughts result in a reduction in the availability of water and grass in the grazing areas as well as a reduction in crop residues from the cropping areas. The acquisition of hardy goats, resistant to many common diseases is used as an important risk management strategy at household level.

***Table 2-14: Livestock slaughter and sales in Chikwawa District***

| Livestock category | Total numbers | Sales (2014/15) | | Slaughter (2014/15) | |
|---|---|---|---|---|---|
| | | Totals | As a proportion of total herd (%) | Totals | As a proportion of total herd (%) |
| Cattle | 146,472 | 15,224 | 10.39 | 399 | 0.27 |
| Goats | 269,190 | 33,169 | 12.32 | 3,332 | 1.24 |
| Sheep | 6,180 | 787 | 12.73 | 164 | 2.65 |

***Source:*** *ADD Office, Chikwawa*

Table 2.14 shows that goats and sheep are the most traded species of livestock by category followed by cattle. This is important for the SVIP which should include components to boost the production of goats and sheep because this could be used to impact on a larger proportion of the inhabitants of the lower Shire Valley. The same can be seen on the number of animals slaughtered.

Further investigations have also revealed that goat meat is the most readily available meat on the market and in the villages. The SVIP could therefore facilitate the promotion of marketing of goats by facilitating the development of appropriate infrastructure and attracting investors to establishing slaughter facilities at the available trading centres. Support services could be provided to the famers to facilitate the requisite capacity building of farmer organisations to enable them to establish and manage the required facilities.

#### 2.3.2.1. Smallholder livestock production

Smallholder livestock production systems adopted in the lower Shire Valley are similar to those practiced elsewhere in Malawi. Goats and sheep are tethered during the crop season but are left to graze freely during the dry season. Cattle are herded throughout the year with one herdman taking care of cattle from more than one kraal (*khola*). However, some cattle are left to graze freely. This gives rise to conflicts between crop farmers and livestock owners as most of the times the stray animals are physically attacked/harmed by the aggrieved farmers as they

drive them from their plots or they are detained and the owner is compelled to pay compensation for the losses suffered as a result of the invasion of the cropping areas.

*"We pay more than twice the value of the crops that have been damaged as the crop farmers just charge without any justification".*

Consultation meetings with the livestock committees in the lower Shire Valley also revealed similar conflicts between livestock and the large scale estates. For example, it was reported that impounded cattle could attract a fine of MK 2,000/head/day for encroaching onto the sugar estate.

In Malawi as a whole there has been a general decline in livestock service delivery. As a result, less than 5 percent of farmers are served, with inadequate staffing levels and the shortage of drugs being mentioned as the major constraints in livestock service delivery. This is against a background that about 57percent of the Malawi population own livestock. In the lower Shire Valley, about 60 percent of the households own livestock. These are the people that require proper livestock extension services in order to drive the development of the livestock industry in Malawi.

Smallholder livestock farmers in Chikwawa and Nsanje are already organized and have established Livestock Associations. Although the livestock farmers are organized, they reported lack of training for both the association as well as its members. It is recommended therefore that these livestock farmers should also be trained. This will ensure that they are conversant with the operations of the livestock association because the association is the entry point of all livestock extension. While the initial focus of these Associations was focused on combating livestock theft by offering ownership certificates and movement permits, they are now considering establishing operating abattoirs.

**Challenges faced by smallholder livestock farmers in the lower Shire Valley**

Smallholder farmers involved in livestock production in the lower Shire Valley have identified a number of challenges they are currently facing, and these include:

- reduced availability of grazing land due to increased pressure for land as the human population continues to increase;
- restricted access to the Shire River in those areas where lands have been set aside for sugar cane production;
- predation by crocodiles residing in the waters of the Shire River;
- poor management of the change of ownership of dip tanks from the government to the farmers leading to poor maintenance and subsequent breakdown of facilities;
- lack of competition on the market. There are two major players operating in both Chikwawa and Nsanje and as a result smallholder farmers perceive collusive tendencies between the operators, who together account for 90 percent of the market share;
- Sale of cattle on credit where they receive payments for their sales after a two-month waiting period;
- high prevalence of livestock diseases such: as foot-and-mouth disease; tick borne diseases; pneumonia; Newcastle; African Swine fever; worm infections and foot rots. The problem of diseases is exacerbated by the general shortage of skills and capacity constraints faced by the government departments responsible for serving the smallholder farmers; and,
- limited extension capacity leading to inadequate provision of technical knowledge.

It is envisaged that as more land is brought under irrigation under the SVIP a more deliberate effort will be made to develop the remaining areas to enhance their carrying capacity. Other capacity building initiatives will focus on enhancing the adoption of good animal husbandry practices with emphasis on improved housing, feeds and feeding; animal welfare; and, animal health. Conflict management and resolution could also will be a part of training activities provided.

Consultation meetings with smallholder farmers elicited the following recommendations:

- SVIP should construct drinking points for livestock and reserve some areas for establishing irrigated pastures around these water points. These can be planted to improved grass species such as Rhodes, Kikuyu, Star grass and Napier fodder.
- The canal design should provide for access (e.g. bridges) for crossing of animals to grazing land.
- There is need for improved fencing and herd management to reduce the incidents of livestock causing damage to the irrigated crops. In addition, appropriate conflict management structures and guidelines should be established to deal with such incidents in a manner that is considered fair by all parties concerned.
- The project should facilitate the formalisation of the marketing of such commodities as crop residues and organic manure to foster strong collaboration between livestock and irrigation farmers. Currently livestock farmers willingly give away manure for free as this helps them to clear their kraals (kholas) even though there is no reciprocal gesture in the disposal of crop residues by crop farmers.
- Smallholder livestock farmers fear that they might be deprived of access to crop residues from SVIP which are likely to be sold to the highest bidder. The commercial farmers who run the existing feedlot schemes have the resources to outbid the smaller scale farmers as witnessed this year. It is envisaged that measures will be taken to ensure that the small-scale farmers will have access to the crop residues realised from crops grown on their traditional land parcels.

#### 2.3.2.2. Existing commercial livestock enterprises

The lower Shire Valley is host to a number of large scale operators whose farming enterprises are focused purely on livestock production. The biggest of these livestock operations are run at the following farms: Dasu; Walisa; S&A Beefmaster; Gwirawekha and Sangisa Farms. These commercial farmers manage large herds, each in excess of 1,000 animals and their operations are managed as business entities that have developed extensive infrastructure including feedlots and related cattle handling facilities. Several of these operations are being run by professional managers recruited from the sub-region to improve the standard of management provided. While their breeding herds are raised on-the-veld, the slaughter stock is often passed through zero grazing units (feedlots) where the animals are fed on a mixture of hay/crop residues and bought-in ingredients including concentrates, minerals and vitamins. Marketing is organized by the individual farmers who have direct links to abattoirs located in Mpemba.

The organisation of these enterprises offers lessons that could be applied under the SVIP to facilitate the commercialisation of the livestock industry in the smallholder sector in the lower Shire Valley.

## 2.4. Status of aquaculture

Fish farming in Malawi began as early as 1906 with the introduction of rainbow trout (*Onchorhynchus mykiss*) for angling (Balarin, 1987 cited by Longwe, Kang'ombe, and Kaunda, 2010). The use of indigenous fish in aquaculture dates back to the early 1950s when the colonials introduced it in Malawi. *Tilapia rendalli* and *Oreochromis shiranus* were stocked in fish ponds within the Northern Region of Malawi. Later in 1959 a fish culture station was established at Domasi near Zomba in the Southern region. The Domasi Experimental Fish Farm was established and it started distributing fingerlings of *T. rendalli* to farmers in the Southern Region. Domasi Fish Farm became the main experimental and demonstration unit for aquaculture in the country (Russell, Grötz, Kriesemer and Pems, 2008).

After independence, a number of investments were made in aquaculture in the Southern Region. In the 1970s, a number of development partners started supporting the development of aquaculture when the United Nations Development Programme funded the Kasinthula Pilot Fish Farm at Chikwawa in the lower Shire Valley. The pilot farm was developed to research on various management practices to improve the viability of aquaculture enterprises and to promote the large scale production of fish and fingerlings. This project achieved limited success due to low government funding and the absence of enabling policy environment to support the promotion of large-scale aquaculture (ICLARM 2001, cited by Russell *et. al.* 2008).

The other investments in aquaculture were made by Oxfam and the United Nations Children's Fund in Zomba District during the years 1974-79, and by UNICEF in Mwanza District during the years 1981-90. The latter project resulted in a shift of focus of the aquaculture development strategy from large-scale to small-scale fish farming. This strategy was replicated elsewhere in Malawi with the establishment of satellite stations throughout the country (ICLARM 2001 cited by Russell *et. al.* 2008).

During the period 1970 to 2002, aquaculture in Malawi received substantial technical and financial support from a variety of sources. This contributed to the strengthening of capacity at the Domasi Experimental Fish Farm, which was renamed the National Aquaculture Centre (NAC) in 1991. In 1990, there were 12 government stations and substations, one of which was operated by Bunda College of the University of Malawi. These facilities collectively developed and managed more than 180 experimental ponds. During the late 1990s, however, direct support from development partners towards aquaculture development declined due to a number of factors including changes in priorities and the perception that the large investments already made had failed to show significant improvements in livelihoods in the benefitting communities (ICLARM 2001, cited by Russell *et. al.* 2008).

Currently about 10,000 fish ponds exist in the country as a whole and the ponds are owned by a total of 6,000 smallholder farmers. Since the early 2000s there has been a growing interest in commercial aquaculture investments (GoM, 2012).

### Aquaculture in the lower Shire Valley

There are currently 367 small scale fish farmers in the lower Shire Valley most of whom operate as fish farming clubs established with support provided through the Local Development Fund cash transfer programme. Most of these clubs have an average of two ponds covering an area of 500m$^2$ stocked with *Oreochromis mossambicus* and *Tilapia rendalli*. Most of these fish ponds have also been colonized by catfish through flooding. The fish farmers' clubs buy *O. mossambicus* and *T. rendalli* fingerlings from Kasinthula Fish Farm and from other farmers.

The stocking densities followed by the farmer clubs depend on the capacity of the individual farmers' clubs to manage their fish farm enterprises. Farmer clubs who can afford to fertilize their ponds with manure and supplement with maize bran, stock 3 fingerlings per square metre while farmer clubs who can only afford to fertilize the fish ponds without any feed supplement are advised to stock 2 fish per square metre. Cow dung and goat manure are used for fish pond fertilization at a rate of 400g per square metre.

Fish farmers' clubs are advised to practice partial harvesting. The fish are harvested when individual fish attain a size range of about 70 to 300 grams. The yields per 500m$^2$ fish pond per production cycle range from 47 to 180 kg (940 to 3600 kg/ha). After harvesting the fish are sold locally among members of the local community.

Fish farmers are supposed to receive extension support from government Agricultural Extension Development Officers every year but sometimes funding limitations militate against the delivery of planned extension services. It was also revealed that there were limitations on the part of the fisheries research office because there is one officer who performs the duties of both the researcher and extension officers. Aquaculture development in the lower Shire Valley has been promoted by non-governmental organisations such as CABOC who supported various activities including: pond construction, fingerling procurement and training of fish farmers in management of their fish ponds. The training package includes, the following topics: pond site selection; pond construction; pond management (manure application/feeding, disease prevention and predator control); and, harvesting of fish.

**Commercialization of fish farming: Case of Kasinthula Fish Farm**

Kasinthula Fish Farm was established on lands adjacent to the Kasinthula irrigation project in the lower Shire Valley during the early 1970s to demonstrate the commercial viability of large scale fish farming in Malawi. At inception a total of 13 ponds where constructed on 22 hectares of land and this was followed by the construction of additional ponds for breeding and nursery purposes as well as to provide fish-grow out facilities. Kasinthula Fish Farm has been run by the Fisheries Department for some time. However, its performance has been poor because of the problem of erratic water supply and excessive fish predation. A concession was awarded to a private operator, Gopi Krishna (GK) Aqua Farms to run Kasinthula Fish Farm between the 2003 and 2013. Detailed information of fish production when Kasinthula Fish Farm was operated by GK Aqua Farms is not available. However, according to a report by Longwe, *et. al.* (2010), GK Aqua farms attained gross margins of over K3 million (approximately US $21,430 (at the time) after just one year by raising three species of fish; the tilapia (*Tilapia rendalli* and *Oreochromis siranus)*, and common carp, *Cyprinus carpio*, in a polyculture system. The farm did not operate any integrated aquaculture-agriculture systems. The fish were stocked in ponds that were fertilized with livestock manure. Manuring was supplemented with artificial diets. Partial harvest was carried out throughout the year, depending on consumer demand. Complete harvest was done once a year.

GK Fish Farm sold fish in Chikwawa District and Blantyre City. The fish were sold at a farm gate price of K400/kg (US $3/kg at the time) for common carp and K250/kg (US $1.8/kg) for tilapia species and at a wholesale price of K500 (US $3.6/kg) for common carp and K300 (US $2.1/kg) for tilapia fish.

After taking over the farm in 2004, GK Aqua Farms started registering a continuous rise in production from 4.2 tonnes per year in 2004 to 29.5 tonnes per year in 2008. However, despite registering a rise in production, the private operator left abruptly in 2009 for undisclosed reasons before the end of the concession period. The farm was idle between 2009 and 2013 but since the engagement of a new Fisheries Officer in 2013 attempts are being made to revamp the operations with support provided under the Agricultural Technology Transfer (AGRITT) project.

## Current situation regarding some key areas of fish farming in Malawi

### *Fingerling production*

Previously fish farmers in Malawi used to source fish fingerlings from the hatcheries run by the Fisheries Department at Domasi. With an increase in aquaculture projects established by various NGOs, fish farmers were being encouraged to share tilapia fish fingerlings amongst themselves. The challenge with this is that fingerlings from some of the farmers may be of poor quality resulting in poor production levels. One major challenge faced by farmers in accessing fingerlings from government hatcheries is transportation of fingerlings from the government hatcheries to fish farms. Where farmers are supported by NGOs, the NGOs have facilitated the transportation of the fingerlings while individual farmers continue to face serious problems in transporting their fingerlings from the point of sale to their ponds.

During consultations with officials at Kasinthula and NAC it was revealed that under the AGRITT Project, plans are underway to resuscitate the hatchery at Kasinthula Fish Farm. The hatchery could provide fish fingerlings for commercial fish farmers under the SVIP.

### *Stocking density of fish species cultured in Malawi*

Currently four species of fish are mainly farmed in both small scale and commercial aquaculture operations in Malawi including three tilapias (*Tilapia rendalli*, *Oreochromis shiranus* and *O. karongae)* and the catfish (*Clarias gariepinus)*. One concern about culture of tilapia fish is their precocious breeding, which causes severe stunting and farmers' lack of knowledge and resources to control the number of fingerlings in their ponds. Under semi intensive culture a fingerling stocking density of 2-3 fish per square metre has been recommended to allow for the low nutritional content of the commonly used farm by-products in Malawi. A higher stocking density of 4-5 fish per square metre has also been recommended in situations where mortality rates are high and where more nutritious feeds rich in protein ingredients can be afforded.

According to discussions with officials at NAC, if deep pond technology is adopted the stocking density can be increased to 6 fish per square metre which can result in the doubling of yields from 3 to 6 t/ha with good management practices.

### *Fish feeding, pond inputs and fertilization*

A majority of small scale fish farmers use maize bran as fish feed. This feed ingredient has been recommended by extension services since the 1940s, but it has low gross protein content (2-3 percent) and a poor food-conversion ratio (FCR) of 12-20:1. The availability of maize bran may vary by region or season. When there is a general shortage of food poorer families also consume maize bran thus making the maize bran unavailable for fish. Thus, access to good quality fish nutritional inputs is one of the key constraint for small scale fish farmers in Malawi.

Farmers who own livestock such as cattle, pigs and chickens use animal droppings to enhance pond productivity, but most of these droppings are also used as organic fertiliser applied on agricultural crops. Most farmers do not own enough livestock to obtain sufficient quantities of animal manure to fertilize their ponds. In such situations the use of inorganic fertilizers has been recommended.

## *Culture practices for fish*

Three fish culture practices are recognized depending on level of management in fish production. The practices followed are: extensive, semi-intensive and intensive culture.

### *Extensive culture*

This is a practice where no additional manure and feed are applied to the ponds. After stocking, the fish are left to depend on the natural productivity of the pond. Low stocking rates are used and as a result production levels are low. The production costs incurred are also very low.

### *Semi intensive culture*

This is a practice where manure is added usually with or without very limited supplementary feeding. The carrying capacity of the pond, fish production and costs of production are higher than under the extensive system. This is the system practiced by most small scale fish farmers in Malawi.

### *Intensive culture*

This is a practice where fish are provided with total nutritional requirements through the provision of high quality formulated commercial feeds. Good quality water with sufficient dissolved oxygen is provided to support fish production. A good example of this culture technique in Malawi is cage culture adopted by MALDECO Company at its fish farms.

During consultations with officials at the Fisheries Department, it was established that most small scale fish farmers in Malawi apply some manure to their fish ponds and provide some supplementary feed (particularly maize bran). Hence the culture practices adopted by these farmers can be classified as semi-intensive culture. However, in order to maximize the fish growth rates and overall productivity of fish ponds the adoption of intensive culture is recommended.

## *Integrated fish farming systems*

Integrated fish farming involves the production of fish in combination with other agricultural/livestock farming operations close to the fish ponds. The farming sub systems benefit from one another resulting in maximization of diversified farm outputs with minimum costs. The CODA report examines a number of possible integrated fish farming systems with a view to implementing them under the SVIP. Specific examples explored included: the agro-waste based system; the integrated fish-livestock system; the integrated fish-rice system; and, the commercial integrated fish-farming system.

### *Agro-waste based system*

In this system the ponds receive agro by-products such as rice and maize bran, or livestock manure, from the surrounding farms.

### *Integrated fish-livestock system*

This involves the integration of fish with livestock (e.g. chicken, duck, or pig) houses constructed above the ponds. The livestock are given complete feeds, while the fishponds do not get any external input except the livestock manure dropping into the water as a fertilizer.

### *Integrated fish-rice system*

About three weeks after transplanting rice, fish are introduced into specially constructed rice paddy. Fish refuges are provided to the ponds to facilitate operations such as weeding, and

fertilizing. The period through which fish are raised in this system is determined by the production period of rice, which is normally not more than three months, hence fish from this system can be used to stock the other systems. Thus, rice farmers can be encouraged to raise fish as a part-time business, and sell the fingerlings to fish farmers. The benefits of integrated rice-fish farming include using fish pond mud as fertilizer for crops and using water from ponds to irrigate crops.

*Commercial integrated fish farming*

This system is based on a long period of trials on fish farming stations. The system is based on integrating fish with livestock, notably chickens and pig rearing. Many experiences have recommended chicken layers with fish farming, but experience in Malawi has shown that broiler units are more profitable than layers. The system is being recommended for commercially oriented rice farmers, who are willing to make long-term investment into fish farming.

The CODA report recommended the development of integrated small scale and commercial fish farms on the Shire Valley Irrigation Project after examining these options. However, the inclusion of integrated fish farming systems in the SVIP will depend on what type of livestock and crops will be promoted by the project. Currently there appears to be very little production of rice in the lower Shire Valley.

## 2.5. Women in agriculture

The Integrated Household Survey (GoM, 2012) reported that female headed households cultivate smaller areas and achieve lower levels of productivity than the male headed households. On average, during the 2009/10 season female headed households cultivated about half of the land cultivated by male headed households and the maize yields attained were on average 1.5 and 1.2 t/ha for male and female headed households respectively (Integrated Household Panel Survey, 2014). These differences are significant and have to be taken into consideration in the future development of the SVIP since about 40 percent of the households residing in the project area are headed by females, either divorced, unmarried, widowed or wives of men performing off-farm jobs at places far away from their home base. The constraints to women's involvement in agriculture include: poor labour availability; smaller size of cultivation areas; lack of access to credit facilities; poor access to improved input supplies; and, poor access to training facilities and general inability to participate in training sessions conducted away from home due to the burden imposed by the multiple roles performed at household level.

Although most decisions on the farm are made jointly by both husband and wife, females tend to make more decisions on food crops, while men take the lead where cash crops are involved. Women are also involved in raising livestock especially small livestock. The asymmetric power relations at household level contribute towards the skewed allocation of the proceeds from the agricultural activities leading to the further marginalising of the female gender.

# CHAPTER 3 : POTENTIAL FOR AGRICULTURE PRODUCTION

This chapter presents an assessment of the agricultural potential of the lower Shire Valley based on climate and soil types that are suitable for the growth of several crops under irrigation. A number of potential crops are identified and enterprise viability assessments (gross margin analyses) carried out for each of the selected crops. In addition, it has been noted that the lower Shire Valley is host to large livestock numbers that need to be integrated into the proposed irrigation project. With irrigation development, there will be a decrease in the land available for grazing in the dry season, as this land will now be used for irrigation. To address this change in farming system, this chapter also presents an assessment of the potential for improved livestock production. Furthermore, the improved availability of water to large portions of the area presents an opportunity for developing fish farming enterprises and therefore it is also necessary to assess the potential for developing aquaculture projects in the lower Shire Valley.

## 3.1. Analysis of the existing farming systems

The Report on Land Tenure Diagnostic, Allocation and Consolidation Strategy for the SVIP (COWI, 2016) reported an average land holding of about 2 ha per household in the Shire Valley. This land holding is split into about three plots of approximately 0.58 ha each. In every year, among the food crops, the area put under maize was the largest and ranged from 17.9 percent in 2011/12 to 24.9 percent in 2015/16. In 2011/12 and 2012/13 cotton occupied the largest area accounting for 39.8 and 26.1 percent of the total area respectively, but has since this has dropped to 11.3 percent in 2015/16. This has led to a drastic fall in cotton production in the lower Shire Valley. In every year, except 2011/12, the area put to the main food crops (maize, sorghum and millet) was above 50 percent. In 2011/12 the other crops that are grown mainly for cash accounted for 59.6 percent and cotton alone was 39.8 percent. These figures illustrate the fact that farming in lower the Shire Valley is currently mainly subsistence and targeted towards food production. The decline in cotton production has been attributed to the low prices on both the local and international markets and farmers not respecting the contract farming arrangements resulting in the reluctance by banks and agribusiness firms to fund cotton production. Among the cash crops the area planted to pigeon peas is on the increase. The area planted to sorghum is also on the increase as the crop is increasingly being used as both a food and cash crop. The area planted to groundnuts is very small constituting only 1.9 percent of the total area on average, and this is attributed to the dominance of heavy soils in the project area that are not suitable for groundnut production.

Consultations with officers in the Department of Animal Health and Livestock Development at Shire Valley ADD revealed that cattle are the major livestock type kept three categories of farmers including small scale farmers (1-200 cattle), medium scale farmers (owning 201 – 1000 cattle) and large scale farmers (owning more than 1000 cattle). It was also revealed that very few farmers if any keep pigs and commercial poultry which are ideal for integration with fish farming. Pig rearing is constrained by the endemic problem of African Swine Fever while commercial poultry production is not common because poultry feed is not readily available (produced in Blantyre) and because commercial poultry has a low market in the lower Shire Valley.

## 3.2. Potential for crop production

The potential of crops to grow in any location is mainly dictated by climatic and soil conditions. In the case of irrigation schemes, the amount and quality of irrigation water determines the type of crops and area to be cropped. In addition, the availability of suitable crop varieties, research undertaken to develop appropriate technologies and availability of support

institutions contribute to the realisation of the potential of the area to be used for irrigated crop production.

This section looks at the main determinates of crop growth, climate and soils. The crops that are currently grown by farmers in the project area are discussed and other crops not currently grown in the area are proposed. The discussion focuses on suitability of the different crops to grow in the lower Shire Valley, yields obtained under the current farming system, crop varieties, potential yields under irrigation and yields obtained in other countries.

### 3.2.1. Climate

The yield and quality of food crops is central to the well-being of humans and is directly affected by climate and weather. Thus, climate variability and changes in the frequency of extreme events are important for yield, its stability and quality. The climatic factors that have a strong influence on crop production in the lower Shire Valley are temperature, rainfall, humidity, and sunlight.

Detailed descriptions of how these climatic factors affect production, productivity and quality of different crops are presented in the Interim Report.

#### *Temperature*

Temperature is a major environmental factor that determines the rate of plant development. Low temperatures tend to reduce plant development for most tropical crops and high temperatures accelerate plant growth up to a certain optimum which is crop specific. The lower Shire Valley is characterized by high temperatures that can exceed 40$^{o}$C during the summer months from September to March. Temperature data for the lower Shire Valley shows that mean minimum temperatures ($T_{min}$) range from 15.5 in June to 23.6$^{o}$C in November and mean maximum ($T_{max}$) range from 28.1 to 36.4$^{o}$C in July and November respectively. Overall the mean temperatures (mean of $T_{min}$ and $T_{max}$) range from 22°C in June/July to 30°C in November and these temperatures are ideal for the growth of several crops. The relatively high temperatures experienced in the lower Shire Valley from May to August (winter) compared to other areas in Malawi makes it possible to practice double cropping of traditional summer crops such as maize, rice, soya beans, sweet potato, cassava, chilies, and related crops.

However, very high temperatures such as those experienced in October and November can lead to a reduction of potential yields and some crops would perform better during the winter months in the lower Shire Valley. Illustrations of the sharpness of response of crop plants to temperatures between 30 and 35°C during the flowering and fruiting periods have been reported by Porter and Semenov (2005). For example, maize exhibits reduced pollen viability at temperatures above 36°C; rice grain sterility caused by temperatures in the mid-30°C and similar temperatures can lead to a reversal of the vernalizing effects of cold temperatures in wheat. High temperatures can also cause flower abortion in beans (*P. vulgaris* L.).

#### *Relative humidity*

Relative humidity (RH) directly influences the water relations in plants and indirectly affects leaf growth, photosynthesis, pollination, occurrence of diseases and overall economic yield (www.agritech.tnau.ac, 2013). It is reported that the atmospheric humidity affects juiciness and taste of most fruits such as oranges and mangoes (www.kzndard.gov.za ). Fruits growing in low humidity, high temperature areas such as the lower Shire Valley have better keeping quality than those growing in high humidity areas. Moderately low air humidity is favourable for seed set in many crops, provided soil moisture supply is adequate. At high RH pollen may not be dispersed from the anthers, therefore the low RH in the lower Shire Valley is conducive to good pollination

### *Sunlight*

Sunlight is vital for photosynthesis or the manufacture of carbohydrates in plants, hence an important ingredient in the production of economic yield in all crops. However, light has three principal characteristics that affect plant growth: quantity, quality, and duration. Most crops require sunlight for a period of 8 to 10 hours per day. In the lower Shire Valley only the months of June, July and December have sunshine hours below 8 hours and the rest have sunshine hours ranging from 8 to 9. This makes the lower Shire Valley sunshine hours ideal for the growth of several crops including high quality fruits. Fruits receiving more sunlight contain more sugars as compared to those receiving less sunlight. This means that oranges and mangoes grown in the lower Shire Valley are sweeter than those grown in the middle and high altitude areas.

### *Frost occurrence*

The lower Shire Valley is virtually frost free all year round. This enables several crops including those that are susceptible to frost, to be grown even during the cool months of May, June and July.

### *Rainfall and evapotranspiration*

The mean annual rainfall in the lower Shire Valley is about 720 mm, an amount which can sustain relatively high crop yields. However, the rainfall is erratic and the high temperatures and low relative humidity results in relatively very high evapotranspiration (Et). A combination of these factors results in low plant available water in the soils resulting in low crop yields under rain-fed conditions. The Et in the lower Shire Valley is higher than precipitation all year round though the difference is smaller during the rainy season.

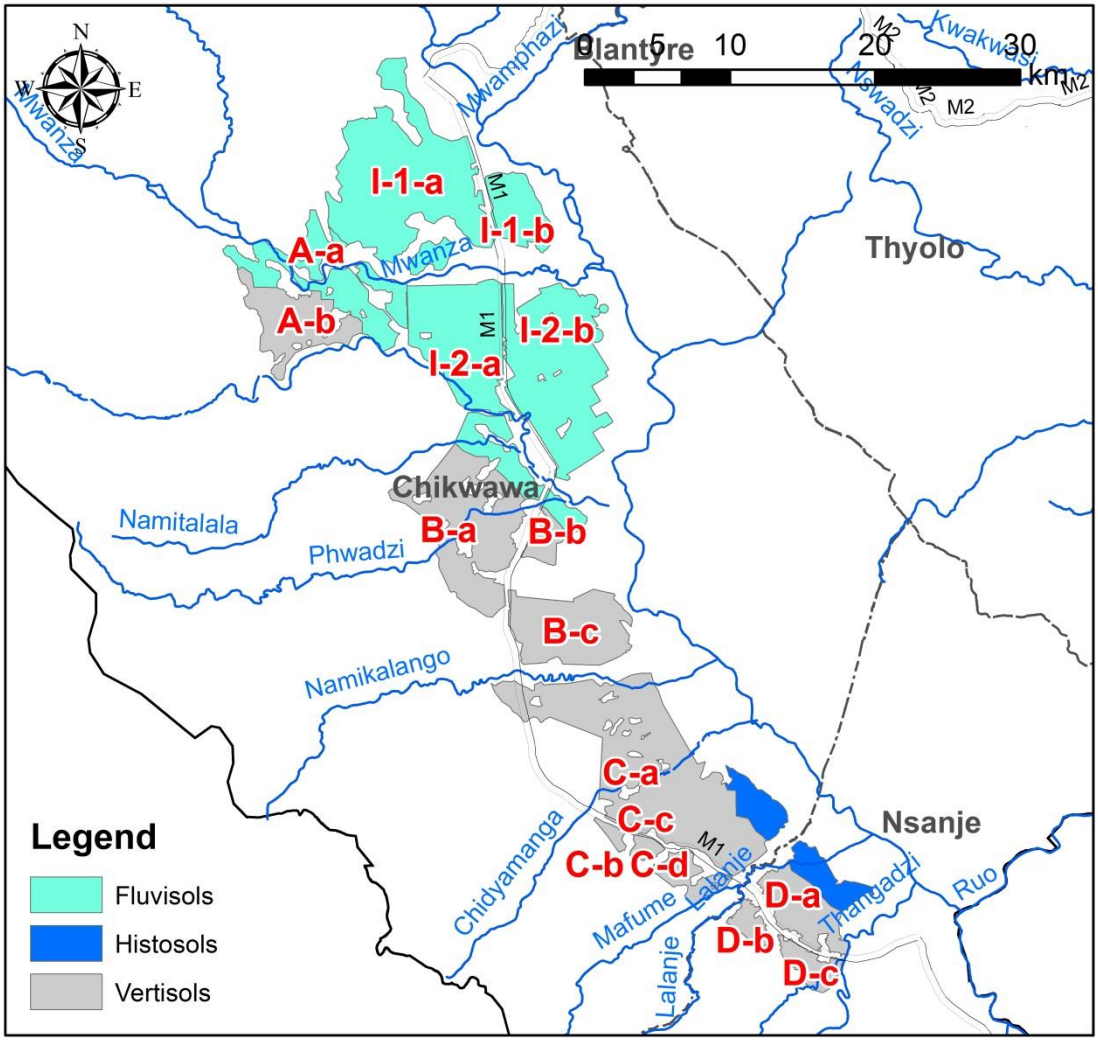
The implication of this analysis is that there is great need for irrigation in the Shire Valley for successful cropping compared to other regions in Malawi. The availability of irrigation water means that crops can be grown all year round. Irrigation will play a significant role in ensuring income generation, export earnings, employment creation and economic development in general.

## 3.2.2. Soil suitability

The lower Shire Valley is located in the Rift Valley (average altitude of 35 to 105 metres) and its soils are mostly calcimorphic alluvials with some extensive areas dominated by hydromorphic soils and vertisols. From secondary sources it is apparent that a significant area of the soils currently under dryland cultivation in the lower Shire Valley can generally be classified as irrigable. This has been verified in the Technical Feasibility Study (TFS) Soils Report (KRCC, 2016). According to the Report the soils have marginal to optimum characteristics for irrigation with specific reference to topography, soil texture, drainage, depth, calcium carbonates, salinity and alkalinity. However, it has also been noted that there are areas in the SVIP project area that exhibit high levels of calcium carbonates, salinity and alkalinity and therefore caution should be taken to ensure that such areas are not included in the irrigation scheme.

According to the Harmonized World Soil Database (HWSD) as reported in the Soils Report, there are roughly three dominant soil groups in the lower Shire Valley: fluvisols, vertisols, and histosols (see Figure 3.1). These are further sub-divided into five categories, namely: dystric fluvisol, gleyic solonchak, vertisols, eutric histosols, and humic gleysols. Fluvisols are the dominant soil group in those zones falling under Phase I while vertisols are dominant in zones falling under Phase II. The main physical and chemical properties of these soils are presented in Table 3.1. The chemical properties of the dystric fluvisols and vertisols are ideal for the production of several crops including sugar cane, maize, cotton, sorghum, rice, beans, pigeon peas, sweet potatoes and related crops. The soils are also suitable for growing other crops

including: tropical fruits; a variety of horticultural crops; and, herbs and spices. However some concerns have been expressed about the suitability of vertisols for crop production under irrigation. These concerns are addressed in the following paragraphs. Additional details on the soil types including their suitability for irrigation are presented in the Interim Report and Soils Report of the Technical Feasibility Study.




**Source:** *Technical Feasibility Study, Soils Report*

***Figure 3:1: Soil types in survey zones***

## Crop growth

### *Soil pH*

Most plants will grow well within a pH range of between 4.5 and 8.0. A soil pH of 5.0 indicates a highly acidic soil whereas a soil pH of 7.5 indicates a highly alkaline soil while a soil pH of 7.0 indicates a neutral soil. The "ideal" soil pH is close to neutral. However for practical purposes a soil is considered neutral if the pH falls between 6.5 and 7.5. It has been determined that most plant nutrients are readily available to plants within the pH range of 6.5 to 7.5. In addition, this range of pH is generally very compatible to plant root growth. Most cereal crops and legumes grow well within a pH range of 5 to 7.5. The majority of horticultural crops (fruits and vegetables) grow best in neutral conditions with the ideal pH levels between 6.0 and 7.0. Tropical fruits can generally tolerate acidic soils better than other varieties of fruit trees. The average pH of the major soil groups in the project area range from 5.9 to 8.1, hence except for gleyic solonchak, the pH is within the range for most crops (see Table 3.1).

*Table 3-1: Top soil physical and chemical properties of the major soil groups*

| Physical and chemical properties | Fluvisols | | Vertisols | Utric histosols |
|---|---|---|---|---|
| | Dystric fluvisols | Gleyic solonchak | | |
| Soil depth (cm) | >150 | >150 | >150 | >150 |
| Drainage class (0-0.5% slope) | very poor | poor | Poor | very poor |
| Sand fraction (%) | 19 | 36 | 18 | 25 |
| Silt fraction (%) | 32 | 43 | 26 | 35 |
| Clay fraction (%) | 49 | 21 | 56 | 40 |
| USDA Texture Classification | clay (light) | loam | clay (light) | clay (light) |
| pH | 6.4 | 8.1 | 7.3 | 5.9 |
| Organic carbon (%) | 1.26 | 0.42 | 0.95 | 38.4 |
| Base saturation (%) | 93 | 100 | 100 | 100 |
| TEB (cmol/kg) | 23.7 | 13.9 | 41.6 | 72.9 |
| Sodicity (ESP) (%) | 1.0 | 46 | 1.0 | 1.0 |
| Salinity (ECe) (dS/m) | 0.1 | 2.8 | 0.1 | 0.1 |

***Source:*** *Technical Feasibility Study, Soils Report*

## Soil depth and drainage

Soil depth and drainage are major determinants of crop growth. Depth determines root depth and availability of water with deeper soils being better than shallow soils and good drainage ensuring that there is adequate air in the soil for crop growth. According to the Soils Report (KRCC, September 2016) the major soil types together extend over 50,763 ha (accounting for 92.5 percent of the surveyed area). All these soil types are described as very deep (more than 150 cm). Drainage is described as poor to well drained; imperfect to poorly drained; moderately well or well drained; and well drained. In terms of depth the soils are perfect for all crops and more so for fruit trees that require very deep soils. However, there is need to address possible drainage constraints on most soil types.

## Sodicity and salinity

Sodicity and salinity can be major constraints to crop growth on irrigation schemes. The chief characteristic of sodic soils from the agricultural stand point is that they contain sufficient exchangeable sodium to adversely affect the growth of most crop plants. For the purpose of definition, sodic soils are those which have an exchangeable sodium percentage (ESP) of more than 15 percent (www.fao.org , Sodic Soils and Their Management). The gleyic solonchak, a sub-group of fluvisols (Table 3.1) has an ESP of 46 percent. Such soils should be avoided. ESP of 15 to 30 percent is considered marginal for crop growth. Sodic soils are unstable, exhibiting poor physical and chemical properties, which impede water infiltration, water availability and ultimately plant growth.

Saline soils contain sufficient neutral soluble salts to adversely affect the growth of most crop plants. FAO define saline soils as those soils which have an electrical conductivity of the saturation soil extract of more than 2 dS/m (www.fao.org, Saline Soils and Their Management). In such soils poor drainage can result in sodicity resulting in the soils being unsuitable for irrigation. Since the lower Shire Valley generally has poor drainage it is important that an adequate drainage system is put in-place.

## Vertisols

Vertisols are often described as problem soils because of their physical properties and as a result are generally underutilized for crop production. The problems encountered include tillage problems especially when they are wet when they tend to exhibit such characteristics as being easily erodible, having a low water infiltration rate and poor drainage. As a result, they have generally been regarded as marginal for crop production. However, much evidence has

been gathered through research, demonstrating that vertisols can be transformed into productive crop land if appropriate measures are taken to address the physical problems described earlier.

Vertisols, sometimes called self-ploughing or cracking clay soils, cover approximately 100 million hectares equivalent to 6 percent of arable land in Africa (Syers *et al*, 2001). Large tracts of land dominated by this soil type are found in Niger, Chad, Somalia, Sudan, Ethiopia and Zimbabwe. With the exception of Ethiopia these soils are found in arid to semi-arid regions that require irrigation for crop production. In these areas vertisols are used for extensive agriculture where irrigation water is available and the soils have proven to be highly productive (Virmani, 1987). The soils can best be utilized by managing irrigation water through installing adequate surface drainage to avoid water logging.

In Sudan, vertisols are by-far the most extensively used soils for both rainfed and irrigated crop production. Close to 90 percent of Sudan's cotton crop is grown on irrigated vertisols which occur on level plains (FAO, 1979). In Zimbabwe, an estimated area of 6,000ha is currently under irrigated sugar cane production. In Malawi, Chilimba (2001) reported the extensive use of vertisols for cotton production where yields attained have been higher than on other soil types. Due to their self-ploughing/cracking nature when dry, vertisols are generally not suitable for growing fruit trees because the cracking action tends to cause root pruning.

Outside Africa vertisols are also found covering extensive areas in Australia and India. In Australia winter crops such as wheat, safflower, barley, oats and summer crops such as sorghum, maize, soya bean, cotton, sunflower and millets are grown under natural rainfall on vertisols. Cotton, fodder crops and rice are grown under irrigation (Connolly et al, 2001). In India vertisols are used for the cultivation of annual crops such as soya beans, wheat and certain pulses (Swindale, 1987).

### 3.3. Suitable crops for project area

The crop selection for the SVIP is based on the climate and soil considerations. From the above analysis several tropical and to some extent temperate crops can grow well in the lower Shire Valley either during summer, winter or all year round. The crops proposed for inclusion in the cropping programme can grow very well on the soils identified as being suitable for irrigation in the project area. The main soil characteristics including: soil pH, depth (at more than 150 cm), structure, chemical properties (except for sodic areas) are all within range for all the recommended crops. Information gathered from available literature suggests that there could be issues pertaining to root pruning for some tree crops planted on vertisols. However, it is also reported that this is not a serious problem for crops grown under irrigation since the cracking is bad when the soils are very dry. Secondly, soya beans and dry beans can experience emergence problems on soils with a high clay and silt content. This problem can be easily managed by applying an "emergence irrigation" at the time the seeds are starting to emerge from the ground. This is normal practice on such soils.

In terms of drainage, cotton, dry beans and soya beans are very susceptible to water logging compared to other crops. Other crops can survive longer periods but yield is drastically reduced (e.g maize, sugarcane). Therefore, there is need to build into the irrigation design adequate drainage lines/trenches. This has been done successfully on schemes developed under similar conditions in other countries in Africa (e.g. the south-east lowveld of Zimbabwe at Chisumbanje, Triangle and Hippo Valley).

This section presents brief descriptions of the crops including niche crops with high potential for export to Europe, USA and Asia. The crops have been divided into cereals, sugar cane, oil

seed, pulses, root and tuber, spices, vegetables, tropical fruits, and fibre crops (cotton). The crop suitability assessment will also include the potential for the cultivation of crops for seed production.

### 3.3.1. Cereals

Under cereals the analysis will focus on the potential of growing maize, rice, sorghum and wheat under irrigation.

#### *Maize*

Maize is grown widely throughout the country and is the staple food crop. Based on five year data maize is cultivated on about 45 percent of cropped land nationally and 22 percent in the lower Shire Valley (refer to Tables 2.1 and 2.5). Frequent droughts have resulted in serious food shortages at national and household levels and government policy is to ensure self-sufficiency at both levels. A five year (2011 to 2015) analysis of data from the MoAIWD agricultural production estimates gave a national average yield of 1.96 t/ha and 0.86 t/ha in the lower Shire Valley. These yields can be improved significantly to a range of 5 to 8 t/ha under irrigated conditions and improved husbandry practices.

For example, commercial hybrid maize grown by Illovo has generally yielded about 4.5 t/ha, given adequate irrigation water and fertilizers. Most hybrid varieties have potential to yield up to 10 t/ha but the relatively high temperatures experienced in the lower Shire Valley reduce this potential substantially. In fact, because of the high temperatures experienced during the summer months, maize would yield better when grown during the cooler winter months.

The optimum mean temperature requirement for maize growth ranges from 19 to 27°C while mean monthly temperatures during summer in lower Shire Valley range from 28 to 30°C and mean maximum temperatures range from 30 to 36°C in summer. The implication of these temperatures for maize production in lower Shire Valley is that maximum yields can only be achieved during the winter months, April to August. Kasinthula Research Station has reported an average on-station yield of about 6.2 t/ha for maize grown in May to the first week of June. Late June and July sowings achieved lower yields. The experiment was carried out over two seasons at two sites using maize hybrid, MH12.

#### *Rice*

Rice grows best under flood conditions and warm temperatures and does best during the summer or rainy season. The optimum mean temperature requirement for rice growth ranges from 20 to 27°C while mean monthly temperatures during summer in lower Shire Valley range from 28 to 30°C. Traditionally, in Malawi, rice is planted in December and harvested in May. During this period mean monthly temperatures range from 24°C in May to 29°C in December and January. However, in the lower Shire Valley, due to the relatively high temperatures in the winter season, there could be two irrigated crops per year. The crop is currently mainly produced under a paddy irrigation system along the shores of Lake Malawi, Lake Chirwa plain and lower Shire River plain at an altitude of 500 to 1000m above sea level (asl).

The major national objective in rice production is to increase paddy yields under irrigation to meet both domestic and export demand (MoAIWD, 2012). Current mean yield is about 4 t/ha but under irrigation and good management, the yield can go up to 6 t/ha. Such a yield increase would lead to more rice exports to the neighbouring countries most of which consume large quantities without growing significant quantities. However, a large scale paddy irrigation system in the proposed SVIP may not be compatible with the cropping system or rotation and may also require a lot of water.

Upland rice varieties are generally drought tolerant, but have a low yield potential and tend to lodge particularly when high levels of external inputs such as fertilizer and supplemental irrigation are applied (www.knowledgebank.irri.org). The high yielding version of upland rice varieties are commonly known as "aerobic rice" varieties and combine the drought-resistant characteristics of upland varieties with the high-yielding characteristics of lowland varieties. Aerobic rice under overhead or flood irrigation can be grown in the lower Shire Valley but this may require extensive research to establish the precise nature of the agronomic practices that need to be adopted in the project area. Upland rice research at Lifulu Agricultural Experiment Station achieved yields of up to 4 t/ha under rainfed conditions (www.cabi.org, Mzengeza, 2008).

Upland rice can be grown in rainfed or irrigated fields prepared and seeded when dry, much like wheat and maize whereas paddy rice is grown in flooded fields. Upland or aerobic rice can grow in ecosystems that are diverse, including fields that are level, gently rolling or steep. Soil requirements range from highly fertile to highly weathered, infertile and relatively acidic well drained soils. The percolation rate by soil type for soils in the lower Shire Valley indicates that is ranges from 22.8 mm/day for Calcaric Cambisols to above 50 mm/day for Haplic Luvisols, Eutric Vertisols, and Eutric Cambisols (Soils Report, KRCC, September 2016). Paddy rice production on soils with high percolation rates will require excessive water supply and it might be necessary to avoid such soils for paddy rice production. It has been reported that nearly 100 million people now depend on upland rice as their daily staple food and almost two-thirds of the upland rice area is established in Asia.

With the development of high yielding New Rice for Africa (NERICA) for upland production systems, farmers in a number of rice growing African countries have adopted the crop. However, in Malawi the adoption of NERICA and other upland rice varieties has been poor. The NERICA varieties can mature in 90 (early maturing) to more than 120 days (late maturing) and under irrigation in the lower Shire Valley this could be ideal for quick rotation with other crops. A yield of 5 t/ha has been reported for NERICA varieties under rainfed conditions.

It has been reported that rice is now one of the most important subsistence crops in Africa (www.grain.org/article/entries). Since colonial times, African governments have consistently promoted rice as a staple food for their increasing urban populations. Domestic rice production has risen, but not enough to keep pace with demand. Production rose at an annual rate of 3.2 per cent between 1961 and 2005 in sub-Saharan Africa, while consumption rose by 4.5 per cent (www.grain.org/article/entries). According to the Africa Rice Centre (of the West Africa Rive Development Association, WARDA), sub-Saharan Africa has gone from producing more rice than it needed (112 per cent of domestic consumption) in 1961 to importing 39 per cent of its consumption in 2006 and today annual rice imports cost almost US$2 billion. In Malawi Mtalimanja a privately owned company established in 2012. The company has a factory with a capacity to process of 200 MT per ten hour shift translating to throughput requirement of 10,000 tonnes of rice per month. Currently farmers are capable of supplying 2,000 tones. To meet its deficit the company needs to secure supplies estimated at 8,000 tonnes per month and it is estimated this could necessitate the establishment of an additional hectarage of 4,500ha of land (assuming an average yield of 1.8tonnes/ha).

### *Sorghum*

Sorghum is a warm-weather crop, which requires high temperatures for good germination and growth. A temperature of 27 to 30°C is required for optimum growth and development but this can range from 20 to 30°C without a dramatic effect on growth and yield. These temperatures are ideal for growing sorghum during summer and winter in the lower Shire Valley where the monthly mean temperatures range from 22°C in June/July to 30°C in November.

Sorghum is drought tolerant hence it is an important food and at times cash crop in the drought prone lower Shire Valley. Though drought tolerant, a five year mean yield in the lower Shire Valley based on MoAIWD agricultural production estimates is about 800 kg/ha and a long term national average is 600 kg/ha (MoAIWD, 2012). It has been postulated the low yields are not only due to low rainfall but to poor management and use of low yielding local varieties. There is potential to increase yields to 3 to 5 t/ha under irrigation, improved management and use of improved seed varieties.

Yield levels of 8 to 10 t/ha have been reported under irrigation in the hot areas of Australia (Wylie, 2008; Peake, 2011). The high yields were mainly achieved under overhead irrigation on soils with large plant available water capacity. The average yield under rain-fed conditions was reported to be 2.5 t/ha and was expected to increase to 3 t/ha (Wylie, 2008).

In South Africa, the national average yield is about 2 t/ha under rain-fed conditions (South Africa Department of Agriculture, Forestry and Fisheries, 2010). Malala (2010) reported a yield of 4.07 t/ha under irrigation compared to 2.33 t/ha under rain-fed conditions.

The yield differences observed in Malawi, Australia and South Africa are mainly attributed to varietal and crop management differences. The major seed companies in Malawi, Seed-Co and Pannar are currently not selling any improved sorghum seed varieties and there will be need to import improved varieties to be tested and undergo the variety release procedures.

Sorghum is mostly suitable for use as a food crop and also for brewing beer. The current sorghum grain production for brewing stands at 200MT against a demand of 800MT. All the sorghum produced is consumed locally. Since sorghum is a potential crop for the area, there will be need to explore export opportunities and other uses locally such as animal feed. The choice for growing sorghum under irrigation would depend on its gross margins compared to other crops but what will be important is to attain high yields.

### *Wheat*

Wheat is a temperate crop that can only be grown during the cold season in the tropics where temperature has a strong effect on yield. Higher yields are achieved in the cooler high altitude areas than in warm/hot low lying areas such as the lower Shire Valley. In Zimbabwe, under similar climatic conditions, mean yield ranged from 3.8 to 4.8 t/ha across four experimental sites (Nyamudeza and Chakanetsa, (unpublished data)). Gwenzi et al (2008) reported a mean yield of 4.4 t/ha in a tillage experiment at a site in Zimbabwe with similar climatic conditions as lower Shire Valley. An irrigation experiment at Kasinthula using old varieties (Torim and Limpopo) attained a mean yield of 2.1 t/ha.

Although wheat quality is a genotype-dependent trait, environmental variables have important effects on wheat grain protein accumulation and processing quality. Adverse environmental or climatic conditions can negatively affect grain protein content, a strong determinate of flour quality. Daily maximum temperatures greater than 32$^{o}$C reduce the duration of grain ongenesis, resulting in change in protein composition, production of shrivelled grains with a high proportion of bran and reduction in wheat quality (Naeem et. al. 2012, Yao et.al., 2006, Chen et.al. 2005). The implication for wheat growing in the lower Shire Valley is that the relatively high temperatures may compromise yield and quality and further research at Kasinthula Research Station is necessary before commercial production is recommended and promoted under the SVIP.

Malawi imports almost all of its wheat requirements and quantities range from 85 to 100 thousand MT per year. This costs the country about US$60 to $90 million per year. The import demand for wheat flour on the domestic market can be reduced through the promotion of the use of substitutes for the commodity and increasing domestic production of the crop. This can

be achieved through the intensification and cultivation of improved varieties and increasing production can result in reduced demand for imports of the commodity.

### 3.3.2. Sugar cane

Sugar cane was first grown on a commercial basis in Malawi in 1965. It has been a very profitable crop under irrigation in Chikwawa and Nkhotakota. Current yield levels range from 90 to 120 t/ha. The yield compares well with an average of 90 t/ha in Mpumalanga Province in South Africa (www.property24.com) and better than the yield of 72 t/ha reported for Mozambique (Esterhuizen and Zacarias, 2011). The crop is currently grown for sugar and ethanol. There is vast potential to increase the area under sugar cane for ethanol production used in blending with petrol.

Ebrahim et al (1999), reported that temperatures above 27°C reduced sugar cane biomass production and at 45°C total biomass production was reduced to between a third and a half of the biomass achieved at 27°C. The highest mean temperature in the Shire Valley is 36.4°C. The reduction in biomass reported by Ebrahim et al (1999) is due to reduced photosynthesis and increased respiration at high temperatures and this also leads to lower sucrose concentration in sugar cane. In general, for all crops, temperatures above or below the optimum reduces biomass accumulation or growth and economic yield. However crops can still be grown in areas where temperatures experienced are lower or higher than optimum provided the temperatures do not completely inhibit growth and yields obtained are viable.

The law in Malawi stipulates that petrol should be blended with 20 percent ethanol but currently due to low supply of ethanol, the blending is only done at the 10 percent level. Fuel statistics show that in 2013 and 2014 petrol consumption in Malawi was 108.85 and 108.90 million litres respectively (Malawi Energy Regulatory Agency, MERA, 2015). To blend at 20 percent a total of 21.78 million litres of ethanol were required but only 12.9 and 14.6 million litres of ethanol were produced in 2013 and 2014 respectively by Ethco and Presscane (MERA, 2015) giving a deficit of between 50 to 70 percent. These figures show that there is great potential to increase the area under sugar cane to produce ethanol.

Currently constraints encountered in producing ethanol are associated with the inadequate supply of raw materials. The current low production is mainly attributed to the small quantities of molasses available from the Illovo crushing mill at Nchalo. The available molasses is not adequate, hence the need to grow more sugar cane that will solely be used for the production of ethanol as is currently done in Brazil and Zimbabwe. The setting aside of more land for growing sugar cane under irrigation in the SVIP will go a long way in addressing the shortage in raw materials required for producing the substantial volumes of ethanol required in Malawi.

The bulk of the sugar produced in Malawi is sold on the domestic market, either for direct consumption or industrial use for ethanol production. About 170,000MT of sugar are consumed locally compared to exports of 100,000 MT. It is reported that within the region, sugar from Malawi is mainly exported to Mozambique, Tanzania and Zambia. The past years have witnessed a rise in exports. The changes in the Sugar Protocol [2]are likely to have an impact on Malawi sugar exports considering that approximately 20 percent of exported sugar was sold into preferentially-priced markets in the EU and United States, with the remainder sold primarily to regional markets.

[2] In October 2009 the sugar protocol between the European Commission and 20 ACP countries came to an end. This meant that sugar exports became free within the limits of a special volume safeguard, which will cease to apply in 2015. After that year sugar will have free access to the EU as any other product under the Economic Partnership Agreement (EPA) signed in 2008.

### 3.3.3. Oil seed crops

Oil seed crops discussed in this section are soya bean, groundnuts and sunflower. Groundnuts are widely grown in the lower Shire Valley but soya beans and sunflowers are relatively unknown crops. It is important to note that one of the national priorities identified by the NES is the promotion of oil seed crops for the specific purpose of providing inputs for the manufacture of cooking oil, meals, soaps, lubricates, bio-fuel, animal feed, snacks and other similar products.

#### *Soya beans*

Soya beans is generally a summer crop and research results show that soya beans are well adapted for production in all agro-ecological zones in Malawi. However, information from Kasinthula Research Station is that in the lower Shire Valley the crop does better during the winter months of May to August. Soya bean production is on the increase, and average production from 2007 to 2012 was 75,000 MT compared to an average of 40,000 MT from 2002 to 2006 (Bulletin of Tropical Legumes, 2013). However, in the past 5 years yield has remained relatively constant at 0.9 t/ha compared to a potential yield of 2.0 to 2.5 t/ha.

Table 3.2 presents the yield potential of soya bean seed varieties marketed by Pannar, Seed-Co and those bred at Chitedze Research Station. The yield potential estimates are based on well managed crops with adequate water in the high altitude areas. Kasinthula Research Station has not conducted any agronomic research on soya beans but they have hosted breeders' materials (nurseries) during the winter season. There is however a general feeling that soya beans perform better during the winter season. The temperature requirements range from 18 to 30$^{o}$C, therefore the crop could be grown in both winter and summer.

***Table 3-2: Yield (t/ha) potential of soya bean varieties from Seed-Co, Pannar and Chitedze Research Station***

| Seed company / breeder | Name of variety | Potential yield (t/ha) |
|---|---|---|
| Seed-Co | Squire | 2.50 |
| Seed-Co | Serenade | 3.50 |
| Pannar | PAN 1867 | 3.00 |
| Chitedze | Tikolora | 2.50 |
| Chitedze | Makwacha | 3.00 |

***Source:*** *Seed-Co, Pannar and Chitedze Research Station*

In 2012 it was estimated that national production was 65,270MT compared to a national demand of 111,000MT and demand in 2015 was projected at 139,000MT (Bulletin of Tropical Legumes, 2013). Area under production in the major producing areas of Kasungu, Lilongwe and Mzuzu, is not likely to increase due to land pressure. Therefore growing the crop on a large scale under irrigation in the lower Shire Valley can go a long way in meeting local demand and for export. According to MoAIWD (2012) the national objective is to encourage the growing and utilization of the crop, and increase yield in order to meet prevailing high demand locally and for export.

#### *Groundnuts*

Groundnuts are grown all over Malawi and are an important food legume in smallholder agriculture, providing approximately 25 percent of agricultural cash income (Minde, et al, 2008). Average production from 2002 to 2011 was estimated at 227,089 MT and projections for 2014 and 2017 were estimated at 244,121 and 303,271MT. During the same periods average national demand was 168,294 MT and projections were 176,372 and 203,008 MT (Bulletin of Tropical Legumes, 2013). These figures show that Malawi is producing more groundnuts than it can consume. On the surface this presents an opportunity to increase exports.

Unfortunately, external markets for groundnuts grown in Malawi are currently limited because of the perception that groundnuts in Malawi have high levels of aflatoxin contamination.

National average yield is estimated at about 0.8 t/ha compared to a potential yields of 1.5 to 2.5 t/ha (MoAIWD, 2012, Minde et al. 2008). Under rainfed conditions reports from Shire Valley ADD show that the yield of shelled groundnuts is 0.5 t/ha. Under good management and adequate soil water Seed-Co varieties SC Nyanda and SC Orion have potential yield of 2 to 3 t/ha and locally bred varieties from Chitedze Research Station, Kakoma, Baka and Chitala have a yield potential of 2 t/ha.

In Malawi research on groundnuts has been going on for a long time. The research has been conducted by the Department of Agricultural Research Services and the Consultative Group on International Agricultural Research (CGIAR) partners. The research has culminated in the development of numerous technologies for enhancing groundnut productivity through improved varieties with resistance/tolerance to major biotic and abiotic stresses, and a package of improved agronomic management practices. Groundnut production in Malawi relies on rainfall, which can affect production and supply of the commodity since the rainfall can be unreliable. The improved availability of irrigation water in the lower Shire Valley and the introduction of new technologies will contribute towards boosting the production of groundnuts in Malawi. However, noting that the dominant soils are vertisols with a high clay content, crop suitability maps show that only small patches are suitable for groundnuts in the proposed project area (Land Resources and Conservation Department and KRCC, 2016).

### *Sunflower*

Sunflowers thrive in warm climatic conditions and optimum temperatures for growth range from 23 to 28$^{o}$C. The crop is known for its hardiness and the ability to survive extreme heat and under marginal soil conditions. Therefore sunflowers can grow all over Malawi and can survive the harsh conditions in the lower Shire Valley. The crop can do well with rainfall as low as 500 to 600 mm (MoAIWD, 2012). The mean annual rainfall in the lower Shire Valley is about 720 mm.

Currently annual average yields are 0.4 to 0.5 t/ha but there is potential to increase yields to 2.5 to 3.0 t/ha through the use of improved seed varieties and soil moisture management. Although sunflowers are able to withstand periods of drought and heat, yields can be increased significantly through the provision of supplementary irrigation if there are lengthy periods without rain. A variety by nitrogen level experiment at KRS attained a yield range of 1.2 t/ha (no fertilizer application) to 2.6 t/ha (100 kgN/ha) for the variety NSCO 323.

## Market analysis – oil seed crops

As a share of Malawi's total exports, exports of oil seed products have been rising over the years, with the share in total exports increasing marginally from an average of 3.13 percent between 2006 and 2011 to 5.3 percent between 2012 and 2014. The exports were largely in raw form reflecting Malawi's low level of manufacturing and/or agro-processing.

Local companies (e.g. Sunseed Oil) have invested in processing of oil from sunflower, groundnuts and soya beans with a capacity of about 180, 000 MT. Other companies like Afrinut are also positioning themselves to expand their capacity to produce oil from groundnuts and soybeans. The deficit of raw materials in the supply chain presents an opportunity for farmers to produce more oil seeds under the SVIP. Concrete commitments are yet to be established with specific companies but many firms have expressed interest to buy oil seeds from farmers to fully utilize their processing capacity.

### 3.3.4. Pulses

The pulses discussed in this section are beans and pigeon peas. The two crops are currently grown by smallholder farmers in the lower Shire Valley under irrigated (beans) and rain-fed conditions for pigeon pea.

#### *Beans*

Dry beans, *(Phaseolus vulgaris* L*),* is an important legume crop grown by nearly every smallholder farmer throughout Malawi. The crop is a good source of vegetable protein and government policy is to increase production to improve the nutritional status of the rural communities. The crop requires a relatively cool climate and for this reason, it does well in summer in the high altitude areas or plateau areas where temperatures are relatively low. In the low altitude areas the crop does well in the dry winter season under irrigation and in dimbas where it mainly utilizes residual moisture and also receives supplementary irrigation. Optimum temperatures for growth range from 19 to 27$^{o}$C. Under hot conditions the crop is susceptible to a number of fungal and bacterial diseases that would need regular spraying. High temperatures can also cause flower abortion and farmers should avoid planting beans when flowering will occur at temperatures far in excess of 30$^{o}$C or below 15$^{o}$C. For this reason in the low altitude areas such as the lower Shire Valley, the crop can only be grown as a winter crop in April/May.

An experiment conducted at Kasinthula Research Station attained a yield range of 1.1 t/ha for a low irrigation regime (2 irrigations) to 3.0 t/ha (8 irrigations) in the lower Shire Valley. Seed-Co variety SC Bounty and Pannar variety PAN 148 have yield potentials of 3 and 4 t/ha respectively.

It is worth noting that production and demand for beans in Malawi are rising, with an annual growth rate of 4 percent between 2002 and 2011 (124,000 MT in 2011) in production (Bulletin of Tropical Legumes, 2013).

#### *Pigeon pea*

Pigeon pea is an important pulse in Malawi which is normally intercropped with maize in the Southern Region. The national objective is to encourage the growing and utilization of the crop as well as to raise yield levels in order to meet the high demand on both the domestic and export markets (MoAIWD, 2012). On average the crop is grown on 148,000 ha giving 113,500 MT at an average yield level of 0.8 t/ha. The low yields are mainly due to the use of unimproved varieties and the traditional practice of intercropping as opposed to establishing pure stands. Discussions with researchers at Chitedze Research Station revealed that a yield of between 2.0 and 2.5 t/ha can be achieved from improved varieties under good management.

The pigeon pea improvement program at Chitedze Research Station has been working in partnership with the International Crop Research Institute for the Semi-arid Tropics (ICRISAT) to develop superior pigeon pea lines and evaluate them at national and regional multi-locational sites for adaptability and acceptance. The results from the programme will play a crucial role in the expansion of pigeon pea production. The high pigeon pea demand from Asian countries strongly indicates that pigeon pea as a potential crop for inclusion in the cropping programme for the SVIP. It is considered a strategic crop that can contribute towards the economic recovery plan developed by the Government of the Malawi.

#### Market analysis - pulses

In 2013, total global trade in pigeon peas and dal amounted to 383,053 MT with a value of US$252 million. India is the largest import market by a large margin accounting for 97.8 percent of the volume of global imports in 2013. It is reported that, Malawi exported 20,395

MT of pigeon peas in 2013 with a value of US$12.6 million. Demand for the pulses is increasing especially from India which bought 90 percent of Malawi pigeon pea crop in 2013.
On the domestic market, ETG is one of the main buyers and exporters of pigeon peas. The demand for the crop is huge as evidenced by the increasing production trends. Other traders like Rab Processors and Transglobe also buy the crop which is mainly sold on the domestic market.

### 3.3.5. Root and tuber crops

#### *Cassava*

Cassava is the most important root crop in Malawi and it is grown in most parts of the country. It is a staple food crop for about 30 percent of Malawians, especially those in the five districts of Karonga, Rumphi, Nkhata Bay, Nkhotakota, and Salima along the shores of Lake Malawi (Mkumbira, 2007). It is grown as a food reserve or cash crop in the other parts of the country where the staple crop is maize. Small-scale farmers produce almost all the cassava crop grown in Malawi. Intensive cassava production is done in marginal areas along the western coast of Lake Malawi where cassava is the staple food.

There is potential to produce cassava on a large scale as an input into industrial production of starch, animal feed and bio-fuels. The Government's objective is to increase both productivity (yield levels) and overall national production. Current average yields range from 8 to 20 t/ha fresh weight. With improved varieties and under irrigation the yield can be increased to more than 30 t/ha fresh weight (equivalent to 9 t/ha dry weight).

The possibility of producing bio-fuels makes the crop even more important for the SVIP since the government intends to increase the level of blending of petrol and bio-fuels used on the local motor vehicle fuel market. The current production levels of bio-fuels from sugar cane is inadequate for the country to achieve the 80/20 blending policy guidelines gazetted by the Government of Malawi.

#### *Potatoes*

Potatoes are most suitable in areas characterized by a cool climate and high rainfall. The crop can be grown under rain-fed conditions in summer and irrigated conditions in winter. It is an important cash and food crop that has a ready market in urban areas. With the right varieties, a large amount of potatoes can be used in industry to make dry potato chips. Current yields range from 7.5 to 10 t/ha but can be increased to 15 to 20 t/ha (MoAIWD, 2012). This potential yield of 15 to 20 t/ha is considered to be low in comparison to average yields of 40 t/ha rain-fed and 70 t/ha irrigated crop achieved in South Africa (Harvey, 2012).

Due to the cool temperature requirements potatoes can only be grown in winter in lower Shire Valley. The valley is normally too hot for growing potatoes in summer. Kasinthula Research Station is currently conducting research on heat tolerant potato varieties that can be grown in the lower Shire Valley.

#### Market analysis – root and tuber crops

In southern and some parts of central Malawi cassava is mainly grown for sale in the markets rather than for household consumption. Currently very little is used in the processing industry where the crop can be used for producing starch and ethanol. The potential for industrial processing is apparent although no major investments have been made to-date.

Currently the potatoes (Irish) produced in Malawi are of relatively poor quality due to poor seed and general management of the crop. However some of the local potatoes are sold in

Mozambique and a lot more can be consumed locally. As indicated earlier production in the lower Shire Valley needs further research.

### 3.3.6. Fibre crops

#### *Cotton*

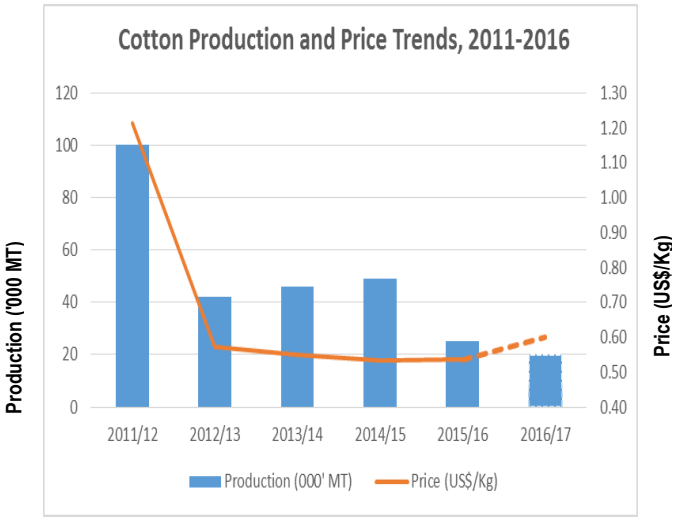
The climate and soils of the lower Shire Valley, especially the vertisols, are very suitable for cotton production. The best soils for cotton are sandy loams, loams and well-granulated clay loams. The crop is currently widely grown under rain-fed conditions in the lower Shire Valley and it is the most drought tolerant crop in the area. However, in recent years the declining world market price has affected viability and concomitantly production levels have declined in many countries in the sub-region (see Figure 3.2). Since the cotton plant has a perennial growth pattern deliberate measures will have to be taken to observe a "dead" period during which no plants will be allowed to grow as a measure to control the spread of diseases in the project area. In addition, integrated pest management will have to be adopted to ensure that all the herbicides and pesticides used do not have an adverse long-term impact on the natural environment.

National mean crop yields in Malawi are relatively low (0.7 – 0.8 t/ha). With good management, yields of between 2.5 and 3.0 t/ha are achievable and yield potential of available varieties ranges from 3.0 to 3.8 t/ha (MoAIWD, 2012). However, under irrigation, yields of between 4 to 5 t/ha can be achieved (www.zimmatic.com/keycrops). Pretorius (2009) reported a five-year national (South Africa) mean yield of 3.6 t/ha under irrigation compared to 0.5 t/ha under rain-fed conditions. Pretorius (2009) also reported a mean yield of 4.3 t/ha for experiments conducted over three seasons at 18 different sites in South Africa.

In Malawi the cost of production of cotton could be higher than in other countries which have adopted genetically modified cotton varieties because genetically modified cotton is less susceptible to pest attack. In South Africa, Bt-technology has proved to be not only effective against the target pests (mainly African bollworms), but it is also beneficial to farmers who gain from the higher yield potential (Bennet-Nel, 2007). However, the controversy on Bt cotton is not yet resolved with reports from South Africa suggesting that Bt cotton has not been the answer to the problems faced by farmers in the Makhathini area in KwaZulu-Natal where the initial benefits have not been sustained. In Malawi Bt cotton was tested under controlled conditions at Makoka but the results achieved were not conclusive.

In Australia, use of GMO cotton has produced higher yields than the traditional varieties. Monsanto reported lint yield of 16 bales/ha in Australia (www.monsanto.com). This translates to about 3.52 t/ha of lint or 10 t/ha of seed cotton at 35 percent lint to seed cotton ratio. Lint yields of 2.44 t/ha (www.cottonaustralia.com.au) and 2.70 t/ha (Kilby et. al., 2012) have been reported for traditional Australian varieties.

In terms of availability of varieties in Malawi, discussions at Makoka Research Station and with representatives of Quton Seed Company revealed that there are locally bred varieties that are suitable for the lower Shire Valley. The varieties have been tested under rain-fed conditions and it is believed they could yield up to 4.5 t/ha under irrigation. The variety which was specifically bred for the lower Shire Valley is Makoka 2000 and a Zimbabwe variety, SZ9314, has also been found to be suitable. There is need to carry out experiments on GMO, and traditional varieties at Kasinthula Research Station to identify suitable varieties that can be grown under irrigation in the lower Shire Valley




***Source:*** *AICC (2016)*

***Figure 3:2: Seed Cotton Production and Price Trends***

Over 95 percent of the cotton lint produced in Malawi is exported. Internationally cotton of widely traded with over 150 countries involved in trading the commodity. Traditionally the cotton produced in Malawi has been exported to South Africa, the United Arab Emirates and the United Kingdom. Asian countries including Indonesia and Thailand are increasingly becoming important destination for Malawian lint.

### 3.3.7. Vegetables

The vegetables covered in this section are baby corn, butternut, green beans, and tomatoes.

#### *Baby corn*

The establishment and management of Baby corn is similar to that of ordinary commercial maize. Baby corn is, in essence, the ears of the maize plant harvested before they are fully developed seeds. Specific seed varieties have been developed to produce the baby corn that is sold through the commercial outlets. In addition, the crops requires large quantities of water to be readily available until it attains maturity.

The growing of baby corn in the lower Shire Valley will be relatively easy since the farming practices adopted closely resemble those used in the production of maize which is widely practiced throughout the country. Baby corn is grown mainly for the export market though in recent times the crop has been accepted in many of the local diets in some African countries especially in the urban areas where growing numbers of the middle class have also taken it up. It is unusual to find baby corn in a supermarket in Malawi.

Baby corn matures in between 45 to 60 days depending on the prevailing weather conditions and it is envisaged that the high temperatures of the lower Shire Valley will be conducive to the early maturing of the crop. Yields have been reported to range from 2 to 3 t/ha. After harvesting the plant stalks will still be green and these crop residues can be used as fodder for livestock, particularly for dairy cows.

#### *Butternut squash*

Although butternuts are not commonly grown in Malawi, the product is fairly common on the shelves of the major supermarket chains in the large urban centres. Virtually all the produce sold through the local supermarkets is imported from South Africa. There is no mention of the

crop in the Guide to Agricultural Production and Natural Resources Management in Malawi (MoAIWD, 2012).

The crop does well under irrigation in hot sunny environments such as those found in the lower Shire Valley where the heat, solar radiation and low humidity are conducive for the production of more sugars in the fruit resulting in a better quality product compared to produce from the higher altitude areas. Under the conditions prevailing in the lower Shire valley butternuts can be grown in both the wet and dry seasons. In South Africa mean yield of most varieties is approximately 20 t/ha.

Apart from the significant demand on the local market there is relatively high demand for butternuts in Europe. One of the advantage that Malawi has is that the crop can be grown in the country at a time when it is off-season in Europe.

### *Green beans*

Green beans are a tender vegetable picked and cooked in their green pods before seeds are fully developed. There are two types, pole or runner bean and bush bean, and like common dry beans, their botanic name is *Phaseolus vulgaris*. Pole beans will grow in a climbing vine and require a trellis or staking. Bush beans will spread up to 50 cm but do not require support. Other common names are fine beans, French, string or snap beans.

Green beans is a cool season crop but it will tolerate higher temperatures than peas with an ideal temperature range of 15 to 30$^{o}$C. The crop is sensitive to frost conditions and high temperatures. In this respect the crop would do better during the winter season in the lower Shire Valley since summer temperatures can easily exceed 30$^{o}$C. High temperature result in poor flower development and poor pod set. Since the lower Shire Valley is relatively frost free, farmers can take advantage by growing the crop when most parts of Malawi and other areas in the region experience frost.

The crop grows well in light to moderately heavy soils with near-neutral pH and good drainage. The crop can grow well on most soils in the lower Shire Valley but there is need to have drainage lines/channels on the heavy clay soils particularly vertisols.

There are many varieties of green beans and selecting high yielding disease tolerant varieties is an important factor for successful commercial cultivation. For this reason it will be crucial to identify the best suitable varieties for the lower Shire Valley through variety trials and/or demonstration plots at Kasinthula Research Station since the crop is not currently grown in the area. Bean varieties currently grown in the area are for dry beans. Data from Kenya and South Africa shows that on average yields range from 9 to 15 t/ha and the pole type produces higher yields than the bush type.

Although green beans is not a popular vegetable for the ordinary people in Malawi and the region, it is in high demand in Europe, USA and other developed countries.

### *Tomatoes*

Tomatoes are grown virtually everywhere in Malawi throughout the year. These are normally the round shaped varieties such as Money Maker, Marglobe, Heinz and Homestead. These are used for cooking in homes and hotels and the country appears to be self-sufficient although Shoprite at times imports some tomatoes from South Africa. The tomato type that should be considered for the SVIP is the oval or processing type and its promotion would require some investment in suitable processing facilities to add value and extend the shelf life of the marketable product to facilitate penetration of the wider regional market. That way the additional production would avoid the adverse impact of exacerbating the flooding of the local market.

There are new varieties now available on the market that significantly yield more than the old varieties. The old varieties such as Roma and Rodade yield about 20 to 30 t/ha while the new varieties from Seminis, a division of Monsanto can yield as much as 50 to 60 t/ha and some varieties from Israel, (e.g. Shanty), can yield as much as 100 t/ha. These are determinate varieties that can be grown during the cooler months in the lower Shire Valley.

### 3.3.8. Tropical fruits

Malawi's subtropical climate is ideal for a diverse range of fruit tree types. These include citrus, mangos, bananas and pawpaw. In Malawi, oranges, lemons, tangerines, mango, bananas, pawpaw are grown on a very small scale or just around the homesteads. The potential in terms of climate and soils is very good especially in the low altitude areas. Tangerines, for example, are growing relatively well in Mwanza despite the visible poor management and these are sold all over the country. In general Malawi can be describe as a net importer of fruits and fruits products with most products imported from the neighbouring countries and South Africa. For example, most local fruit juice processors import all of their concentrates from South Africa (Faulkner et al, 2009).

Ironically, the vast majority of fresh fruit and fruit products imported into Malawi can be produced locally and the lower Shire Valley has vast potential. Fruit products may contribute to Malawi's goal of becoming a net exporter. A study by Faulkner et al (2009) identified mangoes, citrus and bananas as high potential exotic fruits that can be grown locally.

### 3.3.9. Spices

#### *Chillies*

Malawi produces some of the hottest chillies in the world. Malawi Bird's eye chillies are highly sought after, and have a well-deserved international reputation. The crop has good market potential abroad and currently local buyers such as Nali Limited are promoting its production. In conjunction with these buyers there is still great potential to increase production in Malawi.

The crop is normally planted in nurseries in September and transplanted in November. In the relatively hot areas such as the lower Shire Valley, the crop can also be grown during the winter season under irrigation. Wet and dry periods are required for good growth, ripening and drying of the fruits. Yield of up to 2.5 t/ha dry fruit weight can be achieved under good rainfall or irrigated conditions and good management.

#### *Paprika*

Paprika can be grown on a wide range of climatic conditions at elevations ranging from sea level to 1,500 m asl, on well drained sandy loams or sandy clay loams. The crop particularly does well in warm conditions, therefore it can be grown in most parts of Malawi in summer under rain-fed or irrigated conditions.

It produces a yield of about 1.3 t/ha under rain-fed conditions and up to 5.0 t/ha under irrigation (Saka and Kanyika, 1998). However, in a survey conducted by Makoka, et al. (2010) the average yield of paprika for the sample farmers in 2008/09 season was only 0.375 t/ha. The irrigated crop can be harvested over a long period producing up to four flushes of flowers and this makes the crop ideally suited for the lower Shire Valley where temperatures are favourable throughout the year.

### 3.3.10. Other crops

#### *Commercial hemp*

Recently there have been suggestions that Malawi would benefit a lot by growing commercial hemp. The climate and soils in the Shire Valley are suitable for hemp production and the crop could initially be tried out under research conditions at the Kasinthula Research Station.

According to the Department of Agriculture Forestry and Fisheries (2011), the European Union and many South African Companies are planning a R25 million five year project to boost hemp cultivation in South Africa. It is also reported that demand for hemp products worldwide has increased by 233 percent over the past two years and yearly South African hemp imports have grown from R500 000 to R1-million in the last year. This is a crop meriting further investigation in Malawi but this could be done initially under the auspices of the research stations. The research effort would assist in determining the quantities and types required to grow the crop on a sustainable basis under local conditions. On the basis of the information gathered a more accurate determination can be made of viability of the enterprise as a whole.

#### *Seed production*

The production of commercial seeds for most crops, in particular agronomic crops has been done in Malawi for many years. This includes such crops as: maize, sorghum, rice, beans, pigeon pea, soya beans and cotton. Virtually all the seed crops are produced under rain-fed conditions in the cooler higher rainfall areas of Malawi. However, for most if not all vegetables (tomatoes, leafy vegetables, onions and carrots) seed is imported due to the special conditions required for seed production.

The potential for growing seed under irrigation in the lower Shire Valley would depend on the viability of the enterprise and the suitability of the climatic conditions. High temperatures reduce seed quality in terms of germination percentage and it is normally recommended to store seed under cool conditions. High temperatures during maturation of the seed crop can adversely affect the quality of the seed. Soya bean seed for example, produced during summers with high heat conditions can lead to a wide range in germination rate of seed lots available for the next growing season and the quality of some seed lots may fall below customary industry standards (www.mycogen.com). Hampton, et al. (2013) reported that high-temperature stress before developing seeds reach physiological maturity (PM) can reduce germination by inhibiting the ability of the plant to supply the assimilates necessary to synthesize the storage compounds required for germination. It has also been reported that the predicted environmental changes due to climate change will lead to losses of seed quality, particularly for seed vigour and possibly germination. The germination of a seed lot can be negatively affected by the conditions the seeds are exposed to during harvesting, drying, cleaning and storage, but can also be reduced by unfavourable environmental conditions in the field during seed growth and development (Dornbos 1995), particularly temperature, rainfall and relative humidity (Egli *et al.* 2005. The implications of these observations are that, the high temperatures of the Shire Valley may not be conducive for seed production as the product is unlikely to meet the required high quality standards.

In terms of enterprise viability of growing seed in the lower Shire Valley under irrigation, it is obvious that due to cost of irrigation water the enterprise will be less viable than under the rain-fed conditions prevailing in the high rainfall areas such as the Central Region of Malawi. However during years of low rainfall or drought, yield and quality of seed may also be low in the Central Region. During such years seed companies may decide to increase their seed for the following summer season by contracting growing of seed under irrigation in the lower Shire Valley during the winter months (April to August). In such cases the contract price will have to take into account the cost of water.

The quantities of seed required locally especially for crops other than maize are relatively small and may not require investment into seed production in the lower Shire Valley. Secondary sources have revealed that cotton seed requirements for establishing the over 177,000ha of the commercial crop in Malawi are between 3,500MT (of quality seed) and 7,080MT (of fuzzy seed). In addition, since the seed used for most crops grown in Malawi is not of the hybrid type, farmers tend use retained grain (from the previous harvest) as seed and therefore demand for seed from commercial seed houses is relatively low.

## 3.4. Potential for livestock production

The focus of this section is on smallholder cattle production in the project area. The current system practiced is that the cattle graze on the natural grassland during the rainy season whereas in the dry season the cattle graze on the natural grassland and crop residues. While the commercial farmers graze their cattle on the veld and finish them off in feedlots before selling, the smallholder farmers sell their cattle straight from the veld. Cattle are mainly grazed close to the Shire River and other areas that are currently not suitable for cropping. COWI (2016) estimated that only 3.7 percent of current grazing area is suitable for cropping.

The current supply chain in the marketing system involves smallholder cattle farmers and commercial cattle farmers as producers. The next level is what can be described as 'middleman' and these are small scale middleman who can buy one or two cattle for onward sale and commercial feed lot operators. The next level are the processors and these are local butcheries and abattoirs. The last in the chain are the consumers either at local level (rural) and urban centres. Figure 3.1 shows a diagrammatical presentation of the existing supply chain.

### 3.4.1. Potential for beef production

As discussed previously, producers of beef cattle can be grouped into small scale and large scale commercial producers and both categories are found in the lower Shire Valley.

#### 3.4.1.1. Small scale producers

The small scale producers market their cattle through two main channels which are both formal and informal. The latter entails individuals buying cattle from farmers for different purposes including: slaughter for own consumption; as an investment; and, for providing relish at social functions such as funerals, customary celebrations, weddings and religious celebrations. Usually sales for such purposes are conducted right at the farmer's kraal and this has the advantage that there are no transportation costs incurred by the farmer. Sometimes the farmers slaughter the animals themselves and sell the meat to other villagers.

On the other hand, the formal channel is when farmers sell cattle directly to butcheries, commercial farmers and feedlot owners. Butcheries are usually located in places of population concentration and have the capability to express effective demand for sustained periods of time and therefore present significant commercial opportunities for the smallholder farmers. It is common practice that some butchery owners will venture out into the rural areas to identify and buy animals that may be available for sale and then transport these animals to the slaughter facilities.

The smallholder farmers face many challenges when they are marketing their produce. First the informal market channel is not very reliable due to its unorganized and thus unpredictable availability of buyers. Besides, such a marketing channel forces small scale farmers to sell their livestock to buyers who are most likely to have low purchasing power and thus they realise low prices for their animals. The informal channels present farmers with significant challenges

and therefore cannot be relied upon as a basis for the commercialisation of livestock production activities in the project area.

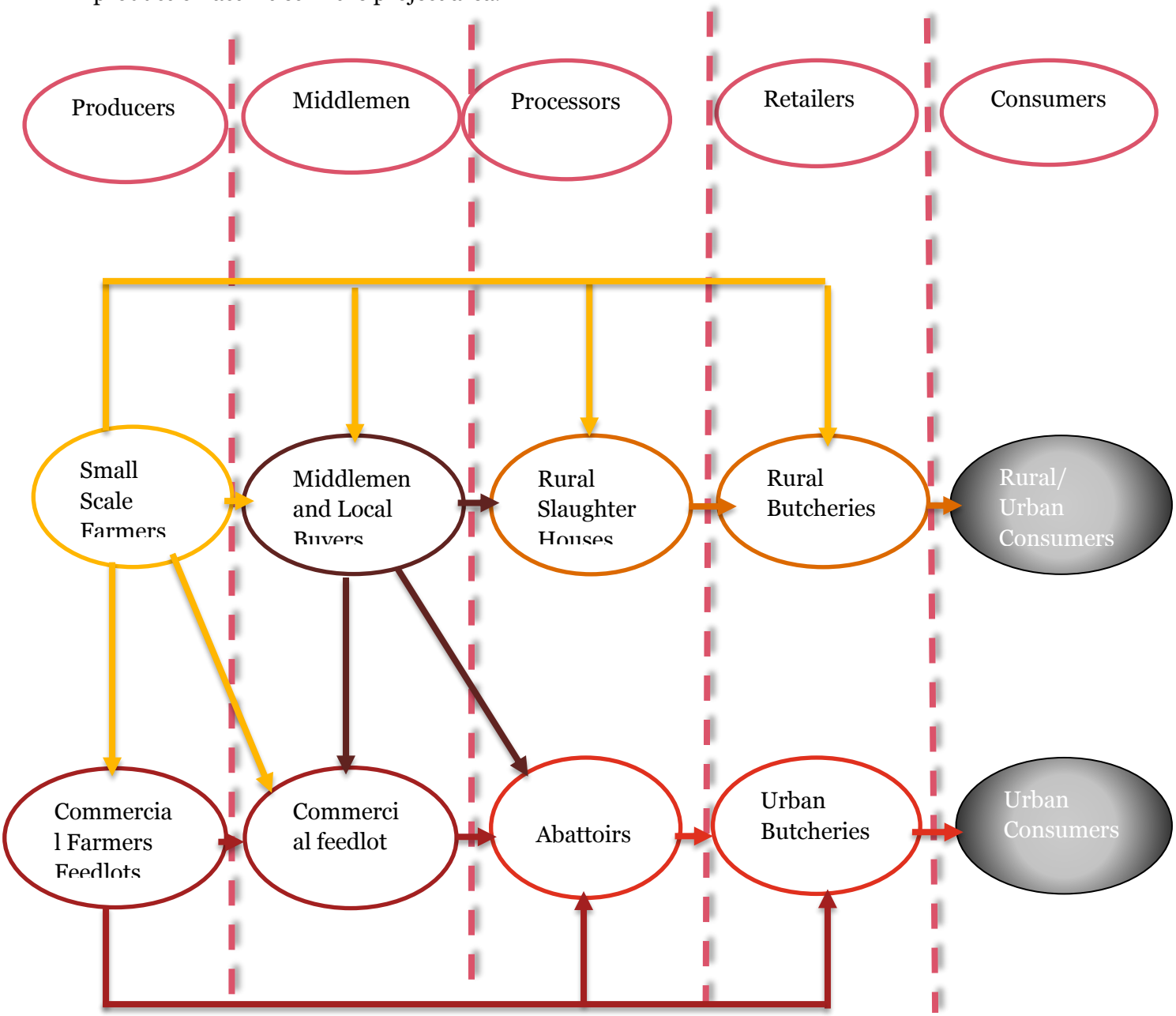



***Figure 3:3: Existing livestock supply chain***

The price for live animals (at the farm-gate) plays a significant role in determining the magnitude of profitability and competitiveness at the farm-level. Many smallholder farmers sell their live animals in an ad hoc pattern. In this case, they are often offered lower prices. The farmers mostly sell their animals to feedlots and are paid on credit. A further inquiry into this practice revealed that most farmers sell their cattle when they are in desperate need of cash and as such, the few feedlots, whose owners are related, collude to offer the lowest prices, below the government recommended selling prices.

In summary the current livestock marketing channels for smallholder farmers gives them poor returns because of the relatively poor state of their animals compared to those from feedlots and commercial farms, and the exploitative nature of buyers. They also do not have direct access to abattoirs where they may get better prices (See Figure 3.3).

*When we sell our cattle to feedlots, we are given papers where we are informed that cash payments will be paid out in 2 months' time. If you have sold cattle for MK1,000,000, this amount is usually received in a number of instalments (at times upto 4 instalments). This is presents a huge challenge for us because we sell our animals to address specific problems faced at home for which we need prompt payment (e.g. buying food or paying school fees).*

#### 3.4.1.2. Large scale commercial farmers

The large scale commercial farmers own thousands of cattle and some of them are involved in managing feedlots. Unlike smallholder farmers, these farmers have direct access to abattoirs where they can sell their cattle after finishing them off through a feedlots. They therefore realise much better returns than the smallholder farmers.

They also buy cattle from small scale farmers to boost their cattle numbers. The cattle purchased from smallholder farmers are normally fattened in feedlots before selling to abattoirs. As such these farmers currently play a significant role in marketing livestock from smallholder farmers.

A comparison of the price movements from the farm-gate, through to the distribution level in the supermarkets indicates that commercial farmers can realise substantial margins given the number of animals they slaughter and sell. The commercial farmers and feedlot owners sell their cattle directly to the abattoir owners.

#### 3.4.1.3. Middlemen

Some local middlemen can also buy cattle to sell to local butcheries or commercial feedlots. The middleman's main activity is to identify several individuals who wish to sell their animals and then gather the animals for sale to the butcheries, commercial farmers, commercial feedlots and abattoirs. The middleman's profit comes from a mark-up put on the cattle bought from the smaller farmers. What this means is that the farmers, if well organized, can make more money if they avoid the middleman and sell direct to butcheries and abattoirs. However because of the current poor organization of livestock farmers the middleman currently plays a significant role in the market chain (Figure 3.3).

The middleman can also be the large scale commercial farmers and feedlot owners. These farmers buy relatively poor condition cattle from smallholder farmers and put them through their feedlots before selling to abattoirs or processors.

#### 3.4.1.4. Processors

The major processors are the abattoirs whose facilities tend to be located in the big cities of Blantyre and Lilongwe. However, because the lower Shire Valley was declared endemic to foot and mouth disease (FMD), live cattle are currently not allowed to be transported outside the Shire Highlands for fear of spreading the disease to other parts of the country. This then leaves the current abattoir owners in Blantyre as the only processors who are accessible for cattle raised in the lower Shire Valley.

Other small scale processors are the rural butchery owners who also act as retailers. The cattle are normally slaughtered and sold in the butcheries (Figure 3.3).

#### 3.4.1.5. Retailers

Meat is mainly sold through rural and urban butcheries. The rural butcheries are mainly located at the trading centres and are characterised by ownership of poor meat cutting and handling equipment. Generally, they tend to use crude tools such as axes, pangas and small knives. However, the downside of using such tools is that the presentation of the final product is not appealing to the consumer and therefore they fail to command the high prices that could be achieved in the more affluent communities. This contrasts sharply with the situation prevailing in those outlets located in the urban areas (such as the large supermarkets) where meat is neatly cut and graded with each grade of meat attracting a different price. This enables the butcheries to target the different segments of the population and therefore reap the benefits accruing from differentiating the prices charged for the different parts of the animal carcass. The ability to enhance the presentation of the final product represents a form of value addition and thus enhances the income realised by the farmers and other actors in the beef supply chain. Some of the ordinary butcheries do not even have cold-room facilities and therefore cannot hold huge stocks for long periods without incurring significant losses to putrefaction. The absence of cold-room facilities represents a health risk to consumers as well.

#### 3.4.1.6. Consumers

The major consumers of beef from the lower Shire Valley are the urban population in many urban areas of Malawi. Although the live cattle cannot be transported outside the Shire Highlands due to FMD problems, the meat is transported all over the country. The lower Shire Valley is the major supplier of meat in the country.

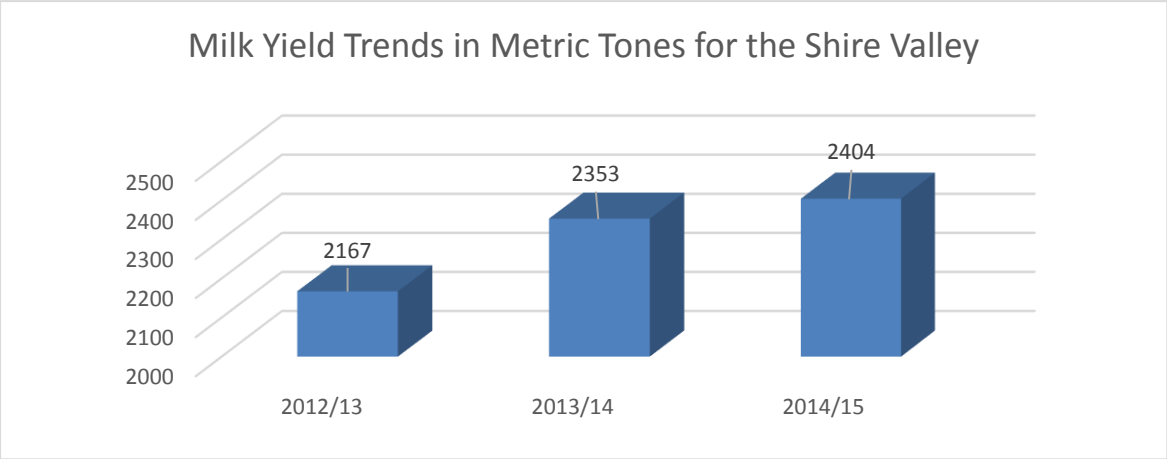
### 3.4.2. Potential for dairy production

Rural dairying is an age-old practice in Malawi with the local breed, the Zebu representing the majority of the milking cows. Commercial dairy farming is not widely practiced in the lower Shire Valley mainly due to the high temperatures and the limited availability of both water and feed material under the harsh environment prevailing in the area.

Dairying as practiced in the commercial sector was started by colonial settlers in the southern region of Malawi before independence in 1964. The settlers mainly grew crops but also kept a few cattle, mostly Jerseys, Aryshires and Fresians for the production of milk. The establishment and growth of townships such as Blantrye and Zomba created demand for milk for both estate farmers and smallholder farmers. Dairy cattle are adversely affected by weather conditions because most of the high production breeds were bred and developed in the cold/temperate regions of the world. For instance, the Holstein breed was developed in Europe (in a cold region which is now The Netherlands), and then introduced to other ecological zones of the world, such as the much hotter tropics. As a result, the breed is not well adapted to the hot temperatures that are prevalent in the lower Shire Valley.

Given the low milk yield potential of the Malawi Zebu cow (less than two litres per day) during the 1970s it was decided by the authorities in Malawi to implement a programme of crossbreeding the local Zebu breed with Friesians. In 1973 half-bred cows were sold to selected smallholder farmers. This initiative was supported by research on the productivity, management and feeding of such crossbreds in order to optimise milk yield. The scheme was expanded to the central and northern regions of Malawi. Bulking groups were organised into milk shed-based associations. Three associations were established, namely: the Shire Highlands Milk Producers' Association; the central region Milk Producers' Association; and, the Mzuzu Dairy Farmers' Association. All these associations later merged to form the Milk Producers' Association of Malawi.

Figure 3.2 shows increased production of milk (from 2,167 to 2,404 metric tons) from the Shire Valley over the past 3 years.




**Source**: *Data from DAHLD, 2016*

***Figure 3:4: Milk yield trends for the Shire Valley***

A study by Nyekanyeka (2011) in the Lilongwe Milk Shed area has shown that there is scope for practising dairy farming under a controlled environment. The gross margin and cost benefit analyses carried out to evaluate farm-level profitability showed that, on average, farmers could achieve positive gross margins which implies that smallholder dairying could contribute income to farmers in the study area (see Table 3.3). Profit efficiency ranged from 0 to 67.5 percent with a mean of 28.1 percent among improved dairy farmers while among local farmers it ranged from 0.5 to 56.2 percent with a mean of 24.7 percent.

***Table 3-3: Annual cost, gross income and margins for dairy farmers in Lilongwe milk shed areas***

| Items (MK) | Improved dairy farmer | Local dairy farmer | Average dairy farmer |
|---|---|---|---|
| Income | | | |
| Milk sales | 158,468 | 36,023 | 126,407 |
| Heifer sales | 56,800 | 22,660 | 39,730 |
| Home consumption | 14,927 | 6,849 | 10,888 |
| Gross income | 230,195 | 65,532 | 177,025 |
| Variable costs | | | |
| Casual labour | 22,373 | 7,228 | 18,327 |
| Veterinary services | 11,277 | 1,636 | 8,702 |
| AI and Bull services | 3,947 | 1,657 | 3,338 |
| Concentrates | 59,078 | 7,576 | 45,323 |
| Miscellanoues | 14,293 | 6,284 | 12,154 |
| Total variable costs | 110,968 | 23,481 | 87,844 |
| GM/cow/year | 119,227 | 42,051 | 89,181 |

***Source:*** *Nyekanyeka 2011*

The constraints encountered by smallholder dairy farmers include:

- limited availability of dairy cattle;
- high calf mortality (of up to 50 percent);
- expensive/high prices charged by commercial farmers for breeding stock;

- competition for the use of land, land and fertilisers between livestock and crop production at the peak of the cropping season, resulting in animals being underfed, kraals and being neglected;
- overstocking because farmers are unwilling/reluctant to sell excess stock;
- general lack of contact between farmers and extension personnel;
- non-availability of feed of sufficient quality leading to a situation where the level of nutrition of cows is not commensurate with the quality of cows;
- even when the feeds are available the animal husbandry extension staff lack knowledge of how to formulate suitable diets to optimise the use of available resources; and,
- inadequate herd health support services.

## 3.5. Potential for aquaculture

### 3.5.1. Fisheries sector in Malawi

The fisheries sector in Malawi comprises three main sub-sectors, namely: capture fisheries; aquaculture; and, aquarium trade. Capture fisheries constitute the major sub-sector and consist of small and large-scale fishing activities. The fisheries sector plays a number of important roles in the economy, including: as source of employment, food, rural income; as a source of exports; as a source import substitutes; and, also makes a significant contribution to bio-diversity (Government of Malawi, 2012). The capture fisheries industry has traditionally been based on the major water bodies of Malawi which include Lakes Malawi, Malombe and Chilwa; the Shire River, and a number of other smaller rivers and lagoons.

Over the years the availability of fish on a per capita basis has declined from about 14 kg per annum during the 1970s, to a minimum of 4.0 kg per annum in the early 2000s (Jamu and Chimatiro, 2005). In 2011, fish availability in Malawi was estimated at 5.6 kg per capita per annum (Government of Malawi 2012). The decline in the availability of fish in Malawi is mainly attributed to the rapid growth in human population and the drastic decline in fish stocks.

Available fish production statistics for the years 2000 and 2011 suggest that capture fisheries supply between 97 and 99 percent of available fish in Malawi while the remainder comes from aquaculture. Through the Fisheries Policy (2012 -2017) the Government of Malawi identifies the need to increase fish production in Malawi from both capture fisheries and aquaculture in order to meet the required domestic demand for fish (Government of Malawi 2012).

### 3.5.2. Fisheries in the lower Shire Valley

Maluwa (2016) has summarized biological and ecological information on 48 fish species found in the lower Shire River. Capture fisheries in the lower Shire River are located mainly in five areas, namely: the Elephant Marsh; the Ndindi Marsh; the lagoons around Chikwawa; the Bangula lagoon; and, the main Shire River. The fisheries are small scale and subsistence in nature and fish are caught using dugout canoes from numerous permanent and temporary traditional fishing villages. The main fishing methods in the lower Shire include seine nets, gill nets, fish traps, scoop nets, cast nets and encircling fish fence. Dug-out canoes and plank boats without engines are the main fishing crafts employed. Gill nets are however, the commonest fishing gear used (Maluwa 2016). Catches of the lower Shire fisheries tend to fluctuate seasonally in-line with the flooding pattern. One of the challenges in managing fishery resources in the lower Shire River is the “open-access” nature of the fisheries which are unregulated.

### 3.5.3. Potential for commercialization of fish farming

In this section an outline is presented of the factors that are necessary for implementation of any aquaculture enterprise and the feasibility of undertaking commercial aquaculture in the SVIP is assessed.

**Factors to consider for successful fish farming venture**

In broad terms, the most important factors for the establishment of a successful commercial fish farming enterprise include: land, water, capital, management skills and markets.

#### *Land*

In order to generate positive returns from an aquaculture enterprise some minimum land size has to be available. For dugout ponds the minimum fish pond size that is frequently cited as being appropriate to start registering profits is, one hectare. Most smallholder farmers in Malawi own less than one hectare of land which is insufficient for purposes of constructing a viable fish pond. This means that in order to run a profitable fish farming business smallholder farmers must amalgamate their enterprises to have a piece of land big enough for the establishment of a pond of at least a hectare in size.

It is also reported that in the lower Shire Valley there are areas with sodic patches which are unsuited for crop production and therefore could be used for the development of fish ponds (Velema, 2008). Such patches of land may be worth considering for aquaculture development though no studies have been carried out on the utilization of such areas for aquaculture. It must be noted that although sodium concentration can have an influence on levels of salt concentration in the water this in-turn may affect fish depending on their tolerance levels to salt concentration (Velema, 2008). Farmed tilapia fish are known to have relatively high tolerance to salinity (Küçük, Karul, Yildirim, and Gamsiz, 2013; Likongwe, 2002) which potentially makes the species a possible candidate for raising in ponds developed on these sodic patches. The possibility of utilizing sodic pans for commercial fish farming under the SVIP can be investigated thoroughly at the Kasinthula Research Station in the early stages of developing the SVIP prior to rolling-out to the rest of the project area.

#### *Capital*

Depending on the system of production, fish culture can be capital intensive. The capital investment may include costs related to: pond construction; building costs; and, specific equipment for fish production such as hatchery equipment and fish harvesting nets. Other investments include variable costs related to feeding and labour. Consultations with Fisheries Department staff revealed that small scale fish farmers in Malawi generally cannot afford to buy the capital equipment required for semi-intensive and intensive commercial fish farming. This explains why most small scale fish farming projects initiated in the past in Malawi have been funded/supported by development partners (Russell *et. al.* 2008).

This raises the question as to who should be involved in commercial fish farming under the SVIP. One possibility is for small scale fish farmers to scale up their activities to commercial fish farming and this can be made possible if fish farmer clubs can be provided with initial capital (in the form of loans) to meet the initial costs of well managed semi-intensive/intensive commercial fish farming. However, previous attempts to link farmers under some small scale aquaculture projects to the banks have proved difficult as a number of banks appear to be reluctant to provide loans to support fish farming. The other possibility is to encourage only fish farmers' clubs who have the resources and means to venture into commercial fish farming under the SVIP.

### *Water*

Both the quantity and quality of water are quite important for the success of any fish farming enterprise. The physical and chemical properties of water have to be suited for the fish species to be reared in the aquatic environment. All the commonly reared fish species in Malawi such as *T. rendalli* and *O. shiranus* are well established in the lower Shire Valley. *Oreochromis mosambicus,* a commonly reared tilapia fish in other countries, is also well established in the lower Shire Valley. It can therefore be assumed that these species are adaptable to most of the physical and chemical properties of water from lower Shire River.

Another aspect that has to be taken into account with respect to the water is that it has to be available throughout the year. During consultation meetings with Kasinthula Research Station Fisheries staff, it was revealed that water availability is a challenge for both smallscale fish farmers and the government fish farm. It is envisaged that under the SVIP special arrangements will be made to avail water directly to meet the requirements of commercial fish production and therefore this challenge will be addressed adequately.

### *Management*

During consultation meetings with fisheries officers from Kasinthula and NAC it was evident that most small scale fish farmers in Malawi are not conversant with the necessary skills required for the successful management of fish farming enterprises. The problem is exacerbated by the fact that the Fisheries Department does not have sufficient resources to regularly offer the required extension services to the fish farmers. For successful commercial fish farming under the SVIP good management is essential. The fish farmer training and back-up extension services will be required to address such problems as predation and disease control.

### *Markets*

Before venturing into the production of any commercial product a market has to be identified. Currently there is generally a high demand for fish in most urban areas in Malawi. However, most individual small scale fish farmers have been unable to access the available fish market because of their low yields. Consultations with officials at NAC and Kasinthula revealed that, after harvesting, small scale fish farmers sell their fish locally. Thus, commercial small scale farmers' clubs under the SVIP will have to synchronize their production cycles so that they can bulk their sales in order to share costs for accessing the market in urban areas and increase individual club profit margins. The other advantage of bulking the production is that wholesalers could be introduced in the fish production chain thereby widening the market of produced fish. The fish farmers will also need knowledge about fish postharvest handling, processing, transportation, packaging and any other available value addition methods.

One challenge that GK Aqua Farms faced from 2003 to 2009 regarding the marketing of fish, was competition for the same market with fish catches from capture fisheries which were sold at relatively lower prices during the summer months (Longwe, *et. al.*,2010). This problem has also been previously reported for other projects that promoted commercial fish farming in Malawi (e.g. the C-Fish Project which was implemented from 2008 to 2010 in the Chingale Area in Zomba). One way to circumvent this challenge under the SVIP is to plan the production cycle in such a way that most fish are ready for harvest in winter. Production could be scaled down during the summer months, the time during which some fish ponds could be maintained. The other way would be to practice partial harvesting during summer as was done by GK Aqua Farms with full harvests being scheduled to take place in winter.

### *Species of fish for culture*

Choice of fish species is one of the important factors to consider for commercial fish farming. Growth rate of individual fish may depend on the species of fish. For commercial fish farming, fast growing fish species and, or strains would enable a fish farmer to maximize profits from the farm. Customer preference for fish could also be influenced by the species of fish. In Malawi the most commonly reared fish species, *T. rendalli* and *O. shiranus* are very popular and therefore the demand for the fish may not be a problem. However, the two tilapia fish have a relatively slow grow rate when compared with the exotic species such as common carp. Currently Malawi Government regulations do not allow use of exotic fish species for aquaculture except for research purposes.

There is a lot of room to identify superior strains of fish exhibiting faster growth rates which commercial fish farmers can use. The other option for increasing fish growth rates would be to consider stocking of sex reversed males which grow faster than female fish. For instance, MALDECO Fishing Company is able to stock sex reversed males of *O. shiranus* within cages farmed in the waters of Lake Malawi. These male fish have recorded weights of up to one kg per fish within a year instead of the 300g which female fish attain. During consultations with officials at NAC, it was revealed that research has shown that stocking sex reversed males of *O. shiranus* under deep pond technology has demonstrated potential for relatively high profit margins.

### Profitability of fish farming

Reliable data regarding the profitability of commercial fish farming in Malawi is not readily available mainly because commercial operators would like to protect their business interests by not releasing such information. However, consultations with officials at both NAC and Kasinthula Research Stations have revealed that with proper management (and using MALDECO feed) profit margins of up to MK4,000,000 (US$ 5,552) per hectare per year can be realized from commercial fish farming. Profits from fish farming were also demonstrated for Kasinthula Fish Farm when it was run and managed by the GK Aqua Farm from 2003 to 2009.

One factor that has been reported to influence the profitability of the aquaculture venture is the area covered by the fish farming operation. It is generally believed that for fish ponds to be profitable the ponds should cover an area of at least one hectare.

# CHAPTER 4 : MARKETING AND AGRO-BUSINESS POTENTIAL

## 4.1. Market potential

This Chapter presents a high level overview of the market potential for the major crops that have been identified for inclusion in the proposed cropping programme for the SVIP. A more detailed discussion of the worldwide market opportunities for the various commodities that can be produced in the lower Shire Valley is presented in Appendix D. Key policies impacting on the marketing and trade in the identified commodities are also discussed.

### 4.1.1. Cotton

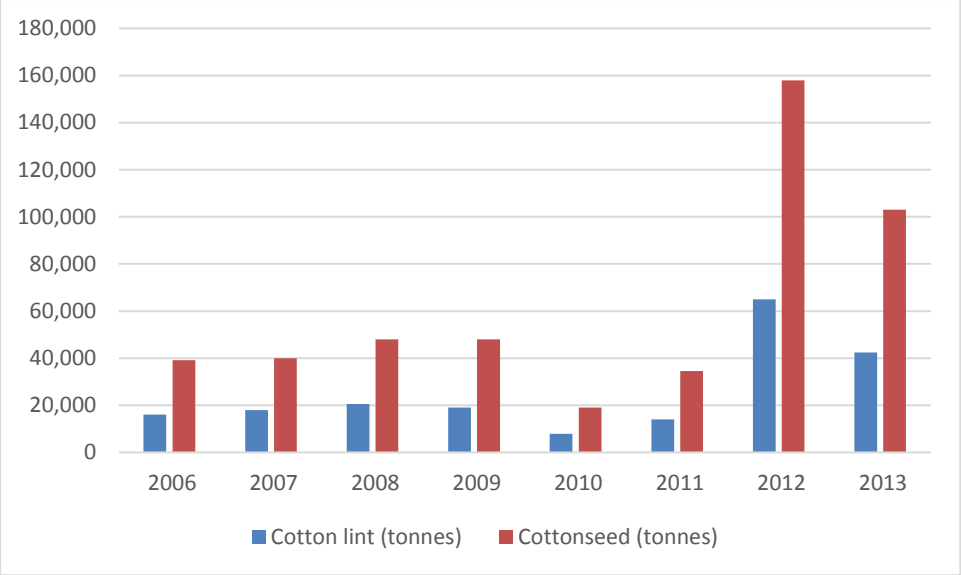
Cotton is a major fibre crop of high commercial value and global importance. The crop is grown in more than 70 countries where temperate and tropical climatic conditions are favorable for its cultivation. Cotton is harvested as 'seed cotton' which is then 'ginned' to separate the seed and lint. The long 'lint' fibres are further processed by spinning to produce yarn which is knitted or woven into fabrics.

Cotton is the fourth largest agricultural foreign exchange earner in Malawi after tobacco, sugar and tea. The cotton sector in Malawi is defined to include: the supply of lint; crude and refined cotton oil; and, cotton seed cake to both domestic and regional markets. The global cotton lint market, currently estimated at 24 million MT, is driven by the dynamics in the major consuming and producing countries. After a major price peak in 2011-12, when global production was very low, prices have stabilized, with 2012-13 and 2013-14 production marginally outstripping demand. However, Malawi's production accounted for only about 2 percent of Africa's total production between 2005 and 2013 (FAOSTAT, 2014). The cotton value chain in Malawi is buyer driven with over 90 percent of the production largely supplied by smallholder farmers. Eighty percent of the lint is exported and the remaining 20 percent is retained for the local textile industry. At the moment there is widespread capacity underutilisation for most ginneries in the country. The major cotton growing areas are: the lower Shire Valley accounting for up to 50 percent of national production; southern region upland areas around Balaka accounting for 30 percent of production; and, the Lakeshore area around Salima accounting for the remaining 20 percent of production.

***Supply side***

Malawi produced 100,000 MT and 40,000 MT of cotton seed and lint respectively in 2013. The level of production experienced volatility between 2006 and 2011 (see Figure 4.1), affecting domestic prices and thus creating uncertainty for producers. The production of cotton lint in Malawi has increased from 19 thousand tonnes in 2009 to 42.4 thousand tonnes in 2013 at a compound annual growth rate (CAGR) of 22 percent. Malawi is the 12th largest producer of cotton in Africa and contributed nearly 3 percent to the total cotton production by the continent[3]. The trend of production of cotton in Malawi from 2009 to 2013 shows that the country has the potential to become one of the major producers and suppliers of cotton in the international market.

[3] FAOstat




***Source:*** *Malawi Government*

***Figure 4:1: Cotton production***

Cotton is mainly grown by smallholder farmers who can be grouped into three main categories, namely: semi-commercial farmers (each growing over 3ha and achieving average yields of 1.5t/ha); middle level smallholder farmers (with average landholdings of 1.1-3.0ha, yielding around 1.0t/ha); and poor smallholder farmers, (with up to 1.1 ha, achieving yields of around 0.7 t/ha). In addition, there are a few commercial farmers operating at large scales. An example, is Toleza Farm with an average crop of about 200-300ha. They also own a ginnery for which they buy additional produce from other smaller farmers to meet the capacity requirements of their machinery.

The global cotton production has increased from 20.9 million tonnes in 2009 to 24.6 million tonnes in 2013 at a CAGR of 4 percent. The major cotton producing countries are China, India, USA, Pakistan, Brazil and Uzbekistan. The total share for these countries in the global cotton production is nearly 80 percent[4].

### *Demand side*

Most of the cotton lint produced in Malawi is exported representing an average 2 percent of the total value of agricultural export between 2005 and 2013 (FAO, 2015). During the marketing season, buying points, or '*bush markets*' are established as temporary market centres by the various ginneries. The marketing season spans from April to early September. The average production has been 50, 000MT between 1992/93 season and 2012/13 seasons despite having a total ginning capacity of 215, 000MT (Table 4.1). Ginning facilities that have been developed in Malawi include: Great Lakes Cotton Company (GLCC), Clark Cotton Malawi (CCM) and Iponga Cotton Company. Clark Cotton Malawi is a joint venture established by ADMARC and Clark Cotton South Africa. The garment industry has traditionally been structured around six main operations, namely: Mapeto-David Whitehead, Crown Fashion, Giant Clothing, Knitwear Industries, Chirimba Garment, Crossbow Clothing and Haps Investment Company Limited/Vanguard Garment Company. However, not all these companies are fully operational in any one season due to reduced quantities of the crop produced and available in the country. In addition there are smaller garment manufacturers

[4] FAOstat

and individual tailors operating from home, street corners or small firms serving mostly the domestic market.

***Table 4-1: Capacity estimates for existing ginning facilities in Malawi***

| Company | Capacity (MT) |
|---|---|
| ADMARC | 45,000 |
| Great Lakes Cotton Company | 30,000 |
| Malawi Cotton Company | 30,000 |
| Iponga Cotton Company | 30,000 |
| Export and Trading Group | 20,000 |
| Cotton Ginners Africa Ltd | 15,000 |
| Mapeto David Whitehead and Sons (DWS) | 15,000 |
| Woget | 10,000 |
| Afrisan | 10,000 |
| Toleza Cotton Ginnery | 5,000 |
| Nadhi | 5,000 |
| **Total** | **215,000** |

Most ginneries are unable to secure enough cotton to fully utilise their existing ginning capacity indicating that demand far exceeds supply. Given this background the expansion of irrigation facilities in the lower Shire Valley presents an opportunity to boost production and therefore improve capacity utilisation for the existing ginneries. Other projects such as the Malawi Oil Seeds Transformation (MOST) are promoting cotton production as well. With the establishment of the Cotton Council in 2014, the sector is expected to be better regulated.

The only spinner in the country, Mapeto DWS also provides a market opportunity for the farmers since the crop from their own farm is insufficient to meet their requirements. Mapeto DWS weaves textiles such as grey cloth for export and *Chitenje* fabric for the domestic market. It is reported that with 3,000MT of lint Mapeto DWS could produce 360,000 metres of cloth/fabric per year. The company has tried to procure lint from other ginneries in Malawi. However in 2013, they invested in a new ginnery in Salima, in order to produce own lint and increase the capacity utilisation of their spinning plant. To break even MAPETO has also been importing loom state cloth/fabric and polyester which is used for finishing their product line with the major costs incurred being value adding materials like dye and related printing materials.

Internationally cotton is a heavily traded commodity with over 150 countries involved in the trade. Cotton plays a major role in the economic and social development of developing and industrialized countries. Nearly 46[5] percent of the total cotton produced in 2013 was exported to different countries[6]. The major cotton exporting countries are the USA, India, Australia and Brazil. These countries together account for nearly 72 percent[7] of the total exports of cotton around the world.

Over 95 percent of the cotton lint produced in Malawi is exported, mainly to the Far East, but also to Europe. Prior to being exported the cotton lint is packed into 200kg bales and shipped by road to an appropriate port. Furthermore, Asian markets such as China, Indonesia and Thailand are becoming increasingly important destinations for Malawian lint. A Chinese company, Malawi Cotton Company has recently invested in ginning equipment to enable it to

[5] FAOstat
[6] FAOstat
[7] FAOstat

export lint to China and other international destinations. For example, in 2013 most of the processed cotton was exported to South Africa, UAE and the UK.

The cotton fibre is used in the textile industry as a major raw material. This is one of the key reason why cotton is in high demand internationally. The major cotton importing countries are China, Turkey, Indonesia, Bangladesh and Vietnam. It should be noted that China alone imports nearly 44 percent[8] of the total cotton imports globally.The major export destinations for Malawi cotton are presented in Table 4.2. About 50 percent of Malawian cotton is exported to the UAE and South Africa. China, Singapore, UK and Zimbabwe are some of the markets for Malawian cotton.

***Table 4-2: World's share of Malawian cotton (2015)***

| Countries | Proportionate share (%) |
|---|---|
| World | 100 |
| United Arab Emirates | 23.3 |
| South Africa | 22.1 |
| Hong Kong, China | 16.6 |
| Singapore | 14.1 |
| United Kingdom | 13.1 |
| Zimbabwe | 3.2 |
| Bangladesh | 2.8 |
| Mozambique | 2 |
| Mauritius | 1.7 |
| Portugal | 0.7 |
| Switzerland | 0.3 |
| Zambia | 0.1 |
| China | 0.1 |

***Source:*** *TRADEMAP*

### Asia potential cotton markets

Asia constitutes 65 percent of world imports of cotton. The five largest importers of cotton in Asia are Hong Kong, China, Bangladesh, Vietnam, Turkey and Hong Kong China. Major competitors in this market are India, Pakistan, and Vietnam.

### EU cotton market

The EU's cotton world market share in 13 percent. Figure 4.12 presents the share of the five largest importers of cotton in the EU and these are Italy, Germany, Portugal, Spain and France. The potential competitors in the EU market are Turkey, Pakistan and Italy.

## *Cotton supply chain in Malawi*

A typical supply chain of cotton in Malawi constitutes farmers, traders, ginners, spinners, garment manufacturers, retailers and export houses. The majority of the farmers sell their produce to traders who in-turn sell it to ginners.

[8] FAOstat

### *Cotton marketing and price policies*

The market chain is regulated through the Cotton Council, where licensing of ginners and buyers and registration of farmers is mandatory and trading must take place at designated buying points. Although only certified seed is recommended for planting and ginners are prohibited from providing recycled seed to farmers, illegal trading does occur because of enforcement challenges, with negative implications for cotton quality and farmer prices.

### *Cotton price movements*

The GoM announces minimum buying prices for cotton together with other crops. However, the minimum price set by the GoM was not systematically aligned with international price trends, which could be due to the fact that prices are set at the beginning of the season and not reviewed during the season to take into account the international price dynamics. Producers benefited from the implementation of the minimum prices only in 2008 and 2009 (Figure 4.14), which in turn provided incentives to farmers. However, for most years, ginners did not offer prices aligned with the minimum price, which makes the enforcement and usefulness of the price fixing mechanism, questionable.

## 4.1.2. Dry beans (*Phaseolus vulgaris*)

About 80 percent of dry beans production in Malawi is supplied by smallholder farmers with only 20 percent being produced by commercial farmers. The main varieties of beans being produced are the red kidney beans and white pea beans. Rabs, Muli Brothers and Transglobe are the main players in the dry beans value chain. They are involved at the input node where they distribute seed. These actors also trade, market and wholesale the commodity. Currently the local demand for beans has not been met in Malawi and this limits the export of dry beans from the country.

The SADC region accounts for 1.2 percent of world imports of dry beans compared to the EU which accounts for 12.4 percent of the world market. Importing countries in the SADC region are South Africa, Angola and the DRC. The Asian market constitutes 64.4 percent of the dry beans market. Importing countries in Asia are Bangladesh, China and India. The importing countries in the EU are Italy, United Kingdom and Spain. The major competitors on the EU market China, Canada and the USA.

## 4.1.3. Maize

Maize production in Malawi is mainly done by smallholder farmers. On average the common practice among farmers in the smallholder community is to adopt a low input-low return strategy with a focus on meeting subsistence requirements. As a result less than 50 percent of smallholder farmers use hybrid or improved maize seeds and less than 35 percent use bought-in inorganic fertilizers. The GoM introduced the input subsidy programme, which has provided subsidized seed and fertilizers since 2005. As a result maize production increased significantly, from 1.22 million MT in 2005 to 3.4 million MT in 2010.

Figure 4.2 illustrates the maize value chain in Malawi. Maize is an important food crop in Malawi because an average household obtains nearly two-thirds of its calories from maize. This implies that maize price and access to maize are the country's two most important political, social, and economic variables. Hence it is inevitable that GoM routinely intervenes on the maize market to stimulate production and stabilize prices, where necessary.

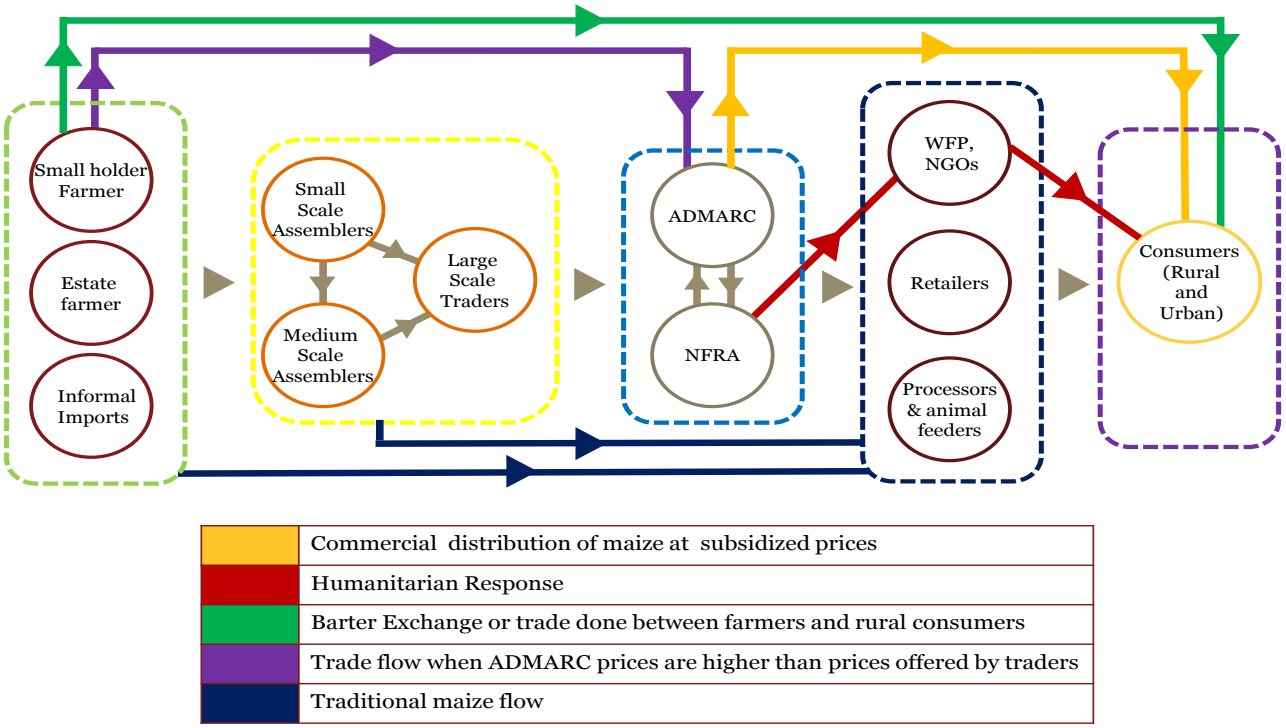



***Figure 4:2: Maize value chain for Malawi***

Most maize is grown in the central and southern regions of Malawi by smallholder and commercial farmers. Input supplying companies include Malawi Fertilizer Company, Export Trading, SeedCo Malawi, Pannar Seed and Demeter Seed. Agricultural Development and Marketing Corporation (ADMARC) is a state run organization with a storage capacity covering an area of 300,000m². The organisation is geared to offer a commercial warehousing as well as the ability to store, process and distribute maize. In the maize value chain ADMARC has a vast network that allows them to buy produce from both smallholder farmers and traders. Currently the industry is dominated by three milling companies that focus mostly on wheat milling. On the other hand, the informal milling industry is represented by small-scale millers who are present in every market and town in Malawi, and who offer their services to smallholder farmers as well as low income consumers. The national trade policy on maize grain allows Malawi to ban exports in times of shortages. When the maize ban is not in-place the export destinations include Zimbabwe, Mozambique, South Africa and Tanzania.

### *Maize marketing and price policies*

Since the 1980s, marketing and price policies have been liberalized gradually from a domain controlled by the state marketing agency ADMARC, with fixed pan-territorial and pan-seasonal pricing for main commodities, to a market in which private traders operate within the limits of a government-set price band. Although ADMARC's operational capability has declined markedly it still does handle significant volumes of crops (including maize, in recent years), its legacy has not been erased in the rural areas.

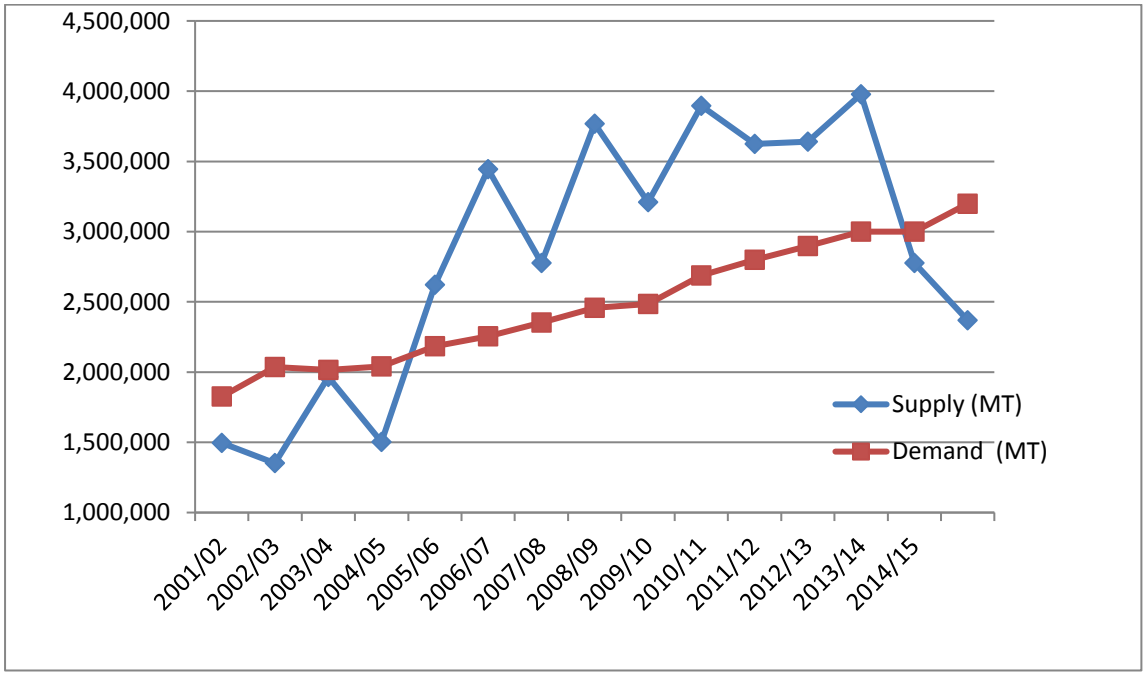
The GoM also maintains the strategic grain reserves through National Food Reserve Agency (NFRA). The total strategic grain reserve capacity is 240,000 MT, of which 36 are concrete silos in Lilongwe with a total holding capacity of 180,000 MT, 3 are metallic silos of 20,000 MT each located in Mzuzu, Luchenza and Mangochi, and the balance being multipurpose warehouses located in Bangula, Kanengo, Kazomba and Limbe. One of the reasons cited for the decline in the operational capability of ADMARC is that the funding of the grain purchase by the GoM has declined significantly with the annual allocations being only released after

approval of the National Budget in July, by which time most of the farmers would have sold their produce to the private traders.

The GoM introduced a minimum producer prices as well as a price ceiling at retail level following the maize shortages experienced in 2002 and 2005. ADMARC was expected to enforce the decision. This was not successful as the private trade in most instances took place outside of the price-bands. In August 2008, the GoM designated ADMARC as the exclusive buyer and seller of maize, effectively banning all private trade. Nevertheless, this measure lasted only for a month after which the GoM instituted a price-band within which private trade was allowed to operate. Despite instituting the price-band, the ban had already disrupted trading by constraining the circulation of maize from the surplus to the deficit areas within Malawi. In addition, the ban also disrupted the illegal/informal cross border trade by impeding the import of maize from the neighbouring countries and thus had an adverse impact on the population's ability to curb shortages on the domestic markets.

### *Maize supply and demand*

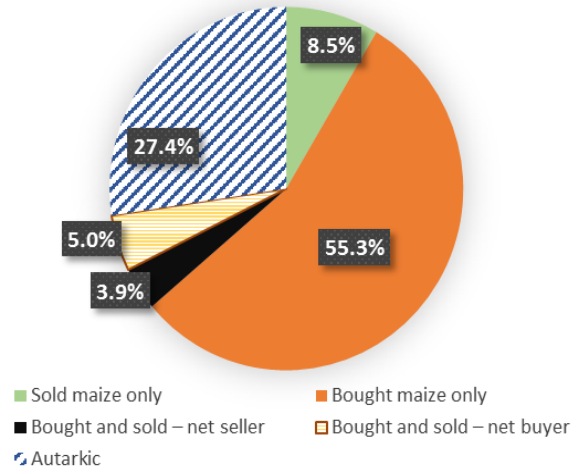
Malawi's maize production between 2005 and 2015 is summarised in Figure 4.3. Malawi was largely self-sufficient in Maize except for the years 2005/6, 2007/8 and 2014/15. The annual maize consumption per head in Malawi is estimated at around 130kg. The total quantity of maize purchased ranges between 263,000MT and 639,000MT depending on whether a poor or good harvest has been achieved, respectively. In a good season the local farmers are capable of supplying an average of 580,000MT whereas in a poor season the quantity supplied could be as low as 241,000MT (Jayne, T.S *et al*, 2010)




**Source:** *Malawi Government*

***Figure 4:3: Maize supply and demand patterns (2000 to 2015)***

A further decomposition of the Integrated Household Survey (IHS3) data shows that maize supply is very thin to the extent that out of 2.5 million farmers, around 5 percent produce more than 3 MT and about 10 percent of maize is marketed (Jayne et al. 2010, GTPA). It was also observed by IFRI (Figure 4.4) that only 8.5 percent of farmers are outright sellers of maize, i.e., they only sell maize and do not buy any maize (these are all maize farmers); 55 percent only purchase maize to supplement own stocks; 9 percent operate as both buyers and sellers and 27 percent are autarkic (i.e. they neither buy nor sell maize).



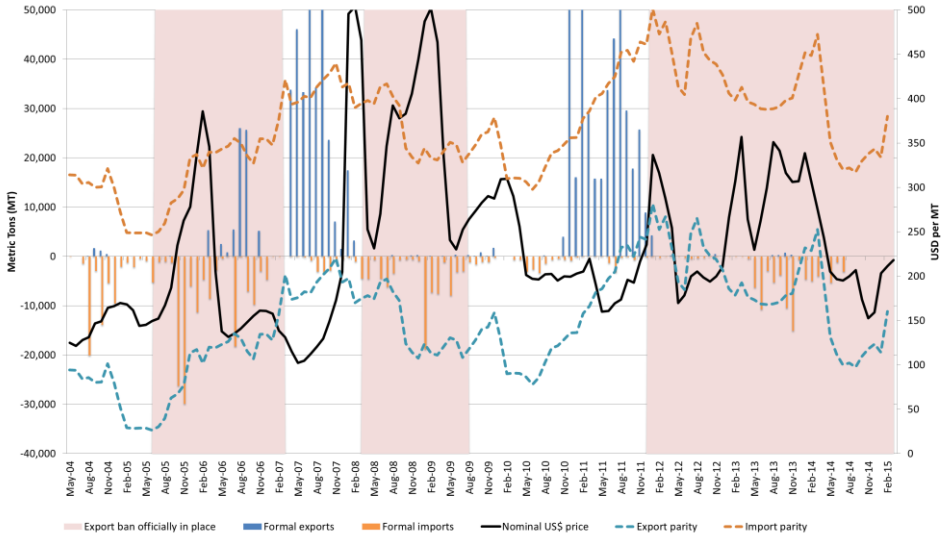

***Source:*** *IFPRI*

***Figure 4:4: Maize market engagement***

The revelation is that there are few sellers relative to the number of producers with the implication that small shifts in supply and demand could lead to disproportionately larger changes in price.

### *Price movements*

Figure 4.5 depicts maize price volatility which have in some instance surpassed the import parity prices. Maize prices are more volatile in Malawi compared to South Africa. The price volatility between 2006 and 2015 as estimated by the co-efficient of variation (CV) is 38 percent for Malawi and 21 percent for SAFEX-South Africa.




***Source:*** *IFPRI*

***Figure 4:5: Maize price volatility in Malawi***

The recent GoM agricultural sector risk assessment identified that maize price volatilities are caused by both unpredictable interventions in the maize market and production risks. Further analysis of the sector revealed that current interventions in the sector have put pressure on farm-gate prices while input prices have remained high, thus acting as a disincentive for productive investments in the sector.

***Table 4-3: Largest importers of maize in SADC***

| Importers | Value of imports USD 000 | Share (%) |
|---|---|---|
| World | 30,276,752 | 100 |
| Southern African Development Community (SADC) Aggregation | 569,872 | 1.9 (SADC Share in world imports) |
| Zimbabwe | 174,269 | 30.5 |
| South Africa | 148,426 | 26 |
| Botswana | 50,123 | 8.8 |
| Namibia | 40,677 | 7.1 |
| Malawi | 32,689 | 5.7 |
| Other | | 21.9 |

***Source:*** *TRADEMAP*

Table 4.3 ranks the largest importers of maize in SADC in 2015. The SADC region accounts for 1.88 percent of the world market for maize. Zimbabwe, South Africa, Botswana, Namibia and Malawi are the largest importers of maize in Africa. Table 4.4 summarises the trade figures for maize exports from Malawi to other countries in the southern and eastern African region. Potential competitors in the SADC region for the Zimbabwean, Botswana and Namibia markets include Zambia and South Africa. Potential competitors for the South African maize market are Argentina, Brazil and Mexico. Tariffs levied by the top five importers in the SADC region are all zero rated mainly because maize is a staple food crop required for food security purposes. The South African market has more competitive imports from Argentina, Brazil and Mexico in terms of cost, thus making it difficult for Malawi to compete on this market. However most imports from Argentina, Brazil and Mexico are of the genetically modified varieties (GMO). This presents an opportunity for Malawi to target those countries that prefer GMO-free maize as a niche market regardless of the high landing cost compared to the crop from South America.

*Table 4-4: List of importing markets for maize exported by Malawi in 2015*

| Importers | Trade Indicators | | | | | | | | | | | | Tariff (estimated) faced by Malawi (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Exported value 2015 (USD thousand) | Trade balance 2015 (USD thousand) | Share in Malawi's exports (%) | Exported quantity 2015 | UNITS | Unit value (USD/ unit) | Exported growth in value between 2011-2015 (%, p.a.) | Exported growth in quantity between 2011-2015 (%, p.a.) | Exported growth in value between 2014-2015 (%, p.a.) | Ranking of partner countries in world imports | Share of partner countries in world imports (%) | Total import growth in value of partner countries between 2011-2015 (%, p.a.) | |
| World | 2172 | -30517 | 100 | 1511 | TONS | 1437 | -45 | -61 | -39 | | 100 | -3 | |
| Zimbabwe | 1090 | 1045 | 50.2 | 894 | TONS | 1219 | 7 | -72 | -42 | 36 | 0.6 | -1 | |
| Mozambique | 781 | -334 | 36 | 445 | TONS | 1755 | -36 | -59 | 111 | 81 | 0.1 | 18 | 0 |
| South Africa | 213 | -93 | 9.8 | 112 | TONS | 1902 | 38 | -11 | | 39 | 0.5 | 19 | 0 |
| Tanzania, United Republic of | 89 | -77 | 4.1 | 60 | TONS | 1483 | 14 | -22 | -89 | 103 | 0 | -4 | 0 |

***Source:*** *TRADEMAP*

### 4.1.4. Mangoes

Mangoes are the most consumed exotic fruit in Malawi. The fruit is grown widely throughout the country although the better quality varieties are usually grown in the northern and southern regions. Large volumes of the fruit are produced in the areas of Machingo, Mangochi and Chikwawa. Total production of mangoes in Malawi was estimated at about 115,000 MT in 2012[9].

Mango trees in Malawi bear fruits from October to February. During the harvest season, the production of mangoes in the country is high and sufficient to meet domestic demand. In fact, up to 60 percent[10] of the total produce is wasted due to poor transportation and storage infrastructure. Scientific post-harvest handling techniques such as sorting, cleaning, grading, and packing can reduce the wastage and also help in raising the prices realized by the farmers. In addition, the crop can generate income even when out-of-season when farmers adopt improved storage and preservation techniques. There is a potential for value addition on the produce through conversion into juice, juice concentrates, dried fruit, pickles, jams, jellies and related products. On the whole, there is need to introduce improved mango varieties with less fibre content which are preferred on the international market and are also easily processed into a variety of by-products.

#### *International trade in mangoes*

About 80 percent of world mango trade is represented by the top ten exporter countries. Latin American countries account for about 48 percent of international trade followed by Asian countries which account for about 46 percent. Mango consumption is rising, and with the growing world population this trend is expected to continue. The major consumption centres are North America, the European Union, Asia and the Persian Gulf. The consumption pattern of these regions for the 2010 to 2014 is given in Table 4.5.

*Table 4-5: Major consumption centres*

| Consumption Centres | Consumption in MT | | | | |
|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 | 2014 |
| North America | 378,744 | 436,178 | 431,699 | 496,375 | 443,852 |
| European Union | 232,495 | 258,521 | 246,267 | 267,186 | 288,421 |
| Asia | 332,859 | 307,687 | 358,929 | 310,426 | - |
| Persian Gulf | 186,573 | 207,204 | 210,683 | 198,835 | - |

***Source**: UNCTAD report on Mango*

#### *Mango supply chain in Malawi*

Mango follows a traditional supply chain in Malawi. After harvesting the fruit is transported by the smallholder farmers to the main road by means of wheelbarrows and bicycles. Consumers, vendors or other middlemen can buy the produce directly from farmers. The vendor or middlemen aggregate the produce from different farmers and sell it at the nearest markets or, to other vendors/middlemen in the event that there are no markets in the immediate vicinity of the farm homestead.

[9] Centre for Promotion of Imports from Developing Countries (CBI) report titled "Promising EU export markets for fresh mangoes" available online at https://www.cbi.eu/sites/default/files/study/tailored-study-mangoes-west-africa-europe-promising-eu-markets-fresh-fruit-vegetables-2014.pdf

[10] Commercial Opportunities for Fruit in Malawi by Laronne Faulkner, Joe Harrington, Damon Levy, Koen The; available online at http://www.worldagroforestry.org/downloads/Publications/PDFS/WP16120.pdf

The number of middlemen involved in transporting the produce from the farm to the end consumer depends on the distance between the farm and the ultimate marketing outlet. In many villages the farmers are not able to organise transport to take their produce directly to the market due to lack of appropriate vehicles, high costs and, or higher opportunity costs (attributed to the time demands for executing other household chores and farming activities). The major markets for mangoes are found in Balaka, Dedza, Ncheu, Lilongwe and Blantyre.

### 4.1.5. Oranges

Oranges are one of the most popular fruits in the world and are well known for being a rich source of Vitamin C. Oranges grow well in Malawi, particularly in the southern region of the country. Studies suggest that there is a strong market potential for fresh oranges in the country. Besides, there is also significant market opportunity for locally produced orange concentrate.

Oranges are seasonal and are harvested from April to October. They are consumed in fresh form or in the form of juice. Oranges are also reported to require less water than other fruit crops and can thrive well in warmer and driers region of Malawi. Studies suggest that there is potential for improvement in yield and size by using improved citrus varieties. Vegetative propagation through grafting is often practiced in the country since grafted plants start producing fruits within two years of planting when compared to propagation through seeds.

The global orange production for 2014-15 was estimated at about 45.8 million MT. However, the global production for the year 2015-16 is forecast down by 3 million MT from the previous year due to climatic variations in Brazil ( which is the largest producer of oranges) and due to effects of citrus greening in the United States[11].

The major producing countries for oranges are Brazil, China, European Union, United States and Mexico which together contributed more than 80 percent of the world orange production in 2014-15 out of which Brazil's share was about 34 percent, followed by China with about 14 percent. European Union and United States share in total production was about 12 percent each, followed by Mexico with a total share of 9 percent.

#### *Exports of oranges*

The global trade in oranges is recorded both in the fresh form and in the form of orange juice. In terms of fresh orange exports in the year 2014-15, the total export volume was estimated at about 4 million MT. The major exporting country was Egypt which contributed about 30 percent to the total orange exports, closely followed by South Africa with about 29 percent share. The third position is occupied by United States with about 13 percent contribution to the global fresh orange exports.

In the orange juice trade[12] the total export volume was about 1.44 million MT. The major exporter is Brazil with about 78 percent share of the total global exports of orange juice, followed by Mexico with about 8 percent and United States with about 6 percent share.

[11] USDA report titled " Citrus: World Markets and Trade" available online at http://apps.fas.usda.gov/psdonline/circulars/citrus.pdf

[12] Juice content with 65 degree brix

### *Demand for oranges*

Imports of oranges are also recorded in terms of fresh and juice produce. In the fresh orange segment the total imports for the year 2014-15 was about 3.79 million MT. The major importer was the European Union which imported about 24 percent of the total fresh orange imports, followed by Saudi Arabia with a share of 13 percent share, closely followed by Russia with a share of 12 percent.

In 2014-15 the total import volume of orange juice was about 1.49 million MT out of which 77 percent was taken up by consumers in the European Union and United States. The European Union's share was estimated at 55 percent and that for the United States was 22 percent.

### Orange supply chain in Malawi

The supply chain for oranges is similar to that of mangoes. After harvest the fruit is transported by the smallholder farmers to the nearby marketing places or main road where consumers, vendors or, middlemen can purchase the produce. The vendors or middlemen aggregate the produce from different farmers and sell it at the nearest bigger market or, to other vendors and middlemen for onward transport to bigger markets. The number of middlemen involved in transporting the produce from the farm to the end consumers depends on the distance between the farm and the big marketing outlets. In many instances the smallholder farmers are not able to deliver their produce directly to the market due to a shortage of vehicles, high travel cost and, or the higher opportunity costs attributed to the shortage of labour at household level.

## 4.1.6. Pigeon peas

Pigeon pea is a grain legume which is native to India and is an important crop of semiarid tropical regions. The crop is cultivated in more than 25 tropical and subtropical countries and its contribution to the total pulses production, globally, is nearly 6 percent[13]. The total global production of the pigeon pea was 4.8 Million tonnes[14] in 2014, with and nearly 98 percent[15] of this being from the Asian and African countries. In Asia the major pigeon pea producing countries are India and Myanmar while in Africa the major pigeon pea producing countries are Malawi, Kenya, Mozambique and United Republic of Tanzania.

Pigeon pea is a significant crop for farmers in Malawi. The crop is mostly grown by intercropping with cotton, maize, sorghum or groundnuts. The plant's ability to fix nitrogen as well as its drought tolerance is perceived to be of benefit for other crops in the rotation. The crop is also suited to the drier regions of southern Malawi. The dry, wet and subtropical climatic conditions has made this crop a viable proposition in the country. The high nutritional value of pigeon peas allows the crop to contribute significantly to food and nutritional security. Pigeon peas are mainly harvested between the months of June and September. They begin arriving on the market in early July and August and peak in September when the second harvest arrives. The high adoption rate of pigeon pea among farmers has raised the production in the country from 0.18 million tonnes in 2009 to 0.30 million tonnes in 2014 at a CAGR of 10.7 percent[16]. It should also be noted that along with the production, the area under pigeon peas in Malawi has increased from 175.7 thousand ha in 2009 to 229.8 thousand Ha in 2014[17].

[13] FAO stat, 2014
[14] FAOstat, 2014
[15] FAO stat, 2014
[16] Faostat and PwC analysis.
[17] Faostat and PwC analysis

## Potential markets for pigeon peas

NASFAM buys most of the pigeon peas in Malawi while other middlemen operate in areas where NASFAM is not represented. Both NASFAM and intermediate buyers sell their pigeon peas to processors. There are over 10 pigeon pea processors in Blantyre. Some of the major processing companies include Transglobe Limited, Rab Processing and Bharat Trading Company. These companies process pigeon peas to tur dhal which requires four processes, namely: soaking, drying, dehulling and splitting the grain. Ten percent of the processed pigeon peas is reserved for the local market. Ninety percent of the crop produced in Malawi is exported market, with the major export markets being India and the UK.

The SADC region accounted for 0.88 percent of the pigeon pea market in 2015. The 5 largest markets in the Southern African Region are Zambia, DRC, Zimbabwe, Namibia and South Africa. The largest market in the region Zambia accounts for 32.2 percent of the market.

In 2015 the EU accounted for 0.56 percent of the world market for pigeon peas. The United Kingdom, Portugal, Italy and France are the largest importers of pigeon peas in the EU. In terms of market share, the United Kingdom accounts for 0.6 percent, Portugal 0.4 percent, Italy 0.1 percent and Belgium 0.1 percent.

The major market for pigeon peas is in Asia which accounted for 96.6 percent of all exports in 2015. The major markets in Asia are India, Saudi Arabia, Sri Lanka, UAE and Malaysia with India accounting for 96 percent of the pigeon pea market in Asia. The major competitors in Asia are Myanmar (which accounts for 43 percent of the Indian market), Tanzania, Mozambique and Malawi. Malawi accounts for 11.8 percent of the Indian market.

## Pigeon pea exports

Excellent market and trading opportunities exist for pigeon peas due to the high demand on the Asian markets, particularly in India which is the leading producer and consumer of pigeon peas. In Asia, Myanmar is the second largest producer and largest exporter of pigeon peas. On the other hand, in Africa, export markets are the key outlets for pigeon pea. The key exporting countries from Africa are Tanzania, Malawi, Kenya and Mozambique. Tanzania exports the Arusha and Madwara varieties both of which are considered the best from Africa by Indian importers. Malawi is rated the next best source of pigeon peas from the continent. The country exported 50,000MT to India in 2011. Although Malawi has a sizeable expatriate Asian population (comprising mainly Indians and Pakistanis), only 10 percent of the pigeon peas grown in the country are consumed locally, with the major focus being on exporting the commodity. The varieties grown in Mozambique are also preferred by the Indian importers and in 2011 India imported about 20,000 to 30,000MT.

## Pigeon pea imports

The demand for pigeon peas is mainly centred on the Asian sub-continent. Due to the huge population and the growing appetite for pigeon peas in the region, the demand for the crop is rising. In addition, the emigration of people from Asian countries to Europe and other parts of the world is also opening up new import destinations for the commodity.

India is undoubtedly the largest producer of pigeon peas but also its imports have shown a steep increase over the past decade. The steep rise in imports is due to the rise in demand on the domestic market mainly for consumption. It is anticipated that imports into India will continue to grow during the coming years given the limited domestic production and continuous growth in demand. The shortfall of Indian supply is met through imports from Myanmar and Africa. On the other hand the EU market is a new find for the exporters. This is

attributed to the significant population of people of Indian descent in the UK and the growing numbers of immigrants into the rest of Europe.

**Pigeon pea supply chain in Malawi**

Malawi is among one of the largest exporters of pigeon peas in Africa. The production of pigeon peas in Malawi is dominated by smallholder farmers. From the farmers, the pigeon pea is purchased by an intermediate buyer. These intermediate buyers are common in all the pigeon pea growing districts of Malawi. These traders act as a linkage between farmers and the processors. They usually set up a small procurement centre within the community during the harvesting season where they buy the crop from the farmers. The crop is collected at these community markets and then transported to processors. There are several companies in Malawi that are involved in processing pigeon peas into tur dal for export. These companies include ETG, Transglobe, Rab Processors, Bharat Trading Company and each one of these have established export houses in the country.

### 4.1.7. Soya beans

Soya beans are produced in almost all the districts of Malawi as a source of food and income, livestock feed, export earnings and also for improving soil fertility. The major producing areas are Kasungu, Lilongwe and Mzuzu ADDs, which account for nearly 80 percent of the total soya beans production in the country.

***Soya supply and demand***

Figure 4.6 shows that Malawi produces about 100,000 MT of soya beans achieving an average yield of nearly 1.0 t/ha.

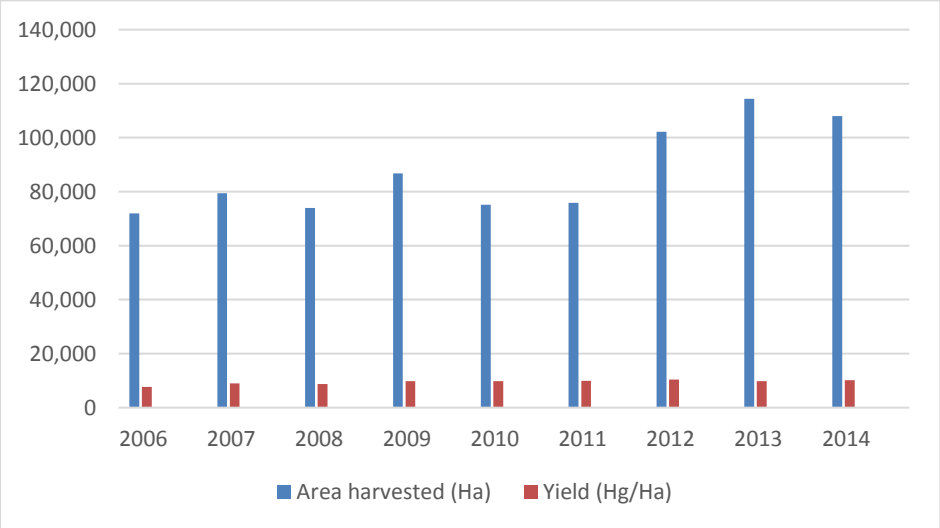



***Figure 4:6: Soya bean production in Malawi***

### *Soya price movements*

Farmers complain that the main obstacle to increasing the area planted to soya beans is the unpredictability of prices throughout the season and the lack of assurance of a minimum farm gate price at harvest time. From the industry's perspective, it is the lack of information on farmers' production decisions that creates panic about potential supplies. From these contrasting perceptions it seems that the main causes of price volatility in the soya bean market in Malawi are: the lack of reliable information on potential soya production (area planted to soya and yields per hectare); and, the GoM policy decisions. For example, the government imposed a ban on exports and then, granted export licenses as well as the limited buying permits and placed restrictions on market entry and competition. A system to estimate areas planted to soya beans and likely yields would make a major contribution to alleviating the vicious circle exacerbating market price volatility.

### *Main conclusions and possible solutions*

The soya bean market in Malawi to a greater extent has been characterised by trade restrictions such as export bans and export licenses which are detrimental to the potential development of soya bean production and marketing. An export ban costs the Malawian economy in dead-weight loss. Preventing the recurrence of export bans and export licensing in coming seasons would greatly improve prospects for raising production and exports and increasing net farm incomes of soya bean farmers.

## Supply chain analysis for soya beans

Soya beans serve a variety of functions in the global food chain, ranging from use as edible oil to a source of protein for humans and use in livestock feed. Globally, nearly 87 per cent of the total soya bean production is crushed into soymeal and soy oil, while the remaining 13 per cent is used for direct human consumption[18].

The global soya bean production has increased from 214.5 million tonnes in 2005 to 308.4 million tonnes in 2014[19] at a CAGR of 4.12 percent[20]. The major soya bean producing countries are the USA, Brazil, Argentina, China and India. Together these countries account for nearly 88 percent[21] of the total world production.

## Soya bean export

In general, oilseeds and their products are intensively traded commodities around the world and soya beans is no exception in this regard. Nearly 38 percent of the total soya beans produced in 2013 was exported to different countries[22]. The major soya beans exporting countries are Brazil, USA and Argentina. These countries together account for nearly 85 percent[23] of the total export of soya beans around the world.

## Soya bean imports

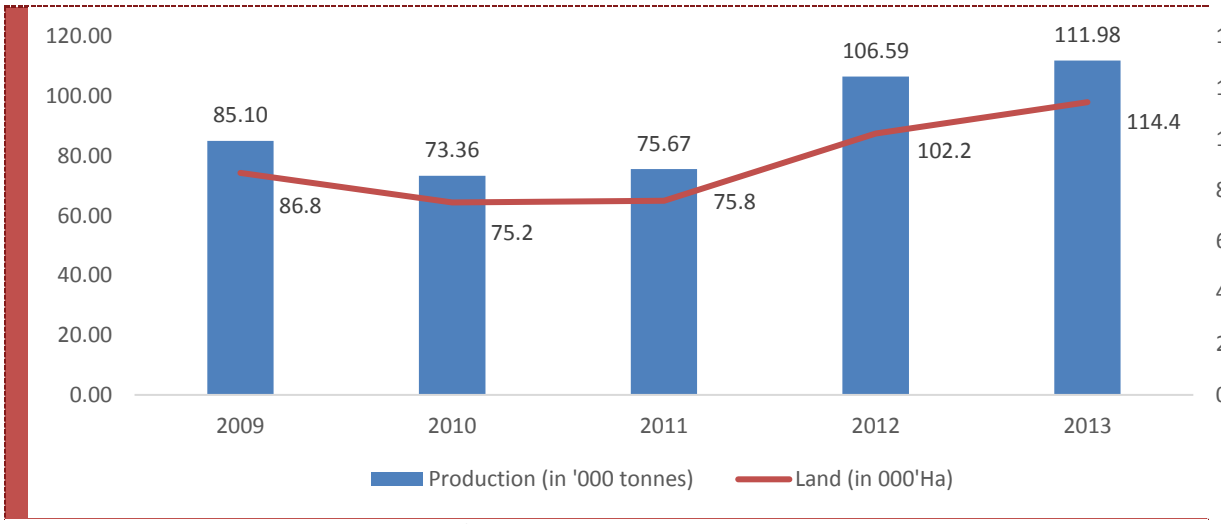
A large number of countries import soya beans and/or their by-products for domestic consumption. Depending on domestic demand, which is also determined by the structure of the local processing industry, countries import either the primary product (soya beans) or

[18] The State of Sustainability Initiatives (SSI) report, https://www.iisd.org/pdf/2014/ssi_2014_chapter_12.pdf
[19] FAOstat 2014
[20] PwC Analysis
[21] FAOstat
[22] FAOstat
[23] FAOstat

directly soy oil and/or soymeal. The major soya bean importing countries are China, Germany and Mexico. It should be noted that China alone imports nearly 62 percent[24] of the total soya beans imported globally.

**Soya bean scenario in Malawi**

Soya bean is one of the most important crops in Malawi. The crop is increasingly becoming popular and serves as both a food and cash crop. The production of soya beans is rising in Malawi due to government policies on value addition, domestic use and crop diversification. Consequently, there is a significant expansion of the soya bean industry within Malawi in response to the substantial demand from both the local and export markets. Malawi is rated as the fourth largest producer of soya beans in Africa behind the leading countries of South Africa, Nigeria and Zambia[25]. The production trends from 2009 to 2013 show that soya bean production in Malawi has increased at a CAGR of 7.10 percent[26]. An overview of the total production and land under soya beans cultivation is presented in Figure 4.7.



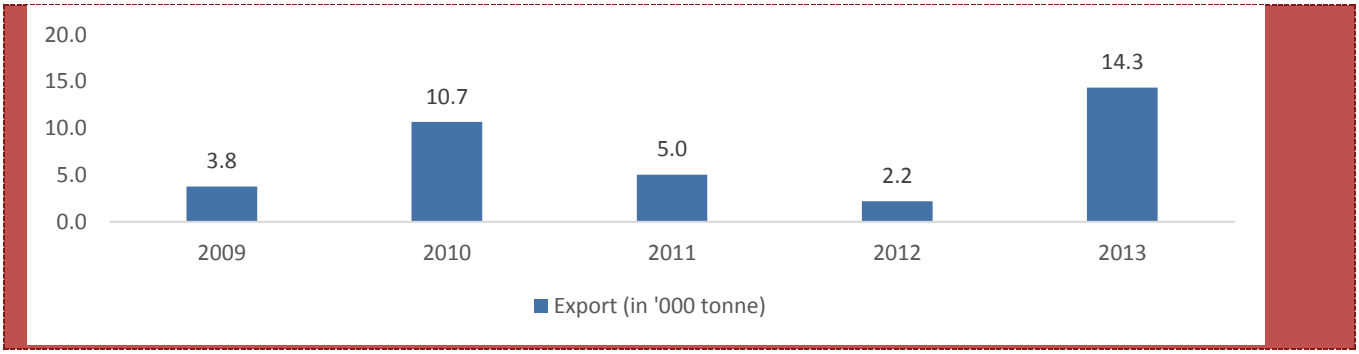

***Source:*** *FAOstat 2014, PwC Analysis*

***Figure 4:7: Production of soya beans (in '000 tonne) and land under soya beans cultivation (in '000 ha)***

Malawi is also one of the major exporters of soya beans in Africa. However, it has been observed that the export market for Malawi has remained confined to other countries on the African continent. In 2013, nearly 90 percent[27] of the total export of soya beans from Malawi was to Botswana and Zimbabwe. An overview of the total export from Malawi is provided in Figure 4.8.

[24] FAOstat

[25] FAOstat
[26] PwC analysis
[27] FAOstat




***Source:*** *FAOstat 2014, PwC Analysis*

***Figure 4:8: Export of soya beans from Malawi (in '000 tonnes)***

This clearly indicates that there is scope for Malawian exporters to explore new and emerging markets around the globe if they can grow the crop competitively.

**Soya bean supply chain in Malawi**

A typical supply chain for soya beans in Malawi constitutes farmers, vendors/traders, processing and exporting companies and retailers. The majority of farmers sell their produce to traders who act as intermediate buyers and collect the produce at the local procurement centres. The traders include vendors, retailers, wholesalers, companies and individual households. Over half of the soya bean crop is sold to the vendors, leaving other players such as wholesalers, retailers, ADMARC and NASFAM to share the balance. Although the GoM announces a minimum buying price for soya beans, the reality on the ground reveals that the traders to a larger extent, determine prices taking into account the demand, transport costs, quality and other related factors. The vendor incur transportation, storage and packaging costs. The vendor then sells the produce to retailers or other processing units and export houses who in-turn sell it to final consumers.

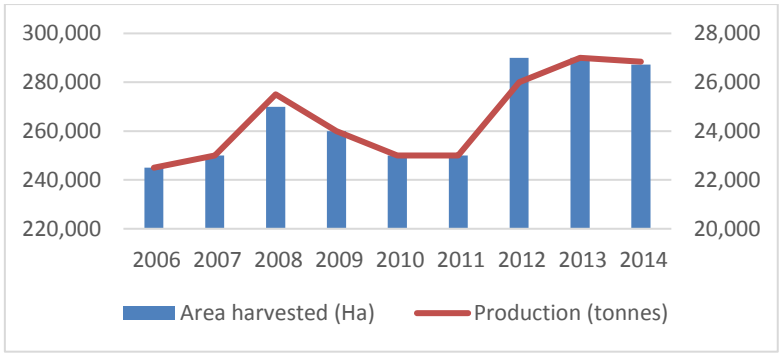
### 4.1.8. Sugar cane

Sugar is the second largest foreign exchange earner in Malawi after tobacco and as such is classified as a priority commodity identified for diversification and value addition purposes under the NES. Furthermore, policy support to the sugar sector offered under the NAS aims to enhance its competitiveness by increasing the factory capacity and overall sugarcane production through efficiency improvements in both the field and factory operations. Illovo is the only company processing sugarcane into sugar in Malawi and is believed to be one of the lowest cost producers in the world.

***Sugar marketing, supply and demand***

Illovo operates five distribution centres for sugar sales throughout Malawi, which offer the traders the opportunity to collect the sugar closer to the markets. The price of sugar is determined by Illovo.

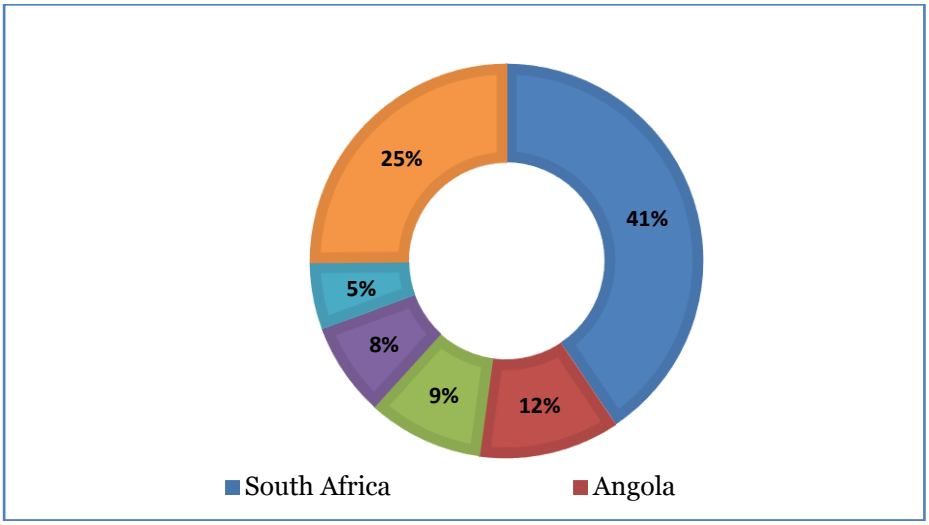
In 2013/14 Illovo produced an estimated 300,000 tonnes of sugar from its factories at Dwangwa, in central Malawi, and at Nchalo, in the south. Over half of the company's total sugar production is sold within Malawi. The remainder is exported to regional markets in Africa and also to the EU and the USA. As highlighted in Figure 4.9, both the land under sugar cane cultivation and production volumes realised recorded noticeable increases between 2011/12 and 2013/14.




***Source:*** *FAOSTAT*

***Figure 4:9: Sugar production in Malawi***

In the SADC region the biggest importers of sugar are South Africa, Angola, Tanzania, Namibia and Botswana. Figure 4.10 shows SADC's largest markets for sugar and their market shares. South Africa has the largest market share while Angola, Namibia, Tanzania and Botswana are among the top five importers. The major competitors in the SADC region include Brazil, India, China and Swaziland.




***Source:*** *TRADEMAP*

***Figure 4:10: SADC largest markets for sugar***

Table 4.6 shows the world's share of Malawi's sugar exports for 2015. The United Kingdom imports 36 per cent of Malawi sugar. This export destination grew due to the Lome Convention of 1975 and subsequent support systems to improve sugar production. Ten percent of Malawi's sugar goes to South Africa, 9 percent each to Zimbabwe and Spain. Malawi has managed to penetrate the European and African sugar markets to date.

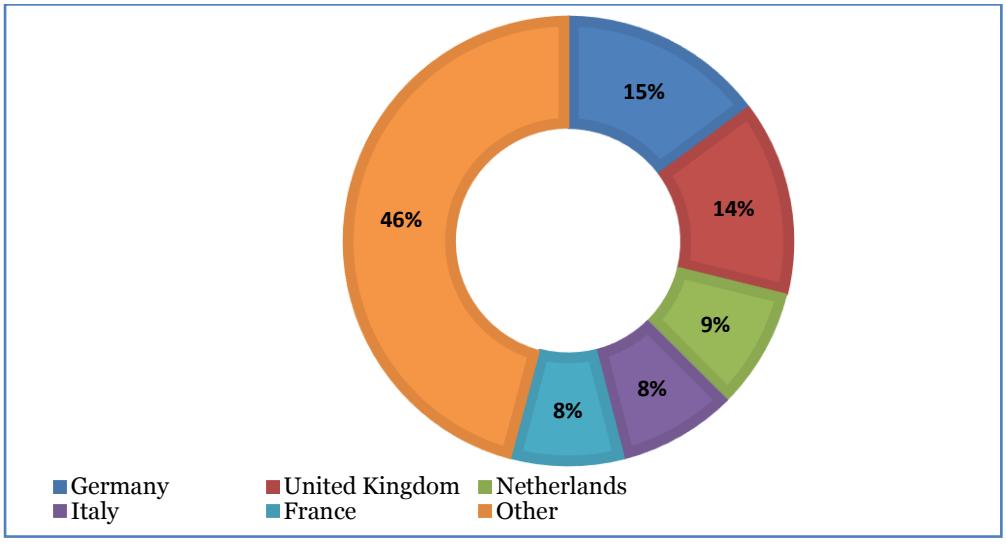
*Table 4-6: World's share of Malawi's sugar exports in 2015*

| Importers (2015) | Share in Malawi's exports of sugar (%) |
|---|---|
| World | 100 |
| United Kingdom | 36.7 |
| South Africa | 10.7 |
| Zimbabwe | 9.4 |
| Spain | 9.2 |
| Italy | 8.3 |
| Sweden | 7.3 |
| Belgium | 5.3 |
| Tanzania, United Republic of | 4.8 |
| United States of America | 3.7 |
| Finland | 1.9 |
| Rwanda | 1.1 |
| Uganda | 0.7 |
| Burundi | 0.7 |
| Kenya | 0.1 |
| Mozambique | 0 |

***Source:*** *TRADEMAP*

## EU sugar market

The European Union's largest markets are the United Kingdom, Germany, Netherlands France and Italy. Figure 4.11 shows their corresponding shares. The potential competitors to EUs sugar market are France, Belgium and Germany. There is a lot of intra-EU trade in sugar.

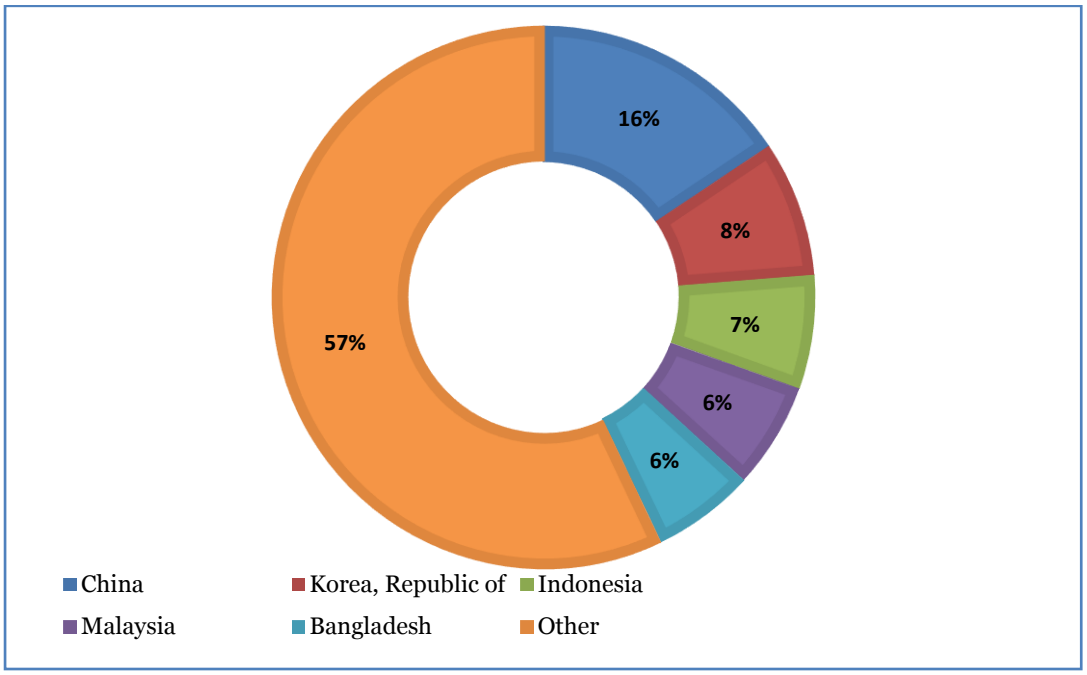



***Source:*** *TRADEMAP*

*Figure 4:11: EU sugar market shares*

**Asian sugar markets**

The Asian top five markets for sugar are China, Korea, Indonesia, Malaysia and Bangladesh (Figure 4.12). The potential competitors in the Asian sugar markets include Thailand, China and Brazil. The tariff rates for the competing importers are zero rated. They have among others advantages in costs and of distance to the Asian market.

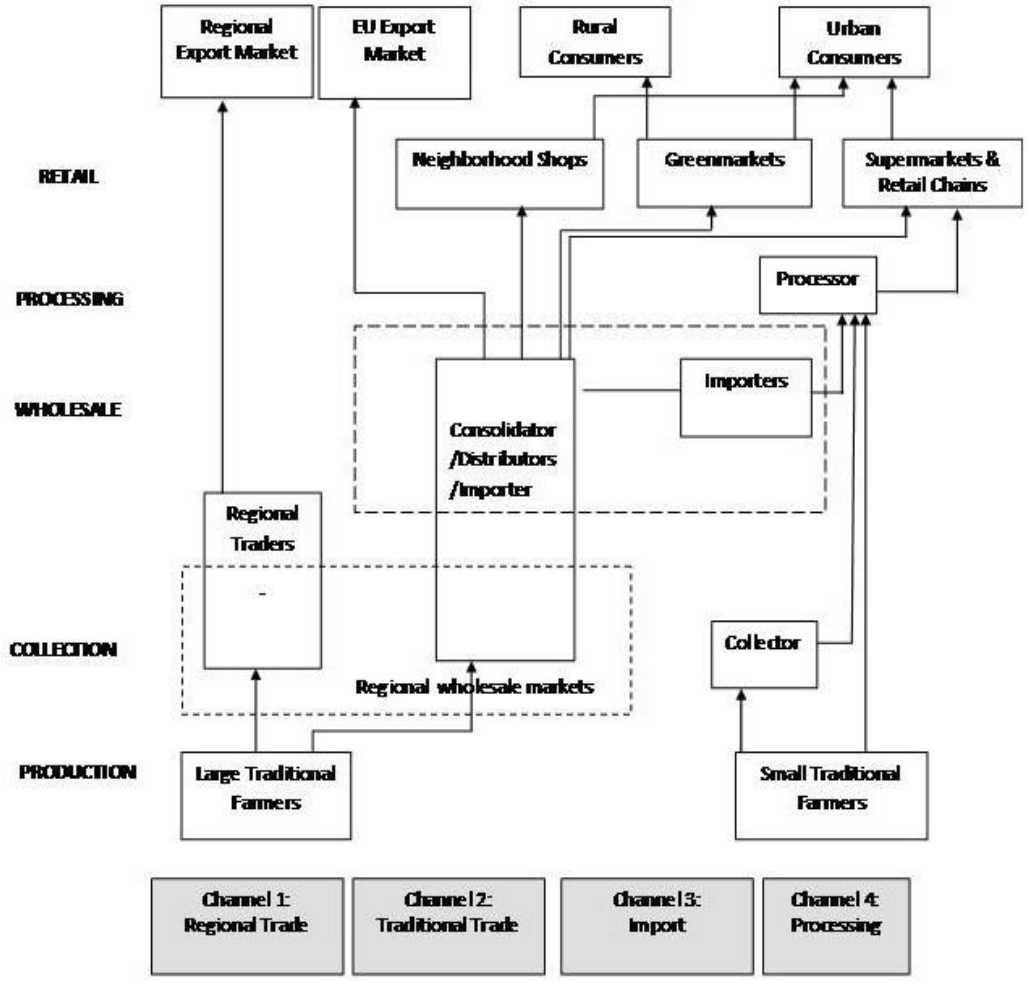



***Source:*** *TRADEMAP*

***Figure 4:12: Asia sugar importers***

### 4.1.9. Fruits and vegetables

Malawi's agro-ecological conditions are suited to the production of fruit and vegetables such as tomatoes, baby corn, citrus, fine beans and mangoes. Malawi has abundant water resources including dams, lakes and rivers which give it an advantage in terms of the availability of cheaper irrigation water in addition to the relatively cheap labour. Despite the abundance of water resources, the potential for vegetable production still remains underdeveloped. Smallholder farmers are the main players in the production of vegetables in Malawi. The few large scale farmers tend to concentrate on supplying the export market. Local production therefore tends to be encumbered by low productivity levels due to: lack of improved seed and varieties; the overall poor quality of products; and, seasonal gluts. The market outlets include both the formal markets (including the big retail shops) and the informal markets (including local consumers and roadside stalls). The big supermarket chains in Malawi include Shoprite, SPAR and Superior Food Market. Figure 4.13 presents the vegetable value chain.




***Source:*** *USAID (2010)*

***Figure 4:13: Vegetable value chain***

Table 4.7 shows the exported value and the major markets for edible vegetables and certain roots and tubers. The world's largest importers of vegetables from Malawi are India and the UAE. About 78 percent of Malawi's exported vegetables are sent to India.

*Table 4-7: Export destinations for edible vegetables, certain roots and tubers*

| Country | Export value in 2015 (USD' 000) | Trade balance in 2015 (USD' 000) | Share in Malawi's exports (%) |
|---|---|---|---|
| World | 64,732 | 61,306 | 100 |
| India | 50.538 | 50,522 | 78.1 |
| United Arab Emirates | 5,515 | 5,513 | 8.5 |
| Singapore | 1,675 | 1,675 | 2.6 |
| Indonesia | 1,173 | 1,173 | 1.8 |
| United Kingdom | 1,113 | 1,113 | 1.7 |
| Zimbabwe | 1,057 | 1,017 | 1.6 |
| South Africa | 1,023 | -18 | 1.6 |
| Malaysia | 937 | 937 | 1.4 |
| Netherlands | 489 | 486 | 0.8 |
| Mauritius | 321 | 321 | 0.5 |
| Botswana | 249 | 249 | 0.4 |
| Congo, Democratic Republic of the | 142 | 142 | 0.2 |
| Germany | 81 | 81 | 0.1 |
| Thailand | 74 | 74 | 0.1 |
| Kenya | 63 | 63 | 0.1 |
| Zambia | 50 | 41 | 0.1 |
| Italy | 45 | 40 | 0.1 |
| Fiji | 43 | 43 | 0.1 |
| Mali | 41 | 41 | 0.1 |
| Finland | 37 | 37 | 0.1 |
| Turkey | 23 | 23 | 0 |
| Mozambique | 21 | -1,439 | 0 |
| France | 13 | 13 | 0 |
| Poland | 5 | 5 | 0 |
| Tanzania, United Republic of | 3 | -45 | 0 |

***Source:*** *TRADEMAP*

### *Potential markets for vegetables*

Table 4.8 summarizes the largest markets for baby corn, mange tout, citrus, fine beans and mangoes in the SADC, EU and the Asian regions.

*Table 4-8: Leading markets for baby corn, mange tout, citrus and fine beans*

| Commodity | Leading consumers in the SADC region |
|---|---|
| Baby corn | South Africa (27%), Namibia (23%), Botswana 18%, Seychelles (13%), DRC (5%), Other (16%) |
| Mange tout | South Africa (64%), Lesotho (23%), Namibia (5%), Botswana (3%), Mauritius (1%), Other (4%) |
| Fine beans | Swaziland (27%), Lesotho (24%), South Africa (20%), Angola (6%), Botswana (5%), Other (8%) |
| Citrus | South Africa (24%), Angola (18%), Mauritius (17%), Zambia(12%), Namibia (8%), Other |
| | **Leading consumers in the EU market** |
| Baby corn | Germany (21%), United Kingdom (20%), France 18%, Netherlands (7%), Austria (6%), Other (28%) |
| Mange tout | United Kingdom (24%), Netherlands (24%), Belgium (21%), Germany (10%), France (7%), other (14%) |
| Fine beans | Spain (22%), France (21%), United Kingdom (19%), Netherland 14%, Germany 9%, Other (15%) |
| Citrus | Germany (17%), France (16%), Netherlands (15%), United Kingdom (12%), Italy (6%), other (34%) |
| | **Leading consumers in Asia** |
| Mange tout | Vietnam (25%), Malaysia (19%), Taipei Chinese (9%), Japan (8%), Pakistan (7%), Other (32%), the Asian market occupies 9% of world market. |
| Fine beans | Singapore (40%), Japan (12%), Kuwait (12%), Saudi Arabia (7%), Bahrain (5%), Other (24%) |
| Citrus | Hong Kong China (11%), Japan (11%), Saudi Arabia (10%), China (8%), Korea (8%), Other (52%) |

***Source:*** *Compiled from TRADEMAP*

## 4.2. Ranking of crops based on market potential

### 4.2.1. Crops showing some potential for inclusion in the project

The pursuit of the market opportunities identified in Section 4.1 will take time and require substantial investments to be made by various stakeholders and at different levels in the project area. In reality, it is important to note that it is likely that by the time the nation as a whole is able to respond to the identified opportunities the market dynamics could lead to significant changes. It is for this reason that the approach in formulating the AgDPS must be forward looking. In selecting the crops to be included in the cropping programme the following quick wins can be identified from the assessment carried out to-date:

- sugar could be used as a programme "cash cow": focusing on markets where Malawi has tariff/duty/quota advantages. Sugarcane is already the major commercial crop in the project area with a well-developed value chain and it is envisaged that the crop will retain this status for the foreseeable future;
- oil seeds, especially soya beans should place emphasis on varieties that will yield well in Malawi's agro-climate and also ones that will combine with the tropical climate to deliver high protein levels. This may allow two streams of benefits: oil and protein rich crush (for the Asian market). Cotton and soya beans are well established crops in Malawi in general, and are considered easy to grow, store and market;
- ensure that the genetically modified organism (GMO) free status is maintained and that certification to allow access to key markets are obtained;
- chillies and paprika may be able to be shipped "fresh" to markets like Indonesia. The best practices here are very similar to tomatoes so if a tomato programme is initiated, chillies could benefit and provide earlier returns. Indonesia is a massive market for chillies but the production of the crop in the country is very volatile. If Malawi can

develop special trading relationships for this commodity, this could be a big opportunity. Big corporations (such as Heinz) could be approached to participate in the production and processing of the commodity;

- pulses appear to yield quite well. Companies such as Poortmans of London may be interested in marketing and supporting a programme in this area. Dry beans and pigeon peas are well established crops in Malawi in general, and are considered easy to grow, store and market;
- high value crops that could be introduced into the cropping programme in tandem with investment in other parts of the value chain include: baby corn; chillies; citrus (oranges); mangoes; sweet corn; and, tomatoes; and,
- further investigations through appropriately designed research programmes will be required to identify and, or develop suitable varieties for the lower Shire Valley for such crops as upland rice and wheat.

### 4.2.2. Review of agricultural markets and supply chains

A review of the supply chains for the major crops that can be grown in the lower Shire Valley suggests that there are significant opportunities that could be exploited based on existing gaps in production, marketing and processing. This section discusses some of the identified gaps for specific cropping enterprises and how they could be exploited under the SVIP.

#### 4.2.2.1. Production

**Cotton**

The country has considerable potential for cotton production and can therefore expand the supply to meet the huge demand on both the domestic and international markets. The commercialization of cotton production can address the issue of erratic supply of the crop on the local market. It is envisaged that commercial farming under the SVIP will improve the supply of cotton to support the existing ginneries and garment manufacturing units by increasing availability of key raw materials.

**Maize**

Malawi's staple food market is thin, which makes it susceptible to sudden shifts in supply and demand and prone to price volatility. Noting that Malawi has the most volatile maize prices in the region, to the detriment of farmers, consumers or any potential investor should signal to the GoM that continued discretionary and ad-hoc interventions in the maize market will perpetuate price unpredictability.

The GoM should avoid discretionary interventions in the market with export bans and licensing arrangements. At the minimum GoM is encouraged to determine the criteria for market intervention and make the criteria transparent. When confidence and predictability are restored, farmers and traders will engage more in the market, making the market more functional. This will eventually lead to increased private investment in the agricultural sector, increased production, and higher levels of food security not only in the SVIP area but also throughout Malawi.

The GoM should focus on reducing domestic and international trade restrictions in order to increase the level of maize marketed within the country and facilitate movement of grain from surplus to deficit areas. The GoM should consider facilitating private investment in rural infrastructure such as one-stop business development centres, central markets, warehouses

and storage in the SVIP area, which would in-turn reduce transaction costs for the value chain players.

**Mangoes**

About 60 percent of the total mango trees in Malawi are of varieties which yield small and yellow fruits with a high fibre content. Such fruits are unsuitable for the production of fruit juice. In order to cater for the international demand for raw materials for mango juice production, there needs to be production of suitable varieties which can be easily processed. A possible solution to this problem is grafting scions (shoot material in the grafting process which bears fruit) to the existing local mango varieties through a process called top-working in which the shoot system of the desired variety is grafted onto an already established mango tree. This will help in reducing the gestation period (time taken for a newly planted plant to come to fruit bearing stage) since the tree is already established. Moreover, a newly introduced variety takes time to acclimatize to the local conditions and may sometimes even fail to grow in a new environment. However in the case of top-working, the desired scion is grafted onto an already established tree, hence the establishment rate is higher.

Since, the local varieties grown in Malawi are high in fibre content, the farmers should shift their focus to the preferred varieties on the export market and also focus on growing improved varieties such as Tommy Atkins which have high processing quality.

Since grafting/top-working requires considerable scientific and technical skill there is a need for the establishment of nurseries which will supply high quality grafting materials to the smallholder farmers. The availability of better quality propagation materials will also help in increasing the productivity of mangoes and directly help in increasing overall total production in the country.

**Oranges**

Studies suggest that there is a potential to increase the yield, size and variety of the oranges grown in the country. Moreover, while there are large fruit juice producing companies in the country, they import juice concentrates from South Africa. Even for smaller juice companies, there is a constraint of securing a continuous supply of raw materials and as a result these smaller juice companies struggle to remain commercially viable.

Since grafting requires considerable scientific and technical skill there is a need for establishment of nurseries which will supply high quality graft materials to the smallholder farmers. Better quality of propagation materials will also help in increasing the productivity of oranges grown in the country. With increased revenue the smallholder farmers will also be able to use more agri-inputs (fertilizers, insecticides, pesticides, plant growth regulators) in an effort to improve the production and productivity of the crop. This will open up the agri-input market space in the country which will attract large agro chemical multi-national companies to sell their produce in the country.

**Pigeon peas**

Pigeon pea cultivation in Malawi is predominantly practiced by smallholder farmers who are very sensitive to the market behavior of other commodities. This translates into an erratic supply of pigeon peas and an output of variable quality. The volumes required for an increase in the export capacity of the pigeon pea sector are not guaranteed under the current model of production.

It is envisaged that the commercial production of pigeon peas will address the issue of erratic supply of the crop in the local market. Commercial farming will supply a crop of uniform quality and will also aid in boosting the export capacity of the pigeon pea sector.

**Soya beans**

It should be noted that although the production of soya beans in the country has increased over a period of time, the overall productivity of the soya beans has remained fairly constant. In addition, the productivity levels at 1.08t/ha is quite low when compared to other African countries like Egypt at 2.7t/ha, South Africa at 1.8 t/ha, Zambia at 1.8 t/ha and Kenya at 1.4 t/ha). The major reason for the low productivity levels in Malawi is the lack of quality seeds together with: poor pest and disease control measures; poor availability of pesticides and herbicides; and, lack of modern agricultural technologies. Farmers do not usually use quality agro-chemicals due to high costs and limited availability. The GoM has introduced several agriculture input subsidy schemes to increase farmers' access to improved inputs. The private sector can take advantage of the government support and can increase farmers' accessibility to quality inputs through different marketing and distribution channels (i.e. channels established by government or by company's own channels).

### 4.2.3. Marketing

**Cotton**

Cotton production in Malawi and the rest of the southern African region has been adversely affected by the fall in the farm gate realised by the smallholder farmers over the past few years. The GoM should strengthen the regulatory framework regarding market transparency and the enforcement of the pricing policy to ensure that the minimum prices are respected by the ginneries and that price information is disseminated to farmers.

**Mangoes**

In Malawi it is estimated that about 60 percent of the total mango produce is lost due to lack of transport infrastructure and lack of storage facilities. This loss can be reduced if there are transport facilities which will help the farmers/vendors/middlemen to take the produce to the nearest market yard with ease and at a low cost. Moreover, mangoes have a short shelf-life compared to other agricultural crops such as maize, cotton and similar crops. Hence the development of transport facilities (improvement of road connectivity) will help in reducing the total time taken to transport the produce to markets/end consumers which will help in reduction of losses.

In order to reduce wastage during storage there needs to be investment in cold storage facilities to help increase the shelf life of the produce by slowing down the physiological deterioration/spoilage process. Also, there can be investment in use of refrigerated trucks to transport produce from farm to market so that the spoilage process is further slowed down while in transit. In order to reduce the physical damage during transportation proper packaging material (such as Corrugated Fibre Board Boxes – CFBs) can also be used. Though there is considerable investment required to set up cold chain facilities, the return due to the reduction in wastage and improved quality of produce will help in offsetting the costs.

In case of supply chains wherein the number of middlemen are higher, the farmers' share of the retail price offered to the end consumer is very low and a major share of the profits is taken by middlemen. Hence there needs to be a mechanism which can directly link farmers with end consumers or reduce the number of stakeholder in the supply chain so that farmers' get a significant portion of the retail price offered to the end consumer

A major disadvantage of ineffective market linkages is that farmers are not able to receive better prices for their produce. An effective solution to the problem is contract farming. In contract farming a buyer (large agro-processor or trader) enters into a contract with farmers

in which the buyer agrees to purchase the produce at a pre-determined price. This hedges the risk of uncertain price fluctuations and also helps the farmer realise a better price for the produce.

**Pigeon peas**

Accessibility to market is essential if farmers are to be convinced to increase production to the levels required for transition to commercial farming. Currently the lack of basic market infrastructure like roads and storage facilities are hindering the overall growth of the sector. In addition to that, Malawi is a land locked country and therefore exporters are forced to incur high costs to access the larger markets abroad.

There is a good market opportunity for establishing warehouses and storage units for pigeon peas. It is envisaged that in the future the overall production of pigeon peas will increase necessitating further expansion of the existing storage capacity and this offers a great business opportunity to investors.

The establishment of export units which could timely cater to the demand of international markets is a good business opportunity in the pigeon pea supply chain. It should be noted that the period when India, the major importer of pigeon peas, generally faces a supply deficit is very close to the harvesting season in Malawi. Malawian producers can therefore capitalize on this opportunity by timing their exports to coincide with the period of high demand in India.

**Soya beans**

The difficulties faced in transporting the produce to the market is one of the key reasons why farmers sell most of the produce to vendors. The lack of basic infrastructure like roads, storage facilities and ready markets are the major constraints endured by farmers and this presents a significant investment opportunity in the project area.

## 4.3. Consultations with agri-business private investors

### 4.3.1. Inventory of existing agri-businesses

The large agro-processing and agro-industrial enterprises constitute a small proportion of the manufacturing sector in Malawi. The major players in the sector in Malawi include: Bakhresa Industries; CP Feeds; Crown Mangoes; Illovo; Malawi Mangoes; PressCane; Press Corporation; Rab Processors; and, Universal Industries.

**Bakhresa Industries**

Bakhresa Industries is a large milling and processing company producing maize meal, wheat flour, cereal blends, biscuits and other bakery products.

**CP Feeds**

CP Feeds is a large-scale feed manufacturer selling feed mainly to the poultry industry. Purchase large quantities of maize locally and also import when necessary.

**Crown Mangoes**

Crown Mangoes is a division of Polypack. They are currently involved in the processing of oil from the seeds of the Neem tree. They have three farms located in the Shire Valley. In Ngabu they have run trials of establishing a cotton crop but the initiative has not been fully rolled out because the project has encountered significant patches of saline soils in the identified area. They have also tried to establish a crop of palm oil trees but the crop is not doing well. Their

latest project is the establishment of a mango plantation with a total of 3,500 trees, so far. The crop seems to be doing well and they are already selling the fruits from the plantation in Blantyre. The immediate target for their mango orchard is 250 ha. It is envisaged that the whole project will culminate in the establishment of a juice extraction factory in the Shire Valley.

**Illovo**

Illovo has been operating in the Shire Valley for nearly 50 years. Illovo processes sugar for local consumption, regional markets – Kenya, Burundi, Tanzania and South Africa and EU market, facilitated by Fair Trade. Illovo meet market standards and requirements for these external markets.

Illovo's experience in growing sugar cane in the area and their willingness to partner with the local communities gives the SVIP great potential particularly with respect to the production of sugar cane. However, it is worth noting that the existing crushing capacity of their factory is nearly fully accounted for. If the decision to increase the size of the area under the sugar cane crop is made, Illovo would need to be engaged to encourage them to invest additional resources to expand their current operations, otherwise other investors would have to be attracted into the project area.

**Malawi Mangoes**

Malawi Mangoes was founded in 2009 with operations based at their farm at Matumba in Salima District close to Lake Malawi. At inception they established 20ha of mangoes and 60ha of bananas on the 126ha farm. In addition, through a community outreach programme Malawi Mangoes has established a network of 2,000 smallholder farmers located within a 30km radius from their existing processing facility. At inception the smallholder farmers had a total of 20,000 trees to which was added another 40,000 trees. The smallholder farmers join the programme entirely of their own will and they are formally registered and given a full briefing of how the programme works. Subsequently the smallholder farmers are supported by Malawi Mangoes who have established a team of 15 outreach workers. The farmers choose whether to top-work existing trees or to plant seedlings. Saplings are typically planted on field perimeters or land with no existing utilisation.

Since then operations have expanded to include farms at Dzuwa and Nyunyu. At Dzuma 290ha of mangoes and bananas were established prior to the acquisition of the 2,565ha at Nyunyu. At Matumba they grow mangoes and bananas as well as conduct trials on a whole range of fruit trees and other crops. While the main operations have been designed around the core commodities of mangoes, bananas and pineapples, other crops that are likely to be included in future in their programmes are passion fruit and citrus (oranges, lemon, lime and tangerine).

Malawi Mangoes have also developed a state-of-the-art processing facility at Matumba which is geared to produce high quality purees and juices. Recognising that much of the fruit from around 4 million mango trees grown along Lake Malawi has historically gone to waste the developed facility used new equipment of European origin with a view to ensuring that the exacting standards of the international market will be met. Fruit used in the processing facility if procured from their own farm and from the smallholder farmers engaged through their community outreach programme.

**PressCane**

PressCane Limited is an ethanol distillery which is a subsidiary of the conglomerate Press Corporation Limited and began operations in June 2004. The plant is located in Chikwawa on the west bank of the Shire River about 30 km north of Nchalo (55km south of Blantyre) and employs 118 Malawians including management.

The main products of the distillery are fuel ethanol also known as anhydrous alcohol (AA 99.8 percent v/v) and industrial alcohol (rectified spirit 96.5 percent v/v). Sugar cane molasses is procured from Illovo in Nchalo and fermented into ethanol. The molasses is a by-product (effluent) for the Illovo Sugar Mill process whose environmental disposal issues have been solved by the establishment of PressCane ethanol plant.

The fuel ethanol is blended with petrol in the ratio 20 percent ethanol to 80 percent petrol by the petroleum companies such as BP Malawi, Petroda, Engen, Enegem, TOTAL Malawi. Fuel blending in Malawi (and indeed elsewhere) was precipitated by the fuel energy crisis in the early 1970s. Today fuel blending is mostly driven by: Environmental clean air issues and the recognized rapid depletion of the traditional fossil fuels and thence the necessity for conserving the non-renewable energy sources. There are further considerations which apply to Malawi such as the need to save on foreign exchange. The surplus ethanol after national blending requirements have been met is exported generating more foreign exchange for Malawi.

PressCane are the owners of the existing ethanol factory in located in Chikwawa which is currently operating at 50 percent capacity. The main challenge faced on this project is the inadequate supply of raw materials to the extent that the company is forced to import some molasses from Sena in Mozambique. PressCane has embarked on an outgrower scheme for smallholder farmers to supply sugar cane. The target is to establish the sugar cane crop initially on 2,000 ha. This will be allocated towards sugar cane production and additional 270ha will be allocated for the production of food crops for the smallholder farmers whose land has been incorporated in the scheme. PressCane have started organising the community into a cooperative, the Katunga-Maseya Cane Growers' Cooperative Society. PressCane have hired a South African firm to facilitate social engagement. Under the KAMA project a feasibility study is currently being carried out. Each farmer measures his/her piece of land in order to know how much land will be the farmer's contribution and subleased by the cooperative. PressCane have secured grant funding and this has helped in facilitating the registration of the cooperative. It is envisaged that PressCane will enter into a cane supply agreement with the cooperative, once production commences.

**Press Corporation**

Press Corporation have expressed a strong interest in participating in the SVIP project area. Their level of participation will be guided by the selection of enterprises identified during the feasibility study as showing the best potential for attaining viability under the Shire Valley climatic conditions. They will also take into account the identified market opportunities both locally and in the regional markets (e.g. within SADC) as well as global markets. Press Corporation is also interested in a range of crops for high quality retail markets e.g. Fruits and vegetables to substitute the current imports as well as respond to export demands. For example, they are currently looking at processing technology for processing tomatoes and carrots with some Italian company. These will however require strict control over production systems to ensure compliance with international standards.

Press Corporation is also investigating the opportunities around the development of bio-fuels. For example, work is being carried out to explore energy cane varieties that can be used to produce cane for ethanol production. Other bio-agricultural energy forms e.g. biodiesel using common biomass forms such as maize through synthetic fuel cracking. In this case a range of crops suitable for energy production will be considered.

The preferred model will be to work with farmer organisations/companies on shareholding where they would use land as capital. Press Corporation should be able to control operations so that farmers can move out without taking land. Currently Press Corporation is working with the Green Belt Initiative land experts to design an appropriate model for using the customary

land system. The Corporation has engaged an Outgrowers' Manager to facilitate the interaction among the key stakeholder groups (the company and smallholder farmers). The intention is to ensure that people are fully aware of the details to the arrangements being made.

### Rab Processors

Rab Processors is a large milling and processing company with a national network of warehouses and distribution points. Main products are maize meal, wheat flour and cereal blends.

### Universal Industries

Universal Industries is the largest agro-processing company with a national network of warehouses and distribution points. Main products are maize meal, wheat flour, biscuits, potato crisps, French fries, soya pieces and beverages. Universal is the only company in Malawi currently purchasing cassava chips and orange flesh sweet potatoes as a partial wheat substitute for bakery products. It buys raw food commodities for processing from local farmers and traders and faces the problem of poor grading and inadequate stocks. It exports some of its products to Zimbabwe, Kenya and South Africa).

### Other key players

Malawi has a relatively well developed seed industry and notable seed companies include Seed-Co, Pannar and Quton. Availability of seed and other crop inputs are crucial to the development of the SVIP. Government policy is to open the seed market allowing companies to produce and sell seed without government licenses and to introduce new varieties for all crops (MoAIWD, 2012).

Currently, there is very little agro-processing that is done in the smallholder sector in Malawi with most of the smallholder farmers selling their produce in the form of raw agricultural commodities with very little if any effort being made to add value.

## *Major constraints identified in agro-processing*

Some of the major constraints identified as likely to be encountered in the commercialization of crop production under irrigated conditions in the Shire Valley include: high post-harvest losses; lack of capacity in the existing agro-processing enterprises; lack of a conducive investment environment and the lack of accreditation capacity to facilitate entry into the high value export markets.

### High post-harvest losses

Horticultural crops have the potential to bring about a big impact on the local and national economic. However, in Malawi, post-harvest losses are estimated at 30 per cent of the total food grains harvested and as high as 50 per cent for perishable crops such as fruits, vegetables, root and tuber crops. Post-harvest crop losses occur at five stages in the farm-to-fork chain, namely: during harvesting such as from mechanical damage and/or spillage; during post-harvest handling, such as drying, winnowing, and storage (insect pests, rodents, rotting); during processing; during distribution and marketing (wholesale, supermarkets, retail and wet markets); and, during consumption (e.g. good quality food fit for consumption being discarded). Post-harvest losses have serious implications for farmers, consumers and the national economy.

### Lack of capacity in the SME sector

The main challenge in the area of food regulations and markets is that the small and medium scale enterprises (SMEs) which are the main players on the local market lack the necessary

resources, namely, laboratory infrastructure as well as adequate national and regional linkages to facilitate the exchange of information and experiences. These shortcomings frustrate the country's efforts to compete well in the international market place. In the context of the Shire Valley further efforts to encourage value addition and agro-processing are likely to be frustrated by, among other factors: the remoteness and concomitant high cost of transporting both the inputs and the produce from the area; inconsistent and, or low quality of produce supplied that fetch low prices on the international market; the inability to maintain the required cold chain for the effective storage of high value perishable commodities; and, poor handling practices resulting in contamination of the produce before it reaches the markets. Additional challenges that need to be addressed include lack of back-up service and technical support to link farmers, processors and traders to improve access to markets, support in accessing inputs and identifying market demand.

**Lack of a conducive investment environment**

Due to the perishable nature of many of the high value horticultural commodities these crops require big investment at various levels including locally, regionally as well as formal linkages to facilitate access to international market outlets. Malawi is a land locked country and faces some challenges in terms of importing and exporting produce. There is relatively poor infrastructure, including roads, rail and airports that cannot accommodate large cargo planes. Availability of power/electricity is currently a big challenge and Malawi's existing electricity generating capacity of only 350 MW is a major constraint in attracting significant foreign investment into the country. For example, the production of fresh produce targeted at the export market would require the installation of adequate refrigeration facilities at both the production end and the airports through which the produce will be transported out of the country.

The political and economic environment must be conducive to investment. The National Horticultural Marketing and Food Processing Study which was conducted by PricewaterhouseCoopers under the Horticulture and Food Crops Development Project (Government of Malawi, 2008) identified a number of challenges to the development of the horticultural sub-sector including: the policy and regulatory environment; availability of market information, absence of public-private-partnerships (PPP), lack of value-addition industries; and, poor promotion of horticultural exports.

**Lack of accreditation of Malawi Bureau of Standards**

Assurance of food safety and quality on the market place in the country is under the jurisdiction of Malawi Bureau of Standards (MBS). Malawi Bureau of Standards (MBS) is a statutory organization established in 1972 by an Act of Parliament (Cap 51:02) to promote standardization of commodities from raw materials through processing and marketing. MBS is responsible for development of standards, inspection, certification and product testing in the country. It has established offices in Blantyre, Lilongwe and Mzuzu and at the border posts in Mwanza, Songwe, Muloza and Dedza. The MBS is currently operating as an unaccredited institution and therefore lacks the credentials to give assurance to trading partners based in the countries where the country's exports are destined. As a result, food products are tested and re-tested by concerned parties wishing to verify the quality of the supplied products as they move from one country to another. The time and costs involved contribute towards making the country's exports less competitive on the regional and international markets. In the worst case scenario the delays encountered in transporting goods to markets have an adverse impact on the pattern of availability of the desired products leading to loss of shelf space in the retail market and concomitantly loss of market share for the specific Malawian products.

### 4.3.2. Perceived constraints that can be addressed by new investors

In the context of lower Shire Valley, value addition and agro-processing will be possible if efforts are made at the outset to address the constraints associated with distance to markets such as: high transport costs; high crop production costs, due to prolonged dry spells; inconsistent and low quality produce that results in low prices on the market; and, an inability to store agricultural produce due to poor handling practices and contamination. Additional challenges that need to be addressed include lack of backstopping support services and poor mobilization of farmers to ensure effective linkages between farmers, processors and traders to improve access to markets, provide support in accessing inputs and identifying market demand.

From experience gathered elsewhere in developing countries, for potential markets to be developed elsewhere in the region and internationally there needs to be a significant local entrepreneurial company leading marketing operations within Malawi. The local companies need to establish links with those from abroad with a focus placed on identifying those companies/entities seeking produce from Malawi or those seeking to "support" those seeking product from Malawi.

Some of the reasons stated by foreign investors seeking produce in foreign territories (such as Malawi) include:

- the search for cost plus pricing to either reduce costs or reduce exposure to market volatility;
- diversifying from traditional suppliers to reduce dependencies/increase buyer leverage;
- the search for supply continuity – this was a key strategic factor during the biofuels boom, especially for biofuel feedstock crops or those competing with these for land. Since the collapse of the oil price on the international market and the surge in shale gas production in the US, this consideration has become less intense;
- diversifying to balance out geographic supplies in response to increased weather variations linked to fears associated with to climate change / weather driven volatility;
- to gain access to sources with preferential tariff rates into key countries/trading blocks;
- to demonstrate to lobbyist and conscience driven investors that the company is supporting diversity and helping Third World countries; and,
- the search for untainted land for crops with special low residue and/or organic requirements.

Companies seeking to secure produce from Africa, for one or more of the above reasons, will also seek to leverage the impact of the resources that they provide by working with other parties. These partners will fall into two broad groups:

- value chain partners, seeking to unlock new markets and revenue streams; and
- financial partners: seeking either higher returns and accepting higher risk; seeking to balance their portfolios; to satisfy their declared mission statement or commitments to particular investors.

Consultations with consultants who have worked with large corporations such as the Heinz Group of companies have revealed that there are three levels of projects which can be identified, namely:

*Level 1: Locally based companies*

Where a company has local processing facilities and but needs to develop the local agriculture base to support this. This was observed in a number of countries for example in: Hungary (tomatoes, fruits, vegetables and corn); Poland (tomatoes, peas and corn); Egypt (tomatoes), New Zealand (tomatoes); California (tomatoes); China (tomatoes, dry beans, soybeans and rice); Indonesia (chillies and palm sugar); India (milk); Russia (tomatoes); and. Brazil (tomatoes and vegetables).

*Level 2: New companies in new territories*

To initiate the growing of a key ingredient in a geography with little or no experience of the crop but with the right agro-climate and perceived cost/quality advantages: Examples where cited in such countries as the Ukraine (beans, tomatoes and potatoes); Ethiopia (dry beans); and, China (dry beans and chillies).

*Level 3: New companies develop as part of a coordinated international effort*

As part of a coordinated international effort to develop / regenerate the agriculture of a region. For example in Egypt (tomatoes) and China (tomatoes).

With these examples in mind the search for potential investors would focus on identifying specific enterprises that could offer the following benefits:

- those that offer a market for the produce to take away the uncertainty of downstream demand;

- those that can provide expertise to:
    - select the right land and assess capabilities;
    - assess and select partners;
    - train, coach and develop personnel and systems; and,
    - set the right standards to ensure quality and maximise crop yield and robustness levels.

- those that can offer various services such as:
    - agricultural equipment suppliers;
    - seed, chemical and testing equipment suppliers;
    - processing machinery manufacturers;
    - assessment groups and laboratories; and,

- those that can provide overall project management, leadership and staff development.

To accelerate interest and commitments towards Malawi, top to top meetings with between the SVIP project management team and potential investors should be seriously considered. It is advisable that such discussions are aligned with the marketing efforts currently being coordinated by the Malawi Investment and Trade Centre and the Green Belt Initiative. Ahead of this, the narrative behind Malawi and a framework milestone plan should be established and the team should approach things as a marketing exercise and seek to make partners want to be part of the programme for developing the lower Shire Valley.

# CHAPTER 5 : PROVISION OF SERVICES

## 5.1. Analysis of existing service provision arrangements in the project area

This section analyses existing arrangements for providing and financing the various technical services in the SVIP project area. These services include: research; technical and extension support; management support, land acquisition, development and related services; credit and input supply; accounting and finance; storage and marketing.

### 5.1.1. Technical services

These services are currently offered by various agencies, examples of which include: services offered by government and related institutions; the private sector and non-governmental organizations.

#### 5.1.1.1. Government and related institutions

The Ministry of Agriculture, Irrigation and Water Development (MoAIWD) is the major player in the delivery and financing of technical services in the smallholder agriculture sector. Other ministries that play some role in the provision of technical services in the project area include: the Ministry of Industry, Trade and Tourism; the Ministry of Lands and Physical Planning; and, the Ministry of Local Government and Rural Development. There are several departments in MoAIWD that currently provide technical and extension services to communities in the proposed SVIP area and Malawi as a whole. These include: the Department of Crop Development (DCD); the Department of Animal Health and Livestock Development (DAHLD); the Department of Irrigation (DoI); the Department of Agriculture Extension Services (DAES); and, the Department of Fisheries (DF). The organisational structure of the MoAIWD is shown in Figure 5.1. Other Government institutions outside the MoAIWD that provide technical and extension services include: the District Councils and the Ministry of Industry, Trade and Tourism.

**a) The Department of Crop Development**

It is normally accepted that technologies developed at research stations by research scientists are rather complex for immediate uptake by farmers, moreso for the smallholder farmers who will be the main beneficiaries of the various initiatives to be promoted under the SVIP. The DCD has a mandate to package crop technologies from DARS in a “simplified” manner. The packages are then used by the DAES to train farmers. The DCD employs subject matter specialists at district and Agriculture Development Division (ADD) level who provide specialist advice to Agricultural Extension Development Officers and/or famers. Other responsibilities for the DCD are: monitoring pests and disease outbreaks; establishment of horticultural crop nurseries and sale of seedlings; farm mechanization and tractor hire; and, facilitating access to and, utilization of inputs. Given the stated mandate for the department it is envisaged that the DCD will play a crucial role in the development of the SVIP.

**b) Department of Agricultural Extension Services**

The DAES is represented at all administrative levels i.e. national, ADD, district and extension planning area (EPA) levels. Agricultural Extension Development Officers (AEDOs) represent the department at the lowest EPA or irrigation scheme level. Extension is provided through: a multi-media approach; a group approach; and/or, individual farmer visits. AEDOs mainly use the group approach that includes talks, demonstrations, group discussions and field days. Visits to individual farmer plots are also carried out. The subjects covered by the AEDOs include improvement of soil fertility through the use of inorganic fertilizers, compost and manure, and general crop management. They are also responsible for carrying out surveys to determine crop yield estimates, a key input into the Malawi Vulnerability Assessment Committee reports.

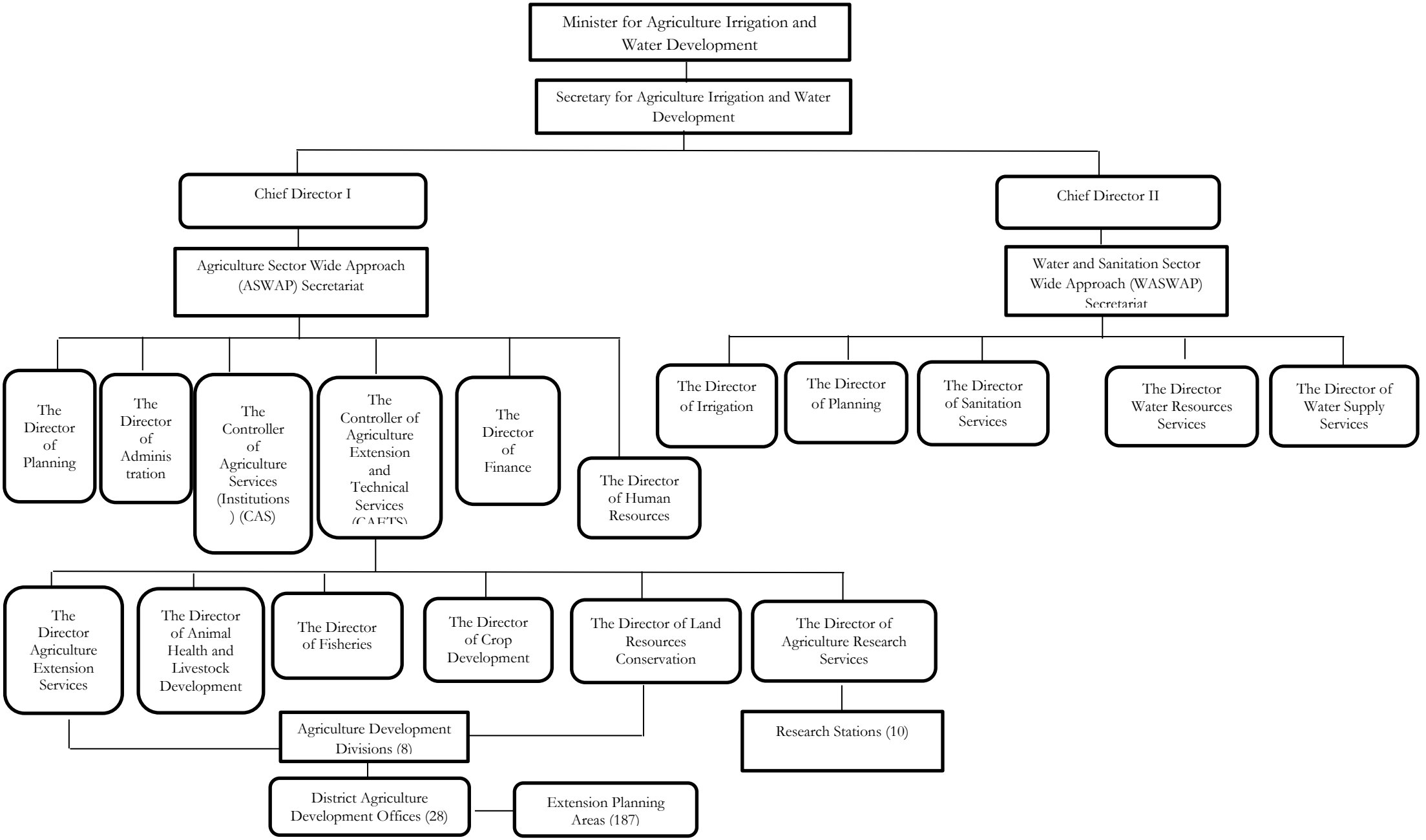



***Figure 5:1: Organogram for the Ministry of Agriculture, Irrigation and Water Development***

### c) Department of Irrigation

The DoI is responsible for irrigation development in the country. The Department has four major functions, which are: planning and development of irrigation schemes- identification, planning, designing and construction of irrigation projects; regulatory- ensuring orderly irrigation development, efficient utilisation of land and water resources and the maintenance of acceptable standards; irrigation technology research and development- continually improving and adapting technologies ensuring that the accepted standards are maintained; rehabilitation of irrigation projects- upgrading and resuscitating irrigation schemes which are in need of rehabilitation or are completely non-operational.

The Department has offices at national level (in Lilongwe), ADDs and at district level. The development of SVIP will be facilitated under the auspices of DoIWD and it is envisaged that the department will continue to play a key supervisory role in the development of irrigation in the project area.

### d) The National Aquaculture Centre

The National Aquaculture Centre (NAC) is located at Domasi in Zomba district. A satellite facility of the Centre was developed at Kasinthula Research Station but currently this is operating well below capacity due to resource constraints. The main Centre at Domasi provides aquaculture research and extension services as well as the formulation and production of fish feeds and fingerlings for on-selling to farmers and their representative organisations. The research, technical and extension services provided by NAC are financed by government as well as through grants received from development partners. Farmers who benefit from the services offered have to pay for fish feeds and fingerlings purchased from the Centre. It is envisaged that NAC will continue and expand the range of services offered to the smallholder farmers in the SVIP area to enable them to fully exploit the opportunities presented by the improved availability of water resources.

### e) The District Council

The District Council has several offices which provide a wide range of services related to irrigation development. These include: the District Commissioner's office for overall management of financial and technical services, settlement of land and related disputes; and, the District Executive Committee (DEC) for public sector coordination including providing leadership for irrigation development initiatives in the Project area. Other key agents affiliated to the District Commissioner's Office include: the District Consultation Forum in which the DEC discusses development issues with the Members of Parliament and the Traditional Chiefs who are active in the Project area; the District Irrigation Office provides engineering and related technical services and coordinates irrigation development activities in the district; the District Agricultural Development Officer (DADO) is responsible for sensitization and community mobilization and also coordinates the provision of extension services on agronomy, diseases control, agribusiness and other technical services through subject matter specialists; as well as field Agricultural Extension Development Officers. The effectiveness of the DADO's office in Chikwawa is compromised by the high vacancy rates among its field staff, currently estimated at 54 percent (DADO, 2015).

### f) Ministry of Industry, Trade and Tourism

The Ministry of Industry, Trade and Tourism offers services to members of the public through its offices located at headquarters and at the district centres. At Chikwawa, the Trade Officer is based at the district offices. The Ministry's mandate includes the development of Cooperative Societies in the whole of Malawi and this includes the responsibility for providing initial training, registration of Cooperatives, as well as conducting annual performance assessments. Currently the Ministry is facing challenges that are adversely affecting service

delivery. These include: inadequate human and financial resources; and excessive centralization with most of the staff based at Head Office in Lilongwe. Since the Ministry's operations are centralized, the provision of initial training and registration of Cooperatives is carried out only at the national headquarters which makes it difficult for the intended beneficiaries to access the services offered. This has an adverse effect on the development of Cooperatives in the rest of the country.

***Key issues***

The smallholder farmers in the project area familiar with the government technical and extension service providing institutions and the approaches they use. The following are the key issues associated with provision of technical and extension services by government institutions:

- Government institutions lack human and financial resources to operate optimally. The District Agricultural Office in Chikwawa, which is supposed to be the key provider of technical and extension services to SVIP, for example, has an annual budgetary allocation of about MK58million to MK65million which constitutes only 25 percent of the required budget. These meagre financial provisions are rarely disbursed in full during the year leading to a situation where the Office fails to offer the services they are mandated to provide. In addition the office is encumbered by high vacancy rates such that many positions for subject matter specialists are either vacant or occupied by less qualified and less experienced personnel than stipulated in the establishment guidelines.
- There are currently no proper mechanisms to effectively coordinate technical and extensions services from the various Government service providing institutions.
- Some institutions have well established technical capacities in terms of qualified personnel but some of these are occupying administrative positions and may not be available to support the SVIP.
- The Ministry of Industry, Trade and Tourism which has the mandate for cooperative development in Malawi, faces serious capacity constraints making it ineffective in its provision of support services to the Cooperative Societies.

Given the many challenges enumerated in the preceding paragraphs it is apparent that if the envisaged transformation of the smallholder sector is to take place under the SVIP substantial resources will have to be provided to support the various government departments in addition to enticing the private sector to play an active role in promoting the provision of various services. In addition, alternative mechanisms for service provision need to be explored.

#### 5.1.1.2. Private sector

The private sector is also involved in providing technical and professional services to the smallholder sector in the SVIP project area. These services are provided through a number of vehicles such as professional consulting firms; farm companies; and, large agri-business enterprise.

***Professional consultants***

At Phata, a private consulting firm has been engaged to provide management services to the project. Agricane provides operation, maintenance and management services required for the purposes of managing a sugarcane production enterprise. The management of all field operations including facilitating contract negotiations with other service providers (such as cane cutters and employment of workers). The professional management company also provides advice on management decisions as well as engages external audit companies to assess quality of finance management systems. Agricane retains 7 percent of total income

realized by the scheme as payment for providing these management services. All other costs such as wages and salaries for workers are paid by the Cooperative.

Independent engineering companies were contracted to develop the land leased by the Trust and Phata Cane Growers Cooperative (PCGC) for sugarcane production. The development of land was done with the aid of grants provided by development partners (the European Commission). Some specific technical services were also outsourced from consulting companies with relevant technical expertise on production related aspects, organisation development, finance, Information Technology.

For the new project being developed for the Katenga-Maseya Cooperative (KAMA), PressCane have facilitated the engagement of other private consultants to conduct feasibility studies for its new outgrowers scheme.

Other examples of services provided by private consultants include experts hire to provide audit services under the FairTrade marketing arrangements both Kasinthula and Phata. Experts are mobilized to conduct annual technical audits to ensure compliance by the farmers with Fairtrade standards. The costs of these audits are recovered from sales of sugar.

### *Farm companies*

An alternative to the engagement of private consulting firms is to establish a private company as was done by the farmers at Kasinthula under the Shire Valley Cane Growers Trust (SVCGT). The Trust created a company, the Kasinthula Cane Growers Limited (KCGL) to be responsible for field operations and overall scheme management including: the sourcing out planting materials; planting sugarcane in the fields; general field operations and maintenance of the irrigation system; application of chemicals (fertilisers, herbicides and pesticides); and, the provision of extension services. All the fixed and operational costs associated with running the company were paid for using an agreed formula of determining the proportion of revenue to be retained from the crops sold by the farmers. For example, the current rate is that KCGL retains 15 percent of gross sales to cover the provision of management services. The participation of farmers in the field operations through use of family labour was limited to weeding, application of fertilizers, checking bundles of sugarcane harvested from their fields as well as application of water in the fields.

Farm companies can also provide other services such as administrative, management advice as well accounting for all financial and related transactions on behalf of their Trust. This ensures transparency and accountability in all the transactions associated with contract farming. The company has developed elaborate systems for collecting and recording data regarding any transaction for every farmer and each farmer or his/her representative must verify the records kept. The company also keeps financial records and manages the accounting systems on behalf of SVCGT.

### *Large agribusiness companies*

Through contract farming arrangements, large agribusiness companies provide a wide range of farm services and inputs. The key services provided include the following:

- Some large scale agribusiness companies have facilitated the formation of farmer organisations and provided the initial technical and financial support required for establishment of contract farming arrangements.
- Illovo an agribusiness occasionally provides some specialized technical services such as pump maintenance to the farmer organization. Illovo also provides initial financing for farm inputs and services and pays for some of the services

- Illovo processes sugarcane into sugar and also markets sugar on both local and international markets.
- Large scale agribusiness also facilitate linkages and access to certain services. For example, KCGL and PCGC outsourcing of cane haulage services is done by Illovo.
- The cost of the services that are provided by the agricbusiness companies are recorede from farmers through deductions effected on the proceeds of crop sales.

The operations of Auction Holdings Limited (AHL) although currently not offered to a significant extent in the lower Shire Valley are worth reviewing as they offer an example of how marketing services can be offered to smallholder farmers. AHL Commodities Exchange Limited (AHCX) a subsidiary of AHL has created a commodities trading platform where farmers benefit from a wide range of market and related services. The company is membership based where farmers may register as individual members, partnerships or other corporate bodies duly incorporated under the Laws of Malawi. The company provides a wide range of services to both organized and unorganized farmers. The services include the following:

- empowerment of farmers by disseminating market information in real time to all market players;
- facilitating trade between members via Authorized Representative who are employed by the members through which farmer can sell a wide range of crops such as pigeon peas, soya beans, maize, cowpeas, groundnuts, rice, sunflower, and other similar products;
- facilitating the provision of credit to depositors of commodities at AHCX, with AHCX as the collateral manager, who has custody of the commodity and manages the same, until the commodity is sold through the market and proceeds paid through the institution concerned; and,
- forward contracts which ensure suppliers of a minimum price for their commodity at a specific delivery period and location whilst earning a premium over the same when global market prices move favourably over the minimum set price.

### *Research institutions*

Elsewhere in Malawi there are some private institutions that provide research services for the benefit of farmers involved in the production of specific niche crops. A case in point is the Tea Research Foundation of Central Africa. The Foundation is a not-for-profit organisation funded entirely by its members through a levy charged per kilogram of made tea. The Tea Research Foundation provides research services which are specific for tea.

Similarly, the Agriculture Research Extension Trust (ARET) is entirely owned and controlled by tobacco farmers, who provide funding to the Trust through a levy. ARET's current mandate is to conduct research on tobacco and provide extension, specialist and technical services to the tobacco industry. While both tea and tobacco are climatically not feasible for the SVIP, there are some lessons which can be learnt from these private enterprise funded research institutions.

### 5.1.2. Contracting arrangements

Contract farming is based on either legal or informal agreements between contracting parties. Agreements, in the form of a written contract or a verbal understanding, usually cover the responsibilities and obligations of each party, the manner in which the agreement can be enforced and the remedies to be taken if the contract terms are breached (Eaton and Shepherd 2001). Whether formal or informal any contract should represent mutual understanding between the contracting parties. This study identified the following categories of contractual arrangement that were in existence in contract farming arrangements between farmer organisations and processing companies consulted: product supply agreements, service agreements, land tenure agreements and standard compliance agreements.

**Case of nucleus estate farming: Mumias Sugar Company in Kenya**

Mumias Sugar Company (MSC)[28] - a sugar manufacturing company, was formed in 1971 with the help of partnership between Booker Agriculture International (BAI) and the Kenyan Government. MSC has a nucleus estate of 3,400 hectares and supplies about 10 percent of the total cane requirement of the factory.

The remaining portion of the cane requirement is supplied by Mumias Outgrowers' Company (MOC). This organisation represents about 23,000 farmers who collectively produce about 85 percent of the sugar factory's requirement.

The major requirements for a farmer to be a part of the nucleus estate farming are:
- landholding size should be at least 1.2 hectares;
- the farm should be within a radius of 21km from the sugar mill.

| Requirements | Mumias Sugar Company |
|---|---|
| **Trust and scope of negotiation** | The contract was a legal agreement between Mumias Outgrowers Company (which represented smallholders) and Mumias Sugar Company. Hence there was a fair amount of trust between the smallholder and the contracting company. |
| **Economic viability and incentives** | The company also provided several inputs on credit and purchase cane based on the prevailing sugar rate in the market. |
| **Contract farming arrangements and risk** | Mumias bought sugarcane from the smallholder farmers based on pre-signed contracts. The sugar market rate along with the conversion ratio of sugarcane to sugar is used to calculate the price that is to be offered to the sellers. |
| **Technology transfer and innovation** | The firm followed advanced agricultural practices and used its own inputs, labour and equipment for planting and harvesting and also helped in transfer of technology |
| **Investment climate** | The government has encouraged private player participation in the agriculture sector in order to boost the growth of agriculture sector |

## Product supply agreements

These are the key market contractual agreements that specify the terms of sale of agricultural produce in the contract farming arrangements between the farmer organisations as suppliers and the processing companies as buyers of the various agricultural produce. In the sugar industry the term used is 'cane supply agreement'. In Dwangwa the cane supply agreement was made between Dwangwa Cane Growers' Trust (DCGL) and Illovo for a period of five years. In this case DCGL signed the agreement on behalf of the smallholder farmers who were in several primary associations. DCGL had a contractual agreement with each of the primary associations operating under the Dwangwa Cane Growers' Trust (DCGT).
At Kasinthula, the cane supply agreement was entered between KCGL and Illovo and covered the period 1998 to 2023. At Phata the parties to the cane supply agreement are PCGC and Illovo. The cane supply agreements stipulate the terms and conditions for the supply of sugarcane that would determine pricing such as: weight of the sugarcane delivered as shown by the weigh bridge; sugar content according to samples sent to the laboratory; and, other related parameters. From the total sales of sugar the farmer organisations get 60 percent while the agribusiness processing company gets 40 percent. The commitment by the agribusiness processing company is to provide farm inputs and other services the cost of which is recovered from the sales of sugarcane. The cane supply agreements were very detailed depending on the requirements of both parties. One association in Dwangwa had also signed a cane supply agreement with PressCane to supply sugarcane for production of ethanol.

[28] Presently, the company as of now is under debt and is seeking assistance form the government for a bailout form the high debt

In the tea industry, Sukambizi Smallscale Tea Growers' Association Trust (SSTGAT) has signed a contract agreement to supply green leaf tea to Lujeri Tea Estates Limited. This agreement too has specifications on how Lujeri Tea Estates would buy the green tea, employment of workers, pricing of tea and the contract also stipulates that Lujeri Tea estates Limited will provide fertilizers, planting materials, and chemicals under strict supervision to SSTGAT.

In the tobacco industry, large companies such as Limbe Leaf Tobacco, Alliance One and JTI, run out-grower schemes with smallholder farmers. In these schemes, the smallholder farmers sign contracts to supply cured tobacco leaf to the companies. In-turn the companies provide farm inputs to the smallholder farmer clubs on loan. In Mzimba district the concerned farmer clubs reported that tobacco companies valued the farm input loans in United States Dollars. The farmers did not know the actual value of the loans that they obtained, in Malawi Kwacha, until the time of tobacco sales. Consequently, the farmers ended up bearing the cost of inflation. The farmers ended up paying more for the inputs.

The following factors are crucial for the product supply agreements – the content of the agreement, covering the different aspects considered in the agreement and the process of establishing the product supply agreement.

In terms of content, the product supply agreement may contain several aspects mutually determined by the farmer organisation (the supplier) and the agribusiness (the buyer). Each party to the contract has to outline the key aspects to be included in the specifications of the contract. Eaton and Shepherd (2001) outline the following as some of the specifications which may be included in the product supply contracts - duration of the contract, the quality standards required by the buyer, the farmer's production quota, the cultivation practices required by the processing company, the arrangements for delivery of the crop, the way in which the price is to be calculated, procedures for paying farmers and reclaiming credit advances and arrangements for covering insurance.

**Case of nucleus estate farming: Integrated Tamale Fruit Company (ITFC), Ghana**

ITFC was formed in 1999 as a private company in Savelugu-Nanton District. The company's focus is on growing certified organic mangoes for export. It has a nucleus farm covering about 160 hectares with about 38,000 trees. The firm started an outgrower scheme which involved about 1327 farmers (as of November 2006). Each farmer has a plot covering an area of one hectare on which 100 mango trees are planted. The interest of the farmers is advocated by the Organic Mango Outgrowers Association (OMOA) and it represents the farmers for dialogue and negotiations with the company. The major requirements for a successful contract and ITFC's way of addressing it is shown below.

| Requirements | Ghanna Rubber Estate Limited |
|---|---|
| **Trust and scope of negotiation** | The executives of the outgrowers' association were satisfied with the terms of contracts as the company offers them support related to credit facility among others benefits such as technical inputs for cultivation. Further as per study reports, there have not been major conflicts with ITFC. A particular case of ITFC increasing the cost of water supplied was resolved through discussions between OMOA and ITFC. |
| **Economic viability and incentives** | The company provides interest free loans to the outgrowers in the form of agri-inputs and technical services. The outgrowers were given a grace period of four years to begin repaying the loan provided to them in the form of inputs. |
| **Contract farming arrangements and risk** | The company has a clear contractual agreement with the outgrowers which requires the outgrowers to pay a commitment fee. |
| **Technology transfer and innovation** | The firm provides technical guidance to the outgrowers and helps the outgrowers in adapting the improved scientific practice in organic mango cultivation. |
| **Investment climate** | The scheme was possible because of the enabling environment for the development of the private sector. Agriculture and rural development has always been a focus in the country and contract schemes were implemented in the country since independence. |

A lot of negotiations based on availability of facts and figures related to the enterprise are required, to come to mutual agreement on each of the specifications of the contract. In most cases farmer organisations do not have the necessary information to base their arguments on; particularly those getting into contract farming for the first time. In addition, where the buyer is a monopoly, just like in the case of Illovo which has been the sole buyer of sugarcane, it is very difficult for farmer organisations to negotiate favourable terms in the contract. Farmer organisations in the sugar industry alleged that they had very limited opportunities to negotiate the terms and conditions in the cane supply agreements. In the tea industry, while the processing company was ready to offer a higher price, the contracting parties had their hands tied on the price because the price of green tea in determined by the Tea Association of Malawi.

## Service contracts

Service contracts in this context relate to agreements on the provision of services. These services, could be technical, administrative or financial. Within the contract farming arrangements, the farmer organisations are the key beneficiaries of the service contracts. The most prominent service contract is the five year professional management contract signed between PCGC and Agricane where Agricane is providing technical and managerial services required for the production and marketing of sugarcane on behalf of PCGC.

Other contracts include cane cutter contract and the haulage contracts between Illovo and haulage companies. The farmer organisations were very unhappy with the haulage contracts because the large deductions made despite them not being clear about the terms and conditions stipulated in these contracts.

The agreement between SSTGAT and Tea Research Foundation was another service contract. In this contract the Tea Research Foundation receives one percent of the value of sales of all the SSTGAT's tea – in return for the Foundation providing training services, tea seedlings of improved varieties and research.

## Land tenure or use agreements

In the smallholder sugar sector in DCGT and SVCGT (at Kasinthula), the smallholder cane growers' Trusts acquire and lease land for sugarcane production. The Trust allocates pieces of the leased land to individual growers on five year contractual terms. The contract has clauses relating to the contract period as well as conditions for using the land. The farmer signs a five year contract to use the land and as a condition, he/she pays 1.5 percent of gross sales of sugarcane each year for using the land. The Trust issues a license to each farmer who has signed the contract that stipulates the rules and conditions for using the piece of land. In the case of the Phata scheme, the individual farmers used the land size that they contributed to the cooperative to determine the proportion of shares each was allocated in the cooperative.

According to Eaton and Shepherd (2001), formal cropland tenancy contracts are necessary and should be legally binding with clauses covering both crop and land husbandry. For example, land tenure contracts can be used to minimize land degradation. The contract may contain land tenure specifications that stipulate land husbandry measures to be followed by the tenant such as conservation agriculture practices. Renewal of such contracts may be based on the tenant's compliance with the stipulated land husbandry practices. Wills and inheritance – tea growers draw up these documents, seal and deposit them into the Trust's Safe for safekeeping. The Will stipulates the name or names of people who will take over the tea fields when the current owner dies and the proportions for benefit sharing. These were introduced to minimize conflicts that arose over ownership of tea fields following the death of the original plot holder.

## Case of nucleus estate farming through land leasing: Value Farms

Value farms is an agribusiness firm that has helped in commercial agriculture through land consolidation in Western Kenya. In 2014, the firm aggregated about 200 smallholder farms into a nucleus for commercial production. The total area aggregated was about 260 acres. The land was mainly owned by fisherman who did not have the capacity and skills for commercial production.

The land owners have leased the land to Value Farms for 10 years under an initial 10 year lease in exchange for a lease fees. Further they are also employed to work on the leased commercial nucleus farms. The nucleus farm uses mechanized production of horticulture crops such as yellow passion (for Aga Khan and Coca Cola Group), kale, capsicum, beetroot, watermelon, chillies and cucumber. The produce is sold at the farm gate. The commercial hub has resulted in generation of additional non-agricultural activities in the vicinity such as bars, restaurants, hotels due to increased income of the benefitted farmers. The major requirements for a successful contract and firms way of addressing it is shown below**.**

| Requirements | Value Farms |
|---|---|
| **Trust and scope of negotiation** | Since land leasing was new concept in the area, Value Farms entered into a long dialogue with the farmers for about 8 months and after negotiation completed the deal. The landowners formed a Community Based Organisation (CBO) which is registered under the Government. The CBO also has a separate representative committee that engages directly with value farms. |
| **Economic viability and incentives** | The farmers leased out their land after understanding additional income that the farmers will get by leasing out the land and the advantages of regular employment by working in the farms. Further the farmers also get health insurance and social security benefits. |
| **Contract farming arrangements and risk** | The contract was based on 10 year lease term with the provision of small holder being employed to work in the commercial nucleus. The success of the contract is shown by the fact that the firm started generating enough capital to meet its recurrent expenses for daily operation costs. |
| **Technology transfer and innovation** | The firm aims to develop a cold chain to deliver the washed and packaged vegetables to the market. It is also in the process of providing agricultural land development services and assured markets to smallholder farmers cultivating in their own land around the commercial nucleus. |
| **Investment climate** | The lease contract is recognized by the Ministry of Land, Kenya which signifies that government has keen interest in enabling and attracting more private business into the country. Value Farms has been able to get additional grant of US $500,000 from USAID for additional expansion of 400 acres. |

## Compliance agreements

Smallholder cane growers of KCGA, PCGC and LCGA as well as smallholder tea growers of SSTGAT were selling some of their produce on the Fair-Trade market. To sell produce on the Fair-Trade market the farmer organisations signed Fair-Trade contracts. Within these contracts were specifications of standards which the farmer organisations have to comply with in order for the members of the farmer organisations to derive benefits associated with selling produce on the Fair-Trade market such as premium for development projects in their communities. Fair-Trade standards include specification on governance of farmer organisations such as adoption of democratic principles in decision making processes, transparency and accountability; and use of premiums; natural resource management.

SSTGAT has also signed several other compliance contracts such as the Rain Forest Alliance, Ethical Tea Partnership. Each of these has specifications of standards which SSTGAT had to comply with. The compliance agreements enables the farmer organisations to penetrate certain markets from which they will receive certain privileges.

### Other forms of contract

Registration of farmers is also often used as a form of contract agreement. For Nkhate WUA and many other farmer organisations albeit with different terms, for a farmer to be considered registered, he/she has to pay membership fees of MK500 and a plot fee of MK1000 per year which has to be signed for. DCGL uses the farmer registration list to track down and record for each farmer, all the materials and services that the company provided. Each farmer is asked to verify and sign against this list as an authorization to enable the company to deduct all the costs of goods and services provided to the farmer from the gross sales of sugarcane for that farmer. This too is another form of contractual agreement.

The farmer registration can be improved as a contract through the introduction of electronic registration that captures detailed information about each farmer including name and contact details, picture, geographical location (GPS coordinates), identification number, social economic profile, details of transactions conducted for the farmer organization and finger prints. Biometric registration may be a good option where there are high loan default rates such as in the cotton sector.

### *Key issues*

In the sugar contract agreements, farmers alleged that they had very limited opportunities to negotiate the terms and conditions in the cane supply agreements because they were dealing with Illovo which has been the sole buyer of sugarcane and was too powerful. In most cases, farmer organisations lacked the necessary information to base their contract negotiations on; particularly those getting into contract farming for the first time. In the tea industry prices were pre-determined by the Tea Association of Malawi, both the agribusiness (Lujeri Tea Estates Limited) and the SSTGAT had no control over the price.

### 5.1.3. Non-governmental organizations

#### Concern Universal

Concern Universal has been working in the project area since 2010. The focus of their programme is on capacity building of farmers' organisations with the aim of changing the mindset of the farmer towards viewing farming as a business. Most of their efforts have been supported from grant funds provided by the European Commission (EC). At Kasinthula farmers have been assisted to produce quality sugar cane; as well as support provided to the farmers' organization to enhance its ability to conduct business affairs and keep track of developments with an improved management information system; improve the individual farmer's ability to understand business language and interact with others as a society.

Concern Universal has been implementing a project to build capacities of all farmer organisations who have entered into cane supply agreements with Illovo namely, KCGA, LCGA and PCGC. The training offered covers the following topics: organisational development and good governance; entrepreneurship and business management; and agronomy. Funding for the programme has been provided through grants provided by the European Commission. The capacity building project has been in three phases. The third phase has focused on the following: women in economic and political leadership; income diversification opportunities; promotion of positive investments using the Value-of-statistical-life (VSL) approach, fuel-efficient stoves, solar; climate change preparedness/mitigation measures; broader community engagement through farmer literacy and adult education (using Regenerated Frerian Literacy through Empowering the Community Technique, REFLECT approach), increased mainstreaming of nutrition, community-level discussions on HIV, sexual and reproductive health rights and issues, challenging Gender-Based Violence (GBV) using campaigns, reformed families, and former perpetrators as role models; social mobilisation and bottom-up governance approach; transparency and accountability systems; community-service provider

interface meetings / Citizens Action Initiatives; Sugar framework and the Malawi sugarcane industry bill 2015.

**COOPI, Salima**

In Salima COOPI are facilitating the formation and development of cooperative societies. Eleven cooperatives have been formed, 8 of them having been registered. At the time COOPI outsourced the provision of expertise to provide a wide range of capacity building services to cooperative societies in Malawi. Through this approach the NGO has collaborated with such organisations as the Malawi Bureau of Standards, the Ministry of Trade and Industry and the Ministry of Agriculture.

### 5.1.4. Finance, credit and inputs supply

Farm households in sub-Saharan Africa and Malawi in particular, are credit constrained (Diagne and Zeller, 2001). As a result shocks to household livelihoods forces these households to adopt drastic measures such as selling their assets, withdrawing children from school and reducing their food consumption. In the rural areas of Malawi where nearly 90 per cent of households are employed in agriculture with little economic diversification, only 12 per cent manage to access credit (IFAD, 2011). This percentage does not even indicate whether those who had access to credit had the full amount they had applied for. A large proportion of the 12 per cent that have access to credit tends to reside in the central part of the country where smallholder agricultural activities are more dominant. Other studies have indicated that most of the farmers accessing credit are those mostly involved in growing tobacco. An anecdotal analysis of the access to credit by crops clearly indicates that tobacco is the only crop favoured by financial institutions because of its organized market structure. Banks are reluctant to provide finance for other crops due to poor marketing structure which increases chances of side-marketing to informal markets and hence making it hard for banks to recover amounts loaned out to support input procurement.

Due to lack of viable financial support, the smallholder agriculture sector in Malawi remains unprofitable and is characterized by low uptake of improved farm inputs, weak links to markets, high transport costs, few farmer organizations, poor quality control and lack of information on markets and prices (Chirwa and Matita, 2012).

#### *Challenges faced in supplying rural and agricultural financial services*

Some of the challenges identified as hindering the provision of credit to the smallholder farming community in Malawi include:

- greater exposure to systemic risk (such as droughts and floods);
- lower density of population;
- higher transactions costs;
- weak physical infrastructure; and,
- seasonality of activities.

Statistics indicate that only 5 percent of the smallholder farmers have access to agricultural credit in Malawi. This is the case because of a number of reasons, key among the many are: weak and inefficient linkages between the various players in the agricultural value chain; high transaction costs; lack of collateral; and, lack of appropriate technology to manage the identified risks.

**Weak and inefficient linkages in the agriculture value chain**

Smallholder farmers are at the base of the agriculture value chain where their primary activities revolve around subsistence crop production. Beyond production there is little or no linkages between the various agencies in the value chain because every player is working

independently. For instance agro-dealers supply inputs to the farmers and the relationship that exists between the agro-dealer and the farmer is just a once-off transaction relationship. Similarly, other players such as processors and distributors do not have an established strong relationship with the farmers and as a result the farmer lacks the market leverage to use in borrowing from financial institutions and cannot take advantage of linkages with other well established players in the value chain who might have the capacity to borrow from the financial institutions.

### High transaction costs

Most of the agriculture activities tend to take place in the rural areas where the majority of the farmers reside but banks and financial institutions have no or little presence in those areas. As a result the cost of doing business is high resulting in no service or high cost services for the farmers. The high cost of transacting also arises from small land holdings. A smallholder farmer on average owns 0.5ha and in most cases the land is segmented across a wide area making it difficult to access for purposes of documenting and monitoring of farming operations by the financial institutions.

### Lack of collateral

The land tenure arrangement in most of the rural areas is based on the customary land tenure system where farmers occupy land on the basis of their lineages and there is no formal/documentation to support any claims to land (title deeds). As a result the land cannot be used as security for loans sought. Although most households in the lower Shire Valley own sizeable herds of livestock, most financial institutions do not recognise their value as collateral since most of them prefer fixed assets located in the urban areas where disposal of the same is much easier to manage/execute.

The lending rate is the bank rate that usually meets the short- and medium-term financing needs of the private sector. This rate is normally differentiated according to creditworthiness of borrowers and objectives of financing. The riskier the borrower or the sector the higher the rate and vice versa. Banks do not have all information on all their customers so they use some screening methods such as increasing interest rates and, or collateral requirements to discriminate against potential bad debtors (Sebu, 2013). In Malawi, agriculture is treated as a risky sector and hence banks charge a margin of 7 to 10 percent above the base lending rate which currently is around 37 percent and this translates to 44 to 47 percent effective interest rate depending on the level of security and the crop in question. Some crops attract a lower interest rate if they have a shorter growing season, well-regulated markets and the proceeds can be accessed by the bank before the farmer. Figure 5.2 shows the interest rate trends in the past six years.

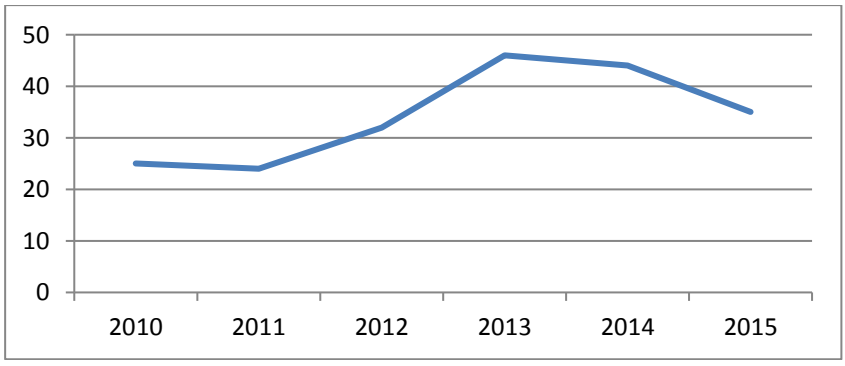



*Figure 5:2: Interest rate trends in Malawi (2010 to 2015)*

The base lending rates have been rising in the past five years due mainly to the high inflation rates prevailing in the country as a whole.

### Lack of technology to manage risk

Financial institutions in Malawi lack proper technology to manage credit risk. Most of the lending business is based on collateral as opposed to cashflow and this poses a limitation for most people, especially those who reside in the rural areas. In other developed countries financial institutions use credit score cards to assess the credit risk but Malawi is far from using such technology.

In addition, the lack of a formal identification documentation system in Malawi has been cited as another challenge that hinders access to credit for smallholder farmers. Malawi is reported to be the only country in the SADC region whose citizens do not possess national identification documents (IDs). This poses a challenge to financial institutions as they cannot easily identify the borrower when they have to follow-up on defaulters.

In 2010, the Parliament of Malawi passed a law to establish a Credit Reference Bureau which is supposed to handle credit history issues and for financial institutions to check the client credit history before advancing a loan. However, to date, probably because of lack of political will and weak institutional structures, the Bureau is still not operational.

## Sources of finance for smallholder farmers

Although the above highlighted challenges contribute towards the poor access to credit facilities in the smallholder sector, some financial institutions have made significant strides in providing credit to this segment of the market. However, for the smallholder agricultural sector the demand for: micro-insurance; money transfer and savings services; and, loans for consumption, may be more important than the demand for loans to support productive operations (Burritt, 2006). For instance at Kasinthula Cane Growers Association in Chikwawa, farmers are accessing consumption loans from one of the commercial banks, New Building Society (NBS) Bank. Other financial institutions that are working with smallholder farmers include: the Opportunity Bank; National Bank; and, Standard Bank The loans offered are mainly seasonal loans to support agricultural production related activities. These are offered for an average period of six months and in some cases this can be extended up to a year, depending on the amount borrowed and the type of crop funded. The loans are serviced as consumer or payroll loans where farmers are given cash advance on a monthly basis in relation to their expected sugar output. These loans are solely for consumption and not production.

The analysis in Table 5.1 indicates the current position with respect to the provision of financial and credit services to the smallholder sector. Standard Bank has demonstrated high capabilities to be the ideal partner for the smallholder projects. As at the time of the study, the bank was already negotiating with PressCane on the possibility of financing an out-grower scheme. At the time, Standard Bank is the only financial institution that has taken a step towards developing products that would be responsive to the needs of the smallholder farmers in the project area. National Bank of Malawi has been ranked the second in the analysis because of their vast experience in managing and financing smallholder projects more especially those growing tobacco. National Bank has also the capacity to provide capital investment loans which most banks do not.

NBS Bank is one of the banks that has strategically positioned itself in the area and it is providing consumer loans to farmers affiliated to Kasinthula Association. Currently there are no production loans or working capital loans that NBS is providing to smallholder farmers in the area but they are flexible enough to provide an offer when there is demand.

Opportunity Bank has the right experience in handling mass markets and would also form a good partner to the project owing to their experience in lending to various groups of smallholder farmers growing a variety of crops ranging from tobacco, maize, and sugarcane. The bank has been financing smallholder sugar out-grower schemes in Dwangwa. The only challenge with Opportunity Bank is that they currently do not do capital financing for start-up farmer projects.

***Table 5-1: An analysis of the services offered by banking institutions to the smallholder sector***

| Financial institution | Existence of agriculture loans for smallholder | Flexibility with smallholder farmer groups | Experience in providing loans for smallholders | Provision for smallholder agriculture capital investment | Provision for working smallholder agriculture working capital | Level of interest in SVIP area | Ranking |
|---|---|---|---|---|---|---|---|
| Standard Bank | Yes | high | High | High | high | High | 1 |
| National Bank of Malawi | Yes | high | High | High | high | medium | 2 |
| FDH Bank | Yes | high | Low | Low | high | medium | 5 |
| NBS Bank | Yes | high | High | Medium | high | High | 3 |
| First Merchant Bank | Yes | medium | Low | Low | medium | medium | 6 |
| Nedbank | No | low | None | Low | low | Low | 7 |
| Opportunity Bank | Yes | high | High | Low | high | High | 4 |
| New Finance Bank | No | low | None | Low | high | Low | 6 |
| CDH Investment Bank | No | low | None | Low | low | Low | 8 |
| ECO Bank | No | low | None | Low | low | Low | 8 |

FDH Bank is one of the most recent and emerging players in the financial services sector and they do not have much experience in working with smallholder farmers. Although the bank is not strong in most of the parameters in the analysis it has potential to run projects of this nature owing to the experience of Malawi Savings Bank (MSB, the bank they acquired in 2015). The acquisition of MSB has made FDH Bank to be on third position in terms of client base and branch network. This could also be a good bank to partner with.

First Merchant Bank previously did not supply direct loans to the smallholder farmers but there has been a strategy shift recently that has gone along with rebranding and repositioning of the bank towards the agriculture sector. This has seen the bank introducing a green color on its brand representing agriculture and setting up of the agriculture unit within its business units.

New Finance Bank is a new entrant in the financial service sector and has not penetrated much in reaching out to smallholder farmers. Nedbank has demonstrated little interest in the smallholder farmers' market segment. ECO Bank and CDH Bank are not bad institutions in any way but they have been rated lowly because of their line of business and target customers. CDH Bank is an investment bank and not a retail bank and hence could only be ideal in the project area where investors would want to get a corporate loan for implementation of their projects while Ecobank has concentrated its business in towns and cities.

## Investment funding

The provision of agriculture investment funding is not common in the smallholder sector in Malawi except, where farmers are working under an outgrower scheme. In such instances the farmers will be working with a well-established organization where the funding provided is not availed directly to the farmers but is accessed through the managing company. In most cases smallholder farmers use their personal resources to finance their farming investments and this limits the extent of development that can be done on the farm. Consultations carried out during the study revealed that financial institutions and multilateral organizations have worked with sugar cane farmers in the lower Shire Valley in providing financial resources for land development. For instance the European Commission has provided grant aid to support the establishment of the sugar cane irrigation schemes.

Generally financial institutions have no desire to provide long term investment funding to individual smallholder farmers because this requires locking financial capital for a long period and the loan structure may not be in tandem with the smallholder production system. Secondly, agriculture is also considered a risky venture due to weather uncertainty and market unpredictability. However where institutional support is available, commercial banks are willing to finance projects on an as-needed-basis depending on the outcome of a detailed benefit-cost analysis and thorough due diligence.

# CHAPTER 6 : FARMERS' ORGANISATIONS

## 6.1. Introduction

The organisation of farmers in the lower Shire Valley will be critical for the successful implementation and sustainability of the SVIP. The collective objectives of all stakeholders are, to: provide a conducive environment for participation of farmers' organizations and private investors that have the capacity to create value and jobs; limit transaction costs when dealing with a large number of farmers; allow smallholder farmers to effectively participate in the Project; and, allow farmers to enter into a fruitful dialogue and collaboration with private investors and get their voices heard, thus enabling the commercialisation of farming in the lower Shire Valley.

Globally, agriculture marketing systems are undergoing major transformations. The traditional marketing channels are getting replaced by more efficient marketing channels with well-coordinated links between farmers, processors, retailers and others, particularly for the export sector and for supplies to local processors. The need for such transformation has been attributed to increasing consumer demand for quality products. In addition, a better marketing system has been motivated by the need to improve accessibility to markets for the smallholder farmers.

It should be noted that the number of intermediaries in the chain is inversely related to the producers' share of the price paid by the final consumer. In addition, multiple handling of the produce also affects the quality of the product particularly in the case of fresh produce. An ideal market would have direct linkage between the market players and the farmers which would enable the farmers to get better returns for their produce and substantially reduce the post-harvest losses.

### Agriculture marketing system and linkages with farmers in Malawi

The agriculture marketing system in Malawi has undergone major changes over a period of time. The changes were intended to bring more efficiency in the overall supply chain and marketing of agriculture produce. The agricultural sector reforms in Malawi began with the periodic upward adjustments in producer prices of major crops and partial removal of subsidies on fertilizers. This was followed by restructuring of the state marketing agency, ADMARC. In 1987, the marketing of smallholder agricultural produce was liberalized through licensing of private traders. The overall marketing system in Malawi can be divided into pre-liberalization and post liberalization period.

Before the liberalization of the agricultural market, ADMARC was the only official buyer and seller of agricultural commodities in the rural areas. As a result it had sole control over the marketing of agricultural commodities in the smallholder sector i.e. major buyer and seller of inputs, outputs and various food commodities.

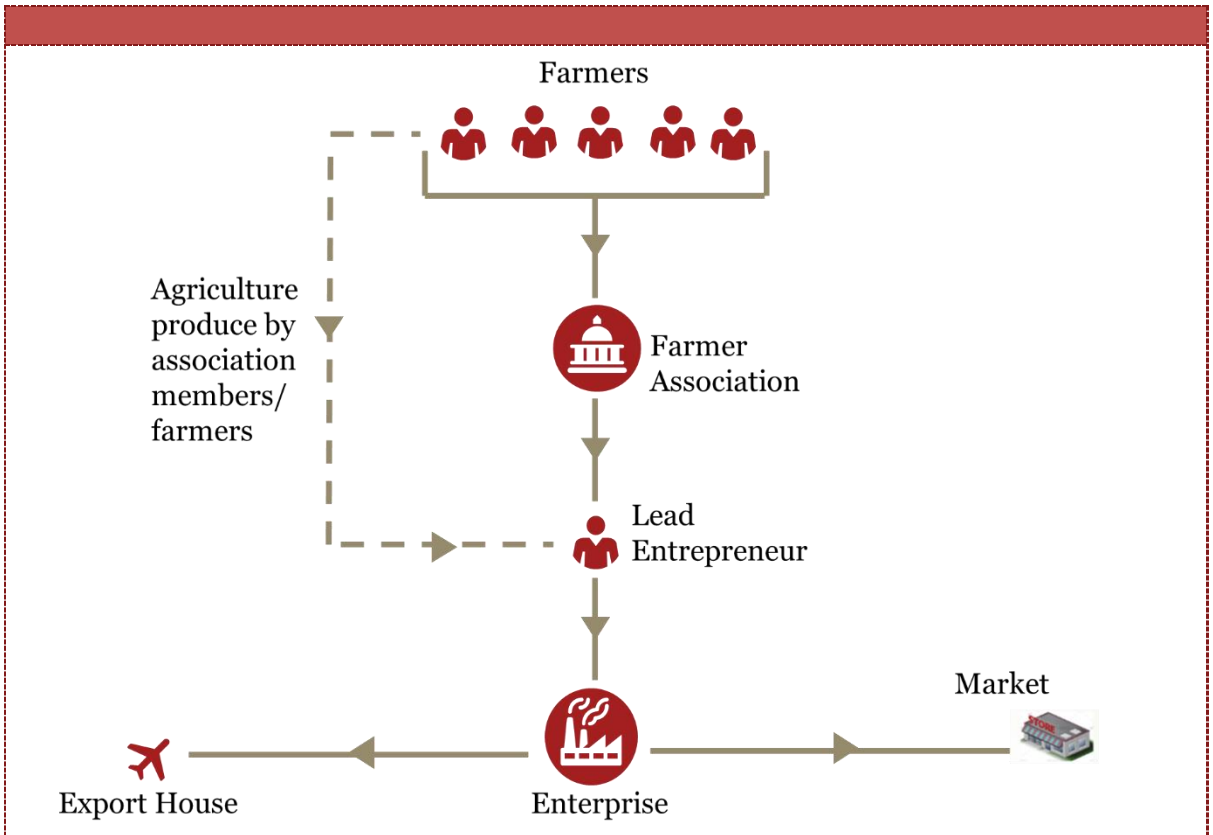
In 1987 the Malawi Government introduced the agricultural market liberalization policy. Under this policy, private traders were supposed to compete with ADMARC in buying and selling agricultural commodities (both inputs and outputs). However, due to the poor accessibility in most regions of Malawi, the private traders have not been able to enter the agricultural market to the same scale as ADMARC. As a result the remote areas have been left with no markets because ADMARC had to close off its non-economic outlets in order to improve the efficiency and overall viability of its operations.

### Current models adopted in Malawi to link farmers to markets

Several models are adopted in an attempt to link farmers to markets including: the use of lead entrepreneurs; targeting of farmers' associations/groups; out-growers scheme between private company and small scale farmers; and, establishment of direct farmer-to–trader linkages. The two most commonly used models are the lead entrepreneur model and the farmers' associations.

### Lead entrepreneur model

Under this model farmers are encouraged to establish associations to address issues relating to production and marketing. The association will comprise of about 15 to 20 clubs with a membership of 15 to 20 people per club. Among the members of the association, a lead entrepreneur is identified for purposes of establishing a micro enterprise on behalf of the association. The rest of the members of the association then sell their produce to the lead entrepreneur who then bulk-up the produce for on-selling to a processing enterprise for a better/high price. An illustration of the model is provided in Figure 6.1.

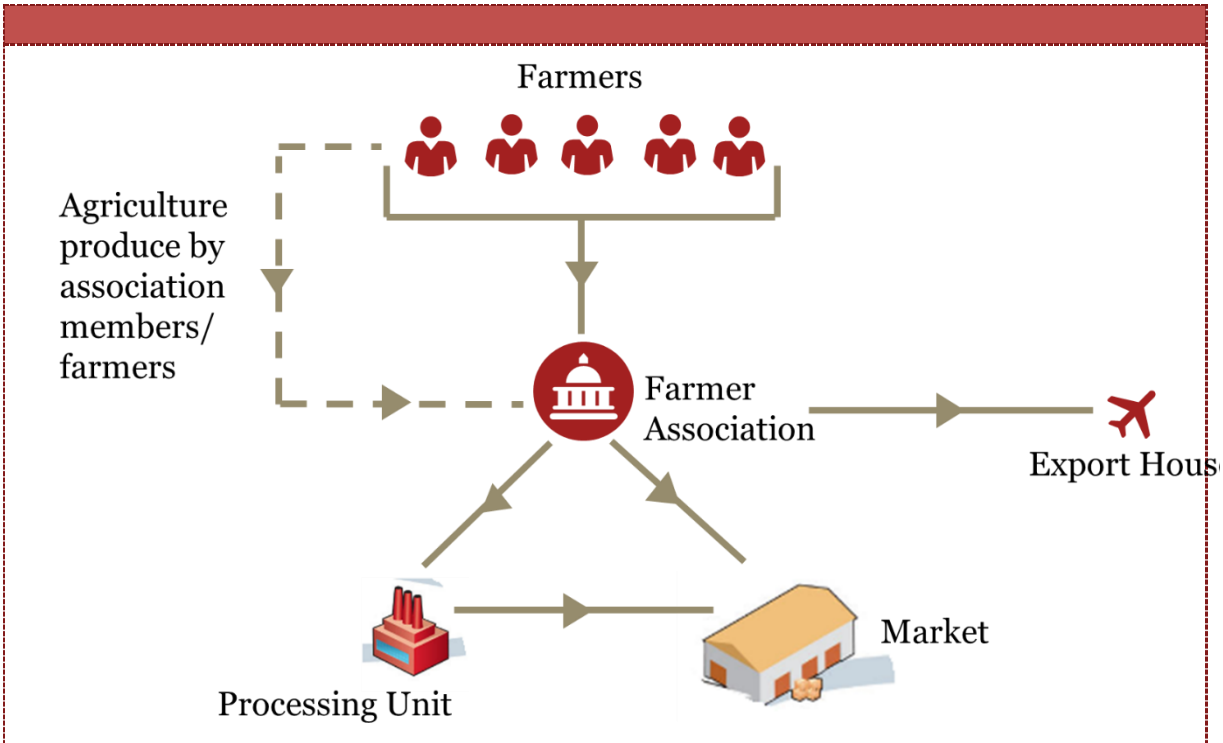



*Source: International Institute of Tropical Agriculture, PwC Analysis*

***Figure 6:1: Lead entrepreneur model***

### Farmers' Associations

This model involves forming farmers' groups and working directly with the group to produce large quantities of crops required by the market. These groups are then linked to companies in Malawi who require the produce available from the farmers. Under this model members of the group aggregate their produce and sell it to the market or to companies involved in the processing of the commodities. There is no enterprise established under the farmer's association. An illustration of the model is provided in Figure 6.2




*Source: International Institute of Tropical Agriculture, PwC Analysis*

***Figure 6:2: Farmers' Association Model***

**Examples of models used in India**

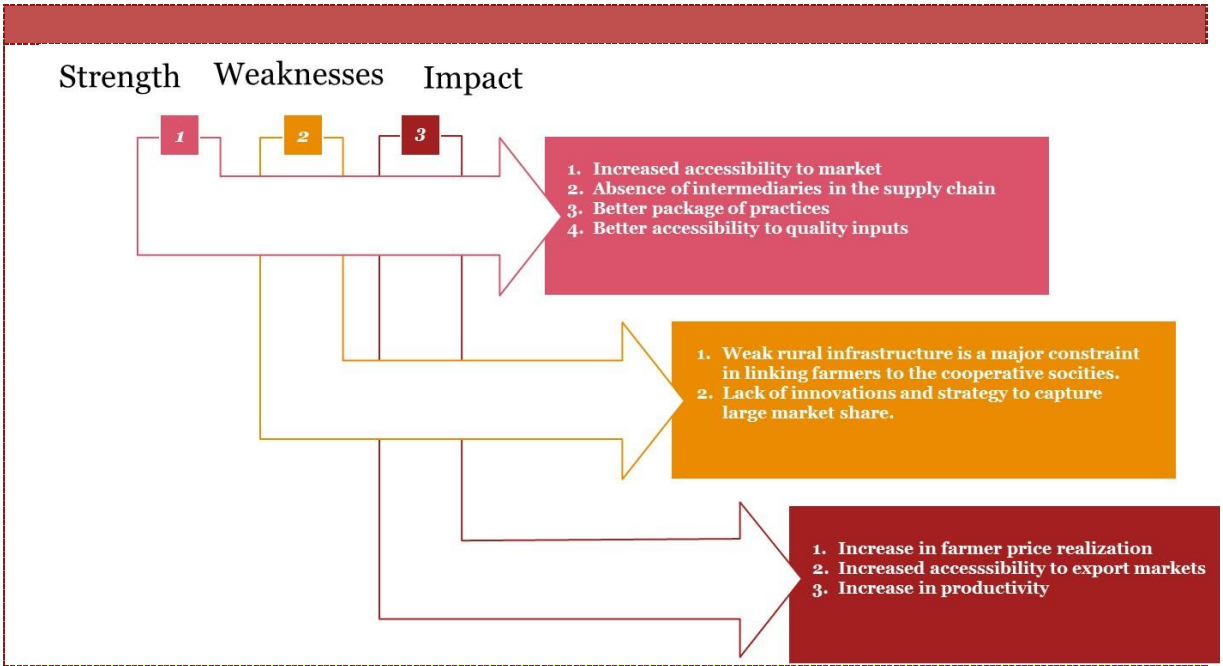
The India market offers opportunities for learning of alternative arrangements for linking farmers in the smallholder sector with other key players on the market. A brief description of some of the models that have been used on the Indian sub-continent will be presented here. The objective is to understand their setup, institutional organization and execution of various approaches to address the value chain issues faced by the farmers. Focus will be placed on the following models: cooperatives; growers' associations; and a few novel ideas that have been tried out in India.

***Cooperatives in India***

India's cooperative model is one of the most successful models of linking farmers to markets. The cooperative model was established primarily to save producers from exploitation by the middlemen/informal traders, and improve their bargaining power.

Two of the major cooperatives in horticulture in India are Mahagrapes in Maharashtra and HOPCOMS (Horticulture Produce Cooperative Marketing and Processing Society Limited) in Karnataka. Mahagrapes is an association of grape growers' cooperative societies. It was established in 1991 to improve the grape growers' access to domestic and international markets, which otherwise was difficult for individual producers. Mahagrapes supplies inputs, technology, and extension services to farmers through cooperatives and empowers them to produce quality output conforming to food safety and quality standards of the importing countries. Cooperatives associated with Mahagrapes own refrigerated transport and cold storage facilities, for which cooperatives charge a fixed amount, on per kg basis from the farmers. Mahagrapes is also involved in the export of grapes, mainly to the UK, the Netherlands and Middle East countries. Mahagrapes does not retain the profits it earns. It charges a fixed amount from farmers, on per kilogram basis, to meet costs of transportation,

labour and other activities. The profits are then passed on to the farmers. A brief overview of the key strength and weaknesses of the Mahagrapes Cooperative is presented in Figure 6.3.



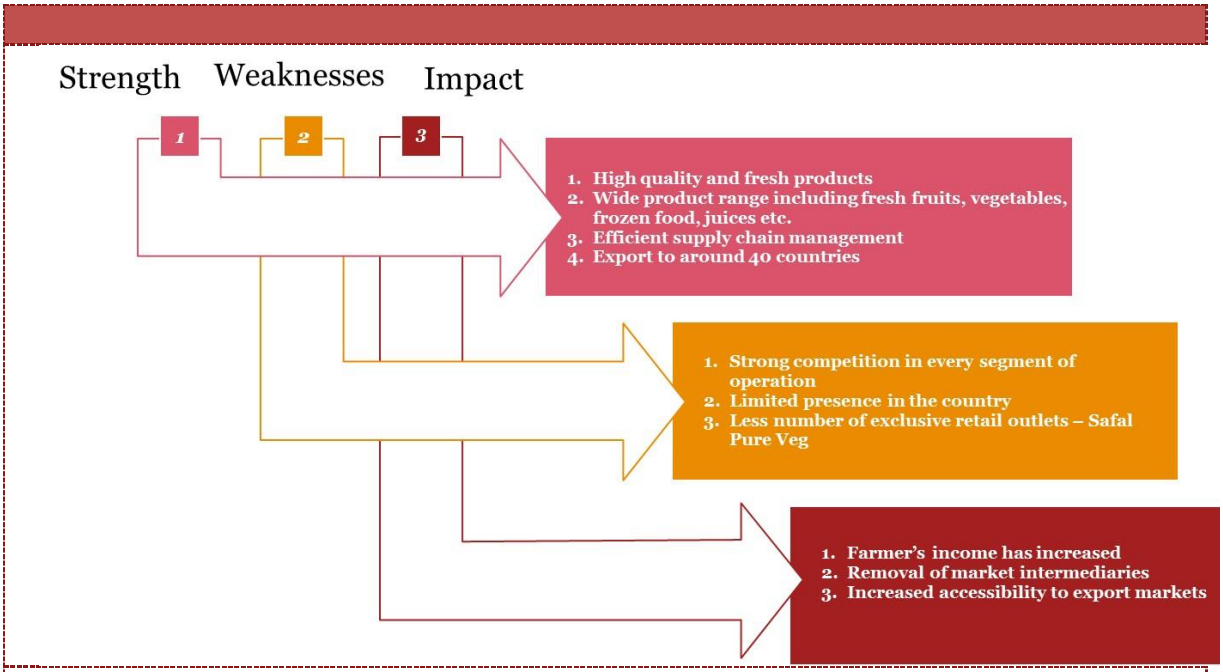

*Source: Agricultural Economics Research Review Vol. 20, PwC Analysis*

***Figure 6:3: Strengths, weaknesses and impacts of the Mahagrapes Cooperative***

HOPCOMS was established by the state government in 1959 in Bangalore and now serves about 12,000 members from which it procures produce through its network of centres in Karnataka. It also owns five cold storage facilities and one processing unit. The Society also owns outlets for the purposes of supplying inputs to the farmer members.

### *Growers' Associations in India*

Growers' associations are informal cooperatives managed by the farmers themselves. SAFAL — a village level association promoted by the Mother Dairy Fruits and Vegetables Limited (MDFVL), has been quite successful in linking fruit and vegetable farmers to markets. SAFAL was established in 1988 to cater to the growing demand for fruits and vegetables in the metropolitan city of Delhi. MDFVL provides technical support to these associations as they prepare crop calendars and draw-up schedules to ensure the delivery of produce on a regular basis. The firm also provides inputs to its members such as quality seeds, bio-pesticides, bio-fertilizers and extension services. The MDFVL is an ISO-9002 and HACCP certified firm. Quality standards for each fruit and vegetable are defined in respect of size, weight, colour and appearance with samples of desired products displayed at each SAFAL collection centre. Daily wholesale market prices in the Delhi wholesale market serve as the base price for the producers. Farmers are paid the modal price plus a 5- 10 per cent premium for quality. The firm does not share any production and price risk. MDFVL has a 100 per cent export-oriented fruit-processing unit in Mumbai. The MDFVL markets produce in fresh, frozen and processed forms with brand name 'SAFAL'. Retailing activity in fresh fruits and vegetables is restricted to the metropolitan area of Delhi through its network of retail outlets. The processed products are meant for domestic as well as export markets. Major export destinations for SAFAL products are: Europe, USA, Australia, Middle East, Japan, Singapore and Hong Kong. A brief overview of the key strength and weaknesses of SAFAL is provided in Figure 6.4.




*Source: Agricultural Economics Research Review Vol. 20, PwC Analysis*

***Figure 6:4: Strength, weakness and impact of SAFAL***

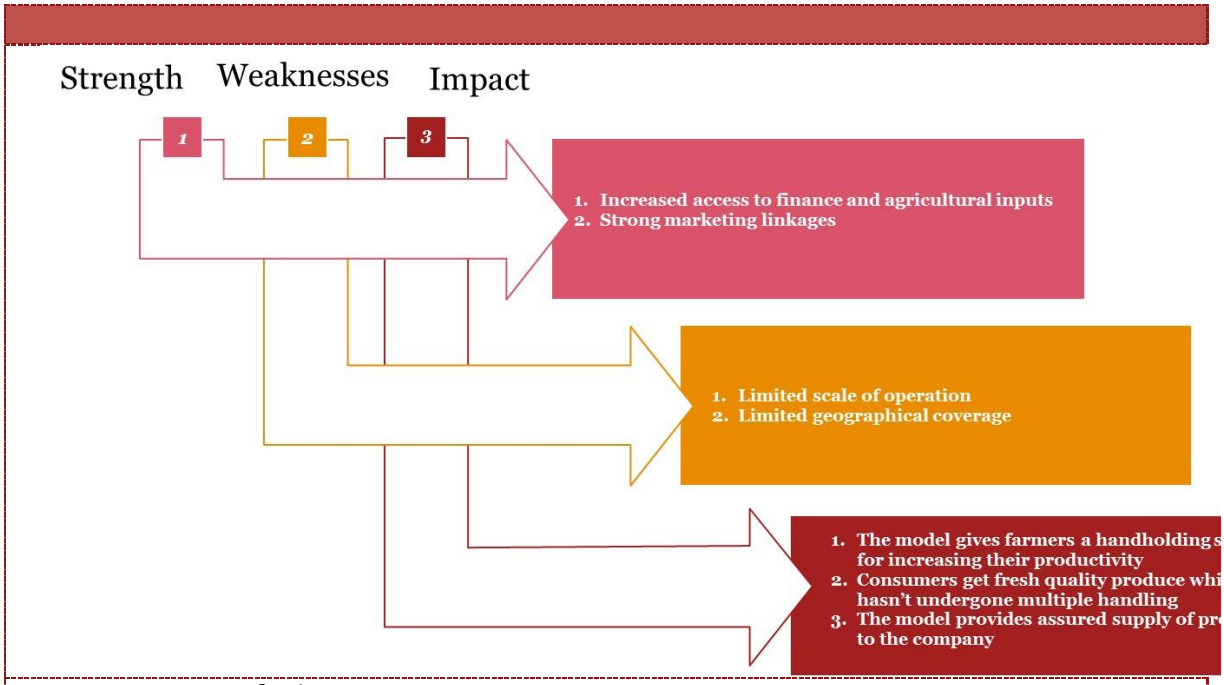
**Others models of linking farmers to market**

There are several other arrangements that have been made to link-up farmers with formal marketing outlets. Two novel examples are discussed here to illustrate that once a conducive environment is created in the project area the various investors attracted to the area will be able to develop other novel ideas for facilitating the linkages between commercial enterprises and the farmers' organisations.

**KNIDS Green Private Limited Model**

The KNIDS Green Private Limited Model was designed for an entrepreneurial start-up in 2007 with the intention to become a profitable and socially responsible business enterprise. KNIDS Green works in association with an NGO, Kaushalya Foundation and caters to the entire value chain of the produce, from "farm to fork". This initiative is aimed for the benefit of small and marginal or landless vegetable farmers, with the NGO team working towards capacity building of farmers to produce better quality produce and then providing an assured market at the doorsteps of farmers.

The overall model works on the concept of collective production and marketing through a registered Farmer Producer Organization (FPO). FPOs are formed at each block level and each one is headed by a farmer who is educated and demonstrates leadership skills. Such a farmer is placed in-charge of all the employees of the producer company. He keeps a track of the field activities of the employee farmers and is responsible for the coordination between the NGO and the farmer producer company. On the other hand, the supporting NGO provides critical support in terms of linking farmers to KNIDS, which acts as front end of the value chain and ultimate buyer. The tie-up facilitates direct procurement of farmers' produce from the collection centres at a price which is at par with the market levels. A brief overview of the key strength and weaknesses of the model is provided in Figure 6.5**.**




*Source: PwC Analysis*

***Figure 6:5: Strength, weakness and impact of KNIDS Green Private Limited Model***

**Rythu Bazaar's**

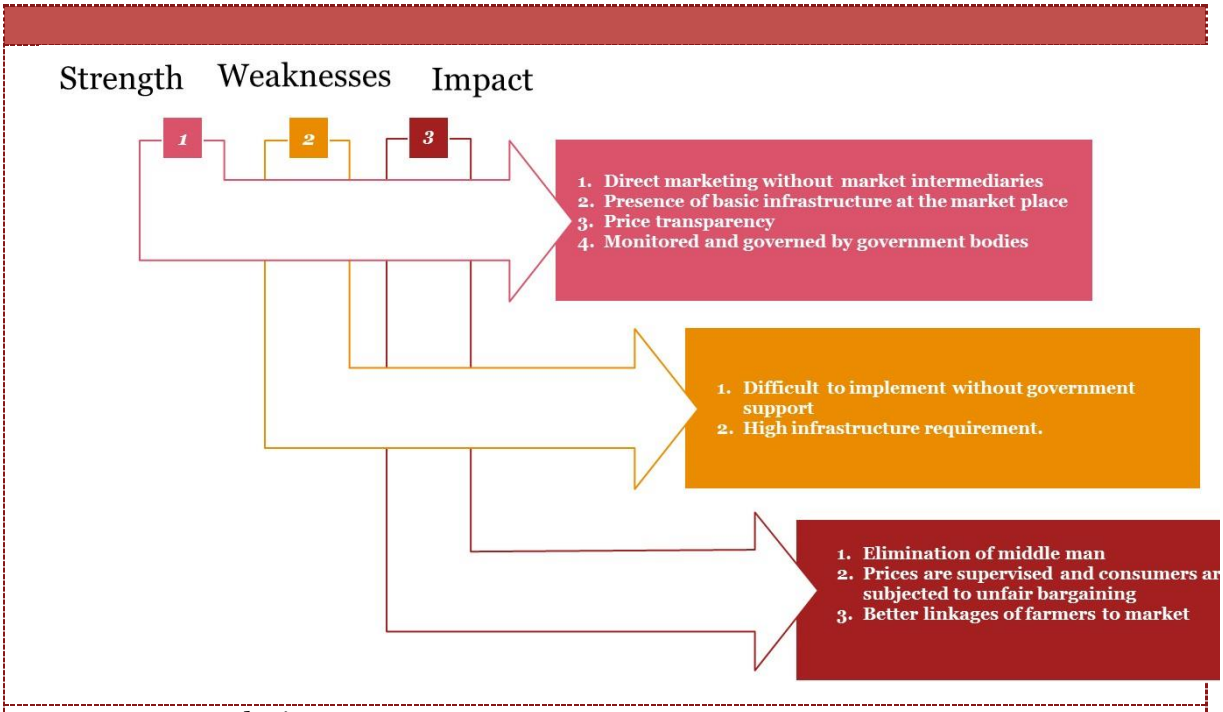
The Government of Andhra Pradesh established the Rythu Bazaar in 1999. The idea behind the venture was to provide a direct marketing platform for the farmers where they can bring fresh produce and sell it to the consumers directly without having to pay various charges such as commission, handling and weigh bridge charges. Rythu Bazaars are organized on government allocated lands which is easily accessible to farmers as well as to consumers. The infrastructure provided by the government includes sheds, arrangements for supply of drinking water, toilets with sanitation facility. A total of 107 Rythu Bazaars are functional in Andhra Pradesh of which nine are located in the twin cities of Hyderabad and Secunderabad.

Rythu Bazaars are based on the concept of direct marketing where the producer sells directly to the final consumer. As intermediaries in the typical Indian vegetable value chain have been constantly criticized as the pain point for the following reasons. In the absence of the Bazaars farmers are forced to sell their produce to either Commission Agents in the Agriculture Produce Market Committee (APMC) market place or to local aggregators, who then bring the collected produce to the Commission Agent and claim his share of margin. Commission for an agent is fixed in every state at 4 percent for vegetables, but the agents normally charge up to 8 percent in addition to the handling and weighing charges. The farmers are forced to sell at that margin for lack of another marketing platform and due to the perishable nature of their produce.

Rythu Bazaar's enable the farmers to sell their produce directly to the consumers. This platform allows the farmers to bypass the marketing costs and margins thus raising their share of the price paid by the final consumer. The elimination of the intermediaries results in reducing the qualitative and quantitative wastage and additional transportation and handling charges. Rythu Bazaar's facilitate immediate realization of the prices to the farmers without deductions as opposed to the market place where the agents sometimes do not pay the farmers in cash on the same day. Rythu Bazaars also eliminate/reduce malpractices generally observed

in the market place such as unfair auctions, faulty weighing machines, and collusion between large farmers, agents and wholesalers.

The retail price for a commodity at Rythu Bazaar is the fixed around 25-30 percent higher than the wholesale price and 25-30 percent lower than the open market price. The prices are fixed by an Estate Officer, a state agricultural marketing department employee, in consultation with farmers. Therefore, the final consumer also benefits by getting their vegetables at prices which are lower than those at roadside vegetable vendors and other retailers. Rythu Bazaar prices act as a stabilizing mechanism for the market as a whole. The key strengths, weaknesses and the impacts of the model are presented in Figure 6.6**.**




*Source:PwC Analysis*

***Figure 6:6: Strengths, weaknesses and impacts of Rythu Bazaar Model***

The unfolding of market liberalization and globalization is causing significant changes in agriculture and agri-food markets. Agriculture is diversifying towards high-value food commodities, and the food marketing system is moving towards efficient coordination. In addition, linking of farmers to markets is a dynamic and ongoing process. It requires adaptation to local conditions and business dynamics. The various country specific examples of direct marketing of agricultural produce present the possibility of exchange of lessons and experiences learnt so far but real applicability can only be assessed after detailed analysis of the local business context.

The formation of sustainable farmers' organizations is not only dependent on the ability to produce and access markets or on the extent to which there is an efficient and effective production system. Rather, sustainable farmers' organizations are dependent on a range of various factors some of which have been discussed in previous Chapters. For sustainable farmers' organizations to develop in the SVIP area it is essential that such institutions provide an incentive for favourable economic behaviour and social inclusion by the major interest groups. In-turn this requires sufficient capacity building aimed at empowering the farmer's organizations and the general community of farmers.

The development of such institutions is dependent on the inputs from all stakeholders in Malawi, including: the private sector and development partners. However fundamentally it is

the public sector that is critical in the development of strong institutions. In certain cases, such as: ensuring the prevalence of fair competition on the market; provision of policy direction; expression of political will; and, the enactment of legal statutes, the public sector plays a lead role. In others, such as, ensuring access to: affordable finance; transport services; and, professional services, the role of the public sector is fundamental in allowing the farmers' organizations and private sector entities to engage in a manner that creates a conducive environment to support the productive base of the economy.

This Chapter will address some of the major strategic issues that were identified during consultations with key stakeholder representatives including selected farmer institutions, and government departments at both local and national levels. The Chapter is divided into four sections:-

i. Inventory of existing farmer organizations
ii. Diagnosis of existing farmer organizations
iii. Proposed organizational setup
iv. Estimated costs of capacity development

It is expected that the best combination of farmer organization(s) would be recommended to form a farm based institution, based on the key issues identified. The best farmer institution identified would form the basis for the planning strategy and subsequent financing of the Strategy. The financing of farmer organization strategy would be based on development process of the institutions and the capacity building programme.

## 6.2. Inventory of existing farmers' organizations

The existing farmers' organizations found in the project area can be grouped into three categories, according to the enabling legislation guiding their registration. The three categories are: Associations registered under the Trustees Incorporation Act; Cooperatives registered under The Cooperative Societies Act of 1998; and Companies registered under the Companies Act of 2013.

These organizations are performing a variety of roles in the lower Shire Valley including the coordination of farmers involved in sugarcane and livestock production. Examples of specific farmers' organizations that exist in the project area include: Kaombe Cane growers which is a joint Venture between Trust of Companies and individuals and Illovo Out-growers - Mill Cum Planters (MCP); Phata Cane Growers Cooperative; Kasinthula under the Shire Valley Cane Growers Trust managed by Cane Growers Association and Company Limited; Nchalo Cane Growers Association; the new Katunga-Maseya (KAMA) Cane Growers' Cooperative; Chikwawa Livestock Association; Chikwawa Livestock Cooperative; and the Sugar Growers' Association of Malawi (SUGAM). In addition, there are other informal groups/clubs or associations, too numerous to mention comprising smallholder farmers who are involved in carrying out farming activities on the many small irrigation schemes that are found in the lower Shire Valley. The farming activities performed include: growing crops such as maize and vegetables; fish farming/aquaculture; and, coordinating the marketing of a variety of agricultural commodities including cotton and pulses.

The inventory of the farmers' organizations is presented in Table 6.1. The table shows the name of the organization, when it was established, the purpose of the organization, who provided financial support to the organization, and the mode of operation.

***Table 6-1: Inventory of existing farmers' organizations in the project area***

| ID No. | Name of organization | Member ship | Year established | Purpose | Financiers | Mode of operation |
|---|---|---|---|---|---|---|
| 1 | Kaombe | _ | 2010 | Sugar cane production on 840ha of land | Trust established by several companies including: Agricane, Illovo, Total and Farming &Engineering Services | The sugar cane crop is grown under a total of 12 Centre pivots: 7 of which belong to MCP; and the remaining 5 belong to a Trust organization or joint venture. Agricane provide management services |
| 2 | Phata | 437 | 2011 | Sugar cane production on 300ha of land and 2 percent of land allocated to food crops | European Union and Government of Malawi | Profession management agreement with Agricane- All the technical and managerial services required for the production of sugar cane which is sold to Illovo on a contract farming agreement. Agricane gets 7 percent of the gross sales of sugar cane as management fees and Phata cooperative pays for all the other operational costs incurred in the production and marketing of the sugar cane |
| 3 | Kasinthula | 762 | 1997 | Sugar cane production on 1,435ha of land | European Union and Government of Malawi | Shire Valley Cane Growers Trust (SVCGT) was formed by GoM. SVCGT facilitated the formation of farmers' association and company to run Kasinthula Sugarcane Irrigation Scheme. Basically, the two institutions are like affiliates of the Trust |
| 4 | Nchalo Cane Growers Association | _ | 2012 | Sugar cane production on 24,000ha of land | Member contributions | Adapt the Phata model of operation |
| 5 | Nkhate WUA | 1,356 | 2001 | Paddy rice production | Government of Malawi though IRLAD Project | Managed by four organs: General Assembly which elects Board of Trustees, Executive Committee and Water Jury. The Executive has working committees to help on daily management of the Scheme |
| 6 | KAMA Cooperative | _ | Under-establishment | Sugar cane production on 2,000ha and food crops on 270ha of land | Feasibility studies coordinated by PressCane | Farmers will be organised into eleven clusters that will operate through Business Centres. The main executive of the each Cooperative will work with these Business Centres. Technically, the Cooperative will recruit a company or individual technical personnel, based on experiences at Phata |
| 7 | Chikwawa Livestock Association | _ | 2008 | Control theft of livestock and disease occurrences | Member contributions | Operate through the Village Livestock Committee, who issue Livestock Ownership Certificates |
| 8 | Chikwawa Livestock Cooperative | 120 | Under-establishment | Marketing of beef | Member contributions | Management of beef processing plant in Chikwawa for smallholder farmers |

| ID No. | Name of organization | Member ship | Year established | Purpose | Financiers | Mode of operation |
|---|---|---|---|---|---|---|
| 9 | SUGAM | _ | 2015 | Regulate sugar industry and promote research work | European Union through Concern Universal | Establish a secretariat and have affiliates |

## 6.3. Diagnosis of existing farmers' organizations

As part of the process to develop the AgDPS, the diagnosis of farmers' organizations in the sugar industry and other industries was carried out. This diagnosis included a review of Associations, Cooperatives, and Trusts and their associated professional management systems. The consulting team conducted Focus Group Discussion (FGD) and direct interviews with key informants guided by a checklist (Annex 2). Some of the organizations that were assessed include: Sukambidzi Association Trust, Kasinthula Smallholder Cane Growers Association, Kasinthula Smallholder Cane Growers Company, Press Cane Limited, Nkhate WUA and Cooperative, Misewu 4 WUA (Water Supply), Ngolowindo Cooperative and Lifuwu Rice Cooperative. The data collected was supported by key informant interviews with representatives of NGOs and key Government Departments that included: Chikwawa DADO and Irrigation Office; Chikwawa District Commissioner's Office; the Department of Irrigation (DoI); the Department of Agriculture Extension Services (DAES); National Association of Smallholder Farmers of Malawi (NASFAM); Farmers Union of Malawi (FUM); Malawi Union of Savings and Credit Cooperatives (MUSCCO); the Department of Cooperative Societies; and, Concern Universal.

These farmers' organizations are meant to facilitate development of the irrigation schemes; crop production; management of schemes; operation and maintenance of irrigation schemes; and, the marketing of produce. In summary the key issues identified were:

- Trusts are bedevilled by perception challenges with farmers perceiving them to be government imposed/controlled institutions.

- Cooperatives –rated at 98 percent failure in the agriculture sector by Department of Cooperatives because of inability to raise capital due to the dependence syndrome among farming communities; weaknesses around leadership, governance, organizational development; lack of input loans and informal markets; adversely affected by high levels of illiteracy in the communities; inadequate institutional support due to resource limitations in the relevant government departments.

- Most of the existing associations deal with localized groups of farmers on small scale irrigation schemes focusing mainly on O & M. Susceptible to political interference due to the low literacy rates in the smallholder farmer communities. By their nature associations are not profit oriented. These associations are also encumbered by the lack of input loans and poor access to formal markets for their produce.

The SVIP scheme is a huge project which will require elaborate and complex institutional arrangements for which existing institutions are not equipped to provide. Most of the existing organizations lack competent technical management support.

An assessment was carried out of farm models that involve smallholder farmers in the Project area; that are implemented in the sugar industry and one rice irrigation scheme – Nkhate WUA. The assessment criteria was based on a rating scale of 1 to 5 was on: production

management; share of benefits; transparency and accountability; governance/organization structure; and cost management. In reference to assessment in Table 6-2, Kaombe has the highest average score of 4.7 and Kasinthula has the lowest average of 2.2 against all the models using the set criteria. Phata is second best from Kaombe, with a score of 4.5. The main difference between Kaombe and Phata are the nature of members that constitutes these organizations. Kaombe membership is mainly comprised of companies and individual out-grower farmers with sound technical know-how and high level of literacy. Therefore, issues of transparency and accountability in all contracts are well addressed than at Phata. At Phata, most members expressed dissatisfaction on how their contracts are negotiated and what elements are considered. This is mainly due to low literacy levels among the farmers. However, Phata farmers are the best representation of the project area. The assessment also shows that existing farmer institutions models are weak in most areas. Given this scenario the project needs to focus on supporting the farmer institutions through capacity building initiatives.

***Table 6-2 Assessment of existing farming models in the project area***

| Model | Governance/ Organization structure | Land tenure /plot allocation | Production management | Share of benefits | Transparency and accountability | Costs | Av. score |
|---|---|---|---|---|---|---|---|
| Kaombe | 5 | 5 | 5 | 5 | 5 | 3 | 4.7 |
| KAMA[29] | | | | | | | |
| Kasinthula | 1 | 4 | 4 | 1 | 2 | 1 | 2.2 |
| Phata Coop | 5 | 5 | 5 | 5 | 4 | 3 | 4.5 |
| Nkhate WUA | 4 | 4 | 2 | 5 | 3 | 2 | 3.3 |

5 = excellent, 4 = very good, 3 = good, 2 = fair, 1=poor

The Phata model approach tackles the whole value chain from production to marketing and processing. The Cooperative stands out as a model that could be emulated for SVIP as illustrated in the Figure 6-7. The Figure shows Phata Institutional arrangements on services provided from sugarcane production to marketing.

In summary, the sections below are results of the SWOT analysis for the Phata Cooperative; from which lessons could be drawn.

### Strengths

- Technical services are hired by the farmers through secretariat
- Decentralized set up
- Involvement of farmers in all processes
- Registered legal entities that could sue and be sued and get into contractual agreements
- Government policing through Department of Cooperatives
- Readily available market through cane supply agreement
- Land used as a share
- Farmers ability to handle low technical demanding crops like maize and beans without inputs from Agricane
- Ability to mobilize funds for initial 10 percent contribution towards the grant as farmer contribution through local Banks
- Readily available inputs for production

[29] Note: KAMA is still under design

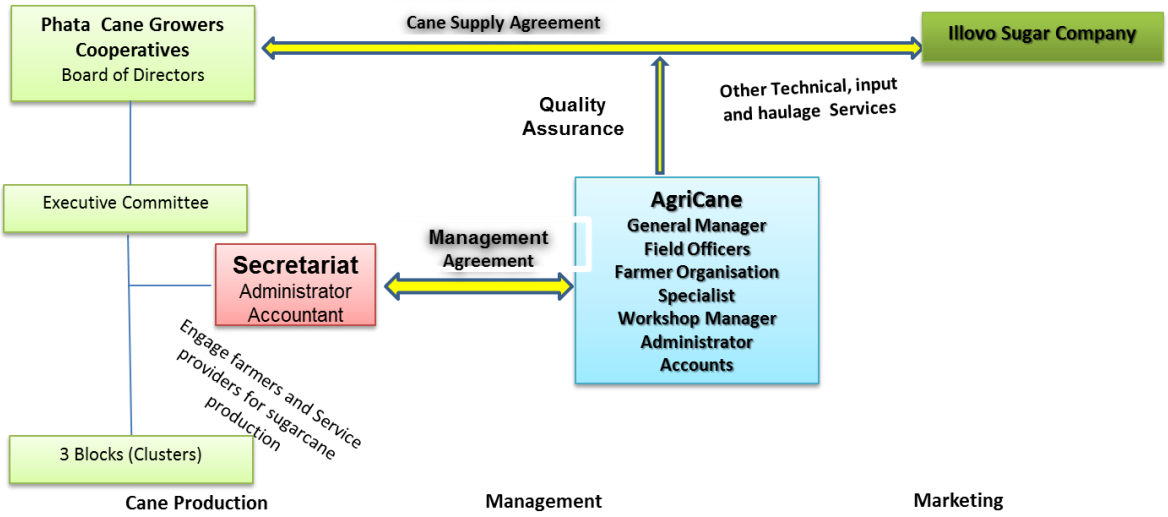



*Figure 6:7: PCGC Institutional arrangement*

### Weaknesses

- Membership only to land owners limits participation of other productive citizens or community members from benefiting from the project
- Operates on the principles of an Association rather than a Cooperative

### Opportunities

- Presence of Development Partners to assist in the Project e.g. EU and Agricane, and Illovo
- Alternative to sustain foreign reserves for Malawian economy through reduction in imports of fossil fuels and opportunity for production of export commodities
- Flexible irrigation system that could suit different crops for production
- The cooperative could easily switch from hiring professional management company to its own management in case of low technical demanding crops

### Threats

- Unstable sugar and fossil fuels prices on the international market could affect the profit margins and stability
- Lack of basis for farmers to negotiate contracts' terms e.g. contracts with Management Company and Illovo

### Success factors for the Phata Model

A comparison of the operations at the two main schemes where smallholder farmers are involved shows that the commendable performance of the operations recorded at Phata can be attributed the following factors:

- the direct involvement of the smallholder farmers in all processes right from inception with adequate allowance provided to provide effective communication;
- the securing of a readily available market right at the outset with the establishment of a cane supply agreement;
- the use of land holdings owed by the smallholder farmers as a basis for determining the size of the shares held under the irrigated land;

- the reservation of small portions of land where the farmers are allowed to grow their food crops such as maize and beans without needing to obtain permission from the professional management team;
- the ability of the scheme to mobilize funds from development partners to facilitate the development of infrastructure; and,
- the ability of the scheme to obtain inputs and technical support from existing service providers operating in the project area.

# CHAPTER 7 : DEVELOPMENT PLANNING STRATEGY

This Chapter details the proposed strategies to achieve the significant improvements in production in the SVIP area. The development management and operation of the SVIP irrigation scheme and the implementation of the development plan will involve many stakeholder groups. This Chapter seeks to clarify some of the institutional arrangements required to ensure the transformation of agricultural activities in the project area from a subsistence to a commercial orientation characterized by efficient, professional and market oriented agricultural production. This strategic framework will inform the implementation of the SVIP where the focus will be on putting in-place the enabling environment, capacity development of the different role players as well as attracting private investment to complement the public investment in the project area. The proposed strategy is discussed in six subsections focusing on:

- the overall strategy framework for the project;
- the strategy for improving crop production;
- the strategy for the development of the non-arable areas;
- the strategy for engaging with the supportive institutions;
- the strategy for development of agro-industries; and,
- identifying the critical policy issues that need to be address to facilitate project implementation.

## 7.1. Overall strategy framework

The lower Shire Valley has been settled for many years and cultivation of crops and rearing of livestock is practiced by the majority of smallholder farmers. However, under the current system both crop and livestock productivity are very low and it is envisaged that the development of irrigation in the project area will lead to significant changes that will boost economic growth at both the regional and national levels. For this to be achieved radical changes to the way agricultural operations are managed are required. For the SVIP the key lessons from the experience gained in Malawi and elsewhere which have informed the strategy formulation process, include:

- the importance of land consolidation and overall organisation of smallholder farmers;
- the importance of insisting on including profitable operations;
- the importance of disclosure of all costs likely to be incurred by participants;
- the need for sustainable operation of water supplies;
- access to markets and value chain services;
- harmonisation of crop and livestock operations; and,
- provision of support towards research and technology generation.

For Malawi, the lessons learnt from the Phata and Kasinthula experiences highlight that commercial agriculture is not a simple operation, and requires scale, cost control and professional management for success. There have been many irrigation projects established to provide “food security” production for smallholders. Many of these fail because they are inherently unprofitable. While the smallholders improve their livelihoods initially, this proves unsustainable in the long term because there is insufficient profit to allow for cost recovery for the operation, maintenance and replacement costs of the infrastructure. These lessons are apparent from the experience gained on several Malawian and other African irrigation projects.

Smallholders are often provided with access to irrigation schemes without knowing the real investment cost, or the cost of water, maintenance and other input cost implications. As a result they are therefore often completely un-prepared to provide the money required to meet

these requirements for sustainable operations. Many irrigation schemes use public sector operators to supply water. These often fail, due to constraints affecting public operations.

Farmers involved in irrigation schemes often complain that they lack access to markets. Often, the cause of this can be attributed to lack of production planning, as well as lack of communication with potential buyers. For commercial success, the farm enterprises need to build trusted relationships with all relevant parties in commodity value chains. These relationships need to be established before production commences, and maintained continuously. Moreover, farms need to produce marketable produce, not simply commodities which are technically possible for production.

Traditional livestock rearing techniques are not compatible with sophisticated irrigated crop production. At the same time, smallholders do rely on their livestock for a significant proportion of their food and income requirement. It is therefore necessary to provide a viable means for livestock production to continue, and to be enhanced, while not interfering with irrigated cropping.

The experience gained in both the tea and tobacco sectors in Malawi highlights the importance of providing continuous support towards research and technology generation to ensure the sustainability of farm operations. Both sectors have, over the years developed systems and procedures to enable farmers to make contributions towards research, as well as for close involvement in setting the research agenda. There are some lessons which can be learnt from these private enterprise funded research institutions, which provide relatively securely funded target research for their farmer clients.

It is proposed to adopt a three stage process to enable smallholders to transform their operations from their current status as low-input/low-output farmers with traditional land tenure rights relying on rain-fed agriculture to owners of commercial irrigation farms. This process supported by the SVIP will be implemented in parallel with the investment in infrastructure to facilitate the delivery of water for use in irrigation.

**STAGE 1: FARM ORGANISATION DEVELOPMENT**

The Parliament of Malawi recently (in 2016), enacted eight (8) new laws that have a direct bearing on the administration land related issues, namely: the Land Act; the Physical Planning Act; the Forestry (Amendment) Act; the Land Survey Act; the Registered Land (Amendment) Act; the Customary Land Act; the Land Acquisition (Amendment) Act; and, the Local Government (Amendment) Act. It is envisaged that the new laws will profound influence in modifying the status and registration of land rights in the country as a whole and therefore will have a significant impact on the pace and pattern of development in the lower Shire Valley. For example, it is envisaged the new legal framework will introduce a decentralised land administration and registration system as it provides for the formalisation and registration of customary rights. This presents both a challenge and opportunities for the proposed SVIP. The main challenge relates to the fact that the new legal framework will be operating in an environment that currently lacks regulatory details and in an institutional context with low capacity and experience and therefore, could contribute to further confusion and delay project implementation. On the other hand, the new framework presents an opportunity for the SVIP to be implemented as a pilot site and thus could be used to generate lessons and to test methodologies for the implementation of the new legislation in the context of a large scale land-based investment process, generating lessons with respect to the specific elements of land consolidation and land acquisition.

To achieve this transformation it will be necessary to organise the farmers to consolidate their land holdings and thus enable them to benefit from the economies of scale. This will be done under two distinct activities.

**Activity 1: Detailed communication and provision of information on the proposed SVIP investment**

This is necessary to facilitate the dialogue that is required to discuss and communicate the various implications, costs and potential benefits as well as the risks that the implementation of the project entails. These issues will be presented and discussed in detail with all the potential participants. Issues to be discussed include changes to the land tenure arrangements, land consolidation, dispute resolution, farm investment decisions, farm organization, selection of crops, livestock, fisheries/aquaculture, potential markets, potential resettlement and associated costs of compensation and the cost of water to be availed under the project. It is envisaged that this exercise will be facilitated by a service provider specifically engaged by the project to undertake it, with support provided by the local government agencies over a period of about six months.

**Activity 2: Formation of proposed farmer commercial organizations**

Based on the assessment carried out it is recommended that at inception of the SVIP, farmers' organisations should be established at each zone level depending on local setting of the zone. There are three main categories of legal entities currently operating in the project area, namely: Association, registered under the Trustee Incorporation Act of 1962 (TIA); Cooperatives, registered under the Cooperatives Societies Act of 1998 (CSA); and, Companies, registered under the Companies Act of 2013 (CA).

To-date consultations carried out in the project area suggest that consensus has been established on a model similar to the Phata Cooperative[30]. This model envisages the formation of cooperatives between the current owners of affected land with shares in this entity being distributed on a *pro-rata* basis per the amount of lane that each owner 'contributes' to the consolidated block. This will entail carrying a detailed survey and recording of the current (pre-existing consolidation) land holdings to formally identify the legitimate holders of the customary rights. This process provides the basis on which to calculate the *pro-rata* entitlement to shareholdings within the cooperative and therefore the share of dividends that each member is entitled to. For that reason, even though it does not lead to the formal registration of the resulting plots of land, the process must include the necessary safeguards and should be done as if it were a formal registration initiative. At a minimum, the process must take place under the auspices of the new institutions envisaged under the new legal framework including the Traditional Authorities (TAs) and the Customary Land Committees (ClCs) and must include widespread public information campaigns, high levels of transparency and formal opportunities for public inspection and objections. The ultimate outcome is that all the pre-existing claims to the land (whether registered or not) are extinguished and a new landholding is established over the entire area. This new landholding is then registered in the name of the cooperative or company.

Whichever legal model is followed the challenge faced in establishing sustainable entities in the project area relate to the quality of leadership, governance, organisational development and capacity. Most of the intended beneficiaries are illiterate and are not used to formal business dealings thus pose additional hurdles in guaranteeing the required levels of transparency and accountability. The administration of land tenure and plot allocation within the project area therefore needs to be clearly spelt out in the by-laws or statutes as well as being underpinned by strong operational capacities within the project's management structures.

[30] This successful initiative has involved smallholders contributing their land rights in return for receiving a share in the commercial agribusiness cooperative, which is itself managed and operated by an appointed management company.

The resulting operating units could be responsible for an area extending over 500 ha per unit (or multiples thereof). Preliminary consultations with representatives of smallholder farmers in the project area suggest that five core areas have been identified to constitute the core units of the farmers' organisations. The focal points for the establishment of these cooperatives have been identified as follows: Kasinthula (Trust); Phata; Katenga-Maseya (KAMA); Lundu/Ndakwera; and, Kasisi. It is worth noting that the farmer organisations at Kasinthula and Phata have been established and have been operating for a number of years, while KAMA has been formed with the assistance provided by PressCane but is yet to be fully operation. The new organisations which are yet to be established will serve the farmers in the Lundu/Ndakwera and the Kasisi area.

The new organisations (cooperatives or companies) are envisaged to then establish agri-business partnerships for the management of the consolidated areas as commercial farming units. They would have the power to: enter into contracts on behalf of their members; mobilize farmers for production; negotiate with suppliers for better input supply, credit facilities and produce. There will be about 15 of these units all-in-all, in an area of about 7,500 ha. When this process is completed, the Farm Cooperative/Company/Association or Trust would be formed, with proper registration and ownership of the land tenure for the farm area. Farm based Associations/Cooperatives would be composed of beneficiaries from the same geographical area and based on the same Group Village Heads (GVH), following existing demarcations. In case the irrigation system design layout cuts through boundaries, negotiations would be facilitated by the DEC, Farmers' Union and actual organizations involved. Membership would be drawn from land owners, who have aggregated land for irrigation development. Each organization would draw its constitution and by-laws that would define membership; land regulations and terms of compensation to land owners who are not members or have defied provisions of guiding by-laws/rules/regulations; leadership hierarchy and their terms of reference; and how operation, maintenance and conflict resolution would be done. The benefits to the individual members could be realised along three possible channels, namely; from annual dividend payments from net profits realised by the ventures; formal labour opportunities associated with various farming operations; and, the opportunity to cultivate food crops on allocated plots within the designated non-commercial portions of the project area.

Each Association/Cooperative would choose its enterprise (crop production, livestock and aquaculture) based on factors as highlighted in Chapter 6, except for Zone 1 and partly 2 that are already into sugarcane production under contract farming with Illovo and PressCane. All enterprises would follow the whole value chain from production to marketing or value addition to marketing. This would be facilitated by SVIP-Project Coordination Unit (PCU) through Technical Assistants (TAs) or Implementation Service Providers (ISP) that would be contracted to provide the services during implementation. Each Association/Cooperative would be directly linked to the Water Service Provider identified for the Project depending on its irrigation water requirement. The viability and sustainability of the SVIP will be influenced to a significant extent by the quality of management services that will be provided to support the key components of: crop production; management coordination; and, general operation and maintenance. Three options have been identified from the practice adopted at existing irrigation schemes found in the lower Shire Valley. The advantages and disadvantages associated with each option are summarised in Table 7.1. The advantages associated with the Phata model help to explain why it is the preferred model for the proposed SVIP.

*Table 7-1: Options for providing professional management services*

| ID No. | Options | Advantages | Disadvantages |
|---|---|---|---|
| 1 | Hiring of Company e.g. Agricane and Phata Coop | Guided by contract agreement; No interference by farmers on day-to-day activities of the company; High quality and quantity production levels; Highly preferred for PPP or Contract farming arrangements | The high level of illiteracy in the farmer community makes it difficult to negotiate effectively with the Company |
| 2 | Forming a Company e.g. Kasinthula | Guided by contract agreement; High quality and quantity production levels; Highly preferred for PPP or Contract farming arrangements | High interference by farmers on activities of the company; approval of operational funds for the company tends to present problems; company is subjected to political decisions e.g. on labour laws, employment, and hiring of services |
| 3 | Farmer-managed but hiring only specialized services e.g. Nkhate WUA | Good for low value crops | Farmers' illiteracy level makes it difficult to make sound technical decisions; low quality and quantity production levels; mobilization of resources is challenging; Not preferred for PPP or Contract farming arrangements with markets |

Daily management of the affairs of the farmers would be done by the secretariat that consists of employed and paid (part-time) staff. Block monitors would also be required to assist the secretariat and any service provider at Block level of the irrigation system. These monitors could be paid a monthly honorarium for motivation. The proposed staff complement includes:

- Scheme Manager;
- Accountant;
- 2 Extension workers;
- Bookkeeper; and,
- Watchmen (as per requirement).

## STAGE 2: FARM INVESTMENT AND OPERATIONAL SUPPORT

The actual farm investment will take place immediately after the farm organization process is completed. This can start in parallel with Stage 1 activities and the actual farm investment will take place immediately after the farm organization process is completed. Two main activities are envisaged under this stage, namely: planning for farm investment; and, the provision of farm operation support.

### Activity 1: Planning for farm investments

The planning for investment include:

a) decisions on crop choice, rotations, livestock, fisheries, technology applied;
b) decisions on farm equipment, basic infrastructure (potable water, electricity connection, access road), engaging the service provider, water application methods and farm management and staffing the cooperative/company with relevant professionals;
c) securing of financing for equipment and production costs;

d) identification and contact with possible markets; and,
e) preparation of the farm investment and business plan.

This process would be supported by specialist service providers as well as by the farm management agency once it is appointed. The farm investment stage would last for about one year. At the conclusion of the process, farms would be ready to commence production.

**Activity 2: Farm Operation Support.**

Financial sustainability of the SVIP irrigation investment can only be achieved through profitable agricultural production. Farms will need to be linked to Commercial Value Chains for production and sale of their produce. Such value chains are currently poorly developed due to the low level of commercial production in the area, with the exception of sugar cane. Development of commercial value chains will be needed to enable farmers to gain access to markets and commercial services; this is essential to enable viable commercial agriculture. Although it will take 3-4 years for the physical infrastructure to be in place, the process of capacitating farmers to take full commercial advantage of the investment will begin immediately after the project is commenced.

Farms will need strong technical support to achieve sustainable profitability. The project would provide technical advice, training and mentoring on agronomy, irrigation management, marketing, business management, environmental management and other topics during the initial three years of operation. This would be provided through the project by service providers, with a clear set of responsibilities under a contractual mechanism and dependent on a transition to hired services for longer term management. Additionally, support would be provided to develop effective communication within the value chains for each commodity produced. This would take the form of value chain platforms involving all interested entities, farmers, inputs suppliers, off-takers, transporters, financiers, public and private extension, commodity associations.

**STAGE 3: SUPPORTIVE INSTUTIONAL DEVELOPMENT**

Support for the development and strengthening of appropriate institutions would take place throughout project implementation. The following would be provided:

**Formation of a representative Farmers' Union**

It is also proposed that SVIP Farmers' Union should be established to facilitate the coordination of irrigation development, management and capacity development initiatives. This arrangement is necessary given the vast expanse of the area covered by the Project and the existence of several farmers' organizations in the project area. This proposed Farmers' Union will provide a link between the farmers' organisations on undeveloped and existing irrigated areas (Associations/Cooperatives) and, the government agencies responsible for coordinating overall project implementation (the SVIP-PCU, Technical Assistants; and, the District Council). In addition, the SVIP Farmers' Union will be affiliated to the Farmers' Union of Malawi. This would perform water users' apex functions on behalf of the farms. It is anticipated that this would evolve into a broader representative organization involving farmers' association and participating value chain entities. This would then be an effective advocacy body for all participants.

**Support towards applied research and technology generation**

This program would be responsive to farmers' needs, and ultimately, farmers would be encouraged to pay a levy on their crop revenues to ensure sustainability of the research.

Modalities for provision of this support would be determined in consultation with farmers during project implementation.

The SVIP program will be implemented in several contiguous or partially overlapping projects. Some elements of Phase 1, especially those in stages 2 and 3 above, may not be completed in Phase 1, and will be continued in Phase 2. The SVIP will also collaborate closely with the Agricultural Commercialization Project (ACP), now being prepared for World Bank financing. Specifically, initiatives concerning the development of appropriate financial services and products, produce standards, industry and business regulation, inter-action and support from the Malawi Industry and Trade Centre (MITC), and possible development of spatial zones for commodity processing that may be supported by the ACP will be relevant for SVIP clients. Some of these initiatives, where relevant to the success of SVIP, may be directly supported in Phase 2.

## 7.2. Strategies for improving crop production

Chapters 3 and 4 detail the analysis carried out to determine the following factors:

- the crops that were best suited to the agronomic conditions of the Shire Valley, particularly when grown under irrigated conditions;
- the likely gross margins for the crops best suited to the productive environment;
- the produce which has a ready market either in Malawi or in the region; and,
- the range of crops which were easily handled, transported and stored without elaborate transformation or investment in processing and storage facilities (beyond those that already exist in the SVIP locality).

Table 7.2 summarizes the results of a gross margin analysis carried out to assess the viability of the crops which are considered suitable, from an agronomic perspective, for growing in the lower Shire Valley. Table 7.2 also includes several high value crops which are capable of realizing much higher returns than those possible for the selection of crops described above. This includes such crops as: citrus; mangoes; tomatoes; baby corn; sweet corn; and, chillies. These crops have not been included in the cropping programme to be adopted at inception to allow for the development of downstream industries that will be required to manage the logistics relating to the packaging, marketing and, or processing that has to be carried out before large volumes can be produced in the project area. For example, the type of tomatoes proposed for the project area will require a processing factory to be established first. The same applies for the cassava crop. It is envisaged that as scheme development progresses some of these crops will be included in the cropping programme.

There is also a group of crops which have been excluded from the programme after careful consideration of their agronomic requirements. For example, rice requires a lot of water and it is not easy to find other compatible crops for rotation purposes. The type of soils found in the project areas are not ideal for groundnut production mainly due to the relatively high clay content. At the other extreme, crops such as wheat, cow peas and sesame are estimated to realize fairly low gross margin returns and therefore have not been included in the proposed cropping programme. The wheat crop has also been excluded because of concerns about the poor quality of the product likely to be produced under the high temperature environment experienced in the lower Shire Valley. Further research will be required to identify or develop suitable varieties of wheat seed for the lower Shire Valley. In addition, research could be carried out to explore the possibility of blending the locally produced wheat with the better quality imported varieties with a view to reducing the huge import bill currently incurred by the bread and confectionary industry.

The seed maize crop has not been included in the cropping programme mainly because of the low gross margin returns as well as the serious reservations about the viability of the seed that can be produced under the high temperature conditions prevailing in the lower Shire Valley.

It is likely that the various seed houses currently operating in Malawi will continue to rely on the farmers from the higher altitude areas where the crops can easily be grown under rain-fed conditions without incurring the additional cost of irrigation. The temperature issue is also applicable for other seed crops and it is important to ensure that particular attention is taken to avoid producing seed that will not meet the clients' expectations with respect to germination performance.

This analysis showed that the following six crops would have highest priority for inclusion in the cropping programme for the proposed SVIP during the first five years of scheme implementation: sugarcane; dry beans; pigeon peas; cotton; soya beans; and, maize for grain production. Sugarcane is already the major commercial crop in the project area with a well-developed value chain and it is envisaged that the crop will retain this status for the foreseeable future. Dry beans, cotton and soya beans are well established crops in Malawi in general, and are considered easy to grow, store and market.

Sugarcane will continue to be grown and processed by the Illovo estate, and the outgrowers currently producing for it. The new smallholder farms will not be able to grow sugarcane because of capacity constraints at the Illovo processing facility. It is therefore proposed that they will initially grow cotton, soya beans and pigeon peas in summer, and maize and dry beans in winter. Provision will also be made for enhanced production of livestock, using irrigated crop residues as fodder, and for aquaculture. Subsequently, after farms have gained experience in irrigated agriculture, it is proposed that 12 percent of the irrigated area be used for high value crops such as banana, mango and citrus.

Finally, it is proposed that each household participating in the schemes will be allocated 0.1 ha of irrigated land for production of household food crops. Farmers will be free to grow crops of their choice on this land, provided that they pay for water consumed and other farm services that they use (e.g. ploughing, plant protection).

This entry strategy will enable the scheme to make a commercially viable start. The emphasis will be placed on developing the farmers' capacity to grow these crops at a commercial scale while at the same time acquiring the skills commensurate with international best practice.

This cropping system is reflected in the financial model prepared for the project (see Appendix E). However, it must be emphasized that decisions on the actual crop mix will be made by the farmers as part of the decision-making processes for initial farm investment and subsequent farm management. Moreover, the design of the farms will be such as to allow for a great degree of flexibility in the crop mix and production systems employed, allowing farms to respond to actual technical and market conditions.

### *Table 7-2: Gross margin estimates and ranking of suitable crops*

| No. | Crop | Average yield (kg/ha) | Av. Price (US$/kg) | Estimated Income (US$) | Total variable costs (US$) | Gross margin (US$/ha) | Include/exclude from cropping programme |
|---|---|---|---|---|---|---|---|
| 1 | Tomatoes | 45,000 | 0.28 | 13,432.84 | **5,749.67** | **7,683.17** | To be introduced gradually in-line with investments in processing technology |
| 2 | Sweet corn | 50,000 | 0.15 | 7,462.69 | **969.33** | **6,493.35** | To be introduced gradually in-line with investments in packing, storage, freight facilities |
| 3 | Green mealies | 45,000.00 | 0.16 | 7,388.06 | **938.30** | **6,449.76** | To be introduced gradually in-line with investments in packing, storage, freight facilities |
| 4 | Sugar cane | 120,300 | 0.07 | 8,806.50 | **5,485.88** | **3,320.62** | **Included** |
| 5 | Cassava (wet) | 30,000 | 0.10 | 3,134.33 | **132.02** | **3,002.31** | Excluded - storage, processing |
| 6 | Baby corn | 11000 | 0.30 | 3,283.58 | **1,299.93** | **1,983.65** | To be introduced gradually in-line with investments in packing, storage, freight facilities |
| 7 | Rice (polished) | 2,500 | 0.75 | 2,611.94 | **740.75** | **1,871.19** | Excluded - rotation, water |
| 8 | Beans (dry) | 2,500 | 1.04 | 2,611.94 | **953.97** | **1,657.97** | **Included** |
| 9 | Pigeon peas | 2,500 | 0.75 | 1,865.67 | **365.17** | **1,500.50** | **Included** – for rotation purposes and to meet the national aspirations |
| 10 | Cassava (dry) | 10,000 | 0.15 | 1,492.54 | **176.34** | **1,316.19** | Excluded - processing, storage |
| 11 | Cotton | 4,000 | 0.45 | 1,791.04 | **567.61** | **1,223.43** | **Included** |
| 12 | Chillies | 1,500 | 0.97 | 1,455.22 | **337.83** | **1,117.40** | To be introduced gradually in-line with investments in processing technology |
| 13 | Rice (unpolished) | 3,500 | 0.45 | 1,567.16 | **740.75** | **826.41** | Excluded - rotation, water |
| 14 | Groundnuts(shelled) | 2,500 | 0.75 | 1,865.67 | **1,112.95** | **752.72** | Excluded - soils |
| 15 | Soya beans | 3,100 | 0.28 | 855.97 | **518.12** | **337.85** | **Included** |
| 16 | Maize (seed, irrig) | 3,500 | 0.37 | 1,305.97 | **1,041.96** | **264.01** | Excluded - viability of seed |
| 17 | Maize (grain, irrig) | 5,000 | 0.24 | 1,194.03 | **997.39** | **196.64** | **Included** -political/social |
| 18 | Sorghum | 5,000 | 0.18 | 895.52 | **729.33** | **166.20** | Excluded - markets |
| 19 | Groundnuts(unshell) | 4,170 | 0.30 | 1,244.78 | **1,078.77** | **166.01** | Excluded - soils |
| 20 | Wheat | 4,000 | 0.27 | 1,074.63 | **965.94** | **108.69** | Excluded - yield, quality |
| 21 | Cow peas | 2,000 | 0.21 | 417.91 | **320.75** | **97.16** | Excluded - marketing not clear |
| 22 | Sesame | 1,100 | 0.27 | 295.52 | **231.37** | **64.16** | Excluded - marketing not clear |

## 7.3. Strategy for the development of non-arable areas

### Grazing areas

A current land-use demarcation exercise carried out by COWI (2016) revealed that 3.7 percent of the whole SVIP area is considered as pastoral/grazing area and this is estimated to cover about 57 ha in Phase I and 2,196 ha in Phase II. It is possible that a portion of this land, will be lost to the irrigation scheme when the demarcation of the proposed irrigation area is done and full development is completed. Anecdotal evidence gathered through consultations with some of the traditional leaders in the lower Shire Valley, seems to suggest that these fears are exaggerated. This is because the Shire River's west bank, through which the canal will pass, is not normally used for grazing. However, it is worth noting that the current grazing practice entails that livestock have access to the arable lands during the dry season. With the development of the irrigation scheme this will no longer be possible. It is envisaged that this can be mitigated by allowing the livestock farmers access to the crop residues from the irrigation scheme to supplement their grazing. A balance will have to be found because complete removal of crop residues from the field can lead to a depletion of soil organic matter which is required for the maintenance of a good soil structure and overall soil fertility.

In addition, it is likely that the improved income generated from the commercialisation of the cropping enterprises under irrigation will be used to acquire and, or build-up the livestock populations. Given the inevitable loss of access to lands that will be put to irrigation there is a need to develop alternative sources of feed for the existing livestock population to avoid exacerbating the pressure on the reduced grazing area. This could be achieved by developing irrigated pastures to boost the carrying capacity of the remaining grazing areas. Suitable areas could be identified in each zone once the area for irrigation development has been clearly identified and a thorough veld assessment has been carried out to determine the nature and composition of the veld grasses found in the specific areas. Appendix E details options available for enhancing the productivity of the grazing areas.

### Aquaculture

The availability of abundant water resources that will be made possible by the development of the SVIP presents opportunities for the resuscitation and expansion of fish farming in the project area. This enterprise could be developed to occupy the area located in-between the irrigated lands and, or any water storage facilities developed as part of the water conveyance system for the project as a whole. It is recommended that SVIP should include commercial fish farming component as one of the enterprises to be supported under the project. Specific measures can then be put in-place to address the challenges identified under the situation analysis (see Section 2.4 in Chapter 2). These include:

- there is need for the SVIP to support the research effort being carried out at Kasinthula and address issues relating to:
    - the feasibility of using sodic pans for fish farming;
    - the possibility of stocking sex reversed male fish which grow faster than females.

- the following facilities need to be established to enhance the viability of commercial fish farming in the project area:
    - a hatchery to produce fish fingerlings within the Shire Valley area.
    - a feed mill at Kasinthula to ensure that fish feed is readily available. Raw materials for the feed could be sourced from within the project area.

- rigorous training of prospective fish farmers in various fish farming technologies to be adopted.

Appendix E details the proposed project components for the fish farming ventures.

## 7.4. Supportive institutional development and multi-stakeholder involvement

In line with the guidelines enunciated in the NIP (2016), the proposed organizational setup will focus on ensuring: sustainable irrigation development; sustainable management; and, capacity development of the farmers' associations and cooperatives for the benefit of developed and undeveloped organizations. The proposed institutional structure for the project is summarised in Figure 7.1.

Support for the development and strengthening of appropriate institutions would take place throughout project implementation. The following would be provided:

a) Formation of a representative Farmers' Union. This would perform water users' apex functions on behalf of the farms. It is anticipated that this would evolve into a broader representative organization involving farmers' association and participating value chain entities. This would then be an effective advocacy body for all participants; and,

b) Applied research support. This program would be responsive to farmers' needs, and ultimately, farmers would be encouraged to pay a levy on their crop revenues to ensure sustainability of the research. Modalities for provision of this support would be determined in consultation with farmers during project implementation.

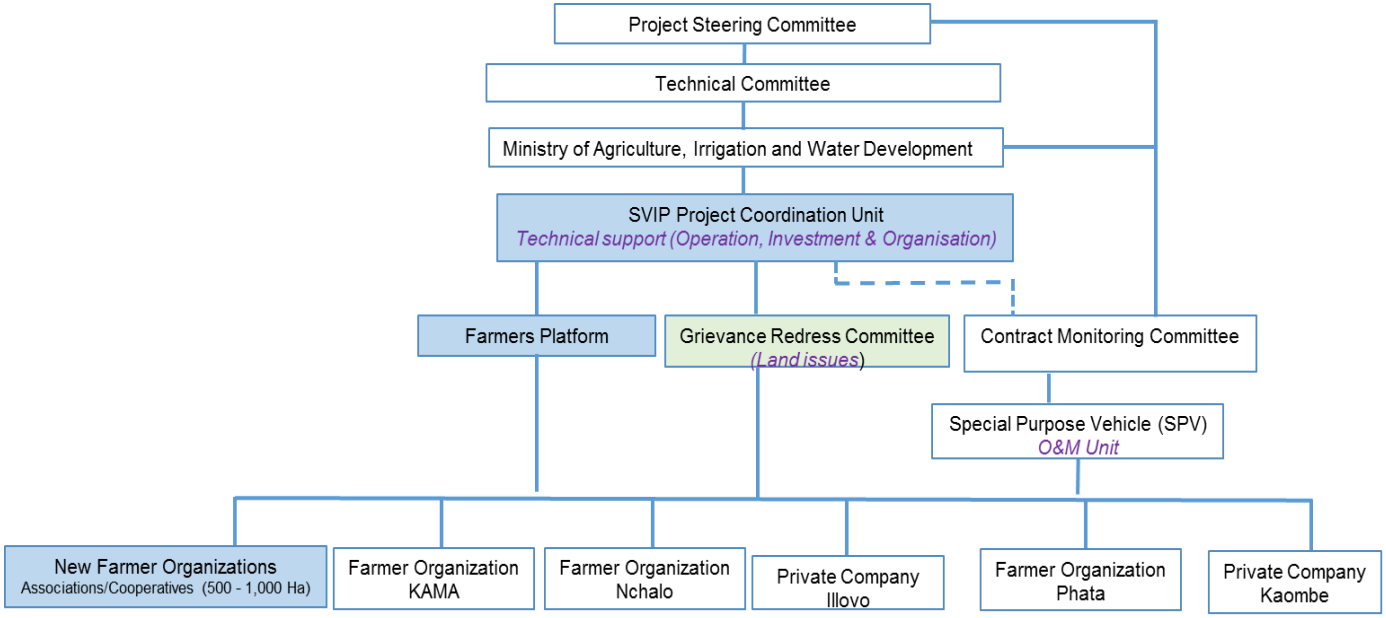



***Figure 7:1: The proposed institutional structure***

The main players that have been identified to play a significant role in addressing the identified priority areas are:

- Ministry of Agriculture Irrigation and Water Development
- District Councils
- SVIP Project Coordination Unit
- Farmers Union of Malawi
- Private Companies/NGOs
- Existing Farmer organizations
- Proposed Associations/Cooperatives

The roles and responsibilities of these stakeholders are described in the following paragraphs.

### Ministry of Agriculture Irrigation and Water Development

The main task of the Ministry and its Departments would be to provide policy direction. The Ministry shall be responsible for ensuring close coordination amongst various Departments such as: Agricultural Research Services; Agricultural Extension Services; Climate Change and Meteorological Services; Land Resources and Conservation; Water Resources Management; Government development initiatives on irrigation; relevant training institutions; private sector; development partners; and, CSOs as stipulated in NIP 2016. The Ministry would also take a leading role in identifying development partners for funding of the implementation phase; identifying the right water service provider through the Nation Water Resources Authority and Shire River Basin Management Authority; and conduct monitoring and evaluation of different components of the Project.

### District Council

The Decentralization Policy has diverted the centre of implementation responsibilities in the irrigation sector from the national level to the districts. This requires that the project organizations, which are responsible for managing the planning and construction phases of the irrigation development initiative, have a good understanding of the organization of the affected farming communities and irrigation and agricultural support service providers in the district.
The District Executive Committee (DEC) is the main governance body for providing leadership to development initiatives in the district. There is a District Consultation Forum in which the DEC discusses development issues with the Members of Parliament and the Traditional Chiefs from the district. Proposed roles of District Council based stakeholders, which would work hand in hand with SVIP PCU and the Farmers Union, are indicated in Table 7.3.

***Table 7-3: District Council stakeholders***

| Institution | Potential roles | Involved actors |
|---|---|---|
| District Executive Committee | Governance team for the Project area providing strategic leadership | District Commissioner, DDPD, DADO, DIO and DWO, Chiefs and MPs |
| District Irrigation Office | Coordinator and facilitator of planning, construction and other technical capacity building process | District Irrigation Officer and his/her staff |
| District Agricultural Office | Coordinator of Agricultural Development Plans and facilitators of capacity development | AEDC and AEDOs in charge of command area |
| District Land Administration | Coordinators and facilitators of Land Tenure Improvement Plan | District Land Officer |

**Farmers' Union of Malawi**

The Farmers' Union of Malawi (FUM) is an umbrella body of farmers and farmers' organizations in Malawi which was established in 2003 under the Trustees Incorporation Act with the aim of creating a conducive policy environment for farmers in Malawi. It is founded on three key operational areas, namely: institutional development; policy and advocacy; and, agribusiness and market access. The overall objective of FUM is to ensure that farmers effectively and meaningfully participate in the design, formulation, implementation, monitoring and evaluation of policies, strategies, programmes and plans aimed at improving the livelihoods of farmers in Malawi (FUM 2016).

This would provide a forum for SVIP Farmers' Union and its respective Associations and Cooperatives to explore additional options in development of different value chains and capacity building initiatives with FUM and its affiliates (e.g. SUGAM). This would also assist in improving farmers' bargaining power on different markets within a chosen enterprise and in demand of policy.

**SVIP Project Coordination Unit and Technical Assistants**

The Project Coordination Unit (SVIP-PCU) is already in-place. It is therefore suggested that the functions of the PCU should still continue for the next five to ten years to coordinate the implementation of the AGDPS. The technical establishment of the PCU is composed of Project Coordinator, Community Mobilization Specialist, Irrigation Specialist, and Government counterpart staff (an Irrigation Engineer).

For successful implementation of the SVIP, in the next phase, the Project needs to hire technical assistants (TAs) who are experts engaged to assist in the implementation of such components as: irrigation development; irrigation water management; and capacity development. The specific areas that will require the inputs of technical assistants are: Irrigation Water Management; Crop Production; Community Mobilization and Farmer Organization; Aquaculture and Livestock; Credit and Input Supply; PPP; Marketing and Value Addition; and, Monitoring and Evaluation. The key roles of the SVIP and TAs, in implementation phase, in collaboration with the DEC would include the following:

- facilitating contracting arrangements for the development of irrigation systems in the SVIP;
- facilitating and coordinating community mobilization and formation of farmer organizational structures;
- facilitating and coordinating capacity building service provision of farm level institutions of the SVIP through service contracts;
- supporting the farm level institutions by putting in-place and developing appropriate governance and business management systems to effectively run their agricultural enterprises;
- facilitating and coordinating contract farming arrangements between farmer organization and agribusiness companies; and,
- linking the farm level institutions with the various Government and other service providing institutions.

Two options are proposed for the recruitment of the TAs: 1) to recruit one Implementation Service Provider (ISP) on contract basis. This ISP would have a team leader, and a team of the following experts:

- Water Management Specialist;
- Agronomist;
- Farmer Organization Specialist;

- Aquaculture and Livestock Specialist;
- Inputs and Loans Specialist;
- PPP Specialist;
- Marketing and Value addition; and,
- Monitoring and Evaluation.

The second option would be for the PCU to recruit and engage these TAs on an as-and-when needed basis. The TAs would be required to facilitate capacity development of the farmers in general through the apex SVIP Farmers' Union and individual Associations or Cooperatives.

Other related services would be outsourced from already established institutions e.g. Research Institutions like Kasinthula Research Station; National Aquaculture Centre; and, Bvumbwe Research Station; NGOs like Concern Universal; and apex bodies like Cotton Ginners' Association and SUGAM; as discussed in Chapter 5.

### SVIP Farmers' Union and farm based cooperatives/associations

The NIP 2016 advocates for well-managed irrigation schemes to sustain productivity. The NIP is aimed at:

- encouraging catchment management practices for the benefit of irrigating and non-irrigating communities;
- developing farmer organizations through technical and administrative empowerment to ensure effective community participation;
- exploring alternatives to handling and marketing of farmers produce for maximum profitability of irrigated crops;
- facilitating in a coordinated manner, the formalization of land tenure rights that will ensure tenure security;
- strengthening extension services for irrigated agriculture through awareness and outreach of irrigation technologies; and,
- supporting beneficiary communities where major rehabilitation, upgrading or modernization of irrigation infrastructure are required.

It is against this background that the existing and the proposed smallholder farmers' Associations/Cooperatives in the Project area would be encouraged to come together to establish the SVIP Farmers' Union. The role of the overarching farmers' organisation will focus on three main tasks, namely, to ease: facilitation; coordination; and, capacity building initiatives for the benefit of all targeted irrigation area beneficiaries or farmers' organizations throughout their value chains.

### The SVIP Farmers' Union

The membership of this Union would be drawn from the representatives of primary cooperatives/associations, for voting purposes. The areas of focus would be: training and extension; production planning; input supply and credit provision; establishment of stores and related outlets to meet the farmers' basic input needs; commodity marketing; mechanization and transport; general operation and maintenance; and overall scheme administration.

Specifically, the SVIP Farmers' Union would be responsible for:

a. Facilitating and coordinating community mobilization and sensitization; establishing irrigation block area management associations and cooperatives; providing assistance in the re-allocation of land; resettlement, and grievance redress; developing farm land

ready for growing crops; advise on farm management and crop production; support to prepare and submit proposals for assistance. Initially project funding would be used for a period of five years. Over time this could grow into a farmers' membership organization providing the services on a demand driven basis.

b. Facilitating and coordinating capacity building service provision of farm level institutions of the SVIP through service contracts.

c. Supporting the farm level institutions putting in-place and develop appropriate governance and business management systems to effectively run their agricultural enterprises.

d. Facilitating and coordinating contract farming arrangements between farmers' organizations and agribusiness companies.

e. Linking the farm level institutions with the various Government and other service providing institutions.

f. Facilitating contracts for the development of irrigation systems in the SVIP area.

Daily management of the Union would be through an interim committee of selected members from existing associations and cooperatives and GVH or VDCs representatives. It is proposed that 11 members should be elected to steer the process.

## Implementation plan

The implementation of the farmers' organization component is anticipated to take five years. The first three years would be for sensitization, formation and operationalization of the associations and cooperatives. The next two years would be for intensive monitoring and evaluation of all aspects involved to make viable enterprises. It is anticipated that after this five-year period, the SVIP Farmers' Union would be an independent entity, receiving minimum assistance from SVIP PCU in terms of funding of its activities. Figure 7.3 shows the farmer organization development process.

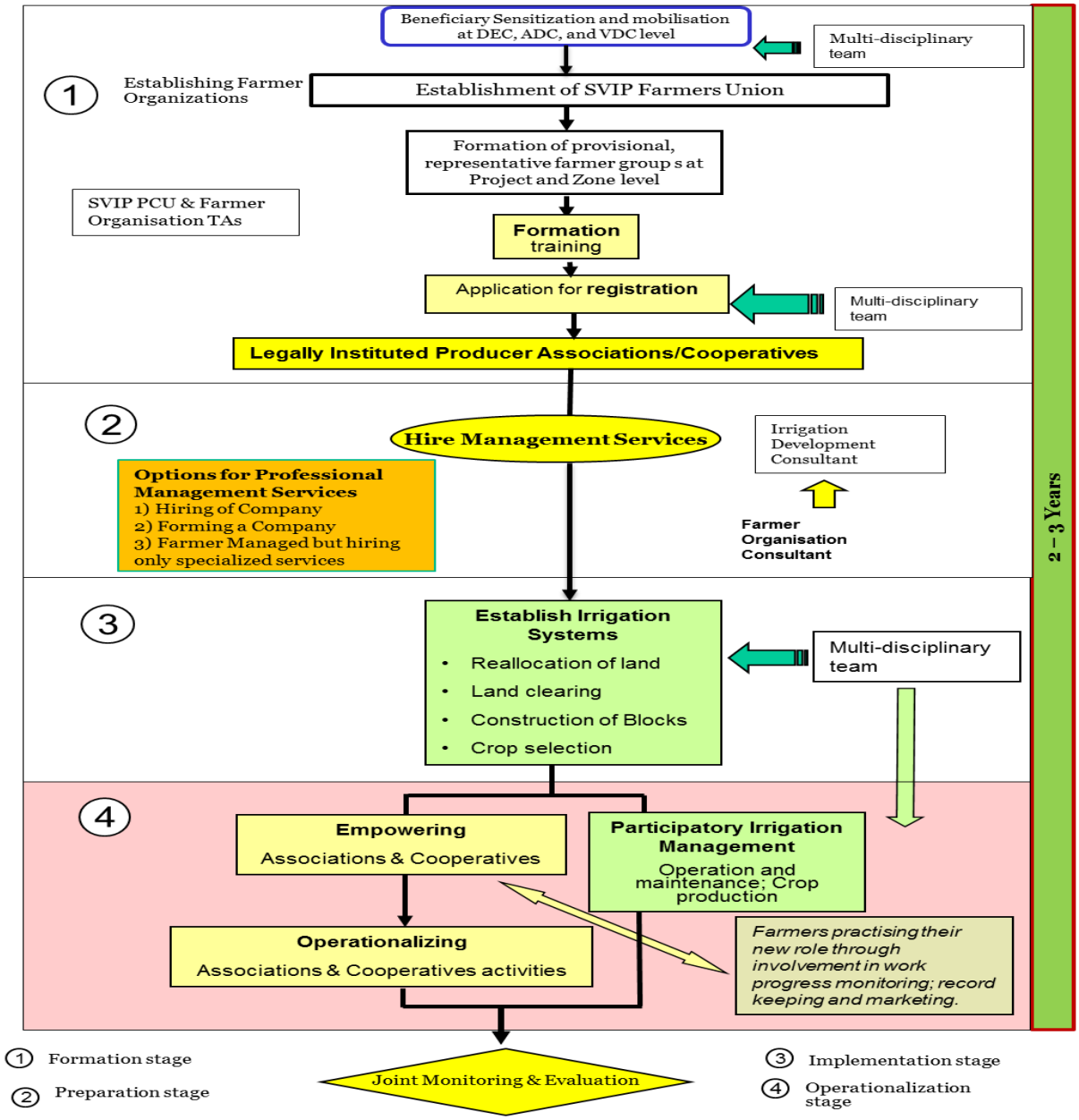



***Figure 7:2: Farmer organization development process***

The proposed institutional set up for sustainable development of the farmers' organizations are indicated in Figure 7.2. The figure also shows the hierarchy of these institutions based on the services that would be provided and as discussed in previous sections.

The activities to be carried out under this activity would include:

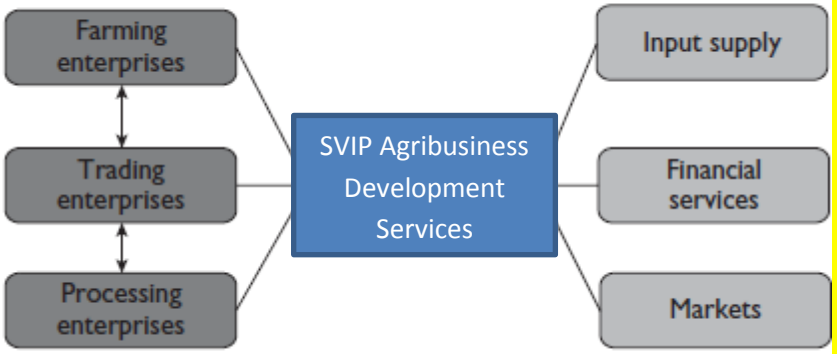
- formation of an interim committee;
- community decisions on participation;
- preparation of a land use plan;
- discussion and agreement on land consolidation methods, including means of conflict resolution;
- actual demarcation and consolidation; and,
- formal land tenure arrangements to be adopted.

It is envisaged that this process will take about two years, supported by specialist service providers. The service providers would each provide a Technical and Sociological team, working in close collaboration with a Public Support Team with officers drawn from each of the following offices: the District Agricultural Development Office (DADO); District Lands Officer (DLO); the Ministry of Agriculture, Irrigation and Water Development (Irrigation Engineer, Extension Officers, Crops Officer and Agribusiness); Ministry of Industry and Trade (Cooperative Development Officer); and, the Ministry of Lands.

At the conclusion of this process, the Farm Cooperative/Company/Association or Trust would be formed, with proper registration and ownership of the land tenure for the farm area.

## 7.5. Strategy for agro-industry development

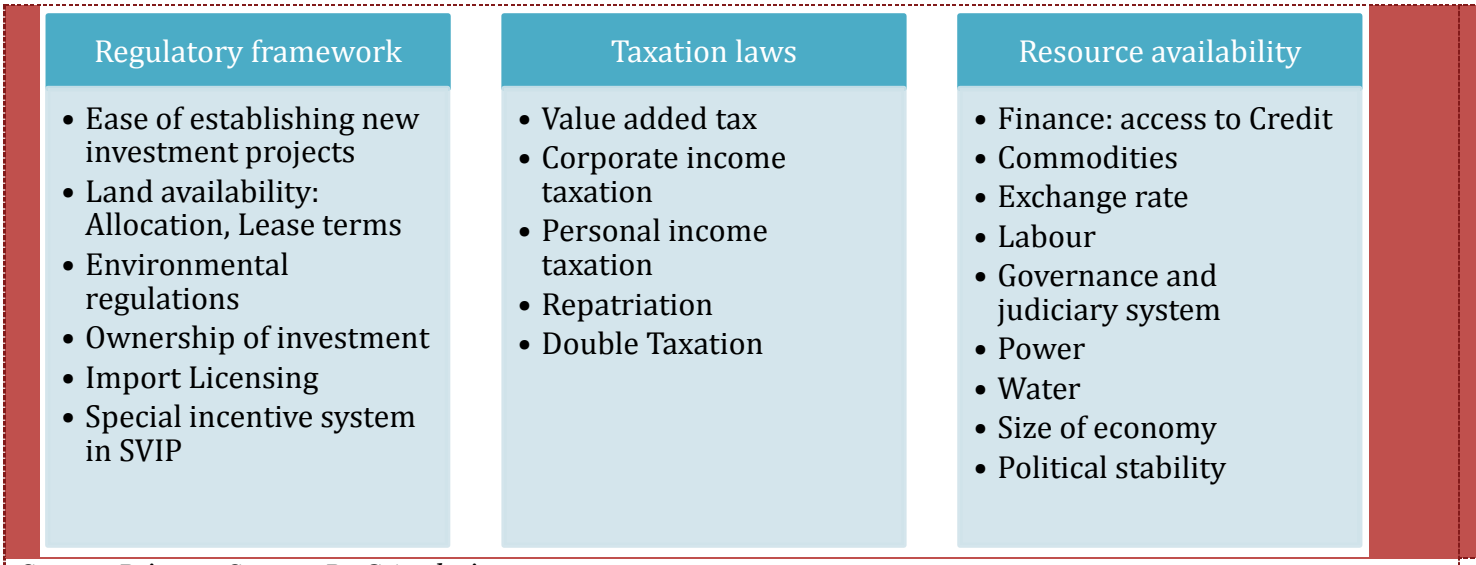
Thus, the SVIP presents many agribusiness value-chain opportunities which are captured in Figure 7.4, including, but not limited to-input supply, farm production, assembly, processing, financial services, trading, markets, support services, logistics and distribution.




**Source:** Adapted from Wilk and Fensterseifer 2003; Roduner 2007

***Figure 7:3: Roles of SVIP agribusiness development services in relation to actors in the agricultural product chain and to support services***

Appendix E shows that Malawi is ranked at 141 out of 189 countries on the ease of doing business. In discussions with potential investors the key issues of concern raised can be presented under three broad categories, namely: the regulatory framework; taxation policies; and, resources. The details of each parameter are described in Figure 7.4.




*Source: Primary Survey, PwC Analysis*

***Figure 7:4: Key parameters defining the attractiveness of an investment destination***

**Regulatory framework**

- Ease of establishing new investment projects
  - For establishing new investment projects what is/are-
    - Number and details of procedures for getting approval?
    - Average time taken to complete a process?
    - Total cost of completing process? How is it compared to other African countries?
    - Efficiency of single window, if any?
    - Assistance mechanism in case of any difficulty?
    - What is the enterprise law of country?

- Land availability
  - How the government of Malawi would allocate the land?
  - What would be the lease terms?
  - How fast can they allot the land?

- Environmental regulations
  - Is the environmental regulation too strict?
  - Pollution control certificate

- Ownership of investment
  - Does it allow 100 percent Foreign Holdings / Participation?

- Import licensing
  - Is there any requirement of license for import of commodities?

- Special Incentives in SVIP
  - What are special incentives/exemption provided for the projects in SVIP area?

**Taxation**

Taxation structure, Administrative process and Fiscal incentives - emerged as key area of interest for the potential investors for the investment in SVIP in Malawi.

- Value added tax:
  - Are all agricultural commodities VAT exempted?
  - If not, what is the applicable rates commodity wise?

- Corporate income taxation
  - Approach for determining taxable income?
  - Does it allow companies to deduct the standard business-related expenses, including depreciation of fixed assets, research and development (R &D) costs, training, advertisement and marketing costs?
  - Any provision for full exemption on corporate income tax for the first few years of operations?
  - *Exemption (Zero) or reduced rate for corporate tax for income from exports of horticultural production and processed and raw agricultural production or for income from production using local agricultural raw materials as their main inputs. Or Exemption from corporate income tax for the first 10 years; after 10 years, a reduced tax rate of 25 percent rather than the ordinary 30 percent. This exemption should come in effect either from start or even before start of operations*

- Personal income taxation
  - Is there any provision in favour of foreigners?
  - This is important from the point of view of cost of hiring high-earning skilled workers, particularly internationally mobile individuals.

- Repatriation
  - What are the conditions or restrictions on-
  - Repatriation of dividends or net profit?
  - Payments for foreign loan servicing
  - Payments of fees and charges for technology transfer agreements and
  - Remittance of proceeds from sale of any interest of the strategic Investment.

  - Is full repatriation allowed?

- Double Taxation
  - Is there relief from double taxation?

**Resources**

- Finance:
  - Access to Credit to SME
  - Any concessional rate of interest for the proposed investment in SVIP?

- Commodities:
  - Availability and secured supply of agricultural commodities in the project area/ nearby area?

- Exchange rate:
  - How strong or weak is the exchange rate?
  - Volatility of exchange rate?

- Labour
    - Competitive advantage of labour cost in Malawi?
    - Availability of labour?
    - Is there any union/ regulation on labour?

- Governance / Law and order
    - What is the level of corruption?

- Transport and infrastructure
    - What are the transport costs and levels of infrastructure in SVIP area in Malawi?
    - Availability of port, airport and related issues.

- Power
    - Availability and quality of power for agricultural and industrial unit?
    - Any concession on power tariff in SVIP?
    - Cost competitiveness of power supply?
- Water:
    - Free or at concessional rates from Shire River

- Size of economy
    - The size of the population and scope for economic growth in Malawi?
    - Middle class demand for the processed food in Malawi and neighbouring countries?

- Political stability
    - What are the elements of country risks?
    - Status of Malawi on political and economic stability?

Over the last fifteen years, many multi-national companies in the food sector have invested in emerging markets to broaden their reach for sources of ingredients and raw materials. Their motivations have ranged from purely economic/financial to diversification (supply/price risk management) and (at the other end of the spectrum) altruism: the latter being motivated by either corporate values, investor expectations and/or the hope of Public Relations (PR) benefits.

The level of commercial interest for International Food Companies to invest in Malawi for agricultural materials that are exclusively for sale within the country is considered to be small to consume all the produce from the lower Shire Valley due to: the small size of the Malawian market; lack of local market/cultural expertise; poor or absence of local infra-structure; and the rather low spending power of consumers and hence the likely low margins to be realised.

The maturity of the Malawian agricultural base is also such that any pro-active interest for export would need to complement existing sources and be part of a longer term strategic solution to an investors' needs. Other interests would be opportunistic: either for savings or to deal with near term supply continuity problems.

The key point of focus, therefore, should be "factors that would motivate interest in investing in Malawian agriculture for benefits that would only be realised a few years into the future". This raises two questions, namely:

1. Why would an investor be interested in dedicating time and resources into new/ alternative geographic sources of agricultural ingredients?
2. Why would they choose Malawi?

It is important to consider both of these points: the first will allow SVIP project sponsors to understand which organisations to approach and to do this in the knowledge of what their motivations may be.

Commercial enterprises often segment their interests in a Kraljic matrix as illustrated in Figure 7.6.

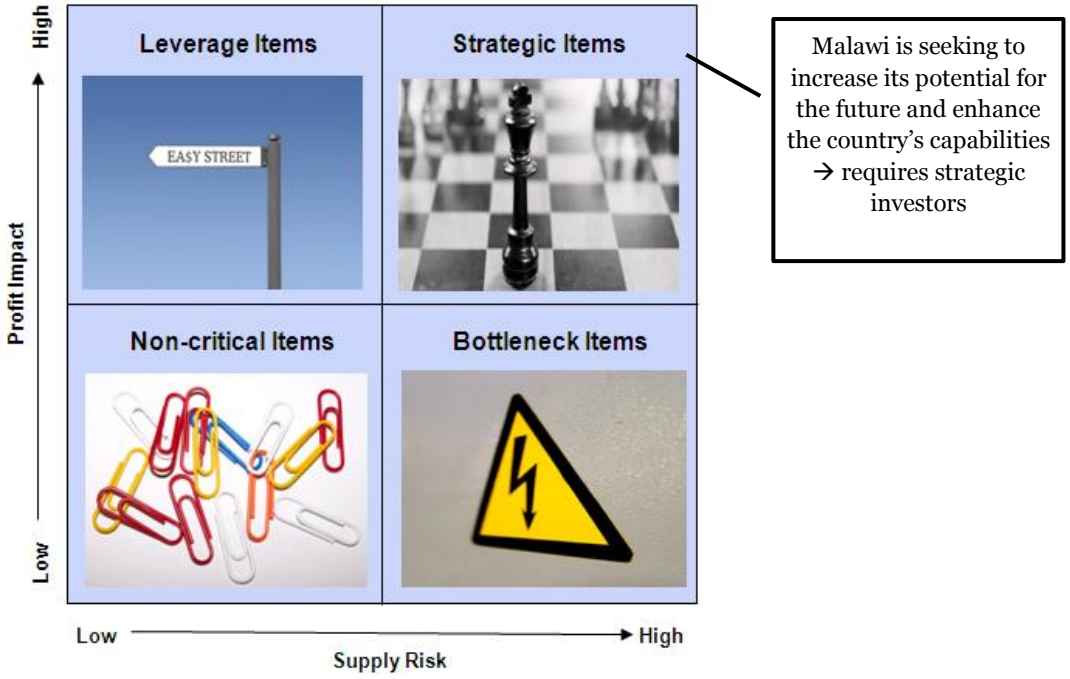



***Figure 7:5: Kraljic matrix***

When seeking strategic investors/partners, therefore, their activities should be reviewed to gain an understanding of what falls into their strategic quadrant: it is in this area where it is likely that they will have an interest – although this may be "dormant" and could need prompting.

The second point will allow the narrative behind the attractiveness of the SVIP to be positioned in a way that best resonates with potential partners and investors.

The real benefits will be into the future, so the point about an investor needing a reason to believe that they will realise the benefits needs always to be borne in mind. Many of the factors in the PESTLE review relate to this. To help assuage the time off-set between investment and benefits, it is worth considering any "Quick Wins" that an investor could expect alongside building up the reason to believe that they should choose to invest in the SVIP project area or, Malawi as a whole.

### Quick wins

These are important to early motivation and the togetherness of the team as well as to the overall benefits equation. In reality, confidence will need to be built and further investments will be encouraged through progressive successes. Some questions to consider:

- How is Malawi seen on the world stage? Which stakeholders and stakeholder customers would be impressed to see an investor directing resources to Malawi?
- Can the investments generate positive PR?
- Can the investment attract fund managers that previously were not interested?

- Are there any negative PR risks by being associated with Malawi or in favouring Malawi?
- Are there any grants that an investor could access, programmes to join or groups to partner with?
- Are there any ingredients that Malawi exports that could be offered to investors on special terms that can be a stand-alone Win – Win for both sides?
- Are there any relationship or association benefits (tangible or otherwise) that can be attained by an investor being part of a coordinated project team?

**Why would an investor choose Malawi?**

The aforementioned "quick wins" should be considered as tactical "lures" to get the attention of investors and as a means of sustaining interest in longer term more strategic investments. As well as these tactical benefits, Malawi will need a very strong narrative and marketing strategy to draw in the necessary infrastructure and capability enhancing investments.

Strategic investments and the raising of the reputation of Malawi as a high quality, economic and dependable source of agricultural ingredients should have a positive impact on all buyers. A high-level analysis of Threats-Opportunities-Weaknesses-Strength identifies some key considerations and highlights some action that need to be taken (see summary below).

One of the most successful ways to unlock these opportunities and stimulate growth in agriculture and agribusiness is by creating an enabling investment climate for agricultural entrepreneurs and by creating increased access to the critical knowledge and factors of production needed to achieve higher levels of productivity. From experience gathered elsewhere in developing countries, for potential markets to be developed elsewhere in the region and internationally there needs to be a significant local entrepreneurial company leading marketing operations with Malawi. The local companies need to establish links with those from abroad with the focus placed on identifying those companies/entities seeking produce from Malawi or those seeking to "support" those seeking product from Malawi.

Some of the reasons stated for seeking produce in foreign territories include:

- the search for cost plus pricing to either reduce costs or reduce exposure to market volatility;
- diversifying from traditional suppliers to reduce dependencies/increase buyer leverage;
- the search for supply continuity – this was a key strategic factor during the biofuels boom, especially for biofuel feedstock crops or those competing with these for land. Since the collapse of the oil price, the surge in shale gas in the US and softening of soft commodities, this consideration has become less intense;
- diversifying to balance out geographic supplies in response to increased weather variations linked to fears relating to climate change / weather driven volatility;
- to gain access to sources with preferential tariff rates into key countries/trading blocks;
- to demonstrate to lobbyist and conscience driven investors that the company is supporting diversity and helping third world countries; and
- the search for untainted land for crops with special low residue and/or organic requirements.

| Strengths and Opportunities related actions and ideas | Weaknesses and opportunities related actions and ideas |
|---|---|
| • Develop and market a vision of the future and underpin with milestone plan<br>• Gain NGO and NFP support to develop, invest in and market the plan to other potential investors: gov's and businesses<br>• Potential partners:<br>– HJ Heinz with Californian processors for tomatoes. Excellent agronomy teams with deep expertise in delivering programmes from low bases. Heinz has demand in South Africa, Egypt and APAC<br>– HJ Heinz and ADM/Cargill for soy oil and beans/bean meal: Heinz have a growing demand for soybeans/meal in Asia (China and Indo') but they would need a processing partner<br>– Could also consider other crops with Heinz: Chillies (Indonesia), Sugar, DMH and Pea Beans with some demand from comparable geographies<br>– Should also involve equipment, seed and chemical suppliers | • Leverage failure to feed the nation and the potential for surplus to gain prioritised investments in water distribution and local storage<br>• As above, to call on agronomical expertise to develop a strategic plan that includes raising capabilities<br>• Adopt international certification system and gain national credibility<br>• Link awarding of mining right to investments in infrastructure<br>• Carefully consider whether there are any benefits from seeking "sponsorship" from rich nations<br>• Strategic, integrated and multidimensional programme underwritten (e.g. by development partners); with strategic users benefiting from cost+ contracts, end to end low cost country sourcing and PR/Sustainability gains; and agricultural materials and equipment suppliers gaining new markets<br>• Leverage development partners open doors |
| **Strengths and Threats related actions and ideas** | **Weaknesses and Threats related actions and ideas** |
| • Use favoured nation status and low tariff benefit to gain short term support for sugar, soybeans and pulses<br>• Promote the longer term benefits of cost plus pricing linked to support that improves yields<br>• Establish strategic cooperatives with scale and with both financial and political backing | • Target development partner investments to improve areas that are lowering the ranking and target internal focus on same<br>• Internal Priority: gain credibility of contract enforcement and complexity of establishing businesses<br>• Call on the development partners to help with electricity projects and for access to credit |

Companies seeking to secure produce from Africa, for one or more of the above reasons, will also seek to leverage the impact of the resources that they provide by working with other parties. These partners will fall into two broad groups:

- value chain partners, seeking to unlock new markets and revenue streams; and
- financial partners: seeking either higher returns and accepting higher risk; seeking to balance their portfolios; to satisfy their declared mission statement or commitments to particular investors.

Consultations with key informants who have worked with large corporations have revealed that there are three levels of projects which can be identified, namely:

### *Level 1: Local processing companies*

Where a company has local processing facilities and but needs to develop the local agriculture base to support this. This was observed in a number of countries for example in: Hungary (tomatoes, fruits, vegetables and corn); Poland (tomatoes, peas and corn); Egypt (tomatoes), New Zealand (tomatoes); California (tomatoes); China (tomatoes, dry beans, soybeans and rice); Indonesia (chillies and palm sugar); India (milk); Russia (tomatoes); and. Brazil (tomatoes and vegetables).

*Level 2: New companies expanding into new geographical locations*

To initiate the growing of a key ingredients in a geography with little or no experience of the crop but with the right agro-climate and perceived cost/quality advantages: Examples where cited in such countries as the Ukraine (beans, tomatoes and potatoes); Ethiopia (dry beans); and, China (dry beans and chillies).

*Level 3: New companies expanding as part of coordinated international effort*

As part of a coordinated international effort to develop / regenerate the agriculture of a region. For example in Egypt (tomatoes) and China (tomatoes).

With these examples in-mind the search for potential investors would focus on identifying specific enterprises that could offer the following benefits:

- those that offer a market for the produce to take away the uncertainty of downstream demand;

- those that can provide expertise to:
    - select the right land and assess capabilities;
    - assess and select partners;
    - train, coach and develop personnel and systems; and,
    - set the right standards to ensure quality and maximise crop yield and robustness levels.

- those that can offer various services such as:
    - agricultural equipment suppliers;
    - seed, chemical and testing equipment suppliers;
    - processing machinery manufacturers;
    - assessment groups and laboratories; and,

- those that can provide overall project management, leadership and staff development.

To accelerate interest and commitments towards Malawi, top-to-top meetings between the SVIP project management team and potential investors should be seriously considered. It is advisable that such discussions are aligned with the marketing efforts currently being coordinated by the Malawi Investment and Trade Centre and the Green Belt Initiative. Ahead of this, the narrative behind Malawi and a framework milestone plan should be established and the team should approach things as a marketing exercise and seek to make partners want to be part of the programme for developing the lower Shire Valley.

Table 7.4 presents a summary of commodities that can be produced in the lower Shire Valley which are currently in demand by various agro-processing enterprises operating in Malawi. This information shows that there is potential market for a number of commodities that can be exploited as project implementation commences. Clearly, this situation will need to be monitored continuously to ensure that the enterprises that are eventually selected for inclusion in the cropping programme are viable from the farmers' perspective to ensure the sustainability of irrigation activities.

*Table 7-4: Local firms expressing interest in the lower Shire Valley project area*

| Institutions expressing interest | Commodity of interest | Comments |
|---|---|---|
| Auction Holdings Commodity Exchange (AHCE) | Various commodities with focus on ensuring delivery of products of consistent quality | AHCE currently involved in facilitating trading in various commodities. Quality standards lacking for most commodities and as a result exported commodities fetching low prices on international market e.g. pigeon peas in India. |
| | Black gram (Beans) | Last year demand estimated at 10,000MT |
| | Green gram (Beans) | Last year demand estimated at 10,000MT. |
| | Pigeon peas | Huge market in India with shortfall estimated at over 6 million MT |
| | Sesame | Demand estimated at 80,000MT last year |
| Cotton Ginners Africa Limited (CGAL); Cotton Council of Malawi | Cotton | Existing ginning capacity in Malawi estimated at 300,000 metric tonnes. Local production levels have been falling to between 17,000 and 100,000 metric tonnes. CGAL has a market share of 21.4% with a ginning capacity of 40,000 metric tonnes. Extensive network established to support contract farming arrangement. They intend to diversify and integrate their operations along the value chain to include oil extraction, soap making, spinning and weaving. |
| Crown Mangoes (subsidiary of Polypack) | Mangoes | They have established an orchard of 3,500 trees with the intention of extending this to 250ha. No plans at this stage for an outgrower scheme. Intend to develop a juice extraction plant in the SVIP area. |
| Illovo | Sugar cane (sugar) | Crushing capacity fully utilized at their mill. No immediate plans for expansion |
| Jequet farms | Red kidney beans | Secured a market for red kidney beans in Kenya and Uganda. Interested in securing 100ha for producing the crop in the SVIP area |
| Maldeco Fish Company | Cassava | Currently production is carried out on 28.4ha. Interested in securing 100ha in the SVIP area |
| Press Corporation | Various commodities that can be used as raw materials for the production of bio-energy products (sugar cane and maize) | Already involved in production of ethanol through PressCane operations. Also investigating the production of bio-diesel using maize as a raw material |

| | | |
|---|---|---|
| | Fruits and vegetables | Looking at investing in various fruits and vegetables as import substitutes |
| | Carrots and tomatoes | Working with Italian company to assess viability of processing carrots and tomatoes |
| Universal Industries | Potatoes (irish and sweet) | Have the capacity to process large quantities of both irish and sweet potatoes |

**Cassava**

Universal Industries (UI) requires at least 20,000MT per annum of cassava for processing into various value-added products such as cassava starch and dried cassava flour that it exports to Zimbabwe for beer brewing. Currently, Universal Industries can only procure 50 per cent of its needs despite establishing contract agreements with a number of smallholder farmers and supplying them with inputs.

The key issues that need to be addressed if cassava is to be commercialized include establishment of nurseries for improved planting material and increasing production to meet the needs of the industrial sector. Linkages need to be established between producers, processors and industries using mechanisms such as contract farming and supply contracts.

**Cotton**

Although there is currently excess ginning capacity in Malawi as a whole, more such facilities are being constructed. In addition, mini-ginneries are being installed across the major producing areas even though the long-term viability of such ventures is not yet proven. However, discussions with key players in the industry suggest that there is a perception that the long-term prospects are positive.

***Opportunities***

a) The Government of Malawi has granted conditional approval for trials to be conducted to determine the suitability of Bio-technology (Bt) cotton varieties to local conditions. It is envisaged that when these trials are concluded the local farmers will benefit from the lower input costs and the higher yields that have been reported on these varieties.

***Limitations***

a) Marketing issues, including policies of other countries in the region to accept Biotechnology cotton from Malawi.

**Fruits and vegetables**

Among the stakeholder representatives and other key informants consulted, Press Corporation Limited (PCL) has expressed commitment to grow fruits and vegetables in the Shire Valley, if the company can secure land for that purpose subject to availability of markets. PCL is contemplating establishing a processing factory in the country with financial assistance sourced from Italy.

PCL representatives have noted that the majority of supermarkets are importing fruits and vegetables from South Africa for sale in Malawi. South African produce is of relatively good quality, is clean and is generally well packaged and presented. What is important from the perspective of supermarkets, is that deliveries have to be made in accordance with an agreed contract stipulating the time schedule, quantity and quality parameters to be met.

There is a significant market opportunity for local produce to compete with South African imports if quality and reliability of supply can be improved. Farmers need to be organized into groups or associations and be sensitised on the importance of quality and post-harvest handling. Facilities such as packing sheds, potable water, knives and shredders (for prepared pre-packed vegetables), packaging materials and labels will be required to improve quality and add value to the local produce.

**Groundnuts**

The average production from 2002 to 2011 was 227,089MT and projections for 2014 and 2017 were 244,121 and 303,271MT respectively. During the same periods average national demand was 168,294MT and projections were 176,372 and 203,008MT (Bulletin of Tropical Legumes, 2013). These figures show that Malawi is producing more groundnuts than it can consume. On the surface this presents an opportunity to increase exports. Unfortunately, external markets for groundnuts grown in Malawi are currently limited because of the perception that the produce is tainted by high levels of aflatoxin contamination.

***Limitations***

Aflatoxin contamination remains a huge problem in the groundnut value chain in Malawi. For example, in 2007 NASFAM exported 25 containers of nuts (total 450 MT), but in 2008 only 4 containers (72 MT of the 280,000 tons produced) were exported to the EU market. Part of the reason for that reduced export volumes is the high incidence of aflatoxin contamination. This has been attributed to the long transit time (of one month) for the produce to reach the European market during which the ensuing fungal growth results in compromised quality.

Smallholder farmers lack the knowledge to prevent the aflatoxin contamination and do not have access to the equipment required for blanching and vacuum packaging of the nuts to extend shelf-life and maintain quality during transportation. Such equipment costs not less than US$ 140,000 and generally smallholder farmers are unable to finance such investments without external support.

NASFAM started promoting groundnuts in 2000 and they are working in close cooperation with ICRISAT to improve access to certified seed and resolve the aflatoxin problem. The Association has been training farmers to minimise the risk of aflatoxin contamination through good handling and storage practices. It has also introduced a traceability system to enable any quality problem to be traced directly back to the farmer. A number of technical innovations have also been introduced to improve nut quality; for example, mechanical shellers that shell nuts centrally instead of farmers shelling by hand, and a SOTEX plant that sorts nuts according to colour and size and rejects discoloured nuts, which are more likely to be contaminated by aflatoxin. NASFAM urge farmers to press discoloured nuts for oil extraction as aflatoxins do not enter the oil that minimizes losses. NASFAM has its own laboratory where it tests for aflatoxins before sending samples to SGS for third party verification.

Some of NASFAM's producer associations have been certified by Fair-Trade and part of the groundnuts are being sold on the European Fair Trade market. As a consequence groundnut production has increased substantially in the country. For example, available crop production data show that groundnuts yield increased from 141,000 MT in 2005 to 280,000 MT in 2010.

***Opportunities***

a) FAO crop statistics show that Malawi is placed at number 71 on the list of groundnut producers in the world. This huge production suggests the need to identify new markets. Both the local markets and those identified with the assistance of Fair Trade

are too small to absorb the country's total groundnut crop, and as such regional market opportunities will need to be identified for nuts, oil and groundnut paste.

b) NASFAM has already identified the EU market through Fair Trade and Malawi exports some of its groundnuts to this market.

### Other oil seeds

Sunseed Oil, a company involved in processing oilseeds have invested in purchasing equipment required to extract oil from sunflower, groundnuts and soya beans. Existing installed capacity is currently estimated at 180, 000 MT per year. Other companies such as Afrinut are also positioning themselves to expand their capacity to produce oil from groundnuts and soya beans.

However, the deficit of raw materials in the supply chain presents opportunities for farmers to produce more oil seeds even through the SVIP.

### *Summary of market opportunities in oil seeds subsector*

The sector can take advantage of the available opportunities on the domestic, regional and international markets. About, 70 percent of the oilseeds and oilseed products are being sold and consumed locally. For instance, out of 375,000 MT of oil seeds produced in Malawi in 2014/15, only 27,000 MT was exported and the rest was consumed locally. Existing unmet demand for oil seeds in Malawi is quite considerable and this situation offers opportunities to increase domestic production of soya beans, groundnuts and sunflower for the local market. For instance, out of 375,000 MT of oil seeds produced in Malawi in 2014/15, only 27,000 MT was exported and the rest was consumed locally. Existing unmet demand for oil seeds in Malawi is quite considerable and this situation offers opportunities to increase domestic production of soya beans, groundnuts and sunflower for the local market.

***a) Sunflower:***

- *The demand is between 30, 000 to 40, 000 MT annually.*
- *Production currently stands at 11, 000 MT annually.*
- *Domestic production of sunflower accounts for only 20-25% of local demand/consumption estimated at 38,000 MT*

***b) Soya:***

- *Local demand increased by over 40% between 2002 and 2013.*
- *Over 6% of this demand is mostly met by imports between 2010 and 2013.*

***c) Groundnuts***

- *National demand for groundnuts is estimated at more than 60% of national production since 2002.*
- *With over 38% of local demand being met by imports between 2010 and 2013.*

Malawi's imports is above 50 percent. Oilseeds are one of the potential and priority crops for Malawi that require scaling up in terms of production and processing. Malawi already has an opportunity to increase production to substitute imports of higher value oil seed products. Moreover, the local market demand for cooking oil and soaps cannot be covered by the country's own production. Thus, opportunities to increase domestic production of higher value products from soya beans, groundnuts and sunflower for the local market also exist. Soya beans are specifically used in the processing of nutritious porridge flour for children and pregnant and lactating women (e.g. Likuni Phala, Super Cereals and Nutri Phala) for the local and regional markets (Zimbabwe and Kenya).

At the moment, Malawi cannot meet the demand for these commodities for the Asian market.

**Orange flesh sweet potatoes**

UI has commenced work with the International Potato Centre (CIP) to contract smallholder farmers to produce Orange Flesh Sweet Potatoes (OFSP) in Chikwawa and Nsanje (in the Shire Valley) at small scale because the current supply from farmers is far too low and it comes with mixed grades.

***Limitations***

a) Potato varieties currently grown in Malawi generally give low yields and are of poor quality, even with the application of fertilizer, due to poor varieties and diseased seed. Yield averages 10 MT/Ha while good quality seed can yield 20-30 MT/Ha. Poor quality seed produces potatoes with a shorter storage life which is prone to rots and other infections during storage. As a result, potatoes are being imported from South Africa to meet the demand for quality potatoes by industrial processors and the catering sector.

b) For potatoes the major constraint in the Shire Valley are the very high temperatures that are not suitable for growth.

c) Research has lagged behind regarding storage of huge quantities of potatoes to reduce wilting and weevil infestation. Traditional storage methods of keeping tubers on the floor inside houses or in a pit with ash have resulted in a short storage life and poor quality planting material. CIP started promoting a Low-cost Diffuse Light Potato Storage System in 2007 and the results so far have been promising, with a number of farmers reporting an increase in storage period from two to three months for the traditional method to up to eight months using the new store. The quality of the seed potato is also improved and results in higher productivity. However, CIP is yet to train more farmers in potato storage and plans for the establishment of a tissue culture laboratory and seed quality control laboratory.

**Potatoes**

Potatoes are considered a high-value crop with growing national and regional demand for use in the production of potato crisps and French fries in the restaurant and hotel sector. The International Potato Centre (CIP) started a potato improvement programme in Southern Africa in 2006, covering Malawi, Zambia, Mozambique and Angola that has resulted in the increase in area under production and yields. Despite these increases, production remains below demand. For example, Universal Industries needs 20,000MT of potatoes per annum for its potato crisps business but can hardly get these quantities from smallholder farmers, hence has embarked on a programme to establishment its own farms to supplement production other suppliers.

**Rice**

Mtalimanja Holdings Limited (MHL), is a privately owned company which has recently invested US$17.5 million to finance the construction of a rice processing factory in Nkhotakota. MHL also owns a 70ha irrigation scheme located close to the processing plant. The plant has a capacity to process 200MT per day and to meet this requirement they are working with 7,000 farmers. The company indicated that including rice in the SVIP will be beneficial even to the company as it is ready to buy from the farmers in the Shire Valley.

**Sorghum**

Sorghum is mostly suitable for food, brewing beer and animal feed. The current sorghum grain production for brewing stands at 200 metric tons against a demand of 800 metric tons.

**Soya beans**

It was estimated that in 2012 national production was 65,270 MT compared to a national demand of 111,000 MT and demand in 2015 was projected at 139,000 MT (Bulletin of Tropical Legumes, 2013). Area under production in the major producing areas of Kasungu, Lilongwe and Mzuzu, is not likely to increase due to land pressure. Therefore growing the crop on a large scale under irrigation in the Shire Valley can go a long way in meeting local demand and for export. According to MoAIWD (2012) the national objective is to encourage the growing and utilization of the crop, and increase yield in order to meet prevailing high demand locally and for export.

**Sugar cane**

PressCane is working with farmers in the project area to facilitate the development of an area covering 2,270 on which sugar cane will be grown to supply a bio-fuel processing plant. The company has already developed the processing plant which is currently operating at 50 percent capacity to produce 60,000 litres of ethanol using molasses bought from the Illovo factory at Nchalo.

The company envisages that the government will increase proportion of blend in diesel to 25 percent; remove taxes on Ethanol Driven Cars in order to create a conducive environment for the growth of their market. It further intends to invest in Zero Liquid Discharge Machine to evaporate effluent into powder or pellets to be used as fertilizer in the fields.

***Opportunities***

a) Illovo is already on the ground with expertise on sugarcane processing and sugar marketing. As a result Malawi supplies sugar to the local, regional and international markets indicating that there is effective demand for the commodity and that the country can meet all the standards set by the consumer in the target markets.
b) PressCane is processing ethanol from sugarcane molasses
c) Press Corporation Ltd (PCL) has expressed a desire to develop large portions of the SVIP project area for the production of sugar cane and other crops. PCL has developed long-term plans to construct new factories to facilitate the processing of sugar cane.

***Limitations***

a) The Illovo factory at Nchalo is close to meeting its existing crushing capacity and therefore may not be able to process additional sugar cane until additional investment is made to expand the capacity of the existing mill.
b) There is increasing competition on the local regional and international markets. For example, it is reported that sugar imports from Brazil are arriving in Malawi in increasing quantities and are being sold at a lower price (US$0.12 per 1 kg packet) due to low production costs. The sugarcane crop in Brazil is grown under rain-fed conditions on soils which are more fertile than the local crop.
c) EU protocol on sugar products expires in 2017 and there is a draft policy advocating manufacturing and consumption of beet root sugar in the region.
d) The sugar industry is not adequately regulated in Malawi and this affects operations. The Sugarcane Act Bill has been drafted and is ready for deliberation by Malawi Parliament.

### Wheat

In 2012 it was reported that wheat production in Malawi is only 5 percent of the total wheat requirement of 100,000 MT per annum. Table 7.5 shows that over the years the country has been importing wheat mainly in the form of flour for domestic use and this has resulted in weakening the trade balance for the country especially in the light of weakening tobacco prices.

***Table 7-5: Value of wheat imports into Malawi***

| Exporters | Value of wheat imported Malawi ('000 US$) | | | | |
|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 | 2014 |
| World | 81,055 | 82,112 | 31,693 | 87,351 | 84,035 |
| Russian Federation | 8,566 | 3,425 | 8,373 | 22,222 | 26,341 |
| Switzerland | 15,147 | 15,867 | 2,805 | 16,005 | 23,199 |
| Canada | 6,911 | - | - | 8,906 | 19,059 |
| Australia | 18,632 | 13,620 | 7,761 | 26,893 | 12,471 |
| Germany | 6,658 | 2,516 | - | 4,110 | 748 |
| Tanzania, United Republic | 1,007 | - | - | 39 | 19 |
| United States of America | 7,808 | 40,750 | 12,752 | 5,219 | - |

**Source: FAO and NSO**

One way of reducing the demand for wheat flour on the domestic market is to promote use of substitutes for the commodity and also to promote domestic production of the crop. The country can significantly benefit from the crop if production can be intensified and improved varieties are promoted. However, wheat grown in hot low lying areas like the Shire Valley is of low quality and yield. According to the Ministry of Agriculture and Food Security (2012), the national strategy is to promote wheat production under irrigation and residual moisture in the high altitude areas. There should be research on growing wheat between May and September in the Shire Valley. It is possible that the new varieties can yield better than those tested during the 1970s.

## 7.6. Policy issues that need to be addressed

Agricultural productivity, growth, and competitiveness in Malawi in general and the SVIP in particular, are the products of Malawi's physical environmental, technology, policy, and micro- and macroeconomic factors. The external factors such as world prices of inputs and outputs, and trade policies of trading partners also play a part.

The analysis of macro and micro economic policies identified a few challenges that need to be addressed for the full potential of the SVIP area to be realised. The analysis focussed on how GoM adopted and implemented policies to govern the economy as a whole (macro-economic policy), or those governing a particular economic sector (sector policies), in order to guide and modify the behaviour and decisions of agents operating in the economy. The GoM influenced the economy by creating policies which regulate, incentivize/disincentivize or inform economic agents.

The key observations made are:

- the exchange rate misalignment in place until 2012 and the inefficiencies in the value chain created additional disincentives of -29 percent on average between 2005 and 2013;
- disincentives in the agricultural sector are mainly the result of poor price transmission between domestic and international owing to inadequate infrastructure and lack of negotiation capacities of producers; and,

- the implementation of trade and markets policies to contain domestic prices also depressed producer prices in some years.

**Reforming output markets and trade policies**

With rapid population growth, demand for food will increase and will have to be met through market transactions. With favorable policies, Malawi's markets for food staples can grow in several ways. One is through increasing the competitiveness of the farmers so that they can compete better against food imports and capture bigger shares of their growing domestic and regional markets, especially for maize and rice. Key policy reforms GoM may pursue to expand trade include agro-processing investment policies, expansion of interregional trade, and price stabilization.

**Agro-processing and value addition**

Processing and value-addition will be needed to transform several of the crops produced into a wider range of products for which there is relatively high demand (e.g., processed cereals, processed foods targeted to growing local food markets, and livestock feed) in local, regional, and international markets. In terms of output, a significant share of Malawi's agricultural output is made up of bulky, perishable crops that are non-tradable in unprocessed form.

New policies are required to allow Malawi to create value from these staple crops, especially through value-added processing. Some of the policy interventions needed include investment in infrastructure (e.g., roads, electricity, communications, and water) to support rural processing zones in SVIP area. In general, these investments though huge, open up opportunities for public-private partnerships given the severe constraints on public-sector resources and capacity.

The GoM should intervene in the financing for businesses and reduce tariffs on processing equipment to promote agribusiness development. This should be accompanied by policies that support entrepreneurship, high-quality products, grades and standards, and certification of farmers are also important in promoting agricultural marketing on the continent. This is against the backdrop that the lack of finance is recognized widely as a perennial constraint to agribusinesses development. Formal lending to agriculture is limited severely by agriculture's seasonality and high risk, and banks are reluctant to deal with agriculture.

**Promotion of intra-regional and cross-border trade**

GoM should aim towards a more open intra-regional trade in view of Malawi's land-lockedness/land-linkedness to take advantage of differences in comparative advantages, achieve greater economies of scale in marketing, and help to stabilize food supplies in the face of adverse weather events at country levels, and act as a vent for surpluses. Intraregional trade can help to reduce the thinness of domestic markets and the likelihood of price collapse from increased agricultural productivity in the absence of wider markets.

Increasing the production of price-inelastic food crops in thin domestic markets, in the absence of regional trade outlets due primarily to high tariff and non-tariff barriers, ostensibly results in the reduction of producer prices for farmers.

**Price stabilization**

The GoM should ensure that the National Food Reserve Agency (NFRA) is fully funded to operate in earnest as strategic grain reserve in order to stabilize domestic grain prices. Liberalized markets have exposed many small farmers to significant price risks that can deter technology adoption and development of markets and agricultural lending. Surplus food

producers are discouraged from intensifying production if they fear that increased output could lead to price collapse at harvest time, robbing them of any gains from productivity enhancement and possibly making them worse off overall. Inter-seasonal price troughs in years of particular abundance are the main concerns. Surplus producers generally have the resources to be able to hold back at least a proportion of their harvest and avoid the worst effects of normal intra-seasonal price falls immediately after harvest.

**Market information and intelligence system**

The GoM should develop a sound and robust market information system for the SVIP area. Price information is necessary to:

- Reinforce the spatial and temporal arbitrage capacity of producers and strengthen their bargaining power with potential buyers;
- Support producers decisions concerning investments, marketing opportunities or storage decisions;
- Systematically monitor and analyse the effects of market and price policies, contributing to the implementation of adequate price and market interventions that consider the effects on both consumers and producers as well as on export competitiveness.

The GoM should set up or improve market intelligence systems for the SVIP area. This may include the establishment of a central repository, which will cover all markets (domestic, regional and international). An appropriate agency should be identified to host the repository, and it will be charged with compiling, regularly updating and passing on up-to-the-minute market information and intelligence to agribusiness players.

**Other complimentary measures**

The GoM should encourage the emergence of competitive marketing systems through infrastructural investments, effective regulation, and providing incentives for marketing agents to serve the SVIP area.

### *Invest in infrastructure development*

The creation of a flourishing agribusiness sector will not be possible without investment in key infrastructural facilities such as roads, railways, energy, communication and physical market areas. Upgraded facilities will reduce the transaction costs of doing business. Clear criteria for prioritisation of infrastructure projects will be developed to form the basis for all investment in infrastructure. The GOM should act on three levels to attract such investment. First, the GoM should encourage public-private partnerships where they are viable, and the government itself will invest in those projects where the consumer cannot - at the outset - pay. Second, the GoM should issue concessions and other tax relief to spur greater investment such as infrastructure bonds to raise funds for heavy investments, e.g. roads, electricity. Third, the GoM should make more financial resources available for infrastructure development, specifically the following:

- strengthening of the agro-machinery sub-sector;
- upgrading of rural access roads;
- improved agricultural water management to include expanded irrigation infrastructure;
- access to affordable fuel energy and other renewable energy;

- establishment of accessible and modern physical agri-food markets, especially in urban areas;
- establishment of adequate storage and collection (e.g. pre-cooling) facilities in production areas; and
- establishment of a National Single Window.

The GoM should establish a “one-stop shop” mechanism for business development services, in which any number of services (technological, business development, financial, and input supply, for example) are offered in a central location. These services centers can have additional objectives of learning and training and are mostly run through public-private partnerships. These might include agribusiness centers, agribusiness incubators, and local economic development agencies, all of which could be designed to provide integrated SVIP development services for small-scale entrepreneurs and smallholder farmers. The specific services could include starting and registering a business, farm business planning, access to finance, training, and technical advice.

The GoM should ensure predictable and stable macroeconomic policies that enhance private sector competitiveness and encourage investment.

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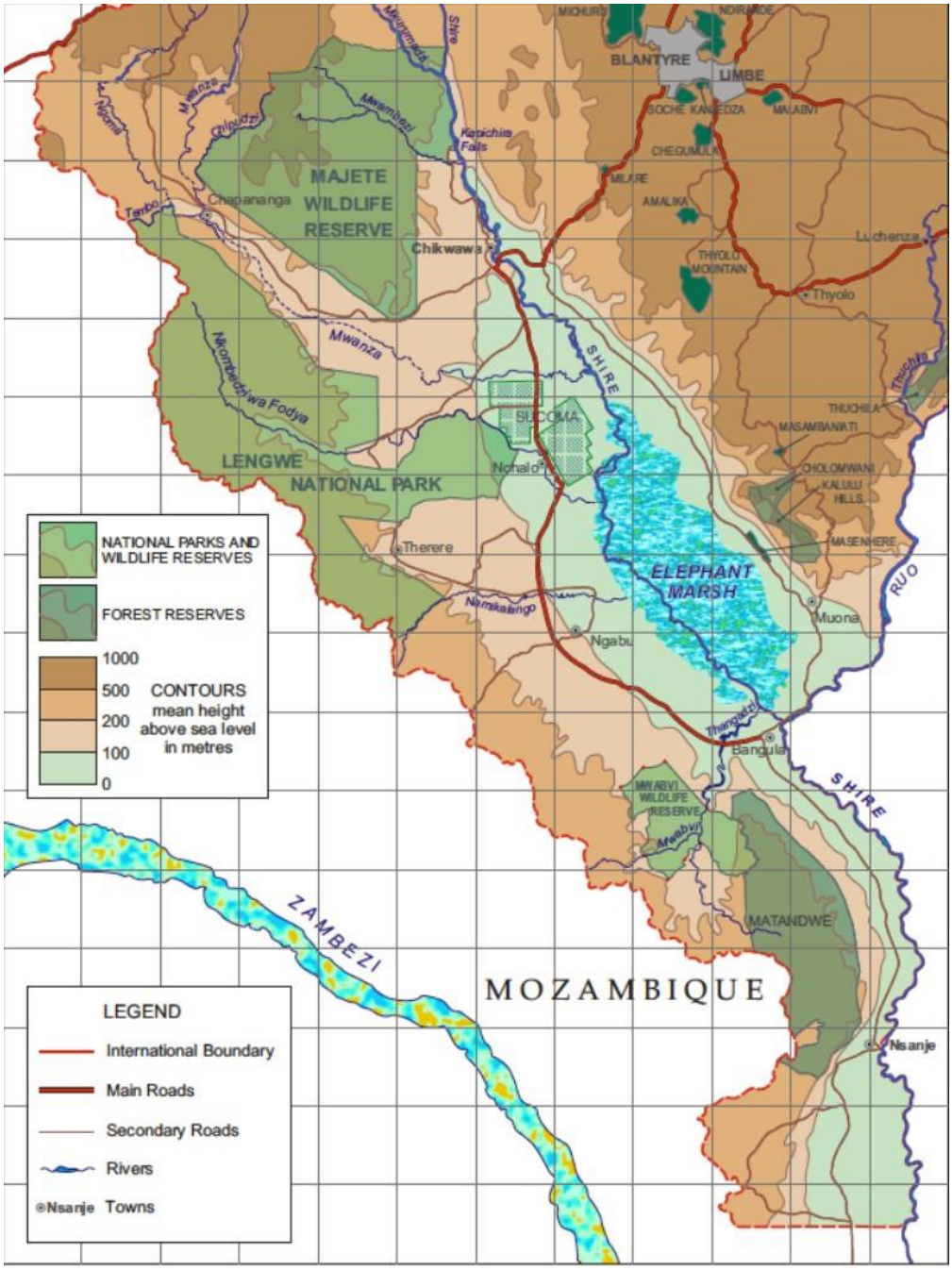
## APPENDIX B: MAP OF PROJECT AREA



## APPENDIX C: OVERALL AGRICULTURAL DEVELOPMENT STRATEGY COMPONENTS

| Objective 1: | Strategy | Responsibility | Time frame |
|---|---|---|---|
| 1. Establishing a mechanism for coordinating service provision in the SVIP | 1.1. Establish the SVISU | DoI | Year 1 |
| | 1.2. Community mobilization and formation of farmer organizational structures. | SVISU | Year 1 |
| | 1.3. Capacity building service provision of farm level institutions of the SVIP through service contracts. | SVISU | Year 1 |
| | 1.4. Supporting the farm level institutions put in place and develop appropriate governance and business management systems to effectively run their agricultural enterprises. | SVISU | Year 1 |
| | 1.5. Facilitating and coordinating contract farming arrangements between farmer organization and agribusiness companies | SVISU | Year 1 – 2 |
| | 1.6. Linking the farm level institutions with the various Government and other service providing institutions. | SVISU | |
| | 1.7. Facilitating contracts for the development of irrigation systems in the SVIP | SVISU | Year 1-2 |
| 2. Establishing alternative demand driven private sector led/financed technical service<br><br>3. Delivery systems | 3.1. Provision of research services | | Year 1 – 3 |
| | 3.1.1. Rehabilitation of Kasinthula Research station | SVISU and DARS | Year 1 – 3 |
| | 3.1.2. Strengthening the resource base of Kasinthula Research Station through a grant that will support improvement of human resources as well as initial establishment of research and development programme for SVIP. | SVISU and DARS | Year 3 |
| | 3.1.3. Facilitating transformation of Kasinthula Research Station to a private research Trust or Foundation | SVISU and DAR | Year 2-3 |
| | 3.1.4. Establish a fund based on levies from the SVIP agricultural enterprises that will finance and sustain research services of Kasinthula as a private research institution | SVISU and DARS | Year 1 – 3 |
| | 3.1.5. Commercialisation of some of the services of Kasinthula research institution | SVISU and farm level institution | Year 3 – 4 |
| | 3.2. Provision of technical and extension services | SVISU and farm level institution | Year 1 – 5 |

| Objective 1: | Strategy | Responsibility | Time frame |
|---|---|---|---|
| | 3.2.1. Identification of technical and extension needs for farmers in the SVIP | SVISU and farm level institutions | Year 1 – 5 |
| | 3.2.2. Mapping and developing profiles of potential technical and extension services providers. | SVISU and farm level institutions | Year 1 – 5 |
| | 3.2.3. Facilitating provision of initial services which are beyond the means of farmer organisations using subsidies from the Government and development partners - irrigation designs and development of irrigation systems. | SVISU and farm level institutions | Year 1 – 5 |
| | 3.2.4. Facilitating negotiations for contract farming arrangements with agribusiness companies | SVISU and farm level institutions | Year 1 - 5 |
| | 3.2.5. Capacity building and development of extension messages for farm level institutions involved in provision of technical and extension services. | SVISU and farm level institutions | Years 2 -5 |
| | 3.2.6. Implementation of outsourced technical and extension services | SVISU and farm level institutions | Year 3 – 5 |
| | 3.3. Provision of accounting, finance and management advice | | |
| | 3.3.1. Establishing and maintaining a biometric based database for members of farmer organization | SVISU and farm level institutions | Year 1 |
| | 3.3.2. Developing and maintaining a system for recoding financial transactions | SVISU and farm level institutions | Year 2 |
| | 3.3.3. Production of financial and audit reports | SVISU and farm level institutions | Year 2 – 5 |
| | 3.3.4. Provision of storage and warehousing services | | |
| | 3.3.5. Construction of warehouses and installation of cold rooms | SVISU and farm level institutions | Year 3 – 4 |
| | 3.3.6. Developing systems for operation and maintenance of storage warehouses and cold rooms | SVISU and farm level institutions | Year 5 |
| | 3.4. Provision of services related to land acquisition, leasing and development | | |
| | 3.4.1. Facilitate the process of aggregation of land into blocks | SVISU and farm level institutions | Year 1 – 2 |
| | 3.4.2. Processing and maintenance of land lease | SVISU and farm level institutions | Year 3 – 5 |
| | 3.4.3. Provision of credit and input supply services | | |

| Objective 1: | Strategy | Responsibility | Time frame |
|---|---|---|---|
| | 3.4.4. Negotiation for advance payments for goods and services (farm inputs, service contracts and any other costs) by the agribusiness companies for costs to be recovered from sales of produce | SVISU and farm level institutions | Year 2 – 5 |
| | 3.4.5. Negotiations for forward contracts with companies such as AHCX | SVISU and farm level institutions | Year 5 |
| | 3.4.6. Provision of marketing and related services | | |
| | 3.4.7. Identification of large agribusiness companies involved in processing, local distribution and or exporting of produce | SVISU and farm level institutions | Year 2 – 5 |
| | 3.4.8. Negations of product supply agreements between the producers and agribusiness | SVISU and farm level institutions | Year 3 – 5 |
| | 3.4.9. Assessing compliance with market standards and requirements as well as product supply agreement specifications | SVISU and farm level institutions | Year 3 – 5 |
| | 3.4.10. Mediation of conflicts related to product supply agreements | SVISU and farm level institutions | Year 3 – 5 |

# Resource requirements for the implementation of the strategy

| Strategy | Estimated costs (USD) | Source of funding |
|---|---|---|
| **Objective 1:**<br><br>Establishing a mechanism for coordinating service provision in the SVIP | | |
| 1.1. Establish a Shire Valley Irrigation Service Unit (SVISU) | 432,000 | Government and development partners |
| 1.2. Community mobilization and formation of farmer organizational structures. | 212,820 | Government and development partners |
| 1.3. Capacity building of farm level institutions of the SVIP through service contracts. | 192,800 | Government and development partners |
| 1.4. Supporting the farm level institutions put in place and develop appropriate governance and business management systems to effectively run their agricultural enterprises. | 85,750 | Government and development partners |
| 1.5. Facilitating and coordinating contract farming arrangements between farmer organization and agribusiness companies | 95,712 | Government and development partners |
| 1.6. Linking the farm level institutions with the various Government and other service providing institutions. | 92,557 | Government and development partners |
| 1.7. Facilitating contracts for the development of irrigation systems in the SVIP | 85,750 | Government and development partners |
| **Objective 2:**<br><br>Establishing alternative demand driven private sector financed sustainable research, technical and extensions services delivery systems. | | |
| 2.1. Research and development services | | |
| 2.1.1. Rehabilitation of Kasinthula Research station - developing irrigation system and fish ponds; rehabilitating infrastructure – offices, laboratory, dwelling houses; buying state of the art research equipment including laboratory equipment for conducting relevant tests as well as plant tissue culture | 486,000 | Government and development partners |

| Strategy | Estimated costs (USD) | Source of funding |
|---|---|---|
| 2.1.2. Strengthening the resource base of Kasinthula Research Station through a grant that will support strengthening of human resources as well as initial establishment of research and development programme for SVIP | 700,000 | Government and development partners for the initial 5 years |
| 2.1.3. Establishing a fund to sustain research and development for SVIP based on levies from crop sales as well as membership contributions | 412,956 | Producer and agribusiness companies from levies or corporate social responsibility |
| 2.1.4. Transforming the legal status of Kasinthula Research Station to a private research institution e.g. Research Foundation that is able to operate autonomously. | 21,225 | Producer organisation and agribusiness companies from levies or corporate social responsibility |
| 2.1.5. Commercialising some of the research services at Kasinthula research station | 50,000 | From sales of services by research institution |
| 2.2. Technical and extension services | | |
| 2.2.1. Identification of technical and extension needs for farmers in the SVIP | 23,500 | Grants from Government and development partner but later from producer organisations |
| 2.2.2. Mapping and developing profiles of potential technical and extension services providers. | 15,450 | Grants from Government and development partner but later from producer organisations |
| 2.2.3. Facilitating provision of initial services which are beyond the means of farmer organisations using subsidies from the Government and development partners - irrigation designs and development of irrigation systems. | 33,110<br>Cost excludes those on development of irrigation systems | Grants from Government and development partner |
| 2.2.4. Facilitating negotiations for contract farming arrangements with agribusiness companies | 35,795 | Initially from grants from Government and development partner but later from producer organisations |
| 2.2.5. Capacity building and development of extension messages for farm level institutions involved in provision of technical and extension services. | 72,000 | Initially from grants from Government and development partner but later from producer organisations |

| Strategy | Estimated costs (USD) | Source of funding |
|---|---|---|
| 2.2.1. Implementation of outsourced technical and extension services | 157,985 | Initially from grants from Government and development partner but later from producer organisations |
| 2.3. Provision of accounting, finance and management advice | | |
| 2.2.2. Establishing and maintaining a biometric based database for members of farmer organization | 110,000 | Initially from grants from Government and development partner but later from producer organisations |
| 2.2.3. Developing and maintaining a system for recoding financial transactions | 120,000 | Producer organisations |
| 2.2.4. Production of financial and audit reports | 75,000 | Producer organisations |
| 2.4. Provision of storage and warehousing services | | |
| 2.2.5. Construction of warehouses and installation of cold rooms | 320,000 | Grants from Government and development partner but later from producer organisations |
| 2.2.6. Developing systems for operation and maintenance of storage warehouses and cold rooms | 120,000 | Producer organisation |
| 2.5. Provision of services related to land acquisition, leasing and development | | |
| 2.2.7. Facilitate the process of aggregation of land into blocks | 166,494 | Grants from Government and development partner |
| 2.2.8. Processing and maintenance of land lease | 35,300 | Initially from grants from Government and development partner but later from producer organisations |
| 2.6. Provision of credit and input supply services | | |
| 2.6.1. Negotiation for advance payments for goods and services (farm inputs, service contracts and any other costs) by the agribusiness companies for costs to be recovered from sales of produce | $48,000 excludes actual cost of inputs | Deductions from product sales |

| Strategy | Estimated costs (USD) | Source of funding |
|---|---|---|
| 2.6.2. Negotiations for forward contracts with companies such as AHCX | $25,000 excludes actual cost of inputs | Deductions from product sales |
| 2.7. Provision of marketing and related services | | |
| 2.7.1. Identification of large agribusiness companies involved in processing, local distribution and or exporting of produce | 64,896 | Grants from Government and development partners |
| 2.7.2. Negations of product supply agreements between the producers and agribusiness | 20,000 | Grants from Government and development partners |
| 2.7.3. Assessing compliance with market standards and requirements as well as product supply agreement specifications | 115,000 | Deductions from product sales |
| 2.7.4. Mediation of conflicts related to product supply agreements | 75,000 | Deductions from product sales |

# APPENDIX D: MARKET AND AGRIBUSINESS OPPORTUNITY ANALYSIS

## D.1 Market potential

This Appendix presents a detailed assessment of the market potential for the various crops that can be grown in the lower Shire Valley. In addition it analyses the supply/value chains for some of the key commodities identified for inclusion in the proposed cropping programme for the SVIP. Key policies impacting on the marketing and trade in the identified commodities are also discussed.

### D.1.1 Bird's eye chillies

Chillies is one of the major spices consumed widely across the globe in both the fresh and dried form. Although there are a lot of chilli varieties distinguishable on the basis of colour, size and pungency, only a few of these are traded on a large scale on the international market. The commonly traded varieties are: Guntur Sannam – S4 from India; Tiensin and Fukien from China; Aji from Peru; and, bird's eye chillies from the African continent. Chillies are generally traded in dried form on the international market.

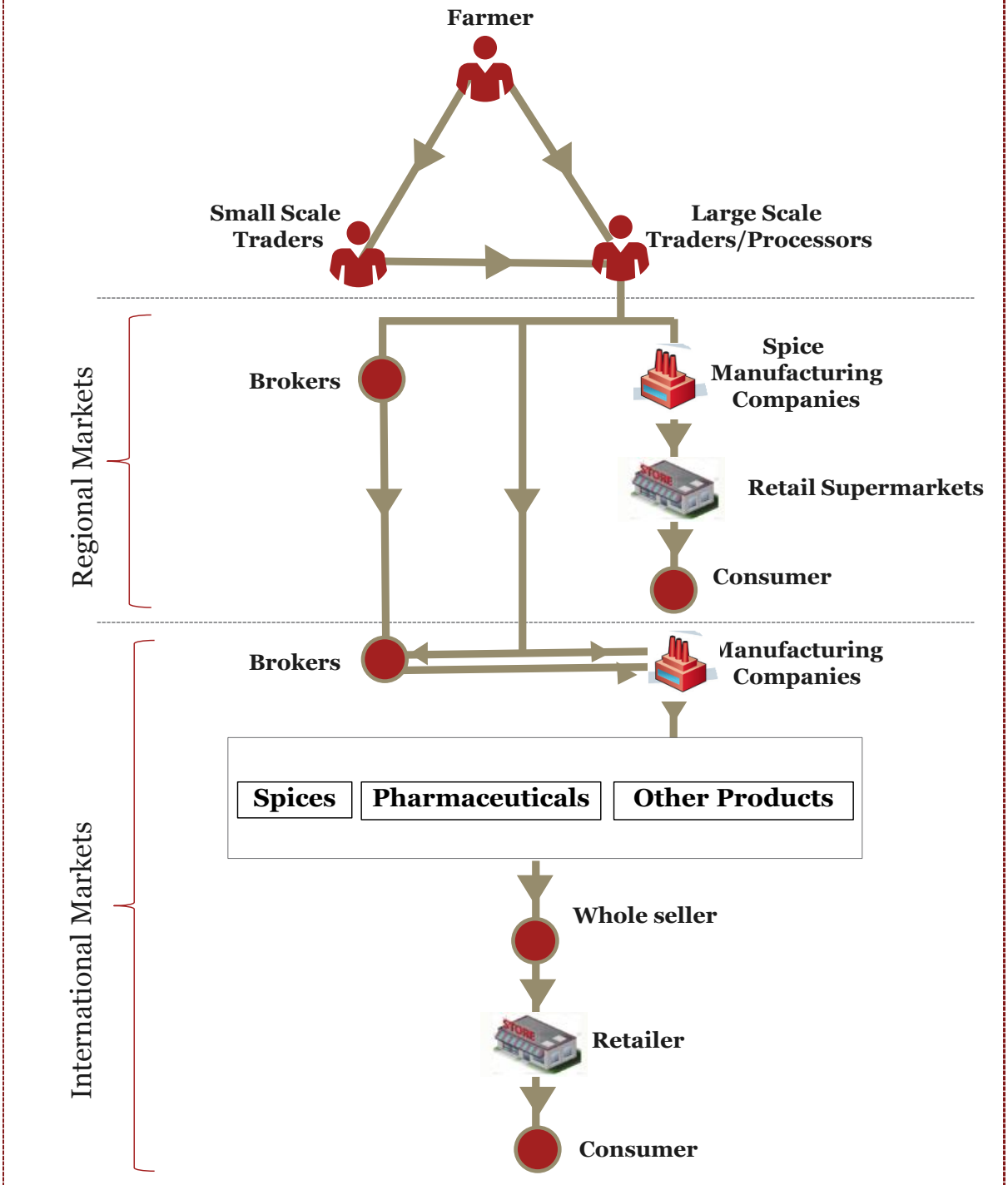
The bird's eye chillies are one of the most pungent varieties of chillies in the world and Malawi is recognised as one of the leading producers of this variety. The variety is also produced in significant quantities in Ghana, South Africa, Uganda, Kenya and Zimbabwe. The crop can be harvested after about 2.5 to 3 months stretching over the next 3 to 4 months.

**Bird's eye chilli supply chain in Malawi**

In Malawi the supply chain is quite developed. The crop is mostly grown by small scale farmers and, a few large scale farmers. Large commercial producers include in their ranks such established brands as: Nali Limited, Africa Invest Malawi, Cheetah Malawi Limited and Duconti Produce. The large scale farmers also tend to boost their production by offering out-grower contracts to farmers growing the crop on smaller plots. The crop's value chain shows a buyer driven characteristic were the buyers dictate the price of the produce. Producers in the value chain have to place emphasis on good quality, high productivity ratios and access to market information to ensure that they attain reasonable profits. In some cases, the farmers sell the produce to intermediate buyers who then sell to large scale traders after carrying out preliminary post-harvest sorting including grading and bulking up of produce of similar characteristics. The large scale traders sell the produce to brokers or spice manufacturing companies. The spice manufacturing companies in-turn process the produce and sell to retail supermarkets and from there it is sold to the end consumer. The large scale traders also sell to brokers and spice manufacturing companies on international markets. The manufacturing companies do value addition to the spices based on the end usage which can take the form of: spices; in various pharmaceutical products; in pest control sprays; in tear gases; and related products. These products are then sold to market intermediaries such as wholesalers for onward sales to the retail market and finally to the consumers. The commercial producers export either through middle-men or directly to export destinations. In 2014 the major export destination of chillies from Malawi was Singapore receiving a total of 8 MT.

The value chain for pepper/paprika is similar to that of chillies, however the level of processing in the case of pepper is higher than for chillies across the supply chain. Nali Limited is the major buyer of fresh paprika in Malawi. Paprika is used for the preparation of chilli sauce and also exported to international markets. Fresh paprika is also used as an ingredient in preparation of mango pickles. However, most of the other traders and processors buy dried paprika directly from the farmers.

*Bird's eye chillies supply chain in Malawi*




*Source: USAID report on Value Chain Analysis of Paprika and Bird's eye chilli in Malawi*

***Figure D: 1: - Bird's eye chillies supply chain in Malawi***

## International markets for chillies and related spices

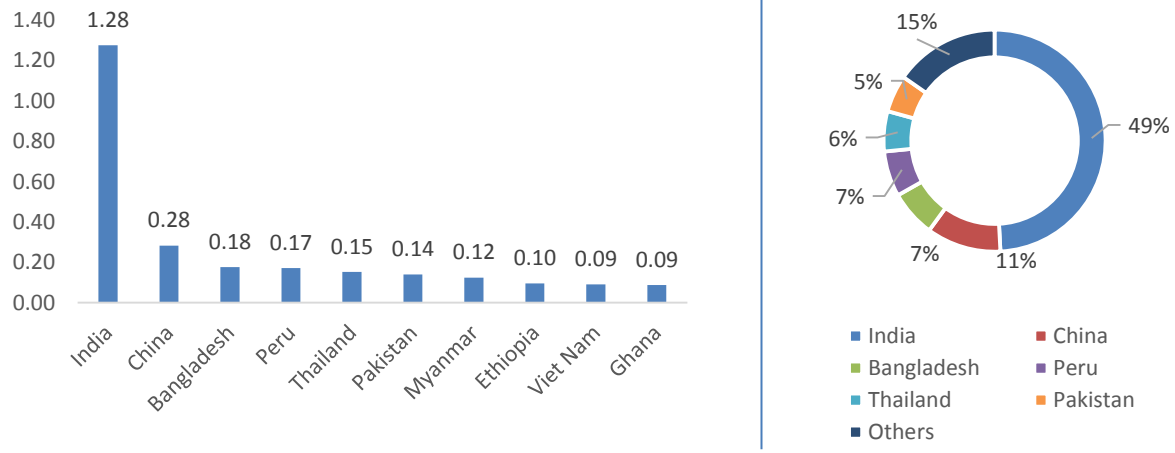
The total area and production of dry chilli and pepper has increased over the past few years. In America the area under cultivation has declined whereas the total production has increased by 19 percent during the period 2008 to 2012 which indicates that there has been an increase in productivity. In Asia, the area under cultivation has increased by 2 percent while production has also increased by 4 percent during the period 2008 to 2012. During the same time period,

Africa has witnessed an increase of 7 percent in area under cultivation as well as an increase of 11 percent in production.

The EU accounts for 30.4 percent of the market with Germany, Spain, the United Kingdom and the Netherlands being the largest markets in the EU region. Their share of the market are Germany (7.8 percent), Spain (3.9 percent), United Kingdom (3.7 percent) and the Netherlands (3.4 percent). The major competitors on the EU market are Brazil, Vietnam and India.

Global production of dry chillies and pepper was estimated at about 3.2 million MT in 2012 and it has grown at an average of 2.6 percent per annum between 2002 and 2012. In 2015 Asia accounted for 51.5 percent of the world market for bird's eye chillies. In Asia, the largest importers are Vietnam, Malaysia, Sri-lanka, Thailand and Malaysia. Their corresponding market shares are Vietnam 13.1 percent, Malaysia and Sri-Lanka 9 percent each, Thailand 3.8 percent and Japan 1.8 percent. India, Mexico and Japan are the major competitors on the Asian market. India is the largest producer of dry chillies and pepper with about 39 percent of the total global production, followed by China (9 percent), Bangladesh (5.4 percent), and Peru (5.3 percent). The major dry chilli and pepper producing countries are shown in Figure D.2**.** African countries accounted for about 18 percent of the total production in 2011.

*Global dry chillies and pepper production, 2011 (in million tonnes)*




***Source: Source: FAOSTAT, 2011, PwC Analysis***

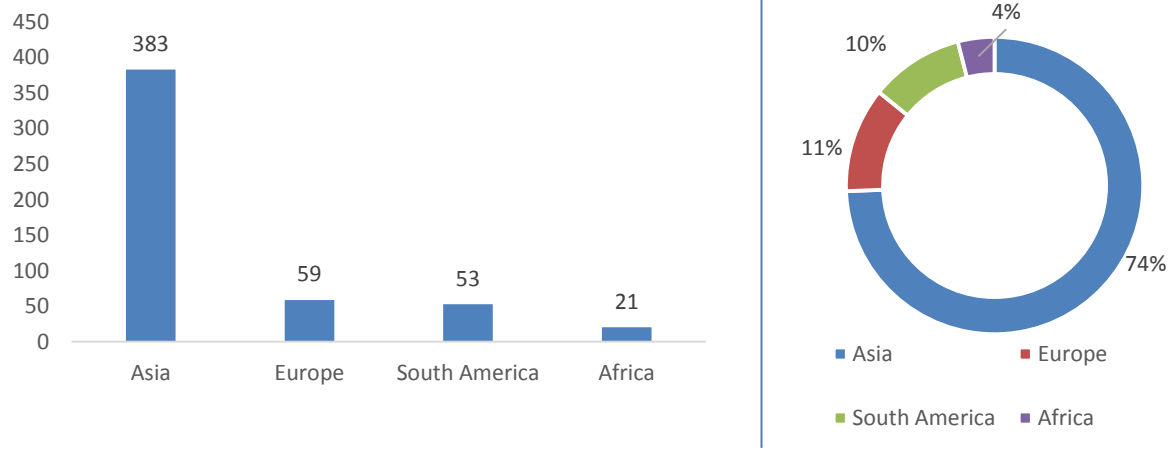
***Figure D: 2: Global dry chillies and pepper production, 2011 (in million tonnes)***

## Chillies and pepper exports

As of 2011, Asia was the largest exporter of chillies and pepper accounting for over 70 percent of the world's exports followed by Europe with an 11 percent share. South America's share of the total global exports is about 10 percent while Africa's share of the total exports is considerably lower at about 4 percent[31]. Figure 4.3 shows the total exports from different regions across the globe. The EU is the main market for bird's eye chillies.

[31] ITC Report titled "Road Map for developing and Strengthening The Bird Eye Chilli's Sector" for Kenya available online at http://www.intracen.org/uploadedFiles/Kenia-Birds%20Eye%20Chilli%20Roadmap_final.pdf

*Global export scenario, dry chillies and pepper (in '000 tonnes)*




***Source: ITC Report titled "Road Map for developing and Strengthening the Bird Eye Chilli's Sector" for Kenya, PwC Analysis***

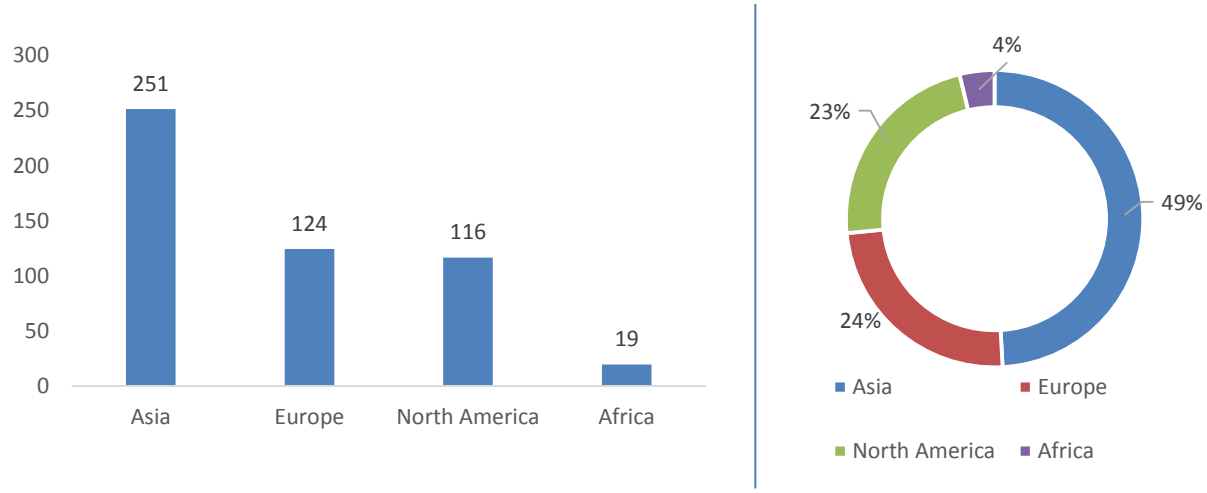
***Figure D: 3: Global export scenario, dry chillies and pepper (in '000 tonnes)***

## Demand for chillies

In 2011 global consumption of dry chillies and pepper was estimated at 3.3 million MT. Asia accounted for about 67 percent of the global consumption; Africa 17 percent, Europe and North America 10 percent each; and, Latin America and the Caribbeans for 6.5 percent.

In terms of imports Asia imports about 46 percent of the total dry chillies and pepper traded across the globe, followed by Europe with a share of 23 percent, followed by North America with about 21 percent. Africa's share is about 3.5 percent of total global imports of dry chillies and pepper. Global imports of dry chilli and pepper is shown in Figure D.4

*Global imports of dry chillies and pepper (in '000 tonnes)*




***Source: ITC Report titled "Road Map for developing and Strengthening the Bird Eye Chilli's Sector" for Kenya, PwC Analysis***

***Figure D: 4: Global imports of dry chillies and pepper (in '000 tonnes)***

### D.1.2 Cotton

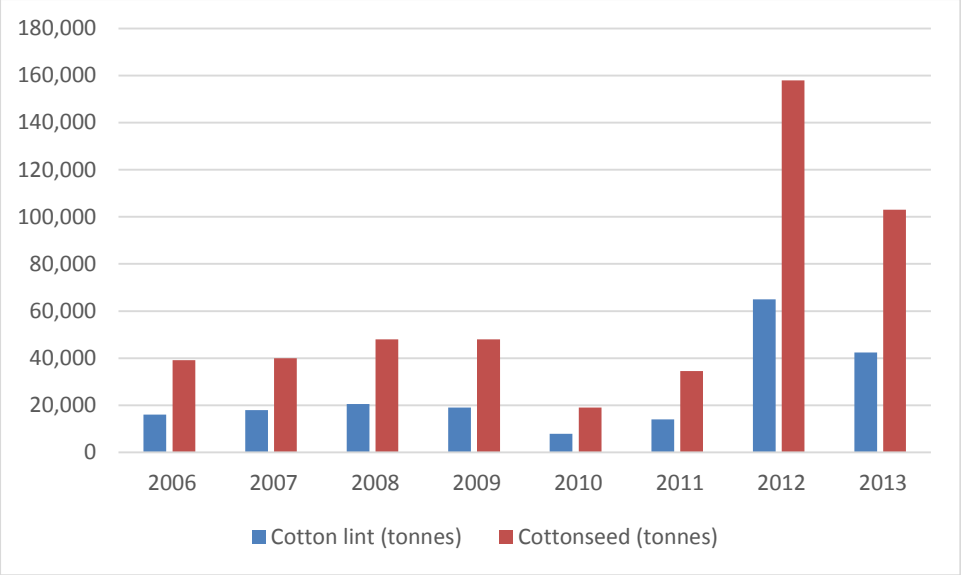
Cotton is a major fibre crop of high commercial value and global importance. The crop is grown in more than 70 countries where temperate and tropical climatic conditions are favorable for its cultivation. Cotton is harvested as 'seed cotton' which is then 'ginned' to separate the seed and lint. The long 'lint' fibres are further processed by spinning to produce yarn which is knitted or woven into fabrics.

Cotton is the fourth largest agricultural foreign exchange earner in Malawi after tobacco, sugar and tea. This cotton sector is defined to include: the supply of lint; crude and refined cotton oil; and, cotton seed cake to both domestic and regional markets. The global cotton lint market, currently estimated at 24 million MT, is driven by the dynamics in the major consuming and producing countries. After a major price peak in 2011-12, when global production was very low, prices have stabilized, with 2012-13 and 2013-14 production marginally outstripping demand. However, Malawi's production accounted for only about 2 percent of Africa's total production between 2005 and 2013 (FAOSTAT, 2014). The cotton value chain in Malawi is buyer driven with over 90 percent of the production largely supplied by smallholder farmers. Eighty percent of the lint is exported and the remaining 20 percent is retained for the local textile industry. At the moment there is widespread capacity underutilisation for most ginneries in the country. The major cotton growing areas are: the lower Shire Valley accounting for up to 50 percent of national production; southern region upland areas around Balaka accounting for 30 percent of production; and, the Lakeshore area around Salima accounting for the remaining 20 percent of production.

#### *Supply side*

Malawi produced 100,000 MT and 40,000 MT of cotton seed and lint respectively in 2013. The level of production experienced volatility between 2006 and 2011 (see Figure 4.5), affecting domestic prices and thus creating uncertainty for producers. The production of cotton lint in Malawi has increased from 19 thousand tonnes in 2009 to 42.4 thousand tonnes in 2013 at a compound annual growth rate (CAGR) of 22 percent. Malawi is the 12th largest producer of cotton in Africa and contributed nearly 3 percent to the total cotton production by the continent[32]. The trend of production of cotton in Malawi from 2009 to 2013 shows that the country has the potential to become one of the major producers and suppliers of cotton in the international market.

[32] FAOstat




***Source:*** *Malawi Government*

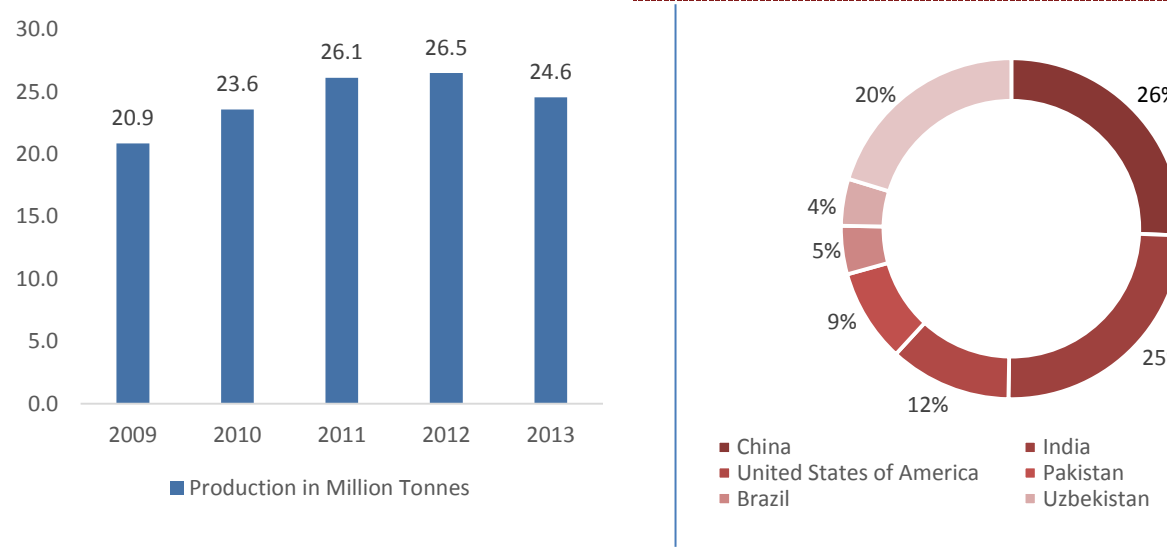
***Figure D: 5: Cotton production***

Cotton is mainly grown by smallholder farmers who can be grouped into three main categories, namely: semi-commercial farmers (each growing over 3ha and achieving average yields of 1.5t/ha); middle level smallholder farmers (with average landholdings of 1.1-3.0ha, yielding around 1.0t/ha); and poor smallholder farmers, (with up to 1.1 ha, achieving yields of around 0.7 t/ha). In addition, there are a few commercial farmers operating at large scales. An example, is Toleza Farm with an average crop of about 200-300ha. They also own a ginnery for which they buy additional produce from other smaller farmers to meet the capacity requirements of their machinery.

The global cotton production has increased from 20.9 million tonnes in 2009 to 24.6 million tonnes in 2013 at a CAGR of 4 percent. The major cotton producing countries are China, India, USA, Pakistan, Brazil and Uzbekistan. The total share for these countries in the global cotton production is nearly 80 percent[33]. An overview of the global cotton production and the major cotton producing countries (in 2013) is provided in Figure D.6**.**

[33] FAOstat

*Global cotton production (in million tonnes) and major cotton producing countries*




***Source: FAOstat 2014, PwC Analysis***

***Figure D: 6: Global cotton production (in million tonnes) and major cotton producing countries***

### *Demand side*

Most of the cotton lint produced in Malawi is exported representing an average 2 percent of the total value of agricultural export between 2005 and 2013 (FAO, 2015). During the marketing season, buying points, or '*bush markets*' are established as temporary market centres by the various ginneries. The marketing season spans from April to early September. The average production has been 50, 000MT between 1992/93 season and 2012/13 seasons despite having a total ginning capacity of 215, 000MT (Table 4.1). Ginning facilities that have been developed in Malawi include: Great Lakes Cotton Company (GLCC), Clark Cotton Malawi (CCM) and Iponga Cotton Company. Clark Cotton Malawi is a joint venture established by ADMARC and Clark Cotton South Africa. The garment industry has traditionally been structured around six main operations, namely: Mapeto-David Whitehead, Crown Fashion, Giant Clothing, Knitwear Industries, Chirimba Garment, Crossbow Clothing and Haps Investment Company Limited/Vanguard Garment Company. However, not all these companies are fully operational in any one season due to reduced quantities of the crop produced and available in the country. In addition there are smaller garment manufacturers and individual tailors operating from home, street corners or small firms serving mostly the domestic market.

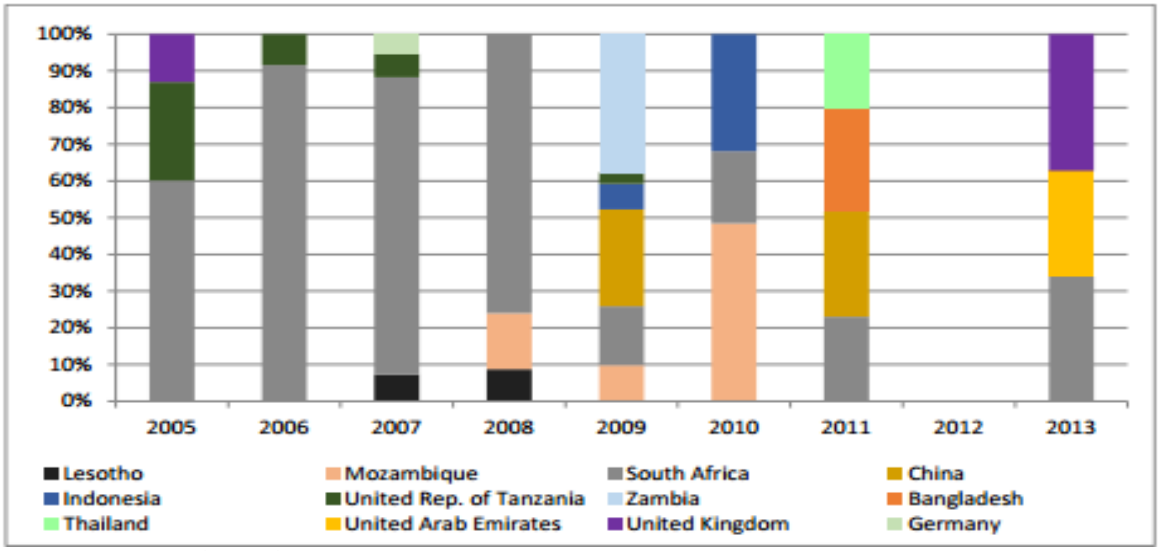
*Table D: 1: Capacity estimates for existing ginning facilities in Malawi*

| Company | Capacity (MT) |
|---|---|
| ADMARC | 45,000 |
| Great Lakes Cotton Company | 30,000 |
| Malawi Cotton Company | 30,000 |
| Iponga Cotton Company | 30,000 |
| Export and Trading Group | 20,000 |
| Cotton Ginners Africa Ltd | 15,000 |
| Mapeto DWS | 15,000 |
| Woget | 10,000 |
| Afrisan | 10,000 |
| Toleza Cotton Ginnery | 5,000 |
| Nadhi | 5,000 |
| **Total** | **215,000** |

Most ginneries are unable to secure enough cotton to fully utilise their existing ginning capacity indicating that demand far exceeds supply. Given this background the expansion of irrigation facilities in the lower Shire Valley presents an opportunity to boost production and therefore improve capacity utilisation for the existing ginneries. Other projects such as the Malawi Oil Seeds Transformation (MOST) are promoting cotton production as well. With the establishment of the Cotton Council in 2014, the sector is expected to be better regulated.

The only spinner in the country, Mapeto DWS also provides a market opportunity for the farmers since the crop from their own farm is insufficient to meet their requirements. Mapeto DWS weaves textiles such as grey cloth for export and *Chitenje* fabric for the domestic market. It is reported that with 3,000MT of lint Mapeto DWS could produce 360,000 metres of cloth/fabric per year. The company has tried to procure lint from other ginneries in Malawi. However in 2013, they invested in a new ginnery in Salima, in order to produce own lint and increase the capacity utilisation of their spinning plant. To break even MAPETO has also been importing loom state cloth/fabric and polyester which is used for finishing their product line with the major costs incurred being value adding materials like dye and related printing materials.

The major export markets for Mapeto are in the COMESA/SADC region with a high proportion of the exports going to South Africa (see Figure D-7).

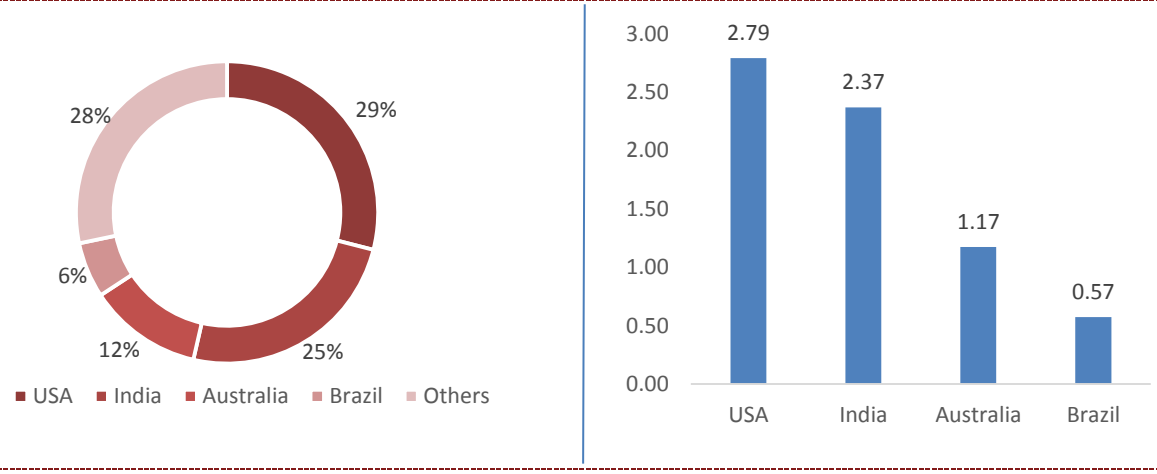



**Source: FAO (2015)**

***Figure D: 7: Main export destinations for Malawi Cotton***

Internationally cotton is a heavily traded commodity with over 150 countries involved in the trade. Cotton plays a major role in the economic and social development of developing and industrialized countries. Nearly 46[34] percent of the total cotton produced in 2013 was exported to different countries[35]. The major cotton exporting countries are the USA, India, Australia and Brazil. These countries together account for nearly 72 percent[36] of the total exports of cotton around the world. An overview of the total cotton exports from different countries is provided in Figure D.8**.**

*Share of major cotton exporting countries and their exported quantities in 2013 (in million tonnes)*




***Source: FAOstat 2014, PwC Analysis***

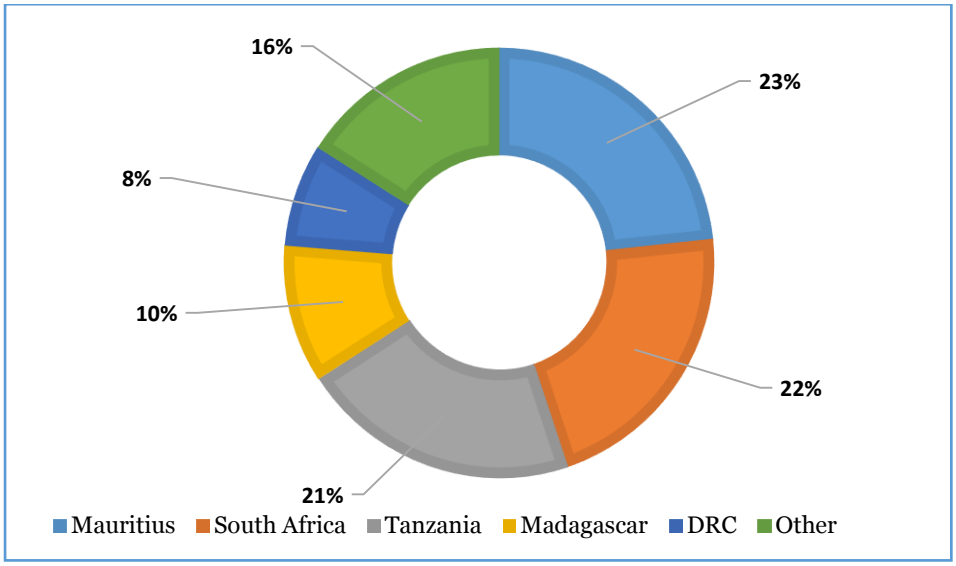
***Figure D: 8: Share of major cotton exporting countries and their exported quantities in 2013 (in million tonnes)***

Over 95 percent of the cotton lint produced in Malawi is exported, mainly to the Far East, but also to Europe. Prior to being exported the cotton lint is packed into 200kg bales and shipped by road to an appropriate port. Furthermore, Asian markets such as China, Indonesia and

[34] FAOstat
[35] FAOstat
[36] FAOstat

Thailand are becoming increasingly important destinations for Malawian lint. A Chinese company, Malawi Cotton Company has recently invested in ginning equipment to enable it to export lint to China and other international destinations. For example, in 2013 most of the processed cotton was exported to South Africa, UAE and the UK.

Figure D.9 presents the top five largest importers of cotton in the SADC region. The five largest importers of cotton in the SADC region are Mauritius, South Africa, Tanzania, Madagascar and DRC. The major competitors in the region to Malawi include China, India and Zimbabwe. Already Malawi is exporting to some of these largest markets in SADC.



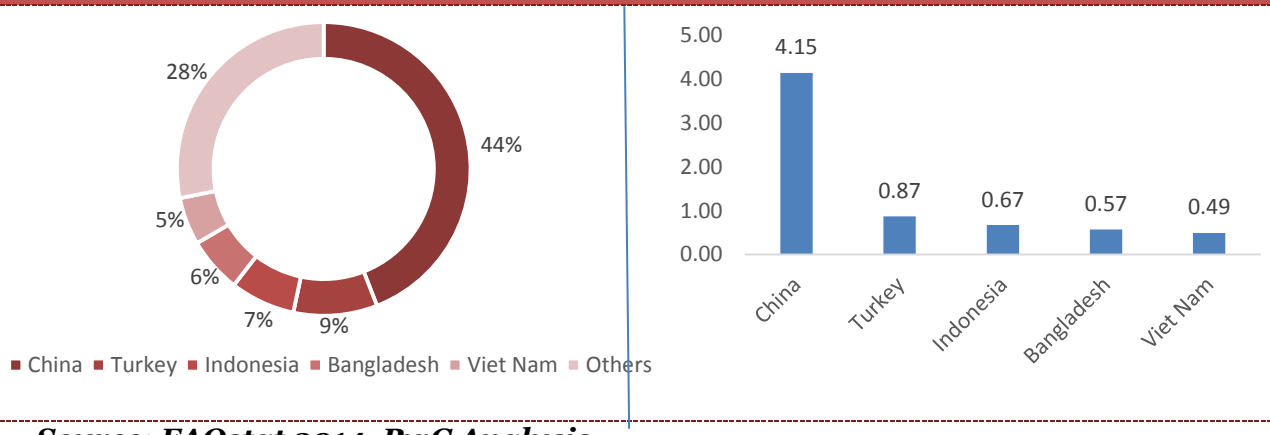

***Source:*** *TRADEMAP*

***Figure D: 9: Five largest importers of cotton in the SADC region***

The cotton fibre is used in the textile industry as a major raw material. This is one of the key reason why cotton is in high demand internationally. The major cotton importing countries are China, Turkey, Indonesia, Bangladesh and Vietnam. It should be noted that China alone imports nearly 44 percent[37] of the total cotton imported globally. An overview of the total cotton imports is provided in Figure D.10.

[37] FAOstat

*Major Cotton importing countries and their quantities in 2013 (in million tonnes)*




***Source: FAOstat 2014, PwC Analysis***

***Figure D: 10: Major Cotton importing countries and their quantities in 2013 (in million tonnes)***

The major export destinations of Malawi cotton are presented in Table D.2. About 50 percent of Malawian cotton is exported to the UAE and South Africa. China, Singapore, UK and Zimbabwe are some of the markets for Malawian cotton.

***Table D: 2: World's share of Malawian cotton (2015)***

| Countries | Proportionate share (%) |
|---|---|
| World | 100 |
| United Arab Emirates | 23.3 |
| South Africa | 22.1 |
| Hong Kong, China | 16.6 |
| Singapore | 14.1 |
| United Kingdom | 13.1 |
| Zimbabwe | 3.2 |
| Bangladesh | 2.8 |
| Mozambique | 2 |
| Mauritius | 1.7 |
| Portugal | 0.7 |
| Switzerland | 0.3 |
| Zambia | 0.1 |
| China | 0.1 |

***Source:*** *TRADEMAP*

### Asia potential cotton markets

Asia constitutes 65 percent of world imports of cotton. The five largest importers of cotton in Asia are Hong Kong, China, Bangladesh, Vietnam, Turkey and Hong Kong China (Figure 4.11). Major competitors in this market are India, Pakistan, Vietnam.

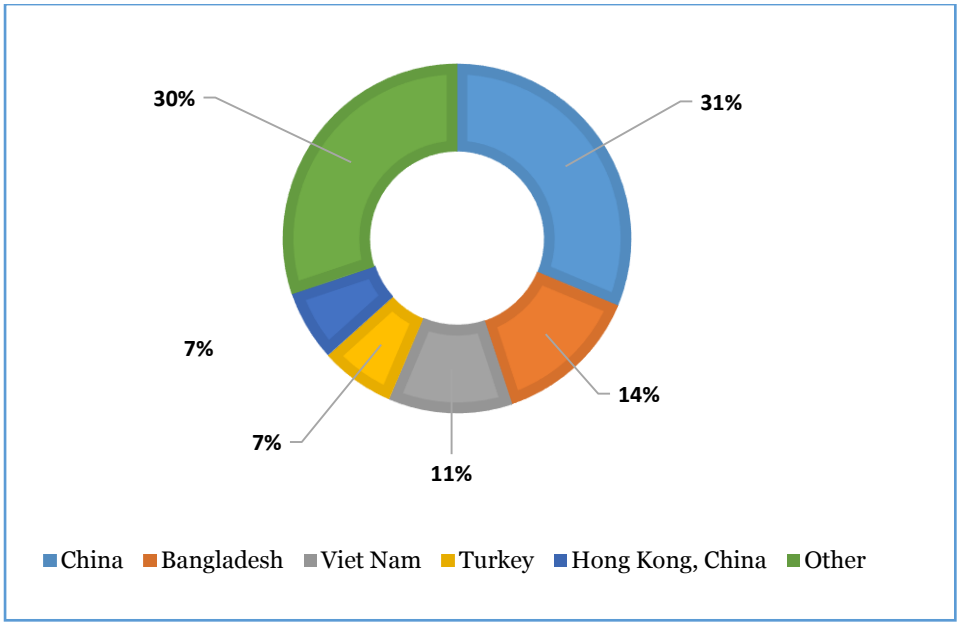
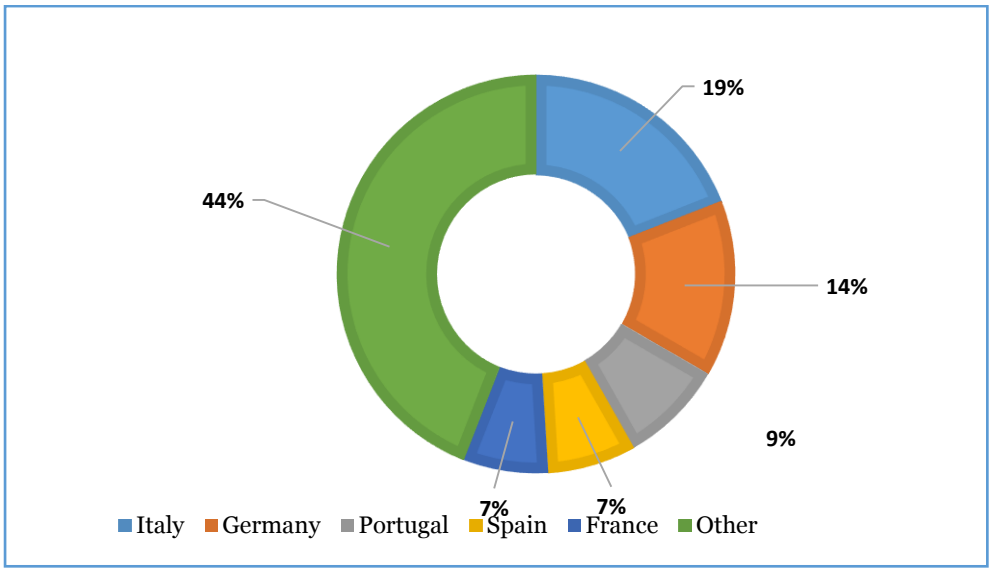



***Figure D: 11: Five largest importers of cotton in Asia***

## EU cotton market

The EU's cotton world market share in 13 percent. Figure D.12 presents the share of the five largest importers of cotton in the EU and these are Italy, Germany, Portugal, Spain and France. The potential competitors in the EU market are Turkey, Pakistan and Italy.




***Source:*** *TRADEMAP*

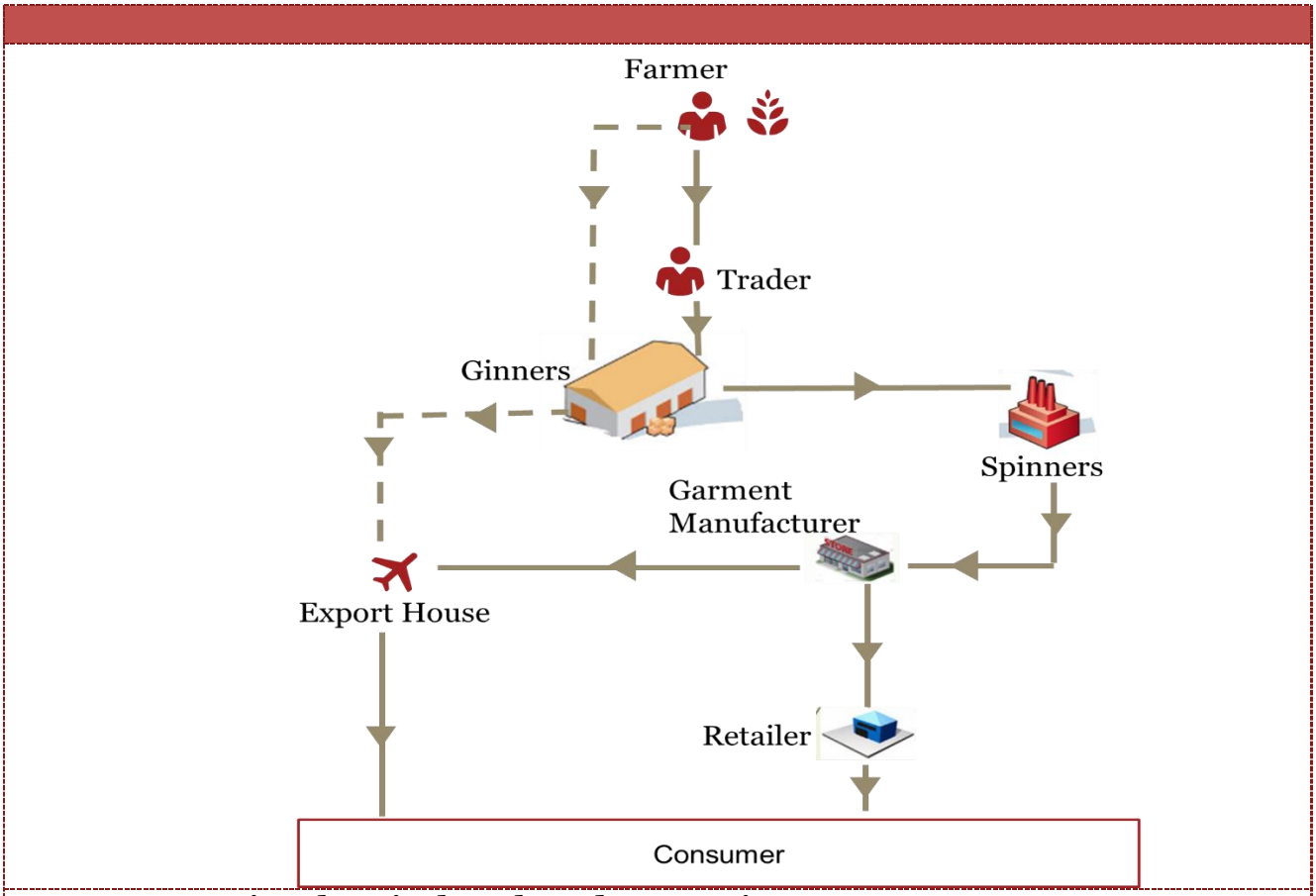
***Figure D: 12: Five largest importers of cotton in the EU***

## Cotton supply chain in Malawi

A typical supply chain of cotton in Malawi constitutes farmers, traders, ginners, spinners, garment manufacturers, retailers and export houses. The majority of the farmers sell their produce to traders who in-turn sell it to ginners. A snapshot of the cotton supply chain is illustrated in Figure 4.13**.**

### *Cotton marketing and price policies*

The market chain is regulated through the Cotton Council, where licensing of ginners and buyers and registration of farmers is mandatory and trading must take place at designated buying points. Although only certified seed is recommended for planting and ginners are prohibited from providing recycled seed to farmers, illegal trading does occur because of enforcement challenges, with negative implications for cotton quality and farmer prices.

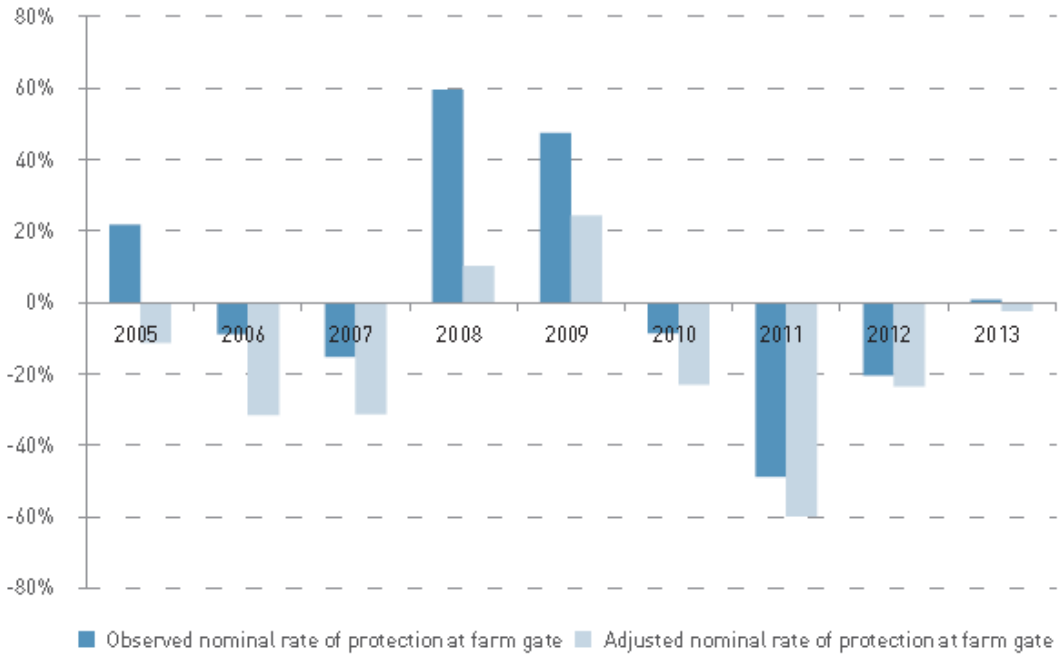



***Source: Regional Agricultural Trade Expansion Support Programme, PwC Analysis***

***Figure D: 13: Cotton supply chain in Malawi***

### *Cotton price movements*

The GoM announces minimum buying prices for cotton together with other crops. However, the minimum price set by the GoM was not systematically aligned with international price trends, which could be due to the fact that prices are set at the beginning of the season and not reviewed during the season to take into account the international price dynamics. Producers benefited from the implementation of the minimum prices only in 2008 and 2009 (Figure 4.14), which in turn provided incentives to farmers. However, for most years, ginners did not offer prices aligned with the minimum price, which makes the enforcement and usefulness of the price fixing mechanism, questionable.




***Source:*** *FAO (2014)*

***Figure D: 14: NRP for Cotton***

### D.1.3 Dry beans (Phaseolus vulgaris)

About 80 percent of dry beans production in Malawi is supplied by smallholder farmers with only 20 percent being produced by commercial farmers. The main varieties of beans being produced are the red kidney beans and white pea beans. Rabs, Muli Brothers and Transglobe are the main players in the dry beans value chain. They are involved at the input node where they distribute seed. These actors also trade, market and wholesale the commodity. Currently the local demand for beans has not been met in Malawi and this limits the exports of dry beans from the country.

The SADC region accounts for 1.2 percent of world imports of dry beans compared to the EU which accounts for 12.4 percent share of the world market. Importing countries in the SADC region are South Africa, Angola and the DRC. The Asian market constitutes 64.4 percent of the dry beans market. Importing countries in Asia are Bangladesh, China and India. The importing countries in the EU are Italy, United Kingdom and Spain. The major competitors on the EU market China, Canada and the USA.

### D.1.4 Maize

Maize production in Malawi is mainly done by smallholder farmers. On average the common practice among farmers in the smallholder community is to adopt a low input-low return strategy with a focus on meeting subsistence requirements. As a result less than 50 percent of smallholder farmers use hybrid or improved maize seeds and less than 35 percent use bought-in inorganic fertilizers. The Government of Malawi introduced the input subsidy programme, which has provided subsidized seed and fertilizers since 2005. As a result maize production increased significantly, from 1.22 million MT in 2005 to 3.4 million MT in 2010.

Figure 4.15 illustrates the maize value chain in Malawi. Maize is an important food crop in Malawi because an average household obtains nearly two-thirds of its calories from maize. This implies that maize price and access to maize are the country's two most important

political, social, and economic variables. Hence it is inevitable that GoM routinely intervenes on the maize market to stimulate production and stabilize prices, where necessary.

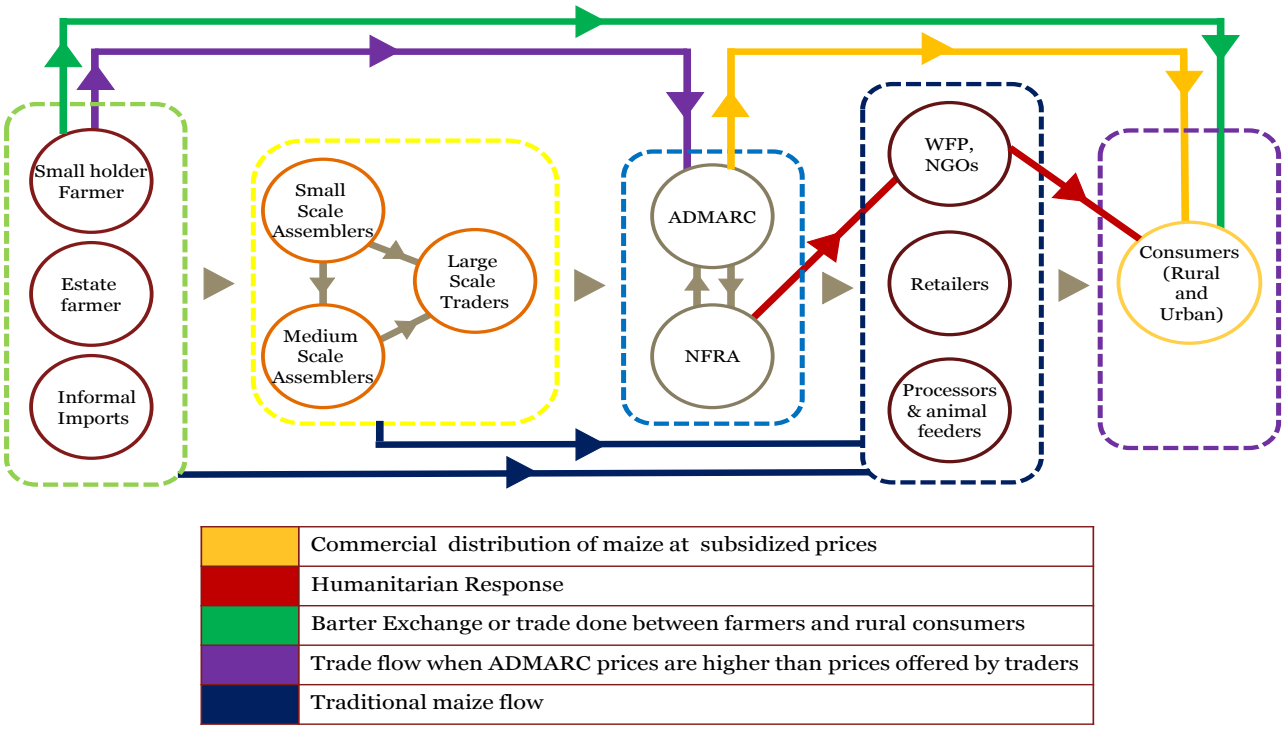



***Figure D: 15: Maize value chain for Malawi***

Most maize is grown in the central and southern regions of Malawi by smallholder and commercial farmers. Input supplying companies include Malawi Fertilizer Company, Export Trading, Seedco Malawi, Pannar Seed and Demeter Seed. Agricultural Development and Marketing Corporation (ADMARC) is a state run organization with 300 000m² warehouses and provides a commercial warehousing service. They store, process and distribute maize. In the maize value chain ADMARC has a vast network that allows them to buy produce from both small holder farmers and traders. Currently the industry is dominated by three milling companies that focus mostly on wheat milling. On the other hand, the informal milling industry is represented by small-scale millers who are present in every market and town in Malawi, and who offer their services to smallholder farmers as well as low income consumers. The national trade policy on maize grain allows Malawi to ban exports in times of shortages. When the maize ban is not in-place the export destinations include Zimbabwe, Mozambique, South Africa and Tanzania.

### *Maize marketing and price policies*

Since the 1980s, marketing and price policies have been liberalized gradually from a domain controlled by the state marketing agency Agricultural Development and Marketing Corporation (ADMARC), with fixed pan-territorial and pan-seasonal pricing for main commodities, to a market in which private traders operate within the limits of a government-set price band. Although ADMARC's operational capability has declined markedly it still does handle significant volumes of crops (including maize, in recent years), its legacy has not been erased in the rural areas.

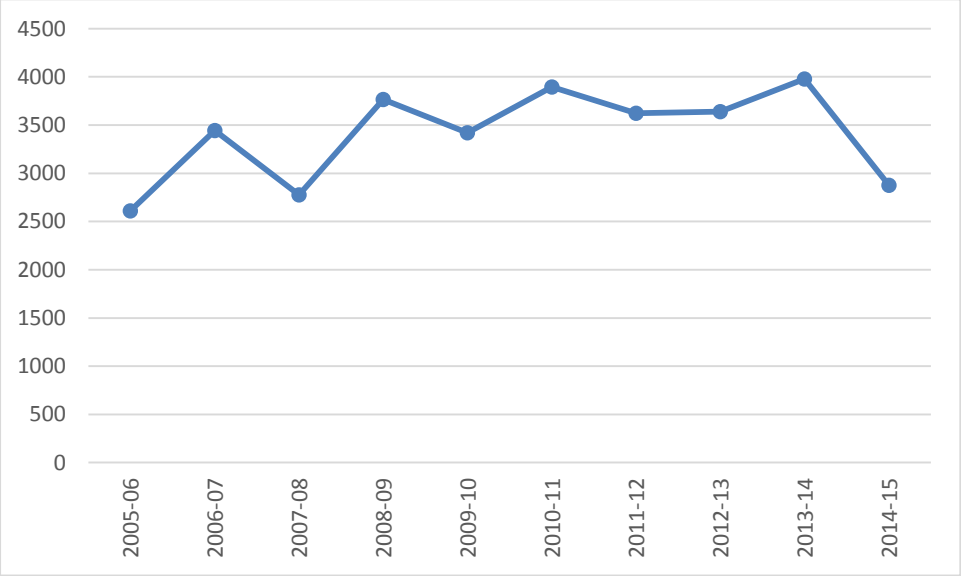
The GoM also maintains the strategic grain reserves through National Food Reserve Agency (NFRA). The total strategic grain reserve capacity is 240,000 MT, of which 36 are concrete silos in Lilongwe with a total holding capacity of 180,000 MT, 3 are metallic silos of 20,000

MT each located in Mzuzu, Luchenza and Mangochi, and the balance being multipurpose warehouses located in Bangula, Kanengo, Kazomba and Limbe. One of the reasons cited for the decline in the operational capability of ADMARC is that the funds used for maize purchases are generally released after approval of the National Budget in July, by which time the farmers would have sold their produce to the private traders.

The GoM introduced both minimum producer prices as well as price ceilings at retail level following the maize shortages experienced in 2002 and 2005. ADMARC was expected to enforce the decision. This was not successful as the private trade in most instances took place outside of the price-bands. In August 2008, the GoM designated ADMARC as the exclusive buyer and seller of maize, effectively banning all private trade. Nevertheless, this measure lasted only for a month after which the GoM instituted a price-band within which private trade was allowed to operate. Despite instituting the price-band, the ban had already done the damage by constraining the circulation of maize within Malawi, from surplus to deficit areas, in addition to disrupting impending informal maize imports from neighbouring countries to curb shortages on the domestic markets.

### *Maize supply and demand*

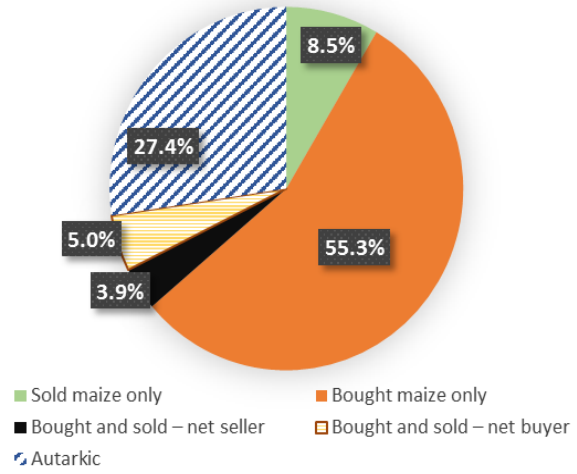
Malawi's maize production between 2005 and 2015 is summarised in Figure 4.16. Malawi was largely self-sufficient in Maize except for the years 2005/6, 2007/8 and 2014/15. The annual maize consumption per head in Malawi is estimated at around 130kg. The total quantity of maize purchased ranges between 263,000MT and 639,000MT depending on whether a poor or good harvest has been achieved, respectively. In a good season the local farmers are capable of supplying an average of 580,000MT whereas in a poor season the quantity supplied could be as low as 241,000MT (Jayne, T.S *et al*, 2010)




***Source:*** *Malawi Government*

***Figure D: 16: Maize production (in 'ooo MT)***

A further decomposition of the Integrated Household Survey (IHS3) data shows that maize supply is very thin to the extent that out of 2.5 million farmers, around 5 percent produce more than 3 MT and about 10 percent of maize is marketed (Jayne et al. 2010, GTPA). It was also observed by IFRI (Figure D.17) that only 8.5 percent of farmers are outright sellers of maize, i.e., they only sell maize and do not buy any maize (these are all maize farmers); 55 percent only purchase maize to supplement own stocks; 9 percent operate as both buyers and sellersand 27 percent are autarkic (i.e. they neither buy nor sell maize).



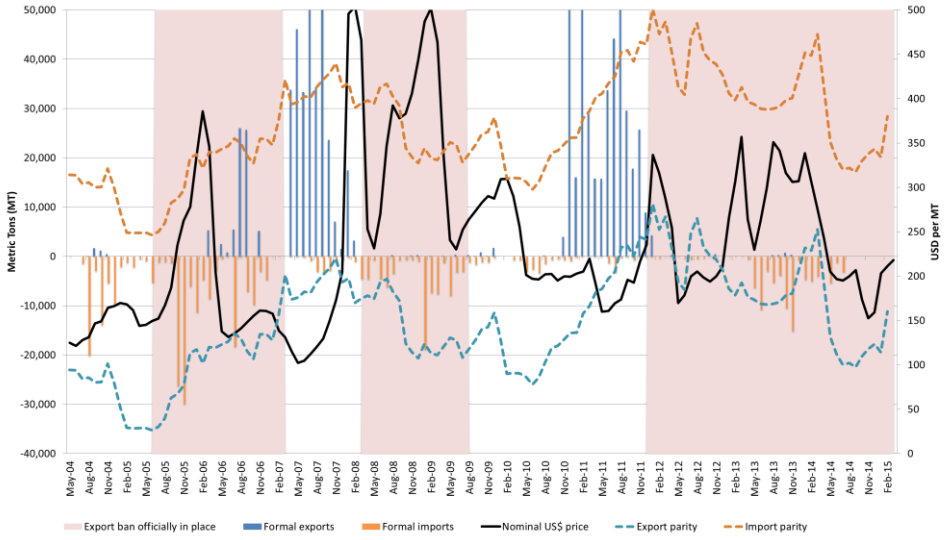

***Source:*** *IFPRI*

***Figure D: 17: Maize market engagement***

The revelation is that there are few sellers relative to the number of producers with the implication that small shifts in supply and demand could lead to disproportionately larger changes in price.

### *Price movements*

Figure D.18 depicts maize price volatility which have in some instance surpassed the import parity prices. Maize prices are more volatile in Malawi compared to South Africa. The price volatility between 2006 and 2015 as estimated by the co-efficient of variation (CV) is 38 percent for Malawi and 21 percent for SAFEX-South Africa.




***Source:*** *IFPRI*

***Figure D: 18: Maize price volatility in Malawi***

The recent GoM agricultural sector risk assessment identified that maize price volatilities are caused by both unpredictable interventions in the maize market and production risks. Further analysis of the sector revealed that current interventions in the sector have put pressure on farm-gate prices while input prices have remained high, thus acting as a disincentive for productive investments in the sector.

***Table D: 3: Largest importers of maize in SADC***

| Importers | Value of imports USD 000 | Share (%) |
|---|---|---|
| World | 30,276,752 | 100 |
| Southern African Development Community (SADC) Aggregation | 569,872 | 1.9 (SADC Share in world imports) |
| Zimbabwe | 174,269 | 30.5 |
| South Africa | 148,426 | 26 |
| Botswana | 50,123 | 8.8 |
| Namibia | 40,677 | 7.1 |
| Malawi | 32,689 | 5.7 |
| Other | | 21.9 |

***Source:*** *TRADEMAP*

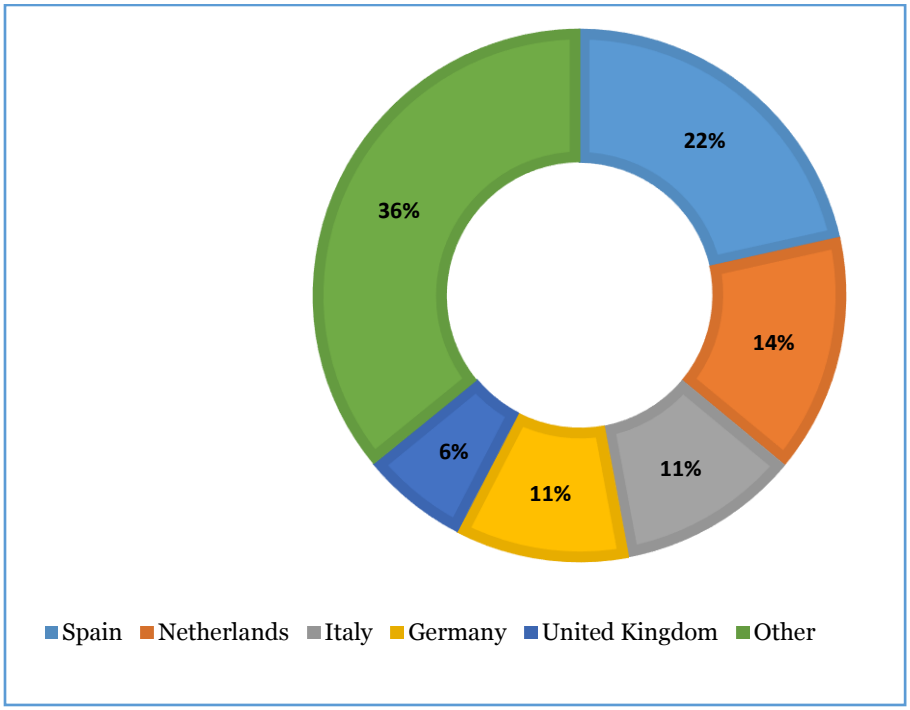
Table 4.3 ranks the largest importers of maize in SADC in 2015. The SADC region accounts for 1.88 percent of the world market for maize. Zimbabwe, South Africa, Botswana, Namibia and Malawi are the largest importers of maize in Africa. Potential competitors in the SADC region for the Zimbabwean, Botswana and Namibia markets include Zambia and South Africa. Potential competitors for the South African maize market are Argentina, Brazil and Mexico. Tariffs levied by the top five importers in the SADC region are all zero rated mainly because maize is a staple food crop required for food security purposes. The South African market has more competitive imports from Argentina, Brazil and Mexico in terms of cost. It thus makes it difficult for Malawi to compete in this market, however most imports from Argentina, Brazil and Mexico are GMO maize and therefore Malawi's GMO free maize may still compete regardless of high landing costs.

***Table D: 4: List of importing markets for maize exported by Malawi in 2015***

| Importers | Trade Indicators | | | | | | | | | | | | Tariff (estimated) faced by Malawi (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Exported value 2015 (USD thousand) | Trade balance 2015 (USD thousand) | Share in Malawi's exports (%) | Exported quantity 2015 | UNITS | Unit value (USD/ unit) | Exported growth in value between 2011-2015 (%, p.a.) | Exported growth in quantity between 2011-2015 (%, p.a.) | Exported growth in value between 2014-2015 (%, p.a.) | Ranking of partner countries in world imports | Share of partner countries in world imports (%) | Total import growth in value of partner countries between 2011-2015 (%, p.a.) | |
| World | 2172 | -30517 | 100 | 1511 | TONS | 1437 | -45 | -61 | -39 | | 100 | -3 | |
| Zimbabwe | 1090 | 1045 | 50.2 | 894 | TONS | 1219 | 7 | -72 | -42 | 36 | 0.6 | -1 | |
| Mozambique | 781 | -334 | 36 | 445 | TONS | 1755 | -36 | -59 | 111 | 81 | 0.1 | 18 | 0 |
| South Africa | 213 | -93 | 9.8 | 112 | TONS | 1902 | 38 | -11 | | 39 | 0.5 | 19 | 0 |
| Tanzania, United Republic of | 89 | -77 | 4.1 | 60 | TONS | 1483 | 14 | -22 | -89 | 103 | 0 | -4 | 0 |

***Source:*** *TRADEMAP*

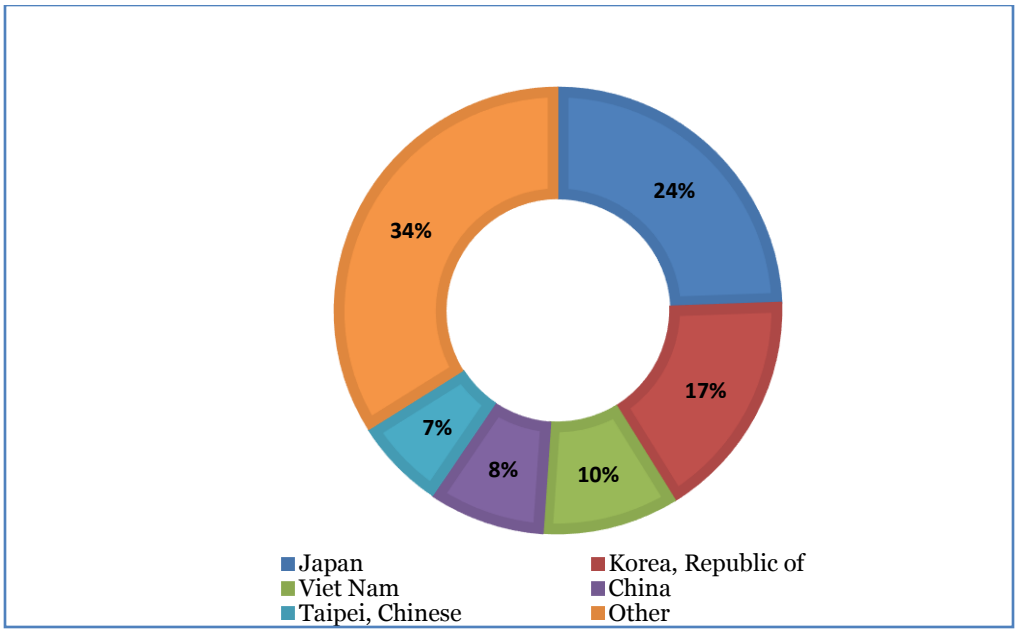
The opportunities for maize in the world are many as shown below by the largest importers in the EU and Asia. Spain, Netherlands, Germany Italy and the United Kingdom are the top five importers of maize in the European Union (Figure 4.19). The potential competitors in the EU market are other EU member countries. Distance, costs and sanitary and phytosanitary measures (SPS) are the potential deterrents to exporting maize from Malawi to the EU. The tariff rates are special rates for LDCs negotiated under the Economic Partnership Agreements.




***Source:*** *TRADEMAP*

***Figure D: 19: Largest importers of maize in the EU***

Asia's share of the world maize market is 46.7 percent. Japan, Korea, Vietnam, China and Taipei Chinese are Asia's largest importers of maize (Figure D.19). Potential competitors in this market are USA, Brazil and Argentina. The tariff lines for maize imports from USA to Japan are zero rated, costs and SPS are a deterrent in exploiting the Asian market for maize.




***Source:*** *TRADEMAP*

***Figure D: 20: Top 5 importers of maize in Asia***

### D.1.5 Mangoes

Mangoes are the most consumed exotic fruit in Malawi. The fruit is grown widely throughout the country although the better quality varieties are usually grown in the northern and southern regions. Large volumes of the fruit are produced in the areas of Machingo, Mangochi and Chikwawa. Total production of mangoes in Malawi was estimated at about 115,000 MT in 2012[38].

Mango trees in Malawi bear fruits from October to February. During the harvest season, the production of mangoes in the country is high and sufficient to meet domestic demand. In fact, up to 60 percent[39] of the total produce is wasted due to poor transportation and storage infrastructure. Scientific post-harvest handling and techniques such as sorting, cleaning, grading, and packing can reduce the wastage and also help in increased price realization by the farmers. In addition, the crop can generate income even when out-of-season when farmers adopt improved storage and preservation techniques. There is a potential for value addition on the fruits through the production of juice, juice concentrates, dried fruit, pickles, jams, jellies and related products. However, there is need to focus on growing improved mango varieties with less fibre content. Such varieties find more acceptance in the international markets and are also amenable for processing.

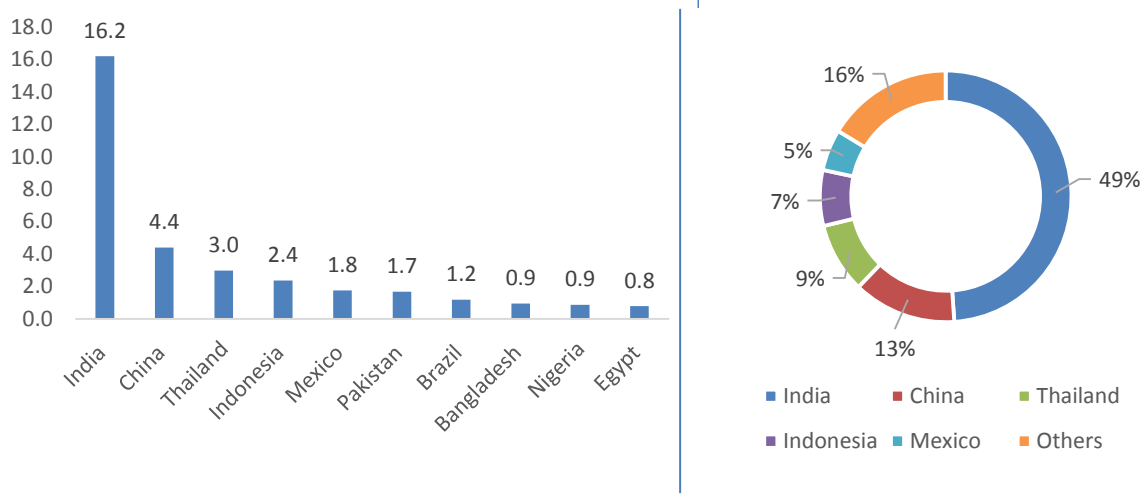
Mango is a tropical crop which is grown in more than 90 countries in the world. The total mango production was estimated at about 43 million MT in 2013 registering a growth of 75 percent when

[38] Centre for Promotion of Imports from Developing Countries (CBI) report titled "Promising EU export markets for fresh mangoes" available online at https://www.cbi.eu/sites/default/files/study/tailored-study-mangoes-west-africa-europe-promising-eu-markets-fresh-fruit-vegetables-2014.pdf

[39] Commercial Opportunities for Fruit in Malawi by Laronne Faulkner, Joe Harrington, Damon Levy, Koen The; available online at http://www.worldagroforestry.org/downloads/Publications/PDFS/WP16120.pdf

compared to a total production of about 24.5million MT in 2000[40]. Though it is grown widely across various geographies, major production of mango comes from geographies which are more conducive for its growth. As of 2012, about 77 percent of the world mango production was contributed by 10 countries with India as the largest producer[41]. The top ten mango producing countries along with total mango production in the 2012 is shown in Figure D.21**.**

*Global mango production, 2012 (in million tonnes)*




***Source: UNCTAD report on Mango, PwC Analysis***

***Figure D: 21: Global mango production, 2012 (in million tonnes)***

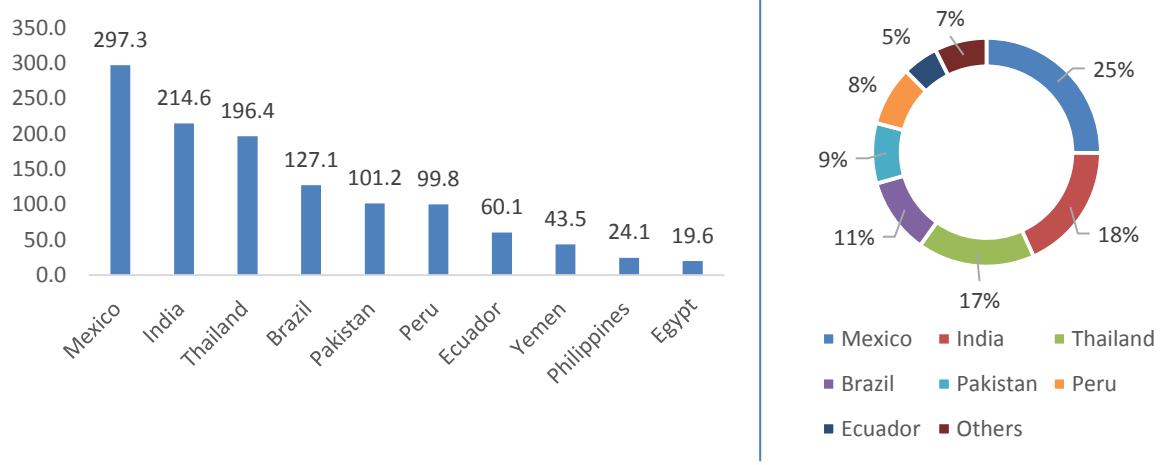
### Mango exports

About 80 percent of world mango trade is represented by the top ten exporter countries. Latin American countries account for about 48 percent of international trade followed by Asian countries which account for about 46 percent. The total share of African countries is just 3 percent of the total world trade Figure D.22 shows the top ten countries exporting mango.

[40] Mango, An INFOCOMM Commodity Profile, UNCTAD; available online at http://unctad.org/en/PublicationsLibrary/INFOCOMM_cp07_Mango_en.pdf

[41] UNCTAD report on Mango

*Major mango exporting countries (in '000 Tonnes)*




***Source: UNCTAD report on Mango, PwC Analysis***

***Figure D: 22: Major mango exporting countries (in '000 Tonnes)***

## Demand for mangoes

Mango consumption is increasing, and with the growing world population this trend is expected to continue. The major consumption centres are North America, European Union, Asia and Persian Gulf. The consumption pattern of these regions for the 2010 to 2014 is given in Table D.5.

***Table D: 5: Major consumption centres***

| Consumption Centres | Consumption in MT | | | | |
|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 | 2014 |
| North America | 378744 | 436178 | 431699 | 496375 | 443852 |
| European Union | 232495 | 258521 | 246267 | 267186 | 288421 |
| Asia | 332859 | 307687 | 358929 | 310426 | - |
| Persian Gulf | 186573 | 207204 | 210683 | 198835 | - |

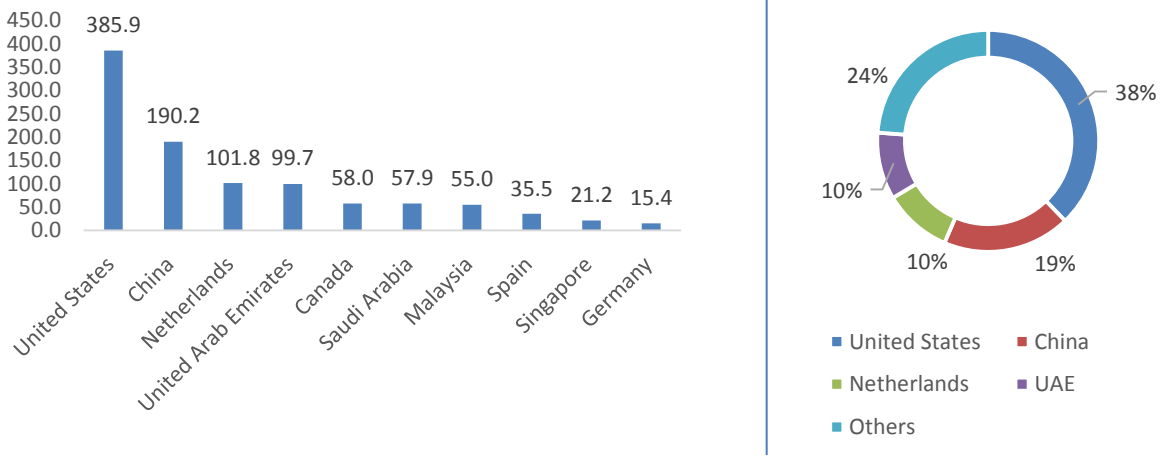
Source: UNCTAD report on Mango

Major importing countries for mangoes are shown in Figure D.23.

## Mango supply chain in Malawi

Mango follows a traditional supply chain in Malawi. The fruit after harvest is transported by the smallholder farmer to the main road with the help of wheelbarrows and bicycles. Consumers, vendors/middlemen can buy the produce directly from farmers. The vendor/middlemen aggregate the produce from different farmers and sell it at the nearest markets or to other vendors/middlemen in the event that there are no markets in the immediate vicinity of the form homestead.

*Major mango importing countries (in '000 Tonnes)*



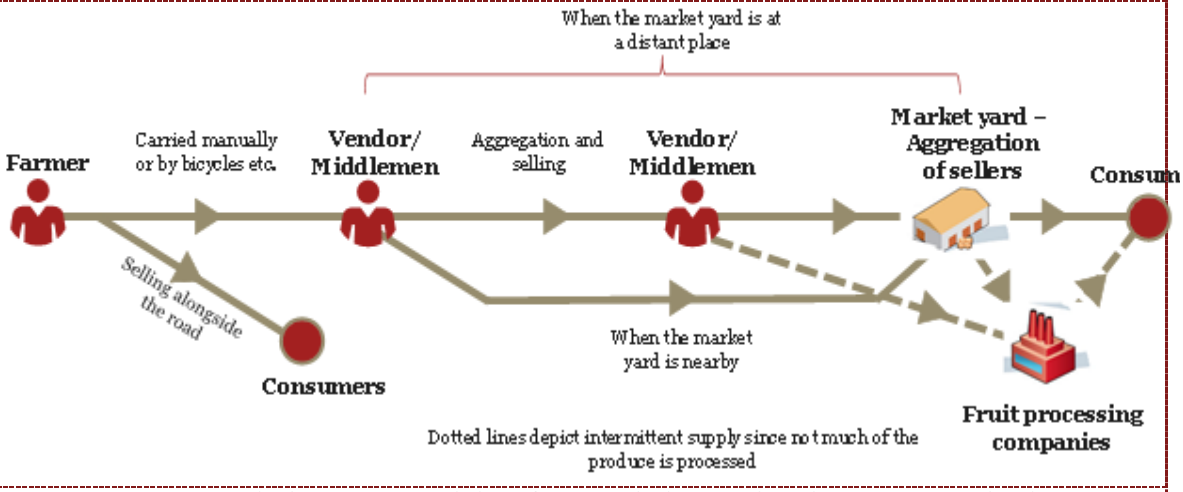

***Source: UNCTAD report on Mango, PwC Analysis***

***Figure D: 23: Major mango importing countries (in '000 Tonnes)***

The number of middleman involved in transporting the produce from the farm to the end consumer depends on the distance of the farm to the market. In many villages the farmers are not able to take their produce directly to the market due to lack of transport vehicles, high travel cost, higher opportunity costs (due to the time demands for doing other household chores and farming

activities). The major markets for mangoes are found in Balaka, Dedza, Ncheu, Lilongwe and Blantyre. FigurD.24 shows the mango supply chain in Malawi.

*Mango supply chain in Malawi*




***Source: Commercial Opportunities for Fruit in Malawi, PwC Analysis***

***Figure D: 24: Mango supply chain in Malawi***

### D.1.6 Oranges

Oranges are one of the most popular fruits in the world and are well known for being a rich source of Vitamin C. Oranges grow well in Malawi, particularly in the southern region of the country. Studies suggest that there is a strong market potential for fresh oranges in the country. Besides, there is also significant market opportunity for locally produced orange concentrate.

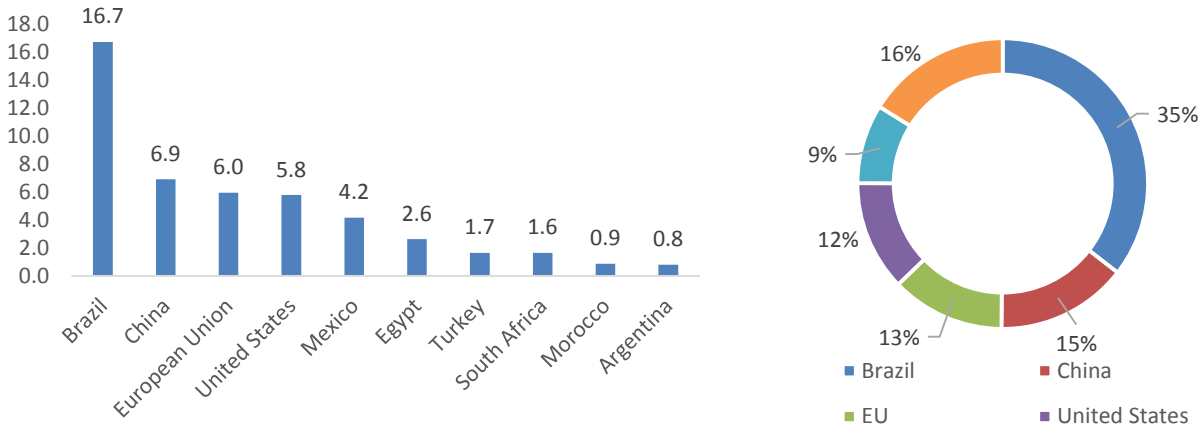
Oranges are seasonal and are harvested from April to October. They are consumed in fresh form or in the form of juice. Oranges are also reported to require less water than other fruit crops and can thrive well in warmer and driers region of Malawi. Studies suggest that there is potential for improvement in yield and size by using improved citrus varieties. Vegetative propagation through grafting is often practiced in the country since grafted plants start producing fruits within two years of planting when compared to propagation through seeds.

The global orange production for 2014-15 was estimated at about 45.8 million MT. However, the global production for the year 2015-16 is forecast down by 3 million MT from the previous year due to climatic variations in Brazil ( which is the largest producer of oranges) and due to effects of citrus greening in the United States[42].

The major producing countries for oranges are Brazil, China, European Union, United States and Mexico which together contributed more than 80 percent of the world orange production in 2014-15 out of which Brazil's share was about 34 percent, followed by China with about 14 percent. European Union and United States share in total production was about 12 percent each, followed by Mexico with a total share of 9 percent. Figure 4.25 shows the top ten orange producing countries in the world.

[42] USDA report titled " Citrus: World Markets and Trade" available online at http://apps.fas.usda.gov/psdonline/circulars/citrus.pdf

*Global orange production, 2014-15 (in milllion Tonnes)*



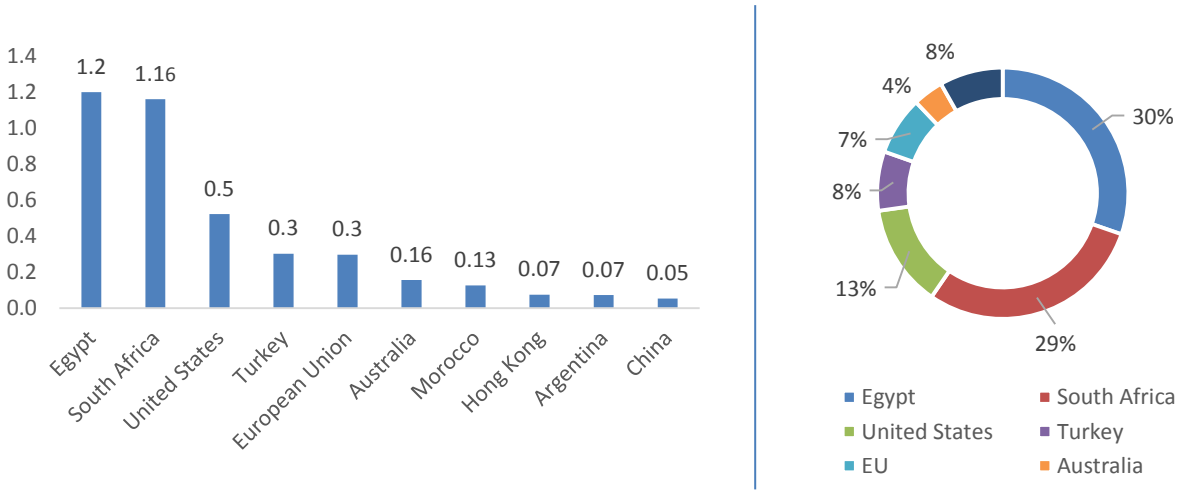

*Source: USDA report titled "Citrus: World Markets and Trade", PwC Analysis*

***Figure D: 25: Global orange production, 2014-15 (in million Tonnes)***

## Exports of oranges

The global trade of oranges is recorded both in the fresh form and in the form of orange juice. In terms of fresh orange exports in the year 2014-15, the total export volume was estimated at about 4 million MT. The major exporting country was Egypt which contributed about 30 percent to the total orange exports, closely followed by South Africa with about 29 percent share. The third position is occupied by United States with about 13 percent contribution to the global fresh orange exports. The major fresh orange exporting countries are shown in Figure D.26**.**

*Global fresh orange exports, 2014-15 (in milllion Tonnes)*

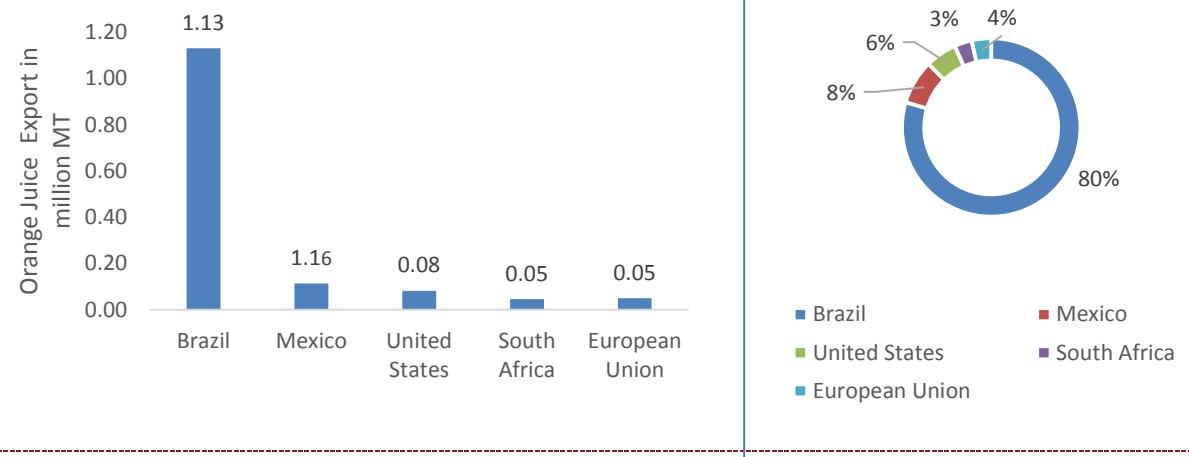



*Source: USDA report titled "Citrus: World Markets and Trade", PwC Analysis*

***Figure D: 26: Global fresh orange exports, 2014-15 (in million Tonnes)***

In the orange juice trade[43] the total export volume was about 1.44 million MT. The major exporter is Brazil with about 78 percent share of the total global exports of orange juice, followed by Mexico with about 8 percent and Untied States with about 6 percent share. The major exporters of orange juice for the year 2014-15 are shown in Figure D.27.

*Global orange juice export, 2014-15 (in milllion Tonnes)*



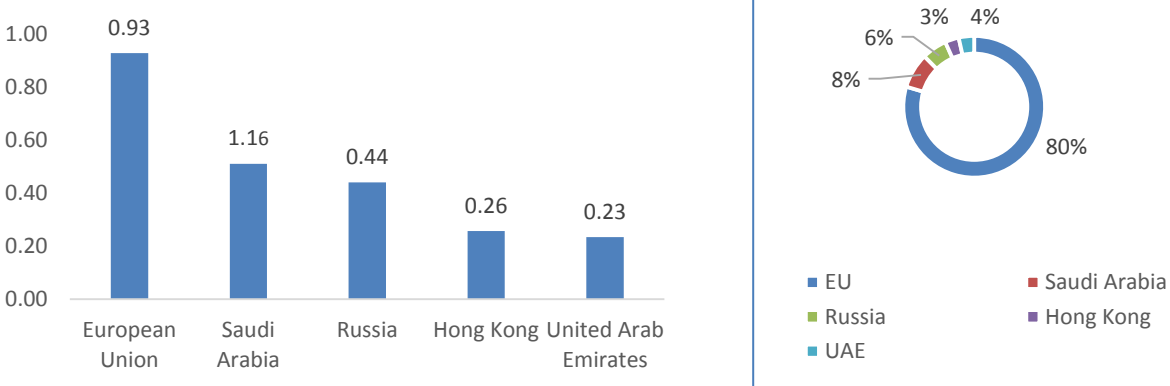

*Source: USDA report titled "Citrus: World Markets and Trade", PwC Analysis*

***Figure D: 27: Global orange juice export, 2014-15 (in million Tonnes)***

## Demand for oranges

Imports of oranges are also recorded in terms of fresh and juice products. In the fresh orange segment the total imports for the year 2014-15 was about 3.79 million MT. The major importer was the European Union which imported about 24 percent of the total fresh orange imports, followed by Saudi Arabia with a share of 13 percent share, closely followed by Russia with a share of 12 percent. Figure 4.28 shows the major regions/countries importing fresh orange juice during 2014-15.

*Major fresh orange importing regions/countries, 2014-15 (in milllion Tonnes)*



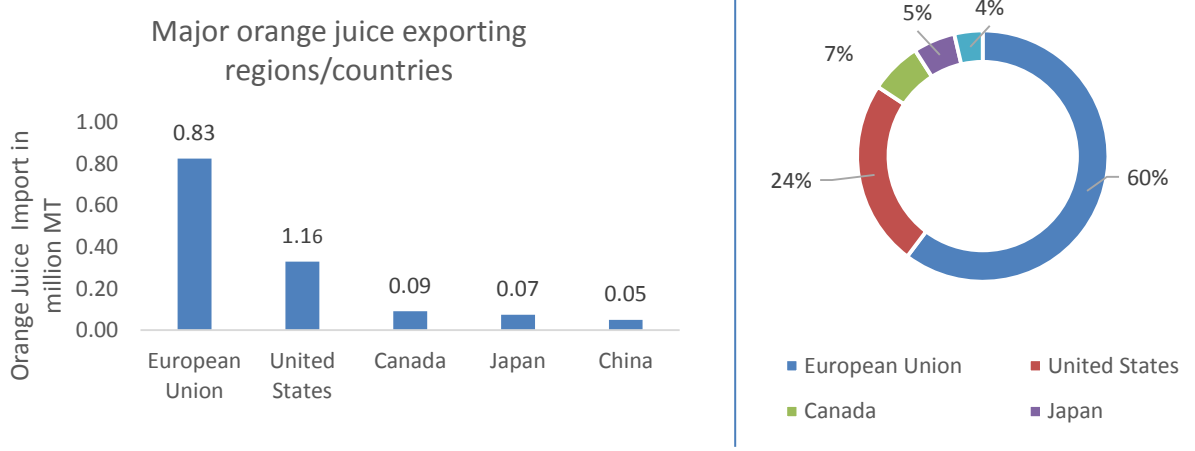

*Source: USDA report titled "Citrus: World Markets and Trade", PwC Analysis*

***Figure D: 28: Major fresh orange importing regions/countries, 2014-15 (in million Tonnes)***

[43] Juice content with 65 degree brix

In 2014-15 the total import volume of orange juice was about 1.49 million MT out of which 77 percent was taken up by consumers in the European Union and United States. The European Union's share was estimated at 55 percent and that for the United States was 22 percent. The major regions/countries importing orange juice during 2014-15 are shown in Figure D.29.

*Major orange juice importing regions/countries, 2014-15 (in milllion Tonnes)*




*Source: USDA report titled "Citrus: World Markets and Trade", PwC Analysis*

***Figure D: 29: Major orange juice importing regions/countries, 2014-15 (in million Tonnes)***

## Orange supply chain in Malawi

The supply chain for oranges is similar to that of mangoes. After harvest the fruit is transported by the smallholder farmers to the nearby marketing places or main road where a consumers, vendors/middlemen can purchase the produce. The vendors/middlemen aggregate the produce from different farmers and sell it at the nearest bigger market or to other vendors/middlemen for onward transport to bigger markets. The number of middlemen involved in transporting the produce from the farm to the end consumers depends on the distance of the farm to the big marketing outlets. In many instances the smallholder farmers are not able to take their produce directly to the market due to lack of transport vehicles, high travel cost, higher opportunity costs. A pictographic representation of orange supply chain in Malawi is shown in Figure D.30.

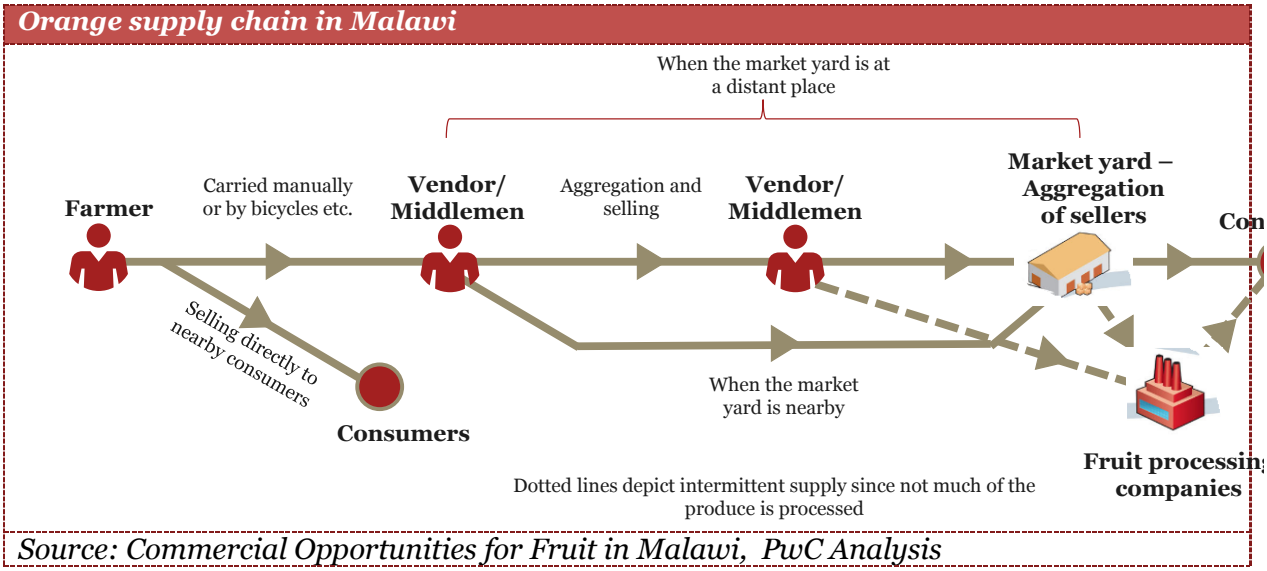



***Figure D: 30: Orange supply chain in Malawi***

### D.1.7 Pigeon peas

Pigeon pea is a grain legume which is native to India and is an important crop of semiarid tropical regions. The crop is cultivated in more than 25 tropical and subtropical countries and its contribution to the total pulses production, globally, is nearly 6 percent[44]. The total global production of the Pigeon Pea was 4.8 Million tonnes[45] in 2014 and nearly 98 percent[46] of the total production was centred in Asian and African countries. In Asia the major pigeon pea producing countries are India and Myanmar while in Africa the major pigeon pea producing countries are Malawi, Kenya, Mozambique and United Republic of Tanzania. The major pigeon pea producing countries along with total production quantities are illustrated in Figure D.31.

[44] FAO stat, 2014
[45] FAOstat, 2014
[46] FAO stat, 2014

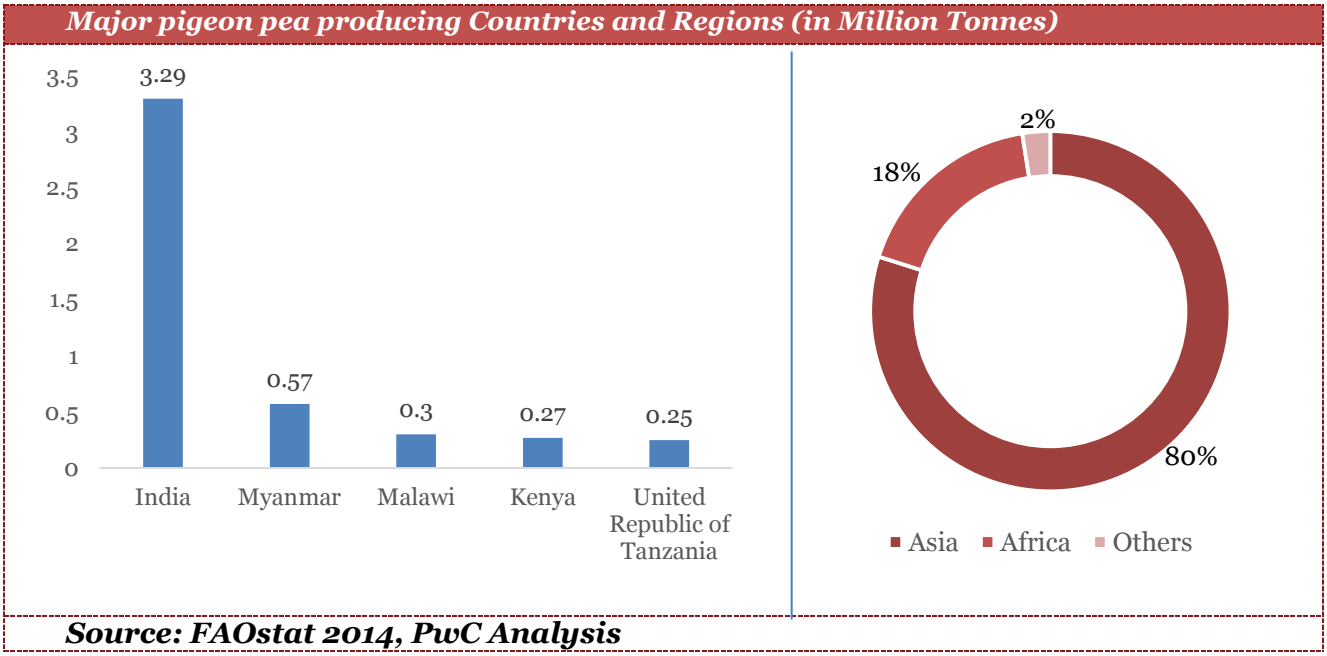



***Figure D: 31: Major pigeon pea producing Countries and Regions (in Million Tonnes)***

Pigeon pea is a significant crop for farmers in Malawi. The crop is mostly grown by intercropping with cotton, maize, sorghum or groundnuts. The plant's ability to fix nitrogen as well as its drought tolerance is perceived to be of benefit for other crops in the rotation. The crop is also suited to the drier regions of southern Malawi. The dry, wet and subtropical climatic conditions has made this crop a viable proposition in the country. The high nutritional value of pigeon peas allows the crop to contribute significantly to food and nutritional security. Pigeon peas are mainly harvested between the months of June and September. They begin arriving on the market in early July and August and peak in September when the second harvest arrives. The high adoption rate of pigeon pea among farmers has raised the production in the country from 0.18 million tonnes in 2009 to 0.30 million tonnes in 2014 at a CAGR of 10.7 percent[47]. It should also be noted that along with the production, the area under pigeon pea in Malawi has increased from 175.7 thousand ha in 2009 to 229.8 thousand Ha in 2014[48]. An overview of the changes in production and area under pigeon pea between 2009 and 2014 is provided in Figure 4.32.

[47] Faostat and PwC analysis.
[48] Faostat and PwC analysis

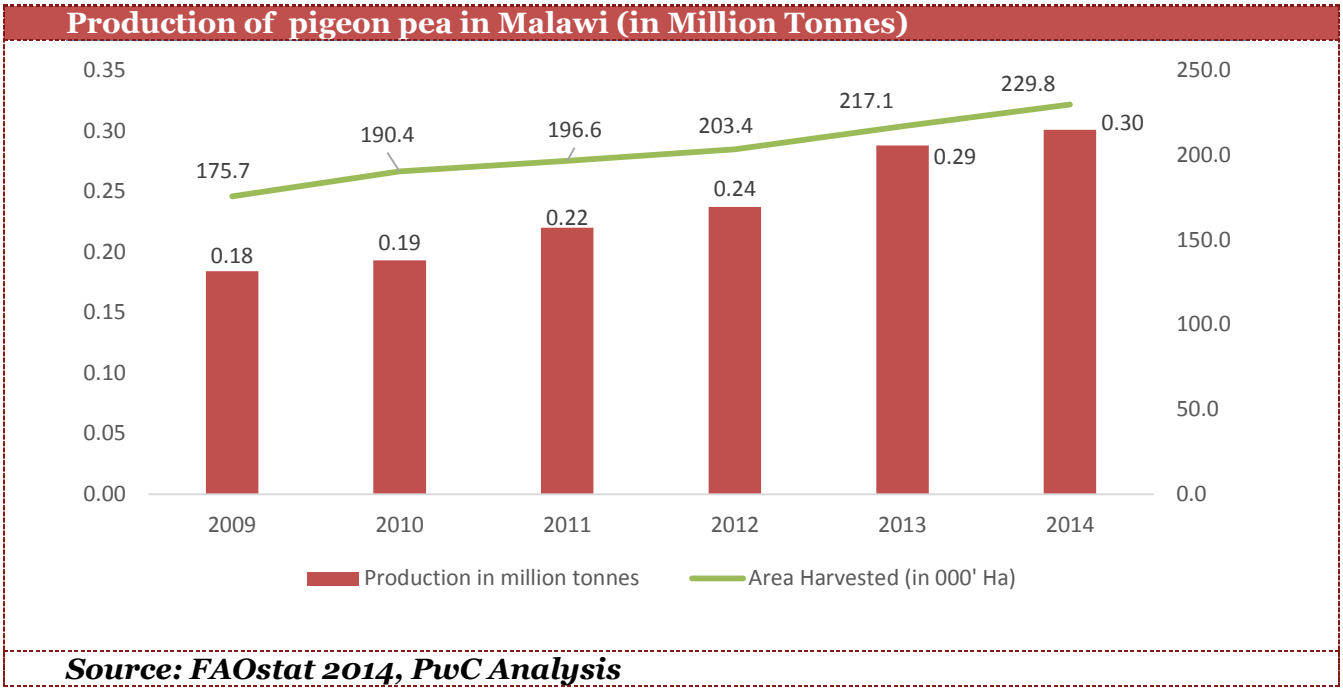



*Figure D: 32: Production of pigeon pea in Malawi (in Million Tonnes)*

**Potential markets for pigeon peas**

NASFAM buys most of the pigeon peas in Malawi while other middlemen operate in areas where NASFAM is not represented. Both NASFAM and intermediate buyers sale their pigeon peas to processors. There are over 10 pigeon pea processors in Blantyre. Some of the major processing companies include Transglobe Limited, Rab Processing and Bharat Trading Company. These companies process pigeon peas to tur dhal which requires four processes, namely: soaking, drying, dehulling and splitting the grain. Ten percent of the processed pigeon peas is reserved for the local market. Ninety percent of the crop produced in Malawi is exported market, with the major export markets being India and the UK.

The SADC region accounted for 0.88 percent of the pigeon pea market in 2015. The 5 largest markets in the Southern African Region are Zambia, DRC, Zimbabwe, Namibia and South Africa. The largest market in the region Zambia accounts for 32.2 percent of the market.

In 2015 the EU accounted for 0.56 percent of the world market for pigeon peas. The United Kingdom, Portugal, Italy and France are the largest importers of pigeon peas in the EU. In terms of market share, the United Kingdom accounts for 0.6 percent, Portugal 0.4 percent, Italy 0.1 percent and Belgium 0.1 percent.

The major market for pigeon peas is in Asia which accounted for 96.6 percent of all exports in 2015. The major markets in Asia are India, Saudi Arabia, Sri Lanka, UAE and Malaysia with India accounting for 96 percent of the pigeon pea market in Asia. The major competitors in Asia are Mynmar accounts for 43 percent of Indian, Tanzania, Mozambique and Malawi. Malawi accounts for 11.8 percent of the Indian market.

## Pigeon pea exports

Excellent market and trading opportunities exist for pigeon pea due to the high demand on the Asian markets, particularly in India which is the leading producer and consumer of pigeon peas. In Asia, Myanmar is the second largest producer and largest exporter of pigeon pea. On the other hand, in Africa, export markets are the key outlets for pigeon pea. The key exporting countries from Africa are Tanzania, Malawi, Kenya and Mozambique. Tanzania exports the Arusha and Madwara varieties both of which are considered the best from Africa by Indian importers. Malawi is rated the next best source of pigeon peas from the continent. The country exported 50,000MT to India in 2011. Although Malawi has a sizable expatriate Asian population (comprising mainly Indians and Pakistanis), only 10 percent of the pigeon peas grown in the country are consumed locally, with the major focus being on exporting the commodity. The varieties grown in Mozambique are also preferred by the Indian importers and in 2011 India imported about 20,000 to 30,000MT.

## Pigeon pea imports

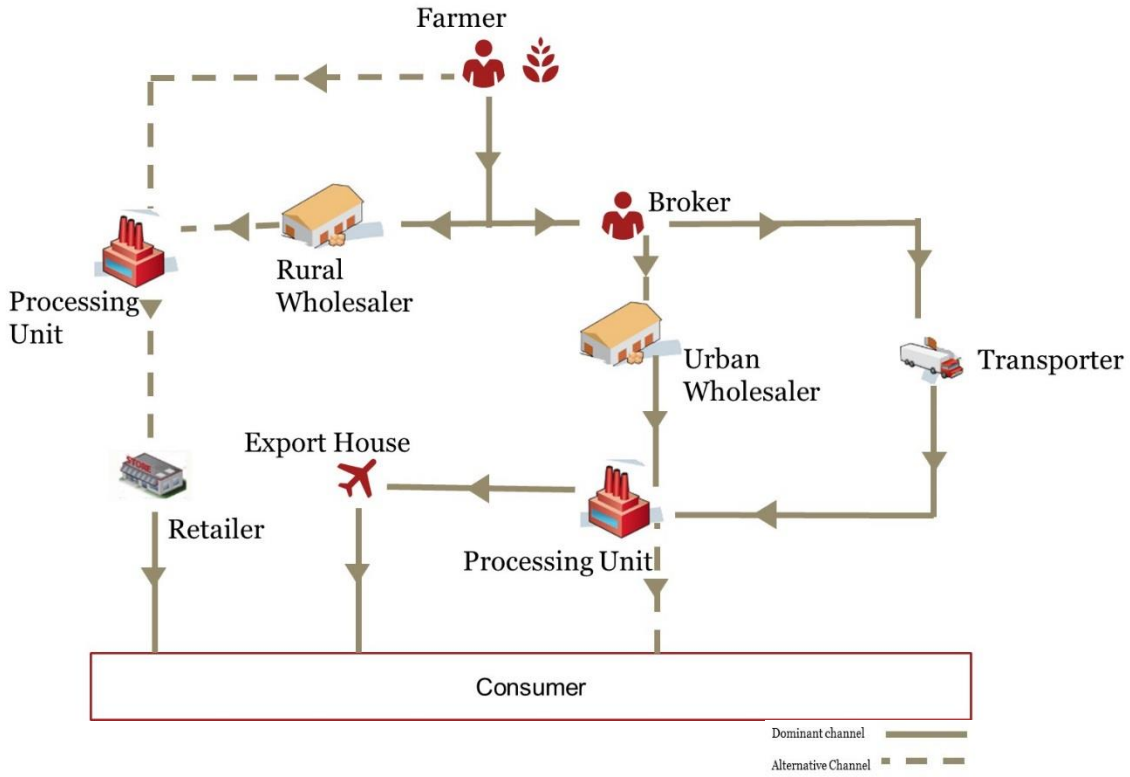
The demand for pigeon peas is mainly centred on the Asian sub-continent. Due to the huge population and the growing appetite for pigeon peas in the region, the demand for crop is rising. In addition, the emigration of people from Asian countries to Europe and other parts of the world is also opening up new import destinations for the commodity.

India is undoubtedly the largest producer of pigeon peas but also its imports have shown a steep increase over the past decade. The steep rise in imports is due to the rise in demand on the domestic market mainly for consumption. It is anticipated that imports into India will continue to grow during the coming years given the limited domestic production and continuous growth in demand. The shortfall of Indian supply is met through imports from Myanmar and Africa. On the other hand the EU market is a new find for the exporters. This is attributed to the significant population of people of Indian descent in the UK and the growing numbers of immigrants into the rest of Europe.

## Pigeon pea supply chain in Malawi

Malawi is among one of the largest exporters of pigeon peas in Africa. The production of pigeon peas in Malawi is dominated by smallholder farmers. From the farmers, the pigeon pea is purchased by an intermediate buyer. These intermediate buyers are common in all the pigeon pea growing districts of Malawi. These traders act as a linkage between farmers and the processors. They usually set up a small procurement centre within the community during the harvesting season where they buy the crop from the farmers. The crop is collected at these community markets are then transported to processors. There are several companies in Malawi that are involved in processing pigeon peas into tur dal for export. These companies include ETG, Transglobe, Rab Processors, Bharat Trading Company and each one of these have established export houses in the country. The overall supply chain for pigeon peas in Malawi is illustrated in Figure D.33.

*Overall pigeon pea supply chain in Malawi*




***Source: India Pulses and Grain Association, PwC Analysis***

**Figure D: 33: Overall pigeon pea supply chain in Malawi**

### D.1.8 Rice

Malawian rice has gained a reputation in the SADC region for its unique aromatic properties. Some of the popular varieties include Kilombera and Faya. Rice is grown mostly in the lakeshore areas, on Phalombe Plain, the lower Shire Valley and areas around Lake Chilwa. The major input suppliers supporting rice production in Malawi include: Rab Processors; Farmers' World; Agora; and, SeedCo. At the production node smallholder farmers are the predominate players in the rice value chain. An average of 63,124ha of land is under rice cultivation each year in Malawi. At the production node, NASFAM facilitates rice clubs of 10-15 members and assists the clubs by establishing linkages and facilitating the marketing of their produce. From the smallholder farmers the produce is bought by a number of agencies including: NASFAM and Mulli Brothers who collect, bulk and store the crop prior to packaging for sale. These companies together with other smaller traders are also involved in retailing the rice on the local market. Processing of rice involves de-hulling and sorting grains, this is done by NASFAM, Rabs, ADMARC and Rice Milling. Wholesaling is done by rice milling, RABS, Tambala, Transglobe and HMS.

#### *Potential markets for rice*

The UK, Zambia, Zimbabwe and South Africa are some of top export destinations for Malawi rice. The export destinations of Malawian Rice are given in the Table 4.4.

The Asian market accounts for 49.5 percent of the world market for rice. Saudi Arabia, China, Iran and Iraq are the biggest importers of rice in the region. Current exporters to the Asian market are India, USA, and Pakistan. The EU market accounts for 31.9 percent of the world rice imports. The biggest markets in the region are the United Kingdom, France and Germany. The SADC market accounts for 5.4 percent of the world market. The major importers in the region are South Africa, Angola, Mozambique and Zimbabwe. The major suppliers to the region include Thailand, India and the UAE. Although Tanzania and Zambia also produce rice in the region, there is still a huge scope for Malawi to penetrate new markets.

***Table D: 6: List of importing countries for rice exports from Malawi***

| Importing countries | Exported value 2015 (USD thousand) | Trade balance 2015 (USD thousand) | Share in Malawi's exports (%) | Exported quantity 2015 | Unit value (USD/unit) | Exported growth in value between 2011-2015 (%, p.a.) | Ranking of partner countries in world imports | Share of partner countries in world imports (%) | Total import growth in value of partner countries between 2011-2015 (%, p.a.) | Tariff (estimated) faced by Malawi (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| World | 50 | -622 | 100 | 125 | 400 | -44 | | 100 | 2 | |
| United Kingdom | 27 | 21 | 54 | 18 | 1500 | -16 | 7 | 2.8 | 1 | 0 |
| Zambia | 11 | 11 | 22 | 42 | 262 | -40 | 131 | 0 | 8 | 0 |
| Zimbabwe | 7 | 7 | 14 | 46 | 152 | -51 | 48 | 0.6 | 9 | |
| South Africa | 5 | -251 | 10 | 19 | 263 | -21 | 13 | 2.1 | -8 | 0 |
| Benin | | | | | | | 12 | 2.2 | 39 | 10 |
| France | | | | | | | 11 | 2.3 | 0 | 0 |

***Source:*** *TRADEMAP*

## D.1.9 Sorghum

Sorghum is grown in the southern, northern and central regions of Malawi. The major input suppliers supporting sorghum production include: Chibuku Breweries, Rab Processors, Farmers' World, Agora and Seedco. Chibuku Breweries, the main player on the Malawi market has established a formal network of suppliers with whom it has contractual arrangements that entail supplying the farmers with all their input requirements and extension support as well as providing a guaranteed market for the sorghum produced. Smallholder farmers are predominantly the producers of sorghum in Malawi. From the farmers, the traders aggregate the commodity for processing. Some of the traders in the sorghum supply chain include the Muli Brothers and a host of smaller traders. The processing of sorghum is a delicate process that requires precision to ensure the quality of the final product is good for brewing purposes. Generally smallholder farmers prefer the white sorghum varieties which a milled for consumption, whereas industrial consumers like Chibuku Breweries prefer the red sorghum varieties which are used for beer brewing. Table 4.5 summarises the sorghum export data for Malawi.

Asia imports 1.4 percent of the world's supply of sorghum and the markets in Asia are India, China and Thailand. The current exporters of sorghum to Asia are Kenya, Pakistan and Saudi Arabia. The European market accounts for 1.7 percent of worlds market of sorghum. The importing countries in the EU are France, Romania and Hungary. The current suppliers to the EU market

are Spain, Italy and Germany. The SADC market constitutes 0.3 percent of world imports with the major importing countries in the SADC region being South Africa, Tanzania and Zimbabwe.

***Table D: 7: List of importing countries for sorghum exports from Malawi***

| Importers | Trade Indicators | | | | | | | | | | | Tariff (estimated) faced by Malawi (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Exported value 2015 (USD thousand) | Trade balance 2015 (USD thousand) | Share in Malawi's exports (%) | Exported quantity 2015 (t) | Unit value (USD/ unit) | Exported growth in value between 2011-2015 (%, p.a.) | Exported growth in quantity between 2011-2015 (%, p.a.) | Exported growth in value between 2014-2015 (%, p.a.) | Ranking of partner countries in world imports | Share of partner countries in world imports (%) | Total import growth in value of partner countries between 2011-2015 (%, p.a.) | |
| World | 45 | 24 | 100 | 273 | 165 | -36 | -34 | -77 | | 100 | 18 | |
| Zimbabwe | 35 | 35 | 77.8 | 210 | 167 | -44 | -43 | 94 | 21 | 0.2 | 19 | |
| Zambia | 7 | 7 | 15.6 | 35 | 200 | 40 | -38 | -94 | 92 | 0 | -28 | 0 |
| South Africa | 4 | -16 | 8.9 | 28 | 143 | -51 | -40 | -93 | 22 | 0.2 | -29 | 0 |
| China | | | | | | | | | 1 | 79.7 | 1766 | 0 |

***Source:*** *TRADEMAP*

### D.1.10 Soya beans

Soya beans are produced in almost all the districts of Malawi as a source of food and income, livestock feed, export earnings and also for improving soil fertility. The major producing areas are Kasungu, Lilongwe and Mzuzu ADDs, which account for nearly 80 percent of the total soya beans production in the country.

#### *Soya supply and demand*

Malawi produces about 100,000 MT of soya bean achieving an average yield of nearly 1.0 t/ha.

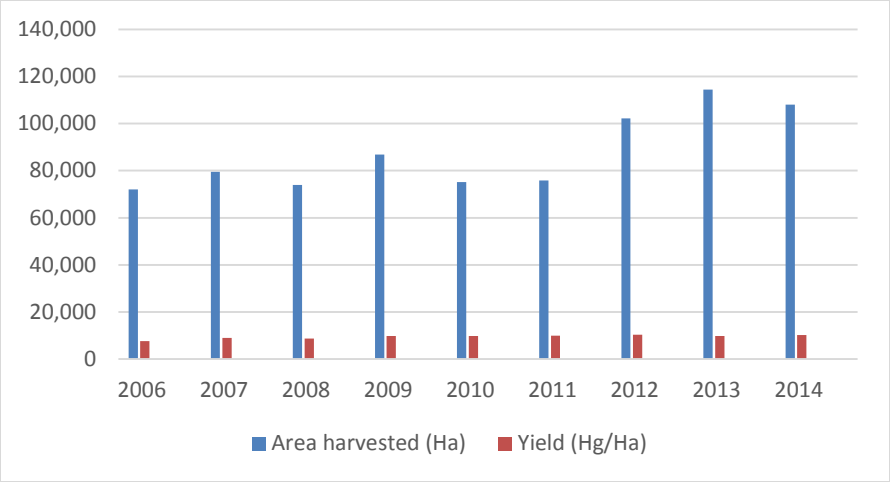



***Figure D: 34: Soya bean production in Malawi***

### *Soya price movements*

Farmers complain that the main obstacle to increasing the area planted to soya beans is the unpredictability of prices throughout the season and the lack of assurance of a minimum farm gate price at harvest time. From the industry's perspective, it is the lack of information on farmers' production decisions that creates panic about potential supplies. From these contrasting perceptions it seems that the main causes of price volatility in the soya bean market in Malawi are: the lack of reliable information on potential soya production (area planted to soya and yields per hectare); and, the GoM policy decisions. For example, the government imposed a ban on exports and then, granted export licenses as well as the limited buying permits and placed restrictions on market entry and competition. A system to estimate areas planted to soya beans and likely yields would make a major contribution to alleviating the vicious circle exacerbating market price volatility.

### *Main conclusions and possible solutions*

The soya bean market in Malawi to a greater extent has been characterised by trade restrictions such as export bans and export licenses which are detrimental to the potential development of soya beans production and marketing. An export ban costs the Malawian economy in dead-weight-loss. Preventing the recurrence of export bans and export licensing in coming seasons would greatly improve prospects for raising production and exports and increasing net farm incomes of soya bean farmers.

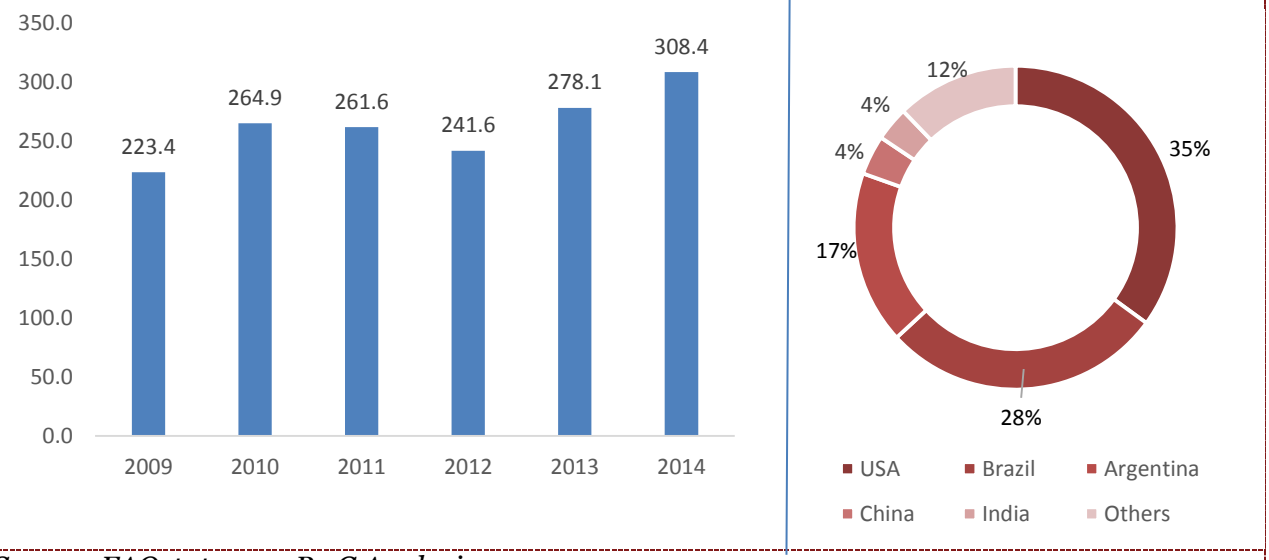
## Supply chain analysis for soya beans

Soya beans serve a variety of functions in the global food chain, ranging from use as edible oil to a source of protein for humans and use in livestock feed. Globally, nearly 87 per cent of the total soya bean production is crushed into soymeal and soyoil, while the remaining 13 per cent is used for direct human consumption[49].

[49] The State of Sustainability Initiatives (SSI) report, https://www.iisd.org/pdf/2014/ssi_2014_chapter_12.pdf

The global soya bean production has increased from 214.5 Million Tonnes in 2005 to 308.4 million tonnes in 2014[50] at a CAGR of 4.12 percent[51]. The major soya bean producing countries are the USA, Brazil, Argentina, China and India. Together these countries account for nearly 88 percent[52] of the total world production. An overview of the total and region wise production of soya beans is illustrated in Figure D35.

***Global soya bean production (in million tonnes) and major soya beans producing countries***




*Source: FAOstat 2014, PwC Analysis*

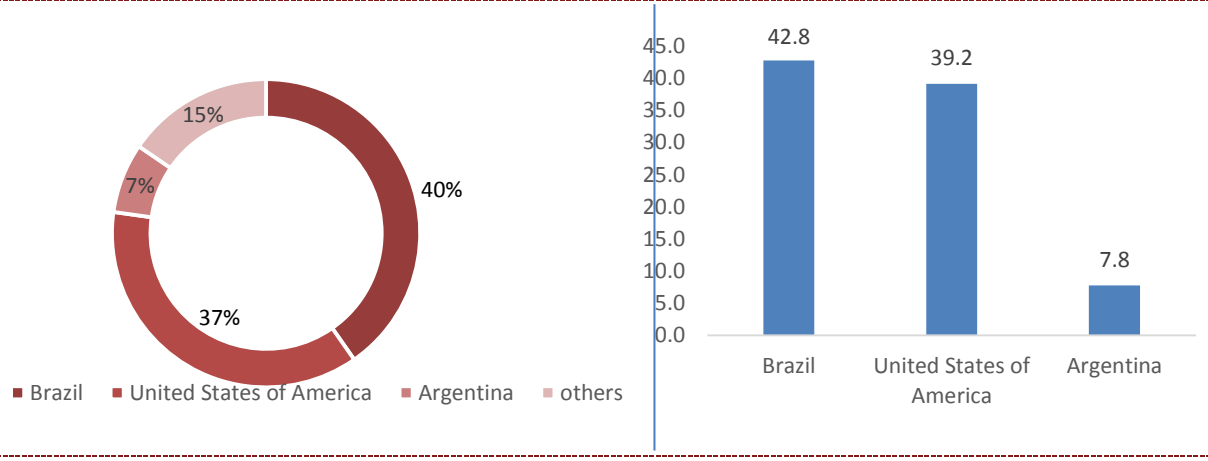
***Figure D: 35: Global soya bean production (in million tonnes) and major soya beans producing countries***

**Soya bean export**

In general, oilseeds and their products are intensively traded commodities around the world and soya beans is no exception in this regard. Nearly 38 percent of the total soya beans produced in 2013 was exported to different countries[53]. The major soya beans exporting countries are Brazil, USA and Argentina. These countries together account for nearly 85 percent[54] of the total export of soya beans around the world. An overview of the total soya beans export from different countries is provided in Figure D.36.

[50] FAOstat 2014
[51] PwC Analysis
[52] FAOstat
[53] FAOstat
[54] FAOstat

*Major soya beans exporting countries and their exported quantities in 2013 (in million tonnes)*



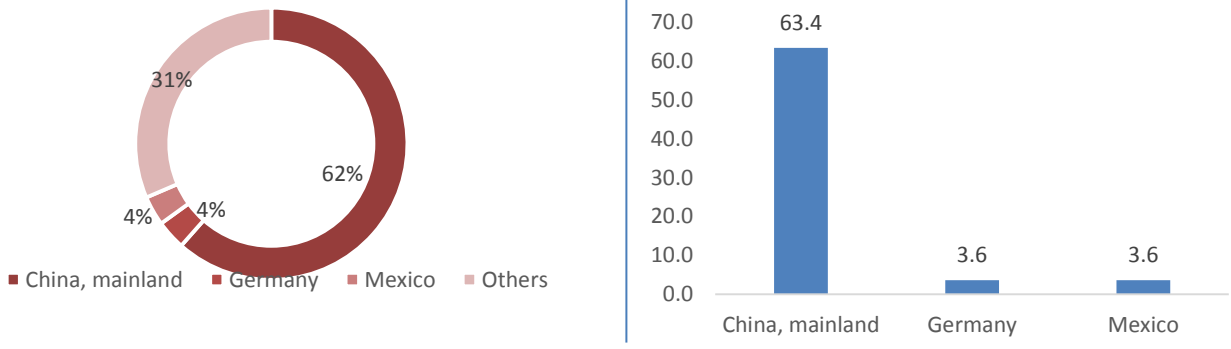

*Source: FAOstat 2014, PwC Analysis*

***Figure D: 36: Major soya beans exporting countries and their exported quantities in 2013 (in million tonnes)***

## Soya bean imports

A large number of countries import soya beans and/or their by-products for domestic consumption. Depending on domestic demand, which is also determined by the structure of the local processing industry, countries import either the primary product (soya beans) or directly soyoil and/or soymeal. The major soya beans importing countries are China, Germany and Mexico. It should be noted that China alone imports nearly 62 percent[55] of the total soya beans imported globally. An overview of the total soya beans imports is provided in Figure D.37.

*Major soya beans importing countries and their imported quantities in 2013 (in million tonnes)*




*Source: FAOstat 2014, PwC Analysis*

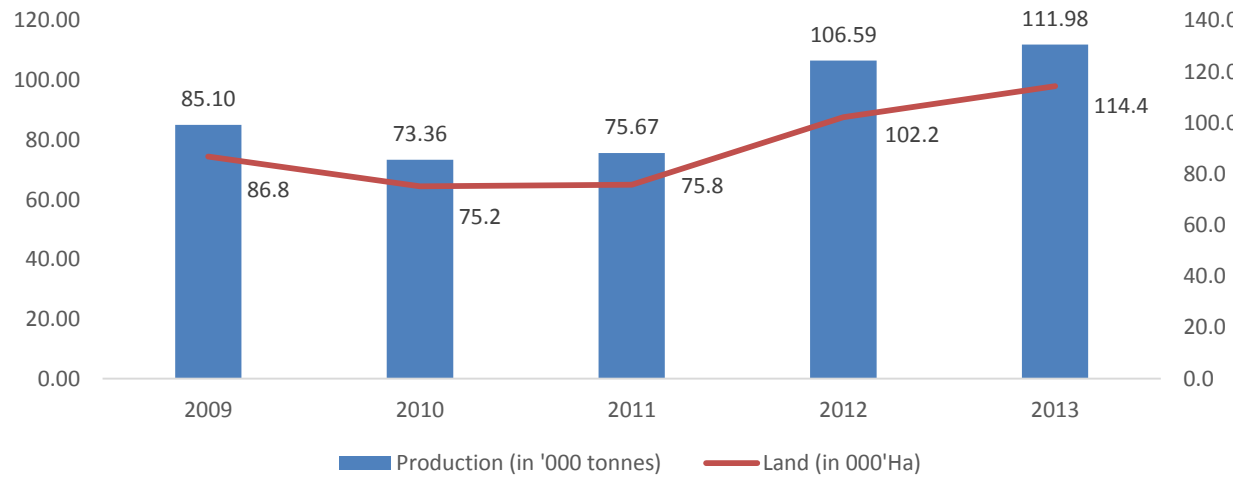
***Figure D: 37: Major soya beans importing countries and their imported quantities in 2013 (in million tonnes)***

[55] FAOstat

**Soya bean scenario in Malawi**

Soya bean is one of the most important crop in Malawi. The crop is increasingly becoming popular and serves as both a food and cash crop. The production of soya beans is rising in Malawi due to government policies on value addition, domestic use and crop diversification. Consequently, there is a significant expansion of the soya bean industry within Malawi in response to the substantial demand from both the local and export markets. Malawi is rated as the fourth largest producer of soya beans in Africa behind the leading countries of South Africa, Nigeria and Zambia[56]. The production trends from 2009 to 2013 show that soya bean production in Malawi has increased at a CAGR of 7.10 percent[57]. An overview of the total production and land under soya beans cultivation is presented in Figure D.38.

***Production of soya beans (in '000 tonne) and land under soya beans cultivation (in '000 ha)***



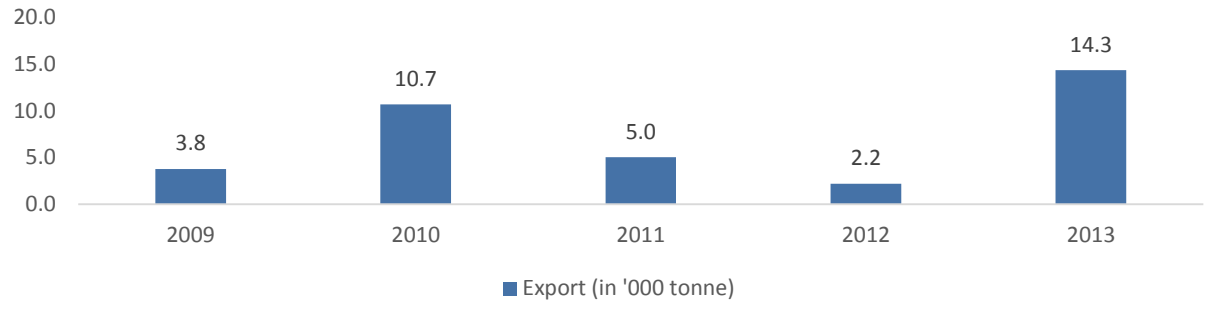

*Source: FAOstat 2014, PwC Analysis*

***Figure D: 38: Production of soya beans (in '000 tonne) and land under soya beans cultivation (in '000 ha)***

Malawi is also one of the major exporters of soya beans in Africa. However, it has been observed that the export market for Malawi has remained confined to other countries on the African continent. In 2013, nearly 90 percent[58] of the total export of soya beans from Malawi was to Botswana and Zimbabwe. An overview of the total export from Malawi is provided in Figure D.39**.**

[56] FAOstat
[57] PwC analysis
[58] FAOstat

*Export of soya beans from Malawi (in '000 tonnes)*




*Source: FAOstat 2014, PwC Analysis*

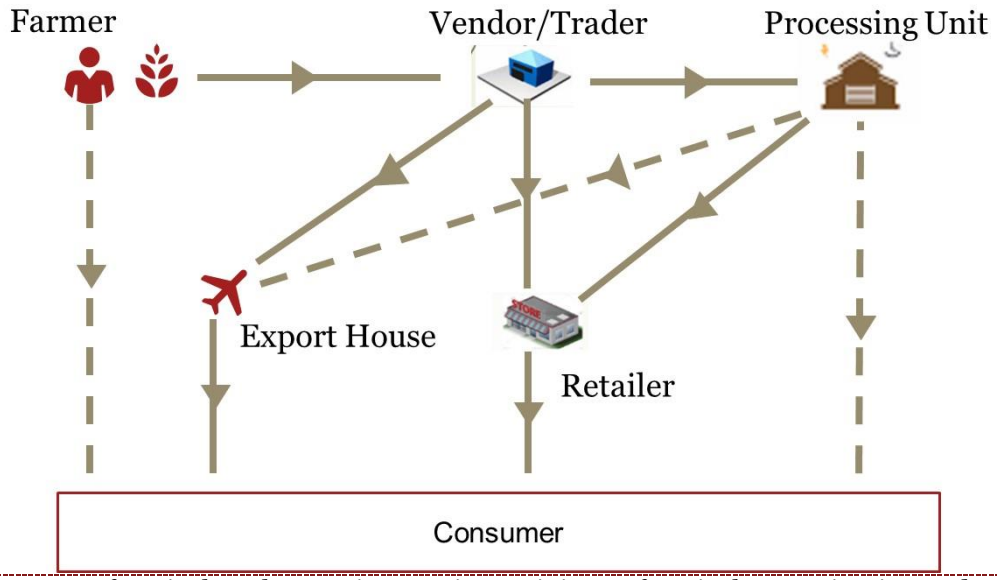
***Figure D: 39: Export of soya beans from Malawi (in '000 tonnes)***

This clearly indicates that there is scope for Malawian exporters to explore new and emerging markets around the globe if they can grow the crop competitively.

**Soya bean supply chain in Malawi**

A typical supply chain for soya beans in Malawi constitutes farmers, vendors/traders, processing and exporting companies and retailers. The majority of farmers sell their produce to traders who act as intermediate buyers and collect the produce at the local procurement centres. The traders include vendors, retailers, wholesalers, companies and individual households. Over half of the soya bean crop is sold to the vendors, leaving other players such as wholesalers, retailers, ADMARC and NASFAM to share the balance. Although the GoM announces a minimum buying price for soya beans, the reality on the ground reveals that the traders to a larger extent, determine prices taking into account the demand, transport costs, quality and other related factors. The vendor incur transportation, storage and packaging costs. The vendor then sells the produce to retailers or other processing units and export houses who in-turn sell it to final consumers. A snapshot of the supply chain is illustrated in Figure D.40.

*Soya supply chain in Malawi*




***Source:*** *Department of Agricultural Extension Services, Ministry of Agriculture Irrigation and Water Development Malawi, PwC Analysis*

***Figure D: 40: Soya supply chain in Malawi***

### D.1.11 Sugar cane

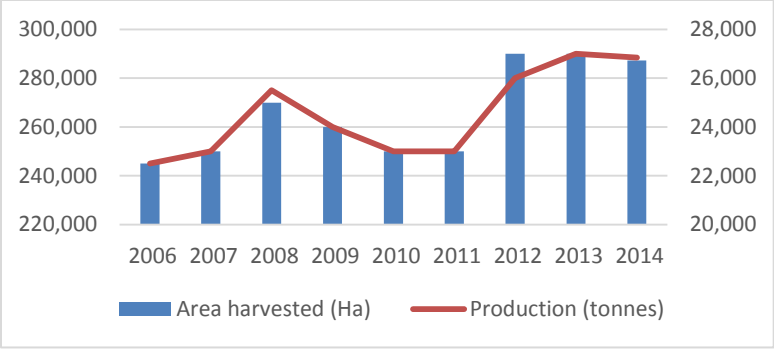
Sugar is the second largest foreign exchange earner in Malawi after tobacco and as such is classified as a priority commodity identified for diversification and value addition purposes under the NES. Furthermore, policy support to the sugar sector offered under the NAS aims to enhance its competitiveness by increasing the factory capacity and overall sugarcane production through efficiency improvements in both the field and factory operations. Illovo is the only company processing sugarcane into sugar in Malawi and is believed to be one of the lowest cost producers in the world.

#### *Sugar marketing and price policies*

Illovo operates five distribution centres for sugar sales throughout Malawi, which offer the traders the opportunity to collect the sugar closer to the markets. The price of sugar is determined by Illovo.

#### *Sugar supply and demand*

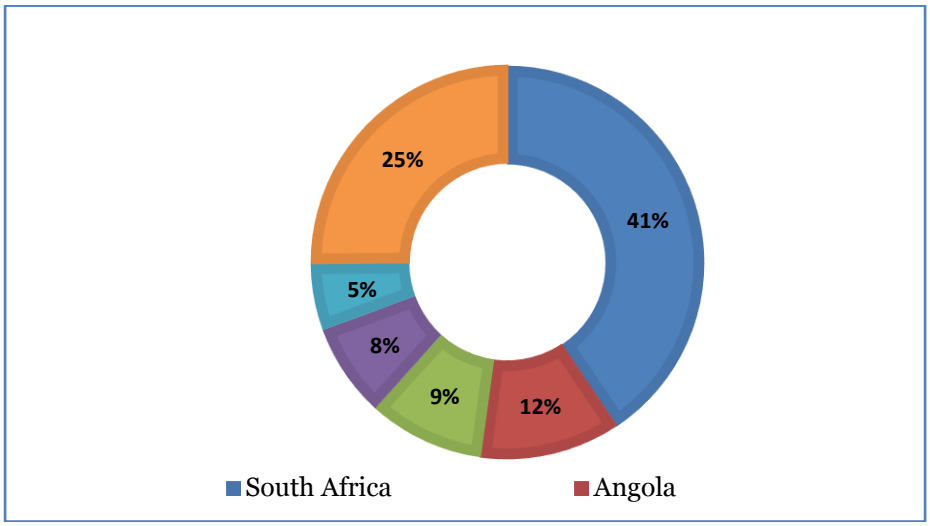
In 2013/14 Illovo produced an estimated 300,000 tonnes of sugar from its factories at Dwangwa, in central Malawi, and at Nchalo, in the south. Over half of the company's total sugar production is sold within Malawi. The remainder is exported to regional markets in Africa and also to the EU and the USA. As highlighted in Figure 4.41, both the land under sugar cane cultivation and production volumes realised recorded noticeable increases between 2011/12 and 2013/14.




***Source:*** *FAOSTAT*

***Figure D: 41: Sugar production in Malawi***

In the SADC region the biggest importers of sugar are South Africa, Angola, Tanzania, Namibia and Botswana. Figure D.42 shows SADCs largest markets for sugar and their market shares. South Africa has the largest market share while Angola, Namibia, Tanzania and Botswana are among the top five importers. The major competitors in the SADC region include Brazil, India, China and Swaziland.




***Source:*** *TRADEMAP*

***Figure D: 42: SADC largest markets for sugar***

Table D.6 shows the world's share of Malawi's sugar exports for 2015. The United Kingdom imports 36 per cent of Malawi sugar. This export destination grew due to the Lome Convention of 1975 and subsequent support systems to improve sugar production. Ten percent of Malawi's sugar goes to South Africa, 9 percent each to Zimbabwe and Spain. Malawi has managed to penetrate the European and African sugar markets to date.

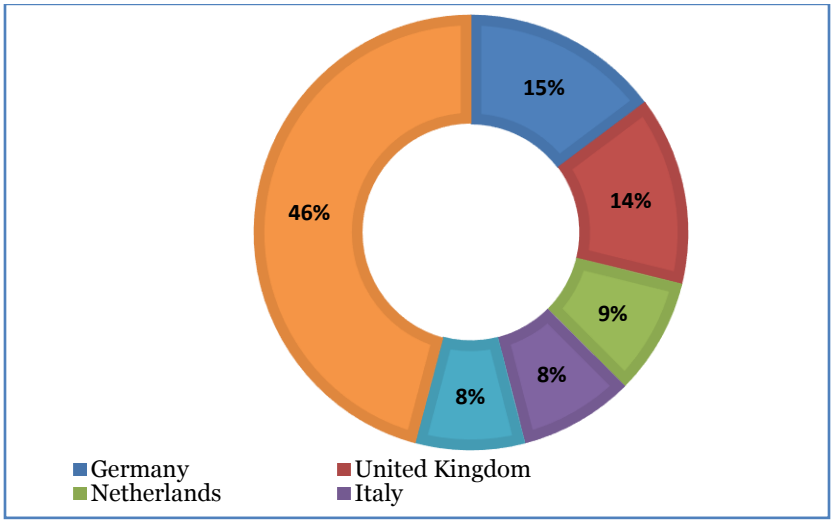
***Table D: 8: Worlds share of Malawi's sugar exports in 2015***

| Importers (2015) | Share in Malawi's exports of sugar (%) |
|---|---|
| World | 100 |
| United Kingdom | 36.7 |
| South Africa | 10.7 |
| Zimbabwe | 9.4 |
| Spain | 9.2 |
| Italy | 8.3 |
| Sweden | 7.3 |
| Belgium | 5.3 |
| Tanzania, United Republic of | 4.8 |
| United States of America | 3.7 |
| Finland | 1.9 |
| Rwanda | 1.1 |
| Uganda | 0.7 |
| Burundi | 0.7 |
| Kenya | 0.1 |
| Mozambique | 0 |

***Source:*** *TRADEMAP*

## EU sugar market

The European Union's largest markets are the United Kingdom, Germany, Netherlands France and Italy. Figure 4.42 displays their corresponding shares. The potential competitors to EUs sugar market are France, Belgium and Germany. There is a lot of intra-EU trade in sugar.

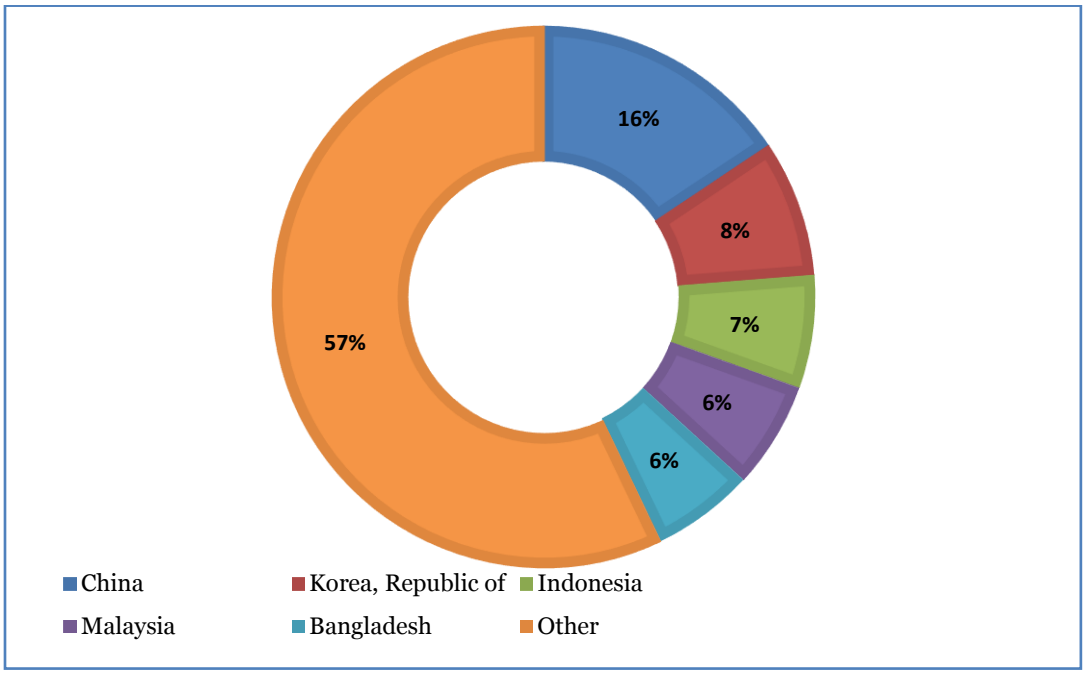



***Source:*** *TRADEMAP*

***Figure D: 43: EU sugar market shares***

### Asian sugar markets

The Asian top five markets for sugar are China, Korea, Indonesia, Malaysia and Bangladesh (Figure 4.43). The potential competitors in the Asian sugar markets include Thailand, China and Brazil. The tariff rates for the competing importers are zero rated. They have among others advantages in costs and of distance to the Asian market.

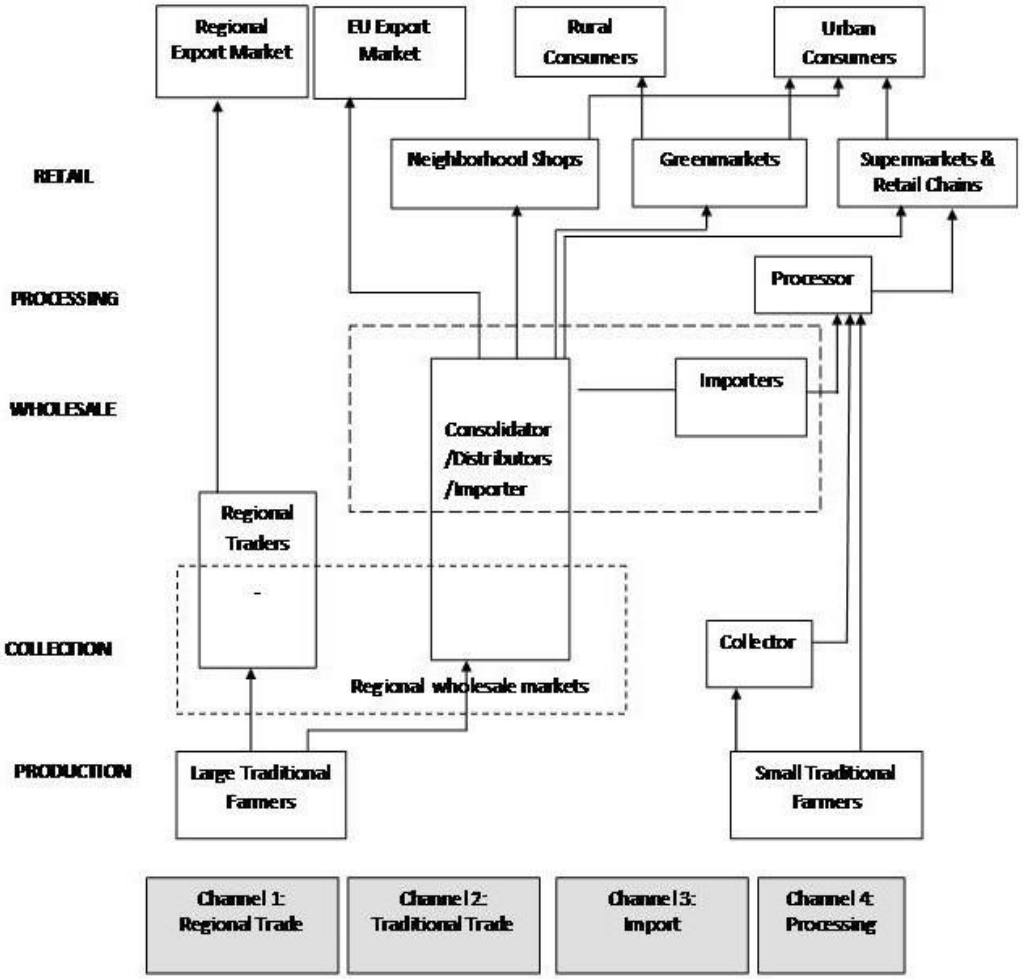



***Source:*** *TRADEMAP*

***Figure D: 44: Asia sugar importers***

### D.1.12 Fruits and vegetables

Malawi's agro-ecological conditions are suited to the production of fruit and vegetables such as tomatoes, baby corn, citrus, fine beans and mangoes. Malawi has abundant water resources including dams, lakes and rivers which give it an advantage in terms of the availability of cheaper irrigation water in addition to the relatively cheap labour. Despite the abundance of water resources, the potential for vegetable production still remains underdeveloped. Smallholder farmers are the main players in the production of vegetables in Malawi. The few large scale farmers tend to concentrate on supplying the export market. Local production therefore tends to be encumbered by low productivity levels due to: lack of improved seed and varieties; the overall poor quality of products; and, seasonal gluts. The market outlets include both the formal markets (including the big retail shops) and the informal markets (including local consumers and roadside stalls). The big supermarket chains in Malawi include Shoprite, SPAR and Superior Food Market. Figure 4.44 presents the vegetable value chain.




***Source:*** *USAID (2010)*

***Figure D: 45: Vegetable value chain***

Table D.7 shows the exported value of vegetables from Malawi in 2015. The major export markets for edible vegetables and certain roots and tubers are also presented in Table D.7.

***Table D: 9: Export destinations for edible vegetables, certain roots and tubers***

| Country | Export value in 2015 (USD' 000) | Trade balance in 2015 (USD' 000) | Share in Malawi's exports (%) |
|---|---|---|---|
| World | 64,732 | 61,306 | 100 |
| India | 50.538 | 50,522 | 78.1 |
| United Arab Emirates | 5,515 | 5,513 | 8.5 |
| Singapore | 1,675 | 1,675 | 2.6 |
| Indonesia | 1,173 | 1,173 | 1.8 |
| United Kingdom | 1,113 | 1,113 | 1.7 |
| Zimbabwe | 1,057 | 1,017 | 1.6 |
| South Africa | 1,023 | -18 | 1.6 |
| Malaysia | 937 | 937 | 1.4 |
| Netherlands | 489 | 486 | 0.8 |
| Mauritius | 321 | 321 | 0.5 |
| Botswana | 249 | 249 | 0.4 |
| Congo, Democratic Republic of the | 142 | 142 | 0.2 |
| Germany | 81 | 81 | 0.1 |
| Thailand | 74 | 74 | 0.1 |
| Kenya | 63 | 63 | 0.1 |
| Zambia | 50 | 41 | 0.1 |
| Italy | 45 | 40 | 0.1 |
| Fiji | 43 | 43 | 0.1 |
| Mali | 41 | 41 | 0.1 |
| Finland | 37 | 37 | 0.1 |
| Turkey | 23 | 23 | 0 |
| Mozambique | 21 | -1,439 | 0 |
| France | 13 | 13 | 0 |
| Poland | 5 | 5 | 0 |
| Tanzania, United Republic of | 3 | -45 | 0 |

***Source:*** *TRADEMAP*

The world's largest importers of vegetables from Malawi are India and the UAE. About 78 percent of Malawi's vegetables are exported to India.

### *Potential markets for vegetables*

Table D.8 summarizes the largest markets for baby corn, mange tout, citrus, fine beans and mangoes in the SADC, EU and the Asian regions.

***Table D: 10: Leading markets for baby corn, mange tout, citrus and fine beans***

| Commodity | Leading consumers in the SADC region |
|---|---|
| Baby corn | South Africa (27%), Namibia (23%), Botswana 18%, Seychelles (13%), DRC (5%), Other (16%) |
| Mange tout | South Africa (64%), Lesotho (23%), Namibia (5%), Botswana (3%), Mauritius (1%), Other (4%) |
| Fine beans | Swaziland (27%), Lesotho (24%), South Africa (20%), Angola (6%), Botswana (5%), Other (8%) |
| Citrus | South Africa (24%), Angola (18%), Mauritius (17%), Zambia(12%), Namibia (8%), Other |
| | **Leading consumers in the EU market** |
| Baby corn | Germany (21%), United Kingdom (20%), France 18%, Netherlands (7%), Austria (6%), Other (28%) |
| Mange tout | United Kingdom (24%), Netherlands (24%), Belgium (21%), Germany (10%), France (7%), other (14%) |
| Fine beans | Spain (22%), France (21%), United Kingdom (19%), Netherland 14%, Germany 9%, Other (15%) |
| Citrus | Germany (17%), France (16%), Netherlands (15%), United Kingdom (12%), Italy (6%), other (34%) |
| | **Leading consumers in Asia** |
| Mange tout | Vietnam (25%), Malaysia (19%), Taipei Chinese (9%), Japan (8%), Pakistan (7%), Other (32%), the Asian market occupies 9% of world market. |
| Fine beans | Singapore (40%), Japan (12%), Kuwait (12%), Saudi Arabia (7%), Bahrain (5%), Other (24%) |
| Citrus | Hong Kong China (11%), Japan (11%), Saudi Arabia (10%), China (8%), Korea (8%), Other (52%) |

***Source:*** *Compiled from TRADEMAP*

### D.1.13 Wheat

Wheat production in Malawi is very low. Only 3 percent of wheat used for flour production is procured from local farmers with the balance being imported. SeedCo is the major supplier for wheat seed in the country. Muli Brothers and other small traders are involved in the wheat trade. Bhakhresa and Capital Foods process wheat producing flour and other by-products such as wheat bran. The distribution of wheat and its by-products is done through local supermarkets and wholesalers such as Kulima Gold, Farmers' World, Agora and Right Price. There are no reported exports of wheat from Malawi due to the low production the huge local demand and low processing capacity. Processors import wheat and produce bran which is exported for stockfeed manufacturing in the neighbouring countries of Zimbabwe, South Africa and Zambia.

# APPENDIX E: STRATEGIC CONSIDERATIONS IN CHOOSING ENTERPRISES TO INCLUDE UNDER THE SVIP

Malawi is highly dependent on agriculture but about 70 percent of arable land is probably underutilized since it is mainly used for subsistence farming under rain-fed conditions. There is definitely a need for change. In an attempt to increase productivity and generate income for the rural households, the government, with assistance from development partners has developed several irrigation schemes. However, many smallholder irrigation schemes have failed to significantly close the gap between irrigated crop yields and potential crop yields. This gap between potential and actual average farm crop yields suggests an abundant scope for improvements in productivity. Therefore as we propose production models for the SVIP the main issues to address are:

- low crop productivity and production that currently contributes little to the overall development of the country and the project area;
- most irrigation schemes have not been viable mainly because of a poor combination of crops in the cropping programme;
- inadequate support from research and extension institutions to ensure that farmers can increase productivity through the use of new technologies; and,
- fragmented land holdings that are not effectively utilized. On irrigation schemes each farmer concentrates on a small piece of land that defies economies of scale.

The smallholder maize based farming system currently followed in the lower Shire Valley contributes little to national development and the development of irrigation is intended to change this and make the lower Shire Valley a big contributor to national economic development. As a strategy to have the SVIP achieve its objective the proposed production models should address the problems of low productivity and viability of irrigation schemes. This can be achieved through the use of modern production technologies and growing of high value crops.

**Specific objectives**

The specific objectives to enable full exploitation of the agronomic potential of the lower Shire Valley are as follows:

- the project area receives low and erratic rainfall and experiences high evapotranspiration rates, high temperatures and low relative humidity making it difficult to grow crops under rain-fed conditions. The objective is to introduce an irrigation system that will be able to do well under these harsh conditions.
- low crop productivity is due to poor crop and irrigation management and use of inferior crop varieties. The objective is to improve crop productivity through the use of appropriate technologies (including improved varieties, soil fertility, pests and disease management) and irrigation water management.
- the current smallholder irrigation schemes are performing poorly or failing mainly due to viability issues, poor scheme management, poor crop mix and size of the schemes. Therefore objectives are, to:
    - diversify the range of crops grown on the schemes by including high value crops in the crop mix; and,

- aggregate household farm holdings and employ professionally qualified personnel to manage the farming operation on a commercially viable basis.

- tillage and other operations require appropriate equipment to ensure high crop yields. The objective is to fully mechanize to promote efficiency and productivity.
- technology development that will give direction on what crops to grow, when and how is crucial for the success of the irrigation scheme. The objective is to obtain funding to support research and technology generation at least three years which could be extended to five years while arrangements are put in place to levy the farmers to fund research just as they do in the tea and tobacco industry. The intention would be to ppromote a vibrant crop research agenda to support cropping in the lower Shire Valley. The research station at Kasinthula could be a beneficiary of this funding arrangement. To achieve this, the resident scientists should develop strong links with international research organizations and research institutions in developed countries with similar climatic conditions (such as Australia and others) and develop programmes that address the problems faced by farmers in the lower Shire Valley

**Strategic considerations**

The choice of crops to be grown the SVIP area is predicated on four main strategic considerations: the desire to realise productivity improvements; the desire to ensure enterprise viability; the desire to ensure enterprise compatibility from an agronomic perspective and the desire to ensure continuous improvement through providing support research and technology generation.

***Crop productivity***

The Shire Valley has very good soils and climatic conditions that can enable growth of several crops. Increased crop productivity will be achieved through the use of high yielding crop varieties obtained within the country, the region or abroad. Crop management must be of high quality and this can be achieved by hiring competent experienced personnel to manage the crop on behalf of the farmers. Application of fertilizers, pest and disease control must follow professional recommendations. Provision of quality services and management are covered in the other sections under producer organization and service provision.

***Enterprise viability***

Large investment is going into the SVIP and the cropping must be such that it pays for the investment. Therefore there is need to ensure that crops grown should not only be for food security (strong sentiments from the communities) but should ensure high returns that will lead to development of the project area and the country. However, there is need for a learning period and there might be need to start off with easy-to-grow and easy-to-store annual crops for the first two to three years.

***Enterprise compatibility***

As stated earlier there is a need to commence project implementation with annual crops that may be less valuable but will enable the farmers to organize production and marketing of high value crops. Therefore the strategy is to propose a combination of crops for the short term, medium and long term.

- Short term (up to 3 years) – easy to grow, easy to manage and easy to store crops such as maize, sorghum, beans, pigeon pea, soya beans, cotton and sugar cane;

- Medium term (3 to 5 years) – assuming that market issues of high value crops are addressed during the first three years, crops for export such as baby corn, green beans, butternuts, chillies and other similar crops; and,
- Long term (from 5 years) – other high value crops such as bananas, citrus, and mangoes can be introduced gradually in tandem with investments in value adding activities in the value chain. Mangoes are already being grown by Malawi Mangoes in Salima and Crown Mangoes in Shire Valley. Malawi Mangoes is also growing bananas. Their farms could act as nucleus farms for mangoes and bananas produced in the SVIP.

### Crop production models

During the early stages of the irrigation scheme the crop focus will be on easy-to-grow, easy-to-store crops as farmers' transition from a focus on subsistence to a commercial orientation. Table E.1 presents possible crop combinations/rotations during the first five years. In terms of crop combinations there could be four options, namely:

- **Option 1**: Cotton and soya bean (summer) and beans, maize (winter);
- **Option 2**: Cotton and pigeon peas (summer) and beans, maize (winter);
- **Option 3**: Cotton and pigeon peas (summer) and soya beans, maize (winter); and,
- **Option 4**: Rice in summer in place of cotton rotated with fine beans in winter in place of maize.

***Table E: 1: Possible crop rotations during the first three years***

| Option | Year 1 | | Year 2 | | Year 3 | |
|---|---|---|---|---|---|---|
| | **Summer** | **Winter** | **Summer** | **Winter** | **Summer** | **Winter** |
| **Option 1** | Cotton | Beans | Cotton | Beans | Cotton | Beans |
| | Soya beans | Maize | Soya beans | Maize | Soya beans | Maize |
| | Perennials | Perennials | Perennials | Perennials | Perennials | Perennials |
| **Option 2** | Cotton | Beans | Cotton | Beans | Cotton | Beans |
| | Pigeon pea | Maize | Pigeon pea | Maize | Pigeon pea | Maize |
| | Perennials | Perennials | Perennials | Perennials | Perennials | Perennials |

Option 2 basically replaces soya beans with pigeon pea. Under each option some area will be under sugar cane. Depending on demand for perennial crops the area under these crops can be increased if the returns are more attractive than for the traditional annual crops.

### Development of the cropping programme

For the first five years emphasis will be placed on facilitating the transformation from a subsistence to a commercial orientation. This will be achieved by providing extension support and strengthening service provision to ensure that required inputs such as planting materials, fertilisers and pesticides are readily available in the project area. In addition, support will be provided to enhance access to markets for the various types of produce.

Table E.2 presents cropping cycles showing time of planting, vegetative growth and harvesting for some selected crops. There will be a very tight change over from the summer to winter crops or vice versa. To overcome this bottleneck there is need to have modern heavy machinery and equipment.

*Table E: 2: Crop cycles of selected potential crops for the Shire Valley Irrigation Project*

| Annual Crops | Hot and Wet Season | | | Cold / Dry Season | | | | | Hot and Dry Season | | Hot and Wet | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
| Cotton | | | | | | | | | | | | |
| Soya beans | | | | | | | | | | | | |
| Pigeon Pea | | | | | | | | | | | | |
| Maize | | | | | | | | | | | | |
| Dry beans | | | | | | | | | | | | |
| Tropical fruits | | | | | | | | | | | | |
| Sugar cane | | | | | | | | | | | | |

Sowing Growing Harvesting

With this in mind the cropping programme adopted for the first 5 years includes crops which are relatively easy to grow, store and market. Table E.3 summarises the pattern of development of the cropping programme during the course of project implementation. The introduction of perennial and high value crops in the cropping programme should be done with careful consideration of the ancillary investment that will be required to ensure that adequate support services are available in the project area. For example, the establishment of good nurseries and the provision of extension support cannot be over-emphasized.

*Table E: 3: Crop combination for 500ha Farm Model*

| Crop | Crop area by year of project implementation in ha | | | |
|---|---|---|---|---|
| | Year 1 to 5 | Year 6 to 8 | Year 9 | Year 10 onwards |
| **Food plot – 25 ha** | | | | |
| Maize | 25 | 25 | 25 | 25 |
| Dry beans | 12.50 | 12.50 | 12.50 | 12.50 |
| Vegetables | 12.50 | 12.50 | 12.50 | 12.50 |
| Total (summer/winter) | 25.00 | 25.00 | 25.00 | 25.00 |
| **Commercial crop area – 475ha** | | | | |
| Bananas | 0.00 | 47.50 | 33.35 | 19.00 |
| Citrus | 0.00 | 19.00 | 19.00 | 19.00 |
| Cotton | 157.00 | 145.00 | 145.35 | 145.35 |
| Dry beans | 237.50 | 209.00 | 209.00 | 209.00 |
| Maize | 237.50 | 209.00 | 209.00 | 209.00 |
| Mangoes | 0 | 19.00 | 19.00 | 19.00 |
| Pigeon peas | 158.65 | 145.35 | 145.35 | 145.35 |
| Soya beans | 158.65 | 146.30 | 146.30 | 146.30 |
| **Total (summer)** | **475.00** | **503.50** | **489.25** | **475.00** |
| **Total (winter)** | **475.00** | **503.50** | **489.25** | **475.00** |

In Zimbabwe, the introduction of these enterprises relied heavily on the extension support that was provided by South African based companies and consultants. Additional investment will be required to establish pack-sheds, processing and transport facilities to ensure that the produce is well packaged to arrive at the destination markets in a presentable condition to be able to compete with produce from other producing countries. Table E.4 summarises the capital investment requirements on a 500ha farm unit.

***Table E: 4: Capital expenditure requirements for 500ha Farm Model***

| **Description** | **Unit cost** | **Number/cost** | | **Depreciation** | |
|---|---|---|---|---|---|
| | | **No.** | **US$** | **Rate** | **US$** |
| **Machinery and equipment:** | | | | | |
| Planters | 15,000 | 2 | 30,000 | 10% | 3,000 |
| Sprayers | 10,000 | 1 | 10,000 | 10% | 1,000 |
| Disk harrows | 10,000 | 1 | 10,000 | 10% | 1,000 |
| Tractors (100kW) | 25,000 | 2 | 50,000 | 12.50% | 6,250 |
| Tractors (60kW) | 20,000 | 1 | 20,000 | 12.50% | 2,500 |
| Trailers | 5,000 | 1 | 5,000 | 10% | 500 |
| Water bowsers | 2,000 | 1 | 2,000 | 5% | 100 |
| Fuel bowsers | 1,000 | 1 | 1,000 | 5% | 50 |
| Fertiliser spreader | 4,000 | 1 | 4,000 | 5% | 200 |
| Miscellaneous | 5,000 | 1 | 5,000 | 10% | 500 |
| **Sub-total** | | | **137,000** | | **15,100** |
| **Vehicles:** | | | | | |
| Truck (1tonne) | 25,000 | 1 | 25,000 | 20% | 5,000 |
| D/cab vehicle | 30,000 | 1 | 30,000 | 20% | 6,000 |
| Motor cycles | 5,000 | 4 | 20,000 | 20% | 4,000 |
| **Sub-total** | | | | | **15,000** |
| **Buildings:** | | | | | |
| Fuel storage tanks | 5,000 | 1 | 5,000 | 5% | 250 |
| Farm shed | 15,000 | 1 | 15,000 | 5% | 750 |
| Storage shed | 10,000 | 1 | 10,000 | 5% | 500 |
| Office block | 20,000 | 1 | 20,000 | 5% | 1,000 |
| Manager's house | 15,000 | 1 | 15,000 | 5% | 750 |
| Junior staff houses | 10,000 | 10 | 100,000 | 5% | 5,000 |
| Water treatment | 10,000 | 1 | 10,000 | 5% | 500 |
| **Sub-total** | | | **175,000** | | **8,750** |
| **Total** | | | **387,000** | | **38,850** |

In Table E.5 are detailed the overhead cost estimates for the 500ha farm unit.

***Table E: 5: Overhead cost estimates for 500ha Farm Model***

| Description | Annual cost – US$ |
|---|---|
| General transport | 5,000 |
| Permanent staff costs | 50,000 |
| Maintenance costs: | |
| Vehicles | 7,500 |
| Machinery and equipment | 6,850 |
| Buildings and immovable property | 3,500 |
| Administration costs: | |
| Insurance | 5,000 |
| Communication (tel, internet, mobile) | 5,000 |
| Subscriptions | 500 |
| Electricity | 4,000 |
| Local authority permits/taxes | 2,000 |
| Accounting/audit fees | 5,000 |
| Bank charges | 5,000 |
| Board/management committee expenses | 4,000 |
| **Total overhead costs** | **103,350** |

Table E.6 details the changes in the values of viability indicators for the 500 ha farm unit during project implementation.

***Table E: 6: Changes in viability indicators during project implementation for 500ha Farm Model***

| Description | Value by year of project implementation US$ | | | |
|---|---|---|---|---|
| | 1 | 5 | 6 | 10 |
| Farm operation net revenue | | | | |
| Bananas | 0 | 0 | (31,404.04) | 132,722.98 |
| Citrus | 0 | 0 | (7,321.05) | 50,194.39 |
| Cotton | 87,261.85 | 212,190.90 | 203,882.22 | 195,573.54 |
| Dry beans | 87,153.30 | 272,809.23 | 256,440.67 | 240,072.12 |
| Pigeon peas | 91,278.27 | 238,058.10 | 228.079.61 | 218,101.13 |
| Maize | 14,000.75 | 83,285.83 | 78,228.68 | 73,291.53 |
| Mangoes | 0 | 0 | (6,968.57) | 6,079.42 |
| Soya beans | 11,457.09 | 49,296.42 | 47,377.70 | 45,458.97 |
| Livestock | (1,225.11) | 5,720.57 | 7,591.11 | 9,430.06 |
| Aquaculture | 11,914.95 | 23,829.90 | 23,829.90 | 23,829.90 |
| **Sub-total** | **301,841.10** | **885,190.95** | **799,796.24** | **994,754.05** |
| Overhead costs: | | | | |
| Depreciation | 38,850.00 | 38,850.00 | 38,850.00 | 38,850.00 |
| Other overheads | 103,350.00 | 103,350.00 | 103,350.00 | 103,350.00 |
| **Sub-total** | **142,200.00** | **142,200.00** | **142,200.00** | **142,200.00** |
| **Net farm profit** | **159,641.10** | **742,990.95** | **657,596.24** | **852,554.05** |
| Profit per ha | 319.28 | 1,485.98 | 1,315.19 | 1,705.11 |

**Strategies for improving livestock production**

The strategy involves the establishment of a Cattle Farmers' Cooperative Society by the livestock farmers residing in the project area. Membership of the cooperative will be drawn from the Livestock Associations whose members will be encouraged to buy shares in the Cooperative Society. This idea is in-line with the expressed wishes of the members of the existing Chikwawa

and Nsanje Livestock Associations. It is envisaged that the Cattle Farmers' Cooperative will coordinate the farmers' efforts working closely with the veterinary and extension agencies. The main activities that will be coordinated include: pasture and herd improvement; provision of veterinary and extension support; maintenance of infrastructure; livestock slaughter; and, marketing of livestock and livestock products.

The Cattle Farmers' Cooperative will hire a professional management team to manage the grazing areas including irrigated pastures and feedlots. The management team will comprise of a manager, supervisors and herd boys located at the different Zones. With assistance from relevant government officers from the Department of Animal Health and Livestock Development, the management team will also be responsible for coordinating the provision of services aimed at improving herd quality such as: artificial insemination services; vaccinations and related animal health services; and, any other activities related to commercial livestock production. The Cooperative will also coordinate livestock marketing and slaughter for a fee. Ultimately, the Cattle Farmers' Cooperative will develop and diversify its operations to eventually include the establishment of an abattoir which will operate along commercial lines to sell meat to urban centres, such as Blantyre and Lilongwe, where demand for meat is high.

The cooperative will receive cattle intended for slaughter or sale from cattle farmers and finish them off on the irrigated pastures and, or feedlots. The cattle will be branded for identification purposes. The Cooperative through the management team will organise sales to the abattoirs and butcheries. Figure E.1 presents the proposed production/grazing and marketing system and the movement of cattle from the farmers to the cooperative irrigated pastures and feedlot. Irrigated pastures and feedlot will be established following detailed investigations in each Zone (zone as defined by the Technical Feasibility Study team).

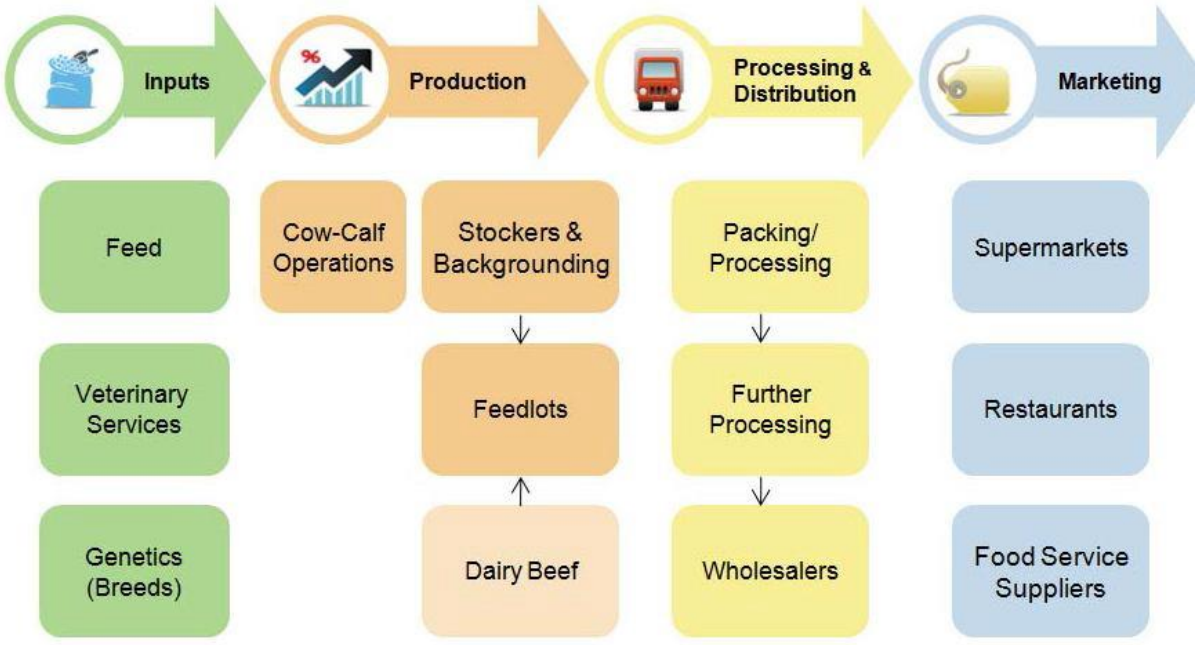



***Figure E: 1: Proposed production and marketing system and the movement of cattle from the farmers to the cooperative***

Table E.7 show the herd build-up pattern for the beef enterprise based on an initial core herd of 100 cows.

***Table E: 7: Changes in herd composition for a unit based on 100 cows***

| Description/Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Adult cows | 100 | 97 | 94 | 77 | 93 | 106 | 107 | 109 | 111 |
| Cull cows | 0 | 0 | 0 | 14 | 12 | 14 | 16 | 16 | 16 |
| Heifers: | | | | | | | | | |
| Replacement | | | | 30 | 30 | 20 | 21 | 22 | 22 |
| Surplus | | | | 6 | 5 | 14 | 18 | 23 | 23 |
| 1-3 year old | | | 36 | 35 | 34 | 39 | 44 | 45 | 46 |
| Weaners | | 38 | 37 | 36 | 41 | 47 | 48 | 49 | 49 |
| Steers: | | | | | | | | | |
| 3-year old | | | | 34 | 33 | 32 | 37 | 42 | 43 |
| 1-3 year old | | | 36 | 35 | 34 | 39 | 44 | 45 | 46 |
| Weaners | | 38 | 37 | 36 | 41 | 47 | 48 | 49 | 49 |
| Calves: | 80 | 78 | 75 | 86 | 98 | 101 | 102 | 104 | 106 |
| Female | 40 | 39 | 38 | 43 | 49 | 50 | 51 | 52 | 53 |
| Male | 40 | 39 | 38 | 43 | 49 | 50 | 51 | 52 | 53 |
| Closing balance | 180 | 251 | 315 | 389 | 420 | 458 | 485 | 504 | 514 |

The project income and expenditure pattern for this herd is summarised in Table E.8.

***Table E: 8: Income and expenditure estimates for the 100 cow herd***

| Description | Value in US$ by project year | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Income: | | | | | | | |
| Cull cows | 0 | 0 | 0 | 14 | 12 | 14 | 16 |
| Surplus heifers | | | | 6 | 5 | 14 | 18 |
| Steers (3 year old) | 0 | 0 | 0 | 34 | 33 | 32 | 37 |
| Total sales | 0 | 0 | 0 | 54 | 50 | 60 | 70 |
| Total revenue | 0 | 0 | 0 | 13,959 | 11,435 | 13,811 | 15,741 |
| Expenditure: | | | | | | | |
| Insurance | 1,350.00 | 1,879.50 | 2,363.40 | 2,914.27 | 3,153.16 | 3,432.41 | 3,638.91 |
| Dipping | 36.00 | 50.12 | 63.02 | 77.71 | 84.08 | 91.53 | 97.04 |
| Dosing | 337.50 | 590.85 | 728.57 | 788.29 | 858.10 | 909.73 | 944.79 |
| Vaccination: | | | | | | | |
| Lumpy skin | 216.00 | 300.72 | 378.14 | 466.28 | 504.51 | 549.19 | 582.23 |
| Botulism and QE | 144.00 | 200.48 | 252.10 | 310.86 | 336.34 | 366.12 | 388.15 |
| FMD | 360.00 | 501.20 | 630.24 | 777.14 | 840.84 | 915.31 | 970.38 |
| Wages | 6.72 | 6.72 | 6.72 | 6.72 | 6.72 | 6.72 | 6.72 |
| Total expenditure | 2,450.22 | 3,408.61 | 4,284.47 | 5,581.54 | 5,713.93 | 6,219.93 | 6,593.15 |
| Gross margin | (2,450.22) | (3,408.61) | (4,284.47) | 8,677.46 | 5,720.57 | 7,591.11 | 9,147.85 |

**Strategy for improving beef production**

The success of beef production under the SVIP will depend on the extent to which the following critical factors are addressed:

- **Farmer organisation.** It is recommended that the farmers are organised to work in groups for ease of coordination as well as to gain from the benefits arising from economies of scale. The groups can be closely aligned with those established for purposes of coordinating activities under the irrigation schemes. Each zone will then be responsible for representing its members at the association level

- **Beef extension**. SVIP could contribute towards the strengthening of the existing livestock extension services. This could include supporting human capacity development in beef extension for the smooth running of the project and supporting the establishment of information centres.

- **Household empowerment through training and support from government and NGO sectors.** The SVIP should endeavour to establish strategic partnerships with NGOs and other government departments to build the capacity of livestock farmers. Currently livestock farmers use knowledge that is passed from generation to generation and through experience even though the livestock sector has changed with time. Recommended good animal husbandry skills should be imparted to the farmers so that they start looking at these animals as a "bank on the hoof".

- **Animal identification.** Various options are available, but the most common and user friendly technique is the ear tagging. Each animal should have an identity number printed on the ear tag using special markers. This should be followed by an individual cow recording card, containing all the relevant information which should be developed in liaison with a veterinarian. Branding using hot iron, is currently practiced at the feedlots and this can also continue.

- **Managing wildlife vs livestock conflicts.** This will entail the project liaising with officials of the Ministry of Wild Life and Natural Resources in coming up with a combined effort to keeping wild animals separate from the domestic animals. It is also recommended to establish perimeter fencing around the existing national park areas (Lengwe and Majete). Livestock farmers should also be discouraged from grazing and watering their animals close to the National Parks and, crocodile infested rivers. The SVIP should facilitate the development of suitable watering points in the demarcated grazing areas.

- **Health care improvement.** The project, working in consultation with a veterinarians, develops sound sanitation and immunization programmes, appropriate to the project area. The farmers would be encouraged to maintain a health record, including treatment and medication used for every animal. Medication must be administered by competent personnel. With the exception of preventive health care programmes recommended by the veterinarians (e.g. tick control, de-worming, de-horning, castration, vaccinations), other medication should be used only to control clinical diseases or to treat injuries. Medication should not be used to replace good husbandry practices. The dosage, time and length of application of prescribed medication must follow the recommendations of veterinarians or, in the case of shelf drugs, the recommendation of the manufacturer. Requirements for withdrawal of medication before slaughter or before animals are marketed for human consumption must be strictly adhered to. The current vaccination programmes are done

in response to a detected disease outbreak. The SVIP could facilitate closer collaboration between the farmers and the DAHLD to carryout scheduled vaccination campaigns in order to contain contagious diseases such as foot-and-mouth disease (FMD).

- **Improving the genetic material.** Malawi has a good pool of locally available genetic material for the beef cattle (the Malawi Zebu). In the SVIP area, the Brahman breed has been introduced to a significant extent. The SVIP could facilitate the identification and supply of other suitable breeds to improve the productivity of the livestock population as well as improve the quality of meat offered on the market.

- **Artificial Insemination Services.** Area Veterinary Officers (AVOs) should be trained to carry out Artificial Insemination (AI) in the project area. It is further recommended that other semen suppliers be identified to complement the services currently offered by NAIC. The possibility of establishing a mini-liquid nitrogen plant within the SVIP should be considered.

- **Intensification, integration and diversification of livestock production.** Those smallholder farmers involved in irrigated crop production could be encouraged to diversify into livestock production. In this way, they will make use of their crop residues to develop stall-feeding facilities at their homesteads or participate by sending their livestock through the group managed feedlot schemes.

- **Support to emerging farmers/entrepreneurs.** Emerging entrepreneurs within the community could be supported to venture into other businesses along the value chain such as input supply (drugs, feed, feed ingredients), veterinary services (AI, clinics) and extension services.

**Improved pastures**

Irrigating pastures for grazing livestock is rapidly becoming an alternative method of providing additional grazing opportunities in a livestock enterprise. The value of irrigation of a grass pasture is simply to provide adequate moisture for grass growth at the appropriate time. For grass to grow, the soil must have adequate moisture at the same time that the correct temperature for grass growth is occurring.

As a grass-fed beef producer, the incorporation of some irrigated pastures is extremely important. It can increase total available pastures to meet current needs. It can provide a higher quality forage and reduce the cost of bought-in feeds. It can compete economically with most commodity crops. It allows an option to convert erodible crop land to reduce negative impacts on the environment and improves ground water quantity and quality. Irrigating pastures can result in the extension of the grazing season and presents an opportunity to concentrate livestock into a smaller grazing area for easier management. The profit margin on livestock has been reported to increase substantially from the use of irrigated pastures.

**Types of forage**

The types of forage to be grown will depend on the goals that the farmers in SVIP may have and on the time of the year when the grazing will take place. It is encouraged to choose among long term perennial forages, short term forages, or even between annuals and biennials. Long term perennial forages can last 20 years or longer. Short term perennial forages are expected to survive for three to five years, are generally quick to establish and are usually of higher quality than the

longer growing species. Biennials and annuals may have a place in a grazing system to fill voids and gaps in the grazing season.

It is recommended to consider the inclusion of legumes in the grass mix. Legumes will increase the total forage production of the pasture. Also, the nitrogen fixing properties of the legumes can reduce the nitrogen fertilizer requirements. They can, however, create challenges with respect to bloat management, weed control, fertilizer, and irrigation management.

The following legumes could be considered for incorporation in veld improvement programmes for the lower Shire Valley: *stylosanthes guianensis* cv Stylo; *Centrosema pubescens* cv centro; *macroptilium atropupureum* cv siratro; *Neonotonia wightii* cv Cooper-glycine; and, *Desmodium Uncinatum* cv Silverleaf desmodium. These legumes can be planted in a grass pasture of any of the following grass species: *Chloris gayana* cv Rhodes grass; *Pennisetum pupureum* cv Napier/Elephant; and, *Cynodon dactylon* cv Star Grass. In hot areas such as the lower Shire Valley star grass performs better than the other grasses.

**Planting guidelines**

Perennial pastures can be established all year round. Establishment during the rainy season is generally recommended. Germination is quicker and more uniform than seeding during the dry season. Weed problems are reduced when the pasture is planted with the first planting rains and this should allow as much early growth as possible.

Legumes take longer to establish and are at a higher risk of poor germination if planted late into the season. This is not the case on irrigated pastures. Dry season seeded pastures should be irrigated frequently after planting and until germination has been achieved. When irrigating it is recommended to irrigate with small amounts of water per application. Approximately 45 mm of water per application is required and half the amount after fertilizer application to avoid leaching. Total applications may be from five to 10 times, depending on current weather conditions.

**Grazing management techniques**

Several management techniques are worth considering with irrigated pastures. The use of high stock density with frequent moves and short grazing periods will result in more uniform use of the available forages. It will also provide more even distribution of the urine and manure across the pasture. It is estimated that 80-85 percent of the consumed nutrients are returned back to the soil. There is need to maintain enough residual leaf area to provide for maximum recovery. Depending on the grass species, this height can range from 10 to 20cm. Appropriate rest or recovery periods are essential to maximize quality and quantity of the forage produced. This time can vary from 20 to 40 days. Too short a rest period will not allow sufficient dry matter production to take place. Resting too long may reduce the quality of the forage. A minimum of five or six paddocks will allow reasonable rotations. It takes at least 12 paddocks to begin to impact high utilization of the total forage produced. Approaching 25 to 30 paddocks will allow daily moves with sufficient recovery time. Managing for highest utilization of forage produced will usually provide the highest gains per hectare from irrigated pasture. It can, however, lower daily animal gains because it reduces the opportunity for selective grazing.

In addition, cut-and-carry methods can be used for stall-fed animals, dairy cows and feedlots. The farmers should plan to feed dry hay in the morning and provide the green grass and other green chop including crop residues in the late afternoon. In the event of overproduction of grass, silage

and hay making skills should be imparted to the farmers to conserve the feed to use during critical months of feed shortage.

### *Pen-fattening/feedlots*

Cattle pen-fattening is an intensive system of producing quality beef and can be operated as a stand-alone lucrative business. Cattle pen-fattening involves the feeding of beef cattle with a protein balanced, high-energy diet for a period of 90 days under confinement to increase live weights and improve the degree of finish and thus obtain better grades at the abattoir. Pen-fattening enables the animals to express fully their genetic potential for growth. It is a method of adding value to beef cattle that helps a farmer realise higher benefits from their animals

Most smallholder farmers in the lower Shire Valley sell their livestock to middle men, who, most of the times pay very little to the producer thus benefit more from the sale of the animals. In most cases the animals are sold in a very poor condition further weakening the farmer's bargaining position. The objective of improving the viability of livestock production could be achieved through the establishment of a feedlot facility.

A model facility could be designed to take an average of 50 animals at any given time. Management of the animals will be the responsibility of staff employed by the Cattle Farmers' Cooperative. Individual farmers could bring their animals for finishing. The Cooperative will provide the feed, drugs and chemicals as well as administration of the fattening activity. Upon disposal of the animal, the Cooperative will then recoup the cost of providing feed, administration and other costs from the sale price of the animal with the farmers paid the difference.

The idea is to help the marginalised farmers sell animals in good condition and fetch better prices that enable them to realise better returns from their beef herds. Farmers will also be organised into groups to benefit from the economies scale to be realised in buying inputs and organising marketing reduce cost of marketing. There is the added benefit of eliminating the middlemen. The development of feedlots can help smallholder farmers in several ways including:

- improved access to organised markets;
- production of good quality animals that are competitive on the market;
- reduced cost of marketing for the small holder farmer;
- employment creation;
- increased income at household level;
- improved feed availability at reduced cost through use of residues and by-products from irrigation facility; and,
- increased off-take from the smallholder farmer herds

### Farm input

A large enough area must be available for erecting the necessary feedlots. The project site will have access to good roads and is situated in the project area in the lower Shire Valley (approximately 80 km from Blantyre). This will help minimize costs and enable the farmers have access to and from the project. A reliable source of clean water is available in adequate quantities to meet the requirements of the animals per day, which is estimated at 80L/animal/day. A tank should also be availed for purpose of reserving water. The area is easily accessible for the purposes of transporting both animals and supplementary feeds.

**Production program**

An animal will be fed at a rate of 3 percent of the live body weight of the animal feed per day. Most of the roughage for the animals will be obtained from the crops grown on the irrigation scheme. Fattening concentrates will be bought from stock-feed manufacturers or raw materials can be obtained and farm-mixed rations can be used. Possible sources of protein, energy, roughage will be produced on the farm to reduce the cost of feed. The feeding proportion will be 60 percent roughage and 40 percent concentrates

**Outputs**

The model unit can be designed based on the following assumptions:

- stock-holding capacity equal to 50 head of cattle at any given time;
- Total throughput per year - 200 beef cattle, fattened for slaughter;
- stockyard dimensions - 2 x 25 cattle;
- space allowance of $10m^2$ per animal;
- total feed requirement per 100 animals is 270MT per year; and,
- The annual water consumption of $2,400m^3$

In addition the facilities listed above there is need for a concentrate feed processing plant with capacity of producing 270MT per year.

**Production process**

Farmers from the nearby community or Zone will bring their animals to the feedlot. Each animal will be fattened for a period of 90 days before they are marketed. The Cooperative will provide the feed and management inputs. On selling the animals the Cooperative will recoup the cost of feed, veterinary services and administration costs. The rest of the money will be paid to the farmer. The advantage is that the farmer will realise better returns from the sale of animals which will be in better conditions and therefore able to attract higher prices on the market. By supporting the feedlot initiative the project will contribute towards raising the income earned by the smallholder livestock farmers and hence improve the resilience of the households in the project area.

**Fodder production**

Improved fodder crops such as red sorghum, forage maize, with high yield potential can be used. Pasture grasses such as hybrid Napier, rye and Guinea grass can be produced under irrigation. They also have the advantage of being multi-cut. Table 7.10 summarises the costs and yield estimates for the different types of fodder that could be established under the project. The average yield from these varieties if properly managed ranges from 10-40MT per ha, in 4-6 cuttings per year. Yield varies depending on fertility of the land, quality of seed, fertilizer application and general management. Forage legumes such as and Desmodium, Setaria and Lucerne, can be grown under irrigation. Silver leaf can be used as reinforcement in the grazing paddocks. About 0.2ha of land/animal will be allocated for fodder production.

Hay making and fodder enrichment such as ensiling silage will be done. The excess green fodder during summer shall be converted into hay or silage and stocked for lean season. Silo pits will be constructed for silage making. And the necessary equipment also obtained. The silo-pits should be large enough to conserve about 100MT of silage.

Since sugarcane production and processing will continue to be grown in the lower Shire Valley, by-products from the enterprise can be utilised in the livestock sector. By-products such as bagasse are a very good source of roughage while molasses is a very good source of energy. Molasses can also be used to improve the palatability of high roughage residues from the fields such as cotton hulls.

***Table E: 9: Fodder production economics in US$/ha***

| Item | Maize | Forage sorghum | Lucerne | Rye grass | Napier |
|---|---|---|---|---|---|
| Land prep | 80 | 80 | 80 | 60 | 60 |
| Seed and sowing | 120 | 60 | 120 | 60 | 50 |
| Fertilizer | 300 | 300 | 400 | 300 | 300 |
| Irrigation | 70 | 40 | 70 | 70 | 70 |
| Harvesting/transport | 280 | 250 | 500 | 500 | 500 |
| Total expenditure | 850 | 730 | 1 170 | 990 | 980 |
| Yield (MT) | 40 | 32 | 42 | 35 | 40 |

There is no fixed fodder requirement of animals but a rule of thumb says an animal requires daily fodder equal to 9-10 percent of its body weight (3 percent of its live body weight on dry matter basis).

**Strategies for improving dairy production**

The Cattle Farmers' Cooperative could also promote diversification into dairy farming. Dairying is an important source of income to farmers and other hired workers in the agricultural sector. Since cropping under dryland conditions that prevail in the lower Shire Valley is mostly seasonal, there is a possibility of creating more employment throughout the year for many people, particularly those who might not be eligible to participate in the irrigated cropping activities. Dairying also ensures improved access to milk for the community as a whole, an important source of animal-based proteins to help reduce malnutrition, which is currently high in rural populations of the lower Shire Valley. In addition, the manure from the dairy animals provides a good source of organic matter for improving soil structure and fertility and hence crop yields. The dairy enterprise also presents an opportunity for developing biogas plants which will rely on the dung collected from the animals to produce methane gas for use as fuel for domestic heating purposes.

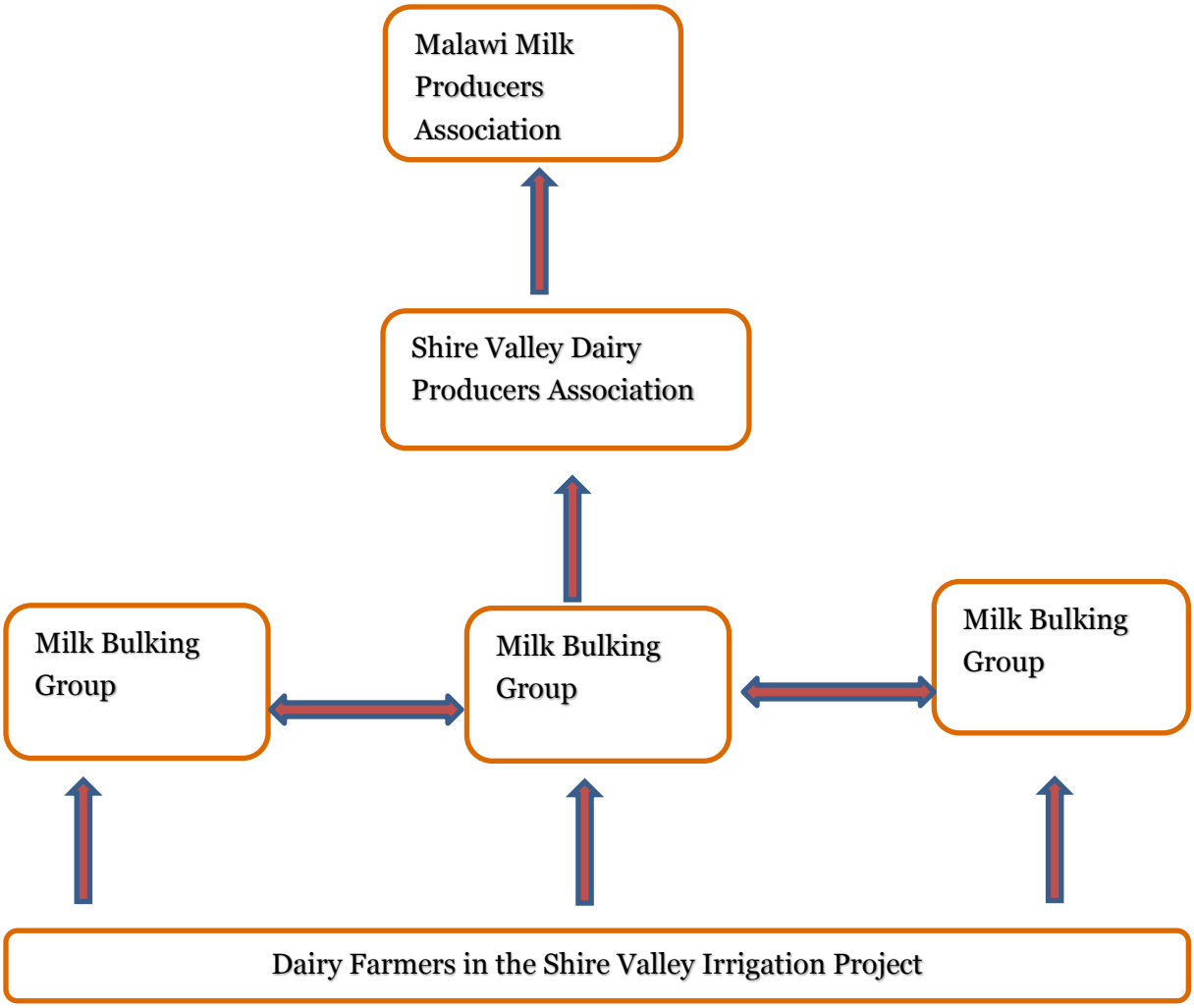



***Figure E: 2: Possible organisation of dairy farmers***

This should only be pursued provided that sufficient interest is expressed by the farmers themselves and should not be another Development Partner driven initiative. In addition the project could facilitate the establishment of linkages with Development Partners involved in promoting such efforts to enable the farmer groups to acquire specialised equipment such as cooling tanks where the milk will be cooled before processors can collect for delivery to their factories. Linkages can also be made with existing dairy companies such as Dairibord Malawi to set up the collection depots with appropriate cooling facilities. The farmers involved could be organised into an association as shown in Figure E.2.

The dairy enterprise will enable the farmers to use by-products and/or residues that may otherwise not be used thereby increasing the benefits realised from the initial investment in irrigation development. The surplus fodder, agricultural by-products and high volumes of residues from crop irrigation can be gainfully used through feeding the animals. The model dairy enterprise is based on a 100 cow herd. The milk produced from the dairy sector can be sold as raw milk to processors and other targeted customers. Value addition can be incorporated through processing of the milk into yogurt, sour milk and other dairy products. Value addition also has the advantage of creating employment for the youths and women from the surrounding area.

Some of the target customers for the dairy enterprise are: milk processors; self- processing (estimated volume of 40,000 litres of milk); dairy companies; milk collection companies and contractors. The investment required will cover the cost of procuring the following capital assets:

- purchase of dairy animals;
- infrastructure development (construction of sheds and paddocks);
- purchase of equipment and machinery;
- the feeding cost during the initial period of one/two months;
- facilities such as cost of land development, fencing, commissioning of diesel engine/pump-set, electricity connections, essential servants' quarters, transport vehicle; and,
- establishment of milk processing facilities.

**Objectives**

The overall objectives if establishing the dairy enterprise are, to:

- generate income from sale of milk, milk products, and live animals to support family livelihood;
- create all year round employment options for youths and women;
- promote dairy farming, and value addition to milk and beef cattle;
- improve access to animal source proteins for the rural/displaced farmers and reduce malnutrition; and,
- utilise residues from the irrigation scheme profitably

The plentiful manure produced will improve the productivity of other crops and enable farmers to practice organic farming.

## Technical plan

### A. Inputs required

### Land

The estimation of the land requirements for establishing a dairy enterprise is shown in Table E.10.

***Table E: 10: Area estimates for dairy infrastructure***

| Structure | Area required (ha) |
|---|---|
| Shed for cows | 0.25 |
| Cage for calves (up to 15 days) | 0.03 |
| Calf shed | 0.05 |
| Shed for heifers | 0.09 |
| Stores for fodder, concentrates machine room | 0.013 |
| Utensils and milk storage | 0.005 |
| Servants room, washroom | 0.035 |
| Workers' quarters | 1 |
| Pastures | 100 |
| **Total** | **101.50** |

### Animal housing

Well aerated sheds, that offer protection from extreme weather (temperatures and wind), with drinking water and a proper drainage system. Table E.11 shows an estimate of the cost of developing the dairy enterprise.

***Table E: 11: Dairy enterprise infrastructure cost estimates***

| Description | $m^2$ | Rate/$m^2$ (US$) | Total costs (US$) |
|---|---|---|---|
| Shed with free stalls for cows | 900 | 16.36 | 14,724 |
| Cage for calves (up to 15 days) | 80 | 4.46 | 357 |
| Calves shed | 160 | 14.88 | 2,381 |
| Shed for heifers | 204 | 14.88 | 3,036 |
| Stores for fodder, concentrates Machine room | 34 | 8.92 | 303 |
| Utensils and milk storage | 16 | 8.92 | 143 |
| Servants room, washroom | 114 | 8.92 | 1,017 |
| Milking parlour | 60 | 11 | 660 |
| Dung peat | 900 | 16.36 | 14,724 |
| Water tanks | | | |
| Silage pits | 25 | 2.46 | 62 |
| **Total** | | | **37,345** |

Heavy duty ventilation fans might be required if temperatures are too high. Other machinery requirements for the dairy enterprise are shown in Table E.12.

***Table E: 12: Dairy machinery cost estimates***

| Farm supplies | Units required | Unit cost (US$) | Total cost (US$) |
|---|---|---|---|
| Milking machine (vacuum line system) | 1 | 10,000 | 10, 000 |
| Milk cooling unit | 1 | 7,600 | 7, 600 |
| Farm tractor | 1 | 7,000 | 7,000 |
| **Total cost** | | | **24,600** |

Table E.13 shows the cost estimate of the various types of equipment that are required in the dairy. This list illustrates that the enterprise is capital intensive and therefore should only be pursued after a thorough analysis of the viability of the whole venture.

***Table E: 13: Dairy equipment cost estimates***

| Farm supplies | Rate | Capacity (No of animals) | Total cost (US$) |
|---|---|---|---|
| Calf feeder | 17.85 | 5 | 400 |
| Teat dip cup | 5.21 | 10 | 60 |
| Maize cutter | 2 500 | 100 | 2 500 |
| Water pump | 178 | | 180 |
| Generator | 2 000 | | 2 000 |
| Testing lab | 1 500 | | 1 500 |
| **Total cost** | | | **6 640** |
| **Total farm equipment cost** | | | **31 240** |

**Herd composition and build-up projections**

The initial herd could be established to comprise a hundred cow Jersey herd. The Jersey breed, preferred is recommended because it is hardy and will give good milk yields, estimated at an average of 20L milk/cow/day. The animals will be procured in the ratio of 80 cows in milk and 20 dry pregnant cows (80:20 ratio) to ensure continuous production of milk all year round.

The female progeny born will serve as the replacement stock to replace aging and/ or culled (low performing) cows. However not all female progeny may be used as replacement heifers. The surplus heifers will be sold as breeding heifers to other farmers who are in, or are planning to get into dairy farming. The male progeny born will be disposed of as veal or sold to other farmers by the age of 3 months to manage the cost of feed. They can also be kept and fattened off as beef animals. The projected growth of the herd is summarized in Table 7.15.

Cost of purchasing animals is estimated at about US$1 200 (giving total investment of US$12,000 to establish the enterprise).

***Table E: 14: Herd build-up projections***

| **Description/ Year** | **%** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
|---|---|---|---|---|---|---|---|---|---|---|
| Cows | | 100 | 97 | 94 | 77 | 93 | 106 | 107 | 109 | 111 |
| Replacement heifers | 20 | | | | 30 | 30 | 20 | 21 | 21 | 22 |
| Weaner heifers | | | 36 | 35 | 34 | 39 | 44 | 46 | 46 | 47 |
| Heifers 1-3 yrs | | | | 35 | 34 | 33 | 37 | 43 | 44 | 45 |
| Surplus heifers | | | | | 5 | 4 | 13 | 16 | 21 | 22 |
| Adult mortality | 3 | 0 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| Culling | 15 | | | | 14 | 12 | 14 | 16 | 16 | 16 |
| **Closing balance** | | **100** | **133** | **164** | **175** | **194** | **208** | **217** | **221** | **225** |
| | | | | | | | | | | |
| Calving | 80 | 80 | 78 | 75 | 86 | 99 | 101 | 103 | 105 | 106 |
| Calf mortality | 5 | 0 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 |
| 1 to 3 yr. mortality | 3 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| Female calf | 50 | 40 | 39 | 38 | 43 | 49 | 51 | 51 | 52 | 53 |
| Male calf | 50 | 40 | 39 | 38 | 43 | 49 | 51 | 51 | 52 | 53 |
| | | | | | | | | | | sales |
| surplus heifers | | 0 | 0 | 0 | 5 | 4 | 13 | 16 | 21 | 22 |
| males calves | | 40 | 39 | 38 | 43 | 49 | 51 | 51 | 52 | 53 |
| Cull animals | | 0 | 0 | 0 | 14 | 12 | 14 | 16 | 16 | 16 |
| **Total** | | **40** | **39** | **38** | **62** | **65** | 77 | **83** | **90** | **92** |

## Feed rations

Ration is the allowance of nutritionally balanced feed per day. It includes dry matter and concentrates to increase animal productivity. The Dry Matter (DM) requirement will be met with a combination of concentrate feed, the green fodder from pastures and fodder trees, crop residues, silage, hay, bagasse and molasses. About 65 percent of DM requirement will be met with green fodder (40 percent), silage (15 percent) and hay/straw-(10 percent). The balance 30percent will be met from concentrate. Table 7.16 shows an estimate of the dry matter content for the two major feed components used in dairy farming. However the quantity of concentrates fed to higher yielding animals will be higher. About 1kg concentrate is required for the production of 2 litres of milk

*Table E: 15: Dry matter content for the major feed components*

| Description | Dry matter % of total | Unit cost (US$) |
|---|---|---|
| Silage | 65 | |
| Concentrate | 35 | 0.42 |

A cow weighing 500 kg live body weight will be considered as one Livestock Unit (1 LU).

**Concentrate feed**

Cows will be fed with concentrates following the recommended feeding regimes. Specific rations including calf starter, maintenance requirement, gestation and production rations shall be fed.

Farm-made general rations will also be used to reduce cost of concentrates.

**Mineral mixture**

This is used as a feed supplement. It comprises of a mixture of minerals (magnesium, iron, sodium, and salts) and they are a good source of energy and help improve productive efficiency in animals. They help maintain animal health.

**Labour requirement**

Labour is required for feeding, watering, and care of the animals. One mature person can handle 25 milking cows easily. This enterprise will require 5 farm workers. An experienced and qualified supervisor cum manager can be hired to supervise all the farm activities. Table E.16 shows the breakdown of the labour requirements for the dairy enterprise.

*Table E: 16: Estimated labour costs*

| Description | Number | Salary/month/person (US$) | Annual salary (US$) |
|---|---|---|---|
| Farm manager | 1 | 500 | 6 000 |
| Workers | 5 | 120 | 7 200 |
| Technician | 1 | 300 | 3 600 |
| Total labour costs | 6 | | 16 800 |

Total enterprise cost estimates are provided in Table E.17.

***Table E: 17: Total enterprise running cost***

| Description/year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Concentrates feed cost | 67 605 | 65 577 | 63 622 | 69 645 | 83 166 | 85 196 | 86 550 | 87 902 | 89 931 |
| Vaccines and drugs | 1 800 | 1 746 | 2 216 | 2 373 | 2 704 | 2 826 | 2 949 | 3 002 | 3 065 |
| Insurance | 9 450 | 9 167 | 10 720 | 11 526 | 13 335 | 13 857 | 14 349 | 14 598 | 14 917 |
| Silage making and hay cutting | 10 000 | 10 000 | 10 000 | 10 000 | 10 000 | 10 000 | 10 000 | 10 000 | 10 000 |
| Depreciation @10 % of cost | 5 584 | 5 26 | 4 523 | 4 071 | 3 664 | 3 297 | 2 968 | 2 671 | 2 404 |
| Sundries | 4 722 | 4 604 | 4 607 | 4 956 | 5 739 | 5 873 | 5 972 | 6 054 | 6 175 |
| Contingency | 4 958 | 4 834 | 4 837 | 5 204 | 6 026 | 6 167 | 6 270 | 6 357 | 6 484 |
| Salaries and labour | 16 800 | 16 800 | 16 800 | 16 800 | 18 240 | 18 240 | 18 240 | 18 240 | 18 240 |
| | 120 919 | 118 311 | 118 387 | 126 089 | 144 795 | 147 742 | 149 913 | 151 737 | 154 394 |

### Health care

Many animal-health related problems shall be avoided by the same measures that enhance production. Specific guidelines will be developed to ensure set norms and standards will be observed to ensure good health of the herd. These guidelines will relate to: bio-security; hygiene; quarantine; vaccination; and, breeding. Bio-security measures including fencing to restrict access by visitors, dogs and other animals will be followed to prevent incidence of diseases. The dairy section will have foot batch/foot dip at the entry point. The shed shall be regularly cleaned and disinfected. Cleaning shall be done before disinfection. The cows shall be fed balanced feed and provide clean drinking water. The sick animals shall be quarantined. This means sick animals shall be kept away from the rest during their illness. The newly purchased cows shall not be allowed to mix with the herd for about six weeks. Vaccination and medicine is required to prevent any disease outbreaks in the animal herd. Each new animal will be vaccinated before entering the farm. Vaccinations and deworming will cost about US$ 15 per animal per year. Controlled breeding will be carried out with the following guidelines being adopted:

- Artificial insemination charges will be around US$30 per cow per year. On average each animal will be requiring 2 doses of insemination;
- Artificial Insemination (AI) services will be required for good quality progenies;
- Animal identification in form of ear tags and/or branding will be used;
- The following records will be kept:
    - Daily milk production and sale records
    - Concentrate purchase and feeding record
    - Farm herd book (for all category of animals)
    - Monthly expenditure and income statements
- A complete breeding and herd health records shall be maintained

## B. Farm output

### Lactation period

The lactation period is the period during which the cow will be producing milk. These animals are called wet animals. The lactation period of a cow is 305 days. The assumption is that 80% of the cows will be wet cows at any given time. The calving interval in cows is 12-13 months. Average milk yield is 20 Litres per cow per day. Annual milk production is calculated as 20 x 305 = 6 100L per lactation/per cow. Expected milk yield from the farm is 488 000litres.

### Marketing plan

*Existing market*

About 40 000 litres of milk will be processed on the farm and sold as either yogurt, sour milk, or other dairy products through existing markets. The rest of the fresh milk can be sold to processing plants at agreed terms.

### Breeding stock development

The milk yield will be improved as a result of appropriate breeding systems. Low yield animals will be sold and replaced with high yielding animals. Replacement heifers will be bred on the farm. Replacement and culling rates will be the same once the optimum herd size is attained. On average cows are productive for 9-10 years. Table E.18 summarises the estimated revenue projections for the whole dairy enterprise.

***Table E: 18: Dairy farm revenue estimates***

| Production of milk | Yr 1 | Yr 2 | Yr 2 | Yr 4 | Yr 5 | Yr 6 | Yr 7 | Yr 8 | Yr 9 |
|---|---|---|---|---|---|---|---|---|---|
| cows (L) | 584000 | 566480 | 549486 | 601520 | 718320 | 735840 | 747520 | 759200 | 776720 |
| milk for calves (L) | 58400 | 56648 | 54949 | 60152 | 71832 | 73584 | 74752 | 75920 | 77672 |
| net annual milk production (L) | 525600 | 509832 | 494537 | 541368 | 646488 | 662256 | 672768 | 683280 | 699048 |
| Revenue | | | | | | | | | |
| From sales of milk (USD) | 262800 | 254916 | 247269 | 270684 | 323244 | 331128 | 336384 | 341640 | 349524 |
| sale of culled cows | 0 | 0 | 0 | 5645 | 4629 | 5596 | 6389 | 6439 | 6557 |
| surplus heifers | 0 | 0 | 0 | 3385 | 2654 | 8811 | 11060 | 14977 | 15491 |
| male calves | 2400 | 2328 | 2258 | 2572 | 2958 | 3035 | 3087 | 3138 | 3191 |
| Total annual revenue | 265200 | 257244 | 249527 | 282286 | 333485 | 348570 | 356920 | 366194 | 374763 |
| | | | | | | | | | |

This will increase with increase in herd size as well as improvement in milk quality.

**Male calves**

These are disposed of at 3 months of age to minimise cost of production. Alternatively, they can be reared separately for beef production.

**Human resource plan**

A competent manager will be employed by the cooperative, who will be able to manage the activities of the dairy, and able to keep farm record and ensure hygiene and sanitation.

A staff compliment of about 10 people will be employed permanently to manage the dairy activity. However, if the option of processing is added, then more people will be employed for the processing unit. Table E.19 shows a draft plan for the possible establishment of a dairy enterprise following the basic assumptions detailed in Table E.20.

***Table E: 19: Implementation schedule***

| | Yr -1 | | | | Yr -2 | Yr -3 | Yr -4 | Yr -5 |
|---|---|---|---|---|---|---|---|---|
| Construct sheds and store, fencing, paddocks, water tank | | | | | | | | |
| Develop fodder | | | | | | | | |
| Purchase cows | | | | | | | | |
| Purchase equipment | | | | | | | | |
| Purchase cream separator cum butter churner | | | | | | | | |
| Sale surplus heifers/m every year | | | | | | | | |
| Replace 20% milking cow every year | | | | | | | | |

***Table E: 20: Assumptions used in estimating dairy project costs***

| **Selling assumptions** | Yr 1 | Yr 2 | Yr 2 | Yr 4 | Yr 5 | Yr 6 | Yr 7 | Yr 8 | Yr 9 |
|---|---|---|---|---|---|---|---|---|---|
| Milk/cow/day | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Wet cows as %of total cows | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% | 70% |
| No of days in a yr | 365 | 365 | 365 | 365 | 365 | 365 | 365 | 365 | 365 |
| Sale price /litre milk | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Sale price/developed progeny cow | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| Heifers older than 1yr | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 |
| Sale price/culled cows | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 | 400 |
| Sale price/male calve | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| No. of animals | | | | | | | | | |
| Average #of cows | 100 | 97 | 94 | 103 | 123 | 126 | 128 | 130 | 133 |
| # Lactating cows | 80 | 78 | 75 | 82 | 98 | 101 | 102 | 104 | 106 |
| # Female calf older than 1 yr | | | 35 | 34 | 33 | 37 | 43 | 44 | 45 |
| #Culled cows | | | | 14 | 12 | 14 | 16 | 16 | 16 |
| #Female calves | 40 | 39 | 38 | 43 | 49 | 51 | 51 | 52 | 53 |
| Total animals | | | | | | | | | |
| Animals sold during the year | | | | | | | | | |
| Surplus heifers | 0 | 0 | 0 | 5 | 4 | 13 | 16 | 21 | 22 |
| Males calves | 40 | 39 | 38 | 43 | 49 | 51 | 51 | 52 | 53 |
| Cull animals | 0 | 0 | 0 | 14 | 12 | 14 | 16 | 16 | 16 |
| total animals sold | | | | | | | | | |
| Feed requirement | | | | | | | | | |
| Cows @ 3% of live Body weight | 459900 | 446103 | 432720 | 473697 | 565677 | 579474 | 588672 | 597870 | 611667 |
| Heifers @2% live body weight | 0 | 0 | 82 | 79 | 77 | 87 | 101 | 103 | 105 |
| Cost of concentrate/kg | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 |

**Strategies for promoting aquaculture development**

**Fish farming under the Shire Valley Irrigation Project**

This section describes the proposed set-up of commercial fish farming enterprise under the SVIP.

Kasinthula Fish Farm should be revitalized and become fully operational to its maximum potential capacity by being leased to experts who can also play a number of roles such as offering technical expertise to the surrounding fish farmer clubs at a fee, hatchery operation, feed production, and sell of fingerlings to fish farmer clubs, sale fish to markets. Organizationally, the farm could employ a manager and three officers to be responsible for three subsections of fish feed production management, fingerling production and sales and fish production (grow out) section (Figure E.3). A feed meal can be established at Kasinthula to produce feed that should cater for fish farmers in the SVIP. Depending on production levels, an investment may be made for freezers for preserving fish.

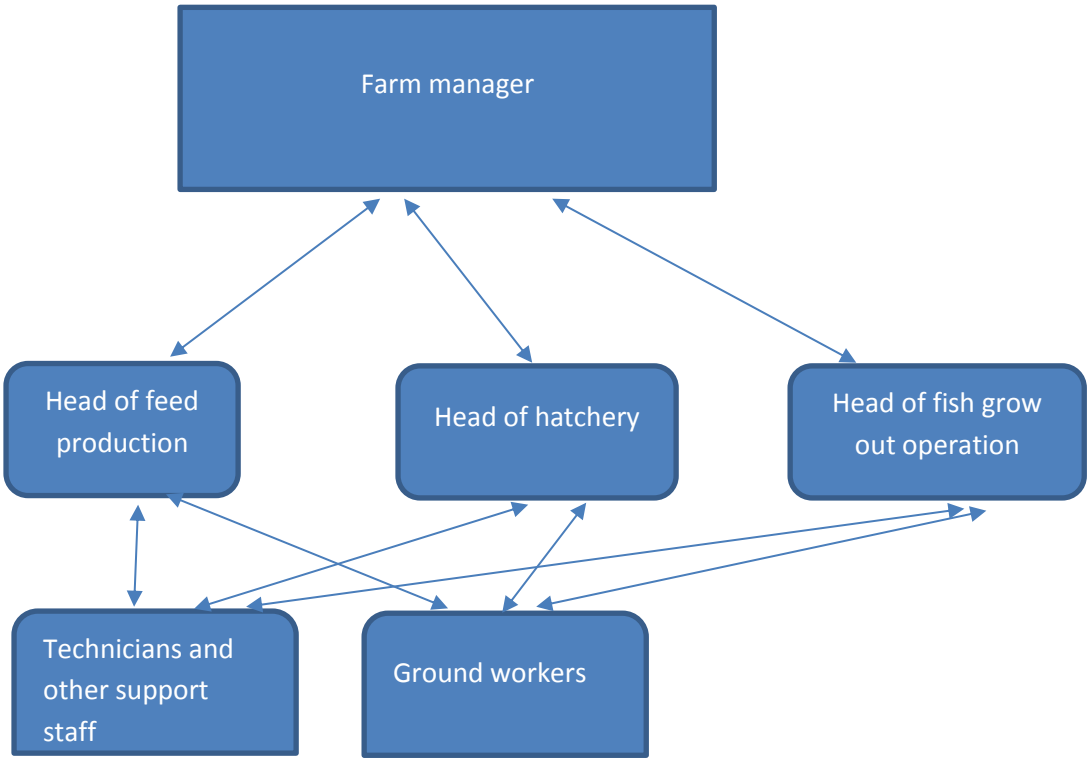



***Figure E: 3: Proposed organizational structure for revitalized Kasinthula Fish Farm***

A number of commercial fish farmers' clubs should be established within the SVIP. The SVIP may set-up some seed money as capital to enable the fish farmer clubs to start operating. Fish farmer clubs could be linked to the revitalized Kasinthula Fish Farm. The Fish farmer clubs may comprise of groups of 10 or more individual fish farmers who can comfortably work together. Each fish farmer club can run and manage one or more hectares of grow out fish ponds depending on their capability. The fish farmer clubs can get various forms of support from Kasinthula fish Farm (on a cost recovery basis) including sourcing good quality fingerlings, feed for the fish, and linkage to fish market. The farmer groups can get support on capacity building from Kasinthula Fish Farm, Government Agricultural Extension Development Officers and external research institutions depending on the type of support

needed. Two production cycles are possible based on rearing of sex reversed male tilapia as established by research at NAC in Domasi and available market.

The fish farmer clubs will need capacity building to ensure that they follow the recommended practices for fish farming such as:

- Proper pond fertilization rates and use of supplementary feed (NAC feed which currently costs MK250/kg)
- Adopt deep (3 metre) pond culture technology where stocking density can be increased from 3 to 6 fish per square metre.
- Control of Fish predation – including predatory birds, frogs, monitor lizards, crocodiles and thieves.

The Fish farmer clubs will have to synchronize their activities so that they can harvest fish at the same time in order to access bigger markets. Fish farmer clubs may choose to either sell their fish through Kasinthula Fish Farm or sell them directly to existing markets depending on their production levels (Figure E.4). The fish farmer clubs can also seek technical expertise from either research institutions or directly from the Kasinthula Fish Farm depending on the nature of assistance required.

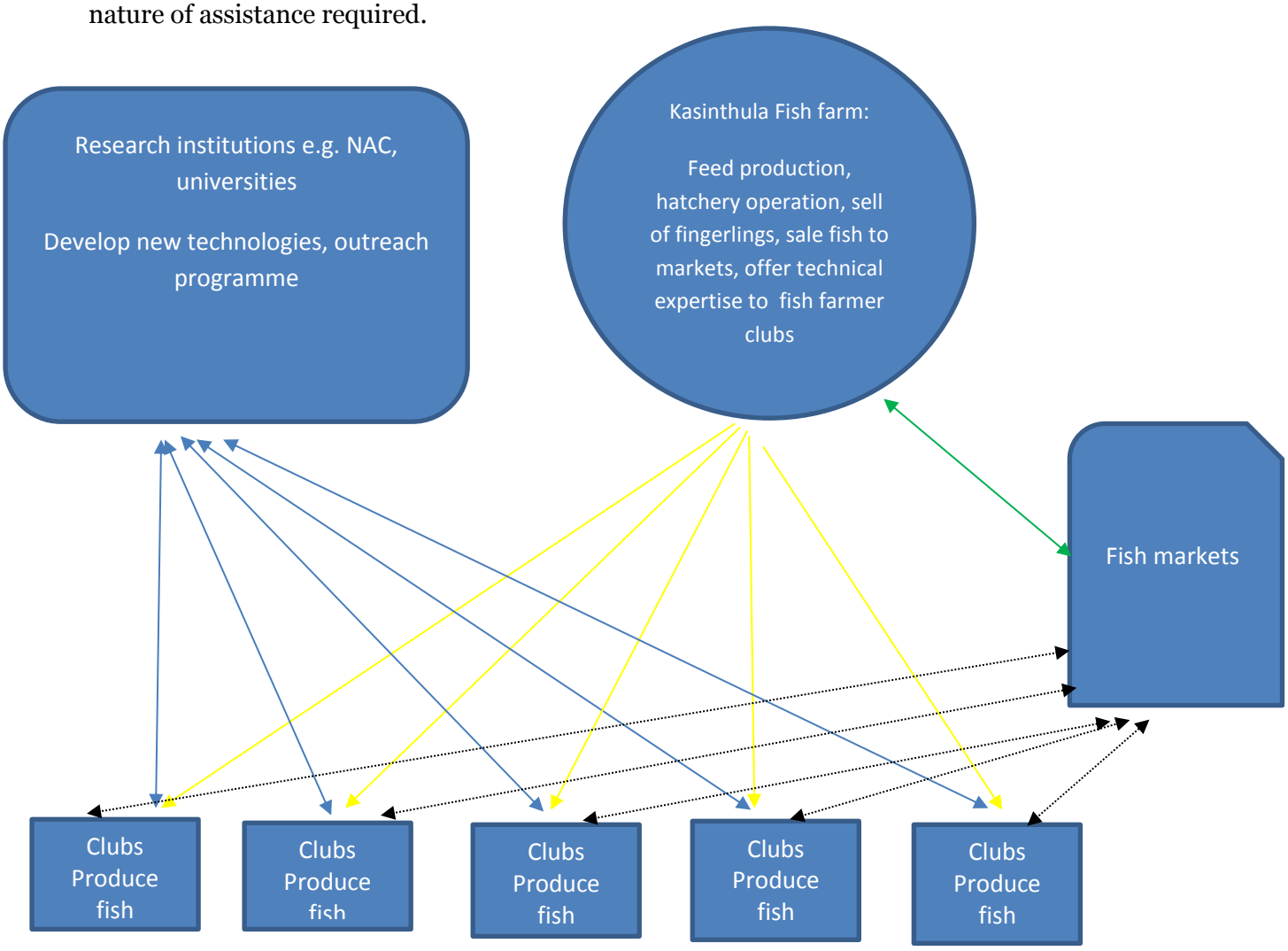



***Figure E: 4: Illustration of the link and relationships that would exist between Kasinthula Research Station, fish farmer clubs, Kasinthula Fish Farm and fish markets***

### Anticipated gross margin for commercial fish farming

It may be reasonable so far to assume that with good management practices farmers will achieve a gross margin of up to US$1,356 per hectare per year (MK911,232) as GK Aqua Fish Farms had achieved in the year 2007. The total amount of profits that can potentially be realized from fish farming alone may depend on the size of land under the SVIP that will be allocated to fish farming.

Secondly, by using sex reversed male fish under deep pond technology, higher gross margins than those obtained by GK Aqua Fish Farms can be obtained. For instance, extrapolations based on research conducted by NAC show that commercial fish farmers can get a gross margin of more than MK3,000,000 (US$4,500) per hectare per year which are more than three times the gross margins realized by Aqua GK Fish Farms.

### Requirements for fish farm development

### Rehabilitation of Kasinthula Fish Farm

In order to resuscitate Kasinthula Fish farm there is need to undertake the following:

- build hatchery;
- install a feed meal;
- increase the depth of the ponds (adoption of deep pond technology);
- install electricity; and
- clear the bushes.

All these will require a special budget. To be estimated after collecting more information.

### Training commercial fish farmers

The cost will depend on the number of farmers to be trained and the number of training cycles to be conducted. This will be estimated when more information is collected about the total size of land under the SVIP that will be allocated to commercial fish farming (determinant of the possible number of farmers).

Assuming that government Agricultural Extension Development Officers will be used some of the cost items to consider will include:

- at least two cars for extension staff;
- cost of development of training material;
- office space;
- office equipment;
- fuel for mobility; and
- periderms for extension.

### Aquaculture research

It is envisaged that some research will be conducted during the rainy season of the first year of the SVIP to determine the following:

- extent to which salt concentration within the ponds in the sodic soils can change when the ponds are filled with water.
- Determine whether the salt concentration within the ponds located in the sodic pans could be within the tolerance levels of the species of fish to be farmed under the SVIP.

- Investigate the possibility of rearing of fast growing exotic fish species under the SVIP after following the right government protocols.
    - Note that permission for this may be sought on the grounds that the Fisheries Policy of Malawi ban the use of exotic fish species within the Lake Malawi Catchment area. However, the planned SVIP is located in an area which is outside the catchment area of Lake Malawi i.e. there may be no danger of possible escape of the exotic fish from Lower Shire River to Lake Malawi.

Total research budget will be estimated after collecting all the required information. The cost of establishing a 1,000m² is presented in Table E.21.

***Table E: 21: Budget for production of fish on a 1,000m2 pond***

| Cost item | Quantity | Unit price (MK) | Total Cost (MK) |
|---|---|---|---|
| **1) Deep water (3 metre) pond construction costs** | | | |
| a) Labour | 45 people | 20,000 | 900,000 |
| b) Pipes and bends | 4 | 7,500 | 30,000 |
| c) Cement | 4 bags | 6,000 | 24,000 |
| d) Wheelbarrows | 5 | 50,000 | 250,000 |
| e) shovels | 10 | 8,000 | 80,000 |
| | | | |
| **2) Water costs** | | | |
| Initial volume of 3000 cubic metres plus top up of 100 cubic metres to cater for evaporation[59] | 3,100 cubic metres | | |
| | | | |
| **3) Production costs (for 1 cycle of 6 months)** | | | |
| a) fingerlings[60] (6 per square metre) | 6,000 | 15 | 90,000 |
| b) lime | 3 kg | 20000 | 60,000 |
| c) manure | 3,000 kg | 4 | 12,000 |
| d) Feed (NAC feed) | 1,000 | 250 / kg | 250,000 |
| e) Labour (feeding, slashing and watchman) | 6 months | 20,000/month | 120,000 |
| | | | |
| **4) Harvesting** | | | |
| a) Harvesting net | 1 | 400,000 | 400,000 |
| b) Labour | 1 | 2,000 | 2,000 |
| c) Ice | 100 | 120 | 12,000 |
| d) Transport | 20 km | 750 | 15,000 |

The information can be used to extrapolate the total budget for any given number of fish ponds. It may therefore be useful for estimating the initial financial support that will be required for fish farmer clubs once the total size of land to be allocated for fish farming is known. Table E.22 shows a summary of the quantity and value of fish that can be produced from each 1,000m² pond. Note that some costs (capital cost such as pond construction and harvesting net) may only be incurred in the first year while production costs have to be included during every production cycle.

[59] The estimation of 100 cubic metres for a 1000 square metre pond during a 6 months production period is based on the upper limit of reported annual evaporation rate of 2000-2200 mm / year for Lower Shire (Masuda, Chirwa and Ntrenjera, 2004).
[60] Assumed to be all male sex reversed *O. shiranus*.

***Table E: 22: Expected fish production from one cycle in a 1'000 square metre pond***

| Description | Weight (kg) | Unit Price (MK/kg) | Revenue (MK) |
|---|---|---|---|
| Quantity to be harvested[61] | 700 | 1,500 | 1,050,000 |

[61] This estimate is based on NAC research for sex reversed male *O. shiranus* yield results of 7190 kg per hectare per production cycle.

## APPENDIX F: LIST OF PERSONS INTERVIEWED

| Name of individual | Institution represented | Title/position |
|---|---|---|
| **Government Ministries, Departments and Agencies** | | |
| Geofrey Mamba | Department of Irrigation | Director |
| Dr Godfrey Ching'oma | Department of Crop Development | Director |
| Mr. Chawanangwa K. Jana | Department of Irrigation | Deputy Director |
| Mr Geoffrey Mwepa | Department of Irrigation | Deputy Director |
| Winston Sataya | Department of Irrigation | Deputy Director |
| Frieda Kayuni | Department of Agriculture Extension Services | Deputy Director |
| Dr. K Salipila | Makoka Agricultural Research Station | Deputy Director |
| Mr A. Mbozi | Department of Irrigation | Chief Irrigation Engineer |
| George Kanthiti | Ministry of Industry, Trade and Tourism | Chief Investment Promotion Officer |
| Mr. Bester Mandele | Chikwawa District Council | District Commissioner |
| Gerome Nkhoma | Shire Valley ADD | Program Manager |
| Ringston Taibu | Shire Valley ADD | Crops Specialist |
| Phideria C Negece-Moyo | Regional Irrigation and Water Office – South Region | Regional Irrigation and Water Officer |
| Mr. Emmanuel Kanchewa | Department of Agricultural Planning Services | Principal Economist |
| Duncan AA Magwira | Chikwawa District Agriculture Office | District Agriculture Development Officer |
| Dennis Chalera | Department of Irrigation, Chikwawa District | Irrigation Officer |
| Dan Nyangwa | District Agricultural Development Office | Assistant Irrigation Officer |
| Felix Chipojola | Bvumbwe Agricultural Research Station | Chief Agricultural Research Scientist |
| Dr Isaac Fandika | Kasinthula Agricultural Research Station | Chief Agricultural Research Scientist / Station Manager |
| Mr Mayamiko Chisale | Kasinthula Agricultural Research Station | Agricultural Research Scientist |
| Dr. Kesbell Kaonga | Chitedze Research Station | Maize Breeder |
| Donald Siyeni | Chitedze Research Station | Leader: Legumes Research |
| Willard Chibwana | Chitedze Research Station | Bean Breeder |
| Levison Siliya | Lifuwu Research Station | Seed Inspector |
| Innocent Machira | Lifuwu Research Station | Senior Assistant Research Officer |
| Ackim Dickson | District Agricultural Development Office | Animal Husbandry Officer |
| Micta Chola | District Agricultural Development Office | |
| Andrew Chamanza | Department of Agricultural Extension Services | Senior Agribusiness Officer |
| Rodrick Champiti | Shire Valley Irrigation Project | Project Technical Coordinator |
| James Chikhungu | Shire Valley Irrigation Project | Senior Irrigation Engineer |
| Mr Ngoma | Lifuwu Rice Irrigation Cooperative | Agricultural Extension Development Officer |
| Nasinuku Saukira | National Food Reserve Agency | Chief Executive Officer |
| Archibald Kandoje | ESCOM, Kapichira Power Station | Senior Engineer |
| Fred Sikwese | Malawi Bureau of Standards | Director of Standards |
| Patrick Khembo | Cotton Council of Malawi | Chairperson |
| | | |

| Name of individual | Institution represented | Title/position |
|---|---|---|
| **Farmer organizations** | | |
| Mr Sande | Dwangwa Sugar Farmers' Association | Chairperson |
| Alnord Kachulu | Dwangwa Sugar Farmers' Association | Treasurer |
| Frank Banda | Dwangwa Sugar Farmers' Association | Secretary |
| Patricia Kanyenda | Dwangwa Sugar Farmers' Association | Administration Assistant |
| Charles Kandiona | Dwangwa Cane Growers' Trust | Trust Accountant |
| Wilfred Chakanika | Dwangwa Cane Growers' Limited | |
| Biziwiki Nkhoma | Lifuwu Rice Irrigation Cooperative | Vice Chairperson |
| Weston Yohani | Phata Cooperative Society | Chairperson |
| Roman MItrozo | Phata Cooperative Society | Vice Chairperson |
| Brahim Bwanali | Phata Cooperative Society | Treasurer |
| Esnat Nungu | Phata Cooperative Society | Committee Member |
| Betsa Chinkhalango | Phata Cooperative Society | Committee Member |
| Kenason Friday | Phata Cooperative Society | Committee Member |
| Lackson Mbwanja | Phata Cooperative Society | Secretary |
| A.L. Msusu | Phata Sugarcane Outgrowers' Coop | Farm Manager |
| H. Nkhulanze | Phata Sugarcane Outgrowers' Coop | Capacity Building Officer |
| Robert Dziweni | Kasinthula Cane Growers Trust and Association | Chairperson |
| Masankho Khembo | Kasinthula Cane Growers' Limited | General Manager |
| Sam I. Banda | Kasinthula Cane Growers' Limited | Agriculture Manager |
| Wilson G. Hunga | Kasinthula Cane Growers' Limited | Finance Manager |
| Stanley Synod Mpaya | Kasinthula Cane Growers' Limited | HR and Administration Manager |
| Duncan Warren | Malawi Oils Seeds Transformation Sector | Intervention Manager |
| Edward Misias | Ngolowindo Cooperative | Chairperson |
| Kazzembe Amazi | Ngolowindo Cooperative | Committee Member |
| Nessie Mphepo | Miseu Folo Water Users' Association | Vice Chairperson |
| F. Damson | Miseu Folo Water Users' Association | Secretary |
| C. Hamuza | Miseu Folo Water Users' Association | Cashier |
| Fayson Makoko | Mwayiwafika Legumes Association | Chairperson |
| Henry Kaunda | National Smallholder Farmers' Association (NASFAM) | Marketing Officer |
| Jacob Nyirongo | Farmers' Union of Malawi (FUM) | Director (Agribusiness and Marketing) |
| Geofrey Khamba | Lake Shore Cane Growers' Association | Chairperson |
| Killex Saka | Lake Shore Cane Growers' Association | Vice Chairperson |

| Name of individual | Institution represented | Title/position |
|---|---|---|
| Patrick Kampaliro | Lake Shore Cane Growers' Association | Vice Secretary |
| Hamfrey Sibale | Lake Shore Cane Growers' Association | Executive Committee Member |
| Kingsley Makiyoni | National Smallholder Farmers' Association (NASFAM) | Business Development Manager |
| Moir Nyirenda | National Smallholder Farmers' Association (NASFAM) | Marketing Officer |
| Synden Mbalapana | National Smallholder Farmers' Association (NASFAM) | Marketing Officer |
| Loveness Billy | Ngolowindo Cooperative | Vice Chairperson |
| Martha Tambala | Ngolowindo Cooperative | Treasurer |
| Fanny Chagunda | Ngolowindo Cooperative | Committee Member |
| Madalena Shuva | Mwayiwafika Legumes Association | Committee Member |
| Patrick Mulenga | Mwayiwafika Legumes Association | Treasurer |
| | Sukambizi Tea Growers Association | Chairperson |
| | Sukambizi Tea Growers Association | Treasurer |
| | Sukambizi Tea Growers Association | Secretary |
| Vito Sandifolo | Root and Tuber Crops Innovation Platform | Board Secretary |
| | | |
| **Non-Governmental Organizations** | | |
| Gift German | COOPI | Deputy Programme Manager |
| Linely Linanche | COOPI | Project Officer |
| Mr Mavuto | Concern Universal | Project Officer |
| **Private sector** | | |
| Abdul Naiko | Jequet Farms | Estate Manager |
| Alastair Peat | Companhia de Vanduz, S.A. t/a Mozfoods, Vanduzi, Mozambique | Director (Procurement and logistics) |
| Austin Changazi | Lujeri Tea Estates | Outgrowers' Manager |
| Martha Khembo | Lujeri Tea Estates | Divisional Manager |
| Robert Mwaliwa | Lujeri Tea Estates | Divisional Manager |
| Charles Chikopa | Exagris Africa Limited | Outgrowers' Manager |
| Connex Chilangwe | PressCane | Out-growers' Programme Development Manager |
| Daud Kaunda | Maldeco Fish Company | Manager |
| David Manyenje | Auction Holdings Commodity Exchange | General Manager |
| Dr Christopher Guta | Press Corporation | General Manager, Operations |
| Dr Lyton Chithambo | Press Corporation | Risk Manager |
| Engineer DK Mansoori | Cotton Ginners Africa Limited | Consultant |
| Esnat Nchembe | NBS Bank | Products Manager |
| Fraiser Chipagala | Nchalo Estate, Illovo | Engineering Manager |
| Fumbani Nyangulu | MUSCO | Chief Operations Manager |
| | | |
| Jean Pinkuku | Universal Industries Limited | |
| Joan Gausi | FINCA | Head, Banking Operations |
| Jones Kemeta | National Bank of Malawi | Relationship Manager |
| Masutano Mulaga | Easy Loans | Chief Executive Officer |

| Name of individual | Institution represented | Title/position |
|---|---|---|
| Nyembezi Lungu | Press Corporation | Operations Officer |
| Professor David Kamchacha | Mtalimanja Holdings Limited | Managing Director |
| Sakina Mandanda | Opportunity Bank of Malawi | Chief Agricultural Officer |
| Spencer Chimbaza | Crown Mangoes | |
| Spencer Zinyemba | Cotton Ginners Africa Limited | General Manager |
| Watson Ligomba | Nchalo Estate, Illovo | Fields Manager |
| Yamikani Jassi | Sunseed Oil Limited | Project Manager |
| Victor Luhanga | Seed-Co Malawi | Seed Inspector |
| Denis Mdzalimbo | Seed-Co Malawi | Marketing Officer |
| John Lungu | Quton Seed Company | General Manager |
| Edward Kabaghe | Pannar Seed (Malawi) Ltd | Research Agronomist |
| Gervaz Thamala | Majete Game Reserve | Field Operations Manager |
| Thomas Banda | Majete Game Reserve | Financial Controller |
| | | |

# APPENDIX G: EASE OF DOING BUSINESS RANKING FORM

http://www.doingbusiness.org/rankings/

| | | 20th of 56 2nd Qtr Africa | 40th of 56 3rd Qtr Africa | 7th of 56 1st Qtr Africa | 43rd of 56 4th Qtr Africa | 10th of 56 1st Qtr Africa | 40th of 56 3rd Qtr Africa | 22nd of 56 2nd Qtr Africa | 15th of 56 2nd Qtr Africa | 20th of 56 2nd Qtr Africa | 34th of 56 3rd Qtr Africa | 44th of 56 4th Qtr Africa |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Economy** | **Africa?** | **Ease of Doing Business Global Ra** | **Starting a Business** | **Dealing with Construction Permits** | **Getting Electricity** | **Registering Property** | **Getting Credit** | **Protecting Minority Investors** | **Paying Taxes** | **Trading Across Borders** | **Enforcing Contracts** | **Resolving Insolvency** |
| Mauritius | Y | 32 | 37 | 35 | 41 | 99 | 42 | 29 | 13 | 66 | 27 | 39 |
| Rwanda | Y | 62 | 111 | 37 | 118 | 12 | 2 | 88 | 48 | 156 | 127 | 72 |
| Botswana | Y | 72 | 143 | 97 | 122 | 70 | 70 | 81 | 71 | 51 | 128 | 56 |
| South Africa | Y | 73 | 120 | 90 | 168 | 101 | 59 | 14 | 20 | 130 | 119 | 41 |
| Tunisia | Y | 74 | 103 | 57 | 38 | 86 | 126 | 105 | 81 | 91 | 81 | 57 |
| Morocco | Y | 75 | 43 | 29 | 55 | 76 | 109 | 105 | 62 | 102 | 59 | 130 |
| Tonga | Y | 78 | 53 | 22 | 61 | 154 | 42 | 115 | 82 | 87 | 97 | 131 |
| Seychelles | Y | 95 | 131 | 123 | 139 | 67 | 109 | 105 | 43 | 86 | 138 | 63 |
| Zambia | Y | 97 | 78 | 110 | 123 | 157 | 19 | 88 | 46 | 152 | 134 | 107 |
| Namibia | Y | 101 | 164 | 66 | 76 | 174 | 59 | 66 | 93 | 118 | 103 | 97 |
| Swaziland | Y | 105 | 156 | 80 | 155 | 113 | 70 | 134 | 79 | 30 | 175 | 96 |
| Kenya | Y | 108 | 151 | 149 | 127 | 115 | 28 | 115 | 101 | 131 | 102 | 144 |
| Ghana | Y | 114 | 102 | 132 | 121 | 77 | 42 | 66 | 106 | 171 | 116 | 161 |
| Lesotho | Y | 114 | 112 | 172 | 147 | 108 | 152 | 99 | 109 | 36 | 85 | 117 |
| Uganda | Y | 122 | 168 | 161 | 167 | 120 | 42 | 99 | 105 | 128 | 78 | 104 |
| Cabo Verde | Y | 126 | 75 | 104 | 140 | 74 | 109 | 163 | 94 | 106 | 47 | 189 |
| Egypt, Arab Rep. | Y | 131 | 73 | 113 | 144 | 111 | 79 | 122 | 151 | 157 | 155 | 119 |
| Mozambique | Y | 133 | 124 | 31 | 164 | 105 | 152 | 99 | 120 | 129 | 184 | 66 |
| Tanzania | Y | 139 | 129 | 126 | 83 | 133 | 152 | 122 | 150 | 180 | 64 | 99 |
| **Malawi** | **Y** | **141** | **161** | **65** | **175** | **93** | **152** | **115** | **102** | **123** | **147** | **164** |
| Côte d'Ivoire | Y | 142 | 46 | 180 | 146 | 109 | 133 | 155 | 176 | 142 | 120 | 76 |
| Burkina Faso | Y | 143 | 78 | 76 | 183 | 149 | 133 | 144 | 153 | 103 | 163 | 112 |
| Mali | Y | 143 | 172 | 152 | 151 | 140 | 133 | 166 | 149 | 82 | 149 | 100 |
| Ethiopia | Y | 146 | 176 | 73 | 129 | 141 | 167 | 166 | 113 | 166 | 84 | 114 |
| Sierra Leone | Y | 147 | 99 | 142 | 178 | 159 | 152 | 88 | 129 | 164 | 105 | 142 |
| Togo | Y | 150 | 133 | 179 | 109 | 182 | 133 | 155 | 163 | 126 | 125 | 93 |
| Gambia, The | Y | 151 | 169 | 117 | 153 | 124 | 162 | 163 | 177 | 104 | 110 | 111 |
| Burundi | Y | 152 | 19 | 165 | 185 | 94 | 174 | 115 | 111 | 154 | 146 | 145 |
| Senegal | Y | 153 | 85 | 148 | 170 | 152 | 133 | 155 | 183 | 113 | 145 | 88 |
| Comoros | Y | 154 | 163 | 116 | 132 | 123 | 109 | 144 | 167 | 80 | 179 | 189 |
| Zimbabwe | Y | 155 | 182 | 184 | 161 | 114 | 79 | 81 | 145 | 100 | 166 | 152 |
| Benin | Y | 158 | 115 | 82 | 179 | 172 | 133 | 150 | 179 | 116 | 168 | 112 |
| Sudan | Y | 159 | 146 | 146 | 102 | 89 | 167 | 166 | 140 | 184 | 142 | 154 |
| Niger | Y | 160 | 134 | 178 | 169 | 126 | 133 | 166 | 156 | 158 | 154 | 121 |
| Gabon | Y | 162 | 144 | 164 | 154 | 173 | 109 | 155 | 158 | 165 | 171 | 120 |
| Algeria | Y | 163 | 145 | 122 | 130 | 163 | 174 | 174 | 169 | 176 | 106 | 73 |
| Madagascar | Y | 164 | 128 | 182 | 188 | 161 | 167 | 105 | 76 | 125 | 153 | 127 |
| Guinea | Y | 165 | 126 | 166 | 159 | 146 | 133 | 166 | 184 | 161 | 118 | 108 |
| São Tomé and Príncipe | Y | 166 | 31 | 121 | 115 | 162 | 185 | 185 | 164 | 111 | 182 | 158 |
| Mauritania | Y | 168 | 70 | 112 | 152 | 100 | 162 | 134 | 187 | 160 | 71 | 189 |
| Nigeria * | Y | 169 | 139 | 175 | 182 | 181 | 59 | 20 | 181 | 182 | 143 | 143 |
| Yemen, Rep. | Y | 170 | 152 | 89 | 150 | 83 | 185 | 122 | 135 | 189 | 129 | 151 |
| Djibouti | Y | 171 | 171 | 124 | 172 | 168 | 181 | 174 | 85 | 162 | 183 | 68 |
| Cameroon | Y | 172 | 137 | 159 | 113 | 175 | 126 | 134 | 180 | 185 | 159 | 118 |
| Congo, Rep. | Y | 176 | 177 | 120 | 176 | 166 | 109 | 150 | 182 | 177 | 158 | 115 |
| Guinea-Bissau | Y | 178 | 179 | 163 | 184 | 150 | 133 | 155 | 152 | 148 | 162 | 189 |
| Liberia | Y | 179 | 37 | 174 | 180 | 178 | 109 | 182 | 118 | 183 | 176 | 168 |
| Equatorial Guinea | Y | 180 | 187 | 157 | 135 | 156 | 109 | 144 | 175 | 175 | 108 | 189 |
| Angola | Y | 181 | 141 | 108 | 166 | 169 | 181 | 66 | 141 | 181 | 185 | 189 |
| Chad | Y | 183 | 185 | 133 | 181 | 155 | 133 | 155 | 186 | 168 | 156 | 149 |
| Congo, Dem. Rep. | Y | 184 | 89 | 131 | 174 | 135 | 133 | 174 | 173 | 187 | 165 | 189 |
| Central African Republic | Y | 185 | 189 | 155 | 186 | 167 | 133 | 150 | 185 | 144 | 177 | 149 |
| South Sudan | Y | 187 | 181 | 177 | 187 | 180 | 174 | 181 | 104 | 179 | 76 | 189 |
| Libya | Y | 188 | 158 | 189 | 126 | 189 | 185 | 188 | 160 | 107 | 131 | 189 |
| Eritrea | Y | 189 | 184 | 189 | 142 | 177 | 185 | 122 | 174 | 189 | 121 | 189 |

Global count of countries = 189. Ranking in the matrix is Global and the order is in line with the aggregate ranking for all criteria. Above each criterion, it is noted where Malawi stands within Africa - if it is in the lower half, the score and column header are highlighted in red text.