

Assessment of the Current Situation and Future Outlooks for the groundnut Sub-Sector in Malawi

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Abstract

Malawi is one of the major groundnut producing countries in southern Africa. This paper reviews the key opportunities and constraints in the groundnut sub-sector in Malawi in terms of the current situation in production, yield and the harvested area, seed delivery systems, marketing systems for produce and examines the future outlooks by making projections for harvested area, production and total demand to the year 2020. Historical trends show significant growth in groundnut production, while exports declined significantly due to quality restrictions in the world market. The outlook analysis based on production and exports simulations shows that area, production as well as demand for groundnuts will continue to rise.

The future outlooks seem promising; however, there are a number of constraints that negatively impact on the development of the groundnut sub-sector in Malawi. The analysis has revealed weaknesses in the current seed systems as well as in the enforcement of quality standards. The technology delivery and the grain marketing systems are underdeveloped, leading to low use of improved technologies, and the production of poor quality of nuts with high levels of aflatoxin that are not accepted by the international markets.

Although the volumes of groundnut exports remain lower than the levels seen in the late 1980s, the review has shown that Malawi maintains a comparative advantage in groundnut production and competitiveness in exports, suggesting that there is a scope for increasing groundnut exports once the required quality standards are adhered to. Therefore the findings suggest the need for faster productivity enhancement, strengthening seed delivery systems to reach more farmers, and the development of existing value chains.

1 Introduction

Groundnut is an important legume crop for most parts of the world. Although groundnut originated in South America, it is now widely planted in tropical, sub-tropical and warm temperate areas in Asia, Africa, North and South America, and Oceania (Freeman et al. 1999) and it is the most widely cultivated legume in Malawi. The crop provides a number of benefits to smallholder farmers in developing countries. In Malawi and Senegal, for example, groundnuts account for 25 and 60 percent of household's agricultural income, respectively (Diop et al. 2003). Furthermore, as a legume, groundnut fixes atmospheric nitrogen in soils and thus improves soil fertility and saves fertilizer costs in subsequent crops. This is particularly important when considered in the context of the rising prices for chemical fertilizers which makes it difficult for farmers to purchase them.

Groundnut also forms an important component of both rural and urban diet through its provision of valuable protein, edible oil, fats, energy, minerals, and vitamins. This crop is consumed as such or roasted (more than 32% of supply) or processed into oil (about 52% of supply). In livestock-farming communities, groundnut can be used as a source of livestock feed and increases livestock productivity as the groundnut haulm and seed cake are rich in digestible crude protein content.

This paper examines the current situation and future outlook for groundnut in Malawi in terms of production, yield, harvested area, and trade. The paper is based on a review of various studies conducted earlier as well as the analysis of secondary data. The future outlooks for groundnut are examined and projections made, on production, total domestic demand and net-trade to the year 2020. The paper provides plausible information that can be used by scientists and development experts to map out the key features, constraints and opportunities for the development of the groundnut sub-sector in Malawi.

The rest of the paper is structured as follows; the methodology is presented in section 2, followed by the global outlook of groundnut in terms of production and trade in section 3.

The profile of the groundnut sub-sector, including available technologies and seed systems for technology diffusion, is discussed in section 4. In sections 5 and 6, we present groundnut marketing systems and future outlooks, respectively. The last section concludes highlighting the key findings and implications for policy.

2 Methods

This study is based on an analysis of existing literature- including published and unpublished materials - and secondary data obtained from national crop estimates statistics and FAOSTAT. The secondary data comprises aggregate data on global and national production, export and import volumes of groundnut, the global and national groundnut price trends over the years, and data related to access to seed. The literature reviews are enhanced by field observations and consultations with several stakeholders.

A diversity of statistical techniques were employed to analyze, summarize and present the data. Descriptive statistical methods were used to analyze the historical trends over the years and to estimate the growth rates over time. The projection of future outlooks for groundnut was done using two approaches. First, a regression model was used to estimate the precedent growth rate to project future groundnut outlooks. Under the regression model approach two scenarios were proposed and tested to project future production outlooks. The first scenario is based on the assumption that farmers will continue producing groundnut using existing/current farmer's technologies and methods of production. The second scenario is based on the assumption of technological change as a result of the adoption of improved groundnut varieties. The base year used for this analysis is 2007 and projections are made up to the year 2020.

The second approach used is a quantitative modeling methodology that projects plausible futures for groundnut area, production, yield, demand and net-trade as part of a global partial equilibrium trade model. The global food projection modeling framework of IMPACT (the International Model for Policy Analysis of Agricultural Commodities and Trade) recently calibrated and adapted for policy analysis of dry land crops by IFPRI and ICRISAT is applied to examine the future situation for groundnut in Malawi. It uses the

new and spatially disaggregated version of the model which allows supply, demand, and prices to be determined within each country and regional sub-models and linked at the global level through trade. Incorporating dry land crops such as groundnuts into the IMPACT modeling framework however required extensive crop-specific data on area, production, supply, demand, trade and several associated parameters. For any specification of these underlying parameters, IMPACT generates projections for harvested area, production, demand for food, feed and other uses, domestic and international prices and trade (import, export and net-trade). For details on the use of IMPACT model and projections for a wider range of crops, refer to Shiferaw *et al.* (2009).

3 Global groundnut production and trade

3.1 Groundnut production

World groundnut production rose from 14 million tons in 1961 to 47 million tons in 2006, representing an annual growth rate of 3.2% (Fig.1). The average annual production growth rate was 2.1 percent for the period 1961-1989, while it was 4.8 percent for the 1990-2006 period. According to FAO statistics, global groundnut harvested area increased at an annual rate of 0.7%, from about 17 million hectares in 1961 to about 22 million hectares in 2006. The observed area and production annual growth rates were, however, characterized by high year to year variations as depicted in Fig.1. The coefficient of variation was 13.9% for the 1961-1989 period and 23.4% for the 1990-2006 period. Groundnut production accounted for 6 percent and 57.6 percent of the world oilseed production and pulses production, respectively, during 1990-2006. Although groundnut is produced worldwide, China and India dominate the global production. China is the world's single largest groundnut producer, accounting for 35 percent (in the period 1990-2006), followed by India, Indonesia and Nigeria (Table 1). The Asian region produces about 70% of the world's groundnut followed by the sub-Saharan Africa (19%), United States of America (8%), and North Africa (2.8%). In Africa, Sudan, Senegal, Congo, Chad, Ghana and Burkina Faso remain the major groundnut producers.

During the period 1961-2006, the worldwide groundnut yield grew at an annual rate of 1.4% from about 800 kg/ha in 1961 to about 1.6 tons/ha in 2006 (Fig.2). Most of the groundnut production growth during this period resulted from yield growth, as the growth in harvested area stayed unchanged. Also, as shown in Table 1, there are significant productivity differences among regions due to differences in technological development, access to key modern inputs and irrigation, and farm management practices. Productivity is highest in the United States of America, China and Argentina. Lower productivity in Africa and India is the result of limited use of modern varieties and high dependence on

rain-fed preproduction. Furthermore, severe drought due to inadequate and highly variable rainfall and high level of pest and disease are important factors contributing to the low groundnut productivity in developing countries (Freeman et al. 1999)

More than half the groundnut harvested worldwide is crushed into oil and meal (Freeman et al., 1999). The worldwide groundnut oil production increased from 2.5 million tons in 1961 to 5.6 million tons in 2006 (Fig.3). The groundnut oil share in the total world's oil production declined from 4.8% in the period of 1961-1989 to 2.9% in the period of 1990-2006, in part, due to a rapid increase in vegetable oil production.

3.2 Groundnut International markets

World exports for shelled groundnuts grew at a modest annual rate of 0.3% for the period 1961-2006. The exports rose from 1.2 million tons in 1961 to about 1.5 million tons in 1968 and then declined until 1980 when exports started rising again (Fig.4). In 2006, about 1 million tons of shelled groundnuts were exported. The annual average growth rate of shelled groundnut exports was negative between 1961 and 1978 whereas it was positive during the period 1979-2006. The main exporters of groundnut for the period 2001-2006 were China, India, the United States, and Argentina. European countries, Indonesia, and Canada were major groundnut importers.

The trend in world groundnut oil exports is also depicted in Fig.4. The exports grew at annual rate of 1.3% for the period 1961-2006. The highest volume of groundnut oil exports of about 0.6 million tons was registered in 1977. The period after 1985 was characterized by a negative growth rate in groundnut oil exports of about -0.3%. The major groundnut oil exporters for the period 2001-2006 were Senegal, Argentina, Belgium and China (Table 3). On the other hand, the major oil importers were France, Italy and Belgium.

Globally, the producer prices also increased at an average growth rate of 7.2 percent during the period 1991-2006. The increasing trend in shelled groundnut exports and

groundnut oil exports are indicative of a positive future outlook. Furthermore, increasing producer and export prices for both shelled groundnuts and groundnut oil are expected to provide incentives for increased groundnut production.

4. Groundnut Sub-sector in Malawi

In 2005, Malawi ranked 20th in the world groundnut output, producing 161,162 tons valued at US\$77.9 million (Nakagawa et al. 1999). Malawi ranked as the 13th largest producer of groundnut in Africa in the period 2001-2006 (Table 4). During the period 2001-2006, Malawi produced an annual average of 157 thousand tons of groundnuts per year, which accounted for 2% of the total production in Africa. Within Malawi, groundnut is the most important legume and oilseed crop both in terms of the total area cultivated as well as production (Table 5). The average annual cultivated area for groundnuts for the period 1991-2006 (171 thousand hectares) accounted for 27% of the total legume land. Groundnut production per year during the same period accounted for 28% of Malawi's total legume production. The area planted to groundnuts was about 14 percent of the area planted to maize.

4.1 Groundnut producing areas and production systems in Malawi

Although produced in the entire country, the central and southern Agricultural Development Divisions (ADDs) of Kasungu, Lilongwe, Kasungu, Machinga, and Blantyre accounted for more than 75% of the total area planted to groundnuts in the period 2001-2006. In Kasungu, harvested area for groundnuts was about 22% of the maize area, while in Lilongwe it was about 17% (Appendix Tables 1 and 2). A summary map indicating the major groundnut growing areas of the country is given in Appendix Fig.1. With regards to the production systems, groundnut is mainly a rain-fed crop cultivated either as a sole crop or in association with cereals such as maize and sorghum or millet or grain legumes such as pigeonpea.

4.2 Available technologies in Malawi

Varieties developed and being promoted for commercial production in Malawi include CG7, ICGV-SM 90704 (Nsinjira), JL 24 (Kakoma), and IGC 12991 (Baka). The earlier releases include Chalimbana, Chitembana, Mawanga, Manipintar and RG 1 (see Appendix Table 3 for groundnut varieties released and their economically important traits). However, the adoption of the improved varieties by smallholder farmers remains low. During the 2004/05-2007/08 period, only 40% of the total harvested groundnut area (260483 ha) was covered by improved groundnut varieties. The main constraint to the adoption of improved groundnut varieties by farmers has been the lack of access by farmers to sufficient quantity of improved seed. Presently, there is absence of a stable and commercially viable groundnut seed market and hence farmers recycle grain and use as seed. Furthermore, the participation of private traders in the marketing of groundnuts and other grain products following the market liberalization in the 1980s led to the closure of a number of ADMARC selling points that previously acted as major sources of groundnut seed, further aggravating the problem of seed constraints among the farming communities.

4.3 Malawi's groundnut harvested area, productivity and production trends

The trend in the area cultivated for groundnuts in Malawi (1961-2006) is depicted in Fig.5. The size of groundnut harvested area grew at an average annual growth of 3.4% from 159 thousand hectares in 1961 to about 267 thousand hectares in 2006. The growth rate is, however, characterized by significant variations with the smallest harvested area recorded in 1990 when only 50 thousand hectares of groundnuts land were cultivated mainly due to the collapse in Malawi's groundnut exports. Since then, groundnut harvested area has steadily increased such that by 2006 it was at par with the harvested area recorded in 1979 and 1980 when groundnut production was at its peak,

Malawi's groundnut annual production grew at annual rate of about 5% from 127 thousand tons of groundnuts with shell in 1961 to about 150 thousand tons in 2006

(Fig.5). The increase in production is attributed to productivity gains per unit area as well as area expansion.

The trend in yield is depicted in Fig.6. Although a number of improved cultivars have been developed and recommended to farmers since 1990, groundnut yields in Malawi are still very low, ranging from 250-800 kg/ha. The average yield almost doubled from 376kg/ha in the period 1982-1991 to 697 kg/ha in the period 1992-2006. The yield grew at an annual rate of 3.6% for the period 1961-2006. The increase in yield during the period 1992-2006 could be attributed to the increased cultivation of improved groundnut varieties. Siambi and Kapewa (2003) also report that the national average yields started improving after improved varieties were introduced into the farming communities through Action Group II of the Malawi Productivity Task Force (1994-1998) and the DARTS-ICRISAT-USAID groundnut and pigeonpea projects (1999-2002). However, the yield is far below the yield of about 4 tons/ha obtained at research stations. The continued use of recycled or unimproved groundnut seed is an important factor contributing to the low productivity which suggests that there is scope for improving productivity once farmers adopt improved varieties and if they follow recommended farming practices. Aside from the low use of improved groundnut varieties, the low productivity can be attributed to other biotic and abiotic stresses such as drought as well as pests and diseases and low soil fertility. With regards to diseases and pests, Babu et al (1995) estimated annual production losses in groundnuts on-farm and on-station situations at 34% and 19%, respectively. They further reported that early leaf spot alone causes a mean annual loss of US\$ 4.79 million and that eliminating yield-losses due to early leaf spot could contribute up to 46% of the trade balance.

Furthermore, poor management practices by farmers lead to low technical efficiency and low productivity. Consistent with this observation, Edriss and Simtowe (2002) reported that technical efficiency of about 75% of groundnut farmers in the surveyed districts of central Malawi and in the 2002 cropping season fell below the sample average technical efficiency index of 0.49, indicating that considerable technical inefficiencies exist in the groundnut farms. This finding is particularly interesting as it suggests that there is scope

for increasing productivity by 51% at the current level of input and technology use intensity (without increasing input use) but by just improving on the management practices. The study further revealed that the lack of extension support for farmers led to technical inefficiency and consequently low productivity. Furthermore, most farmers in Malawi do not follow recommended practices with regards to maintaining optimum plant population and correct row or ridge and plant spacing, leading to low seeding densities and hence low returns to land.

The groundnut oil production grew at an annual rate of 6% from about 4 thousand tons in 1961 to about 21 thousand tons in 2006 (Fig.7). Malawi's production accounted for about 0.2 percent of the total world groundnut oil production during 1961-2006. The annual growth rate was substantially high in the period 1990 - 2006 (14%) compared to the annual growth rate of 1% per year in the period 1961-1989.

4.4 Growth rates of groundnut harvested area yield, production and exports by policy phase in Malawi

This section discusses trends in groundnut harvested area, yield and exports in the last five decades and in relation to the agricultural policies that were implemented to facilitate the process of agricultural transformation. Historically, Malawi's agricultural development process can be said to have passed through three phases. The first phase, spanning up to 15 years after independence (1961-1984), was characterized by active government involvement in the economy and agricultural sector (Chirwa, 2007). The main objective of policies during this period was to diversify the economy away from the agricultural sector through increased import-substitution and industrialization, thereby generating sustainable employment opportunities (Chirwa, 2007).

The second phase, also known as the reform phase, spanned for another 15 years from 1980 to 1994. The period was characterized by government's adoption of several structural adjustment policies proposed by the World Bank, including the liberalization of the marketing of agricultural inputs and produce. Government under the auspices of the

World Bank liberalized prices of most crops in 1988 with the state marketing agency ADMARC, acting as a buyer of last resort at minimum guaranteed pan-territorial and pan-seasonal prices. Private traders were allowed to participate in the marketing of agricultural produce such that by 1995 prices of all other crops, except for maize, were fully liberalized (Chirwa, 1998). This meant that private traders were free to determine their own prices for the purchase of crops from smallholder farmers.

The period from 1995 is regarded as the post-reform period, a period after major structural reforms under structural adjustment period were completed in most sectors of the economy. The phase is characterized by a formulation and adoption of a number of development policy frameworks, including the Malawi Poverty Reduction Strategy (MPRS) of 2002 and the Malawi Economic Growth Strategy (MEGS) of 2004. This phase is also characterized by the reversal of many of the structural adjustment and marketing policies that were adopted during the reform phase. For example, the state marketing agency – ADMARC - has once again become an important player in the marketing of maize and other crops. The continued participation of ADMARC has partly been attributed to the sluggish response of the private sector taking up marketing activities following liberalization.

Presented in Table 6, results indicate that the groundnut annual growth rate in the world's total production (3.2%) was lower than Malawi's annual growth rate in groundnut production of about 5%. The post-reform phase and the second round of the reform phase are characterized by high growth rates in harvested area, yield, as well as production. Also, the first round of the post-reform period (1995-2000) registered the highest groundnut annual rates of growth in production (28.7%), yield (15.3%), harvested area (15.7%), and oil production (30.9%). This is apparently because of a sharp rise in the yield and production between 1995 and 1996¹. The growth can also be seen as a supply response following the liberalization of the marketing of agricultural produce during the preceding reform phase. Malawi's groundnut exports dropped sharply from about 30 tons

¹ It appears this coincided with the period when government was changing the methodology for estimation harvested area, production and yield. Therefore the sharp rise in production, may also be a result of changes in the methodology and not the changes in the absolute volumes of pigeonpea produced.

in 1988 to zero exports in 1989 (see Fig.10). The exports remained low after 1990 despite the reforms in the local markets until 2004 when groundnut exports increased to about 10 tons. This was largely due to the poor quality of groundnut resulting from high aflatoxin levels. The findings suggest that while market reforms helped in sustaining production increase, they failed to sustain growth in groundnut exports. Emphasis in current policies should focus on supporting the production of high quality groundnuts with lower aflatoxin levels.

4.5 Groundnut seed systems

The groundnut seed sector in Malawi is supported by the formal and informal institutions. However, the informal sector supplies most of the groundnuts seed in Malawi, an observation that is consistent with reports by Monyo et al. (2003) who observed that 90% of smallholder seed requirements in Southern Africa are met through the informal farmer-to-farmer exchange and through drought relief. The formal actors include both the public and the private sector institutions while the informal institutions mainly involve seed production by farmers, the non-governmental organizations and the emergency programs run by government.

Groundnut seed production in Malawi has benefited substantially from high investments in groundnut varietal improvement research conducted by ICRISAT in the past years. On the other hand, there is low participation by the private sector in groundnut seed production, largely resulting from the high costs of exclusion as farmers can recycle seed without experiencing significant yield reductions, which reduces incentives for private sector participation.

Seed production and marketing activities for groundnut are conducted by the state, the private sector (e.g. seed companies), the international research organizations such as ICRISAT and farmers. With regards to regulations, Malawi has some procedure for officially releasing new varieties. After variety development, the Agricultural Technology Clearing Committee (ATCC) has to review the proposal for the release of a technology. The committee is composed of members from the National Research

Council, the private sector, the University of Malawi, and the Department of Agricultural Research. Siambi and Kapewa (2003) further reported that for a variety to be released it has to be tested in multiple locations for at least three years.

In order to further enhance the performance of the seed sector, a Seed Traders Association of Malawi (STAM) was created in 2004 comprising several stakeholders in the seed industry to oversee activities in the industry. The goals of the association are to enhance communication between the seed sector and the Ministry of Agriculture, promoting their products, and ensuring that seeds sold to Malawian farmers are of good quality. The association also aims at lobbying for members' interests and to hold their members accountable for maintaining high standards in product and service delivery. The association has, for example, lobbied for inclusion in government and donor discussions of policies and programs that affect their businesses (Ministry of Agriculture and Food Security, 2007).

The structure of the Malawi seed industry is depicted in Fig.6. The figure demonstrates the flow of seed from the seed producers to the farmers. Multinationals, regional companies and local companies as well as seed producer associations produce seed which is then marketed to farmers through input distributors, formal chain stores, agro-dealers through the state managed marketing outlets under ADMARC. However, as stated earlier, groundnut seed production is largely done by farmers, ICRISAT (e.g. through contract farming) and sometimes distributed by NGOs and government (through the subsidy and other related seed multiplication programs)

In the next sub-sections we provide detailed discussions on the key actors in the groundnut seed industry and their roles. After variety release, ensuring that the seed is made available to farmers is critical. In Malawi, the following are some of the key strategies employed to improve farmer's access to seed.

4.5.1 Private companies

The private seed companies such as Monsanto and Seed Co. play a limited role in the supply of commercial as well as foundation seed for groundnut, but they play a central role in the production of foundation seed as well as commercial seed for cereals. As depicted in Fig.6, there are two categories of private companies operating in the seed industry. In the first category is multinationals operating in and outside Malawi. The second category includes regional companies that operate within the southern African region. The multinational companies mainly focus on hybrid maize production and marketing due to its high excludability and hence high profitability. Examples of multinational companies include Monsanto and Pioneer. The regional seed companies include Seed Co., based in Zimbabwe, and Pannar of South Africa. Seed Co. has breeding programs for both hybrid and open pollinated varieties (OPV) of maize, soybean, wheat and groundnut. It also sells seeds of sorghum, cowpeas, millet, rice, common bean and vegetables. Pannar produces and markets hybrid and OPVs of maize but does not supply legume seeds.

Aside from the multinational and regional companies, national companies play a crucial role in the seed industry. For example, founded in 2004 in the southern region, Seed Tech is a company that produces hybrid maize (MH18). Another example is Funwe Farm Limited, founded in 2001 and produces and markets seed for a number of crops but they mainly focus on maize. The presence of such well established companies offers an opportunity for the development of the groundnut seed sector.

4.5.2 Outlets and retailers

Seed reaches farmers through outlets and retailers which stock seed produced by multiple companies. Such retailers include input seed distributors such as Rab Processors and Nyiombo Shops. Other formal chains including the Chipiku Stores and the Agricultural Trading Company (ATC) and NASFAM have been stocking various seeds for sale to farmers. Agro-dealers are also playing an important role in the marketing of seed. The government through its state managed ADMARC sells seed for all crops. Currently, ADMARC has more than 300 marketing units where seeds for different crops are sold but it rarely sells groundnut seed. Agro-dealers also play an important role in the

distribution of seed for other crops but they also rarely stock groundnut seed. For example, in a study conducted by ICRISAT in 2007, more than 70% of the groundnut seed was from farmer's own savings from the previous harvests.

4.5.3 Farmer organizations and smallholder seed multiplication

Farmer organizations play an important role in the production of commercial seed. As reported by Siambi and Kapewa (2003), donor institutions have supported the establishment of seed growers' schemes such as the Association of Smallholder Seed Marketing Action Group (ASSMAG). ASSMAG was a farmer-owned and controlled rural seed production and marketing organization and composed of affiliate organizations from the eight Agricultural Development Divisions (ADDs) in Malawi that produced and marketed open pollinated varieties of maize and legume seeds including groundnut. This system collapsed due to management problems but when operational it enabled seed producers to sell seed at good prices while facilitating the supply of seed to different parts of the country. However, there had been some inefficiency due to the inability of the association to adequately market and buy seed from the producers. The National Smallholder Farmers Association of Malawi (NASFAM) is now entering into certified seed production of sunflower, common bean and soybean as well as some other legumes.

4.5.4 Government and non-governmental organizations

Recognizing the failure of the public and private sector to meet farmers' needs for seed with high cost of excludability such as that for the self-pollinated crops, government and nongovernmental organizations (NGOs) facilitate the operations of a number of informal or emergency seed programs to meet the needs of the poor. NGOs and government also have been active in promoting seed dissemination and multiplication through a number of institutional innovations as follows:

4.5.4.1 Community seed banks

Community seed banks have been used as a strategy for accelerating the dissemination of released varieties of groundnut since 1997. Siambi and Kapewa (2003) reported that a number of NGOs buy seed and distribute it to farmers in their project areas in a form of a loan or credit and the beneficiaries payback loans to the seed banks at an agreed quantity the following year, usually on a one-to-two basis. The seed paid is distributed to other farmers in subsequent seasons. In so doing, NGOs and ICRISAT have played an important part in the multiplication and dissemination of groundnut seed in Malawi.

NGOs have also facilitated on-farm testing of new varieties thereby enhancing demand for certain crop varieties. NGOs also facilitate the dissemination of seed for new varieties, through seed loan schemes, seed exchange or free distribution, especially when a disaster is declared. In 2008, for example, NGOs purchased 10 tons of improved varieties of groundnut seed re-distribution to farmers.

4.5.4.2 Commercial seed producers

The multiplication of groundnut seed through commercial or large scale producers was introduced in Malawi in the year 2000. Siambi and Kapewa (2003) reported that during the period 2000-2002 commercial farmers were contracted to produce groundnut and pigeonpea seed through the ICRISAT-DARTS-USAID project following which commercial seed companies started showing interest in producing groundnut seed. NGOs have been quite instrumental in doing this. For example, Action Aid has supported commercial seed multiplication for quite sometime including the Malawi Smallholder Seed Development Project, which was implemented in collaboration with the Ministry of Agriculture. Approximately 300 groups of 10-20 farmers were formed in order to multiply seed of new varieties including that of groundnut. The farmers received training in seed production and were loaned foundation seed (Tripp, 2000).

4.5.4.3 State seed multiplication

Siambi and Kapewa (2003) reported that the government of Malawi with support from donors such as the European Union has promoted seed multiplication since the 1990s. The Ministry of Agriculture identifies farmers in different ADDs across the country to multiply seeds of different crops, including groundnut. The identified farmers are usually provided with groundnut seed of released varieties on loan. Although such initiatives have proven to be quite successful in improving farmer's access to seed, they usually fizzle out soon after the end of donor funding, suggesting their lack of sustainability.

4.5.4.4 Government subsidy programs

The government of Malawi, through the Ministry of Agriculture, has been implementing input subsidy programs in the last decade in which seed has been a major component. Although such programs target maize, they also include legume crops such as groundnut, common bean, and soybean. For example, in 2009 the government purchased about 16 metric tons of groundnut seed of improved varieties from ICRISAT's support seed revolving fund and distributed to farmers as part of the subsidy program. The major problem with emergency programs and input subsidy programs implemented in Malawi has been that of displacing the sales or supplies from the private sector, which distorts the commercial seed sector.

4.5.5 International research organizations

The international research organizations, particularly those belonging to the Consultative Group for International Agricultural Research have been instrumental in producing breeder seed as well as facilitating the commercial production of seed. ICRISAT has bred and distributed groundnut seed to farmers in Malawi for a number of years. For example, since 1999, supported by USAID, ICRISAT facilitated the production of breeder and basic seed for groundnuts through a revolving fund scheme. Through the

program, about 146 tons of basic seed was produced; while 25 tons of breeder seed was also produced during the period 1999-2006 (see Table 8).

5 Groundnut Marketing Systems

5.1 Structure of groundnut markets

In Malawi, the government parastatal, ADMARC, exerted strong monopoly power during 1980s through an intensive network of rural buying points at which producers were paid guaranteed prices. However, following the liberalization of produce marketing in the early 1990's, grain marketing activities are conducted by private traders as well as by ADMARC. The continued participation of ADMARC has partly been attributed to the sluggish response of the private sectors in groundnut marketing following liberalization. This sluggish response by the private sector, which is also the case in a number of African countries, has in part been attributed to high transaction costs associated with trading in rural areas characterized by under-developed road networks.

Currently, the key actors in groundnut market also include small- and large-scale producers, intermediate buyers, farmer associations, processors and consumers. Fig.9 depicts the structure of legume markets in Malawi showing the flow of groundnuts from the producers to the consumers. The most prevalent groundnut marketing system involves individual farmers selling groundnuts to intermediate buyers. Other prevalent marketing systems involve (i) individual farmers selling groundnut to local markets; (ii) farmers' groups pooling together their groundnuts and selling to large buyers/companies; and (iii) farmers selling groundnut grain for seed to NGOs. There are several categories of buyers which includes, intermediate buyers, processing and packaging companies, and other consumers of groundnuts.

Intermediate buyers

Intermediate buyers are categorized into small-scale and the large-scale. The small-scale intermediate buyers are often village based. They buy from open spaces and shops are

used as warehouses. So they hang their scales in the open while some have small shops in the village and buy the products from the shop. The large-scale intermediate buyers tend to cover a wider area which could be several districts or an entire region or all regions. Most of them deal in both seed and commercial grains and also participate in export markets.

Companies and processors

Aside from intermediate buyers, there are a number of companies in Malawi that buy grain groundnuts and process, package, locally distribute and export processed products. Currently, the majority of these companies depend on intermediate buyers for the supplies of their raw materials; otherwise, others send middlemen to buy products on their behalf.

Non-governmental organizations and other institutions

NGOs usually purchase groundnut grain for redistribution to farmers as seed. They buy directly from farmer associations, or from commercial seed producers; however, they play a very limited role in groundnut grain marketing in general.

5.2 Groundnut export markets, constraints and opportunities

More than half of the groundnuts harvested worldwide are crushed into oil and meal. Consequently, a substantial volume of the groundnut trade worldwide is in the form of oil and meal (Minde et al, 2008). However, there has been a substantial increase in the trade volumes for confectionery groundnuts during the last decade while groundnut oil trade has fallen because of loss of competitiveness in relation to substitutes and concerns over aflatoxin contamination in groundnut products. The contribution of Malawi to international groundnut trade is very thin in part because about 70 percent of the total groundnut production is consumed locally. In the sub-Saharan Africa (SSA) Malawi

ranks as the ninth exporter of groundnut, but it ranks third in Southern Africa. The top exporters in SSA are South Africa, Gambia, Senegal, and Sudan.

The trend in export volumes for groundnuts for the period 1962-2006 is depicted in Fig. 10. Malawi's exports rose from 6 thousand tons in 1962 to about 50 thousand tons in 1967 after which there was a decline. In 1984, Malawi's groundnut exports declined to 1.4 tons. Exports picked up briefly after 1984, but in 1989 Malawi did not export any groundnuts. Its export market share declined from an average of about 20 thousand tons (1.9%) in 1961-1989 to 1.7 thousand tons (0.1%) in 1990-2005. The declining share could be in part due to an increase in export share of China, the United States of America, Argentina, India and other developed countries. Furthermore, following the liberalization of Malawi's agricultural markets, ADMARC stopped stocking groundnut improved seed. Consequently, farmers were forced to recycle their seeds, which led to the deterioration of nut quality. Nakagawa et al. (1999) reported that even though international prices remained relatively attractive, the export market collapsed between 1990 and 1999 due to quality concerns and changes in demand. However, groundnut is slowly re-emerging as an export crop as a result of the establishment of institutional innovations such as NASFAM (the Smallholder Farmers' Association of Malawi), which are promoting and marketing groundnuts (Nakagawa et al. 1999) and hence contributing the competitiveness of the crop. In 2004, Malawi exported 8,329 tons of shelled groundnuts, valued at US\$4,109,000, making it the 17th largest exporter in the world by value (FAO statistics).

Apart from shelled groundnut exports, Malawi also exported some groundnut oil; however, its participation in the groundnut oil export market is negligible. Between 1961 and 2005, the country only exported about 122 tons of its total groundnut oil production of 7568 tons. Malawi also imported some groundnuts during the period but the imports were minimal, adding up to 204 tons of groundnuts for the last five decades.

5.3 Groundnut price trends

The trends in nominal retail prices collected from forty-one markets in Malawi are depicted in Fig.11. Retail nominal prices of shelled and unshelled groundnut increased at an annual rate of about 15% between 1999 and 2008. The average annual nominal retail price for unshelled groundnuts increased from MK 26/kg in 1999 to about MK 100/kg in 2008. The average annual price for shelled groundnuts rose from MK 46/kg in 1999 to MK 160/kg in 2008. However, the monthly prices were highly volatile during this period with a coefficient of variation of 36% and 37% for shelled and unshelled groundnut, respectively. Export prices for shelled groundnuts from Malawi declined substantially after 2001. Prices dropped from about US\$ 600 /ton in 2002 to about US\$ 200 /ton in 2006, which might also have contributed to the drop in export volumes from Malawi. In the 2008 season, it picked up to US\$ 1200/ton.

5.4 Constraints

Higher quality standards in European markets

High levels of aflatoxins in Malawi's groundnuts are partly the reason for the sharp drop in Malawi groundnut exports. Consistent with this observation, Nakagawa et al. (1999) reported that the management of aflatoxin is a crucial factor for exporting groundnuts. They reported that due to the aflatoxin levels exceeding 20 parts per billion, the European Union ceased importing groundnuts from Malawi during the 1990s. A high Performance Liquid Chromatography (HPLC), considered as the only internationally accepted method of aflatoxin detection, costs around US\$230 per sample assessed, which is prohibitively expensive for the farmers. Malawi is currently testing its crops through other forms, including enzyme-linked immunosorbent assay (ELISA) kits, which can be purchased by individual farmers at about US\$1, but that too reduces the competitiveness of groundnut exports. NASFAM and ICRISAT have been testing some groundnuts for aflatoxin using the ELISA technology, but in most cases groundnut samples are still sent to accredited laboratories in the Republic of South Africa

Inadequate supply of seed for market-preferred varieties

The groundnut seed system is grossly under-developed due to the low participation by the private sector in seed production. Consequently, there is low supply of improved and market-preferred varieties to the producers. It was observed in 2007 that, in Malawi, only 40% of the groundnut land was allocated to improved seed varieties which leads to a negative impact on the productivity as well as the competitiveness of groundnuts. Moreover, some of the local varieties are not preferred in the international markets, leading to a reduction in the production for the market-preferred varieties.

Inadequate attention to the development of the sub-sector

The groundnut sector has not received enough attention from the government as well as the private sector with regard to financing its research and development initiatives aimed at enhancing the transformation of the groundnut sector in Malawi. Unlike maize and tobacco sectors that have benefited significantly from public investments in research and development, there has been marginal investment in groundnut research. Also, while there has been significant credit support for the production of tobacco and maize, such support is missing for groundnut production.

5.5 Opportunities

There are a number of opportunities for further development of Malawi's groundnut sector. International donor organizations such as the USAID and international research organizations such as ICRISAT are providing significant support in the enhancement of high-quality seed multiplication and increasing farmers' awareness of quality considerations. As also observed by Nakagawa et al.(1999), opportunities for investments in the groundnut sector also exist in (i) wholesaling, grading, and quality testing for export markets; (ii) peanut butter production for local and regional markets;

and iii) oil extraction for the domestic and International markets. NASFAM reports that Malawian farmers enjoy a competitive advantage in producing groundnuts given the inexpensive inputs required for producing the crop. This is also because groundnut farmers usually do not apply fertilizer to, a situation that reduces the production cost.

As also observed by Mkoka (2007), substantial market opportunities exist for export to the Common Market for Eastern and Southern Africa (COMESA) and the EU (particularly the UK). Malawi's groundnuts are also highly demanded in South Africa, Zimbabwe and Tanzania. There also is demand for Malawi's groundnut in the European markets as well but it is contingent upon improvement in production, processing and handling to meet EU standards for aflatoxin contamination, which must not exceed 20 parts per billion.

Opportunities also exist for the transformation of the groundnut sub-sector from a subsistence-oriented sector to a more commercially-oriented sector. A number of institutional innovations are being implemented to link farmers to markets and to reduce transactional costs associated with working as individual farmers. The recently introduced groundnut production insurance scheme supported by the World Bank is one of such institutional innovations and is seen as a positive step towards promoting the production of groundnuts in Malawi. NASFAM, in conjunction with the Insurance Association of Malawi and with technical assistance from the World Bank and Opportunity International, designed an index-based weather insurance contract that would payout if the rainfall needed for production was insufficient for groundnut production in the three pilot districts of Kasungu, Lilongwe and Nkhosakota. Through this scheme farmers buy insurance for groundnut production and use the insurance premium as collateral for accessing credit from financial institutions. This enables groundnut farmers in Malawi, who traditionally relied on only local seed for production to plant certified groundnut seed hence achieving maximum profits.

6. Outlooks for Malawian groundnut

In this section we examine Malawi's groundnut sector outlook by projecting future trend in production, yield as well as harvested area. The assumptions made are based on current production and technology use levels. The future groundnut outlook depends on a number of factors, including the relative profitability of groundnuts compared to other competing crops. In this section, we make future projections using two approaches. First, a regression-based approach is applied under two scenarios to project future production outlooks. The first scenario assumes that farmers will continue producing groundnuts using existing/current farmers' technologies and methods of production. Thus, we assume a constant groundnut area growth rate of 9 percent per annum. The groundnut area is forecast to increase from 281 thousand hectares in 2007 to 528 thousand hectares in 2020. Similarly, assuming an average yield of 0.869 tons per ha (average yield during 2004/05-2007/08), production from forecast area will increase from 244 thousand tons in 2007 to 459 thousand tons in 2020 (Table 8). In addition, we assume other factors such as yield growth rate, own prices and cross prices (competing crops prices), insect pests and diseases will remain constant.

However, the assumption of continued area expansion is unrealistic in the long-run due to limited land availability resulting from population growth. Thus, in the second scenario we assume that any increase in groundnut production should come from productivity gains per unit area as a result of increased use of improved technologies. Under this scenario it is assumed that farmers will adopt improved groundnut varieties. The base year used for this analysis is 2007 and projections are made up to the year 2020.

Production data for 4 years (2004/05-2007/08) showed that area covered by improved groundnut varieties (CG 7, ICGV-SM 90704, and JL 24), and local groundnut varieties was 40% and 60%, respectively. The average farm yields of improved and local varieties during the same period were 1.03tons/ha and 0.746 tons/ha, respectively. We assume that the area covered by improved groundnuts varieties will increase by 20%, 30% and 50% by 2010, 2015 and 2020, respectively, holding other factors constant. This implies that

area covered by traditional varieties will be reduced by the same percentage. Based on these assumptions, groundnut production is expected to increase from 244 thousand tons in 2007 to 883 thousand tons in 2020 (Table 7).

The second projection approach involves the use of IMPACT model as described in the methods section. The IMPACT model projection assumes continued adoption of new existing varieties that improve yields over time using the current rates of productivity growth. In this sense, the IMPACT model scenario is similar to the second scenario presented using the regression methods above. In terms of the projected area and production trends over the 20-year horizon for which the projections are made, the IMPACT model results suggests that groundnut area and production in Malawi will significantly grow. The IMPACT model results for production projections are similar to the regression methods, but the area and production responses seem to be more elastic. This can be attributed to differences in the methods employed and the base year considered for projection. The IMPACT model projections indicate that groundnut area and production will increase by 30% and 50%, respectively, between the years 2000 and 2020 (Fig.12). The implication is that if the available new varieties of groundnut reach farmers, production is likely to significantly grow that could potentially generate significant marketable surplus that can be exported. It should be pointed out that projected values for harvested area and production are slightly lower than the actual production and harvested area estimates for years 2001-2006. This can be attributed to climatic as well as policy changes which must have created a favorable environment for boosting groundnut production through both area cultivated as well as through yield improvements. Such unanticipated changes which may have been excluded in the IMPACT model could lead to a deviation of the groundnut production from the norm. However; the continued increasing trend in the productions provides hope for sustainability. Also, this might be attributed to significant investments in the seed sector supported by the international research institutions such as ICRISAT as well as NGOs and government through the seed and input subsidy programs that are being implemented. The subsidy program has been now implemented for the past five years.

The total domestic demand and net-trade (export minus import) projection for groundnut show considerable growth in the years to come (Fig. 13). Groundnut total demand in 2020 is estimated at 180,000 tons, up from 130,000 tons in 2008, which represents an increase of 43%, while the net-trade projection for 2020 is expected to be 9000 tons up from 1000 ton in 2008. However the increase in exports will depend on productivity growth as well as the extent to which Malawi complies with international studies on the quality especially with regards to aflatoxin levels. Productivity growth is also constrained by the low use of improved varieties and land scarcity considering that Malawi is densely populated.

7 Conclusions

This paper examines the current situation and future outlooks of groundnuts, the most widely cultivated legume, in Malawi. We address the questions that relate to the current groundnut production levels, available technologies, seed and grain marketing systems, export markets and then explore the potential for increasing production as well as exports in future. The review has shown that groundnut is an important food and cash crop grown in all ecological regions of the country. It accounts for about 14% of the area planted to maize and about 39% of the total pulse production in the country.

Historical trends show that over the past four decades, Malawi's groundnut harvested area and yield grew at annual rates of 3.4% and 3.6%, respectively, while production grew at an annual rate of 5%. Malawi's groundnut productivity remains low largely due to the continued use of unimproved/local varieties by producers as well as due to technical inefficiency. The low adoption is mainly attributed to the underdeveloped and inadequate seed systems, shortage of quality seed and lack of timely delivery, and insufficient access to production credit to farmers, among others. Effort has to be made to promote the use of improved varieties by farmers to improve productivity. This will require coordinated and collaborative efforts from the public as well as the private sector.

Related to the low use of improved varieties, the review of Malawi's seed systems indicated that despite the existence of several seed companies, there are very few that produce and market quality legume seeds in general and groundnut seeds in particular. Apparently, the high costs of exclusion for the legume seed implies low returns to investments in the legume seed sector. Consequently, the private sector is likely to continue maintaining a low profile in the legume seed sector. One viable solution is the promotion of the farmer-seed sector through farmer seed multiplication associations that will produce commercial groundnut seed. Previous arrangements such as the establishment of the seed revolving fund scheme managed by ICRISAT in the period 1999-2006, were viable and should be replicated in different regions of the country. Government financial support in the form of seed money will be required to promote the establishment of such seed schemes.

Furthermore, existing community level and private seed producers and marketing institutions must be encouraged and empowered in a manner that enhances the creation of a stable and commercially viable seed sector that meets the seed needs of a diverse group of farmers. For sustainability of the legume seed industry, government- and NGO-supported input subsidy programs will have to be implemented in a manner that does not displace commercial sales. The development of a commercial seed sector should go in parallel with the development of a commercial grain market, which is poorly developed in most parts of the country. In the absence of a commercial grain market, it is unreasonable to expect a commercial seed market to emerge. Demand for formal seed sector will be simulated by opportunities to sell these crops, and by markets that reward grain quality and types. Agro-processing and other forms of value adding such as packaging would significantly increase the profitability of groundnut production.

The outlook in terms of production and exports is bright. Simulation results have shown that area, yield as well as total production will continue to increase for the next twenty years. The impact model has shown that groundnut area and production will increase by 30% and 50%, respectively, between the years 2000 and 2020. These are encouraging results, but this will largely depend on the stability of the demand for groundnuts as well

as the market prices. The demand projections indicate that the net trade (difference between exports and imports) will remain low but with a slow rise. This observation suggests that there will be some continued dependency on groundnut imports.

References

- Babu S., Subrahmanyam P and Ng'ong'ola. D.1995. Economic analysis of yield losses due to diseases - A case study of early leaf spot of groundnuts in Malawi. *African crop science journal*. Vol 3. No1 pp. 105-115
- Chirwa. E. 2007. Agricultural Growth and Poverty Reduction in Malawi: Past Performance and Emerging Trends
- Chirwa, E. W. 1998. Fostering Private Food Marketing and Food Policies after Liberalisation – The Case of Malawi, in Seppala, P. (ed.) Liberalized and Neglected? Food Marketing Policies in Eastern Africa, Helsinki: United Nations University/WIDER
- Diop, N., J. Beghin, and M. Sewadeh. 2003. Groundnut Policies, Global Trade Dynamics and the Impact of Trade Liberalization. Mimeo. The World Bank, Washington, D.C.
- Edriss. A.K and Simtowe. F (2002) Technical Efficiency in Groundnut Production in Malawi: An Application of a Frontier Production Function. UNISWA Journal pp. 45 - 50
- FAOSTAT. 2008. Online agricultural statistics. www.faostat.org.
- Freeman, H.A., Nigam, S.N., Kelley, T.G., Ntare, B.R., Subrahmanyam, P., and Boughton, D. 1999. The world groundnut economy: facts, trends, and outlook. Patancheru 502 324, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics. 52 pp.
- Minde I., Madzonga O., Kantithi.G., Phiri. K., and Pedzisa T. 2008. Constraints, Challenges, and Opportunities in groundnut production and marketing in Malawi. Report No. 4. ICRISAT -Bulawayo. Zimbabwe
- Ministry of Agriculture and Food security. 2007. Evaluation of the 2006/7 Agricultural Input Supply Programme in Malawi.
- Mkoka, C. 2007. Purging Malawi's Peanuts of Deadly Aflatoxin, Sci Dev Net,<http://www.scidev.net/en/features/purging-malawis-peanuts-of-deadly-aflatoxin.html>.

- Monyo.E.S., Mgonja M.A., and Rohrbach. D.D. 2003. Analysis of seed systems development, with special reference to Small holder farmers in Southern Africa: Issues and Challenges: paper presented at the workshop on successful community based seed production strategies in Harare- Zimbabwe.
- Msukwa,C. 2005. Grain Legume Market Information System : A documentation of some of the findings from the Baseline study conducted in all Districts in Malawi
- Nakagawa.S., Bahl.A., Demisse.M., Ishizuka M., Miranda.F., Ramirez.F, Sung.K. 1999. Foreign Direct Investment in Blantyre, Malawi: Opportunities and Challenges. Colombia University School of International and Public affairs
- Shiferaw, B., Msangi, S. and Rosegrant, M.W., 2009. Analysis of plausible futures for dryland agriculture in the semi-arid tropics under alternative policy scenarios. Research Report, ICRISAT (forthcoming).
- Siambi and Kapewa. 2003. Seed production of groundnuts in Malawi – ICRISAT-Lilongwe, Malawi
- Tripp, R. 2000. Strategies for seed system development in Sub-Saharan Africa: a study of Kenya, Malawi, Zambia, and Zimbabwe. Working Paper Series no. 2. PO Box 776, Bulawayo,Zimbabwe: Socioeconomics and Policy Program, International Crops Research Institute for the Semi-Arid Tropics. 56 pp.

Tables

Table 1: Harvested area and yield of groundnut in major producing countries, 1991-2006

Country	Area per year ('000 ha)	Average yield (tons per ha)	Annual Production (million tons)
World	22272.33	1.40	32.70
Main producers			
China	4106.81	2.76	11.30
India	7158.05	1.00	7.20
United States	610.25	2.99	1.70
Argentina	208.07	2.27	0.47
Main producers in Africa			
Sudan	1028.90	0.69	0.71
Senegal	815.49	0.82	0.67
Congo, DR	551.47	0.04	0.43
Chad	376.64	0.91	0.34
Ghana	253.13	0.99	0.25
Burkina Faso	263.33	0.82	0.22

Source: Computed based on FAOSTAT data (2008)

Table 2: Shelled groundnut exports ('000 tons) and export shares (%) in selected countries

Country	1991-2000		Country	2001-2006	
	Exports ('000 tons)	% share		Export ('000 tons)	% share
China	287.52	36.3	China	360.44	42.9
Argentina	172.83	21.8	Argentina	126.36	15.0
India	109.51	12.0	India	99.50	13.6
Netherlands	83.23	10.5	Netherlands	58.85	7.3
South Africa	24.61	3.1	Nicaragua	50.02	6.2
Gambia	20.93	2.6	Brazil	26.96	3.2
Singapore	17.91	2.3	Gambia	19.24	2.3
Nicaragua	15.77	2.0	South Africa	16.96	1.9
China, Hong Kong	12.51	1.6	Belgium	8.09	0.9
Senegal	8.99	1.0	Australia	5.42	0.6
France	7.44	0.9	Egypt	5.24	0.6
Libya	7.28	0.9	Ghana	5.71	0.6
Germany	5.33	0.7	Libya	4.38	0.5
Mali	4.87	0.6	Singapore	3.94	0.5
Egypt	4.35	0.6	Paraguay	3.76	0.4
Myanmar	2.41	0.3	Mali	3.07	0.4
Paraguay	2.34	0.3	Malawi	2.96	0.3
Australia	1.88	0.2	Bolivia	1.96	0.2
Canada	1.32	0.2	Germany	1.84	0.2
Malawi	1.07	0.1	France	1.61	0.2

Source: Computed based on FAOSTAT data (2008)

Table 3: Groundnut oil exports and export shares from selected countries

Country	1991-2000		2001-2006	
	Quantity ('000 tons)	Share of total exports (%)	Quantity ('000 tons)	(Share of total exports (%))
Senegal	70.70	22.6	56.39	23.7
Argentina	62.18	20.1	53.70	23.5
USA	24.87	8.0	10.04	3.7
Belgium	21.21	6.8	21.71	8.9
India			10.52	4.3
Belgium-Luxembourg	18.75	6.7	0.01	
China	19.4	6.2	20.45	1.3
Sudan	17.42	6.0	3.76	1.4
France	16.29	5.2	18.39	7.1
Netherlands	10.71	3.5	7.24	2.5
Hong Kong	8.10	2.6	16.31	6.7
Brazil	7.89	2.5	7.21	3.7
Mali	7.10	2.3	5.72	2.3
South Africa	6.38	2.0	0.0	
Nigeria	3.94	1.3	2.18	1.2
Singapore	2.37	0.8	0.01	
Gambia	2.31	0.7	6.92	2.8
Italy	1.60	0.5	0.00	
UK	1.08	0.3	0.00	
Nicaragua	0.72	0.2	6.00	2.4
Germany	0.66	0.2	1.28	0.5
Malawi			1.01	0.4

Source: Computed based on FAOSTAT data (2008)

Table 4: Malawi's annual groundnut production and share compared to other African countries (2001-2006)

Country	Production ('000 tons)	Share (%)
Nigeria	3188.00	37
Sudan	816.17	9
Senegal	559.21	6
Chad	449.68	5
Ghana	424.44	5
Congo, DRC	364.05	4
Burkina Faso	278.28	3
Guinea	250.32	3
Mali	198.03	2
Cameroon	207.62	2
Egypt	193.90	2
Niger	175.77	2
Malawi	148.98	2

Source: Computed based on FAOSTAT data (2008)

Table 5: Malawi's groundnut annual harvested area and production compared to other legumes (1991-2006)

Crop	Area ('000hectares)	Area share (%)	Production ('000 tons)	Production share (%)
Groundnut	171.12	27.0	96.41	27.8
Common Bean	170.23	26.8	80.21	23
Lentils	1.12	0.2	0.83	0.2
Peas	12.51	2.0	6.28	1.8
Pigeonpea	112.44	17.7	70.68	23
Chickpea	88.93	14.0	34.34	9.9
Cowpea	78.121	12.3	49.95	14.4

Source: Computed based on FAOSTAT (2008)

Table 6: Growth rates of groundnut production, yield, harvested area and exports in Malawi by policy phase (Annual averages %) compared to the world (1961-2006)

	Pre-Reform	Reform Period			Post-Reform		Total
	1961-79	1980-84	1985-89	1990-94	1995-2000 ^a	2001-06	
A. World							
Production growth rate	1.6	2.6	3.3	4.6	3.6	6.6	3.2
Yield growth rate	0.6	1.0	2.9	2.8	0.6	2.6	1.4
Harvested area growth rate	0.6	-0.3	2.4	1.6	1.0	-0.8	0.7
Shelled groundnut export volume growth rates	-2.81	2.05	3.83	7.77	0.90	-1.60	0.3
Groundnut oil export volume growth rates	5.18	-4.64	3.45	-2.41	-2.28	0.03	1.3
							7
B. Malawi							
Production growth rate	2.5	-7.7	-3.4	6.1	28.7	4.1	4.8
Yield growth rate	-0.5	1.0	-5.7	18.2	15.3	1.8	3.6
Harvested area growth rate	2.7	-10.2	-10.8	14.5	15.7	7.0	3.4
Groundnut oil production growth rate	3.3	-4.5	-2.4	0.7	30.9	9.7	6.0

Source: Computed based on FAOSTAT data (2008)

^a There is a huge jump in the production, yield as well a harvested area for Malawi between 1995 and 1996. This might have occurred due to the change in the crop estimation methodology used by the Ministry of Agriculture during this period.

Table 7: Production of groundnut and pigeonpea seed through a revolving fund scheme managed by ICRISAT in Malawi (1999-2006.)

Season	Groundnut seed quantity (tons)		Pigeonpea seed quantity (tons)	
	Certified Seed	Breeder Seed	Certified Seed	Breeder Seed
1999-2000	61	8	12	3.0
2000-2001	56	15	30	0.4
2001-2002	194	17	35	17.0
2002-2003	116	8	12	2.0
2003-2004	45	3	16	0.4
2004-2005	89	6	34	2.0
2005-2006	64	2	7	0.2
2007-2008	76		23	
Total	801	58	169	25.0

Source: ICRISAT (2006 & 2008)

Table 8: Malawi groundnut area and production forecast under different scenarios (2007-2020)

Year	Area ('000 ha)	Production ('000 tons)	Area under new varieties (%)	Production ('000 ton)	Change in production (%) compared to 2007
2007	281	244	40	244	
2010	335	291	20	307	7
2015	421	365	30	397	38
2020	528	459	50	883	208

Source: Own calculation

Figures

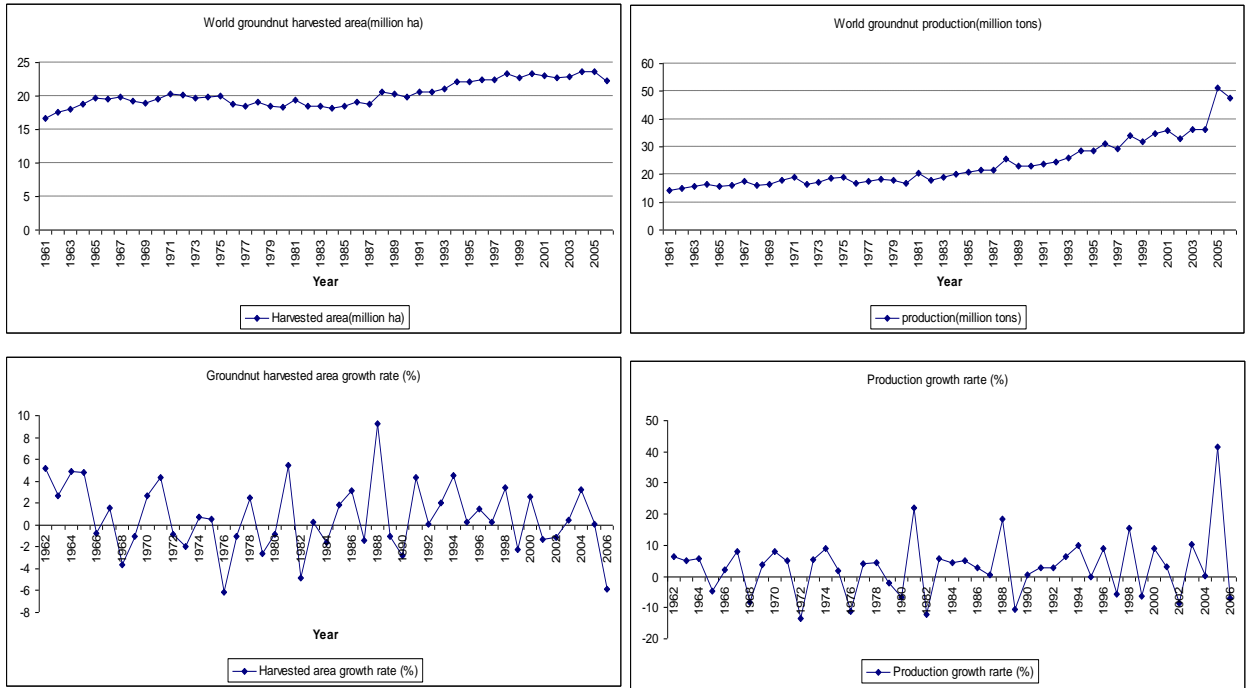


Figure 1 World groundnut harvested area and production trends and growth rates (1961-2007)

Source: Computed based on FAOSTAT (2008)

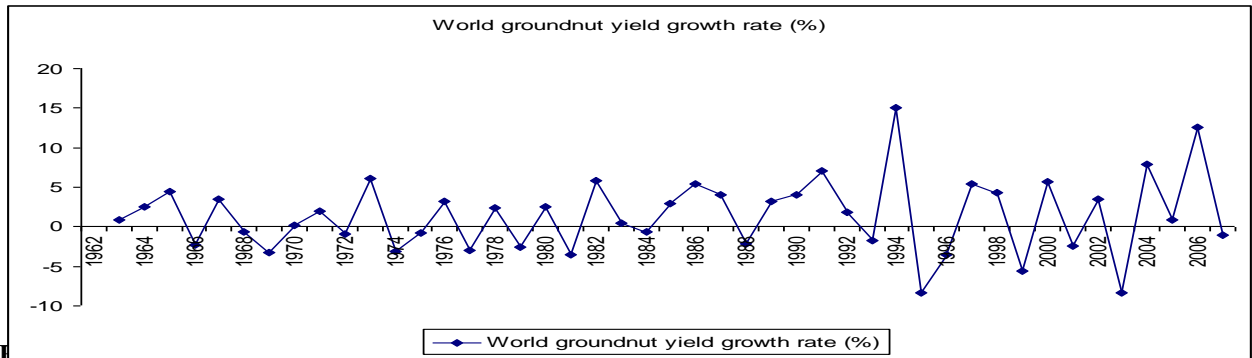
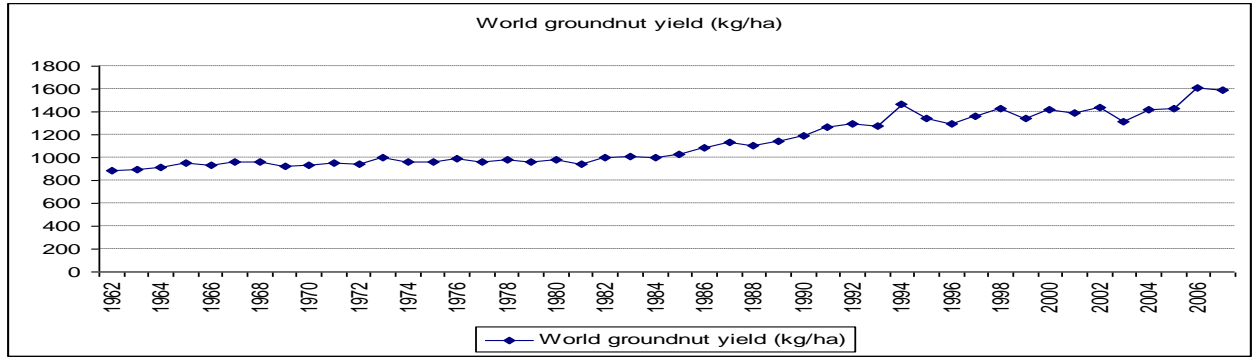


Figure 2: World groundnut yield trends and yield growth rate (1962-2006)
 Source: Computed based on FAOSTAT (2008)

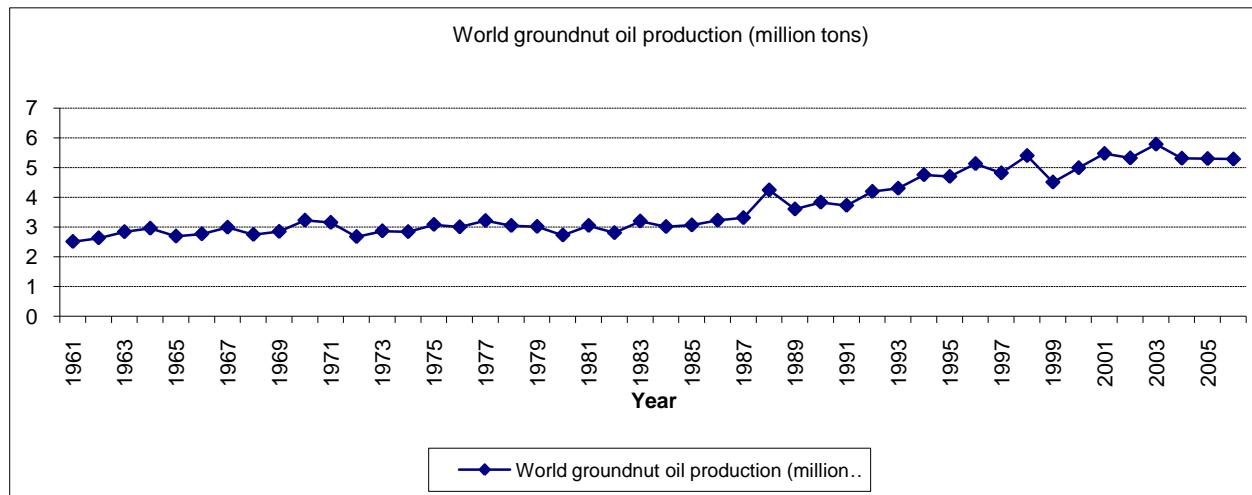


Figure 3: World groundnuts oil production (million tons) (1961-2006)

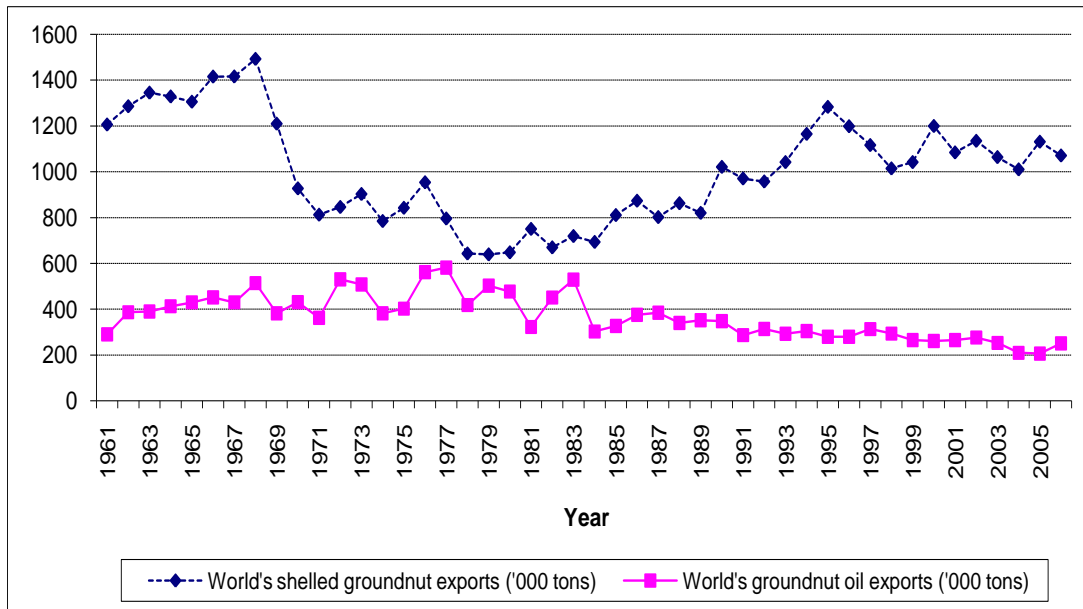


Figure 4: World's shelled groundnuts and groundnut oil exports

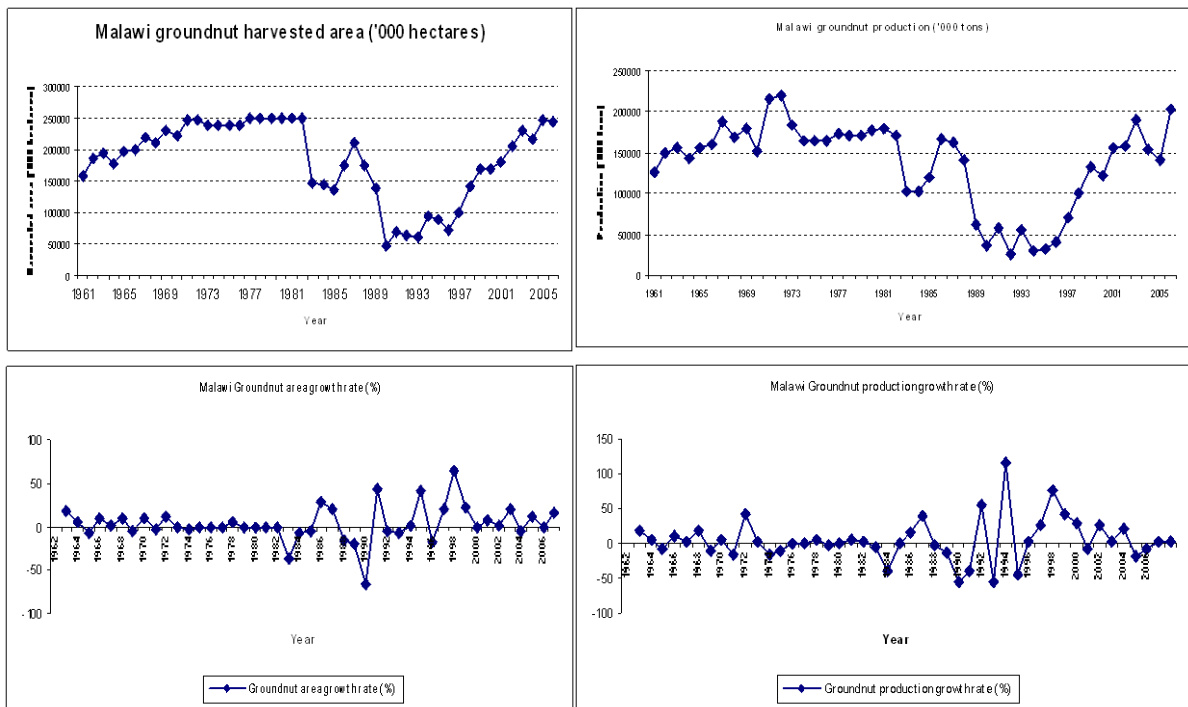


Figure 5: Trend in harvested area and production for groundnuts in Malawi (1961-2006)
 Source: Computed based on FAOSTAT and Malawi's National Statistics Office (various reports: 1961-2006)

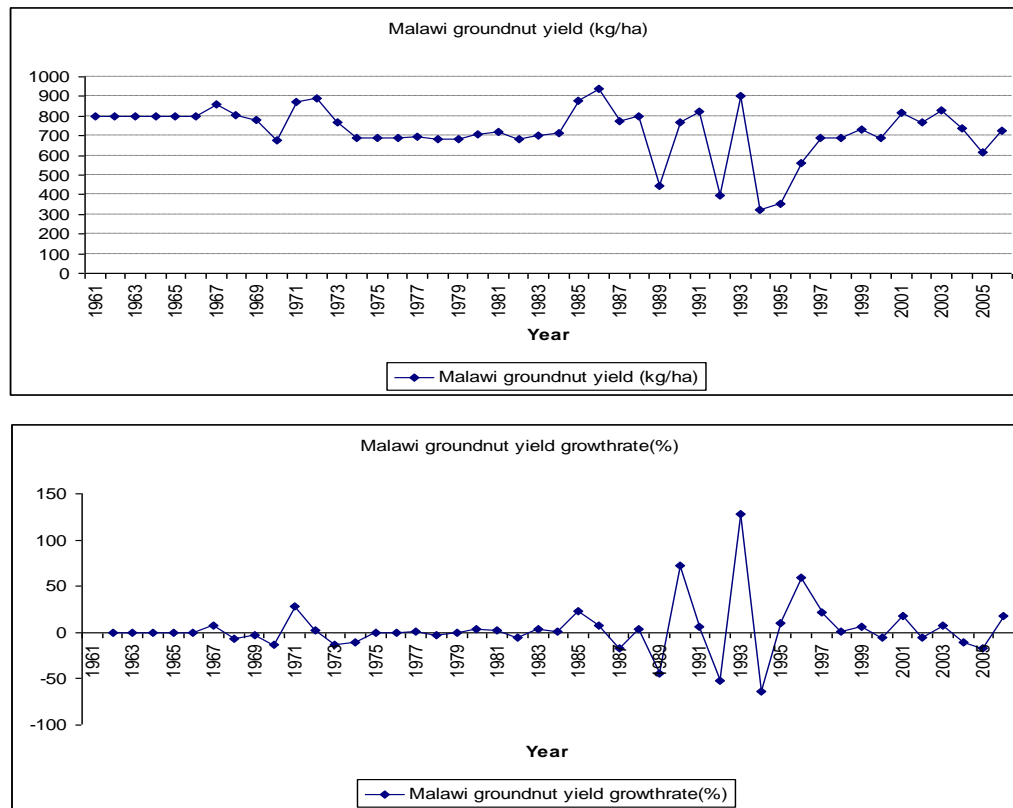


Figure 6: Malawi groundnut yield trends (kg/ha) and yield growth rate (%) 1961-2006
 Source: Computed based on FAOSTAT (2008) and Malawi’s National Statistics Office reports

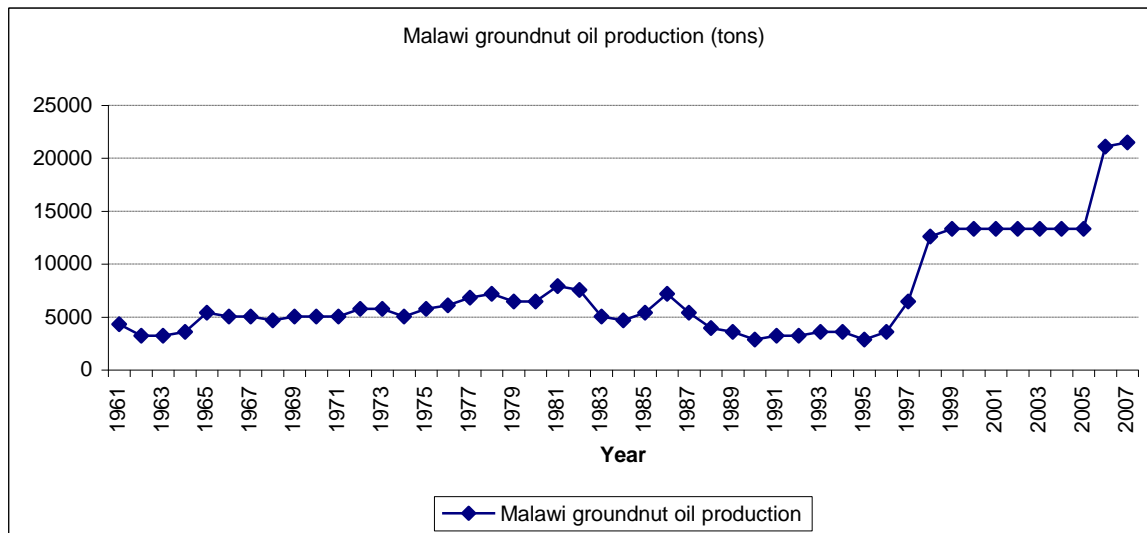


Figure 7: Trend in Malawi’s groundnut oil production (1961-2006)

Source: FAO database

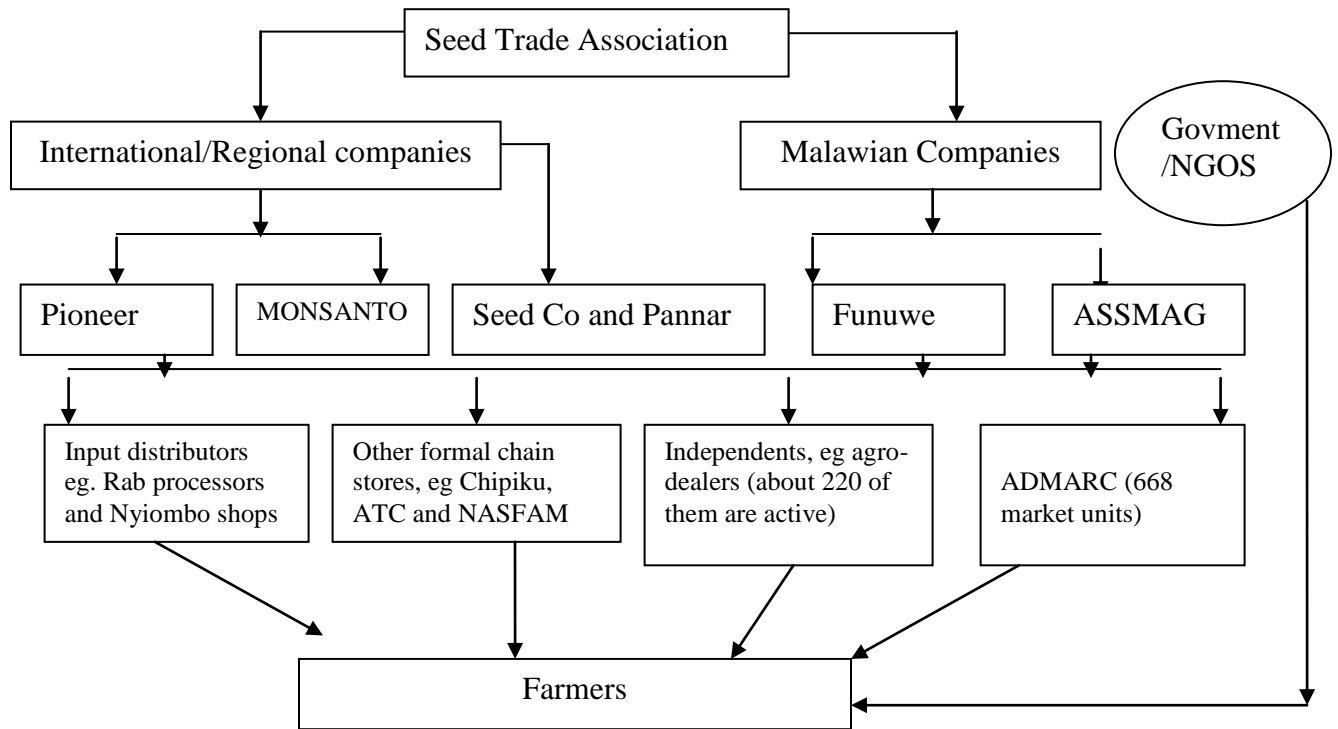


Figure 8: Structure of the Malawi' seed industry and seed distribution system

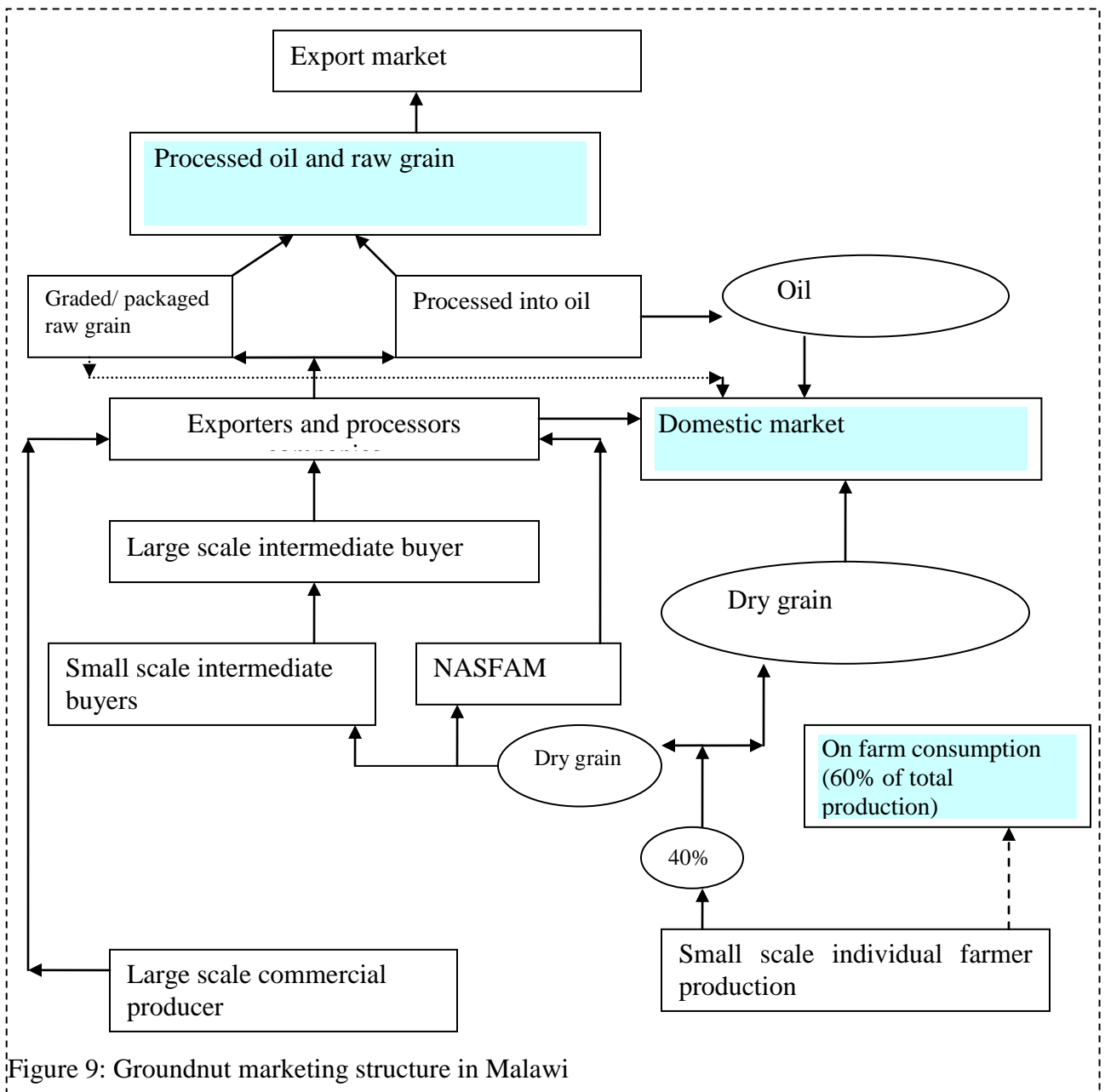


Figure 9: Groundnut marketing structure in Malawi

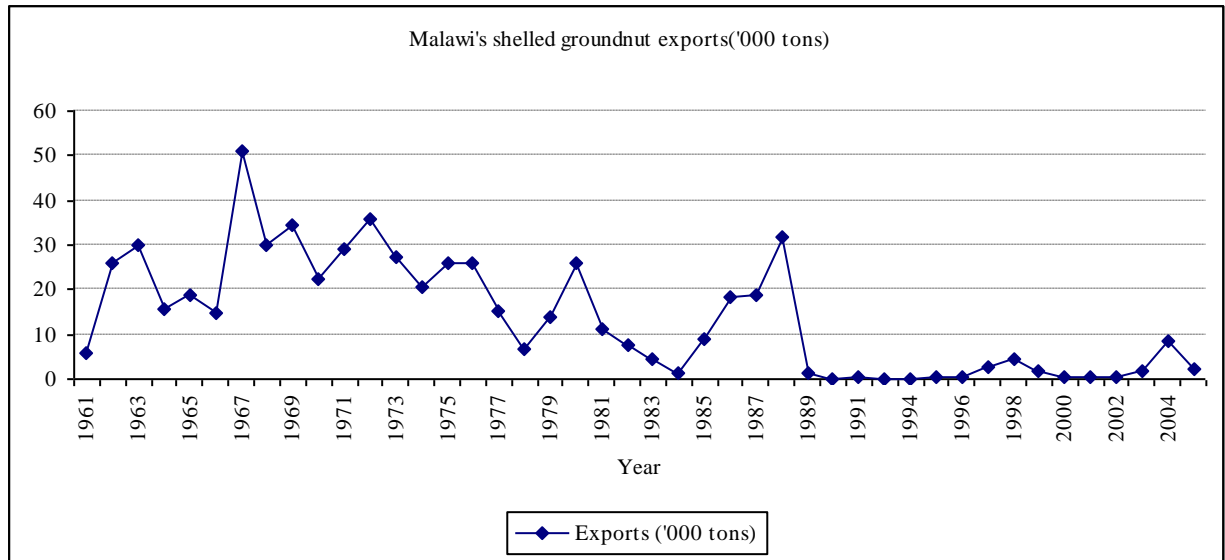


Figure 10: Malawi shelled groundnut export trends (000 tons) for the period 1961-2006
 Source: FAO database

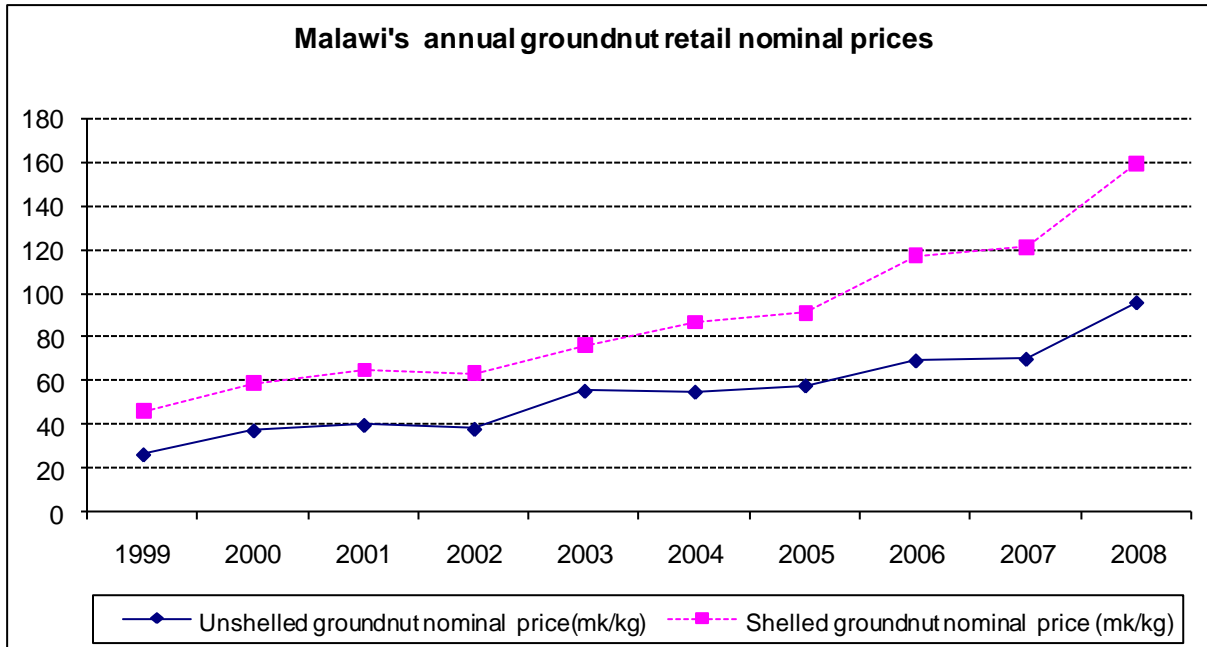


Figure 11: Groundnut annual retail prices (Kwacha per kg)
 Source: Computed based on statistics from the Malawi National Statistics Office

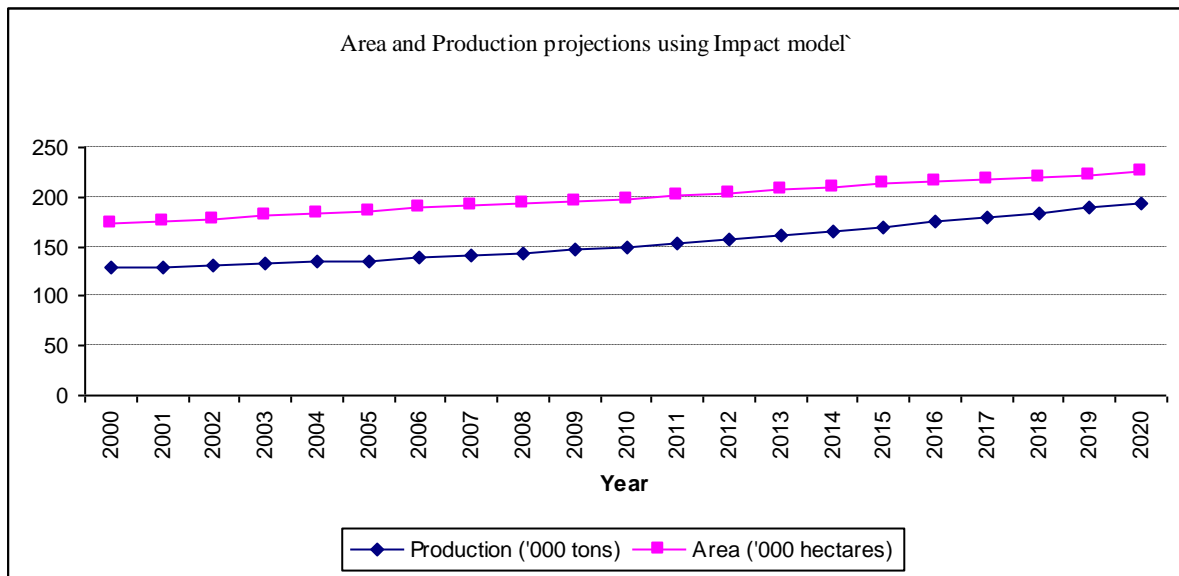


Figure 12: Groundnut area and production projections (from IMPACT model) for Malawi (2000-2020)

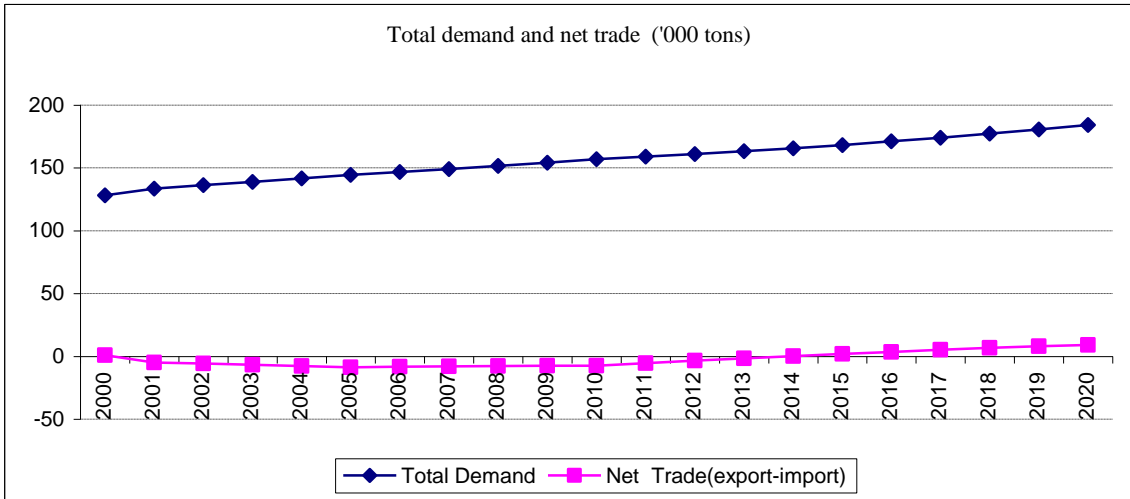


Figure 13: Groundnut demand and net-trade projection for Malawi (2000-2020)

Appendix

Appendix 1; Tab 1: Agricultural Development Division wise groundnut area distribution									
Year	Karonga	Mzuzu	Kasungu	Lilongwe	Salima	Machinga	Blantyre	Shire valley	Total
1982-83	656	10013	59550	60071	3559	18090	3100	500	155539
1983-84	707	11300	47000	62406	1070	16480	3230	380	142573
1984-85	1120	9233	55295	39973	2950	16900	9781	470	135722
1985-86	1240	8593	64538	65239	4400	15290	13740	645	173685
1986-87	1590	15428	83250	75180	3300	15870	12427	860	207905
1987-88	2216	12050	52987	72600	4082	21481	7682	899	173997
1988-89	1914	7636	52138	55841	5300	8572	7453	832	139686
1989-90	1501	4959	11725	13380	2589	8433	4892	793	48272
1990-91	2260	5778	15697	26822	3317	8550	5205	1086	68715
1991-92	2003	5998	16835	23958	3728	6916	4949	0	64387
1992-93	2118	8783	18054	15547	4598	4589	6067	217	59973
1993-94	1809	8241	30069	288731	8247	10204	13039	560	360900
1994-95	2517	7532	24566	23956	1529	12345	12499	1352	86296
1995-96	3607	5579	14509	17771	4016	10418	13455	2231	71586
1996-97	4561	9820	22438	24753	7170	206	14448	2646	86042
1997-98	5425	14843	33874	36996	9145	19955	17371	3138	140747
1998-99	6700	18002	35953	40806	12164	33358	19619	3920	170522
1999-00	5675	17131	35581	43240	13989	29408	20004	3635	168663
2000-01	6086	17412	43201	46847	13317	30475	21489	2510	181337
2001-02	8364	19600	47390	48227	1042	32020	24276	3387	184306
2002-03	7221	23124	57563	53106	11122	37208	26999	4676	221019
2003-04	7360	23517	56548	51116	7240	29130	30153	4106	209170.4
2004-05	6319	26300	62049	60674	9162	35314	29297	4452	233568.3
2005-06	7681	28125	59477	64766	8548	33983.2	25330	3386	231296.2
2006-07	6791	29147	68179	86608	10004	35625	26826	3323	266503
2007-08	7876	28995	88919	75100	10682	36511	28906	3797	280786

Source: Computed from Malawi National Statistics Office (NSO), 2008

* The total area statistics are slightly higher than those reported by FAOSTAT.

Appendix 1; Table 2: Agricultural Development Division wise groundnut production distribution

Year	Karonga	Mzuzu	Kasungu	Lilongwe	Salima	Machinga	Blantyre	Shire valley
1982-83	205	3722	25750	19784	1512	5380	907	22
1983-84	277	4325	18562	20787	525	5510	1060	90
1984-85	440	3735	26565	19647	2059	6400	2975	188
1985-86	535	3638	34869	35882	3296	3666	3645	359
1986-87	665	7010	34740	31030	2092	6615	4671	232
1987-88	886	4663	22846	27220	3719	8953	2868	444
1988-89	747	3050	11280	10324	3126	3714	2201	305
1989-90	528	1851	5565	4264	1235	3331	1630	236
1990-91	886	2318	8776	10166	2280	3370	1810	573
1991-92	535	1799	3553	2840	662	1043	811	
1992-93	947	3155	12157	6467	3344	2903	2313	82
1993-94	675	2281	12199	205211	1991	2880	3379	248
1994-95	1079	2428	8377	6743	811	5595	3409	485
1995-96	1888	2465	9577	9124	3349	6028	6420	1620
1996-97	931	5224	17736	16279	6915	217	8030	2078
1997-98	2967	9904	29099	26561	7680	11646	9261	2107
1998-99	3892	12403	32852	28528	11347	21079	11325	2178
1999-00	3156	11850	25447	34000	12278	17513	9599	1665
2000-01	4233	14908	35132	43911	13317	20686	14182	1299
2001-02	6247	15601	35803	37988	14894	23196	15045	1597
2002-03	5949	21445	49991	51887	13096	27742	19208	3120
2003-04	4723	17741	46255	45191	7494	16649	14918	1662
2004-05	2895	17008	39678	45501	4683	14298	8616	873
2005-06	5224	19093	53029	60394	7076	22832	20675	1859
2006-07	4346	26128	76547	96827	8789	26775	25363	2302

Source: Computed from Malawi National Statistics Office (NSO), 2008

* The total production statistics are slightly higher than those reported by FAOSTAT.

Appendix 1; Table 3: Groundnut varieties developed and released in Malawi
Groundnut varieties developed and released in Malawi

Appendix Table 3: Groundnut varieties developed and released in Malawi

Year of release	Variety name		Yield (tha ⁻¹)		Economically important traits					Agronomic traits		
	Scientific	Released name	On-station	On-farm	Color	100 seed weight(g)	Grain size in mm	confection ery		duration		Disease resistance
1990	ICGV-SM 83708	CG 7	Upto 2.0	1.0 - 1.6	Red	62	19	Suitable		Medium maturing		Susceptible to rosette
2001	ICG 12991	Baka	1.5 – 1.8	1.0 - 1.2	Tan	36	15	Suitable		Early maturing		Rosette resistant
2000	ICGV-SM 90704	Nsinjiro	Upto 2.0	1.0 - 1.5	Tan	45	18	Suitable		Medium maturing		Rosette resistant
2000	JL 24	Kakoma	1.5 – 1.8	1.0 - 1.2	Tan	45	15	Suitable		Early maturing		Susceptible to all foliar diseases
2005	Chalimbana 2005		Upto 2.2	1.0 - 1.5	Tan	81	20	Suitable		Late maturing		Susceptible to rosette
1982	Chitembana		1.0 – 1.5	Upto 1.0	Tan	85	20	Suitable		Late maturing		Susceptible to rosette
1982	Mawanga		Upto 2.0	Upto 1.5	Red & brown	54	20	Not suitable		Medium maturing		Susceptible to rosette
1969	Manipintar		Upto 1.5	1.0	Red & white	52	20	Not suitable		Medium maturing		Susceptible to rosette
1975	RG 1		Upto 1.5	1.0	Tan	38	18	Suitable		Medium maturing		Rosette resistant

Source:ICRISAT

Note: A minus on Nsinjiro and Baka varieties means data not available. Farmers have not yet grown grain Of these new varieties
A minus on RG1 means no data because the variety no longer available with farmers. So we can as well exclude it from the list.
On-station data is equivalent to yield potential
Grain Size information will follo later because we have to check on the data from archives since we only take care of 100 seed

Appendix 2: Distribution of area under groundnut production in Malawi.

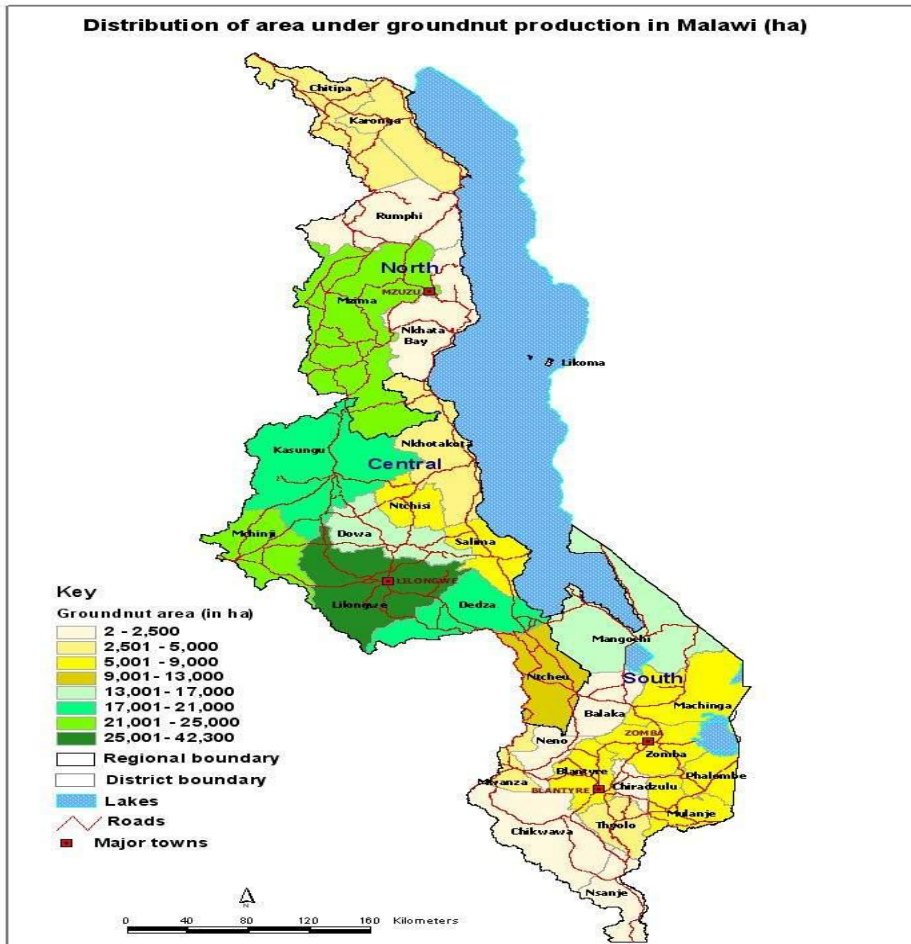


Figure 1: Distribution of area under groundnut production