EFFECTS OF CONTRACTUAL ARRANGEMENTS ON PASSION FRUIT PRODUCTION BY SMALL HOLDER FARMERS IN EMBU DISTRICT, KENYA

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A Thesis Submitted to Graduate School in Partial Fulfilment of the Requirements for the Award of the Degree of Master of Science in Agricultural Extension of Egerton University.

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ABSTRACT

Development agencies such as the World Bank and USAID have been enthusiastic in their support for contract farming as a way to promote smallholder development. A major passion fruit programme, Kenya Business Development Service programme, was started in Embu District in 2003 to promote the production of passion fruit as a high value crop among smallholder farmers. Despite production of the crop through contractual arrangements, production is fairly low compared to enormous demands for passion fruit in both domestic and export markets. The study intended to investigate the effects of contractual arrangements on passion fruit production in Embu District. The study design employed was an *ex post facto*. A structured questionnaire was used to capture information relating to contractual arrangements, quality of the produce, risks and incentives for the parties involved and production technologies applied in passion fruit production. The population comprised of 1,200 contracted and non contracted passion fruit farmers. Data was obtained from a random sample of 120 households obtained through proportionate stratified sampling. To ensure validity, the instrument was reviewed by experts from Department of Agricultural Education and Extension of Egerton University. To ensure reliability, the instrument was pilot tested using a random sample of 10 contracted and 10 non contracted passion fruit farmers in Kyeni Division. Data was analyzed and summarized using SPSS. Specifically, descriptive statistics included means and percentages; inferential statistics involving Chi square, ANOVA and t-test at 0.05 level of significance. The study results indicated that 35% of the respondents were contracted through informal arrangements while, 31.7% through formal contractual arrangements. The results also indicated that contracted passion fruit farmers reported significantly higher yields than non contracted farmers. Further, the study findings indicated that provision of selected contractual support services significantly influenced adoption of new technologies. The study also found that contractual arrangements significantly contributed to the improvement of quality of passion fruit produce. However, passion fruit production through contractual arrangements was faced by diverse challenges ranging from contract breach, limited input support and presence of pests and diseases. In conclusion, contractual arrangements enhanced passion fruits productivity through provision of contractual support services. The study recommends that contracting firms and farmers should enter into formal contractual arrangements in order to build a long term business relationship based on a written agreement.

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LIST OF ACRONYMS AND ABBREVIATIONS

ANOVA	: Analysis of Variance
KBDS	: Kenya Business Development Service.
EAGL	: East African Growers Ltd.
EurepGap	: Euro Retailer Produce Good Agricultural Practice
FAO	: Food and Agricultural Organization
KHDP	: Kenya Horticultural Development Programme
KHE	: Kenya Horticultural Exporters
MLSP	: Market Linkage Service Providers
NABARD	: National Bank of Agriculture and Rural Development
NIE	: New Institution Economics.
SPSS	: Statistical Package for Social Sciences
TCE	: Transaction Cost Economics.
USAID	: United States Agency for International Development

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Contract farming represents an important and growing form of agricultural production around the world. It can be traced back to the 19th century when it was used in the United States of America for processing crops such as sugar beets and peaches. Its use later expanded into many food and fibre sectors (Kirsten and Sartorius, 2002). In Taiwan, contract farming was used for sugar production under the Japanese colonial rule (Runsten and Key, 1996; Rehber 1998; Warning and Woo, 2000). In Brazil, 75% of poultry production is coordinated via contracts (UBA, 2005), whereas in Vietnam, there are indications that 90% of cotton and fresh milk, 50% of tea and 40% of rice are purchased by enterprises through contracts (Arthur, 2005).

Evidence on the recent emergence of contracting is also available from India (Singh and Asokan, 2005; Anon 2003). Agricultural products produced or marketed under contract in China have grown from small-quantity locally specialized products, such as food, oil and vegetables, to bulk commodities such as corn, beans, rice and wheat (Guo *et al,* 2005). All the cotton and tobacco produced in Mozambique and Zambia is done through Contract Farming. Kenya has one of the most extensive contract farming history in Sub-Saharan Africa, covering over a million farming households involved in the contract production of tea, sugarcane, coffee, tobacco, flowers, fruits and vegetables. Coffee, tea and sugarcane constitute the biggest contract schemes, involving nearly 600,000; 360,000 and 100,000 smallholders, respectively. By 2002, contract farming accounted for 60% of tea, 60% of sugarcane and 80% of tobacco production in Kenya (Ochieng, 2005a).

Small-scale farmers often face difficulties in production and marketing of their produce. They usually sell their produce individually at the farm gate to middlemen or on local markets at given prices. This reduces farmers to price takers, irrespective of the costs they incur in the production and marketing process. On the other hand, processors often are not able to procure the quantity and quality of the product they are looking for. Contract farming is a possibility to improve such a situation. The provision of credit, inputs and access to markets motivate farmers to carry out the production process. This relationship can therefore, be used to help the nation realize

reduction of poverty in rural areas where most people face declining output and low production process (Kariuki, 2003). According to FAO (1999), the inherent uncertainty in the output market has been the prime mover towards contractual arrangement between smallholder farmers and exporter firms.

Development agencies such as the World Bank and USAID have been enthusiastic in their support for contract farming as a way to promote smallholder development. Contracting helps in ensuring market to farmers, thus this security can increase motivation to work harder and give an incentive for investments in better crop husbandry, hence increased productivity (Kathrin and Heike, 2006). However, as Glover (1987) suggests, there have been few rigorous empirical studies that would justify contract farming as the panacea some claim it to be. Insufficient attention has been paid to the possible problems contract farming may pose for smallholders or to its possible limitations. To increase rural household income, raise smallholder productivity, widen market outlet, facilitate vertical and horizontal linkages and promote sustainable development of business services, USAID/Kenya, through KBDS, initiated a five year programme in the year 2003 in Embu District to promote production of passion fruits through contractual arrangements. The role of the KBDS was to provide logistic support and technical guidance during the implementation of the programme whereas USAID provided financial support.

The fruit is grown under contractual arrangements between exporter companies, or individual entrepreneurs, on one hand and smallholder farmers on other hand. These exporter companies include; East African Growers Ltd, Greenland Agroproducers Ltd and Just Juice Ltd. East African Growers Ltd contracts farmers, whereas Greenland Agroproducers Ltd and Just Juice Ltd buy fruits through brokers. Linkage between contractors and farmers is provided by Market Linkage Service Providers (MLSP). In Kenya, the MLSP is Fine Line Rural Reach Ltd which has its offices in the fruit growing areas. The role of the MLSP is to provide a centrally administered production for both farmers and lead buyers (USAID/ Kenya, 2007).

Passion fruit has many uses; the pulp is processed into juices. The juice is used as a digestive stimulant and treatment of gastric cancer. Chemicals extracted from air dried passion fruit leaves

are used as a sedative or a tranquilizer whereas seeds are pressed to produce fragrant moisturizing oil (Morton, 1987). According to USAID/Kenya (2006) despite the fact that the district has a high production potential, the current level of production of passion fruit is fairly low compared to enormous demand for passion fruit in both domestic and export markets. To date, few farmers have planted grafted seedlings. Emerging Markets Group Ltd (2008) reported that only 2,215 smallholder farmers are producing passion fruits on full commercial terms with 297 smallholder passion fruit nurseries developed and are operational.

1.2 Statement of the Problem

Development agencies such as the World Bank and USAID have been strongly supporting contract farming as a way to promote smallholder development. In the year 2003, a passion fruit project was started in Embu District by Kenya Business Development Service funded by USAID. Despite the introduction of passion fruit as a high value crop under contractual arrangements to ensure food security and raise household income, production still remains low (USAID/Kenya, 2006). Insufficient attention has been paid to the possible problems contract farming may pose for smallholders or to its possible limitations. Currently, there is insufficient information available on the state of contract farming in passion fruit production in Embu District. The positive and negative effects of contractual arrangements on passion fruit production are equally unknown.

1.3 Purpose of the Study

The purpose of the study was to determine the effects of contractual arrangements on passion fruit production among individual farmers and farmer groups in Embu District.

1.4 Objectives of the study

The following objectives guided the study:

i. To determine the types of contractual arrangements used in passion fruit production in Embu District.
ii. To examine the challenges that face passion fruit production through contractual arrangements in Embu District.

iii. To establish whether informally and formally contracted passion fruit farmers report significantly higher passion fruit yields than non contracted farmers

iv. To determine the effects of provision of selected contractual elements on adoption of new technologies to improve passion fruit production.

v. To determine the contribution of contractual arrangements on improving the quality of passion fruits produce.

1.5 Research Questions

Objectives i and ii were converted into research questions respectively:

i. What are the types of contractual arrangements used in passion fruit production in Embu District?

ii. What are the challenges that face passion fruit production through contractual arrangements in Embu District.

1.6 Hypotheses

Objectives iii, iv and v were converted into Ho_1, Ho_2 and Ho_3, respectively:

i. Ho_1 There is no statistically significant difference in passion fruit yields between informally and formally contracted passion fruit farmers and non contracted farmers.

ii. Ho_2 Provision of selected contractual elements does not significantly affect adoption of new technologies to improve passion fruit production.

iii. Ho_3 There is no statistically significant contribution of contractual arrangements to improving the quality of passion fruits produced.

1.7 Significance of the Study

The study was conducted to provide an opportunity for assessment of the effects of contracts on production of passion fruit. It will be useful to development agencies such as the World Bank and USAID in deciding whether to continue supporting contract farming as a way to promote smallholder development. The results of the study will be useful to the contracting firms and farmers through an understanding of the implication of contract farming on passion fruit production. It will help contracting firms determine whether contract farming can be used to

sustain production or not, thus the information to be generated from the study would form a strong base from which policies promoting the use of contractual arrangements among passion fruit farmers could be formulated. It will help farmers to decide whether contracting helps to reduce risks and uncertainties that exist in production. The study results will be useful to public and private sector extension to help establish whether contract farming could be used to enhance dissemination and adoption of production technologies.

1.8 Scope of the Study

The study focused mainly on the contractual arrangements and their contribution to production of passion fruits. It considered the problems faced by contracted passion fruit farmers during the contract period. It also examined the influence of contractual arrangements to competitiveness and smallholder participation in passion fruit production. The study engaged 1,200 passion fruit farmers in Embu District.

1.9 Assumptions

The study made the following assumptions;

i. It was assumed that the respondents would give honest responses.
ii. The introduction of passion fruit was done uniformly in the district and also farmer's access to technology is uniform
iii. Farmers would continue with the project (sustain it) after the sponsors withdraw.

2.0 Limitations of the Study

i. The study was limited to Embu District. Therefore, it might not be appropriate to generalize the results to the whole country.
ii. The passion fruit farmers were not good in record keeping and therefore the quantity of passion fruits given, were estimated.

2.1 Definition of Terms

The following terms assumed the indicated meanings in this study.

Contractual arrangements - refers to the production of agricultural commodities under a forward agreement whereby the basis of such an agreement is the commitment on the part of the farmer to provide specific commodities in quantities and quality standards determined by the contractor at predetermined prices. The arrangement often involves the contractor in providing a degree of production support through supply of inputs on credits, provision of technical advice and transport to farmers.

Effect –refers to results of adopting contractual arrangements

Formal agreements - are legally endorsed contractual arrangements, which closely detail the condition and obligations of each party.

Informal arrangements - are unwritten arrangements which are used under informal model and they cannot be enforced by legal authorities (or other third parties) they are called self-enforcing contracts, which means that the parties involved have incentives to honour the contract in all contingencies.

Production - refers to the growing of passion fruits of the right quality and especially in large quantities for commercial purposes. In this study, production included, adoption of technologies, yield in kilogrammes and quality of fruit produced..

Quality - the specified size, degree of maturity and the colour of the passion fruit.

Selected contractual elements – refers to provision of inputs on credits, advance payments, extension services and provision of transport services.

Smallholder farmer- a farmer with small parcel of agricultural land. In this research it will be used to refer to a passion fruit farmer with less than 10 acres, and growing less than five thousand vines.

Smallholder participation – smallholder farmers engagement in passion fruits production activities

Technology – the combination of knowledge, inputs and management practices which are deployed together with productive resources to produce a desired output. In this study, the technology will be; grafted passion fruit seedlings, appropriate spacing, application of recommended fertilizers and chemicals.

CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter reviews various aspects related to passion fruit production. These aspects include, contract farming in Kenya, nature and types of contractual arrangements, importance of contract farming, contractual elements, smallholder participation in contractual arrangements, contract farming as an avenue of technology adoption and diffusion, passion fruit production in Kenya and importance of quality. The chapter concludes by a presentation of the conceptual framework that shows interaction of variables of the study.

2.2 Contract Farming in Kenya

Contract farming is mainly common in high potential production areas, such as around Mt.Kenya since irrigation possibilities and climate provide good quality crops and also a steady supply of the produce. It is of particular importance in export horticulture where standards such as EurepGap need to be met. About 15.5% of all Kenyan smallholders produce 40% of tea, 50% of sugarcane, and 80% of tobacco under contract farming. The centre of the contract system and the most renowned part of it is the sugar and tea sectors, both dominated by large parastatals. SONY Sugar Company, among others in Kenya, places strong emphasis on field extension services to its contracted farmers. The extension staff's prime responsibilities are focused on managerial skills required when new techniques such as transplanting, spacing, fertilizer application, cultivation and harvesting practices are introduced to farmers (Eaton and Shepherd, 2001).

According to Kariuki (2003), informal agreements involving handshakes or promissory market access possibilities through brokers and middlemen have enabled most small farmers in Kenya to export an extensive array of fruits and vegetables. Kathrin and Heike (2006) indicates that there are a number of reasons suggesting that contract farming will have the tendency to increase in Kenya, in both the land areas used and commodities covered. Horticultural companies currently working with informal agreements will start using contracts more often in future. This is especially the case for companies, which have to comply with EurepGap, which can be well regulated through contracts. Thus, the cooperation becomes more formal. For crops traded on

national markets such as potatoes, the usage of contracts may also increase in value chains such as chips processing, where specific qualities of certain varieties of crops are not easily available on spot markets. Therefore, rising standards also in the local market might foster the increase of contract farming as a method to ensure the demanded quality.

Baumann (2000) indicates that there are plenty of examples of farmers' organizations which have been established by the contractor as an intermediary, and as a way to coordinate production procedures amongst numerous dispersed smallholders. Instances of collective action amongst them to improve the terms of their contract are more difficult to find. The balance between the contractor and the grower depends largely, on the State and the support it extends to smallholders. For example, the reason why Kenya Tea Development Authority gives favourable terms to the outgrowers is the political activism and population density of the people in an area, and the need for the government to win their support.

According to Kathrin and Heike (2006) the regional distribution of contract farming is likely to expand to currently untouched regions as the land and labour availability in the high potential areas of the central highlands is getting scarce. Increased sales of fruits and vegetables via Kenyan supermarkets or hotel chains might be another driving force for the expansion of contract farming. Socio-economic factors such as improved road and telecommunication networks, as well as higher education standards, are likely to contribute to an increase in the use of contract farming methods.

2.3 Nature of Contractual Arrangements

Kariuki (2003) indicates that the nature and type of contract may vary with the crop, natural condition for the crop production and prevailing technologies. The development of human capital, development of market distribution patterns of assets and development of agriculture, determine the nature and types of prevailing contracts. According to NABARD (2003), contractors need to list the scope of their own activities and those of growers and their respective performance obligation. Contracts must specify: quality, delivery schedule, point of delivery and procedures to be followed in the event of shortfall or excesses, modes and responsibilities of grading, packing, transport and costs, payment modalities, time, farm, hold-backs, if any,

incentives based on quality and or time performance, advances and their recoveries, insurance, market fee and other related costs and provision in case of excess or short supply.

The agreements should be simple, short and devoid of legal jargon. The target crop activity should be well defined, with manageable number of growers who preferably share some other common traits to economize on the effort required to create awareness and interest among them. Dealing with groups is preferred, if not the only way of obtaining acceptable contract performance, through the positive use of substantial group synergy.

2.4 Types of Contractual Arrangements

Formal arrangements

Formal agreements are legally endorsed contractual arrangements which closely detail the condition and obligations of each party. They are particularly common in projects that involve heavy investments in capital infrastructure or where contractors lease land to farmers to grow crops under contract. However, such contracts can be used where land tenure is not a factor. Simple registration is a signal confirmation from the farmer that he/she wishes the contractor to reverse a contract for him or her. It has a technical section that clarifies the responsibilities of both sponsor (contractor) and farmer and the finances section with pricing formulas designed to encourage the farms to produce maximum yields (Eaton and Shepherd, 2001).

A more formalized system specifies the transactions and responsibilities of both parties in a contract document. The farmer normally provides land, labour and tools while the buyer often supplies inputs on credit, extension services including trainings on grading and is responsible for marketing and transportation of the produce. In addition to these, the contract also mentions the quantity and quality requirements for the cultivated crop, prices and technology application, among other obligations (Ochieng, 2005b).

Informal arrangements

Informal (verbal agreements) are unwritten arrangements which are used under informal model and sometimes by corporate sponsors. They cannot be enforced by legal authorities or other third parties. They are called self-enforcing contracts, which means that parties have incentives to

honour the contract in all contingencies (Bijman, 2008). Informal arrangements vary between casual oral agreements and regularly repeated marketing transactions but are characterised by the absence of written contracts or equally binding and specifying documents (Kathrin and Heike, 2006).

Bogetoft and Olesen (2004) indicate that in agriculture, contracts are often simple and verbal. There are good reasons why most contracts are informal and incomplete. Often, the agreement contains variables that cannot easily be verified by the court in case of contract breach. Fafchamps, (2004) gives a more mundane explanation for the simplicity of agricultural contracts by indicating that simplicity is efficient even if parties are able to write complete contracts, it may be less costly to engage in simple informal contracting and rely on self-enforcement instead of third party protection. Moreover, in many developing countries, notably in Sub-Saharan Africa, there is no tradition of written contracts. The traditionally used informal agreements and understandings are still commonly used and respected.

Informal contracts cannot be enforced by legal authorities (or other third parties) they are called self-enforcing contracts, which means that parties have incentives to honour the contract in all contingencies. These incentives can be both economic and social (Nooteboom, 2002; Klein et al., 2005). Economic incentives to comply with the contract can be derived from the contractual relationship itself or from the larger network of current and potential contracting partners. Relationship-specific incentives to honour the contract result from (mutual) dependency or from the unique partner value. This is a micro-based, or bilateral, incentive. Contracting parties may also have a macro-based (or multilateral) incentive to honour the contract.

The so-called reputation mechanism (MacLeod, 2007) means that parties have a calculative interest in cooperation in the current contract because they expect payoffs from future cooperative behaviour. The reputation mechanism means that contract breach not only reduces future trading opportunities with the harmed party, but also forecloses future trade with other parties because the breaching party obtains a reputation of being untrustworthy. Reputation plays an important role in self-enforcing agricultural contracts. Although contracts in agriculture are usually short-term (annual) agreements, they are often (automatically) renewed unless one party

makes an early commitment not to renew or one of the parties does not comply with the contractual agreements. This self-enforcement mechanism of agricultural contracts has been found both in developed countries (Allen and Lueck, 2003; Bogetoft and Olesen, 2004) and developing countries (Key and Runsten, 1999).

Warning and Key (2002) found that in Senegal, found that "most contracts enforcement actually occur through a repeated-game approach in which delinquent contracting farmers are denied future participation in the programme". Also for the social incentives to honour a contract we can distinguish between those that are relationship-specific (or bilateral) and those that are community-specific (or multilateral). On a bilateral level, repeated interaction can lead to empathy, identification, routinization, and affection. Empathy entails that one knows and understands how partners think and feel. It allows one to assess strengths and weaknesses in competence and intentions, to determine limits of trustworthiness under different conditions (Nooteboom, 2002). Identification entails that partners have shared understanding about the goals of the contractual relationship and even develop shared norms to be applied in the relationship (Akerlof and Kranton, 2005). Routinization means that the relationship is not taken for granted. On a multilateral level, contracting parties refrain from opportunistic behaviour because the prevailing values, norms, customs, and moral obligations in the community induce compliance behaviour (Bowles and Gintis, 2002; Keefer and Knack, 2005).

2.5 Contractual Elements

Provision of inputs and production services

Many contractual arrangements involve considerable production support, in addition to the supply of basic inputs such as seed and fertilizer. Contractors may also provide land preparation, field cultivation and harvesting, as well as, free training and extension. This is primarily to ensure that proper crop husbandry practices are followed in order to achieve projected yields and required qualities (Eaton and Shepherd, 2001). The provision of inputs such as quality seeds, fertilizer and pesticides through a credit arrangement is often the only possibility for small-scale farmers to obtain such inputs, and accelerates the transfer of these latest technologies into rural areas (Kathrin and Heike, 2006).

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According to Shoja (2003) in many countries a vicious circle has developed whereby the low demand for inputs provides no incentive for the development of commercial distribution networks and this, in turn, further adversely affects input availability and use. Contract farming can help to overcome many of these problems through bulk ordering by management. It is often difficult for small-scale farmers outside the contract-farming context to gain access to inputs. In Africa, in particular, fertilizer distribution arrangements have been disrupted by structural adjustment measures, with the private sector having yet to fill adequately the void created by the closure of parastatal agencies.

Access to credit

Eaton and Shepherd (2001), found that majority of smallholder producers experience difficulties in obtaining credit for production inputs. With the collapse or restructuring of many agricultural development banks and the closure of many export crop marketing boards (particularly in Africa) which in the past supplied farmers with inputs on credit, difficulties have increased rather than decreased. Contract farming usually allows farmers access to some form of credit to finance production inputs. According to Magembe (2006), unavailability of production credit, limit the adoption of new crops and also restrict the access to inputs, technology and information that is necessary to produce a timely and good quality product. Shoja (2003) found that the tendency of certain farmers to abuse credit arrangements by selling crops to buyers other than the sponsor (extra-contractual marketing), or by diverting inputs supplied by management to other purposes, has caused some sponsors to reconsider supplying most inputs, opting instead to provide only seeds and essential agrochemicals. The policies and conditions that control advances are normally described in attachments to contract.

Guaranteed and fixed pricing structure

The returns farmers receive for their crops on the open market depend on the prevailing market prices as well as on their ability to negotiate with buyers. This can create considerable uncertainty which, to a certain extent, contract farming can overcome. Frequently, contractors indicate in advance the prices to be paid and these are specified in the agreement. On the other hand, some contracts are not based on fixed prices but are related to the market prices at the time of delivery. In these instances, the contracted farmer is clearly dependent on market volatility.

(Eaton and Shepherd, 2001). According to Kathrin and Heike (2006) a regular payment, for instance, twice a month is a stable income a farm household can plan with and use for important family investments such as school fees. Shoja (2003) found that Small-scale farmers are often constrained in what they can produce by limited marketing opportunities, which often makes diversification into new crops very difficult. Farmers will not cultivate unless they know they can sell their crop, and traders or processors will not invest in ventures unless they are assured that the required commodities can be consistently produced. Contract farming offers a potential solution to this situation by providing market guarantees to the farmers and assuring supply to the purchasers. Even where there are existing outlets for the same crops, contract farming can offer significant advantages to farmers. They do not have to search for and negotiate with local and international buyers, and project sponsors usually organize transport for their crops, normally from the farm gate.

Extension services

According to Baumann (2000) one of the major reasons that contract farming has won approval for its developmental potential is that, it is a way to transfer technology to small scale farmers. Since the contractor will have a direct interest in improving the quality of the produce, the theory is that it will provide more and better technical assistance than the public extension service. Kathrin and Heike (2006) found that extension services including the right application of the provided inputs, irrigation and water management, produce handling and grading, as well as trainings in record keeping are important factors of success in contractual arrangements.

Shoja (2003) indicates that the skills the farmer learns through contract farming may include record keeping, the efficient use of farm resources, improved methods of applying chemicals and fertilizers, knowledge of the importance of quality and the characteristics and demands of export markets. Farmers can gain experience in carrying out field activities following a strict timetable imposed by the extension service. In addition, spillover effects from contract farming activities could lead to investment in market infrastructure and human capital, thus improving the productivity of other farm activities. Farmers often apply techniques introduced by management such as ridging, fertilizing, transplanting and pest control.

2.6 Importance of Contract Farming.

Well managed contract farming is an effective way to coordinate and promote production and marketing in agriculture (Eaton and Shepherd, 2001). The existing literature on contract farming identifies several major areas where the management can provide potential benefits. From the point of view of the farmer, contract farming can provide access to markets. According to Setboonsarng *et al* (2006) the arrangement serves to link farmers to distant markets where demand and price of crops are more favourable. The prime advantage of contractual arrangement for farmers is that the contractor normally undertakes to purchase all produce grown within specified quality and quantity parameters (Eaton and Shepherd, 2001). Smallholder farmers benefit from the reduction of market risks as they often have more limited market access. Contracting firms extend credit to farmers in cash or kind by providing inputs such as seedlings and fertilizers.

According to Setboonsarng *et al* (2006) a contracting firm undertakes measures to ensure that contracted producers have timely access to inputs including seeds and fertilizers, in addition to training support and monitoring proper crop husbandry practices. Access to technology/skill development can also be offered by the contracting firm, favouring the production of high valued, often riskier crops. Without technical assistance the tendency is for farmers to avoid venturing into loss known crop and livestock path from subsistence to commercial farming (Arthur, 2005). In contract farming a predetermined price for the crop is generally established during contract negotiations at the onset of the growing season. This may protect farmers from incurring losses in sales due to downward prices fluctuations. In cases where production problems are widespread as a result of uncontrollable purchasers, payments for the produce advances may be deferred until the following seasons (Setboonsarng *et al,* 2006).

Contracting facilitates the introduction of appropriate technology required to upgrade agricultural commodities particularly those produced for market that demand high quality standards. New production techniques are often necessary to increase productivity as well as to ensure that the commodity meets market demands (Eaton and Shepherd, 2001). Arthur (2005) indicates that with the reduction of product and market risk, income stability is favoured. If the contract has a long term continuation, farmers can benefit from more foreseeable and stable

income streams, especially with better planning of consumption and investment decision. Contract farming, likewise affords potential benefits to contracting firms. It assures suppliers that the required crops can be produced consistently. The arrangements may result in increased yields and improved quality with regard to certain types of crops. It also allows firms to minimize cost of purchasing lands or direct labour (Setboonsarng *et al*, 2006).

Although contract farming is not applicable to all crops in all stages of market development, numerous empirical studies from around the world demonstrate that contract farming can lead to better income generated from crops grown under the arrangement as compared to those grown without contract. Income generated by organic rice farming in Thailand is 70% to 100% higher than conventional farming (Setboonsarng et. al, 2006). Glover and Ghee (1992) and Glover and Kusterer (1990) in their studies in Southeast Asia, Latin America, and Africa confirmed that the majority of contract farming efforts appear to contribute to smallholders' welfare by improving income. Such arrangements enable farmers to forecast income levels, which aids in planning (White, 1997).

Increased income in contract farming is generally accompanied with lowering price risk for farmers. In agriculture, prices can fluctuate drastically from region to region and within a growing season. Smallholders have little access to information and face the risk of loosing substantial income if prices fluctuate downward. In contract farming, however, a predetermined price for the crop is generally established during contract negotiations at the onset of the growing season. As a rule, firms typically purchase the crop that falls within specified quality and quantity in accordance with the contract, and farmers are not subjected to incur losses in sales due to price fluctuations. In this respect farmers can lower their price risk, in addition to gaining market access (Binswanger et al., 1995; Baumann, 2000; Eaton and Shepherd, 2001).

2.7 Contract Farming as an Avenue of Technology Transfer and Adoption

When contracting companies provide seeds, fertilizers and agrochemicals, the farmer follows recommended practices; hence, contract farming serves as an avenue of technology transfer and adoption (Kariuki, 2003). According to USAID/Kenya (2005), contractual arrangements encompasses training of farmers in cultivation and improved production techniques such as

grafting, planting, chemical application and grading. The training and dissemination of technologies is done through on farm demonstrations.

Baumann (2000) indicates that one of the major reasons that contract farming has won approval for its developmental potential is that it is a way to transfer technology to smallholder farmers. Since the contractor will have direct interest in improving the quality of the produce, the theory is that it will provide more and better technical assistance than the public extension services. Glover (1994), found that rapid technology transfer is most likely to occur when a new crop has been introduced for which quality standards are very important.

Input suppliers have an incentive to undertake extension as part of marketing, especially if farmers require purchased inputs to achieve desired production results (quantity and quality) as specified in the contract. Extension by input suppliers typically provides information related to the product category such as pest control, plant disease and drought tolerance. Information channels used may include written information, posters, farmers meetings, radio, on farm demonstrations and exhibits at farm shows. Sales people have an incentive to maintain good business relations with farmers, therefore, they typically place high priority on information regarding access to and use of input (Schwartz, 1994).

2.8 Passion Fruit Production in Kenya

Kenya is ranked fifth after Ecuador, Brazil, Peru and Colombia in passion fruit production. In Kenya, passion fruit is planted on about 3,000 hectares with annual production of about 30,000 metric tonnes. Most of the passion fruit is produced by small scale farmers on ¼ to 2 hectares. Although the productive life span of passion fruit is five years, fungal and viral pathogens often shorten it to about two or three years (Wasilwa *et al*, 2006).

According to USAID/ Kenya (2006), passion fruit is mainly grown in three provinces in Kenya; Eastern, Central and Rift Valley due to its agro ecological requirements. Griesbach (1992), indicate that the purple passion fruit forms virtually no flowers below 1000m and should be grown at altitudes of 1200-2000m. All varieties grow on a wide range of soils; but light to heavy sandy loams, of medium texture and at least 60 cm deep are most suitable. Heavy clay soils have

to be drained and very sandy ones need heavy manuring. A pH of 5.5-7 is preferred. If the soil is too acidic, lime must be applied. Good drainage and aeration are essential to minimise the incidence of diseases such as collar rot. The vines require sheltered locations without extreme temperatures: Optimum temperatures for the purple variety are between 18-25°C and for the yellow variety 25-30°C. The Purple passion fruit, especially, grows well on as little as 1000 mm rainfall in Africa, provided the rainfall is well distributed.

Five years ago when Kakuzi Ltd, exited from passion fruit farming, Kenya faced an acute shortage in supply for both processing and export markets. Partly owing to this shortage, the lead passion juice processor in the country based in Thika went out of operation. Many exporters experienced difficulties in meeting their orders while others removed passion fruit entirely from their export lines. Kenya Horticultural Development Program (2006) indicates that the demand for fresh passion fruit from local processors, brokers, exporters and Ugandan buyers remained high, maintaining farm gate prices of around KSh40/kg. KHDP-assisted growers in the Rift Valley made average weekly deliveries of 36 MTs earning KSh 1.44 million (US $ 1,920). With the demonstrated benefits of grafted seedlings, growers are being trained on propagation, for their own use and to sell to neighbouring farmers.

Agronomists are also striving to meet the rising demand for technical assistance in various aspects of orchard establishment and management, as more areas come under production. Growers are innovatively intercropping passion fruit with a range of crops including artemisia, a key ingredient in antimalarial drugs. USAID/ Kenya (2006) found that because of its vulnerability to disease, passion fruit involves more technical management than avocados or mangos, especially if the aim is to reduce diseases and have the plant bear fruits all year long. Grafting purple passion onto yellow passion root stock is one way farmers can reduce the risk of disease. Another issue for this fruit is the safety of some chemicals that are used to control disease and keep the plants flowering, especially if there are residuals on the fruit at time of sale. According to Emerging Market Group (2008), a total of 2,215 smallholder farmers are producing passion fruits on commercial basis and 297 smallholder passion fruit nurseries have been established and are operational.

According to Sebstad and Snodgrass (2004) passion fruit is mostly a woman's crop and women make most of the decisions regarding production and sale. Men decide on the initial investment; but women make most other decisions. They also do most of the work. Men dig holes for the plants and install the poles and wire (one-off tasks) while women maintain the vines, harvest the fruit, and play a key role in sales to brokers. Men play a role in selling to exporters. Women sometimes hire male labor for picking, although they often face labor shortages, especially during the harvest season for other crops. Women's "ownership" of passion fruit is reflected in the comment of a farmer in Eldoret who accused a man of "stealing his wife's fruit and selling it for drink". Women are the first to receive income

2.9 Passion Fruit Production in Embu District

Kathrin and Heike (2006) indicates that East African Growers Ltd. (EAGL) has selected Embu and Meru Districts as the project area for its intervention in the Fruit quality enhancement project, which they implemented with the support of Kenya Business Development Services Program funded by USAID. Due to this cooperation, EAGL has been able to produce a very elaborate contract, which clearly specifies the terms and conditions under which the passion fruit producer and the company work together. Production of the fruit in the district has indeed increased over the past three years from three tonnes to ten tonnes per year.

Passion fruit is a short maturing crop (takes seven months) and unlike mangoes and avocadoes, within 5-7 weeks after transplanting, each plant will have up to four healthy laterals. From then on the vine grows very rapidly; the first flowers are produced 5-7 months after transplanting when the vine can be 10-15 m long (Griesbach, 1992). The producer prices currently range from Ksh 50 -70 per kilo. According to Fineline Rural Reach Ltd (2007) the total numbers of vines planted in the District were 110,047 and by the year 2007, 58,443 were mature. The main growing divisions of passion fruit in Embu district are Manyatta, Nembure and Runyenjes.

2.10 Smallholder Participation in Contractual Arrangements

A number of studies have examined the proportion of contract farmers that are smallholder, as an indicator of an impact of contract farming. Guo *et al (*2005) used data from farm level survey in China covering several products to estimate the likelihood of participating in contract farming.

The results indicated that small farmers are less likely to participate in contract farming than large farmers. Minot and Ngigi (2004) described the evolution of several contract farming schemes in Kenya including one (Del Monte) that gave up on contract production and others that have shifted from large to small scale production. Miyata and Minot (2007) indicate public policy may play a role in supporting the participation of small farmers in contract farming.

According to the USAID/Kenya (2006), there are wide range of constraints to competitiveness and smallholder participation in passion fruit value chain. The prime constraint is that contractual relationships have been marked by mistrust, that is, there is lack of trust among producers, brokers and exporters. Moreover, there is lack of information and knowledge of the market, limited access to inputs, limited access to resources and weak incentives for upgrading and weak vertical and horizontal linkages within the value chain. In addition, there are power asymmetries in value chain where brokers and exporters dictate the prices, when they buy, how much and what they buy. Farmers do not trust input suppliers to sell them safe and effective chemicals.

Sebstad and Snodgrass (2004) found that low yields, especially in relation to export quality varieties, low sales volume, low selling prices, inconsistent quality related to crop husbandry practices and lack of quality assurance services, high rejection rates, post harvest wastes, long and inefficient brokering supply chain and lack of timely delivery also hinder smallholder participation. Constraint to up grading of passion fruits relate to gender discrepancies in access to training: the qualitative research found that men received training in passion fruits cultivation although women do most of the work.

2.11 Quality Consistency

The importance of quality in the produce will have a bearing on production procedures. In some cases this will be through the transfer of technology to the outgrowers and their ability to invest in farming (Baumann, 2000). Absence of quality can have far-reaching consequences in terms of a market acceptance and future expansion. Most contracts contain detailed quality specifications so that produce that does not conform to the agreed criteria can be rejected as indicated by Eaton and Shepherd (2001).

Markets for fresh and processed agricultural produce require consistent quality standards. Moreover, these markets are moving increasingly to a situation where the supplier must also conform to regulatory controls regarding production techniques, particularly the use of pesticides. (Arthur, 2005; Shoja, 2003) For fresh produce there is growing requirement for "traceability",that is, suppliers to major markets increasingly need to be confident of identifying the source of production if problems related to food safety arise. Both estate and contracted crop production require close supervision to control and maintain product quality, especially when farmers are unfamiliar with new harvesting and grading methods. Often, large numbers of crops within a single project have to be transplanted, harvested and purchased in a uniform manner so as to achieve product consistency (Shoja, 2003).

According to Shoja (2003) agribusinesses producing for markets demanding high quality standards, such as fruits and vegetables for export, often find that small-scale farmers and their families are more likely to produce high-quality products than farmers who must supervise hired labour. Contract farming also makes quarantine controls more manageable. It is easier for quarantine authorities to inspect a limited number of exporters of a single commodity, who closely supervise farmers, than to inspect hundreds, or sometimes thousands, of individual producers selling through open markets. In some highly sophisticated operations, containers are now being loaded on the farm for direct delivery to the supermarket.

2.12 Challenges Facing Passion Fruit Production through Contractual Arrangements

Despite the fact that contract farming is advantageous not only to the producers but also to the buyer (contractor), several problems are encountered all the way from production to the sale of the produce. The challenges facing passion fruit production through contractual arrangement include;

Inefficient management

Shoja (2003) found inefficient management can lead to production exceeding original targets. For example, failures of field staff to measure fields following transplanting can result in gross over planting. Sponsors may have unrealistic expectations of the market for their product or the market may collapse unexpectedly owing to transport problems, civil unrest, change in

government policy or the arrival of a competitor. Such occurrences can lead managers to reduce farmers' quotas. Some contracts specify penalties in such circumstances. In some situations management may be tempted to manipulate quality standards in order to reduce purchases while appearing to honour the contract. Such practices will cause sponsor-farmer confrontation, especially if farmers have no method to dispute grading irregularities. All contract farming ventures should have forums where farmers can raise concerns and grievances relating to such issues. According to Kathrin and Heike (2006), inefficient management and marketing problems might lead to the fact that the company does not purchase all the contracted produce.

Corruption

Problems occur when staff responsible for issuing contracts and buying crops exploit their position. Such practices result in a collapse of trust and communication between the contracted parties and soon undermine any contract. Management needs to ensure that corruption in any form does not occur. On a larger scale, the sponsors can themselves be dishonest or corrupt. Governments have sometimes fallen victim to dubious or "fly-by-night" companies who have seen the opportunity for a quick profit. Corruption could include charging excessive fees to manage a government-owned venture or persuading the government and other investors to set up a new contract farming company and then sell to that company overpriced and poor quality processing equipment. In such cases farmers who make investments in production and primary processing facilities run the risk of losing everything. Similarly, Kathrin and Heike (2006) found field staff of contracting companies might be corrupt and therefore, favour specific farmers or groups when it comes to purchasing the product.

Domination by monopolies

The monopoly of a single crop by a sponsor can have a negative effect. Allowing only one purchaser encourages monopolistic tendencies, particularly where farmers are locked into a fairly sizeable investment, such as with tree crops, and cannot easily change to other crops. On the other hand, large-scale investments, such as for nucleus estates, often require a monopoly in order to be viable. In order to protect farmers when there is only a single buyer for one commodity, the government should have some role in determining the prices paid (Shoja, 2003)

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Eaton and Shepherd (2001) suggest that privately managed monopolies under public regulation are preferable to non-regulated private or public monopolies. The greatest abuses do tend to occur when there are public monopolies, where buying prices are set by the government, or where farmers have made long-term investments in perennial crops. In 1999 the Kenya Tea Development Authority experienced serious unrest amongst its growers, reportedly because of the Authority's inefficient extension services and alleged "manipulation" of farmers. There was also discontent in Kenya among sugar farmers because the price set by the government did not change between 1997 and 1999. Indebtedness and over reliance on advances were high, as they thought contract farming did not pay. One of the major attractions of contract farming for farmers is the availability of credit provided either directly by the company or through a third party. However, farmers can face considerable indebtedness if they are confronted with production problems, if the company provides poor technical advice, if there are significant changes in market conditions, or if the company fails to honour the contract. This is of particular concern with long-term investments, either for tree crops or for on-farm processing facilities. If advances are uncontrolled, the indebtedness of farmers can increase to uneconomic levels.

Farmer discontent

Shoja (2003) indicate that a number of situations can lead to farmer dissatisfaction. Discriminatory buying, late payments, inefficient extension services, poor agronomic advice, unreliable transportation for crops, a mid-season change in pricing or management's rudeness to farmers will all normally generate dissent. If not readily addressed, such circumstances will cause hostility towards the sponsors that may result in farmers withdrawing from projects.

Contract breach

Due to failure to honour the contract, many producers as well as buyers and processors, are shy to enter into contract farming. On both sides there are several occasions that lead to contract breach, that is. Breach on the producer's side where farmers often sell their produce outside the contract to other traders when offered a better price; farmers sometimes divert the inputs they have been given (such as fertilizer, pesticides, irrigation.) to other products on their land not cultivated under the contract, thus resulting in lower yields for the contracted crop than expected. When not able to supply the contracted amount of produce, farmers might buy from other

farmers in order to fulfil their quota. In this way, the quality is likely to be compromised and the sustainability of the contract is at risk. Breach on the processor's side occurs when the processor might not pick up the produce not the entire amount of produce as agreed earlier; the processor might not pay the price agreed on in the contract. The processor might complain about the quality of the produce and reject it even though all standards have been met. The real reason for the rejection however, is not the quality but the marketing or processing limitations of the processor. (Shoja, 2003; Eaton and Shepherd (2001)

Input diversion

A frequent problem is that farmers are tempted to use inputs supplied under contract for purposes other than those for which they were intended. They may choose to use the inputs on their other cash and subsistence crops or even to sell them. Clearly this is not acceptable to the sponsor, as the contracted crop's yields will be reduced and the quality affected. Steps to overcome such problems include improved monitoring by extension staff, farmer training and the issuing of realistic quantities of inputs. However, the knowledge that a contract has the advantages of technical inputs, cash advances and a guaranteed market usually makes the majority of farmers conform to the agreement. Unless a project is very poorly managed, input diversion is usually an annoyance rather a serious problem (Arthur, 2005; Shoja, 20003)

2.13 Theoretical Framework

Various schools of thought regarding firm behaviour, property right and agency behaviour form theoretical underpinnings of the phenomenon of contract farming. But the more dominant theoretical framework is the Transaction Cost Economics (TCE) which evolved from seminal works of Coase (1937) and Williamson (1979, 1985, and 1989) Transaction Cost Economics has been expounded on the proponent of the New Institution Economics (NIE) School, which recognize the vital role of social and legal norms and rules underlying economic activities.

The NIE framework has been applied by numerous authors (Minot 1996; Delgado 1999; Key and Runsten 1999) to explain the theoretical rationale for the existence of contract farming. They found that consumers have particular preferences with respect to each characteristic of agricultural produce; perishability, quality and production variability in terms of quantity and

quality and are prepared to pay for the produce having the desired attributes. When asymmetric information exists between the buyer and the seller regarding the quality of the products, product market might break down entirely presenting a need for coordination through contracting. When production technology needed for efficient production and optimum quality and on the desired characteristics of the product, producers find it hard to adjust to the changing demands of consumers, thus making it necessary for some form of vertical coordination or integration.

Contract farming has existed for many years not only in developed but also in developing countries. Agribusiness firms are increasingly involved in global trade of agricultural products such as fruits, vegetables, flowers and many more. The importers and the final buyers such as supermarkets in Europe, the Middle East or other important trading partners of Kenya more often require exporters from developing countries to comply with standards such as EurepGap. Therefore, in recent times, standards and in particular the implementation of EurepGap regulations has gained in importance (Eaton and Shepherd, 2001). In this context, contract farming is discussed as a tool to better control the compliance of farmers with production techniques and food safety standards (Humphrey, 2005).

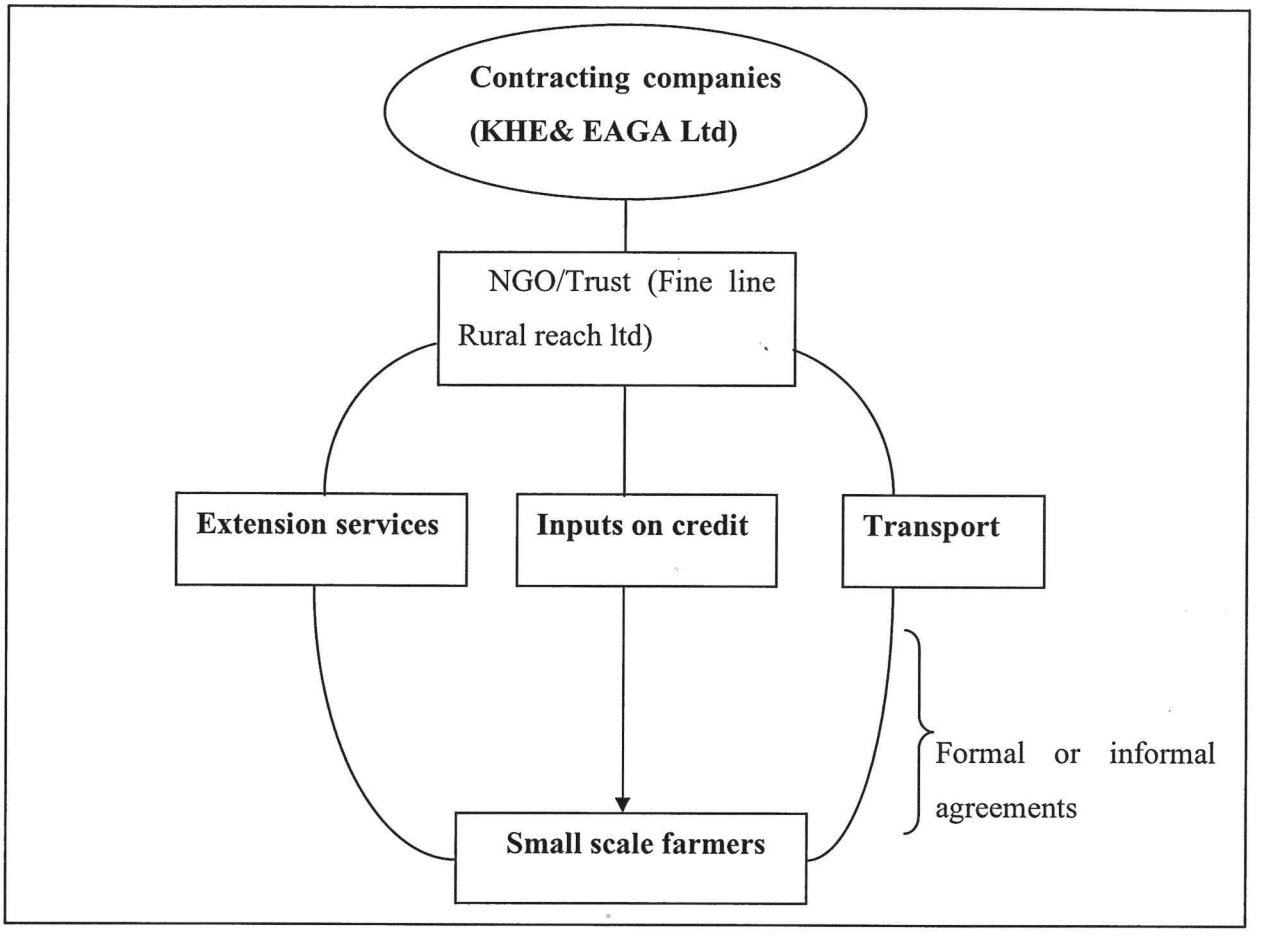
Contract farming arrangements can be classified as either formal or informal. The intensity of the different contractual arrangements varies; some are rather informal and based mainly on mutual trust and verbal agreements, while others have developed contracts as documents to formalize the cooperation. The intensity and formality of the contractual arrangement varies according to the depth and complexity of its organization. On the one hand, buyers and producers might cooperate irregularly based only on verbal agreements with no further assistance concerning input supply and extension.

Bijman (2008) found that farmers may not enter into the production of technically difficult crops such as passion fruits, because they do not have the technical skills, the inputs and the credit needed. As part of contractual arrangement, buyers can provide technical assistance, specialized inputs and credit. Farmers in developing countries may not have the available cash to purchase inputs at planting time, so the contract allows the buyer to provide them on credit and to recover the cost of the inputs by deducting it from the payment to farmers after harvest. The costs

involved are high and thus, there is need for coordination through contractual arrangement. This explains therefore, why passion fruits among other fruits are produced through contractual arrangements.

The form of contractual arrangement used in passion fruit production in Embu District assumes a multipartite model where two or more organizations coordinate and manage the cooperation. Figure 1 show a multipartite model of contractual arrangement where there are two levels of agreement; first, between a NGO and contacting company and second, between the company and the farmers.

The Kenya Horticultural Exporters and East African Growers Limited assisted by Fine line Rural Reach limited contracts small scale farmers to produce passion fruit. Fine Line Rural Reach Limited is an NGO that serves as a link between contracting companies and the farmers. It oversees contracting process on behalf of the contractor as well as ensuring that farmers are paid for their produce.



Source: Own illustration - adapted from Eaton and Shepherd (2001).

Figure 1: Multipartite model of contract farming

2.14 Conceptual Framework

The conceptual framework of the study is based on the relationship between contractual arrangements and passion fruit production. The reasons for farmers to enter into contractual arrangement are fundamentally to benefit from contracting through; reduced risks in production and marketing, improved access to inputs, technical assistance and credit. Contract farming reduces risks and uncertainty involved in adoption of technologies, hence, motivates farmers to adopt new farming techniques often necessary to increase productivity as well as to ensure that the commodity meets market demands. When efficiently organized and managed contract

farming reduces risks and uncertainty to both parties and this serves as an incentive to increase production. Therefore, contractual arrangements can have positive effects on production.

Figure 1 illustrates a concept on contract farming and its influence on passion fruit production. It identifies the independent variable (contractual arrangement), moderator variable (mutual trust, education level and infrastructure) and dependent variable (passion fruit production) all of which form the basic conceptual framework of the study. The dependent variable (passion fruit production) will be measured in terms of yields in kilogrammes per hectare, quality of fruits produced (kilogrammes of grade one produced) and technology adoption whereas the independent variable (contractual arrangements) will be measured in terms of number of passion fruits farmers contracted formally, informally and those not contracted at all.

The moderator variable such as mutual trust, education level and infrastructure may influence passion fruit production. Mutual trust is needed for contract system to work effectively. Relationship-specific incentives to honour the contract result from (mutual) dependency or from the unique partner value. Education is significant in enhancing awareness of adoption of agricultural technologies. The higher the education level of a household head, the higher the probability of the household to participate in contract farming. Good infrastructure permits low transportation costs for the entire sector, favouring both buyers and sellers.

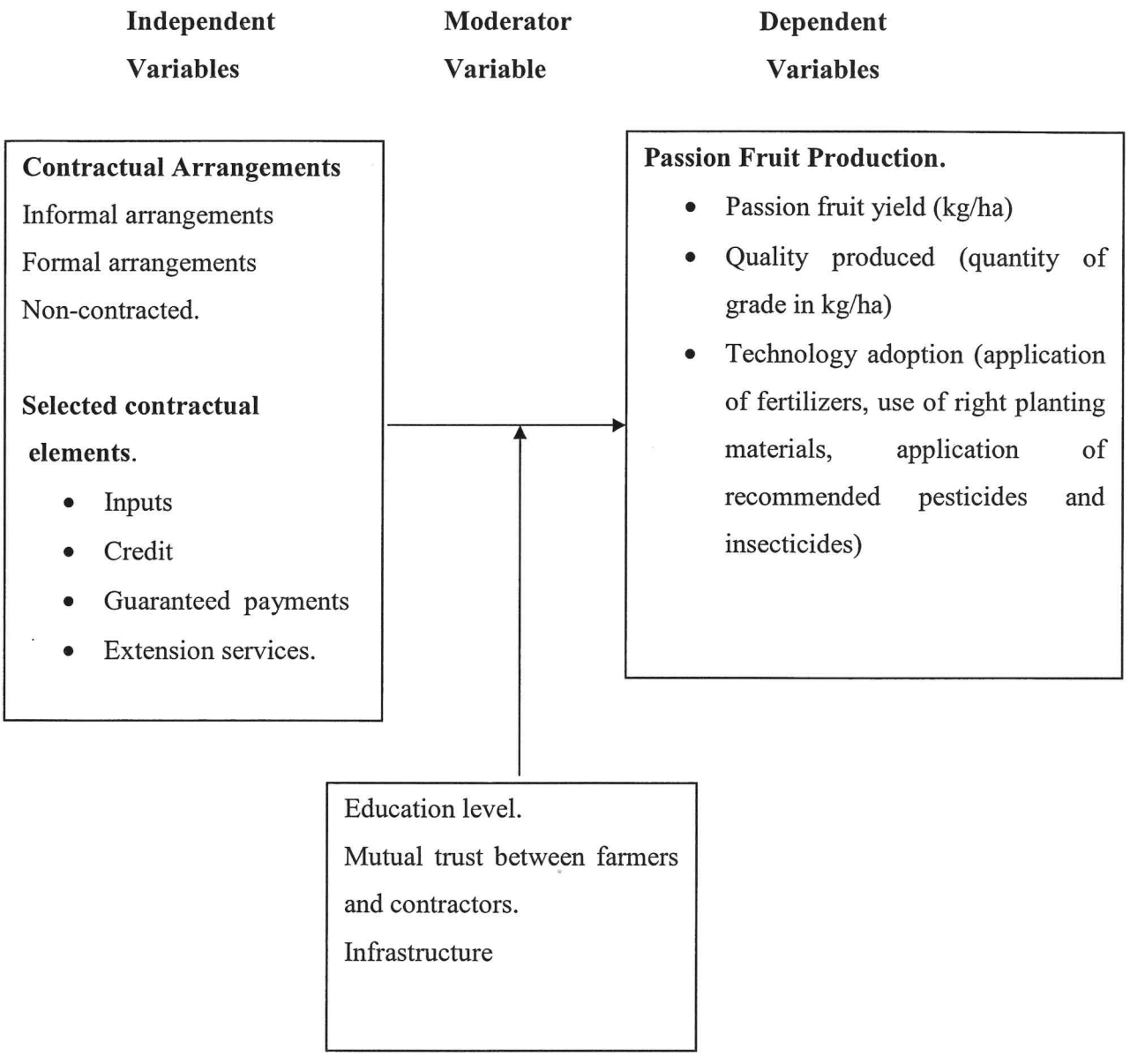


Figure 2: Conceptual framework relating contract farming to passion fruit production

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the method to be used to carry out the study. It gives details on the research design to be employed, study area, population of the study, sampling procedure, instrumentation, data collection procedures and data analysis. The chapter ends with a table showing a summary of data analysis, which shows the study hypotheses, independent variables, dependent variable and statistics used in the analysis.

3.2 Research Design

The study employed an *ex-post-facto* research design since it examined the effects of naturalistically occurring treatment after the treatment has occurred (Kathuri and Pals 1993). The researcher investigated the effects of contract farming after five years of adoption. The investigation rotated around the effect of contractual arrangements on yields, technology adoption, quality improvement as well as negative and positive effects of passion fruit production through contractual arrangements. The investigation also unveiled the challenges facing the fruit production. The study focused mainly on both contracted and non-contracted passion fruit farmers.

3.3 Study Area

Embu District was chosen because it is representative of other districts in the region where passion fruits are mainly grown. Embu District has a diversity of agro ecological conditions ranging from high altitude dairy or temperate vegetables zone (UM1) to very dry lowland livestock-millet zone (L5). The district is divided into five administrative divisions: Central, Kyeni, Nembure, Runyenjes, and Manyatta (Appendix II). Kyeni, Manyatta, Nembure, and Runyenjes are the major passion fruit producing divisions with a mixed farming system. Maize, beans, mangoes, pawpaw, pigeon peas, cowpeas, coffee, cotton, avocado, passion fruits, bananas, greengrams, and sunflower are the main crops. The average farm ranges between 5-7 acres per household.

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Kyeni Division lies between 1,000-1,700 m above sea level and covers 104.9 km^2, of which 78.62 km^2 is arable land. The average farm size is 2.6 acres in the upper and middle zones, respectively. The rainfall is bimodal: October to November, Short rains are between 1,200 to 1,850 mm and April to May, Long rains are between 850 to 1,850 mm. Soils are well drained and mostly *nitrosols*. The Runyenjes Division lies between 1,200-2,070 m above sea level. The average farm holding is 1.2 acres. The annual average rainfall is between 1,000-2,000 mm and distribution is bimodal. The short rains fall between October to December and range between 1,150 to 1,750mm whereas long rains fall between April to May and range between 850 to 1,700mm.

Nembure Division lies between 1,000-1,500 m above sea level. The average annual rainfall ranges from 1,200 to 1,500 mm. Rainfall is bimodal, the short rains fall between October to December and range between 1,150 to 1,750mm whereas long rains fall between April to May and range between 850 to 1,700mm. Soils are fertile and well drained. Manyatta Division lies between 760 to over 4,570 metres above sea level. Rainfall is bimodal, the short rains fall between October to December and range between 1,150 to 2,000mm whereas long rains fall between April to May and range between 850 to 1,700mm. The soils are mostly *nitisols* and *andosols*, which are inherently fertile, well drained and deep.

3.4 Population

The population of the study consisted of passion fruit farmers who are residents of Manyatta, Runyenjes and Nembure divisions, which were chosen because they are representative of the five divisions in the district where passion fruits are mainly grown. The population comprised of 1200 passion fruit farmers in Embu District, 500 from Manyatta Division, 300 from Nembure Division and 400 from Runyenjes Division (Fine Line Rural Reach, 2008).

3.5 Sampling Procedures and Sample Size

Sampling frame

A sampling frame which consisted of a list of smallholder passion fruit farmers from three divisions, Manyatta, Runyenjes and Nembure, will be used to select the study sample. The list will be provided by the Fine Line Rural Reach Ltd, a Market Service Linkage Provider.

Sample Size

A sample of 120 passion fruit farmers obtained by proportionate stratified sampling was used in this study. This sample of 120 passion fruit farmers is above the recommended minimum sample of 100 for survey research (Kathuri and Pals, 1993). The extra 20 will cater for attrition. The sub samples from the three divisions will be proportional to their sizes in the population. The proportion is calculated as follows;

$$\text{Proportion} = \frac{total\ sample size}{total\ population} = \frac{120}{1200} = 0.1$$

The proportion was then multiplied by the division population to get the proportionate samples as shown below;

Table 1:Sample Size by Division

Division	Number of passion fruit farmers	Sample size by sample proportion
Manyatta	500	500 x 0.1 = 50
Nembure	300	300 x 0.1 = 30
Runyenjes	400	400 x 0.1 = 40
Total	1200	120

Source: Fine Line Rural Reach (2008)

3.6 Instrumentation

A structured questionnaire was used to obtain data from passion fruit households. The questions capture data in line with the study objectives. Section A captures general information; B, farmer characteristics; C, production data; D, production technologies; E, contractual arrangements; F,

support services and G, problems faced by contracted farmers. Questionnaire items were set based on the study objectives and the hypothesis to be tested (Appendix I).

Validity of the Instrument

Validity refers to the degree to which an instrument actually measures the variable it claims to measure (Kathuri and Pals, 1993). To ensure that the items in the questionnaire represent the content area that it is required to measure, experts from the Department of Agriculture Education and Extension of Egerton University reviewed the contents of the instrument.

Reliability of the Instrument

Reliability is the extent to which a measuring device is consistent in measuring what it is supposed to measure (Reda, 1992). In this study, to ensure consistency of the developed instrument, the instrument was pilot-tested using a random sample of 10 contracted and 10 non contracted passion fruit farmers in Kyeni Division. The division was chosen on the strength that it has similar characteristics as those found in the study areas. The number 10 was chosen for pre-test because according to Kathuri and Pals (1993), it is the smallest number that yields meaningful results on data analysis in survey research. The pre-test will later be subjected to the split half analysis technique according to Cronbach's formula.

$$\alpha = \frac{N.r}{1+(N-1)r}$$

Where N is the number of items and r is the average inter-item correlation among the items. According to Mugenda (1999), the advantage of split-half technique is that it eliminates the chance error due to differing test conditions. The instrument pretest results gave a reliability coefficient of 0.8 above the recommended coefficient of 0.7 (Santos & Reynaldo, 1999). This therefore, indicated that the instrument was fit for use in the study.

3.7 Data Collection Procedures

The researcher used a letter of approval from graduate school to seek for permit from the National Council for Science and Technology, in order to get assistance and cooperation from the Provincial, District and Divisional Agricultural Officers. The assistance of passion fruit group leaders and extension staff from both Ministry of Agriculture and Fine Line Rural Reach

Ltd extension officers were used to enable the researcher obtain the sampling frame and access the households in the study areas. Appointments for visits were made with household heads in advance. Questionnaires were administered orally as the researcher recorded the response to each item. Secondary data from Fine line Rural Reach Ltd was used to provide a list of smallholder farmers growing passion fruit and location in the study areas.

3.8 Data Analysis

The questionnaires were coded and then data was entered into the computer for analysis. Data from the questionnaires were summarized in data sheets. Statistical Package for the Social Sciences (SPSS) software was used for data analysis. Data was analyzed using both descriptive and inferential statistics. Frequency, means, mode and percentages were used for descriptive statistics, while T-test and ANOVA were used for inferential statistics at 5% level of significance. Data from objective 1 and 2 were summarized using frequencies and percentages. Information from objective 3 was summarized using means and percentages and analyzed using ANOVA. Data from objective 4 was summarized using means and percentages and analyzed using chi square. Chi square distribution table was used to get the value of chi square value. Data from objective 5 was summarized using, percentages and means and thereafter tested using T-test.

Table 2: Summary on Data Analysis

Hypothesis	Independent variables	Dependent variables	Statistical analysis
Ho_1: There is no statistically significant difference in passion fruit yields between informally and formally contracted passion fruit farmers and non contracted farmers.	Contractual arrangements • Formally contracted • Informally contracted • Non contracted	Passion fruit production Passion fruit yield. Production (kg / ha)	Descriptive ANOVA
Ho_2: Provision of selected contractual elements does not significantly affect adoption of new technologies to improve passion fruit production.	Selected contractual elements • Inputs • Credit • Guaranteed payments • Extension services.	Passion fruit production Technology adoption Proportion of farmers using new production technologies	Descriptive Chi square
Ho_3: There is no statistically significant contribution of contractual arrangements to improving the quality of passion fruits produced.	Contractual arrangements • Informally Contracted • Formally contacted • Non contracted	Passion fruit production Quality produced Quantity of grade 1(one) (kg/ha)	Descriptive ANOVA

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

This study was guided by various objectives and hypotheses, which identified various research variables that were studied. The analysis, presentation and discussion of the results have been done based on the set objectives. This chapter therefore discusses the research findings by addressing the objectives and the hypotheses. It also describes the characteristics of passion fruit farmers in the study area.

4.2 Demographic Characteristics of the Respondents

The farmer characteristics were identified in order to establish the kind of farmers who participates in passion fruit production. These characteristics are believed to be critical in understanding the nature and the role of farming in an area. The farmer characteristics documented includes; age, education level, gender and the size of land, especially the land allocated to passion fruit production.

Age of household head

Most of household studies assume that household decisions are made by one household member but for the benefit of the whole household (Ellis, 2000). It is also argued that the age attribute of the household head is crucial for his or her decision making especially in determining what to produce in a given season. The ages of the farmers involved in this study ranges from 20 to 70 years, however 85% percent were 50 years and below. The mean age was 40.18, this suggests that majority of the respondents were in their mid ages, therefore, capable of making decisions whether to engage in contractual arrangements or not. Table 3 shows the age distribution of passion fruit farmers. According to the results on Table 3, 20% of the respondents were aged between 20-30 years, 34% were aged between 31-40 years, 30% were aged between 41- 50 years, 12% were aged between 51-60 years and 3% aged between 61-70 years

Table 3: Age Distribution of Passion Fruit Farmers.

Age of the farmers	Frequency	Percentage
20-30 years	24	20
31-40 years	41	34.17
41-50 years	37	30.83
51- 60 years	14	11.67
61-70 years	4	3.33
Total	120	100.0

Farm size

Land as a major factor of agricultural production has been used in several studies. Studies conducted in Uganda and Kenya found a positive and significant relationship between farm size and participation in contract farming (Prossy, 2002; Ota, 2002). Table 4 indicates the land sizes of passion fruit farmers in Embu District.

Table 4: Sizes of Land Owned by Passion Fruit Farmers in Embu District

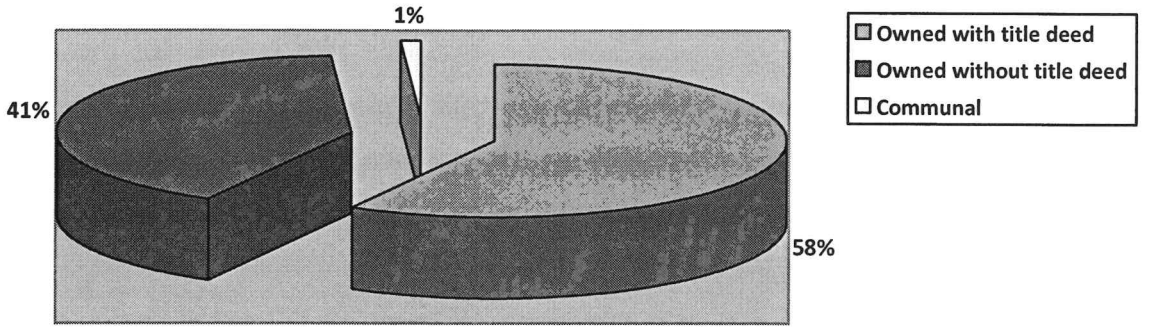
Farm size in acres	Frequency	Percent
≤ 1	24	20
1-2.5	67	58.8
2.6 – 5.0	18	15
≥ 5	11	9.2
Total	120	100.0

Mean land size = 1.02 acres Std deviation = 0.157

The mean land size of the fruit farmers involved in the study ranged from ≤ 1 to ≥ 5 acres. The mean land size was 1.02 acres per household. The results indicated that 20% of the farmers owned ≤ 1, 59% owned between 1 and 2.5 acres, 15% owned between 2.6 and 5 acres whereas 9% owned 5 acres and above.

Form of Land Ownership

The study also sought to establish the form of land ownership of passion fruits farmers. The results are indicated on Figure 4.



Analysis of the form of land ownership indicated that 58% of the respondent owned land with a title deed, 1% cultivated communal land and 41% owned land without a title deed.

Gender of the household head

Like age, sex of household head is an important factor in household decision making. Past studies have indicated that male headed households tends to focus on income generating crop production while women headed households focus more on food crops (Ellis, 2000). The gender of passion fruit farmers is as shown in Figure 3.

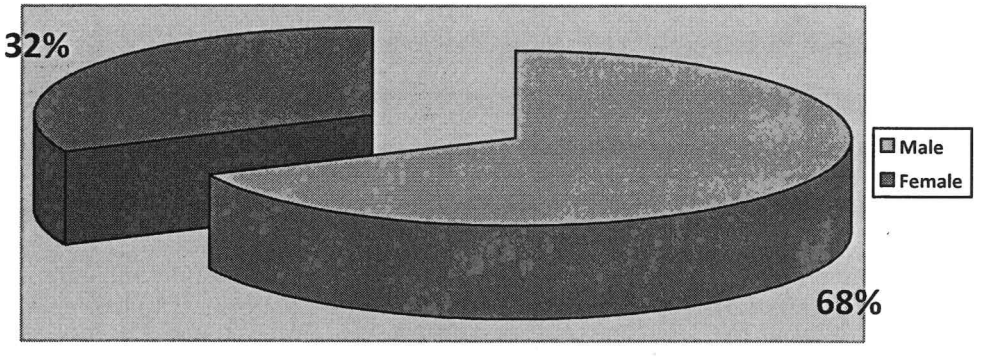


Figure 3: Gender of the household heads

According to the results on Figure 3 males formed the majority of passion fruit producers in Embu District. 68.3% of the farmers who were engaged in the study were male while 31.7 %

were female. This implied that majority of the farmers engaged in passion fruit production were male.

Education of household head

Literature has proved that education and new technology use are directly and positively correlated (Hossain and crouch, 1992; Hassan *et al.*, 1998). Thus, the higher the education levels the higher the probability of adopting passion fruit technologies. Results of the study indicates that out of 120 respondents involved in the study, 7.5% were illiterate, 44.4% had primary education, 34.2% had secondary education, 12.5% completed colleges while 1.7% had gone up to the university level. This, therefore, shows that over 90% of the farmers had the minimum level of education to adopt the technologies. Table 5 shows the education level of passion fruit farmers in Embu district.

Table 5: Education Levels of Passion Fruit Farmers in Embu District

Education level	Frequency	Percent	Cumulative Percent
None	9	7.5	7.5
Primary	53	44.2	51.7
Secondary	41	34.2	85.8
College	15	12.5	98.3
University	2	1.7	100.0
Total	120	100.0	

4.3 Types of Contractual Arrangement

Objective one sought to determine the type of contractual arrangements used in passion fruit production in Embu District. The essence of this objective was to establish the conditions needed for one to enter into the agreement as well as the terms of contract. Table 6 indicates the types of contractual arrangements used in passion fruit production in Embu District.

Table 6: Type of Contractual Arrangements in Passion Fruit Production in Embu District

Type of contractual arrangement	Frequency	Percent
Informal	42	35.0
Formal	38	31.7
Non contracted	40	33.3
Total	120	100.0

According to the results, 35% of the respondents were contracted through informally through verbal agreements, 32% through formal contractual agreement, whereas 33% were not contracted at all.

Formal contractual arrangements

The results indicate that 32% of the respondents visited during the study are contracted through formal contractual arrangements. The findings reveal that formal contractual arrangements are written agreements between the farmer and contractor (exporter companies). The exporter companies involved in the arrangements are Kenya Horticultural Exporters (KHE) and East African Growers Limited. The agreement specifies the terms and conditions under which the passion fruit producer will tender the passion fruit vines and fruits, while the company will promote the purchase, process and market them.

The company agreed;

a) To provide training in good passion fruit production, handling and grading techniques on periodic basis.
b) To buy agreed and specified passion fruits of acceptable quality tendered by the producer as per the company's requirements.
c) That the quantity of the fruit delivered will depend on the fruit production but has to be regulated by the projections that have been made by the entity concerned with the coordination of these activities.
d) That grading and inspection will be done at the collection centre level whereby both parties will endeavour to adhere to the highest quality standards. Standard raw material

intake quality control regulation set out by the company will be followed upon receipt of the fruit at the processing plant.

e) To supply collection cartons in good time to facilitate timely packaging; to issue delivery notes to each producer group for all the fruit collected at any given date.

f) Not to enter into multiple contract with suppliers whether groups or individual farmers within the area.

g) That the price of fruit will be fifty shillings per kg minimum guaranteed price, however when there is a significance differential between the buying price and the prices in the auxiliary market, the prices of the fruit will be adjusted to attain the market price.

h) Payments of the fruit be made as per the following schedule: Fruits delivered from first day to fifteenth day of the month will be paid on the twenty second calendar day of the existing month and fruits delivered from the sixteenth day to thirty first day of the month will be paid on the sixth day of the proceeding month.

The fruit producer agreed;

a) To use part of the farm that has been surveyed and approved by the company for the purpose of growing, grafting and tendering passion vines and fruit.

b) To follow all technical recommendations made by the company with regard to pruning, weeding, fertilizer, pest and disease control, picking sorting and grading of the passion fruit and maintenance of proper field and orchard hygiene.

c) To conform to the agreed schedule for fruit harvesting and collection; to conform to high standards of handling the fruit with a view to maintain good quality of the fruit.

d) To sell all the fruit to behest of the company's requirements; to maintain all collection crates in good hygiene and to maintain proper record of pesticide usage and crate control.

Based on the discussion with the parties involved, more emphasis is placed on the following aspects; protective clothing, chemical wastes disposal, cleanliness of the chemical storage facilities, chemical pre harvest intervals where the chemicals and spraying chemicals should be as specified by the contractor, documentation of the deliveries and traceability forms are duly filled. The contract specifies ethical trading requirements, penalties of contract breach, communication channels, dispute settlement and duration of the agreement.

Informal contractual arrangements

Table 8 shows that 35% of the farmers visited were contracted through informal contractual agreement. This confirms Fafchamps (2004) mundane explanation for the simplicity of agricultural contracts by indicating that there is no tradition of written contract and traditionally used informal agreements are still commonly used and respected. The informal contractual arrangements are unwritten, verbal agreements between the fruit producer and the buyer. Discussions with the informally contracted passion fruit farmers reveal that some exporter companies such as Kenya Horticultural Exporters enter into informal agreements with the fruit farmers. Other contractors who engage in informal agreements are supermarkets and big brokers who sell the produce to juice producing companies. The contractors do not provide any kind of production support to the producers. The terms of agreement revolve around the sale of the passion fruit produce.

4.4 Challenges Facing Passion Fruit Production through Contractual Arrangements

The second objective sought to determine the challenges that face passion fruit production through contractual arrangement in Embu District. The objective was based on the fact that despite production of the fruit through contractual arrangements the yields are still low. Therefore, the study aimed at establishing of the problems threatening increased production. Results indicate that the challenges included lack of input support, inefficient management, contract breach and increased pest and disease incidences.

Limited input support

Results in Table 7 indicate that only 26.3% of the contracted farmers involved in the study were receiving input support while 73.8% were not. This shows that majority of the contracted farmers were producing the fruits without input support from the contracting companies. This made majority of the farmers unable to expand their production since most of them had limited income sources. The limited input support in addition, impacted negatively on production levels as well as quality since farmers were not financially able to purchase and apply all the required inputs.

Table 7: Percentage of Farmers Receiving Input Support

Whether receiving input support or not		No. of farmers	Percent
Contracted Farmers	No	59	73.8
	Yes	21	26.3
	Total	80	100.0
Non contracted farmers		40	
Total		120	

Contract Breach

The respondents were asked to indicate whether there was contract breach or not. The results are indicated on Table 8.

Table 8: Contract Breach

Whether there was contract breach or not		No. of farmers	Percent
Contracted farmers	No	72	90.0
	Yes	8	10.0
	Total	80	100.0
Non contracted farmers		40	
Total		120	

The findings of the research indicated that contract breach was pronounced in that 90% of the contracted farmers engaged in the survey acknowledged that there was contract breach. This implies that there was minimal or no trust among the parties involved and therefore posed a great challenge to production of fruit through contractual arrangements. The breach of agreement experienced rotated around failure to honour the agreed prices, delayed collection of fruits, delayed payment and buying fruit at lower prices than agreed.

The respondents were further requested to indicate who breached the contract. Table 9 presents the results.

Table 9: Distribution of Breach of Contract

Who was breached the agreement	No of farmers	Percent
Contracted farmer	1	1.4
Contractor	51	69.9
Both	28	28.8
Total	80	100.0
Non contracted farmers	40	
Total	120	

The results indicated that 69.9% of the contract breach was from the contracting companies, 1.4% was by the farmers and 28.8 % of the agreement breach was by both parties. Table 12 shows the distribution of contract breach between the two parties.

The respondents were further asked to indicate whether there were delays in payment or not. Table 10 indicates the number of farmers who complained about delayed payments.

Table 10: Number of Farmers who complained about Delayed Payments

Delayed payments		No. of farmers	Percent
Contracted farmers	Yes	71	88.8
	No	9	11.3
	Total	80	100.0
Non contracted farmers		40	
Total		120	

The results indicated that most of the time the contractor delayed paying for the produce collected. 88.8% of the contracted farmers engaged in the study confirmed that the contracting

companies paid for the produce collected with delay contrary to the agreed time. Table 13 indicates the number of farmers who complained about delayed payments.

Results also indicate that the exporter companies which contracted farmers to produce passion fruit paid for the produce at lower prices than agreed. Table 11 indicate that 65% of the contracted farmers involved in the study acknowledged that there was problem of low prices as opposed to 35% who indicated that the prices were not lower than agreed.

Table 11: Lower Prices than Agreed

Whether the prices are lower than agreed		No. of farmers	Percent
Contracted farmers	No	28	35.0
	Yes	52	65.0
	Total	80	100.0
Non contracted farmers		40	
Total		120	

Increased pest and disease incidences

The results further show that increased pest and diseases incidences also posed a threat to production of passion fruits in Embu District. Table 12 show that 63% of the contracted farmers engaged in the study indicated that pest and diseases incidences have escalated in the recent past and therefore a great challenge to future production of the fruits. The most pronounced diseases were Fusarium wilt and brown spot. All the non contracted farmers engaged in the study indicated that the biggest challenge in fruit production was pest and diseases.

Table 12: Pest and Disease Incidences

Whether there are pest and disease incidences or not		No. of farmers	Percent
Contracted farmers	Yes	76	63.3
	No	4	3.3
	Total	80	66.7
Non contracted farmers	Yes	40	33.3
Total		120	100.0

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	No	4	3.3
	Total	80	66.7
Non contracted farmers	Yes	40	33.3
Total		120	100.0

The study findings also indicated that *Fusarium wilt* and brown spot were the most common diseases whereas the most common pests were the leaf miner. According to USAID/ Kenya (2006), leaf miner pest (*Lyriomyza spp*) is a pest that had caused severe damage to passion fruit plants in Embu District. The study results also confirmed the findings of Fineline Rural Reach Ltd (2007), which found that most farms in Embu district had been affected by *Fusarium wilt* disease, which is also called collar rot and it is characterized by yellowing of leaves. The collar region of affected plant at soil level turns brownish and vertically cracks and vines wilt followed by a complete collapse of the plant. On dissection of infected stems, vascular tissues show brown discoloration.

The findings also revealed that the vines were affected by brown spot, a disease that is caused by *Alternaria passiflorae.* Its symptoms are brown spots, up to 10 mm diameter, on the leaves, often extending along the veins and drying out in the centre. On the stems, spots are up to 30 mm long, and when they occur at the leaf axils may kill the vine, resulting in dieback. On the fruit, the spots are light brown, round and sunken; they often merge, covering large areas, and produce red-brown spore masses. Spores, produced on the leaf, stem and fruit, are dispersed by wind-blown rain. Warm, moist weather favours disease development. Most of the study respondents complained about the disease indicating that most of the affected fruit could only be sold for local consumption only.

4.5 Comparison of Passion Fruit Yields between Contracted and Non Contracted Farmers

The third objectives sought to establish whether informally and formally contracted passion fruit farmers report significantly higher passion fruit yields than non contracted farmers. The independent variable was contractual arrangements while the dependent variable was passion fruit yields. The respondents were asked to indicate their passion fruit yield in per year from 2004 to 2009. Table 13 presents the annual passion fruit yields of passion fruit famers engaged in the study.

Table 13: Total Production of Grade 1 Passion Fruits between the Years 2004 - 2009

Quantity of grade one fruit by various types of farmers							
		2004	2005	2006	2007	2008	2009
Informal	Sum	18210	21070	38798	62400	73786	98520
	N	42	42	42	42	42	42
	Mean	433.5	501.6	923.7	1485.7	1756.8	2345.7
	Std. Deviation	947.1	990.2	1565.6	1432.2	1728.5	5336.9
Formal	Sum	25620	34300	61680	98290	102740	78770
	N	38	38	38	38	38	38
	Mean	674.2	902.6	1623.1	2586.5	2703.6	2072.8
	Std. Deviation	1139.2	1283.0	1510.1	2761.2	2988.1	1929.2
Non contracted	Sum	13000	19460	27680	40510	51290	51110
	N	40	40	40	40	40	40
	Mean	325.0	486.5	692.0	1012.7	1282.2	1277.7
	Std. Deviation	851.7	881.3	967.1	1256.4	963.9	902.7
Total	Sum	56830	74830	128158	201200	227816	228400
	N	120	120	120	120	120	120
	Mean	473.6	623.6	1067.9	1676.7	1898.5	1903.3
	Std. Deviation	985.54	1068.0	1418.9	2005.0	2109.9	3383.4

Setboonsarng *et al*, (2006) observed that Contract farming affords potential benefits to contracting firms in that it result in increased yields and improved quality with regard to certain types of crops. Finding by Kathrin and Heike (2006) indicate that most of the bigger companies have supply obligations with supermarkets, restaurants etc. in Kenya or buyers abroad. Therefore, they have to assure the quantity they need to supply their customers regularly and to

use their processing/packaging facilities to their full capacity. Contract farming is one way to make the production more reliable and predictable. This is confirmed by the study findings in that the informally and formally contracted passion fruit farmers report higher yields than non-contracted in Embu district as shown on Table 13. The table shows the quantity of grade one passion fruits produced by informally and formally contracted passion fruit farmers as well as non contracted farmers engaged in the study in Embu district. It shows the quantities on yearly basis from 2004 to 2009. It indicates the yearly mean, standard deviation and the sum for the two types of contractual arrangement as well as for the non contracted farmers engaged in the study. According to the results shown in Table 13, production of passion fruits has progressively increased since 2004. However, the production of the fruit is expected to decline in the near future due to pest and diseases, limited input support and exploitation by contracting firms.

Testing hypothesis one

The objective related to objective three stated that *there is no statistically significant difference in passion fruit yields between informally and formally contracted passion fruit farmers and non contracted farmers*. ANOVA was used to test whether there was significant difference between the two variables. The findings are indicated on Table 14.

Table 14: Mean Yearly Quantity (kgs) of Passion Fruit between Contracted Farmers

Type of contract	Mean	No.	Std. Deviation	Sum	Significance
Informal	7447.2381	42	7501.63146	312784.00	.002
Formal	10563.1579	38	7538.76042	401400.00	
Non contracted	5076.2500	40	4114.49887	203050.00	
Total	7643.6167	120	6896.27959	917234.00	

df= 119 $\alpha = 0.05$

The findings indicated that there was a statistically significant difference between contracted and non contracted passion fruit farmer's yields as shown on table 17. The significance level is less than the alpha level. The mean passion fruit yield for informally contracted farmers was 7447 kg per year, that of formally contracted was 10563 kg per year and that of non contracted farmers was 5076 kg/year. This implies that formally contracted farmers report higher yield than

informally and non contracted farmers. It is clear from the results that contractual arrangements had a direct influence on passion fruit production in that they helped in increasing the fruit production. This therefore, confirms the findings of Ramaswami *et al.* (2006) who observed that that production under contract is more efficient than non-contract production. However, the results also indicate that formally contracted farmers reported higher yields that informally contracted farmers. This might be due to the assurance that exists in formal agreements whereby there are written documents to show what is expected of each party. It can be further argued that contract breach in formal agreement can be dealt with through the court and this therefore improves compliance.

4.6 Effects of Provision of Selected Contractual Elements

Objective four sought to determine the effects of provision of selected contractual elements on adoption of new technologies to improve passion fruit production. The selected contractual elements in question were inputs such as fertilizers and chemicals, credit, guaranteed payment and extension services.

Guaranteed payment

Most of the farmers who were interviewed acknowledged that a contractor offers them higher prices than they can otherwise obtain in the open market or through brokers. In fact, contracts often fix a price for a relatively long period, which means that in times of over supply the guaranteed contract price might be higher than the one in the open market. Eighty five percent of the contracted farmers involved in the study indicated that one of the major benefits of contractual arrangements is guaranteed payment. Table 15 shows the percentage of passion fruits farmers who benefited from fixed prices through contractual arrangements

Table 15: Provision of Guaranteed Payment

Whether receiving guaranteed payment		No of farmers	Percent
Contracted farmers	No	12	15.0
	Yes	68	85.0
	Total	80	100.0
Non contracted farmers	-	40	
Total		120	

Provision of extension service

Results indicated that majority of contracted passion fruit farmers benefited from extension services offered by the contractor. Table 16 shows that 65% of the contracted farmers engaged in the study received extension services from the contracting companies. Farmers indicated that the companies had employed agronomists who were stationed in the field to provide technical advice. This was supplement by Fine Line Rural Reach Limited staff who acted as link between the contractor and the buyer as well as providing extension service.

Table 16: Provision of Extension Service

Whether receiving extension service or not		No. of farmers	Percent
Contracted farmers	No	28	35.0
	Yes	52	65.0
	Total	80	100.0
Non contracted farmers	-	40	
Total		120	

Provision of inputs

Results indicate that there was limited or no input support through contractual arrangements in passion fruits production in the district. Table 17 indicates that only 26.3% of contracted farmers involved in the study received input support from the contractor, while 73.8% had not. This implies that majority of the contracted farmers were sourcing for inputs on their own. According

to the contractor's field officers they were only offering input support to farmers who had won the company's trust. They reported that some farmers were selling their produce to brokers after being provided with the necessary inputs. This therefore, led to decreased provision of inputs to farmers.

Table 17: Provision of Inputs

Whether receiving input support or not		No. of farmers	Percent
Contracted farmers	No	59	73.8
	Yes	21	26.3
	Total	80	100.0
Non contracted farmers		40	
Total		120	

Provision of credits

Results indicate that the contracting companies were not extending any form of credit to contracted farmers. Table 21 indicates that 100% of farmers contracted by exporter companies did not receive any form of credit. The possible explanation for this is that there was limited trust between the farmers and the contractor. This was contributed by pronounced agreement breach as shown in table 11. The field officers of the exporter companies also reported that some contracted farmers were selling their produce to brokers who were offering them better prices especially during off peaks. As a result, the contracting firms decided not to extend any form of credit to the fruit farmers.

Table 18: Provision of Credits

Does the contractor provide credit?		No. of farmers	Percent
Contracted farmers	No	80	100
Non contracted farmers	-	40	-
Total		120	

Testing hypothesis two

The second hypothesis was that; *Provision of selected contractual elements does not significantly affect adoption of new technologies to improve passion fruit production.* A chi-square test was used to find out whether on adoption of appropriate technologies in passion fruit production was contingent on the provision of selected contractual elements. At 0.05 level of significance and 5 degrees of freedom the critical value determined from the chi square table was 83.003 while the calculated chi- square was 91. 677.

Since the calculated 91.677 (calculated chi) is more than the critical value of 83.00, it was concluded that adoption of new technologies was contingent on provision of selected contractual elements and adoption of new technologies. The null hypothesis was therefore rejected. This implies that provision of input, credit, guaranteed payment and extension services through contractual arrangement aid in adoption of technologies particularly in passion fruit production. Despite the fact that there was limited input support, a positive relationship exits between provision of technical advice, inputs, guaranteed payment and adoption of water saving irrigation methods, chemical, land preparation and grafting technologies. Similarly, Kathrin and Heike (2006) observed that well organized companies pre-finance inputs which small-scale farmers otherwise often could not afford. These inputs and the extension service actually represent new technologies and skills, which enable farmers to increase their yield and meet the quality standards required by the commodity market.

4.7 Contribution of Contractual Arrangement on Improvement of the Produce

The fifth objective sought to determine the contribution of contractual arrangements on improving the quality of passion fruits produce. The essence of this objective was to establish whether contracted farmers produce higher quantities of quality passion fruits than non contracted farmers. The quality aspects in question Table 19 shows the quantities of grade one passion fruits produced. Informally contracted farmers produces an average of 7447kg of quality fruits per year, formally contracted farmers produced 10563kg of quality fruits per year while the non-contracted farmers produced an average of 5076 kg per year.Formally contracted farmers therefore, reported higher quantities of quality produce followed by informally contracted while non contracted farmers reported the lowest quality produce per year.

Table 19: Quantities of Quality Produce (kg).

Type of contract	No. of farmers	Quality produce per year	Quantity of quality fruits (5 years)
Informal	42	7447.2381	312784.00
Formal	38	10563.1579	401400.00
Non contracted	40	5076.2500	203050.00
Total	120	7643.6167	917234.00

Testing hypothesis three

The third hypothesis stated that; *there is no statistically significant contribution of contractual arrangements to improving the quality of passion fruits produced.* One-way ANOVA was used to test the contribution of contractual arrangements on improvement of quality. The results are indicated on Table 20.

Table 20: Mean Quality Passion Fruit Produce.

Type of contract	No. of producer	Mean annual produce	Std. Deviation	Df	Significance
Informal	42	7447.2381	7501.63146	2	.002
Formal	38	10563.1579	7538.76042		
Non contracted	40	5076.2500	4114.49887	117	
Total	120	7643.6167	6896.27959	119	

df= 119 $\alpha = 0.05$

The study findings indicate that contractual arrangements significantly contribute to improvement of passion fruit quality. Table 20 shows the mean quality passion fruit produced by farmers engaged in the study. This was due to the fact that contract farming usually makes smallholder farmers more aware that their products must satisfy the consumer, something that is often taken for granted in the case of mass-produced staple crops such as maize. Intensive technical advice and input support that was provided to the contracted passion fruit farmers had also played a big role in improving the quality of produce. The findings confirm what was observed by Eaton and Shepherd (2001) that market for fresh and processed agricultural produce requires consistent

quality standards. Moreover, these markets are moving increasingly to a situation where the supplier must also conform to regulatory controls regarding production techniques; particularly the use of pesticides and this quality consistency can only be achieved through contract farming.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter covers summary of the study findings as presented. It also presents the conclusions and recommendations based on the findings of the effects of contractual arrangements on passion fruit production. It also presents areas related to the study that needs further research.

5.2 Summary

This study focused on the effects of contractual arrangements on passion fruit production in Embu District. The research was guided by specific objectives and hypotheses. The study was conducted among small scale farmers producing passion fruits through contractual arrangements, as well as those who are not contracted. The research focused mainly on the following areas; farmer characteristics which included education levels, age, land sizes and ownership, types of contractual arrangements used in passion fruit production, challenges facing its production, production levels, adoption of technologies and the contribution of contractual arrangements in quality of produce improvement.

The review of literature related to the variables under investigation was done. Literature from both developing and developed countries was presented. The aspects reviewed included contract farming in Kenya, nature and types of contractual arrangements, importance of contract farming, contractual elements, smallholder participation in contractual arrangements, contract farming as an avenue of technology adoption and diffusion, passion fruit production in Kenya and importance of quality.

Survey research method was used in this study where proportionate sampling was used to select a study sample of 120 passion fruit farmers. The research design employed was *ex post facto.* Questionnaires were used in data collection. The questionnaires were delivered to the farmers and those unable to respond were guided by the researcher. Data was then subjected to Statistical Package for Social Sciences after coding. Hypotheses were tested using, one way ANOVA and chi square at ≤ 0.05 level of significance.

The research findings indicated that the types of contractual arrangements used in passion fruit production were formal and informal. Formal contractual arrangements involved written agreements between the buyer and the producer; they are legally binding while informal contractual arrangements are verbal and self enforcing since they cannot be enforced by legal authorities.

The research found that the challenges that have been threatening production of passion fruits through contractual arrangements which included, Lack of input support which was an obligation of the contracting party, inefficient management and marketing problems which include corrupt practices of the field staff , contract breach and pest and disease incidences. The study further established that formally contracted farmers reported higher passion fruit yields, followed by informally contracted farmers, while non contracted farmers reported the lowest level of yields. The results indicated that provision of contractual elements such as inputs, guaranteed payments, credit and technical advice, directly influenced adoption of such technologies as application of appropriate chemicals, application of efficient irrigation methods, land preparation technologies and appropriate planting materials that is use of grafted passion fruit seedlings. Contractual arrangements had a direct influence on the quality of the passion fruit produce since contacted farmers received intensive technical advice and a few farmers also benefited from input support, which helped in improving the quality.

5.3 Conclusions

Based on the findings of the study, it can be concluded that contract farming is not a panacea to solve all related problems of agricultural production and marketing systems. However it appears to be a promising institutional arrangement to facilitate farmers' access to an array of agricultural services from which they are typically excluded. Contract farming enhances the agricultural productivity and efficiency of poor farmers by introducing improved farming practices through the provision of inputs, transportation, extension services, and, most importantly, market access. It also brings investments and technical expertise to rural areas. The types of contractual arrangements used in passion fruit production are formal and informal. The degree of formality varies in formal arrangements and quite a number are rather informal mainly based on mutual trust and verbal agreements. To determine which linkages are more formal than others is

tively difficult because it might happen that well organized companies which provide the ıers with inputs, extension and transport thus giving a formal impression on the other hand 't feel the need to issue contracts and therefore could also be categorized as informal. Small er farmers engage in contractual arrangements because of the risks and uncertainties that t particularly when the crop is a high-value, high-risk crop.

clear from the findings that informally and formally contracted farmers reported higher ion fruit yields as compared to the non contracted farmers because of the support services ided by the contractors. However, formal contractual arrangements proved more appropriate : formally contracted farmers reported higher yields than informally contracted farmers. The ·actual support services offered by the contractors motivated farmers to adopt the ɔpriate technologies in passion fruit production. However, maximum passion fruit ıction could not be attained due to the diverse challenges that farmers faced. These enges included limited input support, contract breach, pest and diseases. Production of on fruit through contractual arrangements helped in improving the quality of the passion produce as contracted farmers reported higher grade one quantities compared to non acted.

ecommendations

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Recommendations Based on the Findings

Contracting firms (EAGL & KHE) and passion fruit farmers should enter into a formal contractual arrangements inn order to build a long term business relationship based on trust, mutual respect and transparency, rather than on contracts that lack compliance.

The Market Service Linkage Provider (Fineline Rural Reach Limited) needs to enforce the terms of agreement to reduce cases of contract breach and other disputes between the contracting parties.

relatively difficult because it might happen that well organized companies which provide the farmers with inputs, extension and transport thus giving a formal impression on the other hand don't feel the need to issue contracts and therefore could also be categorized as informal. Small holder farmers engage in contractual arrangements because of the risks and uncertainties that exist particularly when the crop is a high-value, high-risk crop.

It is clear from the findings that informally and formally contracted farmers reported higher passion fruit yields as compared to the non contracted farmers because of the support services provided by the contractors. However, formal contractual arrangements proved more appropriate since formally contracted farmers reported higher yields than informally contracted farmers. The contractual support services offered by the contractors motivated farmers to adopt the appropriate technologies in passion fruit production. However, maximum passion fruit production could not be attained due to the diverse challenges that farmers faced. These challenges included limited input support, contract breach, pest and diseases. Production of passion fruit through contractual arrangements helped in improving the quality of the passion fruit produce as contracted farmers reported higher grade one quantities compared to non contracted.

5.4 Recommendations

Two sets of recommendations are emanating from this study. The first set is based on the findings of the study in relation to the set objectives. The second set is based on the issues that emerged during the study and could not be dealt with due to the scope of the study.

5.4.1 Recommendations Based on the Findings

a) Contracting firms (EAGL & KHE) and passion fruit farmers should enter into a formal contractual arrangements inn order to build a long term business relationship based on trust, mutual respect and transparency, rather than on contracts that lack compliance.

b) The Market Service Linkage Provider (Fineline Rural Reach Limited) needs to enforce the terms of agreement to reduce cases of contract breach and other disputes between the contracting parties.

c) Capacity building to empower individual farmers and farmers associations to increase their bargaining skills should be considered by Fineline Rural Reach Limited as the primary step in improving contractual arrangements. Education on what are the responsibilities, obligations as well as the rights and expectations of both contracting partners should be the prime purpose of the training.

d) Contracting companies (EAGL & KHE) need to organize exposure visits such as trips to the processing plant or pack house of their respective buyers. This can serve as a revelation to show farmers the expenses in terms of labour and equipment a buyer needs to make in order to be successful in the business. Through this experience, farmers can better understand the quality requirements the buyer needs that in turn help them in their grading procedure in the field. Furthermore, such interaction might create a closer bond between the two parties and thus increase the compliance with the contract.

e) There is need for the contracting companies (EAGL & KHE) to increase input support and credit facilities to equip the farmers adequately to fight with the escalating incidences of diseases and pest particularly *Fusarium wilt* and *brown spots* which cause high losses to the farmers.

5.4.2 Recommendations for Further Research

a) Research is needed to provide a better understanding of modes of operation of contractual arrangements and their sustainability of their involvement as the contractual relationship matures.

b) Research is also needed to find out the role of private-public partnerships in promoting and sustaining contract farming.

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APPENDICES

Appendix I: Farmers Questionnaire

Introduction

Your household is among several passion fruits growing households selected to assist with information regarding its production. I am conducting a study on the effects of contractual arrangements on passion fruit production. It is very important that you provide correct responses because the information gathered will contribute towards solving the underlying problems in fruit production. All information obtained will be treated with utmost confidentiality.

Instructions

i) Please read each question and respond to it as requested

ii) Do not write your name anywhere on the questionnaire.

iii) Respond by checking ( ) or by providing the information requested on the spaces provided.

Section A: General information

Village .....

Sub location .....

Location .....

Division .....

Section B: Farmer characteristics

1. Age.....

2. Gender

Male ☐

Female ☐

3. Highest education level

None ☐

Primary ☐

Secondary ☐

College ☐

University ☐

4. Size of land holding in acres

Less than 6 ☐

6-10 ☐

11-15 ☐

16-20 ☐

21-25 ☐

26-30 ☐

Over 30 ☐

5. Mode of ownership of land

Owned with a title deed ☐

Communal ☐

Owned without a title deed ☐

Leased ☐

Others specify.....

6. What is the number of members in your household including dependants?

Less than 3 ☐

3-6 ☐

7-9 ☐

10-12 ☐

Above 12 ☐

Others specify .....

Section C: Production data.

7. What is the acreage under the following crops;

Acres under all crops .....

Acres under food crops .....

Acres under passion fruits.....

Acres under other cash crops .....

Acres under fodder crops .....

8. How long have you grown passion fruit? .....

9. What was the acreage at the initial stages of passion fruit production? .....

10. What is the acreage under passion fruit now? .....

11. Do you intend to increase the acreage for passion fruit production?

Yes ☐

No ☐

If No, why.....

If yes, by how many acres .....

Why.....

12. State the price offered by contractor per kilogramme of grade one of passion fruit delivered in Khs .....

13. State the prices offered by brokers per kilogramme of grade one of passion fruit delivered .....

14. What is the frequency of payment after produce delivery? ☐ Weekly ☐ every 2 weeks ☐ monthly

15. What are the quality specifications? .....

16. Passion fruit yields

Year	Area (acres)	No. of vines	Quantity of grade one fruits (kg)	Quantity of reject fruits (kg)	Total output (kg)
2004					
2005					
2006					
2007					
2008					

17. What is your average annual income from passion fruit?

Source	Less than 12,000	13,000-30,000	31,000-50,000	51,000-70,000	Over 70,000
passion fruits					

Section D: Production Technologies

18. Technologies applied in passion fruit production.

Activity	Technology	Units/Quantity/No
a) Land Preparation		
b) Irrigation		
c) Spraying		
d) Harvesting		
e) Transportation		
f) Chemicals		

Fill in the above table by selecting the number of the technology applied and then supplying the quantity of that technology.

a)1 = Tractor, 2 = Ox-plough, 3 Hand tool 4 = 2 & 3 5 other specify.

b)1=Water pump 2= sprinkles 3= Flooding 4= Drip 5 =others specify.

c)1 =Knapsack 2 =Jerry can and twigs 3= others.

d)1 =Human labour 2= machine 3= other (specify).

e)1=Ox-Cart, 2=motor-vehicle, 3=human labour, 4=1 and 3, 5=Bicycles, 6=other (specify)

f)1= chemical pesticides, 2= traditional chemicals, 3 =none

19. Are you using grafted seedlings?

Yes ☐

No ☐

If No, why .....

20. What is the recommended spacing for passion fruit seedlings? .....

21. Do you use the recommended spacing? ☐ Yes ☐ No

If No, why? .....

22. Do you apply fertilizer on your passion fruit crop? Yes ☐ No ☐

If yes, provide the following information;

At Planting			Top dressing			
Type	Rate	Method of application	Type	Rate	Method of application	Frequency

If No, give reasons for not using fertilizer .....

Section E: Contractual Arrangements

23. Are you producing passion fruits through contractual arrangements?

Yes ☐

No ☐

If No, do you ever think of entering into a contractual arrangement?

.....

If yes, what are the incentives that made you to enter into a contract?

.....

.....

.....

.....

24. Type of agreement.

Formal ☐

Informal ☐

25. Period under such arrangements ☐ (seasons).

26. When is the price offered?

During planting ☐

During harvesting. ☐

During contract signing ☐

27. Do you like the price offered?

Yes ☐

No ☐

If No, why.....

Section F: Support Services

28. Who does grading of passion fruits? ☐ Farmers ☐ contractor

29. Who caters for the cost of transporting the produce? Farmer ☐ contractor ☐

30. Which one of the following technologies does the contractor provide?

Seeds ☐

Fertilizer ☐

Pesticides ☐

Credit and Seeds ☐

Fertilizer and Pesticides ☐

All ☐

If the contractor provides the above items, do you use them as recommended?

Yes ☐ No ☐

If No, why .....

31. Do you know where to get extension services (advice or information) on passion fruit production?

Yes ☐ No ☐

If yes, provide the following information.

Extension services	**Provider**
Nursery management	
Field establishment	
Chemical application	
Record keeping	
Water management	
Eurepgap	
Grading	

Section G: Problems/challenges faced by the contracted farmers

32. Was there a contract breach since you started producing passion fruit through contractual arrangement? Yes ☐ No ☐

33. Who breached the contract? Farmer ☐ contractor ☐

34. Which other problems do you encounter when engaged in contract farming?

i. .....

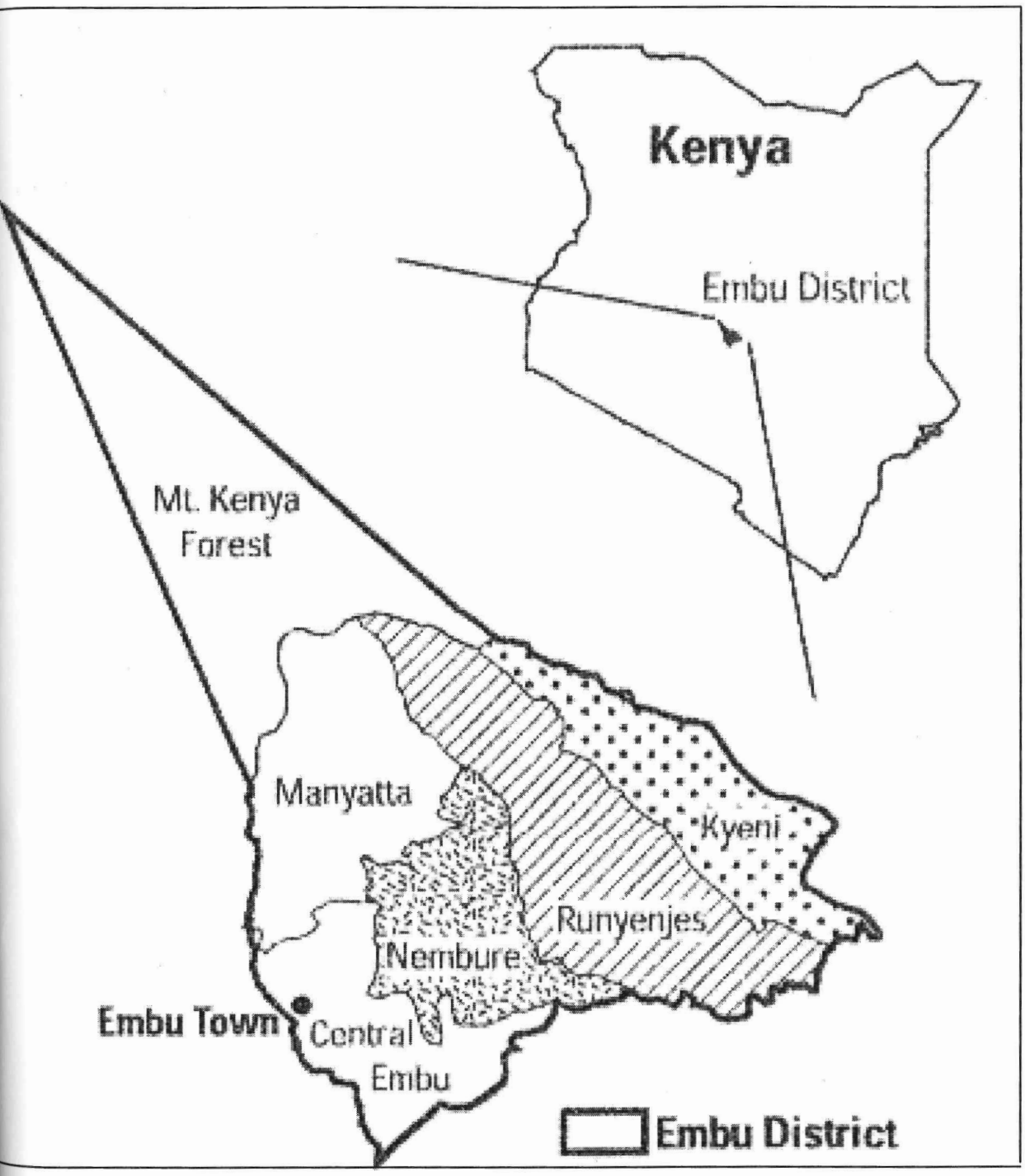
ii. .....

iii. .....

35 .Advantages/disadvantages of contract farming

What advantages do you see for you as a farmer for being engaged into contract farming?	1..... 2..... 3..... 4.....
What disadvantages do you see for you as a farmer for being engaged into contract farming?	1..... 2..... 3..... 4 .....

Appendix II: A Map of Embu District



Appendix III: Kenya Horticultural Exporters Passion Fruit Contract

11

MEMORANDUM OF AGREEMENT MADE this.....**Day of**.....**2009,** between **KENYA HORTICULTURAL EXPORTERS(1977) (KHE),** Exporters of Fresh Horticultural Produce, hereinafter referred to as " The Company" and Passion fruit Producer Group, _____, hereinafter referred to as "The Partner Group " whose address is : c/o .....Location, ... Division. This contract specifies the terms and conditions under which the Passion fruit Producer Group will tender the Passion fruit vines and fruits, while the Company will promote, purchase, process and market them.

This contract specifies the terms and conditions under which the Passion Fruit Producer Group will tender the passion fruit vines and fruits, while the Company will promote, purchase, process and market them.

1. The Company agrees:

i. To provide training in good Passion fruit production, handling and grading techniques on a periodic basis.

ii. To buy all agreed and specified Passion fruits of acceptable quality tendered by the Producer group as per the Company's requirements. The Passion fruit is subject to quality assessment by staff of the company.

iii. That the quantity of fruit delivered will depend on the fruit production but has to be regulated by projections that have been made by the entity concerned with the co-ordination of these activities.

iv. That grading and inspection will be done at the Collection center level whereby both parties will endeavor to adhere to the highest quality standards. Standard Raw material intake quality control regulations set out by the company will be followed upon receipt of the fruit at the processing plant

v. To supply collection cartons in good time to facilitate timely packaging.

vi. To issue relevant delivery notes to each producer group for all the fruits collected at any given date.

vii. Not to enter into multiple contracts with suppliers – whether groups or individual farmers - within the program area i.e. Embu and Meru Districts.

viii. That the **price of fruit will be market driven** and the average **buying price will be sixty seven shillings (KShs.67) per kilogram** of passion fruits less K.Sh.2 for commercialization and KShs.2 for GlobalGAP fund, hence a net of KShs.63 per kg.

ix. Fruits delivered from 01st to 15th calendar day of the month will be paid on the 22nd calendar day of the existing month. Fruits delivered from 16th to 31st calendar day of the month will be paid on the 06th calender day of the proceeding month.

x. That payment will be done by cheque in favour of Equity Bank – Embu and Meru Branches with an accompanying list of the groups to be credited with specific amounts.

UPAGE UIU

2. **(a) The Producer group agrees:**

i. To use the part of their farm that has been surveyed and approved by the Company, for the purpose of growing, grafting and tendering the Passion fruit vines and fruits.

ii. To follow all technical recommendations made by the Company with regard to pruning, weeding, fertilizing, controlling pests and diseases, picking, sorting and grading of the Passion fruits and maintenance of proper field and orchard hygiene.

iii. To supervise all matters pertaining to harvesting of fruits to ensure that fruits are harvested at the right stage as per the company's specifications.

iv. To conform to high standards of handling the fruit with a view to maintaining good quality of fruit.

v. To conform to the agreed schedule for fruit harvesting and collection as agreed upon between the program and KHE.

vi. To sell all agreed and specified Passion fruits of acceptable quality tendered on the farm to the behest of the Company's requirements.

vii. To maintain all packaging cartons in good order and hygiene. Company cartons that are lost will be replaced at the group's expense at the rate of fifty shillings (Kshs.50) per carton.

viii. To maintain proper records of pesticide usage and carton control. Failure to adhere to these practices will force the company to reject fruits or terminate this contract. These standards MUST be strictly adhered to at all times.

ix. To ensure that the company is made aware of all fruits that are rejected at the farm level and sold as rejects, and share all the relevant information between the concerned parties.

x. To give accurate projections to the company.

xi. To deliver fruits at the collection/grading centre at own cost.

xii. To grade fruits as per the recommendations at the grading centre.

xiii. To pay two shillings (Kshs2.00) per kg of fruit sold to cater for GlobalGAP certification process. These monies will be held in a separate account at Equity Bank, Embu. The account will be managed by Fineline Rural reach on behalf of the producer group. The producer group hereby authorizes KHE Ltd to deduct and remit the amount to the designated bank account.

xiv. To pay a service fee of two shillings (Kshs.2) per kilogram of fruit sold to Fineline Rural Reach for management of the project. The producer group hereby authorizes KHE Ltd to deduct and remit the amount in favor of Fineline Rural Reach Ltd

xv. **That all members are jointly and severally bound by this agreement.** All farmers will sign to indicate their commitment to the project.

(b) More emphasis must be placed on the following aspects: -

i. The Producer group MUST at all times ensure that adequate protective clothing is used by those concerned with issuing, mixing or applying agricultural chemicals on the farm.

ii. The Producer group MUST ensure that all empty Chemical Containers are punctured, burnt and buried in accordance with safe use requirements.

iii. The Producer group MUST provide suitable secure storage space for all chemicals used on the farm, which should be well organized and clean. Neat legible stock records must be kept at all times.

iv. The Producer group MUST adhere strictly to chemical pre-harvest intervals (PHI) when spraying any agricultural fungicide/pesticide as per the Company's Recommended Pesticide List (hereon forwarded) on crops grown under this agreement. These PHIs are to be recorded in every instance.

v. To report immediately to any member of Fineline/ KHE Production Team any situation arising on the farm, and / or within the group which at any time may compromise the agreed programme or endanger the health of the consumer.

vi. To ensure that all collections/ deliveries are documented on Produce collection notes (P.C.N.s).

vii. To ensure that all traceability forms are duly filled and accompany harvested fruit.

3. Ethical Trading:

It is a requirement for all producer groups to ensure that Company's business is at no time put at risk as a result of contraventions of the International Labour Organization (ILO), or our customer's standards relating to the employment of staff.

i. The conditions under which workers are employed must not deny or demean their basic human rights, freedoms and dignity. Producer groups may not use forced labour, nor shall workers be required to surrender identity papers or lodge deposits prior to commencing employment.

ii. Producer groups should provide a safe and hygienic working environment, clear, toilet facilities and portable water. Workplace hazards must be removed or minimized. Any accommodation must be safe and clean, with hygiene food storage, and meet the basic needs of the worker.

iii. Producer groups cannot use child labour (under 16). Young persons (16-18) must not work at night or in hazardous conditions.

iv. Producer groups must not engage in or threaten physical, sexual or verbal abuse and shall not employ harassment or intimidation of any kind.

Appendix IV: East African Growers Passion Fruit Contract

Confidential

EAST AFRICAN GROWERS LTD. PASSIONFRUIT CONTRACT

- 1 -

MEMORANDUM OF AGREEMENT MADE this First Day of **April 2005** between EAST AFRICAN GROWERS LTD (EAGA), Exporters of Fresh Horticultural Produce, hereinafter referred to as " The Company" and Passion Fruit Producer Group, ..., hereinafter referred to as "The Farmer Group " whose address is : c/o ..... location, ... Division, Embu District.

This contract specifies the terms and conditions under which the Passion Fruit Producer Group will tender the passion fruit vines and fruits, while the Company will promote, purchase, process and market them.

Preamble:

EAGA / KBDS has selected the high growth potential area of Embu and Meru Districts, within the Eastern Province as the project area for its intervention in the fruit quality enhancement project. These districts are among the leading zones in the production of passion within the Republic.

The project area will initially cover Embu and Meru Districts and will work with about two thousand small-scale farmers organized into production units.

Membership to the newly formed or existing Passion producer group carries some certain privileges and obligations. These include the right to market the Passion fruit through East African Growers Limited and to receive related technical and business services as long as all the other obligations and rules of the contractual agreement and group membership regulations are complied with.

The Company agrees:

- To assess the suitability of the area or location proposed by the Farmer Group for Passion production.
- To provide high-quality pesticide inputs to the Farmer Group in good time and quantity for effective vine and fruit husbandry.
- To provide training in good Passion production, handling and grading techniques on a periodic basis.
- To buy all agreed and specified Passion fruit of acceptable quality tendered by the Farmer Group as per the Company's requirements.
- That the quantity of fruit delivered will depend on the fruit production.
- That grading and inspection will be done at Farmgate and the farmer is paid for all produce which is carried by the company at the farm gate **provided** that quality specifications are maintained and that packability of the fruits are ninety percent (90%) and above. Both parties will endeavour to adhere to the highest quality standards.
- To supply collection crates in good time to facilitate fruit collection.
- To issue relevant delivery notes for fruits collected.
- Not to enter into multiple contracts with suppliers within the project area

Signature EAGA..... Signature Group.....

- That the price of fruit will be fifty shillings per Kg (50/= per Kg). When there is a significant differential between the buying price and the prices in the auxiliary market, the price of the fruits will be adjusted to attain the then market price.
- That payment will be done by cheque to the relevant Farmer Group.
- The payment of fruits will be done as per the following schedule :

Fruits delivered from 01st to 15th calendar day of the month will be paid on the 22nd calendar day of the existing month.

Fruits delivered from 16th to 31st calendar day of the month will be paid on the 06th calendar day of the proceeding month.

- To append all payment processing analysis with the Farmer Group Cheque deposits and advise KBDS consultant for dissemination to the groups.

The Farmer Group agrees:

- To use the part of their farm that has been surveyed and approved by the Company, for the purpose of growing, grafting and tendering the Passion vine and fruit.
- To follow all technical recommendations made by the Company with regard to pruning, weeding, fertilizing, controlling pests and diseases, picking, sorting and grading of the Passion fruit and maintenance of proper field and orchard hygiene.
- To conform to high standards of handling the fruit with a view to maintaining good quality of fruit.
- To conform to the agreed schedule for fruit harvesting and collection.
- To sell **ALL** fruit under the defined project to East African Growers Ltd only.
- To sell all agreed and specified Passion fruit of acceptable quality tendered on the farm to the behest of the Company's requirements.
- To maintain all collection crates in good order and hygiene. Company crates that are lost will be replaced at the group's expense.
- To maintain proper records of pesticide usage and crate control. Failure to adhere to these practices will force us to reject fruits, and / or terminate this contract. These standards MUST be strictly adhered to at all times.
- **That all members are jointly and severally bound by this agreement.**

  Refer to Appendix A – Protocol of Signatures of all members of the Farmer Group.

  More emphasis must be placed on the following aspects:-

i. YOU MUST at all times ensure that adequate protective clothing is used by those concerned with issuing, mixing or applying agricultural chemicals on the farm.

Signature EAGA..... Signature Group.....

ii. YOU MUST ensure that all empty Chemical Containers are punctured, burnt and buried in accordance with safe use requirements.

iii. YOU MUST provide suitable secure storage space for all chemicals used on the farm, which should be well organised and clean. Neat legible stock records must be kept at all times.

iv. YOU MUST adhere strictly to chemical pre-harvest intervals (PHI) when spraying any agricultural fungicide/pesticide as per the Company's Recommended Pesticide List (hereon forwarded) on crops grown under this agreement. These PHIs are to be recorded in every instance.

1) To report immediately to any member of the EAGA / WILHAM / SHALIMAR Production Team any situation arising on the farm, and / or within the group which at any time may compromise the agreed programme or endanger the health of the consumer?

2) To endeavour at all times to improve post harvest and cold chain procedures on the contract farm through the use of field shades, wet wall technology and charcoal / electric coolers.

3) To ensure that all collections / deliveries are documented on Produce collection notes (P.C.N.s).

4) To ensure that all traceability forms are duly filled and accompany harvested fruit.

Ethical Trading:

It is a requirement for all farmer Groups to ensure that Company's business is at no time put at risk as a result of contraventions of the International Labour Organisation (ILO), or our customer's standards relating to the employment of staff.

- The conditions under which workers are employed must not deny or demean their basic human rights, freedoms and dignity. Farmer Groups may not use forced labour, nor shall workers be required to surrender identity papers or lodge deposits prior to commencing employment.

- Farmer Groups should provide a safe and hygienic working environment, clean toilet facilities and potable water. Workplace hazards must be removed or minimized. Any accommodation must be safe and clean, with hygiene food storage, and meet the basic needs of the worker.

- Farmer Groups cannot use child labour (under 16). Young persons (16-18) must not work at night or in hazardous conditions.

Signature EAGA..... Signature Group.....

Appendix V: Research Authorization

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THIS IS TO CERTIFY THAT:

Prof./ Dr./ Mr./ Mrs./ Miss. RAPHAEL MWITI GIKUNDA

of (Address) EGERTON UNIVERSITY P.O. BOX 536, EGERTON

has been permitted to conduct research in .....

..... Location,

EMBU District,

EASTERN Province,

on the topic EFFECTS OF CONTRACTUAL ARRANGEMENTS ON PASSION FRUIT PRODUCTION IN EMBU DISTRICT, KENYA.

.....

for a period ending 31ST DECEMBER, 20 10

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Research Permit No. NCST/RRI/12/1/AS/10

Date of issue 15/11/2010

Fee received SHS 1,000



Applicant's Signature

Secretary National Council for Science and Technology