

TEOSA

Assessment of the
Potential of Edible
Oilseeds Produced in
Tanzania:
*The Case of Sunflower
and Sesame*

October 2012



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Hebron A. Mwakalinga.
Consulting Team Leader

LIST OF ABBREVIATIONS

AMCOS	Agricultural Marketing Cooperative Society
BEST-AC	Business Environment Strengthening for Tanzania – Advocacy Component
CAMARTEC	Centre for Agriculture and Rural Mechanization Technology
CEZOSOPA	Central Zone Sunflower Oil Processors Association
CIIP	Cotton Industry Implementation Plan
DADP	District Agriculture Development Plan
FAO	(United Nations) Food and Agriculture Organizations
GDP	Gross Domestic Product
MAFC	Ministry of Agriculture, Food Security and Cooperative
MFI	Micro-finance institutions
Mt, mt	Metric tone
MUVI(RBSSP)	Muunganisho wa Ujasiriamali Vijijini (Rural Business Support Services Project)
NBS	National Bureau of Statistics
NGO	Non-Government Organizations
NMB	National Micro-finance Bank
QDS	Quality Declared Seeds
RLDC	Rural Livelihood Development Company
RTA	Round Table Africa
SACCOS	Savings and Credit Cooperative Society
SIDO	Small Industries Development Organization
SNV	Dutch Development Organization
TCCIA	Tanzania Chamber of Commerce, Industry and Agriculture
TRA	Tanzania Revenue Authority
TEOSA	Tanzania Edible Oils Actors Association
TFNC	Tanzania Food and Nutrition Centre
USD	United States Dollars
ADF	African Development Foundation

ACKNOWLEDGEMENT	I
NATIONAL MACRO-ECONOMIC INDICATORS	I
EXECUTIVE SUMMARY	1
1.0 INTRODUCTION	4
1.1 Background.....	4
1.2 Study Methodology.....	5
1.3 Work Calendar.....	6
1.4 Study Limitations.....	6
2.0 GLOBAL AND NATIONAL OVERVIEW OF THE EDIBLE OILSEEDS SECTOR	7
2.1 Global trends.....	7
2.2 Evolution of Edible Oil Sector in Tanzania.....	8
3.0 FINDINGS ON THE QUANTITY OF SUNFLOWER AND SESAME PRODUCED ...	12
3.1 Ministry of Agriculture, Food Security and Cooperative.....	12
3.2 FAO Statistics.....	12
3.3 The National Sample Census for Agriculture-2002/03.....	13
3.4 National Sample Census for Agriculture – 2007/08.....	15
3.5 Data from Regional Secretariat offices.....	16
3.5 Data from Singida, Regional, District and Village.....	17
3.6 Data from Kondoa District and Mondo Village.....	21
3.7 The Case of Iringa MUVI Programme.....	25
3.8 Sesame Data from Lindi.....	26
4.0 ANALYSIS OF FINDINGS	31
4.1 Comparison of Production Data Among Sources.....	31
4.2 Mathematical Interpretation of the Census Reports.....	32
5.0 CONCLUSIONS AND RECOMMENDATIONS	36
5.1 Conclusions.....	36
5.2 Recommendations.....	37
REFERENCES	39
ANNEX I: LIST OF PEOPLE INTERVIEWED/PARTICIPATED IN INTERVIEWS.. ERROR!	
BOOKMARK NOT DEFINED.	
ANNEX II: TYPES AND QUANTITIES IN KGS OF IMPORTED EDIBLE OIL SEEDS	
..... ERROR! BOOKMARK NOT DEFINED.	
ANNEX III: OUTPUT PER FARMER AT IKHANODA AND NTONGE VILAGES IN	
SINGIDA ERROR! BOOKMARK NOT DEFINED.	
1 BAG = 65KG ERROR! BOOKMARK NOT DEFINED.	
IKHANODA VILLAGE ERROR! BOOKMARK NOT DEFINED.	
NTONGE VILLAGE ERROR! BOOKMARK NOT DEFINED.	
ANNEX IV: EXCERPTS OF THE TORS ERROR! BOOKMARK NOT DEFINED.	

LIST OF TABLES

<i>Table 1.1: Study sample</i>	5
<i>Table 2.1: Quantity of palm oil exported in Mt</i>	7
<i>Table 2.2: Production of palm oil in Kigoma</i>	9
<i>Table 2.3: Export and Import of Groundnuts (2007 - 2011)</i>	10
<i>Table 3.1: Quantity of sunflower and sesame produced between in '000mt</i>	12
<i>Table 3.2: Quantity of Sunflower and Sesame Produced in Tanzania between 2000 and 2010 in '000mt</i>	13
<i>Table 3.3: Production of Sunflower in 2002/03 in Mt</i>	13
<i>Table 3.4: Sesame production in 2002/03 in Mt</i>	14
<i>Table 3.5: Sunflower Production in 2007/08</i>	15
<i>Table 3.7: Sunflower Production from 9 Regions that responded to data request</i>	16
<i>Table 3.6: Sesame production in 2007/08</i>	16

**Assessment of the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame**

Table 3.8: Production of Sunflower in Singida Region.....	17
Table 3.9: Sunflower Production in Singida Rural District.....	18
Table 3.10: Relative importance of sunflower at Ikhanoda.....	18
Table 3.11: Sunflower Production Trend at Ikhanoda.....	19
Value chain actors found at Ikhanoda village are QDS producers, agro-dealers, extension officers, farmers and traders. There is no oil press at the Ikhanoda village, the seeds are bought by local and distant traders for pressing elsewhere. In the short-term, three major constraints facing sunflower production are; i.) shortage of extension officers; ii.) limited supply of improved seeds and; iii.) poor attitude towards good agriculture practices by most farmers (refer to yield data in Table No. 3.12 above).....	
Table 3.13 Village level sunflower stakeholders.....	19
Table 3.14 Problems that face farmers at Ikhanoda.....	21
Table 3.15: Sunflower production trend for Kondoa District.....	22
Table 3.16: Relative Importance of Sunflower at Mondo Village.....	22
Table 3.17: Sunflower Value Chain Actors at Mondo Village.....	23
3.18: Average sunflower size of farms at Mondo Village in Kondoa in acres.....	23
3.19: Sunflower production trend at Mondo village.....	24
3.20: Value chain actors at Mondo village.....	24
3.21: Market channels for sunflower at Mondo.....	25
3.22: Production trend for sesame in Lindi Region.....	26
3.23: Stakeholders involved in agriculture development in Lindi.....	27
3.24: Sesame production data at Makaranga village.....	28
Table 3.25: Role of various actors in the sesame supply channel at Mkaranga.....	29
Table 3.26 Comparison of prices between AMCOS and open market in Tshs/Kg.....	29
Table 4.1: A Comparison on Data from RAS and 2007/08 Census Report.....	Error! Bookmark not defined.
Table 4.2: Variation for sunflower production data between MAFC and 2007/08 Census Report.....	Error! Bookmark not defined.
Table 4.3 Production of Sunflower in 2003 and 2008 in Mt.....	32
Table 4.4: Projection of Production Using Inter-censal Growth rates.....	33

NATIONAL MACRO-ECONOMIC INDICATORS

	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
<i>The Economy</i>						
Population in millions (NBS)		37.27	38.67	39.45	40.67	43.19
Annual growth of GDP - at 2001 prices (NBS)	7.40%	6.70%	7.10%	7.40%	6.00%	7.00%
Exchange rate - in Tshs/USD (NBS)	1,123	1,252	1,233	1,354	1,320	1,396
<i>Agriculture</i>						
Contribution of agriculture to GDP in %	27.6	26.6	26.1	26.9	26.5	
Contribution of Crops to GDP (MAFC)		18.7	18.6	19	18.9	
Annual agriculture GDP growth in % (NBS)	3.8	4	4.6	3.2	4.2	
<i>Sunflower Production and Trade</i>						
Sunflower produced in Mt-FAO	220,000	250,000	170,000	160,000	220,000	182,010
Sunflower produced in Mt - MAFC	373,391	369,803	418,317	162,019	348,877	786,902
Sunflower exported in Mt (TRA)	7,643	5,981	15,450	4,874	30,206	
<i>Sesame Production and Trade</i>						
Sesame produced in Mt - FAO	67,410	103,640	48,000	155,794	46,767	115,295
Sesame produced in Mt- MAFC	221,421	155,794	46,767	72,932	65,557	357,162
Exports of sesame in Mt - TRA		24,887	31,776	65,708	71,614	76,017
Exports of sesame - Trade Map.		24,887	31,776	71,803	65,708	76,017

EXECUTIVE SUMMARY

Introduction

Tanzania imports significant amount of edible oils in various forms; it is estimated that 50% of edible oils supplied in Tanzania is from domestic sources and the remaining 50% is imported mainly as crude or refined palm oil. Important oilseeds in Tanzania in terms of cultivated area are: groundnuts, sunflower and sesame, other crops that augment domestic supply of edible oil are cotton seeds and palm oil. The country spends more than USD 230 million of its scarce foreign exchange to meet the import bill for edible oil. There has been growing interest and efforts by the Government and other stakeholders to improve the competitiveness of domestic sources of edible oils to substitute imports. However, the importance of domestic edible oilseeds has not been fully recognized hence there are no clear enabling policies, strategies and programmes.

This study provide an analysis of strengths, weaknesses, opportunities and constraints facing edible oil industry in Tanzania using sunflower and sesame as case commodities. It is intended to equip TEOSA with knowledge that will help it dialogue primarily the Government. The study used both secondary and primary sources of data/information, secondary data was collected from the Ministry of Agriculture, Food Security and Cooperatives, the National Bureau of Standards, Food and Agriculture Organization, Tanzania Revenue Authority, Regional Administrative Secretariat offices and Trade Map®. Primary data was collected in the Districts of Ruangwa (Lindi) for sesame, Kondoa (Dodoma) and Singida Rural (Singida) for sunflower. Data mining, literature review, structured interviews and focus group discussions were the main data collection approaches. MS Excel application was used to analyse and present data.

Research Findings

MAFC reports that sunflower production between 2000 and 2010 has been growing at an average annual rate of 53% and sesame at 81%. The Ministry attributes the increase to support by International Non-Governmental Organizations, application of improved seeds, investment in the crops through District Agriculture Development Plans and increased mechanization ushered in by *Kilimo Kwanza*. Over the same period FAO reports an average rate of 6-7% per annum for sunflower and 59% for sesame. The changes per annum between 2002/03 and 2007/08 Censuses had been 34% and 21% for sunflower and sesame respectively that suggests that in 2011/12 Tanzania would have produced 792,000mt of sunflower 127,000mt of sesame. Some studies have suggested that on average a household consumes 140gms of edible oil per day that sums to 460,000mt consumption for the household segment.

Opportunities in the Domestic Edible Industry

Market: Increase in prices of palm oil in the world market has provided space in the market for domestically produced edible oil. The economic and population growth in Tanzania of about 2.7% per annum has led increase in demand for edible oil. Improvement of physical infrastructure has lowered transport cost for sunflower seeds and edible oils in different markets.

Political (Government Policies): There is growing recognition of the strategic role of edible oilseeds by the Government e.g. VAT waiver on processing equipment and edible oils, subsidy in planting seeds, parallel standards by TFDA/TBS to allow SMEs access markets, etc.

Technical: Scalability of oil pressing technology allows broad/rural - based value addition and there is local capacity to support the technology – Intermech, SIDO, CARMATEC, etc.

Assessment of the Potential of Edible Oilseeds Produced in Tanzania: *The Case of Sunflower and Sesame*

Partnerships: There is growing support by development partner NGOs e.g. RLDC, SNV, Aga Khan, VECO, Farm Africa, etc. Growth in investment by private sector and emergence of actors associations e.g. CEZOSOPA, TASUPA, TEOSA, UMAMBE, etc.

Weaknesses

Technical: Yield is still very low, farmers could double the yield if they will adopt good agriculture practices. There are limited R&D activities on planting materials and plant health management.

Marketing: Edible oil seeds trade is not structured, there is rampant use of non-standard measurements and packages. There is high post-harvest losses due to lack of appropriate storage facilities.

Institutional capacity: The sub-sector is just emerging and therefore characterized by weak industry actors' organizations.

Constraints

Political (Government Policies): There is no proper policy and regulatory framework to protect the industry against unfair competition from imports. There is no clear strategy to foster co-existence between small and large edible processors. Weak enforcement of standard measurements along the value chains has constrained the domestic oil from accessing upper and export markets.

The recently launched food fortification initiatives have sidelined SME oil processors.

Technical: Limited R&D on planting materials, diseases and pests pose a serious risk to the industry growth. Land degradation leading to loss of soil fertility and return on investment is on the increase. Oil expelling technology is inefficient because of lack of standards. Packaging industry is yet to be developed and adds significant on cost to final price.

Market: Despite the potential, there are no initiatives at national level to support seedcake export market.

Financial: There is limited outreach (availability) of financial services in rural areas, this include stringent credit terms – security, interest rates and repayment patterns.

Conclusions

There is wide discrepancy on sunflower production data between MAFC and FAO. Since the Censuses offer information that is scientifically gathered and analyzed, it is used as the basis for estimation of edible oil production. Looking at key determinants of sunflower production, land, Government supportive policies and programmes, growing demand for edible oil, there is no significant changes that could have affected growth of the sector after 2007/08. It is plausible to conclude that the industry has been growing at annual rate of above 34% for sunflower and 21% for sunflower per annum respectively. The quantity of sunflower seeds produced in 2011/12 is therefore over 800,000mt and 130,000mt for sesame. Assuming an oil recovery rate of 30%, the 800,000mt contributed 240,000mt of sunflower oil in the market, note that cotton and palm oil are estimated to contribute around 20,000mt.

The sector has a potential to contribute to the economy including employment, foreign exchange saving and earning as well as domestic technology development. It is however, beset by a number of constraints related to weak institutional and policy frameworks, weak market systems, poor production, processing and packaging technology and very weak actors' capacity to advocate.

Recommendations

Assessment of the Potential of Edible Oilseeds Produced in Tanzania: *The Case of Sunflower and Sesame*

In the short-run: There is need to support TEOSA's capacity on knowledge management that is precursor to effective advocacy and dialogue with the Government. Initiatives to coordinate development of refining technology, including setting standards in collaboration with institutions like TFNC, SIDO, TFDA and TBS need to be emphasized. It is also recommended that the Government encourage the use of appropriate packaging materials at retail level. Transitioning towards import substitution, the Government should put in place a predictable enabling business environment including re-imposition of 10% excise duty on imports to protect the domestic industry. The public-private partnership should champion the formulation and implementation of a national strategy for edible oils. For effective coordination, there is a need for an anchor section/department at MAFC and MIT under PPP framework.

In the medium and long-term: Tanzania has a potential to become a regional player in the industry, there is a need to focus on positioning the domestic edible oil sub-sector in the regional markets, EAC and SADC. An establishment of Tanzania Edible Oil Development Board under PPP framework is likely to accelerate growth of the sector. Access to industry information is key to TEOSA, it is proposed that stakeholders lobby with NBS to include oilseeds details in the next Agriculture census, and to work with TRA to improve import/export data specificity.

1.0 INTRODUCTION

This report is organized in five chapters. Chapter One provides information about the background of the study indicating the context of the research, research objectives, methodology and limitations. Owing to its influence on the dynamics of the sector in the country, Chapter Two provides Global and National Overview of the edible oil industry. Chapter Three presents findings from secondary and primary sources. Chapter Four analyses the findings found in Chapter Three while Chapter Five contains Conclusions and Recommendations. It should be noted that the numbering of figures and tables has followed the number of sections in which they appear.

1.1 Background

1.1.1 TEOSA

Tanzania Edible Oilseeds Actors Limited (TEOSA) is an association of, as the name indicates, actors involved in the edible oilseeds subsector in Tanzania which includes processors, producers, traders, suppliers of technology. Through the support of SNV it was able to register as a company limited by guarantee (not having share capital) on the 30th of December, 2010 by the Registrar of companies and bears a Certificate of Incorporation No 80722. The association's primary objective is to promote and protect interests of the edible oilseeds industry in Tanzania which is mainly composed of smallholder producers and processors and other actors from various edible oilseeds industry value chains. TEOSA'S broad objectives are to:-

- Engage in lobbying and advocacy for the interests of the industry;
- Strengthening service delivery to edible oilseeds value chain actors/stakeholders;
- Develop knowledge and skills capacity to manage and share knowledge;
- Research and market information;
- Facilitate access to financial services; and
- Engage in cross-cutting issues like HIV/AIDS in relation to the industry.

The need to address key constraints to the growth of the industry strengthened TEOSA's resolve and one strategy has been to broaden the network and support from organizations and institutions that share the vision. Through this shared vision TEOSA is working with BEST-AC, Round Table Africa (RTA) and SNV, among other partners. TEOSA, through funding from BEST-AC has commissioned this study to increase TEOSA's knowledge base on the industry, an important tool in their advocacy role.

1.1.2 The Edible Oilseeds Sub-Sector

Edible oil is nutritionally essential for good health and FAO recommends an average consumption per capita of 21kg per annum. The global demand for edible oil is growing at 5.1% per annum [FAO] due to increased demand in China and other Asian economies, India and Eastern Europe. The growth of domestic edible oil seeds industry was suppressed by availability of cheaper imports of palm-based oils from Far East, notably Malaysia and Philippines, especially after the 1980 glut that saw the price of crude palm oil fall from more than USD 400 per ton to about USD 250. The current upward trend in price for palm oil is due to increased global demand and efforts to diversify uses into bio-fuel.

The domestic edible oil industry can be regarded as still emerging; there is an increase in investment in edible oilseeds production, national crushing capacity, domestic consumption of edible oilseeds

and oil as well as growth in exports of edible oilseeds. There are a number of challenges constraining growth of the sector, they include: policy, legal and regulatory challenges; organization of actors in the sector; accumulation and application of knowledge; and developing a national strategy that is compliant to the broad national agriculture agenda, the Kilimo Kwanza. The above challenges, particularly the policy ones have at sometime hindered growth of the sector and caused losses to actors. According to data from MAFC sunflower is an important source of livelihood in the regions of Singida, Dodoma, Rukwa, Manyara and Arusha. This has attracted the attention of rural development agencies including Rural Livelihood Development Company (RLDC) and SNV. The two organizations have supported (and continue to support) efforts to organize actors using the approach of value chain development which has led to establishment of edible oilseeds actors bodies such as Central Zone Oilseeds Processors' Associations (CEZOSOPA), Tanzania Edible Oilseeds Actors Limited (TEOSA), Tanzania Sunflower Promoters Association (TASUPA).

1.1.3 Rationale for Research

Empirical data indicate that edible oilseeds are increasingly becoming important commodities in the development of the country in terms of food security, import substitution, foreign currency earning, employment creation and domestic technology development. In addition, edible oilseeds have strong linkages with the domestic animal sub-sector as they provide vital input in animal feed production. Notwithstanding the significance of the crops, there has been limited support from the Government and other key stakeholders because of limited knowledge about the sector. It is for this reason that TEOSA has sought support to build its knowledge base so that it can enhance its communication power with policy makers and other strategic stakeholders.

1.2 Study Methodology

This section outlines the methodology used in carrying out the study; it looks at the approach, tools, sample and schedule.

1.2.1 Document Review

Using a checklist, various documents were reviewed in order to gather secondary data. These include the 2002/03 and 2007/08 Agriculture Census reports, MAFC budget speeches and National Economic Survey reports. Quantitative data from TRA, FAO and Government Regional Administrative Offices were analyzed to establish long-term trends.

1.2.2 Primary Data Collection

The research involved collection and analysis of data from a sample of villages in Dodoma, Lindi and Singida. The researchers in collaboration with the Regional Advisors sampled districts, processors and traders. At the District level the researchers collaborated with officers at District offices to sample villages for detailed focus groups to understand the dynamics of the crops at village level. The sample regions, districts and villages are shown in Table No. 1.1.

Table 1.1: Study sample

S/N	Region	District	Villages	
			Name	FGD Participants
1	Singida	Singida Rural	Ikhanoda, Ntonge	
2	Dodoma	Kondoa	Mondo	
3	Lindi	Ruangwa	Mkondo	

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame**

S/N	Region	District	Villages	
			Name	FGD Participants
Sampling method	Purposeful, regions that are most important for the commodity in the country.	Purposeful, regions that are most important for the commodity in the country.	Purposeful, regions that are most important for the commodity in the country.	Purposeful, regions that are most important for the commodity in the country.

Source: Author

1.2.2 Study Approach and Methodology

The study is both qualitative and quantitative; the quantitative part relied on secondary data from MAFC, FAOStat, Regional Agriculture Advisors at Regional Administrative Secretary (RAS), Agriculture census reports of 2002/03 and 2007/08, and village level focus group discussions. As regional data from MAFC was incomplete, efforts were made to collect the same from regions by phone, (a spreadsheet obtained from MAFC was shared with the Regional Administrative Secretary (RAS) who assisted in filling in the gaps). The tool used was guiding questions and checklist to collect information from Regional, District and Village level data.

In order to establish the significance of the sector an attempt was done to establish production levels, production data was analysed over a period of ten years to understand trends. Data was triangulated by looking at different sources and assessing variations.

1.3 Work Calendar

The assignment started with a discussion with TEOSA Executive Secretary¹ It was followed by review of secondary data in the first week of July. At the same time preparations were being made for field work that took place between July 8th and 22nd for Lindi and Singida, and July 15th to August 3rd for Dodoma. Meanwhile the lead researcher continued to review various literature and sourcing of information from TRA and NBS. Analysis and compilation of the report was undertaken between August 5th and September 15th (resulting in Submission of this initial document). The delay was caused by delays on accessing 2007/08 Census data which came out in September 2012.

1.4 Study Limitations

The noted limitations that were dealt with included; difference in the periods for which data was available. For example, FAO Stat imports data was available up to 2010; data from the Ministry of Agriculture, Food Security and Cooperative (MAFC) was incomplete for most regions; in the proposal it was assumed that data from 2007/08 Agriculture Census by NBS was available, it was released in the 2nd week of September. The however, above limitations have not affected the outcome of research on the overall performance of the sub-sector.

¹ Dr. Enock Ugullumu

2.0 GLOBAL AND NATIONAL OVERVIEW OF THE EDIBLE OILSEEDS SECTOR

2.1 Global Trends

The supply of edible oil took a turn around in the 1980s when Far East countries, mainly Malaysia and Indonesia increased production of palm oil leading to a glut in the world market. As a result prices plummeted from an average of USD 470/mt² before 1980s to USD 250 – 300/mt.

The cheap FOB price attracted imports in developing countries that had serious consequences on the development of the domestic edible oilseeds subsector. The International Development Research Centre (IDRC) reports that prior to the global oversupply, Kenya had an advanced smallholder-based sunflower value chains around Nakuru consisting of more than 80,000 smallholder farmers linked to small oil expellers who sold oils to a large refinery. The influx of cheap palm oil led to the demise of the value chains as the refiner switched to cheaper palm oil imports. After 3 years only 10% of the smallholders were active.

Spatial pattern among countries shows that consumption of edible oils is highly correlated to income per capita, FAO reports that in recent decades consumption of vegetable oils has been increasing by 5.1% per annum due to strong demand particularly in China with more than 10% economic growth per annum and India with about 7% per annum. Other countries with strong demand are Indonesia, Malaysia, Pakistan, Japan and the former Soviet Union countries. At present the world average consumption is 16Kgs per annum; India consumes less than 10Kgs while UK consume 30Kgs.

Table 2.1: Quantity of palm oil exported in Mt

	Exporting country	2007	2008	2009	2010	2011
1	Indonesia	11,875,418	14,290,685	16,829,206	16,291,856	16,436,202
2	Malaysia	11,628,977	13,329,194	13,924,403	14,732,713	15,783,756
3	Netherlands	1,279,525	1,543,229	1,310,774	1,103,122	1,313,517
4	Papua New Guinea	449,396	451,477	496,458	520,498	554,918
5	Thailand	283,065	360,342	113,842	121,328	381,847
6	Côte d'Ivoire	89,381	96,088	191,379	201,172	254,038
7	Ecuador	171,638	177,491	185,599	145,781	249,764
8	Germany	202,258	211,786	189,356	232,228	235,159
9	Guatemala	110,186	159,843	146,177	152,762	218,816
10	Costa Rica	143,839	123,087	94,955	131,882	168,346
11	Others	1,397,539	1,555,509	1,475,344	1,439,542	1,175,576
	Total Mt	27,652,615	32,302,907	34,958,688	35,072,885	36,771,940
	Total Value in USD'000	19,371,918	30,265,758	23,165,691	29,704,975	40,275,023
	Cost per tonne	700.55	936.94	662.66	846.95	1,095.27

Source: Trade Map

The surge in demand has not been matched by growth in supply; hence, there has been an increase in the demand for edible oilseeds. Data shows that between 2007 and 2011 the volume of palm oil exported globally grew by an average of 7.6% per annum while the value grew by an average rate of

² IDRC reports that palm oil had reached highs of USD 750/mt before what could be stated as a free fall to below USD 300/mt.

24% per annum and consequently the average change of cost per tonne stood at 15.4% as the Table above shows³.

2.2 Evolution of Edible Oil Sector in Tanzania

This section discusses the context in which the edible oilseeds production in Tanzania has taken place. Since sunflower and sesame are the crops being researched, this section pays more attention to other edible oil commodities such as groundnuts, palm oil and cotton seeds.

2.2.1 The Edible Oil Seeds in Tanzania

Main edible oilseeds produced in Tanzania are: sunflower, sesame, groundnuts, cotton seeds and oil palm. A study by the MAFC in collaboration with the Food and Agriculture Organization (FAO) in 2010 indicated that the country has the potential to produce safflower, jatropha, castor seeds, moringa and olive. A review of export records kept by TRA shows that Tanzania exports a range of oilseeds, they include poppy seeds, rape or corza seeds, soya bean, linseed, corn oil and Brazil nuts. Unconfirmed information indicates that Tanzania has a great potential to develop avocado crop for production of edible oil in the Southern Highlands. In most discussions at national level the crops referred to under edible oilseeds are sunflower, sesame, groundnuts, palm and cotton seeds.

2.2.2 Cotton Seeds

Cotton production and marketing systems in Tanzania were developed in 1952 after the formation of the Tanganyika Lint and Seed Board. The main cotton growing regions are Mwanza, Shinyanga, Tabora, Kigoma, Singida and Kagera, they together account for 95% of all the cotton produced in the country. Turbulence in international market prices led to fluctuations in production, for example, in 1999/2000 the country produced 123,555mt [MAFC, 2008] and in 2005/06 it produced 376,591mt, correspondingly the quantity of oil produced were 10,897mt and 33,215mt (an average oil recovery rate of 8.82%).

In 2010 the Tanzania Cotton Board reported existence of 32 ginners that produced 16,121mt of cotton oil. The Cotton Industry Implementation Plan (CIIP) 2010 – 2015 aspires to: improve the quality of cotton to international standards; doubling productivity from 750 kg/ha of seed cotton (260 kg/ha of lint) in 2008/09 to 1,500 kg/ha (520 kg/ha of lint) in 2014/15; doubling output from 126,000mt of lint cotton in 2008/09 to 260,000mt of lint cotton in 2014/15. This will be coupled with increase in domestic cotton processing capacity from 30% of production in 2008/09 to 90% in 2014/15. The implication of this development will be a stable supply of at least 22,000mt of cotton seeds into the market.

The projection of cotton oil however needs to be treated with caution as the development of the sector requires “difficult-to-achieve” systemic changes. The strategy envisages transforming agriculture business model from farmer-based investment to value chain-wide investment. The new arrangement faces a number of exogenous huddles including unpredictable price in the world market, ever increasing cost of inputs, unpredictable weather and politics. The value chain management structures are still weak and require time and concerted efforts to strengthen.

³ Following the global petrol crisis efforts to use palm-based oils for fuel have grown, it may be another contributing factor to the price increases.

2.2.2 Palm Oil

The main source of palm oil in Tanzania is Kigoma where palm trees date back to 1920s, it received some attention in the 1980s and early 1990s particularly with respect to introduction and development of processing technology by SIDO and Tanzania Food and Nutrition Centre (TFNC). SIDO promoted the technologies for kernel crushing and soap making at SME level.

In recent years, demand for biodiesel has triggered interest for large scale production of crude palm oil, according a study by International Institute for Environment and Development (IIED) of 2009 there had been a rush into palm oil production for biodiesel by large scale investors. In 2005 Farming for Energy for Better Livelihoods in Southern Africa Company (FELISA Ltd) requested 10,000ha, the government granted about 4,200ha on which 100ha had been planted with hybrid trees on pilot basis by 2009. Apart from Kigoma, Rufiji and Kilombero basins are among the most potential areas for palm trees. African Green Oil Limited plan to develop 20,000ha by 2020. By 2009 the company had acquired 5,000 ha and planted 435ha on trial. In Bagamoyo another company, Tanzania Biodiesel Plant Ltd has 16,000ha while in Kilombero InfEnergy Ltd had acquired more than 5,000ha for the same purpose.

At present, Kigoma region accounts for over 80% of the palm oil produced in the country, the remaining 20% comes from Kyela district in Mbeya region. According to the Kigoma Regional Socio-economic Profile, hectares under oil palm cultivation increased consistently between 2000/01 and 2004/2005 and at a rate of 8.6% per annum. Another set of data covering 2006/07 and 2010/2011 shows that production grew by an average of 11.1% while hectares increased at a lower rate and indeed between 2009/10 and 2010/11 the area cultivated shrank by 14%. Production between the two years increased by 21% from 15,268mt to 16,110. Apart from Kigoma, the 2007/07 Agriculture Census report that there is production in smaller quantities in Tabora, Pwani, Morogoro, Tanga and Kagera Regions.

Table 2.2: Production of palm oil in Kigoma

		2006/07	2007/08	2008/09	2009/10	2010/11	Average
Output	Mt	10,667	11,797	12,040	13,268	16,110	
	Change		10.6%	2.1%	10.2%	21.4%	11.1%
Hectares	Hectares	11,668	12,889	12,960	13,578	11,660	
	Change		10.5%	0.6%	4.8%	-14.1%	0.4%
Yield	Yield (Mt/ha)	0.91	0.92	0.93	0.98	1.38	1.05
	Change		0.1%	1.5%	5.2%	41.4%	12.0%

Source: Kigoma Regional Administrative Secretary

The challenge facing palm oil production in Tanzania is very low output per tree hence per hectare at around 1,000kg/ha that contrasts sharply with a potential of 6,000kg/ha. If the reported 13,578 hectares were to increase yield to 4,000-4,500kgs/ha as it has proved feasible at TACARE research centre in Kigoma, then palm oil could supply 54,312mt to the domestic market constituting close to 20% of the imports.

Kigoma Region has not been able to implement large scale plantations and most trees are aged, there is limited likelihood that palm oil will in 5 to 10 years change the composition of the supply of edible oils in Tanzania, the major investors are still on trial phase and their business models are built on biodiesel and not edible oil though switching among uses may not be a problem. Hence sunflower will continue to be the most dependable source.

2.2.3 Groundnuts

Commercial groundnut production in Tanzania started around 1946 - 1951 under an ambitious British colonial plan to grow 3,210,000 acres (1,284,000 ha) in East Africa to meet the high demand of fat in Europe at the time. The aim was to produce 800,000 tons per annum under the Overseas Food Corporation (OFC) which developed projects in Kongwa (Dodoma) investing USD 8.3 million and Urambo (Tabora) some USD 120 million. Irregular rainfall and crop diseases rendered the project not viable.

Currently major groundnuts producing regions are Dodoma, Tabora, Rukwa, Shinyanga, Iringa, Singida, Ruvuma, Mtwara and Lindi regions. There are a number of varieties with a yield of 0.4mt/ha, it is reported that Israel yield is at 5.4 mt/ha.

The crop is primarily produced for domestic consumption, with a limited volume being exported by traders who exploit the low prices at the peak harvest season. During off-peak seasons Tanzania imports groundnuts from neighbouring countries principally Malawi and Zambia.

Apart from fat that accounts for 40-50% of the weight, groundnut seeds are rich in protein (20 – 50%) and carbohydrate (10 – 20%), they have vitamin E, niacin, folacin, calcium, phosphorus, magnesium, zinc, iron, riboflavin, thiamine, potassium etc. It is therefore a valuable food consumed in its raw form, roasted, boiled, or powder as garnish to relish. It is also commonly used in preparation of home-made infant meals.

Table 2.3: Export and Import of Groundnuts (2007 - 2011)

	2007	2008	2009	2010	2011
EXPORTS					
Ground-nut oil (excl. crude) and fractions	647	10	48	116	3
Ground-nuts in shell, not roasted or otherwise cooked	5,858,	5,425	9,786	12,277	10,858
IMPORTS					
Ground-nut oil (excl. crude) and fractions	17	0.99	4		10
Ground-nuts in shell, not roasted or otherwise cooked	826	647	10	48	116
NET OF EXPORTS					
Ground-nut oil (excl. crude) and fractions	630	9	43	117	-7
Ground-nuts in shell, not roasted or otherwise cooked	5,032	4,777	9,776	12,229	10,741

Source: TRA- Customs Department

A study by Catholic Relief Services [2008] showed that most of the groundnuts are taken in as snacks in the following forms; Roasted salted and non salted nuts; Raw non-roasted nuts; Roasted spiced peanuts (dipped or coated with spicy masala like chilli powder, salt, sauf, Jeera powder, gram flour, cardamom powder and green grams; Stir fried peanuts mixed with other foodstuffs like potato crispy, puffed rice, gram flour and cooking oil. Some groundnuts are processed into powder form and blended with finger millet flour, maize flour and soya powder to prepare fortified food mostly for use by infants and the sick.

There is no evidence of existence of a commercial groundnut oil production plant in Tanzania despite that oil in the seed is about 40%, the reason behind has been that groundnuts have higher value in nut form than if it will be converted into oil as farm gate prices range between Tshs 1,500 per Kg during peak supply season to Tshs 2,000 at off-peak season which means one has to invest between

Assessment on the Potential of Edible Oilseeds Produced in Tanzania: *The Case of Sunflower and Sesame*

Tshs 3,000 and 5,000 worth of groundnuts to extract a litre of oil, sunflower oil price range between Tshs 2,000 to 3,000.

The implication of the above findings is that groundnuts are not expected to contribute to edible oil supply in the near future, it is not economical to press groundnuts for purpose of extracting edible oils as there are several cheaper sources.

2.2.4 Sunflower and Sesame

Sunflower: There were various technology-driven initiatives to develop the sunflower sub-sector under the aegis of “appropriate” technology championed by SIDO, Appropriate Technology International (ATI) and Centre for Rural Mechanisation and Agriculture Technology (CARMATEC). In the early and middle 1980s under the Indo-Tanzania Programme, SIDO disseminated sunflower processing plants at Njombe and Mpanda that were owned by District Development Corporations (DDCs)⁴. The sunflower sub-sector received another boost from Sida funded Rural Hire Purchase and Women Hire Purchase programmes through which a number of mini-oil presses notably from Germany and India. Later, SIDO workshops developed internal capacity to produce oil presses⁵ and since the 1980s SIDO has disseminated many oil expeller units. Under the Basic Industry Strategy (1975) the government invested in a larger plant, Morogoro Oil Processing Company (MOPROCO) in an effort to increase national edible oil supply.

Sesame: Sesame was among important oilseeds exported in raw form since the era of General Agricultural Products and Exports Authority (GAPEX). Based on FAO reports, Tanzania ranks between 8th and 13th in world sesame trade; in Africa it is behind Ethiopia, Sudan and Burkina Faso.

⁴ Both Njombe and Rukwa plants are still operating, however, oil refining sections are not being utilized following TFDA approval of non-refined sunflower oil.

⁵ SIDO has dedicated the workshop of Iringa to specialise in manufacturing the oil expellers and mini refineries

3.0 FINDINGS ON THE QUANTITY OF SUNFLOWER AND SESAME PRODUCED

In the subsequent section on analysis, comparison of these sources is provided together with some arguments on which could be more realistic quantities of the selected commodities.

3.1 Ministry of Agriculture, Food Security and Cooperatives

One important source of data for edible oil seeds in Tanzania is MAFC which is expected to be the main official source of information in the country. The Ministry reports that Tanzania sunflower production increased from 80,870 mt in 2000/01 to 786,902mt in 2010/11; this is almost 10 fold increase. The year-on-year change has averaged at 51% with significant changes in 2004/05 and 2005/06 when production increased by 320% and in 2009/10 and 2010/11 when the crop registered 115% growth.

Sesame outperformed sunflower, between 2004/05 and 2010/2011 production increased almost 14 times from 25,707mt to 357,000mt. The average year-on-year change stood at 81% as table No 3.1 below indicates.

Table 3.1: Quantity of sunflower and sesame produced between in '000mt

	2000 /01	2001/ 02	2002 /03	2003/ 04	2004/ 05	2005/ 06	2006/ 07	2007/ 08	2008/ 09	2009/ 10	2010/ 11	Aver age
Sunflower ('000mt)	81	104	112	106	89	373	370	418	162	349	787	
Annual change		29%	8%	-5%	-16%	320%	-1%	13%	-61%	115%	126%	53%
Sesame ('000mt)	26	55	22	49	75	221	156	47	73	66	357	
Annual change		114%	-59%	119%	53%	195%	-30%	-70%	56%	-10%	445%	81%

Source: Minister's Budget Speeches for 2010/11 and 2012/13

The Government has attributed the growth in edible oil sector (sunflower, sesame, groundnuts, cotton and palm oil) which on the overall grew at a rate of 31% per annum to prevailing market opportunities in the domestic market, technical support from the Central Government and LGAs' DADP investments. Other support comes from NGOs as well as access to improved on-farm and post harvest processing technologies. Expansion in land utilisation for sunflower production is another contributing factor; for example MAFC reported (in Mpagalile, J.J, Ishengoma, R, and Gillah, P., 2008) the number of regions that reported to have produced sunflower increased from 6 in 2000/01 to 11 in 2001/02, and 16 in 2002/03 in Tanzania Mainland.

It is understood that in some quarters the feel that the Ministry's figures are "exaggerated" and don't reflect the reality. On the other hand there are those who think the figures are correct. Later in the analysis chapter, MAFC data will be collated with data from other sources including those from Regional Administrative Secretariat offices, the FAO, TRA Customs Department and TradeMap^(R).

3.2 FAO Statistics

The United Nations – Food and Agriculture Organization (FAO) has a comprehensive database of crop production that is widely referred to in many studies (www.faostat.org); at the time of this

Assessment on the Potential of Edible Oilseeds Produced in Tanzania: *The Case of Sunflower and Sesame*

study it had data up to 2010 [Note that FAO uses calendar year, while the Government's year starts in July and ends in June. FAO shows that in 2000 Tanzania produced 135,000 mt of sunflower; the production increased at a relatively modest rate, peaking in 2001 and 2002 when output increased by 20%. Production then shrank by 32% in 2006 and 2007. On the overall, FAO puts the ten year average at 187,000mt, the peak being in 2006 when recorded production reached 220,000mt. The database gives a 4.8% year-on-year growth rate for the period between 2000 and 2010.

FAO reports that sesame production in 2000 was 39,000mt but in 2001 it declined to about a third of the 2000 level to 14,000mt. It picked up again in 2002 to about 4 times the 2001 level. This see-sawing pattern characterizes production of sesame throughout but over the ten year period annual production averaged at 75,000mt. Despite the low base in early periods, the increase to above 100,000 in 2005, 2007, 2009 and 2010 has uplifted the year-on-year average growth to 59% per annum. One common aspect between the two data sources, MAFC and FAO, is that production is not even there are spikes and troughs of supply just as intense as those noted in MAFC data.

Table 3.2: Quantity of Sunflower and Sesame Produced in Tanzania between 2000 and 2010 in '000mt

		2000	2001	2002	2003	2004	2005	2006	2007	'08	'09	'10	Average
Sunflower	Mt'000	135	150	180	194	200	220	250	170	160	220	182	187
	Annual change		11%	20%	8%	3%	10%	14%	-32%	-6%	38%	-17%	4.80%
Sesame	Mt'000	39	14	55	41	67	104	48	156	47	115	144	75
	Annual change		-64%	293%	-25%	63%	55%	-54%	225%	-70%	145%	25%	59%

Source: www.faostat.org

3.3 The National Sample Census for Agriculture-2002/03

Lack of clear benchmarks for establishing accuracy of data from the above two sources prompted the need to look for and use the Census data as a benchmark against MAFC and FAO data. The report uses both 2002/03 and 2007/08 and Census data.

3.3.1 Sunflower Seeds

The 2002/03 Census report indicates that in 2003 Tanzania produced 53,278mt of sunflower seeds which at the extraction rate of 30% would have produced around 15,000mt of oil (excluding stocks for seeds and home use). Sunflower was reported to be produced in 15 out of 21 regions in the Mainland Tanzania. Singida harvested 21,337mt that made up 40% of the total production. Other regions which produced more than 5,000mt were Iringa (7,366Mt), Dodoma (6,582Mt), Manyara (6,347) and Rukwa (5,957Mt). Kilimanjaro had the highest output per hectare of 683Kgs per Ha; Manyara was in second place with 564Kgs, while Singida in third place managed 522Kgs. The overall national simple mean was 476Kgs.

Table 3.3: Production of Sunflower in 2002/03 in Mt

	Number of Households	Area Planted (ha)	Quantity Harvested (tonnes)	Share in National Total	Yield (tonnes/ha)
Singida	45,995	40,869	21,337	40.05%	0.522
Iringa	37,496	15,674	7,366	13.83%	0.470
Dodoma	31,577	21,074	6,582	12.35%	0.312

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame**

	Number of Households	Area Planted (ha)	Quantity Harvested (tonnes)	Share in National Total	Yield (tonnes/ha)
Manyara	12,004	11,251	6,347	11.91%	0.564
Rukwa	19,960	11,463	5,957	11.18%	0.520
Kilimanjaro	20,235	3,338	2,279	4.28%	0.683
Mbeya	10,545	3,781	1,783	3.35%	0.472
Shinyanga	2,373	1,434	455	0.85%	0.317
Arusha	1,977	1,098	441	0.83%	0.402
Ruvuma	3,537	796	399	0.75%	0.501
Tabora	1,525	510	149	0.28%	0.292
Morogoro	1,303	495	133	0.25%	0.269
Tanga	96	78	35	0.07%	0.449
Pwani	96	21	10	0.02%	0.476
Lindi	103	10	5	0.01%	0.500
Total	188,822	111,892	53,278	100.00%	0.476

Source: National Sample Census for Agriculture 2002/2003

Sesame Seeds

In 2002/03 Tanzania produced 22,675mt of sesame from 19 out of 21 regions in the Mainland Tanzania. The main producers were Dodoma with 7,121mt, followed by Lindi which produced 5,142Mt. The two regions accounted for 53% of national production. The average output per hectare was 369Kgs. In total the crop was produced by 188,822 households who cultivated 111,892 hectares. More information is in Table 3.4.

Table 3.4: Sesame production in 2002/03 in Mt

	Number of Households	Area Planted (ha)	Quantity Harvested (tonnes)	Share in National Total	Yield (tonnes/ha)
Dodoma	27,164	20,709	7,121	31.40%	0.344
Lindi	33,452	13,956	5,142	22.68%	0.368
Ruvuma	21,421	6,279	2,376	10.48%	0.378
Morogoro	16,162	7,362	2,170	9.57%	0.295
Mbeya	7,719	5,194	2,051	9.05%	0.395
Mtwara	10,880	3,512	979	4.32%	0.279
Singida	2,765	2,053	887	3.91%	0.432
Iringa	1,575	1,245	822	3.63%	0.660
Pwani	4,894	2,386	312	1.38%	0.131
Tanga	1,163	729	271	1.20%	0.372
Shinyanga	794	364	194	0.86%	0.533
Manyara	463	361	103	0.45%	0.285
Tabora	976	548	94	0.41%	0.172
Kigoma	263	53	41	0.18%	0.774
Rukwa	357	65	35	0.15%	0.538
Mara	453	103	27	0.12%	0.262

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame**

	Number of Households	Area Planted (ha)	Quantity Harvested (tonnes)	Share in National Total	Yield (tonnes/ha)
Mwanza	289	58	26	0.11%	0.448
Kilimanjaro	396	80	19	0.08%	0.238
D' Salaam	123	47	5	0.02%	0.106
Total	131,309	65,104	22,675	100.00%	0.369

Source: National Sample Census for Agriculture 2002/03

3.4 National Sample Census for Agriculture – 2007/08

Another important source of secondary data for this report has been the results of 2007/08 Agriculture Census Report. The report was the most recent, scientifically conducted work hence it formed the benchmark for other sources.

3.4.1 Sunflower Seeds

The report indicates that in 2007/08 Tanzania produced 238,663mt from both short and long rains. Singida, Dodoma, Manyara and Rukwa accounted for 75% of the total produce. The commodity was produced by 498,516 households on an average of 1.72acres per household and 278Kgs/acre. In the MAFC data it was noted that in 2005/06 16 regions produced sunflower while in the Census Report the number of regions had reached 20 regions.

Table 3.5: Sunflower Production in 2007/08

	Number of Households	Hectares	Quantity in Mt	Percent
Singida	89,975	99,154	68,297	28.61
Dodoma	108,705	83,385	56,068	23.49
Manyara	40,144	39,074	29,244	12.25
Rukwa	48,463	36,774	27,425	11.49
Iringa	77,795	32,270	21,161	8.87
Tabora	28,153	15,415	11,802	4.94
Mbeya	33,399	14,963	10,131	4.24
Shinyanga	9,643	5,447	3,290	1.38
Morogoro	7,026	5,260	3,103	1.30
Ruvuma	11,003	4,367	2,841	1.19
Kilimanjaro	32,617	6,521	2,590	1.09
Arusha	7,925	2,217	1,187	0.50
Others	3,668	2692	1540.05	0.64
Total	498,516	347,539	238,678	100.00

Source: Agricultural Census 2007/08

By comparison to 2002/03, the number of households producing sunflower increased by 163%; hectares increased by 211%; and output per hectare increased by 44%. Various evidences show that just by applying improved seeds output increases by more than 100%. The changes may also be attributed to various interventions by the central Government on seeds and international NGOs notably RLDC, VECO and SNV.

3.4.2 Sesame Seeds

During the 2007/08 season some 232,347 households cultivated 139,826 hectares and managed to harvest 59,091mt of sesame which means one household cultivated on average of 1.49 acres where it harvested a quarter of a tonne (250Kgs). Four regions i.e. Lindi, Mbeya, Dodoma and Morogoro accounted for 62% of the national production, the crop is quite widespread and only Kigoma region reported to have not produced sesame at all.

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame**

Table 3.6: Sesame production in 2007/08

Summing up the trend for edible oil production the 2007/08 Census observes that:

"The importance of sunflower and sesame has increased considerably since the 2002/03 Agriculture Sample Census. The area under sunflower, 347,478 ha, (35.9% of total area under oil seeds) has increased three fold compared to the 2002/03 census (115,583 ha) and that of sesame, 139,910 ha (14.5%), is twice as much as that of the 2002/03 census". Pg 55

It will be noted that the changes for sesame were: a 76.95% increase in the number of farmers; 114.77% increase in hectares; and 160.60% in productivity. Output per hectare shows that both sunflower and sesame experienced strong growth between the two periods.

3.5 Data from Regional Secretariat offices

As indicated in the methodology, apart from the primary data that was collected in Lindi, Dodoma and Singida, efforts were made to reach as

many regions as possible via telephone to gather data from Regional offices for the purpose of collating with data obtained in the budget speeches which is much aggregated. The regions that provided data are Iringa, Kigoma, Mara, Arusha, Rukwa, Tanga, Ruvuma, Kagera, and Morogoro. For the purpose of comparison with other sources, sunflower is used as a sample crop.

Table 3.7: Sunflower Production from 9 Regions that responded to data request

Region	2006/07	2007/08	2008/09	2009/10	2010/11	Average Annual Change in percent
Singida	74,937	128,826	152,500	107,263	165,504	29%
Dodoma	74,860	94,181	88,530	43,621	73,109	9%
Rukwa	36,055	81,436	76,951	73,279	98,673	38%
Iringa	12,722	25,096	47,946	60,921	70,429	58%
Ruvuma	1,800	1,705	1,627	4,682	2,874	35%
Arusha	3,564	2,425	8,368	13,995	13,916	70%
Kagera	61	33	17	6.50	23.50	26%
Tanga	972	942	833	1,052	152	-18%

	No. of H/holds	Hectares	Quantity in Mt	Percent of National Quantity
Lindi	48,908	23,259	11,010	18.63%
Mbeya	16,416	18,453	9,842	16.66%
Dodoma	36,578	26,617	9,388	15.89%
Morogoro	35,313	17,594	6,671	11.29%
Ruvuma	25,642	11,716	4,652	7.87%
Mtwara	23,739	9,621	4,354	7.37%
Rukwa	4,796	6,647	3,194	5.41%
Pwani	15,473	9,089	2,866	4.85%
Singida	6,996	5,498	2,789	4.72%
Tanga	7,115	4,806	1,538	2.60%
Manyara	2,225	1,784	843	1.43%
Tabora	2,050	1,420	551	0.93%
Shinyanga	2,905	1,453	535	0.91%
Iringa	1,757	1,044	425	0.72%
Arusha	143	376	300	0.51%
Mwanza	1,246	219	72	0.12%
Mara	508	175	43	0.07%
Kagera	204	25	18	0.03%
Dar es Salaam	138	14	1	0.00%
Kilimanjaro	195	16	0	0.00%
Total	232,347	139,826	59,091	100.00%

Source: NBS, 2007/08 Census Report

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame**

Region	2006/07	2007/08	2008/09	2009/10	2010/11	Average Annual Change in percent
Morogoro	13,068	14,116	16,322	7,164	18,597	32%
Total	218,039	348,760	393,094	311,984	443,278	38%
Change		60%	13%	-21%	42%	

Table 3.7 shows a relatively consistent positive change compared with other sources except for 2009/10. The quantity produced in 2010/2011 was 443,505mt up by 42% from a production of 311,984mt in 2009/10. The average change per annum is a robust 38%; this rate is close to the rate established by the Censuses of 2002/03 and 2007/08.

3.5 Data from Singida Region

Singida is the leading producer of sunflower seeds in the country. The crop is produced in the districts of, by importance, Singida Rural, Iramba, Manyoni and Singida Urban. Based on data availed at the Regional office, sunflower production in the Region increased from 37,720mt in 2004/05 to 165,504 in 2010/2011 giving an average annual growth rate of 27% per annum.

Table 3.8: Production of Sunflower in Singida Region

Year >		2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	Average
Area	Hectares	40,153	50,667	77,063	102,969			64,057
	Annual change	-19%	26%	52%	34%			23%
Production	Mt	32,658	74,937	128,826	152,500	107,263	165,504	99,915
	Annual change	-13%	129%	72%	18%	-30%	54%	38%
Yield	Mt/ha	0.81	1.48	1.67	1.48			1.24
	Annual change	7%	82%	13%	-11%			23%

Source: Singida Regional Administrative Secretariat

It will be noted from Table 3.9 that between 2005/06 and 2010/11 sunflower production in Singida grew at an average rate of 38% per annum. Part of this growth was due to the fact that hectares increased by 23% and yield at the same rate of 23% per annum. Although in 2007/08 Singida region accounted for 40% of the total national production, it dropped to 28% in 2007/08 meaning that more regions increased production.

Sunflower has been prioritized in the region as the leading cash crop and under the Kilimo Kwanza Resolve, the Government in collaboration with SACCOS have increased the number of motorized farm implements used in among other crops, sunflower. As of 2011/2012 the region had a total of 141 tractors, 176 power tillers and 82,561 animal ploughs. As a result the region has experienced growth in cultivated hectares from 49,434hectares in 2004/05 to 102,696 in 2008/09, an increase of more than 100%.

The output shows an upward leap in 2005/06 especially in yield, this is mainly due to support to sunflower production including subsidized improved seeds and intensification of extension and marketing services by the Government and development partners.

Assessment on the Potential of Edible Oilseeds Produced in Tanzania: *The Case of Sunflower and Sesame*

The challenges that face the crop highlighted by regional authorities include inefficient marketing system. The Government, though at slow pace has been working to improve the warehouse receipt marketing system. The presence of warehouses has attracted banks like CRDB and NMB to work with farmers' through their cooperative societies.

Sunflower Production in Singida Rural

Singida Rural is among the main producers of sunflower in the Region, wards that have the highest production in the District are Mtinko, Ntuntu, Msange, Makuro, Mudida, Ughandi and Muhintiri. Total production has grown steadily over time from about 13,000mt in 2007 to about 40,000mt in 2011 as Table 3.9 indicates.

Oil Processing

The number of oil presses in Singida has increased from 50 units in 2007 to 90 by June 2011 with Iramba witnessing the highest growth from 15 units in 2007 to 41 in 2011.

Table 3.9: Sunflower Production in Singida Rural District

	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Hectares	13,225	28,101	29,461	39,465	39,306
Production (mt)	29,441	44,162	58,922	47,358	47,167
Output per Unit Area					
Per hectare	2.23	1.57	2.00	1.20	1.20
Per acre	0.90	0.64	0.81	0.49	0.49
No. of 65Kg bags/acre	14	10	12	7	7

The increase came from expansion of area cultivated while output per acre declined. Singida Rural District Council has prioritized sunflower sub-sector development in its District Agricultural Development Plans, it has adopted the value chain approach with interventions covering not only production but also marketing, processing and related services. The District Council is investing in Warehouse Receipt System, at the time of the survey there were 23 sunflower processors, 4 suppliers of inputs (agro-dealers) and 24 transporters as the key actors in the value chains.

Given the importance of the commodity in the District's economy, issues around sunflower are among key agenda with the Tanzania Chamber of Commerce, Industry and Agriculture (TCCIA). RLDC has been supporting development of market linkage under contract farming..

Sunflower Production at Ikhanoda Village

Sunflower is among the main cash crops at Ikhanoda, others are finger millet and groundnuts. Sunflower ranks first in terms of land resource allocation at the village, on average a household plants 3 acres of sunflower while finger millet and groundnuts cover one acre each. It is estimated that every household at Ikhanoda cultivates sunflower and finger millet while 50% produce groundnuts as indicated in Table 3.10 below.

Table 3.10: Relative importance of sunflower at Ikhanoda

Name of Crop	% of households involved	Average acres per household	Average quantity in 65Kgs bags
Sunflower	100	3	12
Finger Millet	100	1	5
Groundnuts	50	1	8

Source: Focus Group Discussion - Ikhanoda

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame**

The majority of farmers have less than 2 acres (44%) followed by those having between 2 and 5 acres who make 41%, and 15% of the farmers with more than 5 acres. Production of sunflower has been increasing rather unevenly, for example while in 2007/08 more than 1,252 hectares were cultivated, farmers harvested 0.33mt or 4.6 bags of 65Kgs each per hectare, the following season acreage was cut to 429 hectares and output per unit area increased by a wide margin which enticed farmers to cultivate more hectares in subsequent years. Table 3.11 sheds more light on the trend.

Table 3.11: Sunflower Production Trend at Ikhanoda

	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	Average
Production (mt)	407	219	317	391	1,484	563.60
Hectares	1,252	429	709	837		806.75
Yield (Mt/ha)	0.33	0.51	0.45	0.47		0.44
Changes in %						
Production		-46.19%	44.75%	23.34%	279.54%	75.36%
Hectares cultivated		-65.73%	65.27%	18.05%		5.86%
Yield		54.55%	-11.76%	4.44%		15.74%

Source: Focus group discussion at Ikhanoda

Based on 2011/2012 prices, sunflower generated more than Tshs 300million or Tshs 470,000 per farmer. Increased production has created an opportunity for increased income and improved welfare of farmers, many have indicated that sunflower has helped them to afford better houses. The income has also enabled farmers to contribute to investments in social services such as building classrooms, toilets and houses for teachers. Farmers acknowledged good access to extension services and improved seeds under Quality Declared Seeds (QDS) system.

Village Level Value chain Stakeholders

Value chain actors found at Ikhanoda village are QDS producers, agro-dealers, extension officers, farmers and traders. There is no oil press at the Ikhanoda village, the seeds are bought by local and distant traders for pressing elsewhere. Major constraints facing sunflower production are; i.) shortage of extension officers; ii.) limited supply of improved seeds and; and iii.) lack of access to credit. In summary the value chain number of actors and their weaknesses and strengths are shown in Table No. 3.1.3

Table 3.12 Village level sunflower stakeholders

Value Chain Actor	# of Actors	Strengths	Weaknesses
QDS farmers	2	Increased demand for improved planting seeds within the communities.	Despite the growing demand, the quantity produced is still inadequate to meet demand.
Agro-dealers/Input suppliers	-	Presence of National Input Voucher Scheme (NAIVS) has provided a good base for small/village level agro-dealers.	There is late delivery of farm inputs particularly those under the NAIVS.
Extension officer	1	Good experience and skills in sunflower production.	The number of extension officers is not adequate to serve all farmers.

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame**

Value Chain Actor	# of Actors	Strengths	Weaknesses
Farmers	736	All village households produce sunflower, this attracts traders/processors who prefer larger volumes.	They have limited access to credit services due to lack of collateral. There are no affordable harvesting and threshing technologies, activities rely on labour that is sometime not available or expensive.
Local traders	4	Help farmers with credit when they need cash.	Credit is extended at a high price/interest.

Source: Focus Group Discussion at Ikhanoda

Marketing of Sunflower at Ikhanoda

On average a household stores about 5 bags at home waiting for the price to appreciate, during this period a household may lose up to 10Kgs due to rats and other domesticated animals. All the produce is sold at farm gate as farmers avoid transport costs and security risks. Farmers do not grade their produce, some of the processors do grade the crop in terms of cleanliness and oil recovery rate. Farmers have no clear knowledge about the importance or benefits of grading as the market doesn't reward graded products. Farmers usually don't distinguish between winnowing and grading, they however, understand that winnowed seeds fetch better price. The problem of ungraded products is one of the concerns of traders in many areas, in ideal conditions processors were supposed to buy seeds based on extractable oil and not just volume.

Volume measurements are the commonest, weighing scales are discouraged by farmers because it is difficult to ensure that they are well calibrated. In 2010 sunflower prices per kilo was Tshs 300 at peak supply season and Tshs 765 during off peak equivalent to Tshs 19,500 and 49,725 per 65Kg bag respectively.

There has been a directive from Singida Regional Commissioner that processors should buy sunflower from cooperatives and not at farm gate. The directive raised some concerns because most of the cooperatives have no money to purchase the sunflower from farmers, for the case of Ikhanoda village there is no cooperative society. The Regional authority has imposed a ban on trucks from traveling at night for fear of evading cess, this has affected efficiency in trade flow.

Access to Finance

Pride has managed to reach rural areas including Ikhanoda, credit is extended to farmers under group guarantee. At about 5% of the famers accessing Pride loan, and most of them are women. The main uses of the credit for most of people are buying seeds, preparing farms, planting and weeding. The loan sizes range from Tshs 20,000/= to Tshs 200,000/=, with an interest of 22.5% for 3 months (about 90% per annum). Collateral pledges include assets such as bicycles, motorcycles, cows, plot of land, etc.

Problems that face sunflower production at Ikhanoda

Sunflower production, like any other crop, faces a number of constraints, some are internal while others are external in nature. The problems have been explained in Table 3.13.

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame**

Table 3.13 Problems that face farmers at Ikhanoda

Type of problem	Description	Efforts to solve the problem
Improved planting seeds are not coming on time.	It's supposed to be at the warehouse by November but seeds are delivered late December almost every season.	Farmers opt to buy from other sources that has no quality assurance.
Changes in weather pattern	For example in 2011/12 there was a prolonged dry spell which discouraged farmers to plant crops.	Nothing was done
Diseases	There is increasing prevalence of fungal and viral diseases since 2010/11. They are diagnosed few weeks before harvesting.	No pesticides applied
Birds	This happens every season but the damage is not serious	No effective, efficient technology available. Relies on whistling.
Non-standard measurements	A 20litre plastic bucket is widely used as standard unit of measuring sunflower (and other crops) that in most cases disfavour farmers.	At village level nothing is done as no one is there to enforce the use of weighing scale.
Limited access to financial services	There are few financial institutions operating in rural areas, where they exist they charge high interest rate and demand security that is beyond farmers reach. Repayment schedules are not farmer friendly.	Farmers are being encouraged to establish or join SACCOS without much success.
Low producer prices	In July/August 2012 the price was at Tshs 415 – 460 per Kilo or Tshs 27,000 - 30,000 per 65Kgs bag. This is very low price compared to the price of finished product in the market factoring all costs.	There is a plan to form a cooperative union by regional government which will buy directly from farmers.
Loss of soil fertility	There is over-cultivation without making soil analysis to determine the level of soil nutrients deficiency. This leads to fall in yield and or increase in cost of production.	Farmers are being encouraged to use manure to improve the soil, however the manure is not available in large quantities. It is recommended that they also practice crop rotation.
Limited supply of extension services	There is only 1 extension officer working for 2 villages	The Government has promised to add another extension officer in 2012/13 financial year.

3.6 Data from Kondoa District

Ninety five percent of Kondoa population is made up of farmers and livestock keepers, the farms sizes range from 5 to 10 acres on average per household. Food crops are maize, pearl millet, sorghum, beans, cassava and sweet potatoes while cash crops are sunflower, sesame, groundnuts and finger millets. In 2007/08 Kondoa produced 22,300mt from 37,167hectares. Over the period the highest output was recorded in 2010/11 when 40,767mt of sunflower were produced. On Average production has increased by 13% between 2007/08 and 2011/12. Yield rate has grown at 15% per annum between 2008/09 and 2011/12. Sesame seems to have performed more evenly at an average

Assessment on the Potential of Edible Oilseeds Produced in Tanzania: *The Case of Sunflower and Sesame*

production of 4,363Mt. On the overall production increased by hardly 0.37%, yield as well estimated to have been at 0.6mt/hectare⁶.

Table 3.14: Sunflower production trend for Kondoa District

		2008/2009	2009/2010	2010/2011	2011/12	Average	Average annual change
Sunflower	Production (mt)	22,300	21,125	40,767	21,125	26,329	13.18%
	Area (Ha)	37,167	30,178	33,973	30,178	32,874	-5.80%
	Yield (mt/ha)	0.600	0.700	1.200	0.700	0.800	15.48%
Sesame	Production (mt)	4,460	3,674	5,645	3,674	4,363	0.37%
	Area (Ha)	7,433	6,124	9,408	6,124	7,272	0.37%
	Yield (mt/ha)	0.600	0.600	0.600	0.600	0.6000	-0.01%

Source: Kondoa District Office

Challenges facing sunflower and sesame value chains in Kondoa

The sunflower value chains face a number of challenges, they include: -

- *Unpredictable Weather:* Processors have been facing incessant shortages of sunflower seeds due to unpredictable weather forcing them to operate under capacity including closures due to poor rains.
- *Weak marketing system:* There are no clear strategies for sunflower marketing at national and regional level; as such the business is prone to high fluctuations not necessarily caused by weather but also by cyclical trends in prices.

To address the above challenges, the following are being carried out by the Regional and District Governments:-

- Support to QDS farmers for production of better seeds
- Organizing farmers in groups so that they can easily access services as well as markets.
- The processors and farmers are being facilitated to form groups in order to enable them to access loans from banks and other credit institutions.
- Weights and Measures Agency (WMA) regional staff do regular inspection at factories to check the scales to make sure that farmers and consumers of sunflower oil are not undermined.

Sunflower Production at Mondo Village in Kondoa District

The village has seventy five square kilometres or 7,500 hectares of land, of which 3,800 hectares (or 51%) are used for agriculture with about 1,000 hectares used for sunflower production which is about 15.33% of the total land and 26% of the land under agriculture. It

Table 3.15: Relative Importance of Sunflower at Mondo Village

Name of Crop	% of households cultivating the crop	Average acres per household
Sorghum	100	2
Sunflower	100	3
Finger millet	100	1
Maize	80	1
Beans	50	0.5
Groundnuts	50	1
Green pea	20	0.25

⁶ The output of 0.6mt has been repeated indicating t of data from villages.

Source: Focus Group Discussion – Mondo Village

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame**

is estimated that the village has 12,000 people from a base of 10,961 during the 2002 Census.

In 2010/11 sunflower production in the village was 623mt or 9,585 bags of 65Kgs each. In 2011/12 production fell by 13% to 541Mt or 8,323 bags of 65Kgs due poor weather. The village level value chain actors are few and weak as Table 3.17 illustrates.

Table 3.16: Sunflower Value Chain Actors at Mondo Village

	Number of Actors	Strengths	Weaknesses
QDS farmers	15	Have skills for QDS production.	Lack of adequate market led to shifting of QDS farmers into processing. Only 1 acre of QDS is available in the village.
Agro-dealers/Input suppliers	0	Good experience and knowledge on sunflower production.	Limited access to financial services.
Extension officers	1	Good knowledge on sunflower production	The village is relatively large for 1 extension officer.
Farmers Brokers	5	Knowledge about the market and connection skills.	Most often act against farmers' interests by offering low farm gate prices.
Local traders	5	Have capital for purchasing seeds.	They are not many and are likely to act as monopolists.
Distant traders	5	Give better price	Very few to make significant impact.
Processors	6	Process oils and provide market for seedcake.	Only 6 machines are sometime not adequate. There is no electricity.
Finished product traders	20	Provide market for oil (they have distribution network)	They tend to offer low prices.

Source: Focus Group Discussion – Mondo Village

In Kondoia sunflower is cultivated on large, medium and small scale farm sizes, the mode frequency farm size is 5 – 10 acres followed by 10-20 acres that respectively accounted for 67% and 12% of total farms. Sunflower is no longer a subsistence crop for most households.

Seeds are sourced from QDS farmers at a price of Tshs 1,000 per Kg, an acre usually requires between 3 and 5 Kgs. The QDS price is relatively cheap compared with other sources including ASA (Tshs 2,100), agro-dealers retail other brands at Tshs 3,500-5,000. The availability of QDS seeds from among the farmers is another key driver for the growth of production.

3.17: Average sunflower size of farms at Mondo Village in Kondoia in acres

Farm size	% of farmers
More than 50 acres	5
Between 20 and 50	8
Between 10 and 20.	12
Between 5 and 10	67
Between 2 and 5	5
Less than 2 acres	3
Total	100

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame**

3.18: Sunflower production trend at Mondo village

Year	2007/08	2008/09	2009/10	2010/11	2011/12(Estimate)	Average
Quantity (Mt)	698	668	690	682	642	676
Annual changes		-4.3%	3.3%	-1.2%	-5.9%	-2.0%

Production at Mondo village has been stable but declining between 2007/08 and 2010/11, in 2011/12 the crop faced *powdery mildew*, some farmers sprayed pesticides.

The crop is stored in bags in the households, on average a farmer stores between 10 to 30 bags at home. There is lack of good, large storage facility at the village while at homes the stock is prone to rats and other pests.

Sunflower Supply Chain Actors

The sunflower marketing (supply chain) is relatively long with many actors each adding value to the commodity. Their main roles, strengths and weaknesses are indicated below in Table No. 3.20:.

3.19: Value chain actors at Mondo village

	Number and main role	Strengths	Weaknesses
Brokers	5	Knowledge about markets	Usually biased against farmers.
Village level traders	Sell processed oil	Give small loans to farmers, on interest.	High interest rate (22.5%)
Urban oil seeds traders	Some support QDS training.	Possess cash, don't buy on credit like cooperatives.	There is lack of transparency on what happens upstream hence mistrust.
Processors	Process oil, sells oil and transport oil.	There is competitive oil pressing service at the village.	Seedcake has no clear market.
Edible oil traders	Purchase oil from processors.	Provide market for sunflower oil, manage distribution activities.	Sometimes they temper by mixing it with palm-oil.

About 70% of the producers sell their sunflower at household and 20% at pressing point. While farm gate marketing is discouraged farmers say it saves them transport costs to and from established market centres. There could also be some risks associated with taking goods to the market including failure to get buyers, theft, etc. The second most important selling point is at oil press, the advantage here is that they have option to press the seeds and sell oil and cake, it gives them flexibility and adds income. Table No. 3.24 summarizes the marketing channels.

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
*The Case of Sunflower and Sesame***

3.20: Market channels for sunflower at Mondo

	Percent selling at a specific location	Benefits of selling at the location	Challenges for the selected exchange point
At the farm/household	70	No transport cost	Low prices, limited competition.
At village/ward market	3	Improve market opportunities.	It is not a reliable market.
At processing point	20	Can sell already processed oil plus seed cake.	Lack of transparency on value of seedcake.
At certified warehouse	0	-	-
At district or regional market	5	Better price is offered	Not a reliable market as oilseeds come from different markets.
At other markets	2	-	-

Despite the fact that farmers are aware of the need to grade their produce and that grading can add value, they do not grade their sunflower oilseeds instead, it is the processor who has to clean the seeds.

Access to Finance

Farmers at Mondo village don't have access to finance from formal lending institutions, this perhaps explains why farmers can't expand their farms and are forced to dispose most of their produce during peak supply season when prices are low. Farmers reported to obtain loans from fellow villagers which they repay in terms of sunflower seeds or cash.

3.7 The Case of Iringa MUVI Programme

In the 2002/03 Census reports, Iringa ranked 2nd after Singida in sunflower production, during the year the region produced 7,366mt and during 2007/08 was 21,161mt This is an increase of 200%. Data from RAS indicates that in 2007/08 Iringa produced 25,096mt of sunflower, the RAS figure is higher by 18.50% over the census data. The RAS office puts the figure at 70,429mt⁷ for 2010/11 which is an increase of 176% over a period of 3 years from the base of 25,00mt.

In Iringa there is a programme funded by IFAD to develop the sunflower value chain operating in the Districts of Njombe and Iringa Rural. The programme known by the (acronym MUVI) which stands for the Swahili words Muunganisho wa Ujasiriamali Vijijini, works in 30 villages. The value chain development work involves: -

- Improving access to better planting seeds of Record variety.
- Looking at possible innovations in the value chain e.g. policy, technology, markets etc that could bring significant and durable positive changes.
- Organizing value chain actors, i.e. input suppliers, farmers, traders and processors to have common/shared development vision.

⁷ This figure may require some validation.

Assessment on the Potential of Edible Oilseeds Produced in Tanzania: *The Case of Sunflower and Sesame*

- To capacitate farmers to access and use market information
- Linkage to financial services.

In Iringa Rural, a farmer cultivates an average of 1.91 acres or 0.77 hectare where prior to MUVI they used local varieties and harvested 3 bags/acre but now they get about 8 bags. The Programme has reached about 5,000 farmers and therefore has a potential to increase directly about 4,000mt and much more through multiplier effect. The two districts are also supporting sunflower production through the District Agriculture Development Plans.

3.8 Sesame Data from Lindi

Lindi is currently the leading supplier of sesame oil seeds in Tanzania with an average 26,000mt per annum between 2005/06 and 2009/10. The crop is quite important to the region next to cashew nut. At an average price of Tshs 1,000 per Kg, the 26,000 Mt imply that the crop is valued at Tshs 26 billion per annum and the local Government reported in 2011/12 to have collected Tshs 0.948 billion in cess. The overall performance pattern over the period shows a decline from 28,233mt in 2005/06 to 18,815 in 2008/09, and an increase of 73% in 2009/10. The 5-year average change is a dismal 6% as table No 3.24 shows.

3.21: Production trend for sesame in Lindi Region

	2005/06	2006/07	2007/08	2008/09	2009/10	Annual Average
Production in Mt	28,233	25,997	24,556	18,815	32,531	26,026
Change		-8%	-6%	-23%	73%	9%

Source: Lindi RAS office

The performance of agriculture including sesame in Lindi receives the support of many stakeholders from the public and private sector through direct and or formal partnerships of business/transactional-based service providers. The list of key stakeholders whose services impact on sesame is provided in the Table below: -

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame**

3.22: Stakeholders involved in agriculture development in Lindi

Name of organization	Status	Activities
Small industrial development organization (SIDO)	Public organization	Distribution of processing equipment-training for community empowerment on food processing. Participation in DADPS formulation, Field and Desk Appraisal
Metro Water Services LTD	Private Sector (Contractor)	Distribution of eight Power Tillers
Kineng'ene, Tuliene, Mitwero and Kitumbikwela primary society (KITUMIKI)	(NGO)Primary society	Supply of agricultural and livestock inputs
Mnazimmoja Primary Society	(NGO) Primary society	Supply of agricultural and livestock inputs
Ng'apa Primary Society	Primary society	Supply of agricultural and livestock inputs
SHAMGID Shop	Private Sector (Contractor)	Sale of agriculture & livestock inputs
Agriculture Research Institute (Naliendeke)	Government organization	Research on improved varieties
		Farmers training on sesame production Establishment and support to AMCOs
MUWATU (Muungano wa Wakulima wa Tuliene)	NGO	Agriculture food and cash crop production (cashew nuts, maize, cassava, sorghum, sesame and cow peas and keeping animals, Pest and disease control
Farm Equipment (T)	Private Sector (Contractor)	Distribution of two Power Tillers
Intermech Company Limited	Private Sector (Contractor)	Distribution of two Power Tillers
MVIWATA	NGO	Production of advisory services to Agriculture, development partners and an umbrella of all farmer groups.
Metro Water Co	Private Sector (Contractor)	Distribution of Eight Power Tillers
SUBA AGRO	Private Sector (Contractor)	Extraction of Sesame oil

Data from Ruangwa District

Sesame is the lead cash crop in Ruangwa District, it generates income to the villagers and has a great impact on the economic development. Between 2007/08 and 2009/10 Ruangwa produced an average of 2,033mt of sesame there was an increase from 1,600mt to 2,300 in 2009/10 making a year-on-year growth at 21%. At an average farm gate price of Tshs 1,000 the total value of the produce has averaged at Tshs 2.3 billion.

Data from Makaranga Village

Makaranga village is one of the villages in Ruangwa that produce sesame as their main cash crop, it is cultivated by about 300 households. At a production of 26.88mt for the entire village the average quantity produced per household is about 112kgs worth about Tshs 112,000.

3.23: Sesame production data at Makaranga village

	2008/09	2009/10	2010/11	2011/12	Average
Quantity produced in Kgs	14,925	26,940	35,683	29,972	26,880
Change		80.5%	32.5%	-16.0%	32.3%
AMCOS price (Tshs)	1,000	1,000	1,300	1,500	1,200
Open market price (Tshs)	1,000	1,200	1,400	1,500	1,275
Value (open market price)	14,925,000	32,328,000	49,956,200	44,958,000	35,541,800

Source: Mkaranga Village Focus Group Discussion

The annual change in quantities produced between 2008/09 and 2011/12) is 26.88Mt and there was a growth of about 32% over that period. Main traders collecting sesame in the area are Frasal Intertrade Company Ltd, Export Trade, OLAM, ABBAS and PRAYOSA. The companies have branches in Lindi, Mtwara and Masasi. Farmers sell sesame and other crops locally at farm gate and others at AMCOS where they are paid the same day. Key problems that face production of sesame at Makaranga area include: -

- Poor roads that make it difficult for traders to penetrate to villages to compete for the commodity.
- There is only one extension officer who serves Nambilanje Ward and has to attend many crops, in most cases the focus being on food crops and less on such crops as sesame.
- There is an outbreak of new sesame disease that causes the plant leaves to become whitish and dry. The disease has not yet been reported to Naliendele Research Institute (NARI).
- Training on growing methods (sowing density, plant protection, and weed control) and on post harvest handling is limited.
- There is lack of winnowing/destining machine to remove sands and other foreign matters makes quality of sesame relatively poor.
- Access to credit is very limited as SACCOS face administrative problems.

Post-Harvest Handling

Commodities are stored in the warehouse packed in 50Kg bags. The crop is susceptible to being by rats and soiling during spreading on ground for drying. The processor in Lindi makes sure that the seeds are clean as he has a cleaning equipment. The Ward Agricultural Officers, NARC and the Aga Khan Foundation conduct training to farmers on handling sesame from harvesting to marketing.

Sesame Marketing Channel

The marketing channels are relatively well established and distributed over the villages. Mkaranga village sell their cash crops at Mtondo AMCOS and to local traders known as "chomachoma". Traders from Masasi and Lindi come to buy the seeds at a collection centre at Mtondo village.

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame**

Table 3.24: Role of various actors in the sesame supply channel at Mkaranga

	Main activities they perform at village level	Strengths	Weaknesses
Brokers	There is only one broker in the village. Farmers bring sesame to the AMCOS warehouse the AMCOS sell to outside traders (from Masasi and Lindi) on their behalf at an agreed price.	Long experience in sesame business	- Before brokers requested to purchase on credit, payments were delayed. - Lack of competition
Village level traders	They collect small quantities of sesame from door to door and bulk at their premises, waiting for outside traders to come and buy.	They have good bargaining power against outside traders.	They always act to maximize their own profit without regard to the farmers' interests – i.e. unfair trade practices.
Other Outside traders	They come to buy sesame at village AMCOS warehouse and pay cash	They have working capital and are able to buy all sesame found at the selling point.	They come with their own weighing equipment which is not checked and may cheat farmers e.g. a bag of 60 kgs may read 53kgs.

Source: Focus group discussion

About 40% of the farmers sell their produce at household, the remaining 60% sell their produce at certified warehouses. The main advantage of selling at farm gate is avoidance of costs

associated with transport to the warehouse. Most of the 40% selling at homestead do so in small quantities to meet household needs. The advantage of taking the crop to the warehouse is that there are buyers all the time.

Table 3.25 Comparison of prices between AMCOS and open market in Tshs/Kg

Year	2007/08	2008/09	2009/10
At AMCOS	1,000	1,070	1,300
Open market	1,200	1,300	1,400
Difference	20%	21%	8%

Generally sesame is not graded instead it is identified by colour, it is either white or black (also known as blue sesame). Officially throughout the chain the unit of transaction is a Kilogram, the seeds are packed in 50Kgs bags for both domestic and export trade.

Access to Finance

The main sources of credit in the village/ward are Mbekenyeri SACCOS, Ruangwa SACCOS and National Microfinance Bank at Ruangwa town. About 20% of farmers are able to access credit, but it has been reported that Mbekenyeri and Ruangwa SACCOS face some problems by well off members being given preference over smallholder farmers, the SACCOS are most of the times cash strapped. Borrowed money is used to buy inputs such as oilseeds, pesticides to apply on cashew

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
*The Case of Sunflower and Sesame***

trees and hiring casual labour. Loan size ranges from Tshs 500,000 to 1,500,000 and is usually three times the total shares. Loan interest rate is 15% collateral demanded include a house, land and cultivated plots/farms. The nearest source of credit is at Mbekenyera town which is 15 kms from the village. On the overall access to credit is not very helpful to farmers.

4.0 ANALYSIS OF FINDINGS

4.1 Comparison of Production Data among Sources

4.1.1 MAFC and FAO

Data provided by the three sources vary significantly, MAFC indicates as ten year average of 268,000 per annum while, FAO gives 187,000mt. The trend of the difference between 2000/2001 and 2005/06 is relatively consistent, while they widen strongly after 2005/06 as Figure No 4.1 and 4.2 show. Ten year data have been used to accommodate variation that could be attributed to accounting period, FAO uses calendar year while MAFC uses a fiscal (July – June) year.

Pivoting the data from the two sources against the 2007/08 Census Report shows that the Ministry has been rather optimistic by a wide margin as the 2007/08 results indicate a positive difference of 75%. On the other hand FAO has been somehow pessimistic but with less margin as its difference with the Census results is narrower by -12%.

The FAO data trend depict a modest average year on year growth rate of 4.8% which contrasts sharply with MAFC's which is 10 times higher at 45%. Coincidentally the two sources converged in 2008/09 with a production of about 160,000mt. While MAFC data show higher than normal growth after 2009/09 FAO data is rather flat. The computation of r^2 is very high with Ministry data at 0.5916 while that of FAO is at 0.1544⁸

Figure 4.4.1: Growth trends in production of sunflower and sesame

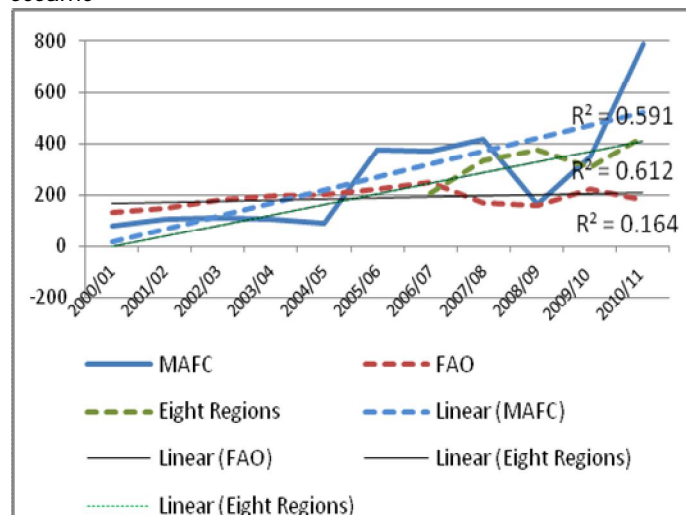
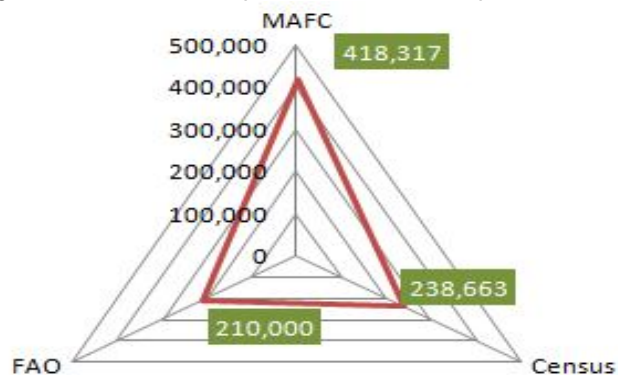


Figure 4.2: Cobweb comparison of sunflower production data



⁸ r^2 is the Pearson product-moment correlation coefficient (sometimes referred to as the PPMCC or PCC, or Pearson's r , is a measure of the correlation (linear dependence) between two variables in this context, is *time* and *quantity* produced.

4.1.2 Data from Regional Offices and 2007/08 Census Report

There is also a wide variation between data obtained from the Census report and data received from Regional Agriculture Advisors for the same 2007/8 year. In Rukwa the data from RAA was higher by 196%, from Singida by 88% and from Dodoma by 68%. In Ruvuma, however, data from RAA was understated by 40%. See **Error! Reference source not found.** for more information.

4.1.4 Inter-censal Changes

One of the approaches for estimating production of edible oilseeds is to look at the growth between two periods and use the change index to project the current level of production. It can be seen from the findings below that between 2003 and 2008 sunflower production increased 4.47 times from 53,278 to 238,663Mt. Land utilized increased by 210% while land productivity (output per hectare) increased from 476Kgs/Ha to 687Kgs – an increase of 44% during the same period.

4.1.5 General Observations

Discussion with some actors shows disagreement with FAO data, they argue that while MAFC data may be overstated it is closer to the situation on the ground. The study extended its analysis to try to estimate the national supply because:-

- Reference to macro-economic indicators shows that the economy grew at an average rate of 6.93% per annum between 2006/07 and 2010/11 and since economic growth is positively related to demand for edible oils, the increase in demand should be met through either increased imports or domestic production or both.
- A rapid review of sunflower edible oil in many shops shows that demand for local sunflower oil is growing, especially in Dar es Salaam which is traditionally the main market. Many sunflower oil brands are becoming conspicuous in shops notably Singida Fresh, Sundrop and Sunola. Singida Fresh, for example, was not common in the market a few years ago but at present it is the leading sunflower oil name for oil packed in 10/20 litre containers in the Southern Highlands (Iringa, Njombe and Mbeya).

Table 4.1 Production of Sunflower in 2003 and 2008 in Mt

	2003	2008	Change in %
Singida	21,337	68,297	220.1%
Iringa	7,366	21,161	187.3%
Dodoma	6582	56,068	751.8%
Manyara	6,347	29,244	360.8%
Rukwa	5,957	27,425	360.4%
Kilimanjaro	2,279	2,590	13.6%
Mbeya	1,783	10,131	468.2%
Shinyanga	455	3,290	623.0%
Arusha	441	1,187	169.1%
Ruvuma	399	2,841	612.1%
Tabora	149	11,802	7821.0%
Morogoro	133	3,103	2232.9%
Tanga	35	337	862.4%
Pwani	10	81	707.1%
Lindi	5	0	-100.0%
Mwanza		486	
Kagera		28	
Mara		306	
Kigoma		265	
Dar es Salaam		22	
Total	53,278	238,663	1019%

Sources: 2002/03 and 2007/08 Agriculture Census Report

4.2 Mathematical Interpretation of the Census Reports

Perhaps the most plausible basis for estimating production is through extrapolation of the Censuses results mathematically, using a simple growth formula in the tile.

Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
The Case of Sunflower and Sesame

Computations show that if the growth momentum observed between 2002/03 and 2007/08 was maintained, Tanzania is expected to produce 792,187Mt in 2011/12. Coincidentally the figure above is close to MAFC's stated production of 787,000Mt in 2010/2011. The results from the formula are just indicative and more econometric work may be necessary to establish various variables that influence the growth in production of sunflower and sesame in the country. Adjustments may lower the projected level because the basis for projections had assumed all factors that prevailed between 2002/03 and 2007/08 are the same and had equal influence on production between 2008/09 and 2011/12. Land is one of the constraints to the growth model as it does not expand as much, productivity on the other hand play significant role in total production.

Growth Equation Projection

$$Q_x = Q_{x=0} * (1+r)^n$$

where

Q_x = Quantity at nth year

Q_0 = Quantity at base year

r = (compounded) rate of growth

n = number of periods (years)

NOTE:

r was determined first using a base of 53,278Mt, n of 5 years, and Q_t of 238,663Mt.

4.3 Enabling Business Environment

We have noted in Chapter 4 Section 4.2 that Tanzania may be producing 792,000mt based on the projection from the two (2002/03 and 2007/08) census reports. Hereunder are some issues that have been cited which influence the key dynamics of the industry.

Table 4.2: Projection of Production Using Inter-censal Growth rates

	2002/03 - 2007/08
Rate (r)	0.34975
Base output ($Q_{t=2002/03}$)	53,278
Period (n)	5
Output achieved ($Q_{t=2007/08}$)	238,679

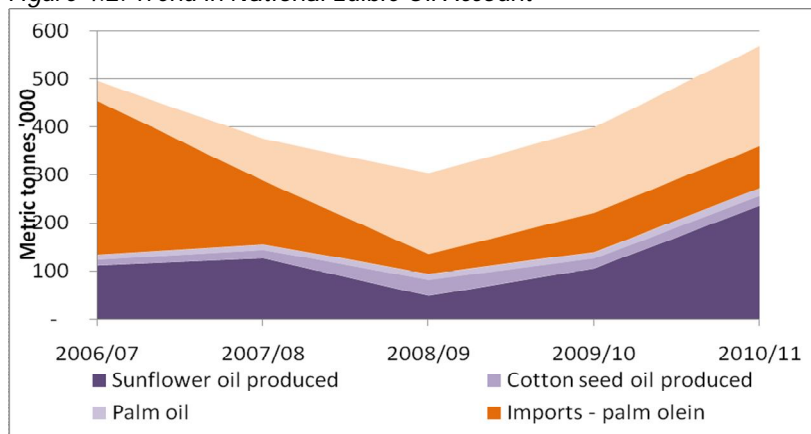
	2008/09 - 2011/12
Rate (r)	0.34975
Base output ($Q_{t=2007/08}$)	238,679
Period (n)	4
Output achieved ($Q_{t=2011/12}$)	792,187

Source: Agriculture Census Reports & Author's Projection

4.3.1 Opportunities in the Edible Industry

There has been strong growth in the domestic supply of edible oils from sunflower seeds whose production has been increasing rapidly in recent years. Sunflower will likely continue to be the most dependable oilseed because there is no evidence that other edible oilseeds i.e. groundnuts, cotton seeds, palm oil, etc will contribute significant amounts in the domestic supply in the medium-term. Sunflower production has increased in terms of hectares cultivated and output per hectare. On the other hand sesame has a strong demand especially in export the market segment.

Figure 4.2: Trend in National Edible Oil Account



Assessment on the Potential of Edible Oilseeds Produced in Tanzania: *The Case of Sunflower and Sesame*

The noted growth has been catalyzed by; i.) Government's positive policies e.g. VAT waiver on domestically processed edible oils, subsidy and direct investments in the distribution of improved planting seeds); ii.) investments under DADP and other projects e.g. MUVI; and iii.) efforts by international NGOs supporting sunflower industry at various levels; these include RLDC, SNV, Aga Khan and VECO that play an important catalytic role especially through building value chain actors bodies to promote the crops.

Conscious efforts to focus on supporting processors with a strategic vision of creating a sustainable force for driving the value chains instead of just focusing on farmers helped to strengthen the market pull effect, traders/processors competition for oilseeds in the villages has benefited farmers.

There is an elaborate institutional and policy framework though is not well embedded to oilseeds which include:-

On crop production

- o The Agriculture Sector Development Strategy (ASDS), Agriculture Sector Development Programme(ASDP) of 2001 and 2006 respectively;
- o Tanzania (Crop) Seed Act 2003 (amended in 2007); and
- o The Comprehensive Africa Agriculture Development Programme (CAADAP);
- o Southern Agriculture Growth Corridor of Tanzania (SAGCOT)⁹;
- o The Kilimo Kwanza Resolve;
- o The Agriculture Policy (2012), etc.

On marketing

- o The national economic growth rate of more than 6% is a powerful signal for growing demand for edible oil seeds, and indeed for sunflower oil as it is more preferred by consumers.
- o Presence of Agriculture Marketing Policy (2008) and subsequent Agriculture Marketing Strategy (2010);
- o The Tanzania Warehouse Licensing Board (2005) encourages the use of warehouse receipt system (WRS) to address a number of marketing shortcomings especially appropriation of gains from seasonal price fluctuation in favour of farmers and improving access to finance;
- o The Cereals and Other Produce Board (2009) whose tasks, among others, include participation in trade where there are manifestations of monopolistic market behaviour.
- o The 2003 Cooperative Act strengthens primary cooperatives involved in marketing especially the AMCOS and SACCOS.

Emergence of TEOSA to represent the interests of the sector country wide is an important opportunity as the organization has started assuming a strategic role in the development of the sector.

Weaknesses of the Sector

Despite existence of many opportunities, policy and institutional framework, the sector demonstrate several weaknesses, these are: -

On production

- Yield is still very low, literature show that it is feasible for an acre of sunflower to produce up to 4 – 5 times the current levels under average weather conditions and good agriculture practices (GAP). For sesame there is potential for doubling output. Sunflower and sesame are characterized by non-use of fertilizers and chemicals¹⁰.

⁹ There are indications that some of the large scale investors under SAGCOT target to produce sunflower seeds.

¹⁰ Most literature show that sunflower and sesame farmers are not using fertilizers and chemicals, scientists however advise the replenishment of soil nutrients and preventive application of chemicals. MMA (2012) Pg. 15.

Assessment on the Potential of Edible Oilseeds Produced in Tanzania: *The Case of Sunflower and Sesame*

- Production of sunflower and sesame show a cyclical pattern in supply due to, inconsistent and unpredictable rainfall, increases the speculative behaviour in the value chains.
- Weak technical support and infrastructure facilities as the crops do not neatly fit into food security or export categories. There is limited technical base especially R&D on planting materials and plant health management¹¹. Sunflower main research services are based at Ilonga and those for Sesame are based at Naliendele Agriculture Research Institute (NARI). Both crops are produced in many regions and the coordination between designated ARIs and R&D outreach posts is very weak. It has to be borne in mind that prolonged concentration on a crop make pests adapt to infest the crop.

On marketing

- Marketing of sunflower and sesame faces a number of marketing challenges, among these are: -
 - Non-structured trade – products are not graded and also rampant use of non-standard measurements and packages. This is worsened by the weak capacity to enforce compliance to standard weights and measures. Under the 1980 Weights and Measures Act sunflower should be packed in 40Kgs packages.
 - Limited or, in most cases, lack of storage facilities increases post-harvest loss and influences negatively the cash flows of value chain actors as they are forced to sell commodities during peak supply season at lower prices.
 - As farmers direct more livelihood resources (in this case) towards sunflower, it is important to bear in mind that the sector is still nascent and prone to global supply/demand shocks, particularly the trends in the prices for crude palm oil. There is a need for deliberate effort to insulate the domestic production/industry against global shocks.

On processing technology

- The oil expellers found in the domestic market are of poor quality because of lack of standards and enforcement mechanisms. It is estimated that between 10 – 15% of oil is left in the seedcake due to poor technology.
- TFDA recommends that edible oils are refined i.e. removing traces of unwanted elements particularly gum. Apparently there is no small scale technology for refining oil in the market although SIDO is pilot-testing its own version¹².

¹¹ For example in 2009/10 there was an outbreak of a fungal disease in the Northern part, however, information about the problem were rather trickling in. Refer also to the case of Mkondo village in 2011/12. RLDC (2008) confirmed the situation. Pg.9.

¹² The plant may cost more than Tshs 50million upon completion. It has also been reported by MUVI Project that in Mwanza there is a micro-refinery unit imported from China.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

- i. Despite the variations in production data, there is ample that the sector is experiencing strong growth, drivers of this growth from the demand side include national economic growth as well as population growth. From the supply side, the Government and other stakeholders including NGOs, financial institutions and private investors have contributed significantly to the growth of the sector. Global demand for edible oils has increased competitiveness of domestic oil sources.
- ii. Concerted efforts by international development organizations such as RLDC, SNV, ADF, VECO, Aghakhan, etc to promote the crops under value chain approach. Kilimo Kwanza added an impulse into the sunflower and sesame production particularly through access to mechanization.
- iii. Data on the production of edible oils especially sunflower and sesame vary significantly among sources, however, when collated data from the Government, Census and limited consumer survey suggest that the country may be consuming close to 500,000mt of edible oils.
- iv. The edible oil sector supports livelihoods of many households from production, transport, processing and marketing of edible oil. It also has potential to contribute to foreign exchange generation on the regional markets for oil and international markets for seedcake. This contribution should be recognized and supported.
- v. Despite the emerging importance of domestic source of edible oils, the sector faces a number of constraints. The debottlenecking of these constraints will certainly accelerate the growth of the industry and hence will benefit the economy more.
- vi. Farmers lack access to credit and where it is available it is not tailored to smallholder farmers and is relatively expensive, this impact the capacity to expand production.
- vii. The edible oil industry is characterized by existence of smallholder processors and large importers and refiners some of whom also press and refine sunflower oil. The importers tend to protect their businesses by advocating for ease of import restrictions that are intended to protect domestic industry which is the aspiration of small scale processors.
- viii. Until recently small processors and farmers in the sector lacked a collective voice to dialogue with the Government, the formation of stakeholders bodies like CEZOSOPA, TASUPA and TEOSA has very positive impact to the development of the domestic industry.
- ix. The actors' bodies lack good knowledge of the industry and therefore are weak to dialogue with the Government, set and promote good business/trade practices and to develop an industry national strategy.
- x. There is weak link between policy makers (the public) and other value chain players, this is because oilseeds are not grouped in either food security or export categories hence there is limited support for the commodities in terms of R&D, extension services, development programmes.

5.2 Recommendations

5.2.1 Short-term Recommendations

- a. In the meantime TEOSA and other stakeholders should jointly develop a strategy for the industry. It has already been pointed out that this is not a strategy for TEOSA, but rather for the industry. It should therefore pull various actors and stakeholders together including those from other oilseed sub-sectors such as cotton seeds, palm oil, etc. The key subject is to set out a national vision for the industry building on the experience and evidence available thus far among all stakeholder. The primary list of stakeholders includes processors the value chains pullers, the government represented by relevant officials at MIT and MAFC, development agencies and programmes eg. BEST-AC, ACT, SCF, SHAFS etc.
- b. Alongside the national vision to be promulgated, TEOSA should advocate for having anchor persons at relevant Ministries (to start with at MAFC and MIT) whom they can interact with on a day-to-day basis to be able, among other things, to monitor the evolving sector and advice respective authorities on timely. The key objective here is to entrench a shared vision between the private sector and public sector. The Government has so far shown itself to be willing to address genuine constraints e.g. the removal of VAT on edible oil that is locally produce; there is a strong case to argue for investment incentives by way of a VAT waiver on machineries and spare parts used in the industry e.g. for oil presses etc if this will improve the local industry and make it more competitive. This provided there is sufficient evidence that this will not harm the domestic industry.
- c. To complete the picture of the sector, it is recommended that somewhere down the line a consumer survey should be carried out to estimate the level of consumption, e.g. the VECO study established that a household in Mbeya uses 0.153 lts of sunflower oil per day. Such a study would complete a product flow be used to collate data grow the supply side. It will be important also to cover the end use of seed cake for the purpose of exploring further commercial domestic use and export potential. Such initiatives have been supported in the dairy sector. The purpose is to equip domestic industry actors with adequate knowledge of the consumers. TEOSA should liaise with international organizations with the necessary expertise and experience to improve the nutritional quality of edible oils e.g. fortification with essential nutrients like Vitamin A that are crucial for normal body growth¹³. Among the requests that TEOSA could seek is the consumer survey referred in d.

5.2.2 Medium and Long-term Recommendations

- a. To be able to expedite the above, TEOSA should build its capacity particularly on serving its members with information and become an efficient industry's information repository. The industry needs to develop a system that will pull data routinely from all actors in the value chains and consolidate these to generate and regularly update the profile of the industry good example is the comprehensive data available at (refer to www.ratin.org) for information regarding oilseeds in the country.
- b. Based on findings of this report on the size of the industry, oilseeds deserve to be included in crops that are covered in details in NBS's Agriculture Censuses reports to enable stakeholders to deepen the understanding of the dynamics and trends of the commodities. It has been noted

¹³ USAID is supporting fortification of edible oils with Vitamin A.

**Assessment on the Potential of Edible Oilseeds Produced in Tanzania:
*The Case of Sunflower and Sesame***

that TRA data is too much aggregated, TEOSA needs to advocate with TRA to improve data specificity.

- c. The country should map opportunities available in East African Community (EAC) and Southern Africa Development Community (SADC) markets because the observed production growth shows that in the long run the country may be able to saturate its market calling for foresight planning.
 - d. TEOSA should advocate for institution of standards all along the value chains/sector as a step towards competitive domestic and export sector. The Association should also advocate for the establishment of Tanzania Edible Oil Development Board under public private partnership principles.
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Annexes

