EVALUATION OF CHALLENGES FACING INDUSTRIAL CROPS FARMING IN THE COASTAL REGION OF KENYA

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DECLARATION

This Research Project is my original work and has not been presented for a degree or any award to another university.

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This work is dedicated to my late parents Mr. Gambo Maropia and Mrs. Sarah Mbuche Gambo who passed away same year on April and December 2010 respectively when I was preparing to start this project.

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ABSTRACT

Industrial crops are grown to produce goods to be used in the production sector, rather than food for consumption. Industrial crops impact the economy by providing a product which lessens the need for imports. Industrial crop is a designation given to an enterprise that attempts to raise farm sector income, and provide economic development activities for rural areas. Industrial crops also attempt to provide products that can be used as substitutes for imports from other nations. The Kenyan Coast Region is comprised of six counties namely, Mombasa, Kwale, Kilifi, Tana River, Lamu and Taita Taveta. Overall, farmers in Coast Region earned 7.8 billion shillings from various crops in 2010. Yet it is known that the opportunities to earn a lot more are enormous. Hence need for the Ministries of Agriculture, Livestock and Water together with the Coast Province leadership must devise ways and means to harness the unutilized potential for the benefit of the people of this region.

The general objective of the study was to evaluate the challenges facing industrial crops farming in the coastal region of Kenya. The specific objectives of the study were to identify the industrial crops available in the coastal region, assess key requirements to successful industrial crop farming, conduct comparative analysis and identify the gap in industrial crop farming and finally assess interventions to industrial crop farming at the coastal region.

The study adopted descriptive research design. The target population consisted of six categories of farmers of bixa, cashew nut, coconut, cotton, mango and jatropher who were selected from a list that was obtained from District Agricultural Offices and using both stratified and random sampling methods where the sample was drawn from. The data collected were analysed using descriptive techniques which were conducted with help of Statistical Packages for Social Sciences.

Conclusions and recommendations were drawn based on the analysis and interpretation of data collected which includes; government issuing title deeds to the farmers for land ownership, strengthening farmers cooperative societies for marketing of farmers produce, improve farmers participatory in research innovations and create awareness to certification

and quality standards of farm produce. The study also recommended further research to be done on industrial crop farming in the coastal region of Kenya.

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LIST OF ABBREVIATIONS AND ACRONYMS

APVC	Agriculture Product Value Chain
ARF	Agriculture Research Fund
ASAL	Arid and Semi-Arid Land
ASK	Agriculture Society of Kenya
CBK	Central Bank of Kenya
CBS	Central Bureau of Statistics
CDA	Coast Development Authority
COMESA	Common Markets for East and Southern Africa
DFID	Department for International Development
EPZA	Economic Processing Zone Authority
ERS	Economic Recovery Strategy
FAO	Food and Agriculture organisation
GDI	Gross Domestic Income
GDP	Gross Domestic Product
GNP	Gross National Product
IFAD	International Fund for Agricultural Development
KARI	Kenya Agriculture Research Institute
KEBS	Kenya Bureau of Standards
KIHBS	Kenya Integrated Household Budgetary Survey
MOA	Ministry of Agriculture
NEMA	National Environmental Management Authority
NEPAD	New Economic Partnerships for African Development
NGO	Non-Governmental Organisation
R&D	Research and Development
RDP	Regional Development Policy
SACCO	Savings and Credit Cooperative

SADC	South African Development Community
SPSS	Statistical Package for Social Sciences
SRA	Strategy for Revitalising Agriculture
SSA	Sub- Saharan Africa
UNDP	United Nations Development Programme
USDA	United States Department of Agriculture
WTO	World Trade Organisation

DEFINITIONS OF OPERATIONAL TERMS

Industrial crops: An Industrial crop is any crop that provides materials for industrial processes and products such as soybeans, cotton (lint and seed), flax, and tobacco (McGraw-Hill Science & Technology Dictionary).

Regulation: Regulation is administrative legislation that constitutes or constrains rights and allocates responsibilities. It can be distinguished from primary legislation (by Parliament or elected legislative body) on the one hand and judge-made law on the other.

Crop Farming: Any crop planted and tended in a field for the purpose of producing a produce for either consumption or for industrial purposes.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

According to McGraw-Hill Science & Technology Dictionary an Industrial crop is any crop that provides materials for industrial processes and products such as soybeans, cotton (lint and seed), flax, and tobacco. An industrial crop is a crop grown to produce goods to be used in the production sector, rather than food for consumption. It impacts the economy by providing a product which lessens the need for imports (Wilson, P.N., James, C.W., Julie, P.L., 2006). Industrial crop is a designation given to an enterprise that attempts to raise farm sector income, and provide economic development activities for rural areas. Industrial crops also attempt to provide products that can be used as substitutes for imports from other nations. Georgetown University through their website (http://gulib.georgetown.edu/newjour/i/msg02781.html) goes further to give examples of new or potential industrial crops as agave, cassava, crambe, cuphea, elephant grass, fibre hemp, flax, guar, guayule, jojoba, kenaf, lesquerella, maize, meadowfoam, oil palm, peas, plantago, potato, pyrethrum, rape seed, safflower, soybean, Stokes aster, sugar beet, sunflower, vernonia, and wheat.

Globally, the demand for plant-based industrial raw materials as alternatives to synthetically produced materials has increased, as has research into expanding the utility of plants for current and future uses in the same scope. Non-food crops are being utilized in a variety of different industries and products including bio-energy, industrial oil and starch, fibre and dye, rubber and related compounds, insecticide and land rehabilitation (Bharat, 2010)

Africa is the only region in the world where poverty is on the increase; by far the highest incidence of under nourishment is found in sub-Saharan Africa – one third of the population is

undernourished (FAO, 2004). In this continent, the vast majority up to 80% of the population live in rural areas, and 70% of this rural population are dependent for a large part of their livelihood on agriculture production through farming or livestock keeping; the majority of them are women. Agriculture provides 75% of all employment, and constitutes the backbone of most African economies – in most countries it is still the largest contributor to Gross Domestic Income (GDI), the biggest source of foreign exchange, and the main generator of savings and tax revenues (NEPAD, 2002). It is also the dominant provider of industrial raw materials. Thus agriculture remains crucial for economic growth in most African countries, but the problems of agriculture in Africa are manifold. Productivity tend to be declining, poor people lack access to land and other resources, due to low investment in research and poor dissemination of research findings to the farmer. Adverse market conditions and poor access to markets are also major problems for farmers in Africa.

1.1.1 Industrial Crops in Kenya

Kenya's economy is heavily dependent on agriculture. Generally 75% of Kenyans earn their living from farming either directly or indirectly (Kitching, 1980). Kenya is among a few African countries whose food production has kept pace with its population growth. Only in 1984, a year of drought was there a registered deficit in food production. Agriculture usually brings in over 6% of foreign exchange earnings and provides raw materials for Kenya's agro-industries, which account for about 70% of all its industrial production (EPZA, 2005). In Kenya, agriculture accounts for about a third of Gross Domestic Product (GDP); 76% of the population live in rural areas; agriculture employs 85% of the rural labour force which has been growing at 3.5% while agriculture has been growing at 2.6% (World Bank, 1991; GOK, 1993). 70% of Kenya's merchandise exports are agricultural which mostly come from industrial crops; and 33% of manufacturing sector output is based on agricultural products (Pearson, 1995). Because of

agriculture's contribution to total output and employment, for sometimes to come, attempts to im prove living standards must give particular attention to increased incomes and productivity in the agricultural sector. Enhancement of agricultural productivity is thus an important condition in alleviating rural poverty, and increasing household food security and stimulating growth in farm activities. Unfortunately, there is limited household-level information available in Kenya to allow planners, policy makers and donors to make a comprehensive assessment of the factors that determine industrial crop productivity in Kenya.

1.1.2 Industrial Crops in Coastal Region of Kenya

The Kenyan coast region is composed of six counties namely, Mombasa, Kwale, Kilifi, Tana River, Lamu and Taita Taveta. The region has a long history of economic activity, with a distinct differentiation by ethnic group. Swahili traders have been occupying the coastal towns for several centuries, while the nomadic pastoralists roamed the semi-arid hinterland. In between those two groups, the agriculturalists of the Mijikenda tribe settled in a band along the coast about 400 years ago (Waaijenberg, 1994). Until the 19th century, they lived in nine *makaya* or fortified villages on top of wooded hilltops, growing sorghum, millets, and cowpea. During the 19th century, they left the *makaya* to settle on the uplands and plateaus, and adopted maize, rice, and cassava as staple foods. At the end of the 20th century, the Mijikenda were still the most important group within the agriculturalists. Although agriculture is still their main economic activity, it has changed drastically (Waaijenberg, 1994).

The coastal region has enormous potential in all agricultural enterprises. The region is endowed with 3.3 million hectares of arable land and an irrigation potential of 190,000 hectares. Also 80% of the province has potential for ranching and non-conventional livestock production. It points at areas of great potential waiting to be fully exploited. For example, while the region has a potential to produce 660,000 metric tons of coconut worth 13 billion shillings annually, the

current production is only 162,000 metric tons worth 3.2 billion shillings (GOK, 2010). The region has a potential to produce 64,000 metric tons of cashew nuts worth 1 billion shillings but the current production is only 10,000 metric tons worth 265 million shillings. The region has also potential for mango production. Mango trees occupy 8,230 Ha which is 54% of the national acreage under the crop. Production costs are Kshs. 256 million while export values are Kshs. 150 million(GOK, 2010), meaning more mangoes are consumed locally or go to rot as there is only one fruit processing plant at Mtwapa. The same scenario is true for pineapples, citrus, bixa and other horticultural crops. Oil crops such as sunflower, cotton, simsim, groundnuts and macadamia nuts can also be produced so are emerging crops such as Jatropha, Aloe Vera and vanilla which all grow well and need to be promoted for production of bio-diesel from Jatropha and for pharmaceutical, cosmetic and food processing industries.

In addition to these industrial crops, the province produced a total of 609,000 bags of maize valued at 1.4 billion and 143,264 metric tons of cassava worth 1.3 billion shillings in 2008. This production is far below the requirement; hence the region is a net importer especially of all cereals (GOK, 2010).Overall, farmers in Coast region earned 7.8 billion shillings from various crops in 2008. Yet it is known that the opportunities to earn a lot more are enormous. Hence the Ministries of Agriculture, Livestock and Water together with the Coast province leadership must devise ways and means to harness the unutilized potential for the benefit of this region.

1.2 Problem Statement

The Coastal Region of Kenya has potential for the growth of industrial crops including but not limited to bixa, coconuts, cashew nuts, cotton, sugarcane, mango and recently jatropher. These crops have the potential of turning around the rural economy of this region. However, industrial crops farming and production has continued to be on the decline in the region. According to the

Kenya Integrated Household Baseline Survey (KIHBS, 2006) the coast region is among the poorest in Kenya with 75% of its population living below poverty line (CBS, 2006). The collapse of major agribusiness industries such as Kilifi Cashew Nut, Ramisi Sugar Factory, Malindi Cotton Ginnery, Miritini KCC among others made the situation even worse. This is indication of crisis facing the coastal region. The fact is that the marked decline of key institutions is an important dimension of the crisis facing the coastal region. It is not simply that desirable institutional development may not yet has taken place, but rather that a number of previously able and functioning institutions are now losing their effectiveness.

The major industrial crops cover 18% of cultivable lands in coast region. They generate farm level revenues in excess of Kenya shilling 3 billion and provide an income for tens of thousands of smallholders, as well as contributing to national import substitution exports (FAO, 2004). For example the region has a potential to produce 660,000 metric tonnes of coconut worth 13 billion Kenya shillings annually by growing hybrid coconut varieties while the current production is only 162,000 metric tonnes (Masha, 2010). The importance of industrial crop in coast region must not be underestimated as it is a labour-intensive sector in which most of these counties can enjoy a comparative advantage, particularly relative to industry. A vigorous growth in agricultural production and exports is an absolutely essential condition for the creation of significant employment and earning opportunities for the rural poor in the region.

The study therefore did evaluation of the challenges facing industrial crop farming in the coastal region of Kenya and recommended possible interventions to reverse this decline trend.

1.3 Objectives of the Study

The main objective was to evaluate the challenges facing industrial crops farming in the coastal region of Kenya.

1.3.1 Specific Objectives

The study sought to achieve the following specific objectives;

i. Identify the industrial crops available in the coastal region.

ii. Assess key requirements to successful industrial crop farming.

iii. Conduct comparative analysis and identify the gap in industrial crop farming at the coastal region.

iv. Assess interventions to industrial crop farming at the coastal region.

1.3.2 Research Questions

The study sought to answer the following research questions;

i) What are the industrial crops available in the coastal region of Kenya?

ii) What are the key requirements for successful industrial crop farming?

iii) What is available versus what is required for successful industrial crop farming at the coastal region of Kenya?

iv) What are the best interventions for successful industrial crop farming in the coastal region of Kenya?

1.4 Significance of the Study

This study is significant to stakeholders such as managers of industrial crop industries, government policy makers, academia, plant breeders, economists and the general public. The identification of the challenges facing industrial crops farming in the coastal region should result in a portfolio of solutions suitable for the coast region and help in mapping the most suitable strategies to be derived from these crops and meet the future needs of consumers and industry in the region.

1.5 Assumptions of the Study

Whereas there were many industrial crops in the coastal region of Kenya, the challenges facing their farming across the region can be generalized.

1.6 Scope of the Study

The study focuses on the challenges facing industrial crops in the six counties of the former coast province namely, Mombasa, Kwale, Kilifi, Tana River, Lamu and Taita Taveta. The crops whose challenges were considered includes, Bixa, Coconuts, Cashew nuts, Cotton, Mango and Jatropher.

1.7 Limitations of the study

The study was on challenges facing industrial crops (Bixa, Cashew nuts, Coconuts, Cotton, Mango and Jatropher) farming in the coastal region of Kenya which comprised of the following Counties; Mombasa, Kwale, Kilifi, Tana River, Lamu and Taita Taveta. The study therefore was not generalised for other crops grown in the region other than industrial crops neither was it also generalised for industrial crops grown outside the region.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter presents the past studies that were done and theories advanced on challenges facing industrial crop farming in the coastal region of Kenya. The chapter includes the theoretical review empirical literature review; Conceptual framework critical review, summary and the research gaps that were filled by the study.

2.1 Theoretical Review

A project has to be economical viable for it to attract capital expenditure. Economical viable is a complex issue which is affected by social, environment and economic factors in the locality. The global market for a product and free trade further affects the economic viability of the project. According to Esterhuizen, (2006) globalization and technology are rapidly changing trends in the consumer behaviour and impact heavily on the way agricultural business are conducted. Agricultural production is changing from an industry dominated by subsistence based to small scale farms to larger industrial crop farming. This has aligned across agricultural production and distribution value chain across the sector and beyond.

Economically viable developments projects should be sustainable meaning that they meet the needs of the present without compromising the ability of the future generations to meet their own needs (World Commission on Environment and Development, 1987). Also viable projects should always have a higher benefit cost ratio. Hence sustainable industrial crop farming should produce enough products for the present generation but still conserve the land productivity for the future generation. According to Miller, (2000) one of the strategies would be to reduce inputs in industrial agricultural production which will lead to control on land degradation from soil erosion, leaching and acidity. This will results optimal yields with minimized production cost as well as minimized potential environmental pollution. Agriculture plays an important role in

economic development in the coastal region of Kenya though has continued to perform poorly due to various constraints. The poor performance has been widespread. According to the Strategy for Revitalising Agriculture (SRA) (GOK, 2004a) factors that continue to constrain the growth of agriculture include: Inappropriate legal and regulatory framework: An outdated legal and regulatory framework serves only to constrain agricultural development, trade and effective competition. Liberalization was not accompanied by appropriate legal and regulatory framework.

Low absorption of modern technology: Use of modern science and technology in the production of industrial crops is still limited, although Kenya has a well-developed agricultural research infrastructure. While lack of affordable credit has contributed to this situation, equally important is the inadequate research-extension-farmer linkages and lack of demand-driven research.

Inadequate markets and infrastructure: Agricultural marketing information and infrastructure are poorly organized and institutionalised. The domestic market is small and fragmented and lacks an effective marketing information system and infrastructure. The dependence on a few external market outlets makes agricultural exports very vulnerable to changes in the demand of agricultural products and unexpected imposition of non-trade barriers by foreign markets.

Kenya's main industrial crops are tea, coffee, sugar cane, cotton, sunflower, pyrethrum, barley, tobacco, sisal, coconut, cashew nut and bixa, all of which contribute 55 % of agricultural exports (GOK, 2010). The production of these industrial crops has remained low despite large unexploited potential with enormous capacity to improve living standards in rural setups.

However, this research shall only be concentrated in the analysis of the economic potential and assess of challenges facing industrial crop farming in the coastal region of Kenya.

2.2 Empirical Review

The process of globalisation and industrialisation has created opportunities for smallholder farmers to produce wide range of high value crops. However there is a possibility that this will exclude farmers from high value markets. According to many scholars (Boehjlje,2000; Drabenstott,1995; Sofranko, frerichs, Samy and Swanson,2000) have argued that the most dramatic changes in agriculture are taking place in terms of changes in agricultural in the fundamental business proposition and agricultural industrialisation. The new life styles of consumers in wealthy countries along with shifting demographic and growing appreciation for the link between diet and health have contributed to different eating patterns. As a results processors and marketers have engaged in more directly channels in production, full ownership and vertical integrations (Kirsten & Sartorius, 2004).

In Africa, according to Rukuni, (1999) observed that there is prima facie evidence that key agricultural organisation-research, extension, training, finance, marketing and land reforms are not functioning as a well oiled system. These prime movers need to be developed as a package because it has been shown that no single factor is sufficient to get agriculture moving. On the other hand in his research, Eicher, (1994) pointed out that to develop these prime movers sub Saharan countries need to invest in human capital, agricultural research, capital formation and rural institutions. In Kenya according to Egerton University Tegemeo Institute of Agriculture and Policy, (2002) the administrative boundaries had some extend of industrial farming based on type of crop that was found in the region. This has led government programmes to be designed in a manner that is tailored for different geographical locations of agricultural activities.

Although Kenya has a well-developed agricultural research system, use of modern science and technology in agricultural production is still limited. Inadequate research–extension–farmer linkages to facilitate demand-driven research and increased use of improved technologies

continue to constrain efforts to increase agricultural productivity (GOK, 2010). According to Chambers, (1987) on agricultural research for resource-poor farming technology and farming system, the country's agricultural resource base should be increased and improved through developing diversified, demand-driven crop varieties; intensively applying appropriate technologies; and expanding use of irrigation systems in agricultural production. To achieve this research–extension links should be strengthened to ensure demand-driven research and effective application of research technologies on the farm. In addition, the private sector should be encouraged and supported to invest in agricultural production at all levels of the supply chain from farming, research and extension to processing and marketing.

Agricultural research in Kenya faces a number of other policy analytic questions. One is how to make the public funds available to agricultural research have the greatest impact. According to Huffman & Just, (1999) one way is to limit public expenditure to those lines of research with a high public good component and externalities. Lines of research where the outputs of research can be captured in a marketable commodity and the beneficiaries can be targeted and made to pay, should move towards research on contract, or have beneficiaries contributing to the costs of research. Nyikal, (2007) in financing small holder agricultural production in Kenya however argues that for the use of research funds for poorer areas or people on the strength of a poverty alleviation or equity agenda needs to be looked at critically as there are more efficient and direct ways of achieving the same result. Agricultural research work at the coastal region needs to be driven by their special needs. While that may be an issue for government rather than KARI, the entire public sector can benefit from this experience in trying to improve efficiency in the use of public funds. The move toward decentralization and devolution of decisions about how funds are to be used is aimed at solving this welfare-reducing problem that leads to inefficient resource allocation. According to Huffman and Just, (1999) in the role of crops and credit cooperatives in

rural landing, the use of the Agricultural Research Fund (ARF) is to help bring the universities in particular into agricultural research. 57% of proposals, 66% of proposals accepted, and 74% of funds awarded have gone to the universities. Top quality agricultural researchers take upwards of ten years of post-secondary education training to produce. The quality of their training, beginning at the undergraduate level, determines how good they can become. This suggests that some of the funds earmarked for agricultural research should be invested in developing agricultural and science departments in local universities. The agricultural researchers of 2010 already are in the university pipeline but lack some of the basic tools needed to be competitive.

The industrial crops development subsector is predominantly characterized by small-scale farming, mainly in the high-potential areas according to Alila & Atieno, (2006) in agricultural policy in kenya. Small-scale farming in Kenya accounts for 75% of the total agricultural output and 70% of marketed agricultural produce. Small-scale farmers produce over 70% of maize, 65% of coffee, 50% of tea, 65% of sugar, and almost 100% of the other crops. Production is carried out on farms ranging in size from 0.2 to 4 ha, for subsistence and commercial purposes. The use of improved inputs such as hybrid seed, fertilizer and pesticides or machinery is low. Increased productivity is possible in smallholder farming, but it will require concerted efforts to encourage farmers to adopt modern farming practices. Large-scale farming is practised on farms averaging 50 ha. It accounts for 30% of marketed agricultural produce according to Mureithi, (2008) in coffee in Kenya-some challenges for decent work. Large-scale farmers mainly grow tea, coffee, horticultural crops, maize and wheat. Sustained high inputs and good management practices have ensured that these farmers have higher yields than their small-scale counterparts. Great potential exists in the crops and land development subsector to realize high-quality crop production.

The Government of Kenya has outlined strategies aimed at reviving the country's cotton subsector which has been on the brink of collapse following the liberation of the textile industry (CBK, 2000). It has laid down strategies to revive the textile industry in an effort to reduce poverty levels especial in the growing areas. To achieve this it has addressed the issues of production, marketing, and reviews the present regulations on the management of Cotton Act and establishment of a new regulatory body. According to Waithaka, (2009) invest in the growing and ginning of cotton in Kenya, Investors have the opportunity to be involved in the growing and ginning of cotton which has been identified as a subsector that could help bring rapid economic development in the coastal region. However the cotton subsector has been picking up recently but at a slow rate according to Mastenyi, (2011) in the challenges slowing Kenya cotton industry. While Mulama, (2007) in helping cotton sector turn over a new leaf observed that the once flourishing subsector still has a lot of obstacles to overcome to increase the supply and modernize the ginneries.

Kenya coconut farmers have never had a chance to grow hybrid coconut varieties according to Masha, (2010) in coconut characteristics work plan in kenya. The Kenya Coconut Development Authority in collaboration with other research institutions had started researching on new varieties to improve on the production of the crop. This would require heavy funding from the government, private sector and donors apart from waiting for a long period of time before the new high yielding varieties will be out to the farmers. The region has a potential to produce 660,000 metric tonnes worth 13 billion shillings annually while the current production is only 162,000 metric tonnes. According to baseline survey report Githende, Odhiambo and Masinga, (2007) the coconut survey was formulated to take a census format. The main methodology used in undertaking the exercise was largely quantitative. The findings identified that the coconut sub-sector continue to be embroiled and held back by legality questions and lack of research and

development. The survey concluded that the sub sector is more driven by the wine and unless there is a clear legality stand point in this product, development in this subsector will always be clandestine with no proper structures and business support systems.

An intensive cashew nut farming extension programme was launched in Mombasa in a new initiative to revive the crop at the Coast (MOA, 2005). 90 front line extension workers received technical and extension kits to work with 200 families with an average of 50 cashew nut trees each to enhance production by 5-6 kilograms of nuts per tree. This would translate into an extra 5000 tonnes of production. However the GOK have shelved plans to constitute a board that would run the cashew nut industry which is very important according to Kithi, (2006) in epitaph unnecessary for cashew nut industry .The current cashew nut production stand at 10,000 metric tonnes worth 265 million shillings while the region has a potential to produce 64,000 metric tonnes worth one billion shillings annually.

Kenya is a world leader second to Peru in the production of bixa, an industrial crop that does very well in the coastal region (MOA, 2008). The major production areas are Kwale, Lamu and Kilifi. While there is enormous potential for the crop in the region, poor marketing channels and low prices of bixa has made farmers not to engage in its production as exemplified in 1999 when prices dropped from kshs110 per kilogram to kshs5. This demoralized many farmers and some replace it with other cash crops while some left unattended. Thus production of the crop in the region has been on the decline since then though the crop has a lot of potential in generation of income in the coast region (MOA, 2007).

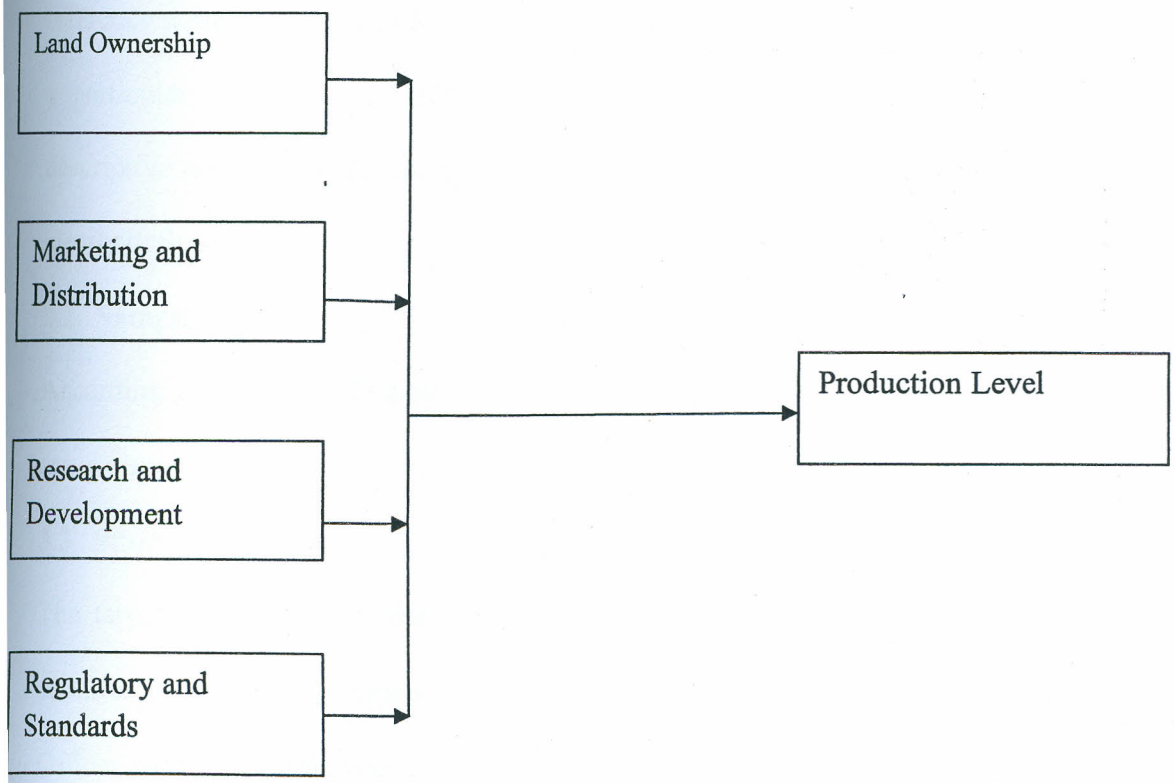
There have been a number of studies (Waithaka,2009; Mulama,2009; Masha,2010; Okolla,2002; Kithi,2006) that have been conducted on various industrial crops in Kenya. However in all of these studies none of this has done assessment of challenges facing Industrial crops farming in

the coastal region of kenya. This study therefore attempted to fill that gap in the lack of literature and stimulates further thought on the subject.

2.3 Conceptual Framework

The diagram below shows the study conceptual framework which illustrated the relationship between the variables of the study. The independent variables relates to the challenges facing industrial crops farming in the coast region of Kenya.

Figure 2.1 Conceptual Framework



Independent Variables **Dependent Variable**

Source: Researcher 2012

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

This chapter explains the method that was applied in carrying out the study. The chapter covers the following sections: Research design; target population; sampling frame; sample and sampling technique; instruments; data collection procedure; pilot test and data processing analysis.

3.1 Research Design

The research design selected for the study was descriptive survey. The study considered this design as appropriate since it facilitated gathering of reliable and accurate data that clearly accessed the challenges facing industrial crops farming in the coastal region of Kenya. Descriptive survey can be adopted to collect information for any population that can be used as reference point according to Kothari (2004) it is concerned with describing the characteristics of a particular individual or groups while Mugenda & Mugenda (2003) further argued that descriptive research is appropriate for studies that have specific issues where a problem has been clearly defined.

3.2 Sampling Size

According to Gay, (1981) a sample size of ten percent (10%) of the population is adequate to serve a study sample.

3.3 Study Population

The target population for the study consisted of industrial crops farmers from the different counties in the coastal region. The list of the farmers was obtained from District Agricultural Offices where a sample was drawn using stratified and random sampling methods.

Table 3.1 Study Population

Category		Target Sample
Farmers	Bixa	500
	cashew nuts	500
	Coconut	500
	Mango	500
	Cotton	500
	Jantropher	20
Total		**1020**

3.4 Sampling Technique

The study used stratified and random sampling methods. The goal of using these methods was to achieve a desired representation from various subgroups in the population.

3.5 Data Collection Method

The study collected both primary and secondary data. Primary data was gathered using structured and unstructured questionnaires. The questionnaires were prepared in simple and understandable language relating to the objectives of the study. It was worded in such a way that it did not led the respondent or presupposed the answer (Polonsky & Waller, 2005). The information obtained from questionnaires was free from bias and researcher influence and thus accurate and valid data was gathered. Secondary data was gathered from past published scholarly articles. All the respondents were assured of confidentiality and security in dealing with their responses.

3.6 Pilot Test

A pilot study was conducted to test reliability of the questionnaires. Pilot test was necessary for testing the reliability of instruments and the validity of a study (Sekaran, 2003). It was conducted to detect weakness in design and instrumentation and provided proxy data for selection of sample (Cooper & Schindler, 2006). This involved selection of 3 respondents from each stratum and issued them with the questionnaires where their responses were checked against the research objectives. Based on the feedback from the pilot test, the questionnaire was modified and a final one developed.

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.0 Introduction

This section expounds on the analysis and findings of the study. The results presented were expounding on evaluation of challenges facing industrial crops farming in the coastal region of Kenya. The data collected was gathered through questionnaires as the research instrument. In some areas oral interview was used to ensure accurate information was captured in the questionnaire. Likert type of questions was included whereby respondents indicated the extent to which the variables were practiced in a five point scale.

4.1 Response Rate

The study targeted 100 farmers who were the respondents of the data collected drawn from different cadre of industrial crop farmers. This was categorised to capture all the types of industrial crops intended to be researched. From the study, 63 out of 100 targeted respondents filled in and returned the questionnaire.

4.2 Type of Industrial Crop Grown

Table 4.1 Types of Industrial Crops Grown

	Frequency	**Percent %**
Coconut	19	32
Mangoes	13	22
Cotton	5	08
Cashew nuts	11	18
Bixa	7	12
Jatropher	5	08
	63	**100**

From the response above depict that 32% of farmers around the coast grow coconut, whereas 22% Mangoes, 08% Cotton, 18% Cashew nuts, 12% Bixa and 08% Jatropher. It was evident from the respondents that those who had educational background had better decision in terms of what industrial crops to grow and the implication in terms of profit expected versus the sales volumes, whereas the respondents with less than O-level education had a similar characteristic if they have been employed in the farms they are working on, seeing the crop through from planting to harvesting. This clearly depicts the role education plays in ensuring the people move from subsistence farming to commercial farming majoring on industrial crops to improve their livelihoods and reduce poverty levels as well as promoting the respective agro based industries.

4.3 Land Accessibility Challenges

Table 4.2 Land Accessibility Challenges

	Measure	Frequency	Percentage
Accessibility of land title and ownership	Ancestral	56	88%
	Acquired Title	32	50%
Arable land	Below 50%	38	60%
	Over 50%	25	39%
Size of Land Needed for Industrial Farming	Below 5 Acres	18	29%
	Above 5 Acres	45	71%

The findings from the respondents showed that 88% of farmers' have engaged in agricultural activity in their ancestral land and that only 50% had title deed. This shows that the number of locals who grow industrial crops is limited to those with title deed as a driving force. Despite owning land most of the farmers cannot engage in legal partnerships with either financial institutions or industries to engage in expansive large scale farming since more than half have no title deeds. 60% of farmers believed that their farms are below 50% arable whereas 39% believed their farms were over 50%. This is directly related to the climatic condition and the type of soil found around the coastal region.

There is a relationship between the size of farms and the farming activities in the coastal region. Farmers with less than 5 acres who comprise of 29% do not undertake industrial crop farming

since they believe that it is not viable because of the size of their farms whereas 71% of the respondents believed that anyone with more than 5acres of land is suitable to engage in industrial crop farming.

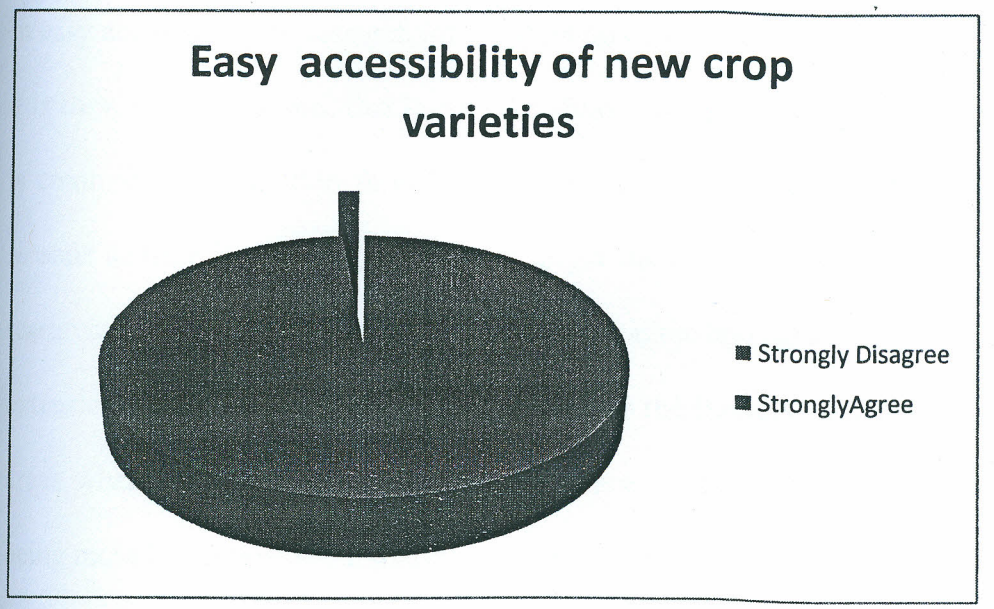
4.4 Research and Development

4.4.1 Accessibility of New Industrial Crop Varieties

Table 4.3 Accessibility of New Industrial Crop Varieties

	Measure	Frequency	Percentage
Easy accessibility of new crop varieties	Strongly Disagree	42	67%
	Strongly Agree	21	33%

Fig 4.1 Easy Accessibility of New Crop Varieties



Accessing crop varieties by farmers is a challenge since 67% strongly disagree that it is easy, whereas 33 % respondents agree that it is easy.

4.4.2Accesibility of Research Information on New Industrial Crops

Table 4.4 Accessibility of Research Information on New Industrial Crops

	Measure	Frequency	Percentage
Easy Accessibility of research information on new crops	Strongly Disagree	24	38%
	Disagree	12	19%
	Strongly Agree	14	22%
	Agree	13	21%

In easy accessibility of research information on new crops, 38% of farmers strongly disagree that it is easy, citing examples that it can take almost two years for them to be aware a new crop that is commercially viable in farming in there region is available. Whereas 19% disagree giving reasons as time it takes for the farmers to get the information after it has been released by the researchers. 22% and 21% respectively strongly agree and agree citing availability of agricultural extension officers who convey the information to the farmers on time. However, it is clear that in areas where industrial crop farming is embraced, farmers are eager to new developments by being more inquisitive about market structures and information.

4.4.3 Easy Access to New Technology and Training

Table 4.5 Easy Access to New Technology and Training

	Measure	Frequency	Percentage
Easy access to new technology and training	Strongly Disagree	42	67%
	Agree	21	33%

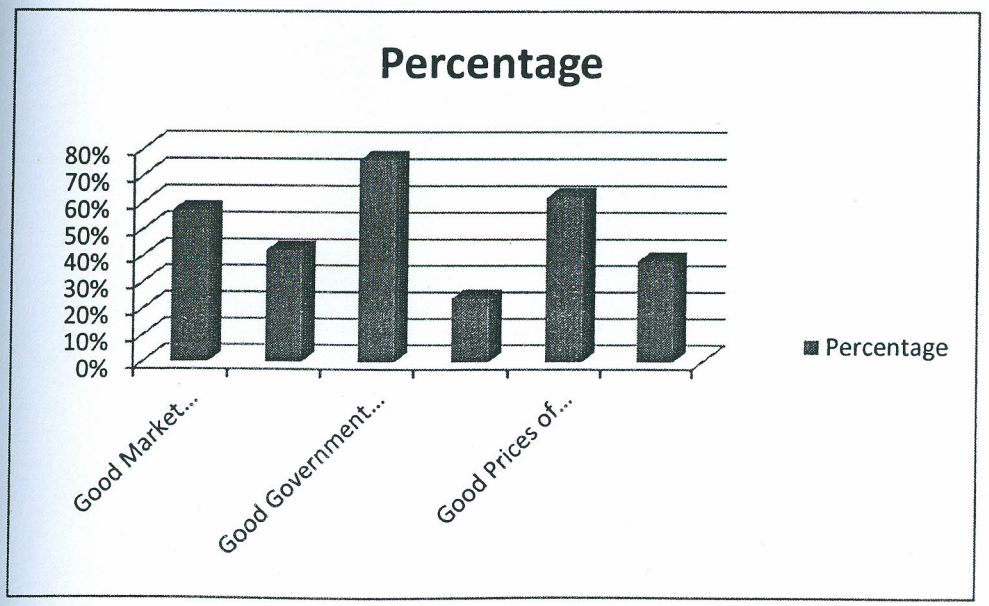
Even though other respondents acknowledged having received training on industrial crop farming, 67% strongly disagree with easy accessibility to new technology and training. Many farmers cite ignorance as one main challenge in improving their agricultural activities and expanding their farming activities to fully industrialisation, 33% of the respondents appreciated the role played by non-governmental organisations in helping farmers accessing new technologies and training on best farming practices. Though these services are only limited to the areas where the non-governmental organisations have projects leaving out bigger area uncovered. The respondents also commented on the government laxity to empower the farmers through training and introduction of new technology.

4.5 Marketing Challenges

Table 4.6 Marketing Challenges

	Frequency	Percentage
Good Market Accessibility	36	57%
	27	42%
Good Government Support	48	76%
	15	24%
Good Prices of products at farm gate	39	62%
	24	38%

Fig 4.2 Market Challenges



In marketing challenges 57% of respondents strongly disagree that there is good market accessibility, mentioning that most of their produce end up rotting at the farm level due to lack of good infrastructure. In some instances, the industrial crops grown targets oversee markets which is keen on the volumes and quality of produce to be harvested. Due to the nature of farmers being small scale, it needs a strong cooperative society to combine the farmers' effort so as to have strong negotiating power. On the other hand, 76% of farmers interviewed cited that they strongly disagree or disagree that there is good support from the government. This was in line with the activities of government extension officers and their role in ensuring that farmers get easy access to the market. In other line, the farmers believed that the government had let them down by exposing them to agents. On the other hand 62% of participants strongly disagree with the prices of products at farm gate, citing agents who are exploiting them by offering lower prices for the produce whereas 38% agree that the prices offered to them at the farm gate was good.

4.6 Regulatory Challenges

Table 4.7 Regulatory Challenges

	Measure	Frequency	Percentage
Easy availability of regulation of operation on farming activities	Strongly Disagree	35	56%
	Agree	28	44%
Easily assistance on standards for the case of export market	Strongly Disagree	49	78%
	Agree	14	22%
Rules and regulations affect farming operations	Strongly Disagree	32	51%
	Agree	31	49%

From the findings, 56% of the respondents cited difficulty in easily accessing rules and regulations on industrial crop farming activities thus strongly disagreeing, on the other hand 44% agreed having prior knowledge of information.78% of respondents strongly disagreed on knowing the quality standards required for the export market whereas 22% cited having easily known the quality standards required for the exported market from the agricultural extension officers and their own research. 51% of respondents know nothing about the rules and regulations affecting industrial crop farming operations whereas 49% of the respondents agreed to having known the rules and regulations that affect industrial crop farming operations. This response shows the relationship between the availability of operation regulations on industrial

crop farming activities and the assistance by the relevant authorities to make it known to the farmers who in this case were the respondents. In this regard, a higher percentage of respondents disagree on the part that asks if there is easy assistance to rules and regulations pertaining to industrial crop farming.

4.7 Current Status Versus Standard Status

Table 4.8 Current Status Versus Standard Statuss

CROP	BIXA	C/NUT	COCONUT	MANGO	COTTON	JA/ROPHA
STANDARD STATUS i)Land	5Acres	5Acres	10Acres	8Acres	3Acres	2Acres
ii)Market	20%	31%	52%	43%	12%	9%

Source: Ministry of Agriculture 2008

CURRENT STATUS i)Land	2Acres	3Acres	6Acres	5Acres	2Acres	1Acre
ii) Market	12%	18%	32%	22%	8%	8%
GAP						
i)Land	3Acre	2Acres	4Acres	3Acres	1Acre	1Acre
ii)Market	8%	13%	20%	21%	4%	1%

CROP	BIXA	C/NUT	COCONUT	MANGO	COTTON	JA/ROPHA
STANDARD STATUS i)Research and Development	70%	70%	70%	70%	70%	70%
i)Regulatory and Standards	80%	80%	80%	80%	80%	80%

Source: MOA/ABD 2009

CURRENT STATUS i)Research and Development	5%	5%	5%	5%	30%	50%
ii)Regulatory and Standards	65%	5%	5%	5%	60%	10%
GAP						
i)Research and Development	65%	65%	65%	65%	40%	20%
i)Regulatory and Standards	15%	75%	75%	75%	20%	70%

From the findings, 60% of farmers who engaged in bixa farming use 2 Acres for the crop, Cashew nut 3 Acres, Coconut 6 Acres ,Mango 5 Acres ,Cotton 3 Acres and Jathropher 1 Acre . These showed the discrepancy of the standard status of the crops in the region according to the

Ministry of Agriculture as stipulated in the table. However, the study also showed that the respondents strongly disagree with the matter of easy accessibility of market for their products. Most of the products have not fully utilised the availability of the market since the gap established showed that there was room for more production if the market is fully exhausted by the farmers. The researcher related this to the reserved usage of standard land and low production output.

From the findings, research and development in industrial crop farming is inadequate. For instance bixa crop has a gap of 65%, the standard status is 70% while the current research and development is only 5%. This means industrial crop farmers do not access quality planting varieties instead are recycling what they have in the farms. The same scenario is true for coconut, cashewnut and mango crops. Jathropha and cotton crops have been recently introduced in the market. For regulatory and quality standards, bixa and cotton have a gab of 15% and 20% respectively. Bixa end processed product is sold in the world market as food product hence are strictly in the quality standards while a stained cotton produce is rejected. Coconut, cashewnut and mangoes are consumed locally hence have low regulatory standards and end up with a gap of 75%.

4.8 Intervention

The study showed that the current production status of industrial crops covered are all below the standards, for instance in bixa crop current status is 2 acres, while production standard is 5 acres, showing a gap of three acres. While the rest of the crops show inadequacy of between 4 to 1 acres. This could be corrected by demarcating and issuing title deeds to the farmers who will then be able to access credit facilities from financial institutions.

The study showed that there is a high demand for all industrial crops meaning the current production status cannot satisfy the market demand, for instance, the market demand share for

bixa produce in the market is 20% while the current supply is only 12% showing a gap of 8%. The same scenario is true for all other industrial crops. Marketing information is very important to the farmers, the government can help farmers by providing market information for their produce by strengthening cooperative societies hence minimise the use of middlemen and agents who exploit the farmers.

The study also showed that information on new varieties and technology does not reach the farmers in time, this can be corrected by involving farmers in the research process at some staged thruogh holding of workshops, field days and training on the same. For regulatory standards and quality, it is only in two crops bixa and cotton where farmers are aware of quality standards because the end products are for export market while the other crops which are for local markets sales are not aware of quality standards. The government through Kenya bureal of standards should create awareness on certification on quality standards of farm produce to the industrial crop farmers through workshops, seminars and trainings. This would help farmers improve on quality standards of farm produce.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS.

5.0 Introduction

This chapter provides the summery of the findings from chapter four, and also it gives the conclusions and recommendations of the study based on the objectives of the study. The objective of this study was to evaluate challenges facing industrial crops farming in the coastal region of Kenya.

5.1 Types of Industrial Crops Grown

The findings depicted that 32% of farmers around the coast grow coconut, whereas 22% grow Mangoes, 08% Cotton, 18% Cashew nuts, 12% Bixa and 08% Jatropher. It was evident from the respondents that those who had educational background had better decision in terms with what industrial crops to grow and the implication in terms of profit expected and the sales volumes, whereas the respondents with less than O-level education had a similar characteristic if they have been employed in the farms they are working on, seeing the crop through from planting to harvesting.

5.2 Land Accessibility Challenges

In land accessibility challenges showed that 88% of farmers have engaged in agricultural activity in their ancestral land and that only 50% had title deed. This shows that the number of locals who grow industrial crops is limited to those with title deed as a driving force. Despite having land most of the farmers cannot engage in legal partnerships with either financial institutions or agro based industries to engage in expansive large scale farming since more than half do not have title deeds. Despite that, among those interviewed 60% believed that their farms are below 50% arable whereas 39% believed their farms were over 50% are arable. This is directly related to the climatic condition and the type of soil found around the coastal region. There is a direct

to the climatic condition and the type of soil found around the coastal region. There is a direct relationship between the size of farms and the industrial crop farming activities taking place in the coastal region, farmers with less than 5 acres who comprise of 29% do not undertake industrial crop farming since they believe that it is not viable because of the size of their farms whereas 71% of the respondents believed that anyone with more than 5acres of land is suitable to engage in industrial crop farming. This clearly showed that if agri-business is considered then there is a bigger number of farmers will benefit in the agricultural sub sector in the region.

5.3 Accessibility of Research Information on New Industrial Crops

In matters of easy accessibility of research information on new crops, 38% of farmers strongly disagree that it is easy. They cited that it could take almost two years for them to discover a new crop that is commercially viable in their region. Whereas 19% disagree giving reasons as time it takes for the farmers to get the information after it is released by the researchers. 22% and 21% respectively strongly agree and agree citing availability of agricultural extension officers who convey the information to the farmers on time. However, it is clear that in areas where industrial crop farming is embraced, farmers are eager to embrace new developments by being more inquisitive about market developments. This challenges the government to improve on research information dissemination on new industrial crops on time in the region.

5.4 Easy Access to New Technology and Training

Even though other respondents acknowledged having received training on matters relating to industrial crop farming, 67% strongly disagree with easy accessibility to new technology and training. Many farmers cite ignorance as one main challenge in improving their agricultural activities and expanding their farming activities to be fully industrialised. 33% of the respondents appreciated the role played by non-governmental organisations in helping farmers accessing new

technologies and training on best industrial crop farming practices. Though these services are only limited to the areas where the non-governmental organisations have projects, letting a bigger area uncovered. The respondents also commented on the government laxity to empower the farmers through training and introduction of new technology in the region.

5.5 Marketing Challenges

In marketing challenges 57% of respondents strongly disagreed that there is good market accessibility, mentioning that most of their produce end up rotting at the firm level due to lack of good infrastructure to take the produce to the market. In some instances, the industrial crops grown targets oversee markets which is keen on the volumes and quality to be harvested. Due to the nature of farmers, most who are small scale, it requires a strong cooperative society to combine the farmers' effort so as to have strong negotiating power. On the other hand, 76% of farmers interviewed cited that they strongly disagree or disagree that there is good support from the government. This was in line with the activities of government extension officers and the role played by the government in ensuring that farmers get easy access to the market after harvesting their produce. In other line, the farmers believed that the government had led them exposed to agents who exploit them. On the other hand 62% of participants strongly disagree with the prices of produce at farm gate, citing agents who are exploiting them by giving them low prices for the produce at farm gate whereas 38% agree that the prices offered to them at the farm gate was good. There was also a relationship between level of education and those who strongly disagree with most of the marketing challenges showing that those who were educated believed they could do better than the current market status quo whereas those with less education agree with current market situation.

5.6 Regulatory Challenges

From the findings it showed that 56% of the respondents cited difficulty in easily accessing rules and regulations on industrial crop farming activities thus strongly disagreeing, on the other hand 44% agree having prior knowledge of availability of operation on industrial crop farming activities. 78% of respondents strongly disagreed on knowing the quality standards for the case of export market whereas 22% cited having easily known the quality standards for the export market from the agricultural extension officers and their own research. 51% of respondents know nothing about the rules and regulations governing industrial crop farming operations whereas 49% of the respondents agreed to having known the rules and regulations that governs ndustrial crop farming operations. This response shows the relationship between the availability of operation regulations on industrial crop farming activities and the assistance by the relevant authorities to make it known to the farmers who in this case were the respondents. In this regard, a higher percentage of respondents disagree on easy assistance on the rules and regulations governing industrial crop production in the coastal region.

5.7 Conclusion

From the study the locals who grow industrial crops do it in their ancestral land. This has hindrance in agribusiness as a result of lack of financial support from financial institutions from indigenous farmers. Despite having land most of the farmers cannot engage in legal partnerships with either financial institutions or industries to engage in expansive large scale farming since more than half do not have title deeds. There is a direct relationship between the size of farms and the farming activities taking place in the coastal region, farmers with less than 5 acres who do not undertake industrial crop farming since they believe that it is not viable because of the size of their farms whereas some respondents believed that anyone with more than 5acres of land

is suitable to engage in industrial farming. This clearly showed that if agri-business is considered then a bigger number of farmers will benefit in the agricultural sub sector in the coastal region.

From the study there is a relationship between the availability of operation regulations on industrial crop farming activities and the assistance by the relevant authorities to make it known to the farmers who in this case were the respondents. In this regard, a higher percentage of respondents disagree on the part that asks if there is easy assistance.

There was a relationship between level of education and those who strongly disagree with most of the marketing challenges showing that those who were educated believed they could do better than the current market status quo whereas those with less education somehow agreeing with current market situation.

5.8 Recommendations

The study recommended that government should issue title deeds to industrial crop farmers in the region. This would help them access credit facility from financial institutions thereby increase industrial crop acreage.

In marketing the government should support farmers cooperative societies in the region. This will market farmers produce and avoid exploitation by agents and middlemen. The farmers through their societies will access marketing information for their produce.

The government agencies dealing with research such as KARI should involve farmers through seminars, workshops and field days. This will easily disseminate new technology and information to the farmers.

The Kenya bureau of standards should create awareness on certification of quality standards of farm produce through seminars, workshops and field days. This would help farmers improve on quality of their produce

The study recommended further research to be done on industrial crop farming in the coastal region of Kenya.

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APPENDICES:

Appendix 1: Introduction Letter

Stephen Tembo Gambo ,

P.O. Box 1444 80200,

Malindi.

Tel; 0720-837799

TO WHOM IT MAY CONCERN

Dear Sir/Madam

RE: REQUEST FOR PARTICIPATION IN A RESEARCH STUDY

I am an MBA student at Kenyatta University, Mombasa Campus. My area of specialization is Project Management. I am currently undertaking a research on "Challenges Facing Industrial Crops Farming in the Coastal Region of Kenya"

I would be grateful if you could spare some time and complete the enclosed questionnaire. All the information provided will be used purely for academic purposes only and will be treated with utmost confidentiality.

Thank you for your co-operation

Yours faithfully,

Stephen Gambo

Kenyatta University Student

Appendix 11: Questionnaire

Please tick in the spaces provided below.

Section 1: General Information

1) Name of the farmer.....

2) Gender Tick Male [ ] Female [ ]

3) Level of Education Tick University [ ] O Level [ ]

Others [ ]

4) Occupation Tick Employed [ ] Self Employed [ ]

5) The County Located.....County

6) The Industrial Crops Grown Tick

i) Coconut [ ]

ii) Cotton [ ]

iii) Mango [ ]

iv) Cashew nut [ ]

v) Bixa [ ]

vi) Jatropher [ ]

vii) Others (Specify).....

This section looks at the challenges on the land related issues

Section 2: Land accessibility challenges

	Factors	Strongly Agree	Agree	Disagree	Strongly Disagree
1	Easy accessibility of title				
2	Easy accessibility of ownership				
3	Easy access to communication net				
4	Below 50% is arable land				
5	Over 70% of land is arable				
6	Industrial farming need above 5 acres				
7	Industrial crop farming does not requires land size of above 5 acres				

This section covers on the challenges the farmers face on research and development

Section 3: Research and Development

	Factors	Strongly Agree	Agree	Disagree	Strongly Disagree
1	Easily accessibility of new crop varieties				
2	Easily accessibility of information on new crop				
3	Easily accessibility on research information				

4	Easily technology transfer from agent to the farmers				
5	Easy access to acquire new technology in the market				
6	Easy accessibility on the training of new technology				

This section covers on the challenges related to standardisation on the farm produce by KEBS and ISO Certification requirements by the international markets

Section 5: Regulatory challenges

	Factors	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**
1	Easily availability on regulation of operation on farming activities				
2	Rules and regulations affect farming operations				
3	Easily available information on standards required on each crop				
4	Easily assistance on standards for the case of export market				

This section covers challenges on the marketing of the farm produce both locally and for export

Section 4: Marketing challenges

	Factors	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**
1	Good accessibility of market				
2	Easy availability of market information				
3	Add value to produce before sale on the market				
4	Good support from government extension officers				
5	Good support from Non Governmental Officers				
6	Good prices at the farm gate for produce				
7	Easily communication systems on marketing network				

Section 7:

What measure do you think needs to be taken to improve on the industrial crop production?

_____

_____

_____

_____

_____

_____

Section 8

Please list and discuss any other challenges you face apart from the above mentioned on industrial crop farming.....

.....

.....

.....

Appendix 111: Research Time Schedule

Activity/Time	January – February	March	April	May	June
Proposal					
Proposal presentation/defence					
Data collection					
Data analysis					
Report writing					
Defence of project					

Appendix 1V: Budget Estimates

No.	Item	Estimated Cost (Ksh)
1.	Stationery	10,000.00
2.	Airtime	3,000.00
3.	Research Assistants	18,000.00
4.	Typesetting	5,000.00
	Total	**36,000.00**