Agricultural Forward Contracts as Pre-harvest Commodity Marketing: Problems and Prospects

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FOREWORD

A better marketing system is expected to stimulate the agricultural production to increase the capacity to feed the growing population and at the same time meeting the needs of consumers and allocating scare resources more efficiently. High price fluctuations, high marketing margins, lack of integration between input supply production and marketing, unstable output markets and inefficiency of government intervention in marketing are some of the major issues in the agricultural marketing sector in Sri Lanka. Price volatility leaves a farmer uncertain whether he will receive a high price or a low price at the time of sale. As an alternative to the conventional government intervention in agricultural marketing, the Central Bank of Sri Lanka introduced forward Sales Contracts (FSC) under the *Govi Sahanaya* scheme in 1999 for mainly paddy and selected other field crops. Importance of this study can be highlighted as, to safeguard the farmers from seasonal price declines and to popularize forward market contract for other field crops are the priority direction areas in the government development policy framework.

This study mainly aims at investigating the socio economic factors affecting the adoption of Forward Sales Contracts and the present situation of the programme. The study focused on Forward Sales Contracts in most popular other field crops, maize and soya bean. The study found experienced, educated innovative small scale maize farmers with more agricultural income who are more likely to participate in contract farming through agricultural forward contracts. Success stories reveal a "win-win" situation where all key determinants are integrated properly: selection of farmers, awareness, capacity building, delivery of inputs, pre and post harvest technology, technology transfer, trust building, pricing, financial support, timely payments, social and welfare activities and human resources development for both farmers and company field staff. An essential factor derived from the success stories is that, the sustainability of forward contracts depends on practicing the whole concept of contract farming through vertically integrated value chain is needed rather than limiting only for forward sales buying agreement. Experiences suggest the need for the government to create a mechanism to encourage implementing agricultural forward contracts through contract farming. Effective coordination among concerned parties and stake holders through awareness programmes is vital for the sustainability.

I congratulate the team of researchers for successfully undertaking this study and hope the findings and recommendations of the study would be useful to the policy makers in the agricultural sector, planners and academic community.

E M Abhayaratne
Director

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EXECUTIVE SUMMARY

As an alternative to the conventional government intervention in agricultural marketing, the Central Bank of Sri Lanka introduced Forward Sales Contracts (FSC) under the *Govi Sahanaya* scheme in 1999. More than ten years after the implementation of FSCs, still a mixed performance and low-level of adoption can be observed. The major objective of the study was to assess the factors affecting the adoption of FSCs. This study applied the Maximum Likelihood Logistic Regression (*Logit*) method to analyze the factors affecting the adoption of the forward sales contracts system related to the two groups of contracted and non contracted maize farmers. The analysis indicated that variables such as agricultural experience, agricultural income, and total agricultural land holdings are positively and significantly related to farmer's decision making on adoption of FSCs. Moreover, statistically significant higher yield by maize contract farmers over non contract farmers was achieved due to efficient input delivery mechanism. Regarding agricultural income, significant differences between adopters and non adopters were observed since adopters had more agricultural income than non adopters. This is mainly due to growing cash crops by the adopters during other seasons while growing rain fed crops by others. Nearly 44% of the contract farmers were young (below 40 years) and the participation of women was 20%. Nearly 85% of the contract farmers were satisfied with the extension services and seeds given by the company.

The findings revealed that experienced, educated progressive small scale maize farmers with more exposure to other cash crops cultivation with high income earning are more likely to participate in contract farming through agricultural forward contracts. It also revealed that following the whole contract farming model instead of following FSCs alone, was productive. Further, efficient input delivery mechanism, vertically well integrated value chain of the company, proper monitoring of each step, agricultural extension service, long term relationship and building mutual trust between farmers and buyers, an assured market for buyers, thinking beyond FSC document, group formation and encouraging the group cohesion among farmers, and welfare and social programmes implemented by the company are the key factors for the success of FSCs. For ensuring more participation of small farmers, company limits the land extent of each farmer. Inability to sell the whole harvest to the company, high input prices, lack of credit, and lack of crop insurance have been identified as major constraints of contract farmers.

A very essential factor derived from the success stories is that, for the sustainability of forward contracting practicing the whole concept of contract farming through vertically integrated value chain is beneficial than limiting to only forward sales buying agreement.

Smallholders organize themselves into farmer organizations as a prerequisite for entering into contract farming and establish proper crop insurance and credit programme and increase the awareness of all stakeholders about such programmes.

Standards and minimum guaranteed prices should be defined separately for the maize and soya for the food and feed use. In selection of crops, priority should be given to industrial processing and export oriented crops such as maize, soya bean, green gram, black gram and gerkin.

The findings suggest that in future, when planning more attention should be paid to contract farming system than FSC approach. At the national level, there should be a framework that supports contract farming. Such a framework does not currently exist in Sri Lanka. Lessons learnt from the success programmes should be replicated. Experiences suggest the need for government to create a favorable environment and a mechanism to encourage implementing agricultural forward contracts through contract farming. Development of a mechanism for legislation, guidelines and awareness of contract farming practices in Sri Lanka are prerequisites for success. Effective coordination among the concerned parties and stakeholders through awareness programmes is vital for the sustainability.

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ABBRIVIATIONS

CBSL	-	Central Bank of Sri Lanka
CSR	-	Corporate Social Responsibility
FAO	-	Food and Agriculture Organization
FSC	-	Forward Sales Contract
GDP	-	Gross Domestic Product
GRN	-	Goods Released Note
HARTI	-	Hector Kobbekaduwa Agrarian Research and Training Institute
LOGIT	-	Logistic Regression Model
MIS	-	Market Information System
NCRCS	-	New Comprehensive Rural Credit Scheme
RDD	-	Regional Development Department
USAID	-	United States Agency for International Development

CHAPTER ONE

Introduction

1.1 Background

Agriculture has been the backbone of the Sri Lankan economy with one-third of the rural population depending on it. It contributes to about 11.1% of the country's Gross Domestic Product and 32.9% of the total employment and 24% of the exports (Central Bank of Sri Lanka, 2012). The relationship between Sri Lankan life and agriculture is so intimate, that it permeates all aspects of Sri Lankan culture and history. Sri Lankan agriculture has witnessed a phenomenal transformation during the past six decades. This was brought not only by technological changes, but also by institutional innovations in delivering farm inputs and marketing of output.

Within the framework of open market economy, Sri Lankan agriculture faces a number of challenges such as production at competitive prices and meeting global standards with regard to quality, while providing foods for the rising population. Wide fluctuations in food commodity prices due to the seasonality of crop production are a common phenomenon experienced in the farming sector. In general, agricultural commodity prices have been more volatile than those of manufactured goods over the last three decades all over the world, mainly due to the impacts of changing climate or weather related risks and price related risks which is inherent to the agriculture sector.

Price volatility leaves a farmer uncertain whether he will receive a high price or a low price at the time of sale. The problem is however, not limited to how much cash a farmer receives for his harvest. Every investment decision a farmer makes during the crop cycle is a difficult one because he does not know whether he will be able to pay back the loan for the investment (i.e. labour, fertilizer, equipment and repairs). The expected commodity price, prices of competing crops and government programmes play important roles in determining the area to be planted. Uncertain prices pressure a borrower's ability to repay and thus make agriculture financing a risky proposition for lenders. In the absence of appropriate risk management instruments, financiers are reluctant to finance traders given the cash flow uncertainty. Often they will raise interest rates to cover uncertain risks, or simply refuse to provide credit. As a result, lack of price risk management has becomeone of the major reasons that poor farmers stay poor (World Business Council for Sustainable Development, 2004).

IMF Research (Cashin, 2003) emphasizes fluctuations in world commodity prices and terms of trade as the most important external shocks that would affect macroeconomic performance and external balances of developing countries.

Over the past half century, the international community and governments have attempted to manage commodity price risks by stabilizing price volatility or making the price distribution less variable through market interventions. Key among these mechanisms was compensatory mechanisms, stabilization mechanisms and international agreements. As the poor performance of stabilization schemes became more evident, academics and policy makers began to distinguish between policies that try to change price distribution either domestically or internationally, and policies that used market based solutions for dealing with market uncertainty. They turned to policies that emphasized risk management instead of efforts to manage agricultural markets (Kang and Mahajan, 2006).

The key advantages of market based instruments over price stabilization schemes are that market based instruments provide certainty of future revenues and ensure the use of concrete cash flows, rely on market prices rather than administrative prices, thus shifting risks to viable financial markets that are better able and willing to assume risks, andcan increase the creditworthiness of the borrower. Commodity future markets remain the most efficient price formation mechanisms, providing reliable benchmarks for physical trade, and the low cost of executing transactions, liquidity and also standardized requirements (Varangis and Larson, 1996).

Agricultural commodity marketing is a problematic area not only in Sri Lanka but also in most of the developing countries. During the harvesting season farm gate prices declined drastically and during the off season high prices were recorded creating wide fluctuations in prices of agricultural produce between the seasons. In other words, during the season, prices fall sharply, usually below the cost of production, making agricultural activities unprofitable and unviable. In contrast, off-season short supply pushes prices up, giving wrong signals to farmers, while raising the cost of living of the consumers. Due to this scenario both farmers and consumers were negatively affected. Therefore, greater stability of the prices of agricultural produce would sustain the farmer and ease the burden of the consumer.

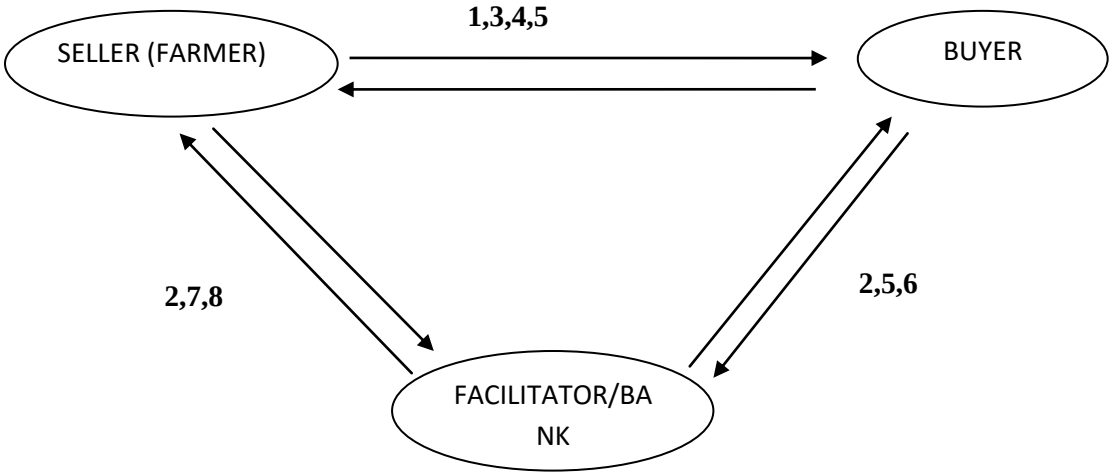
1.2 Agricultural Forward Sales Contracts: An Introduction

The conventional solutions for price stabilization such as price controls, floor price schemes and the establishment of government marketing institutions were not long term sustainable. According to the Central Bank of Sri Lanka (CBSL), this situation has been mainly due to difficulties in maintaining a dual price system continuously and the inefficiency of government marketing boards in functioning as effective marketing

institutions. It has become necessary to approach the problem through a system, which would be effective both in the short-run and in the long-run. Many countries have achieved this by establishing the forward sales contact system for agricultural produce to guarantee an acceptable price for both the seller and the buyer in the market.

According to the CBSL (1999), the forward sales contract process is "A legally binding agreement between a buyer and a seller". By this agreement, the seller agrees to sell (and the buyer to buy) a given quantity of agricultural produce of a specified quality on a given future date at a predetermined price. Such contracts amount to marketing arrangements in advance, which would secure a confirmed order to the seller, on the one hand and an assured supply to the buyer, on the other. A system of that nature was promoted by the Central Bank in 1999 under the promotional title of "*Govi Sahanaya*" (relief to the farmer). Although Sri Lanka has had such forward marketing arrangements for selected perennial crops on informal basis for a long time, the *Govi Sahanaya* was the first attempt to introduce a forward contract system on a formal basis. The forward contracts derive their legal status from the Sale of Goods Ordinance, enacted in 1896. In the system introduced in Sri Lanka, in addition to the buyer and the seller, provision has been made for a bank to participate as a facilitator of the contract. Hence, it can be called a tripartite arrangement among the farmers, buyers and the bank. A forward sale contract is purely a voluntary action which three parties involved would enter into the contract on their own accord. It is a system of stabilizing prices through the market.

The contract helps the farmer by assuring a stable price for his produce. The price can be fixed by a mark-up over the cost of production, thereby giving an assured net profit to the farmer, depending on market conditions. At the same time, it assures a guaranteed supply to the buyer at a given price, thereby helping him to pre-plan his procurement process and the cash flow properly. The role of the banker in the contract is simply to disseminate information on the cost of production and the time of availability of products, and bring together potential buyers and sellers. For these services, the banker is entitled to charge a commission from both the buyer and the seller. In addition, the process could also be financed by the bank by extending a direct loan or providing an indirect facility. In the former case, a direct loan could be extended to the farmer to finance cultivation. Once the goods are delivered, the same process could be financed further by extending a loan to the buyer. The bank could help the parties involved by discounting an inland bill of exchange, which is drawn by the seller on the buyer and accepted by the buyer. On the due date, the bank which discounted the bill will forward it to the buyer for payment. A further refinement to the operational process is the introduction of an internal letter of credit which could be opened by the buyer on the seller. In order to encourage the use of forward contracts by farmers and buyers of the agricultural produce, the government announced in its budget document 2000, a waiver of the stamp duty on Sale Contracts, Inland Bills of Exchange and Internal Letters of Credit that may be generated to facilitate a Forward Sales Contract (CBSL Annual Report, 1999).



(1) Buyer and seller sign a contract. The facilitator certifies the signatures. A copy of the contract is given to the buyer, seller and facilitator
(2) Seller can use the contract, if necessary, as collateral to obtain a cultivation loan from the bank. Buyer too can obtain a loan from the bank for sorting or processing of purchased produce
(3) Seller asks the buyer to pay through the bank
(4) Seller delivers goods to the buyer
(5) Buyer issues a Goods Received Note (GRN) to the seller upon delivery of goods and buyer informs the bank
(6) Buyer remits payment to the bank
(7) Seller forwards the GRN to the bank
(8) After recovering loan outstanding, the bank pays the balance to the seller.

Source: Adopted from Welivita, (2003)

Figure 1.1: A Schematic Presentation of a Forward Sales Contract

If the prevailing market price is greater than the contract price, the buyer will make profits at the expense of the seller. On the other hand, if the market price is lower than the contract price, the seller will make profits at the expense of the buyer. Such contracts amount to marketing arrangements in advance, which would secure a confirmed order to the seller, on the one hand, and an assured supply to the buyer. In addition to the buyer and the seller, provisions have been made for a bank to participate as a facilitator of the contract. In addition to that, under the New Comprehensive Rural Credit Scheme (NCRCS) of the Central Bank of Sri Lanka, Participating Financial Institutions granted loans to farmers as well as to companies to facilitate the forward sales contract programme. The financial institutions which granted the loans under the NCRCS were the Bank of Ceylon, Hatton National Bank, Seylan Bank, Commercial Bank, Regional Development Banks, Sanasa Development Banks and Sampath Bank.

Table 1.1: Loans Granted (Rs/Mn) for Crops by the Participating Financial Institutions under the New Comprehensive Rural Credit Scheme (NCRCS)

Season	Maize (Rs.mn)		Other Pulse Crops (Rs.mn)		Total (Rs.mn)	
	Farmers	Companies	Farmers	Companies	Farmers	Companies
2004/05 *Maha*	25.5	12.5	1.9	17.5	27.4	30
2005 *Yala*	1.1	26.0	12.6	52.4	13.7	78.4
2005/06 *Maha*	54.7	84.0	7.6	55.8	62.3	139.8
2006 *Yala*	0.3	0.0	13.1	116.9	13.4	116.9
2006/07 *Maha*	132.0	227.8	11.5	29.9	143.5	257.7
2007 *Yala*	2.9	90.8	20.0	90.7	22.9	181.5
2007/08 *Maha*	398.5	418.9	33.4	19.0	431.9	437.9
2008 *Yala*	7.5	79.9	3.5	78.5	11	158.4
2008/09 *Maha*	420.8	234.4	12.9	37.5	433.7	271.9
2009 *Yala*	2.4	0.0	2.7	59.4	5.1	59.4
2009/10 *Maha*	199.0	497.5	8.9	27.5	207.9	525
2010 *Yala*	2.1	8.4	8.5	0.0	10.6	8.4
Total	**1246.8**	**1680.2**	**136.6**	**585.1**	**1383.4**	**2265.3**

Source: Central Bank of Sri Lanka

1.3 Research Problem

In the Sri Lankan context, over ten years after the implementation of Forward Sales Contract, still a low-level of adoption can be observed related to this mechanism (Table 1.2 and Annex 1).Central Bank of Sri Lanka withdrew the interest subsidy provided for the Forward Sales Contracts under New Comprehensive Rural Credit Scheme in 2010. And since then no study has been conducted to examine in the process of the FSC programme. Therefore, this study mainly aims at investigating the present situation of the programme. As there had been no comprehensive study undertaken in order to understand the present situation of Forward Contract Scheme in Sri Lanka, this study focuses on examining the Forward Contract Scheme and reviewing its performance. The study will focus on Forward Sales Contracts in selected other field crops such as maize, and soya bean.

1.4 Significance of the Study

The importance of the study can be highlighted in relation to the needs of the country. "To safeguard the farmers from seasonal price declines and to popularize forward market contract for other field crops are the priority direction areas in the government development policy framework". [1](The Emerging Wonder of Asia, pp 15). Adoption of Forward Contracts is one of the priority research areas in the Council for Agricultural Research Policy.

[1] The Development Policy Framework (2010), Government of Sri Lanka

1.5 Research Objectives

The major objective of the study is to assess the socio economic factors affecting the adoption of Forward Sales Contracts.

Specific research objectives:

1. To evaluate the problems and prospects and the success factors of FSC
2. To suggest the key policy initiatives needed for the sustainability of the Forward Sales Contract programmes.

Table 1.2 : Number of Farmers Adopted FSC according to the Crop by District

Maize

Year	Ampara		Moneragala		Hambantota		Anuradhapura		Total	
	Yala	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*
2006					70		2,662	4,136	2,732	4,136
2007							5,449	12,111	5,449	12,111
2008			125	94	85	83	458	9,535	668	9,712
2009				223		209	56	5,935	56	6,367
2010		656	136	245	20	33		12,929	156	13,863

Soya Bean

Year	Ampara		Moneragala		Hambantota		Anuradhapura		Total	
	Yala	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*
2006							4,150	587	4,150	587
2007							2,500		2,500	-
2008			120					95	120	95
2009							1,778		1,778	-
2010							677	738	677	738

Blackgram

Year	Ampara		Moneragala		Hambantota		Anuradhapura		Total	
	Yala	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*
2006			407		35				442	-
2007			367	807	73			60	440	867
2008			533	399				100	533	499
2009				1,120					-	1120
2010			3	106	6			54	9	160

Source: Central Bank of Sri Lanka

CHAPTER TWO

Review of Literature

This chapter explains the basic concepts of Agricultural Forward Contracts and the Contract Farming. In addition, it distinguishes the two concepts of forward contracts and contract farming. Further, transfer of decision-rights and the shift of risk from the farmer to the buyer in different types of contracts are also described.

2.1 Conceptual Review:

2.1.1 Agricultural Forward Contracts, Types of Contracts and Contract Farming

According to the FAO research (Kang and Mahajan, 2006); forward contract is an agreement between the seller and buyer to deliver a specified quantity of a commodity to the buyer in the future for a specified price or in accordance with a specified pricing formula. The terms and conditions of the forward contract are therefore usually specific to each transaction.

The types of forward contracts are mentioned below:

(A) Fixed Price Contract: One of the most common type and here the farmer commits himself to delivering at an agreed time a certain quantity of commodities of a specified quantity. Normally, the farmer is only paid on delivery, although this type of contract can also be used to obtain pre-harvest financing.

(B) Price to be fixed contract: Price-to-be-fixed (PTBF) contracts also called executable orders (in sugar trade) or on call contracts (in cotton trade), are the most common forms of export contracts for commodities from Latin America. They are also very common in Asia, and although still common in Africa, are relatively less used. Unlike other forward contracts where the used reference prices are commonly futures market prices, in this case the seller (or the buyers, in case of processors, importers or end-users) has the active ability to fix the prices at the moment deemed most opportune.

(C) Deferred Pricing Contract: A deferred pricing (or delayed pricing, price later, no price established) contract provides that the farmer delivers the commodity and transfers ownership on the contract date but maintains control over when it is priced. This contract allows the seller to separate the pricing decision from the delivery decision. The risks of storage are passed to the buyer at the time of delivery and the contract may also be used as a substitute for storage when unavailable. The price may equal the

elevator's bid price or and adjusted futures price at a time selected by the farmer. While this gives the farmer the opportunity to benefit from price rises, he also retains the risk that prices will fall between the time the contract is entered into and the date on which the sales price is determined. This is one of the most widely used instruments for small-scale farmers, especially where there is an established level of confidence in the buyer.

(D) Deferred Payment Contract: A deferred or delayed payment contract specifies the price to be paid and transfers ownership upon delivery while postponing payment. This contract may also offer farmers tax advantages by deferring income from the sale of a commodity to the next tax year as a tax-saving strategy for the current year.

(E) Minimum Price Contract: This forward contract is similar to a fixed –price forward contract, except that it guarantees a minimum price with an opportunity to participate in future price gains. From the farmer's side, this eliminates an important risk factor, and the incentive to default on the contract is less than that with fixed price contracts. On the other hand, the buyer can also hedge the assumed risks by taking opposite positions. The farmer can be required to pay a certain price to take advantage of this benefit. In practice, the vast majority of farmers in developing countries have no access to forward contracts than contain this kind of price risk management component.

(F) Reference Price Contracts: This form of contract uses reference prices, at times future prices, but more often average export prices of a country, to price forward contracts. On delivery, farmers are automatically paid the price of the day or period when they make their delivery.

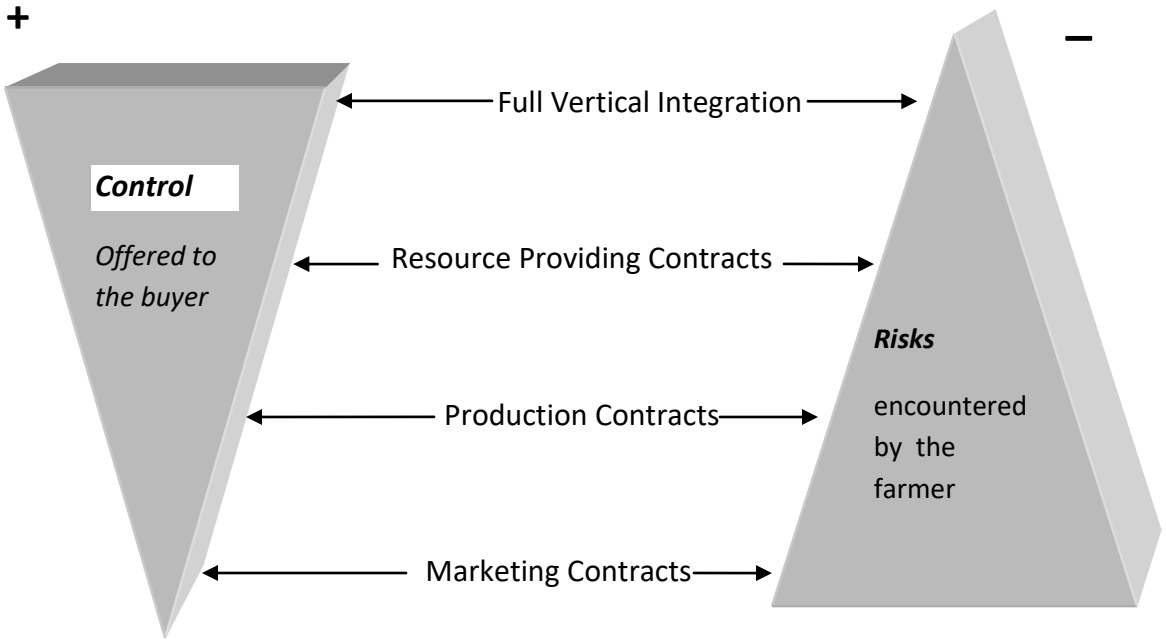
There are other two important contract types identified as basic contracts and hedge to arrive contract and those contracts are based on futures. Future contracts were invented as a way to standardize forwards. In its simplest sense, a futures contract is a standardized forward contract that is exchange traded (Kang and Mahajan, 2006).

In this study, FAO definition of Contract Farming has been adopted; "Contract farming is defined as an agreement between farmers and processing and/or marketing firms for the production and supply of agricultural products under forward agreements, frequently at predetermined prices. The arrangement also invariably involves the purchaser in providing a degree of production support through, for example, the supply of inputs and the provision of technical advice. The basis of such arrangements is a commitment on the part of the farmer to provide a specific commodity in quantities and at quality standards determined by the purchaser and a commitment on the part of the company to support the farmer's production and to purchase the commodity" (Eaton and Shepered, 2001,pp2).

The intensity of the contractual arrangement depended upon the structure of the economy that means how much the economy is developed and how the farmers behave in the market economy and the nature of uncertainties handled by the contract. This contractual arrangement varies from crop to crop, like the nature of contractual arrangement in case of perishable commodities (i.e. flowers, vegetables etc) is different from commodities such as cotton and tobacco. According to the Eaton and Shepherd (2001), the nature of contractual arrangement can take place in one of the following forms depending upon the structure of the economy, i.e. (a) The Centralized Model, (b) The Nucleus Estate Model, (c) The Multipartite Model, (d) The Informal Model, (e) The Intermediary Model. Contract farming varies depending on the nature and type of contracting agency, technology, nature of crop produce and the local or national context.

Gresh *et al* (2012) explained that in institutional economics, contract farming is described as a hybrid agreement that positions itself between the two extremes of the institutional arrangement spectrum, namely spot markets and market integration. On spot markets, products are sold and bought immediately, at a price set during the transaction and with no involvement of the buyer in the production or in the definition of the conditions of the transaction. At the other extreme, full vertical integration implies that the buyer controls all stages of production, processing and distribution throughout the value chain. Between these, contract farming allows the buyer a measure of control (decision-rights) over production without formally engaging in the farming activities (Grosh, 1994; Ménard, 2005). The allocation of risk depends on the terms of the contracts. As such, contract farming provides a response to market failures with respect to inputs, credit, insurance, information and outputs, by reducing the associated transaction costs, monitoring, transfer of goods and bargaining and enforcement (Key and Runsten, 1999; Poulton *et al*., 2010). Christensen and Scott, (1992) explained that contract farming is a case of bringing the market to the farmers, which is navigated by agri-business firms.

The literature on contract farming differentiates between three classic types of contracts (Market specification, Production management and resource providing) according to depth and complexity of the provisions, the transfer of decision-rights and the shift of risk from the farmer to the buyer (Figures 2.1.). The contract farming system should be seen as a partnership between agribusiness and farmers. To be successful, it requires a long-term commitment from both parties (Eaton and Shepered, 2001; Key and Runsten, 1999; Mighell and Jones, 1963; Minot, 1986).



Source: Adopted by the Authors from Gresh et al (2012) and Mighell and Jones (1963) and Minot (1986)

Figure 2.1 : Typology of Contracts

Market specification – Contracts refer to **pre-harvest agreements** that engage a buyer in providing a market to a farmer under pre-established conditions often related to price, quantity, quality and timing. Thus, the farmer delegates a part of the risk to the buyer, while keeping control over production. Both the farmer and the buyer benefit from the price premium on the quality and stability in the flow of supply of products to specified markets.

Management-providing (production-management) contracts are similar to marketing contracts -these contracts however delegate some of the farmer's control over the production process to the buyer. In terms of these contracts the adoption of specific farming practices (land preparation, planting dates, seedlings, fertilizer application rates and dates etc.) or the choice of post-harvest management practices will come under the technical supervision of the buyer to attain higher quality and to control the timing of output. The buyer recoups the costs of extension from the proceeds of marketing a higher-quality product according to the timing of demand.

Finally, resource-providing contracts - are the closest arrangement to full vertical integration and require not only the buyer provides a market outlet to the farmer but also he agrees to supply selected inputs, including on occasions of land preparation and technical advice and delivers input packages on credit and corresponding technical

assistance in its use. It results in the buyer having major control over production with the contract shifting most decision-rights and risks to the buyer (Greash et al, 2012).

According to the above literature Forward Sales Contracts (FSCs) can be regarded as the marketing component existing in the contract farming process. Furthermore, it is clear that this marketing component has been implemented in the "*Govi Sahanaya"* programme conducted by the Central Bank of Sri Lanka (CBSL). Most of the companies have implemented only Forward Sales Contracts while few others implemented the entire Contract Farming concept inclusive of all the three components marketing, production and resources contracts.

2.2 Empirical Review

It was observed that the locally available literature was limited in the subject area of contract farming. Not many researches has been done on contract farming in the context of Sri Lanka. However, Senanayake (1995) studied contract farming systems and out grower schemes for sugarcane and tobacco cultivation in Sri Lanka and he stated that output and income objectives can be achieved through contract farming and grower out scheme without sacrificing employment and income distribution objectives. The study also revealed that these schemes can minimize the marketing and price ricks, provide extension advice and material inputs, and improve the access to institutional agricultural credit, thus promoting the adoption of new technologies of cropping and livestock. This had led to productivity improvement in the agricultural sector. The study further revealed that the introduction of contract farming and out grower schemes promoted the adoption of new agronomical technologies.

Weliwita (2003) identified that, the *Govi sahanaya* scheme has generated encouraging results in its infancy stage. Senanayake (2006) further reveled that according to the literature the impact of the contract farming and Out Grower Schemes (OGS) on farmers, contracting firms and other host governments has become a controversial issue. He further noted that there were vast differences in the literature emerging from various disciplinary backgrounds and political perspectives.

Senanayake (2008) identified that the literature on contract farming linked with three other issues. First, it is closely associated with those on the impact of trans-national agribusiness on the host country economy, and farming households (Goldsmith, 1985). Second, most of the crops selected for contract farming are cash crops as opposed to food crops (Glover, 1990). Third, the spread of cultivation of cash crops increases the commercialization of agriculture in the Developing Countries. Therefore, the researchers of the International Food Policy Research Institute (IFPRI) highlighted the impact of this process on food consumption and nutrition of the farming households has another important area of concern.

Karunagoda *et al* (2010) conducted a research on factors affecting the adoption of forward sales contract of rice, maize and onion growers in Anuradhapura and Matale districts and revealed that even though it had offered a mechanism to reduce producer price risk among the farmers in these districts, the proportion of farmers who joined the programme was comparatively low. A field survey conducted in 2006 indicated that the land extent, participation in social activities and contact with village extension agent had positively influenced the adoption decision. Further, the determinants of participation indicated that forward sales contracts provide a reasonable hedging mechanism to farm households that depend more on agriculture. Therefore, the farmers have identified the forward sales contract as a mechanism to reduce the income and marketing risk.

Forward contract farming has been identified as one of the best solution for price risk minimization related to small scale tomato famers in Haryana State, India (Dileep et al, 2002). Recent research conducted in India has further revealed that yield and gross return obtained by the contract farmers were almost double than that of non contract farmers.

According to Glover (1984) and Minot, (1986) contract farming can be defined as an agreement between a farmer and a buyer, ranging from simple oral arrangements to formal written documents, in which parties respectively commit to sell and buy specific volumes or acreages under pre-established conditions. The buyer can be a local or a transnational agribusiness, a private plantation, a parastatal with its own production, or local merchants.

The contractual arrangement often involves the purchaser in providing a degree of production support through, for example, the supply of inputs and the provision of technical advice. For this arrangement to work the farmer commits himself to provide a specific commodity in quantities and at quality standards determined by the purchaser. The company on the other hand agrees to support the farmer's production and to purchase the commodity. In more simple terms, contract farming can be regarded as a partnership between agribusiness companies and farmers.

Eaton and Shepherd (2001) have also identified the possibility of using contract agreements as collateral to arrange credit with a commercial bank in finding inputs. Vertical integration was also another expressed benefit of contract farming. This means processors may vertically integrate into farm production or employ production contracts to exercise greater control over the quality and timing of deliveries and the quality of inputs used in the production process.

Kumar and Kumar (2008) revealed that employment generation on contract farms has also been found almost double compared to that on non contract farms in the Karnataka State in India.

Silva, (2005), revealed that, the advantages for the farmers in contract farming as: reducing the uncertainties and costs associated with input availability, ensuring quality and costs due to the inputs provided by agribusiness firms, provision of technical assistance, agricultural credit and a secured market. Small-scale farmers in particular benefit from the reduction of marketing risks, as they often have more limited market access the uncertainty about sales price is often reduced, since contracts typically specify at the beginning of the growing cycle the prices to be paid at product delivery, with the reduction of product and market risks, income stability is favored, Access to credit is enhanced. Under a resource provision contract, working capital credit is typically supplied in kind, via input provision, by the contracting firm and by-products and residues from the contracted farming activity can be used in complementary farm enterprises.

Silva C. A. (2005), also revealed that the main potential advantages for the buyers are as follows: Greater regularity of agricultural product supplies to the firm is ensured, (firms can schedule the deliveries so as to optimally utilize their processing capacity and they can also better coordinate product delivery with the timing of the demands from their own clients), Greater conformity to desirable product quality attributes and to safety standards is promoted, firms obtained a better position to meet consumer requirements and mandatory quality and safety standards, Economies of scale in purchasing can be attained by firms that acquire large quantities of farm inputs and the input costs per unit are reduced, Access to agricultural credit and eventual financial incentives and subsidies are facilitated, The reduction of risks in the firm's supply chain and the economies of scale associated with contracting operations are conditions that in principle increase a financing institution's willingness to lend, Access to government incentives like tax breaks, foreign exchange quotas, tariff reduction for imported inputs, etc, and subsidies programmes was facilitated, and labor costs are reduced. He further described that contractual relationships will only be sustainable if partners perceive that they are better off by engaging in it. One of the most critical success factors is development of mutual trust and reciprocal dependency by the parties, Appropriate enabling environment is prerequisite that means no successful contracting scheme can exist or remain sustainable where the institutional and political setting is not conducive to it. Good communication fosters non-adversarial relationships between farmers and firms and it minimized the contract failures. A further critical success factor is the appropriate consideration of production risks in the contract design.

Match Maker Associates Limited (2006) revealed that the key elements of PepsiCo India's success in Contract farming are : Core Research and Development team, Unique partnership with local agencies, Well-trained extension personnel, Supply of all kinds of agricultural implements, Supply of timely and quality inputs on credit, Prompt dispatch/delivery/procurement of produce, Use of modern communication technology

for communication with field executives, Regular and timely payments to farmers, Perfect logistics system and global marketing standards.

Silva C. A. (2005), described that contractual relationships will only be sustainable if partners perceive that they are better off by engaging in it. One of the most critical success factors is development of mutual trust and reciprocal dependency by the parties, Appropriate enabling environment is prerequisite that means no successful contracting scheme can exist or remain sustainable where the institutional and political setting is not conducive to it. Good communication fosters non-adversarial relationships between farmers and firms and it minimized the contract failures. A further critical success factor is the appropriate consideration of production risks in the contract design.

Waghdare *et al* (1998) reported that village level extension workers, progressive farmers and local leaders are important sources influencing adoption behavior of farmers.

However, researchers have identified a number of common bottlenecks related to contract farming mechanism. Arunkumar (2002) pointed out that major problems faced by the contract farmers in India were low contract price and irregular payments. Many of the researchers identified major problems faced by the contract farmers were low contract price, irregular and delayed payments, side selling of farmers when the prices were high manipulation of norms by the firm, and poor co-ordination of activities. Arunkumar (2002), Singh (2000), Chawla (2002) and Shiva Kumar Gupta (2002).

Regarding contract failure incomplete contracts, embedded ness of contracts, Information, Capital, Management skills and Technical knowledge asymmetry, Lack of trust, unintended factors (climate, etc.), Lack of support by government / NGO, Quality problems, Lack of sharing of benefits, Dishonesty and lack of integrity, Lack of ownership and the pricing policies are the most common aspects for contract failure (National Agricultural Marketing Council of South Africa, 2009).

As many researchers have identified, major problems faced by the contract farmers were low contract price, irregular and delayed payments, side selling by the farmers when the prices were high manipulation of norms by the firm, and poor co-ordination of activities. Arunkumar (2002), Singh (2000), Chawla (2002) and Shiva Kumar Gupta (2002). On the other hand a sound legal framework governing contract farming may promote fair contract negotiations and guide farmers and buyers to a more successful implementation of agricultural contracts (Pultrone, 2012).

Kumar and Kumar (2008) have further found that delayed payments for crop produce, lack of credit for crop production, scarcity of water for crop production, erratic power

supply and difficulty in meeting quality requirements as the major constraints faced by contract farmers, whereas major constraints outlined by contracting agencies were violation of terms and conditions by farmers, lack of proper management by the company and frequent price fluctuations in the international market.

Kumar (2010) has studied the characteristics and determinants of contract design of wheat seed farming in India by using logit model. He identified that common determinants of the public and private sectors were found to be the ratio of contract price and open market price, the off farm income and the land holding size are the drives that motivate farmers for the adoption of contract farming.

Arumugam, (2011) studied the determinants of fruits and vegetables (FFV) farmers' participation in Contract Farming in Peninsular of Malaysia. The study using Logit analysis was carried out to identify determinants that influenced fresh fruit and vegetable (FFV) farmers participating in contract farming. The findings in the paper showed that, based on the output from logistic regression, ownership, land size, education background, perceived benefit, complicated process, lacking in opportunities and price risk are dominant variables. Landownership, land size, education and perceived benefit are dominant variables that positively influenced FFV farmers to participate in contract farming. Complicated process, lack of opportunities and price risk negatively influenced FFV farmers' participation in contract farming.

CHAPTER THREE

Methodology

3.1 Study Locations and Sample Selection

According to the secondary data of Central Bank of Sri Lanka on forward contract farmers of (Table 3.1) Anuradhapura District was selected purposively as it is the major district where forward sales contracts (FSC) are continuously practiced and it was clear that maize and soya bean have been the most popular crops under the FSC since the beginning of the programme (Annex 1). Therefore, attention was paid to those two crops in the study.

There are several private companies engaged in maize and soya bean cultivation process through FSC. Such as *Rajarata Govi Samagama, Wayamba Govi Samagama* and KST Evergreen Limited. It was observed that some companies operate only for purchased maize or soya bean and some have given seeds to the farmers during the commencement of the season and registered farmers with agreed price. Most of these arrangements are not formally written agreements. However, the company, Plenty Foods Private Limited found having a large farmer base and long term experience in forward contract farming practices for maize and soya bean. Therefore, the sample of contract farmers were selected randomly from the list of farmers obtained from the company and the Mahaweli Authority.

For the collection of primary data from the farmers, the Anuradhapura district was selected purposively as it is the main district where forward sales contracts for maize, soya bean, and black gram were initiated. Then, multi-stage random sampling technique was applied in choosing farmers for primary data collection. At the first stage, Divisional Secretariat Divisions (DSDs) where cultivation is highly concentrated were selected for each crop. In that case, farmers who engaged in FSCs for maize were selected from nine DSDs namely Thalawa,Thambuttegama, Galnewa, Kekirawa, Galenbidunuwewa, Kahatagasdigiliya, Galgamuwa, Thirappane and Mahawillachchiya. Farmers who have not adopted FSC were selected from three DSDs namely and Kahatagasdigiliya, Galenbidunuwewa and Madyama Nuwaragam Palatha DSDs for soya bean and Willachiya DSDs for black gram were selected. At the next step, contract farmers were selected randomly based on the farmer - list which was made available through buying company and the Mahaweli Authority. The following table illustrates the number of farmers selected related to each crop and cultivating area. Soya bean farming was entirely done under the contract farming and it has a very limited open market. Therefore, the study examines only contract farmer's behavior regarding the Soya bean farmers.

Table 3.1: Study Location and Sample Size

Crop Adoption Status	DSD	Number of Maize Farmers	Number of Soya Bean Farmers	Total Number of Farmers
Contracted Farmers	Thalawa Thambuttegama Galnewa Kekirawa Galenbidunuwewa Kahatagasdigiliya Galgamuwa Thirappane Mahawillachchiya	87	95	182
Non Contracted Farmers (Independent growers)	Kahatagasdigiliya. Galenbidunuwewa Madyama Nuwaragam Palatha	54	-	54
Total		**141**	**95**	**236**

Source: Author's Survey, 2012

3.2 Data Analysis

3.2.1 Application of the Maximum Likelihood Logistic Regresses Model to Analyze the Factors Influencing Adoption Decision

Maximum likelihood logistic regression *(logit)*[2] method is employed to analyze the factors influencing the adoption decision of the forward sales contracts.

Maximum Likelihood Logistic regression model extends the principles of generalized linear models (ex. regression) to better treat the case of dichotomous and polychromous dependent variables. The logit model gets its name from the "logistic" functional form of the choice probabilities, which traces out an S-shaped curve. Logit regression model applies maximum likelihood estimation after transferring the dependent into a logit variable (the natural log of the odds of the dependent occurring or not) (Gujarati,2005).

Therefore, logit method is applied instead of ordinary least square method because the dependent variable is binary, which means *Y* i will take the value of one if the farmer is already adopted forward sales contract and the value of *Y* i is assumed as zero or otherwise.

[2]Logistic Regression Model

According to the linear regression function,

$E[Y] = \beta_o + \beta_1 X$

$E[Y]$=Mean of the variable *Y* in the population, β_1= Coefficient, X = Explanatory variable

But, if *Y* is dichotomous outcome variable coded as *Y* = 1 for the outcome of interest (denoted a "success"), and *Y* = 0 for the other possible outcome (denoted a "failure") and *Pi* to represent the probability that the "success" outcome occurs in the population. The probability of a "failure" outcome is then 1 - *Pi*.

Model for the probability of a "success" outcome

$Pi = \beta_o + \beta_1 X Pi = \beta_o + \beta_1 X$

$Pi =$ Probability

But, the usual regression assumption of normality of *Y* is not satisfied - *Y* is not continuous, it only takes a value of 0 or 1. Therefore, instead of fitting a model for *Pi,* the model is fitted for log-transformed *Pi*.

$$\log e\left(\frac{Pi}{1-Pi}\right) = \frac{Pi(Sucess)}{Pi(Failure)} = odd\ ratio$$

The odds ratio in favor of adopting forward sales contract is the ratio of probability that a farmer will adopt the forward sales contract, to the probability that he/she will not adopt the forward sales contract.

The logistic regression model is written in terms of the log of the odds, called the logit (1.)

$$\log e\left(\frac{Pi}{1-Pi}\right) = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots \beta_n X_n \quad \ldots\ldots 1$$

$$\ln\left(\frac{Pi}{1-Pi}\right) = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots \beta_n X_n \quad \ldots\ldots 2$$

The formula can be rearranged as follows.

$$\left(\frac{Pi}{1-Pi}\right) = e^{\beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots \beta_n X_n} \quad \ldots\ldots 3$$

The probability of occurrence of success event can be written as follows.

$$Pi = \frac{1}{1 + e^{-(\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots \beta_n X_n)}} \quad \ldots\ldots 4$$

All four forms of the model (1), (2),(3) and (4) are equivalent.

The logit model for the adoption of FSC related to maize crop in Anuradhapura district is as developed as follows;

Farmer who already adopted was given the value 1, while farmer who did not adopt is given 0. The predictor variables were derived based on the assumption that adoption is a function of range of farmer characteristics such as personal, resource related and income related variables.

Accordingly, it is predicted that personal characteristics such as age, level of education, experience in agricultural activities, and degree of social participation could have an effect on adopting FSC. Moreover, it is assumed recourse related characteristics such as total agricultural land holdings, land extent of the contracted crop and availability of family labor (full time)could have an effect on adopting FSC. The considered income related characteristics were agricultural income (monthly)of the family, and whether he/she is a Samurdhi recipient.

The conceptual model of adoption of FSC related to maize crop in Anuradhapura district is:

$$\ln\left(\frac{Pi}{1-Pi}\right) = \beta_o + \beta_1 \mathrm{AGE} + \beta_2\,\mathrm{EDU} + \beta_3\,\mathrm{EX} + \beta_4 \mathrm{SP} + \beta_5 \mathrm{TL} + \beta_6\,\mathrm{LEC} + \beta_7\,\mathrm{FLF} + \beta_8 \mathrm{AI} + \beta_9 \mathrm{SB}$$

Table 3.2: Descriptions of the Selected Explanatory Variables Applied in the Logit Model

Variable	Unit	Description
Age (AGE)	Ordinary	1=If less than 20yrs,2=20-40yrs, 3 = more than 40yrs.
Level of education (EDU)	Ordinary	1=If up to grade 5, 2=grade6 to A/L,3=higher than A /L
Experience (EX)	Ordinary	1=If less than 10yrs, 2=10to 20yrs,3=more than 20yrs.
Degree of Social Participation (SP)	Binary	1=If member of a society, 2=Office bearer of a society, 3=not relevant=0
Total agricultural land holdings (TL)	Ordinary	1= If less than 2 Ac,2=2to 4 Ac, 3=more than 4 Ac.
Land extent of the contracted crop (LEC)	Ordinary	1= If less than 2 Ac, 2=2to 4 Ac, 3=more than 4 Ac.
Availability of family labour (full time (FLF) (FLE)	Ordinary	1=If less than 2,2=2 to 4, 3= more than 4.
Total agricultural income (monthly) (AI)	Ordinary	1= If less than Rs. 5, 000, 2 = Rs5, 000 – Rs.10, 000 3=more than Rs. 10, 000.
Samurdhi beneficiary or not (SB)	Binary	1=If a Samurdhi beneficiary or else =0.

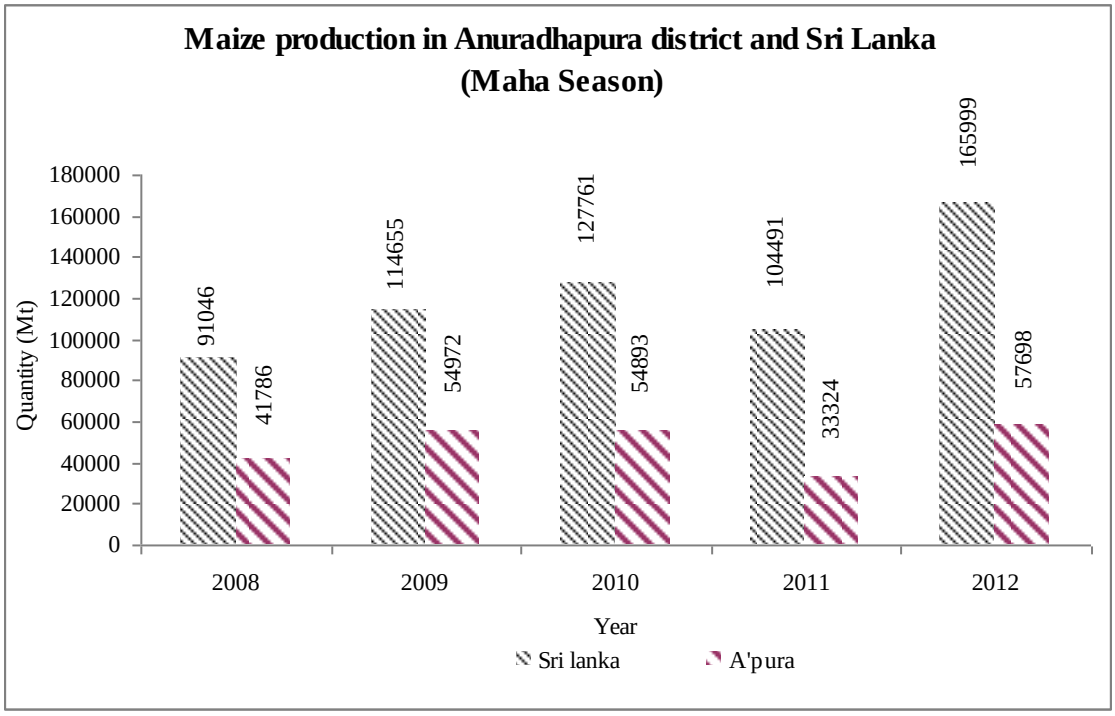
Source: Authors Survey Data, 2012

CHAPTER FOUR

Results and Discussion

4.1 Contribution of Anuradhapura District to the National Maize Production

The Anuradhapura district is the major maize producing district in the country and it contributes over 40% to the national production. During the last decade the contract farming system is most popular for the maize and soya bean sector in Sri Lanka**.** The development of both food and feed industry for maize and soya is the main reason for this growth. According to the Central Bank of Sri Lanka there has been an increase in the number of farmers adopted contract farming until the middle of the decade and after that there has been a decline. Both maize farming and contract maize farming are concentrated mostly in the Anuradhapura district (Annex 1). The soya bean cultivations are mostly spread in Mahaweli H region of the Anuradhapura district.



Source: Department of Census and Statistics

Figure 4.1: Maize Production in Anuradhapura District vs. Sri Lanka

4.2 Cropping Pattern of the Contract and Non Contract Farmers

Table 4.1: Cropping Pattern of the Contract and Non Contract Farmers by Season in Study Areas

Contract Farmers				Non Contract Farmers Maize	
Maize		**Soya**			
Maha	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*
Maize	Paddy	Paddy	Soya	Maize	Paddy
Paddy	Green chilli	Vegetables	Paddy	Paddy	Gingelly
Vegetables	Vegetables	Soya(seeds)	Vegetables	Vegetables	Vegetables
	Big onion		Big onion		

Source: Author's Survey Data, 2012

Contract farmers of maize in Anuradhapura and Galenbidunuwewa areas mainly cultivate maize and vegetables in their highlands in [3]*Maha* season while they cultivate paddy in low land. Those contract farmers grow green chilli, paddy, vegetables and big onion during the [4]*Yala* season mainly in their lowlands. Among those crops, green chilli cultivation was the prominent cash crop by the contract maize growers during their other cropping season.

According to the findings 56% of contract farmer's cultivated green chilli and 36% cultivated big onion and vegetables in *Yala* season. The average green chilli cultivated extent was 0.58 Ac. However, nearly 58% farmers cultivate paddy during *Yala* season for the food security purposes. About 90 percent of contract farmers is involved in paddy cultivation in *Maha* season in addition to maize cultivation. 38 percent out of that have a cultivated extent more than 3 Acers. But only 48 percent of these farmers cultivate paddy in *Yala* season. Contract farmers mostly cultivated cash crops like Green Chillies, Big Onions and vegetables in *Yala* season.

About 56 percent of the non contract farmers is involved in paddy cultivation in addition to maize cultivation in *Maha* season. And 85 percent out of them have paddy cultivation extent less than 3 Acres. They mainly use encroached forest areas for maize cultivation. According to that 36 percent of non contract farmers have maize cultivation extents in encroached forest areas sell their harvest to private sector which produce animal feed and hence these cultivations and post harvest activities are not quality oriented. In *Yala* season they cultivate gingerly under the rain fed condition in their highland in *Yala* season and paddy in lowlands. It was observed that 72% of the non contracted farmers

[3]Cultivation Season (October to March)

[4]Cultivation Season (April to September)

were engaged in rain fed [5]gingelly cultivation in *Yala* season. The progress of these rain fed cultivations depend very much on the rainfall received in the relevant season. In addition to that they are also engaged in paddy cultivation in *Yala* season. According to the above cropping behavior, it is clear that contract farmers operate in a diverse cropping system giving priority to cash crops using labor intensively.

Contracted soya bean farmers in Galnewa and Madatugama areas cultivated soya in *Yala* season in their lowlands. In addition to that, they cultivate paddy, big onion and vegetables during *Maha* season(tomatoes, pumpkin and capsicum). These contracted soya farmers are completely involved in paddy cultivation in *Maha* season. Mainly farmers in Mahaweli areas have only 2.5 acres of paddy land and 0.5ac of home land plot. They do not have chena or other encroached high lands for *Maha* season cultivation. Therefore, in those areas, maize cultivations are very low compared to non Mahaweli areas.

4.3 Analysis of Factors Affecting the Adoption Decision of Maize Farmers in Anuradhapura District by Employing the Maximum Likelihood Logistic Regression Model

The *logit* model on FSCs adoption was empirically tested using data collected from maize farmers in Anuradhapura district in order to find out the factors determining the adoption of maize FSC. The predictor variables tested in the model were Age (AGE), Education (EDU), Experience (EX), Degree of Social Participation (SP), Total agricultural land holdings(TL), Land extent of the considered crop (LEC), Availability of family labour full time (FLF),Total agricultural income (monthly)(AI)and Samurdhi beneficiary status (SB).

According to the Table 4.2, Model-3 was preferred over model-1 and model-2 as it recorded the log likelihood ratio more close to zero and higher pseudo r^2 value compared to model 1 and 2.

[5] Sesame Seeds

Table 4.2: The Model Statistics

Variable	Model-1	Model-2	Model-3
Age (years)	-0.5	-0.579	-0.596
	(0.402)	(0.425)	(0.451)
Education (level)	0.739	0.59	0.533
	(0.451)	(0.466)	(0.51)
Experience (years)	1.027***	0.947**	0.777**
	(0.284)	(0.304)	(0.324)
Social participation (level)	0.116	0.069	0.178
	(0.275)	(0.296)	(0.309)
Total agricultural land (Ac.)		1.632***	1.059**
		(0.418)	(0.466)
Land extent of the contracted crop (Ac.)		-1.092**	-1.054**
		(0.381)	(0.387)
Family labour availability (Full time)		-0.463	0.536
		(0.831)	(1.034)
Agricultural income (Rs./month)			2.735**
			(1.203)
Samurdhi beneficiary status (yes/no)			-0.304
			(0.517)
Constant	-2.369*	-3.167*	-10.445**
	(1.25)	(1.72)	(4.203)
Number of observation	139	139	139
Likelihood ratio chi^2	19.97	39.60	51.43
Probability of chi^2	0.0005***	0.000***	0.000***
Pseudo R^2	0.1087	0.2155	0.2798
Log likelihood value	-81.906	-72.094	-66.178

*** , ** and * indicate the significant levels of 1%, 5% and 10%
Figures in parenthesis indicate the standard errors of estimates

As indicated in model-3, the estimated coefficients of variables such as experience, total agricultural land, land extent of the contracted crop and agricultural income have reported more than 5% of significance level. Estimated coefficients of variables; experience, total agricultural land and agricultural income has reported positive values, thus these variables have affected positively and significantly for the adoption decision of FSC system. On the other hand, estimated coefficient of the variable; land extent of the contracted crop has reported negative value hence land extent of the contracted crop has affected negatively and significantly for the adoption decision of FSC system.

Estimated coefficient of experience variable indicate that, if a selected farmer has exposed to more experience in agricultural activities, he or she is more likely to adopt FSCs decision than an in-experienced farmer. According to the model estimates, when a farmer moves to a higher level of experience, log-likelihood ratio in favor of adopting FSCs increases by 0.777, with other variables held constant. In other words, as the marginal effects of log likelihood ratio suggests (Annex 2) that probability of becoming an adopter of the FSC system of a farmer increases by 19% when he or she moves from lower level of years of experience category to the adjacent higher level of years of agricultural experience category. Karunagoda, (2010) related to adoption of FSC in Sri Lanka in maize crop in 2006, obtained similar results. It seemed that context has not changed much even after the CBSL moved away from the facilitation and monitoring role in 2009.

Next, estimated positive significant coefficient of total agricultural land pointed out that if a selected grower possesses higher agricultural land holdings, he or she is more inclined to adopt FSC farming decision than a grower who possesses a lesser agricultural land holdings. According to the model estimates, when a farmer moves to a higher level of agricultural land holdings, log-likelihood ratio in favor of adopting FSC increases by 1.059, with other variables held constant. As the marginal effects of log likelihood ratio suggest (Annex 2) if a farmer moves upward in the agricultural land holding categories his or her probability of adopting the forward sales contracts increases by 25% when the other variables held constant. In other words, growers who have a higher level of resources (such as land) are more likely to join FSC system.

Similarly, estimated coefficient of agricultural income reflects that, if a selected farmer earns greater share of his or her income through agricultural means, he or she is tended to adopt FSC farming system than a farmer who earns a higher income from nonagricultural means. The model indicates that when a farmer moves to a higher level of agricultural income category log-likelihood ratio in favor of adopting FSC increases by 2.73, with other variables held constant. As the marginal effects of log likelihood ratio indicated (Annex 2) when a farmer moves to a higher level of agricultural income category his or her probability of adopting the forward sales contracts increases by 65% when the other variables held constant. Findings of this research is in line with the findings of Karunagoda (2010) which indicated that the tendency to join the FSC programme became less when farmers have more non-agricultural opportunities. Further, it was highlighted that farmers, whose livelihood is mainly dependent upon off-farm income sources are reluctant to adopt the FSC. One fact might be that the farmers who engaged in off-farm activities may find it difficult to allocate more resources and time at each step of the cultivation process, which is considered as a pre-requisite to meet the quality standard of the produce. However, Kumar *et al*.,(2010) found out that higher off-farm income has favoured the adoption of contract wheat seed farming programme implemented by the private sector in Haryana state, India. He argued that it was due considered farmers less reliance on contract farming system as their main income source.

The only variable which indicates negative and significant impact on adoption of FSC system is land extent of contracted crop (LEC). It points out that if LEC is increased by one unit, on average the estimated log likelihood value decreases by 1.054, signifying a negative relationship between adoption and the considered variable. It means if a particular farmer owned more land extent of maize, they are more likely to not adopt FSCs system. The marginal effects of log likelihood ratio indicated (Annex 2) that when a farmer moves upward in the contracted crop's land holding categories his or her probability of adopting to the forward sales contracts will decrease by 25% when the other variables held constant. It might be due to imposing of ceiling value of 2Ac of land extent per farmer in joining with the FSC system. This regulation has discouraged attracting large scale farmers to the system. On the other hand, FSC farmers who owned more than 2 Ac of maize land also experienced problems in selling their produce as same as the non contract farmers. The positive impact of this regulation is it has created more room for small scale farmers to join the FSC system. Therefore, the Sri Lankan experiences of FSC system support the fact that FSC could act as a mechanism for small scale farmers to better participate in the market economy.

4.4 Comparison between Farmers who Adopted FSC and Independent Growers in Anuradhapura District

Table 4.3: Comparison between Farmers who Adopted FSC and Independent Growers, in Anuradhapura District

Variable	Adopted (1) or Not (0)	Mean	Std. Deviation	t - Statistics	Significance at 5%
Age (Yrs)	1	42.41	9.61	0.201	0.842
	0	42.02	12.09		
Experience (Yrs)	1	21.86	10.85	4.448	0.000*
	0	13.40	10.85		
Agricultural income (Rs/month)	1	50453.70	29169.92	7.201	0.000*
	0	20617.40	19599.80		
Non agricultural income of the family (Rs/month)	1	6620.69	11344.75	0.127	0.278
	0	9105.77	13866.78		
Total land(Ac)	1	5.91	2.74	0.518	0.606
	0	5.53	4.91		
Land extent of contracted crop(Ac)	1	3.1	1.43	-1.099	0.276
	0	3.481	2.63		
Availability of family labor (Full time)	1	1.77	0.64	-0.641	-0.76
	0				

*p<0.05

Source: Author's survey, 2012

In relation to agricultural experience, the Table 4.4 shows there is a significant difference between adopters and non adopters, whereas adopters have more agricultural experience than non adopters.

Table 4.4: Experience in Maize Farming –Adopted Farmers vs. Non Adopted Farmers (%)

Category(Yrs)	Adopted Farmers (%)	Non-adopted Farmers (%)
<10	20	54
10-20	38	23
>20	42	23

Source: Author's Survey, 2012

Experience in maize farming has a significant positive impact on the probability of farmers to adopt forward contracts. Thus, farmers with more experience in maize are more likely to grow maize under forward sales contracts. The literature revealed that the experience is regarded as a very good teacher.

Table 4.5: Age Distribution of Adopted Farmers vs. Non Adopted Farmers (%)

Category(Yrs)	Adopted Farmers (%)	Non adopted farmers (%)
20-40	46	50
40-60	49	46
>60	05	04

Source: Author's Survey, 2012

Age-wise there was not much difference between the farmers who adopted FSC and farmers who did not adopted FSC (Table 4.5). It seemed that age has not played a significant role in making the adoption decision. The Table shows that nearly half of the farmers in both adopted and non adopted farmers are below 40 years.

Table 4.6: Level of Education - Adopted Farmers vs. Non Adopted Farmers (%)

Category	Adopted farmers (%)	Non Adopted Farmers (%)
Up to grade five	05	19
Up to GCE O/L	85	71
Up to GCE A/L	08	10
Beyond GCE A/L	02	0

Source: Author's Survey, 2012

Next, there is a significant difference between adopters and non adopters in relation to level of education since chi square value between two categories takes the value of

7.724, (Significance at 5% takes 0.024) which was significant at 5% level. Majority of adopted farmers have attained secondary education while majority of non adopters attained only up to primary level of education. As many research indicated, accumulation of knowledge via education in human beings is an important factor of economic development. (Kumar, 2010). Therefore, it can be concluded that education has played a significant role in making the adoption decision.

Table 4.7: Total Agricultural Income -Adopted Farmers vs. Non Adopted Farmers (%)

Category(Rs/Month)	Adopted Farmers (%)	Non-adopted Farmers (%)
<25,000	25	73
25,000- 50,000	33	17
50,000- 75,000	25	10
>75,000	17	0

Source: Author's Survey, 2012

Moreover, regarding agricultural income, a significant difference between adopters and non adopters was observed since adopters have more agricultural income than non adopters. It seemed that having more share of agricultural income has positively influenced the adoption decision. The average monthly agricultural incomes of adopted farmers were almost two times higher than that of the non-adopted farmers. The Table 4.7 shows that the monthly gross income of nearly 40% of the adopted farmers have more than Rs.50,000/= income while it is only 8% in non-adopted farmers. This was mainly because the adopted farmers grow cash crops such as green chilli, big onion and vegetables during the *Yala* season in their low land and some extent of high lands. Green chili is regarded as a highly labor intensive and time consuming cultivation. The study findings revealed that 56% of adopted farmers grow green chilli and 36% big onion and vegetables in *Yala* season. The average green chilli cultivated extent is 0.58 Ac. From a green chili cultivation, farmers could obtain aRs.300, 000-400,000 gross income per/0.5 Ac in the *Yala* season.

Table 4.8: Total Agricultural Lands - Adopted Farmers vs. Non Adopted Farmers (%)

Category(Acers)	Adopted farmers (%)	Non adopted farmers (%)
<2	02	29
2-4	31	23
>4	67	48

Source: Author's Survey, 2012

Table 4.9: Total Maize Cultivated extent -Adopted Farmers vs. Non Adopted Farmers (%)

Category(Acers)	Adopted Farmers (%)	Non adopted farmers (%)
<2	37	42
2-4	47	31
>4	16	27

Source: Author's Survey, 2012

Regarding the total agricultural lands of the farmers the Table 4.8 shows that 67% of the adopted farmers and the 48% of the non adopted farmers have more than 4 acres of land. However, it revealed that 2% of the adopted farmers and the 29% of the non adopted farmers have less than 2acres of total lands. However, when we consider only the maize crop extent the Table 4.9 shows among the adopted farmers 16% have more than 4 acres of lands while 27% of the non adopters have more than 4 acres of maize lands. This situation is mainly due to the ownership of paddy lands. Among adopters 38% have more than 3 acres of paddy lands and 14% of non-adopted farmers have more than 3acresof paddy lands.

4.4 Comparison between Adopted Farmers vs. Independent Growers in Relation to Average Yield, Availability of Family Labour and Received Extension Service

The calculated *t* statistics values the comparison between comparing adopted farmers and independent growers in relation to average yield, availability of family labor and received extension service is described in Table 4.10.

Table 4.10: Statistics for Adopted Farmers and Independent Growers in Relation to Average Yield, Availability of Family Labor and Received Extension Service

Variable	Adopted (1) or Not (0)	Mean	Std. Deviation	t - Statistics	Significance at 5%
Average yield (Kgs/Ac)	1	2516.67	525.22	4.631	0.000*
	0	2125.00	455.10		
Availability of family labour (Part time)	1	0.54	1.14	0.973	0.156
	0	0.38	0.75		
Extension Service (No of visits /season)	1	3.19	2.294	13.435	0.000
	0	0.11	0.462		

*p<0.05

Source: Author's survey, 2012

As it is explained, there was a significant difference between maize growers who adopt FSCs and independent maize growers in relation to average yield, received extension

service (No of visits /season) and perception on quality of input. The mean values of average yield related to adopted farmers are about 400 kg higher than that of independent growers, in the Anuradhapura district. Further, this value is significantly higher than the national average of 1980Kg/Ac. As witnessed by the *t*-statistics, extension agent's numbers of visits per season are significantly higher in adopted farmers, where the reported mean value is over 3 visits per season. Here, the extension service is provided by the respective company.

Table 4.11: The Availability of Family Labor - Adopted Farmers vs. Non Adopted Farmers (%)

Category	Adopted Farmers(%)	Non Adopted Farmers(%)
<2	94	92
2-4	06	08
>4	0	0

Source: Author's Survey, 2012

Availability of family labor is less than two for over ninety percent of both adopted and non adopted farmers. It is observed that the major occupation of 92.5 of adopted farmers and 87% of non-adopted farmers was farming. Further, there is no significant difference in the *Samurdhi* beneficiary status of the two categories of farmers (Table 4.12).

Table 4.12: Samurdhi Beneficiary Status of Adopted and Non-adopted Farmers (%)

Category	Adopted farmers (%)	Non adopted farmers (%)
Beneficiary	74	67
Non Beneficiary	26	33

Source: Author's Survey, 2012

As the Table 4.13 indicated, there is a significant difference between adopted farmers and non adopted farmers in the perception on quality of input. This may be due to the buyers' involvement in providing high quality inputs (ex seed, fertilizer.) to the farmers who adopted FSC system. On the other hand, there is no significant difference between adopted farmers and non adopted farmers in relation to land ownership types. The results further revealed that both adopted and non adopted farmers equally utilized encroached *chena* lands for the cultivation of maize.

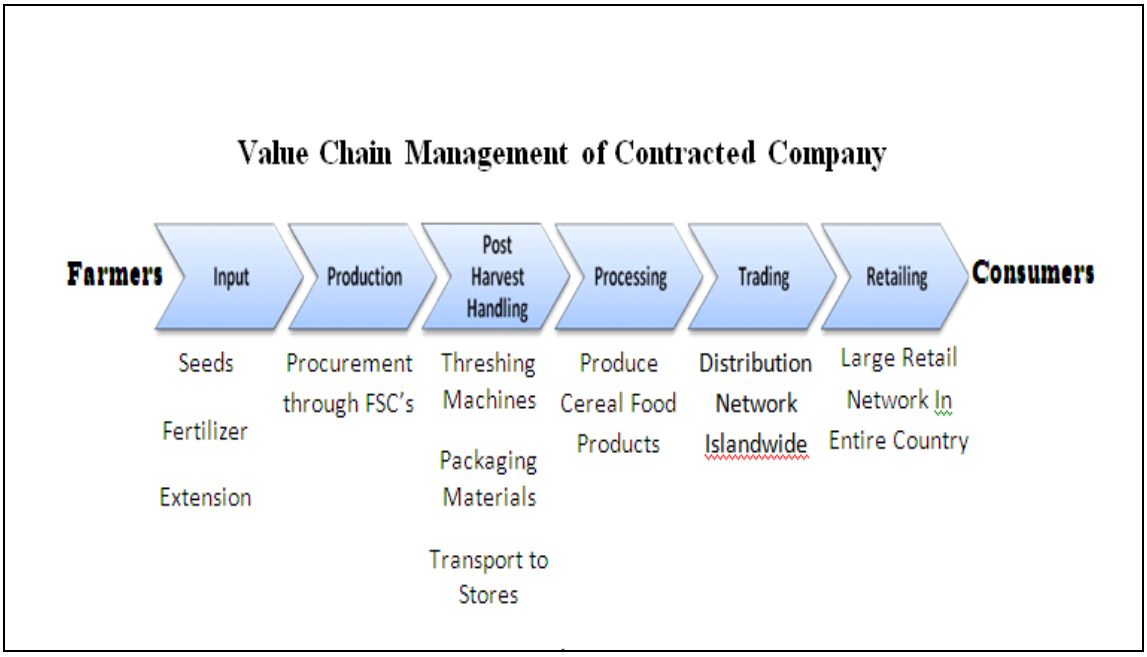
Table 4.13: Summary of Chi-square Statistics for Maize Growers who already Adopted FSCVs. Independent Growers in Anuradhapura District

Variable	Pearson Chi-Square	Significance at 5%
Type of ownership of the land	1.906	0.413
Type of water source use for agricultural purpose	1.213	0.528
Perception on quality of input	19.053	0000*

Source: Authors Survey Data, 2012

4.5 Maize and Soya Production Programmes of Contracted Company through Forward Sales Contracts in Anuradhapura and Mahaweli H Area

The company has been established in 1996 and it has extensive experience in the agriculture sector. The contracted company engaged in the manufacture of high-energy cereal products with locally grown raw materials, supports over 8000 famers by guaranteeing fixed prices for their produce and assisting in extension and micro financing through banks.



Source: Authors survey, 2012

Figure 4.2: Value Chain Management of Contracted Company

The company is expanding the backward integration programme to uplift the local farmers. One of the major products of the company, [6]Samaposha which is a nutritional supplementary food has become a popular cereal food item in the country. It is a pre-cooked food made from locally grown legumes and cereals such as corn, soya, rice and green gram. This unique brand could be consumed as a delicious breakfast cereal with milk and sugar or as a traditional food "*Aggala*" with coconut chips and sugar. In addition to that the company produces to the market some other range of cereal based food items including herbal foods. These products are marketed within a huge established market network from the level of rural boutiques to super markets. This is revealed by Figures 4.2.

4.6 Key Elements of Successful Forward Sales Contract Schemes

The literature on contract farming reveals that the factors affecting the success of contract farming practices were: capacity of the buyer (mainly assured stable market), mutual trust is key (building a trustworthy relationship between the farmer and buyer), efficient input delivery and product purchasing mechanism, extension service, quality standards, provision of credit, farmer group formation and group cohesion, well integrated value chain and physical and social infrastructure. Researchers highlighted that the contract farming process is built on the premises of value chain elements. And also government support, supportive legal and regulatory framework to guide FSC are prerequisites for the success (Eaton and Shepherd,2001; Match Maker Associates Limited, 2006).

Most of the above mentioned elements can be observed in a successfully operated contract process. The company has vast experience in the contract farming through Forward Sales Contracts (FSCs). Company operates in major agricultural districts, such as Anuradhapura, Matale, Badulla Moneragala and Mahaweli H area. Presently, their farmer base is nearly 8000 and major crops are maize and soya beans.

For a group of seventy famers they appoint a leader farmer and a professionally qualified field officer is appointed to cover 5 leader farmer areas. He visits the farms once a week to monitor the cultivation programmes. This integrated process enables a good environment to introduce new technology for farmers. The farmers are capable of getting necessary urgent instructions related to the crop management from the extension officer via relevant leader farmers. According to the field survey of contract farmers nearly 85% of the contract farmers were satisfied with the extension service and seeds given by the company.

[6]Cereal based food item

During the post harvesting period, threshing machines and tarpaulin (storage materials) were provided to famers to obtain quality products. In major producing areas storage points were established and the produce was transported to these stores by the company. To ensure the food safety measures the contracted company is testing for [7]Aflatoxin in maize in farm and storage levels in supply chain. Aflatoxin level should be maintained by below 5 ppm (parts per million)in Maize for the human food preparation. The company has adopted integrated crop management practices with special focus on harvesting and post harvesting activities to ensure the food safety. During the process, regular quality checking measures were properly maintained. In stores and factory (situated in Kandy) fumigation and hygienic practices were assured. Field Executives and Research and Development Managers were also included in their professional team.

It is observed that they had well integrated the input delivery mechanism and production distribution system and they practice a well integrated value chain management system (Figure 4.2). Their final cereal based food product is marketed to the consumers through an island wide marketing network under the well established company Ceylon Biscuits Limited.

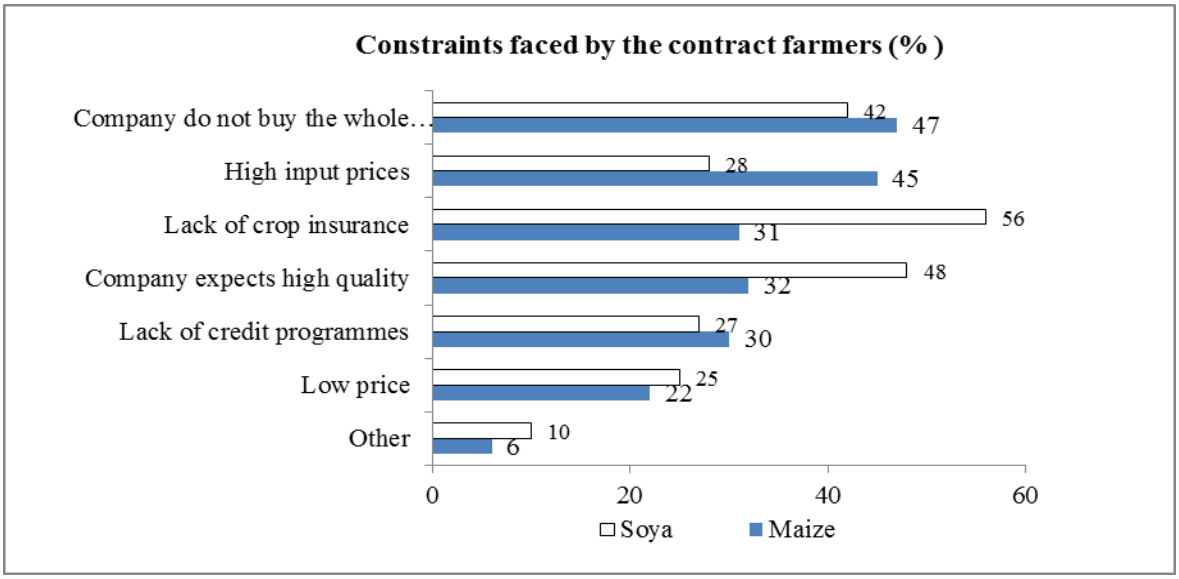
The company has gradually built the trust of the farmers through a number of welfare programmes such as "*Govi Paula*" under the concept of Corporate Social Responsibility (CSR). It is observed that the company has been successful in establishing mutual trust with the farmers which is a must for the sustainability of the contracts. It reveals that the company operations and thinking spread beyond the forward sales contract document which is the most important and compulsory element for the sustainability of the contract farming. Their commitment to the agricultural sector was evaluated and they were awarded several times by the National Agri-business Council.

The study observed that farmer to consumer, a proper value chain was established and each element was properly monitored by the company. The most significant feature was that the company follows the whole contract farming model including forward contract for their marketing arrangement and the production contracts and some extent resources contracts.

4.7 Constraints Faced by Contract Farmers

Based on the information furnished by the sample farmers, the constraints being faced by contract farmers in practicing forward contracts and their suggestions to overcome those constraints were summarized in the Figures 4.3.

[7] Toxin formation in Maize



Source: Authors Survey, 2012

Figure 4.3: Constraints Faced by Contact Farmers

4.7.1 Company does not buy the Entire Harvest

The contracted company buys maize and soya bean from farmers to produce cereal food products. The company provides 80 percent of their products to the local market and exports the rest. The company decides its annual requirement of maize and soya bean and distributes the relevant extent of land to each production area accordingly. In this process the extent of land to which a farmer can get registered is 2 acres. However, farmers who have established long term linkages with the company can go up to three acres. It is decided by leader farmers of the company and extension officers. When maize cultivation is considered it is mostly done in *Maha* season by the farmers in encroached *chena* lands other than the land of they own. But they have to provide 2000kg of maize per acre and 1000kgs of soya per acre which is relevant to their registered extent. The harvest from the lands other than the registered extent is sold to the open market at a low price to be used as animal feed. The farmers say that the whole harvest is not bought by the company. The company practices this limited purchasing in order to ensure benefits to a large number of small scale farmers.

4.7.2 High Input Prices

The other important problem highlighted by the farmers is the high price of seed and agro-chemicals. According to them, the cost of five kilos of highbred imported maize seeds needed for an acre is nearly Rs.4500 and they say it is a high price. These seeds

are sold to the farmers by the company. In addition, the farmers also point out high prices of weedicide and pesticides as a problem they encountered.

4.7.3 Lack of Credit

According to the farmers, absence of proper credit programmes is another problem. The contracted company does not provide loans but in some seasons it provides inputs such as seed, agro chemicals and fertilizer on a loan basis. Seeds are often provided on cash by the company at the beginning of the season. Most of the farmers find it difficult to obtain loans from the commercial or development banks as they cultivate on encroached farm lands. However, this factor is not very much prominent in soya bean cultivations in Mahaweli areas as the farmers cultivate on their own lands. Lack of proper coordination among the contracted company, the banks and the relevant government institutions is another constraint for the proper implementation of credit programmes.

4.7.4 Lack of Proper Crop Insurance Programme

Another problem encountered by the contracted farmers of maize and soya is the lack of a regular crop insurance programme. The contracted company always looks for a high quality product as it is used for producing human cereal foods. But the quality of the production tends to decrease due to variations in climatic factors. Furthermore, sometimes crop damage is caused by pests and diseases. The quality of soya beans is more sensitive to the above factors than maize. Therefore, when the crops get degraded, the farmers are compelled to sell their products at low prices to be used as animal feeds. Hence, the farmers emphasize the need of a properly implemented crop insurance programme. According to the farmers, they have to pay an installment as the crop insurance when they obtain loans from banks but they are quite ignorant of further implementation of it. It is observed that most of the farmers do not have a clear awareness about the crop insurance programme.

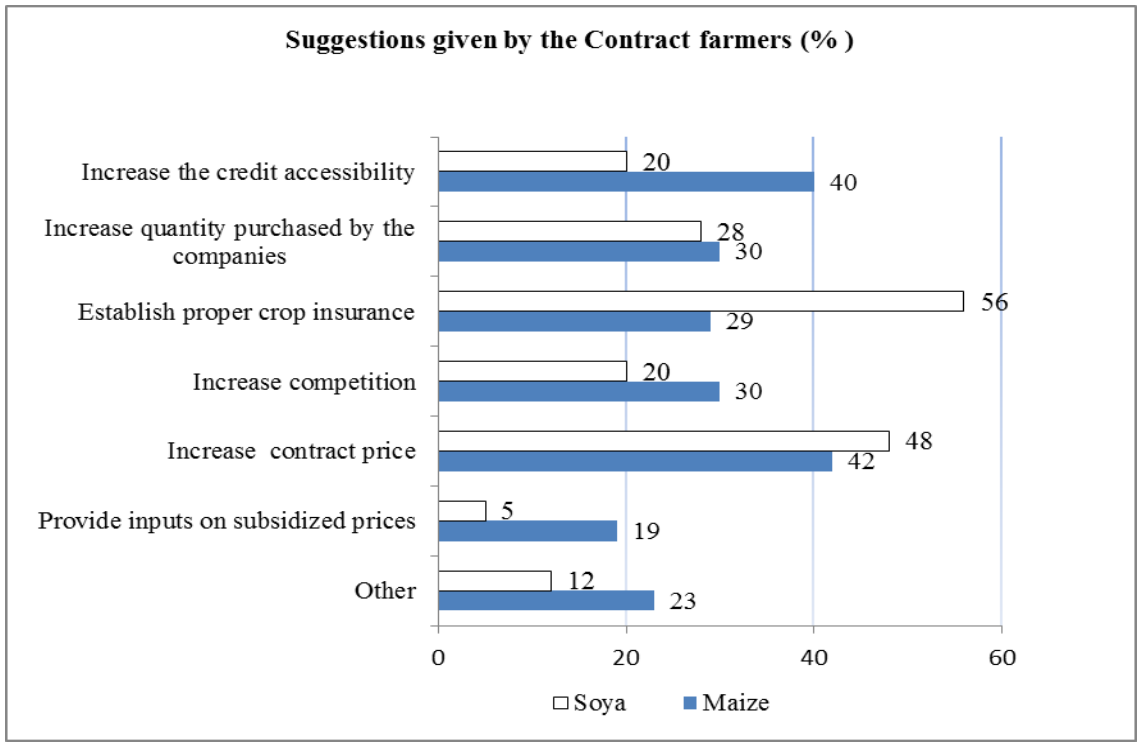
4.7.5 Company Expects High Quality

The company expects high quality in maize and soya purchased through the contracts as they are used to producing cereal food products. Despite the involvement of the company throughout the entire process of cultivation the farmers also have to be committed to ensure a quality product. However, sometimes the harvest gets affected due to some unfavorable climatic factors in which the harvest turns discolored and with damaged seeds. In such situations, farmers are not able to meet the company expectations of quality products. The company maintains records of the particulars of the harvest of every farmer. Therefore, the company can identify the farmer who has provided a particular harvest in their processing center situated in Tirappane.

4.7.6 Low Price

Nearly 25% of the contract farmers mentioned that the price they get for their produce is not sufficient. The contract price for maize in *Maha* season was Rs.32.00/Kg and the purchased price was Rs.37.00/Kg and for soya bean the contracted price was Rs 70.00/Kg whereas, the purchased price was Rs.90.00/Kg. It is clear that the company always purchases at a higher price than in the market price. However, the farmers expect a further increase of purchased price as they have to provide a high quality produce. When compared to the maize the open market for soya is limited as it is cultivated only for contract. When considering the contracted prices of maize and soya it was nearly 15% higher than that of the open market and the stocks of both crops purchased by the company was of the highest quality.

4.8 Suggestions Made by Farmers



Source: Authors Survey, 2012

Figure 4.4: Suggestions Made by Farmers

4.8.1 Increase the Contract Price according to the Input Price

According to the farmers, in every season the prices of inputs like seeds, agro chemicals and labor charges keep increasing constantly. The contracted price for farmers must also be increased in relation to the increased input prices. In general, in the contract price determination method the contract price is set nearly 15% to 20 % higher than the open market price of maize for feed use. Further, according to the information provided by the farmers, if the open market price increases during the harvesting season, the company will increase the contracted price. However, farmers say that since they have to maintain higher standards for the maize used for human cereal food products, the price should be further increased. Farmers suggest that during every harvesting season, a minimum guaranteed price should be set for maize. They also point out that the contracted price will increase in relation to that minimum guaranteed price. Framers suggest that the need of separate quality standards for maize as feed and food. Therefore, the government's attention on this matter is vital for the sustainability of the industry. For instance, in *Yala* and *Maha* seasons of year 2012, the contracted price for maize was Rs.32.00/kg and Rs.70.00/kg respectively. However, in buying these crops the company has paidan increased price of Rs.37.00/kg and Rs.90.00/kg for maize and soya respectively. Farmers expect this price to further increase.

4.8.2 Increased the Quantity Purchased by the Company

Every year the company decides the amount of raw materials they require for their food products. Then according to that figure, they decide the necessary quantity of raw materials (maize and soya bean) from their producing areas. The company produces maize in *Maha* season in the Anuradhapura district and in *Yala* season in the Badulla district. In addition, the company produces soya bean in *Yala* season in Mahaweli H area. The regional offices and extension officers of the company decide the extent of cultivation of each leader farmer areas in order to achieve the production target. To ensure increased participation of small scale farmers, the extent of land a farmer can register for maize and soya has been limited to 2 acres. Sometimes, the company decides to increase this limit for the farmers who have involved in contract farming with the company for a long period in a reliable manner. Through this the company meets its need for the standard raw materials which are required to reach their market targets. With regard to this, farmers and their agents mention that if the company can join the "*Thriposha*" programme of the government, more farmers will get an opportunity to get involved in contract farming practices. The company needs to enhance the local market or export market opportunities to increase the farmer participation. At present, soya and maize for the government *Thriposha* programme supplied by the companies such as *Rajarata Govi samagama,* KST evergreen company, *Wayamba govi samagama* are not fully engaged in the whole contract farming process. Some provide seeds to the farmers at a concessionary rate at the beginning of the season and later they come to collect the

harvest. They do not cover the whole contract farming process. In order to evaluate the various approaches followed by companies there is a need of a government mechanism for contract farming.

4.8.3 Established Proper Crop Insurance Programme.

As discussed in the problems faced by farmers', farmers strongly suggest that the need of proper crop insurance programme is vital for sustainability. It is essential to create a series of awareness programmes regarding crop insurance for all stakeholders. To achieve this purpose proper integration of companies, credit institutions (banks), farmers, government officials and all other stake holders are needed.

Increasing the credit accessibility, increasing competition, providing inputs at subsidized prices, providing fertilizer subsidy, creating a controlled price, establishing buying centers by region, providing storage facilities and evaluating the process are other suggestions of the farmers for the sustainability of the contract farming process. It is observed that presently there is no government mechanism for regulation or coordination of contract farming practices. In order to provide solutions, first there is a need to establish a government mechanism for regulating the contract farming practices.

4.9 Major Causes for Agreement Violations

Table 4.14: Major Causes for Agreement Violations

Cause	% of Responses
Due to low quality of harvest	30
Side selling(when the open market price is high)	24
Delay in procurement of produce	20

Source: Authors Survey, 2012

It is observed that the one of the major reason for agreement violation is the quality of the harvest. To ensure food safety measures the contracted company focuses on quality of raw materials throughout the value chain. High level of moisture and high Aflatoxin level are the common quality failure factors of Maize and Soya bean. Other important reason is when the open market prices are high farmers tend to sell their products to other sellers. However, this selling practice depends on the trustworthy relationship among the farmers and the company. Sometimes the company's delay in procurement of harvest caused farmers to sell their products to others. In order to minimize the failures, commitment of both parties is very important.

CHAPTER FIVE

Findings, Conclusions and Recommendations

5.1 Findings

- The model indicates that variables such as experience, agricultural income and the total agricultural land holdings are positively and significantly related to farmer's decision making with regard to adopting FSCs.

- Regarding agricultural income, significant differences between adopters and non adopters were observed since adopters have more agricultural income than non adopters. This was mainly due to 56% of adopters growing green chili and 36% growing big onion and vegetables in *Yala* season on highland. Among those crops, green chili was the high income earning crop (Rs.300000-400000 gross income per/0.5 Ac)

- Moreover, the vegetable land extent of the considered crop is negatively and significantly related to the farmer's decision making process to adopt FSC. This can be considered as the Company limits the land extent of maize from farmers (Maximum two acres per farmer) to provide more opportunities to a number of small scale farmers.

- Level of education, availability of family labor (fulltime) and the degree of social participation are the variables which have positive but insignificant impacts on farmer's decision to adopt FSC.

- Next, the age and being a Samurdhi recipient are the variables which have negative but insignificant impacts on farmer's decision to adopt FSC.

- Nearly 19% of the maize and 15% of soya contract farmers were women while nearly 45 % of the maize and 35% of soya farmers were below 40 years of age.

- Over 85% of the contract farmers were satisfied with the extension service and seeds given by the company.

- Nearly 56% of contract maize farmers cultivated green chillies in the other (*Yala)* season.

- The average cultivated extent is 0.58 ac. Other *Yala* crops are vegetables and big onion. Eighty five percent of the soya farmers cultivated paddy as the main crop in the other season.

- Priority should be given to the industrial processing and export oriented crops like maize, soya bean, green gram, gherkin and black gram has room to improve under FSCS.

5.2 Conclusions

Based on the findings of the study following conclusions are drawn. Experienced, educated progressive small scale maize farmers with more exposure to other cash crops cultivation with high income earning are more likely to participate in contract farming through agricultural forward contracts. The quality of maize and soya bean produce can be rapidly improved through contract farming to meet global market standards. Therefore, contract farming can be promising for agro-industry development. Success stories reveal a "win-win" situation where all key determinants are integrated properly: selection of farmers, awareness, capacity building, delivery of inputs, pre and post harvest technology, technology transfer, trust building, pricing, financial support, timely payments, social and welfare activities and human resource development for both farmers and company field staff. A very essential factor derived from the success stories is that, for the sustainability of forward contracting practicing the whole concept of contract farming through vertically integrated value chain is needed rather than limiting only for forward sales buying agreement. At the national level, there should be a framework that supports contract farming. Such a framework does not currently exist in Sri Lanka. Experiences suggest the need for the government to create a favorable environment and mechanism to encourage implementing agricultural forward contracts through contract farming. Effective coordination among concerned parties and stakeholders through awareness programmes is vital for the sustainability.

5.3 Recommendations

- In future planning, policymakers need to pay more attention on implement in the whole contact farming system (marketing, production and resources contracts) rather than limiting only for forward sales buying agreement through vertically integrated value chains.

- It is necessary to establish a smooth favorable government mechanism for the monitoring of the contracts system following a discussion of all stakeholders. Development of specific legislation and guidelines, registering contracts, implement awareness programmes, and development of public private partnerships for contract farming practices is a prerequisite for the success.

- Replicate the lessons learnt from success programmes. Create enabling environment and motivate the private sector companies engaged in Agri –business with assured markets to join in contract farming.

- The role of organizations in facilitation of market linkage arrangements becomes important. The most suitable facilitator was development or commercial banks operating in the producing areas. They can easily provide a series of financial services such as credit, insurance, savings which are the binding agents for farmer and buyer to create a mechanism to provide technical extension for the farmers by collaborating qualified project officers, company officers and government officers operating in the producing area.

- Prior to deciding the type of market intervention, it is essential to examine the socio economic situation, existing production and marketing environments such as crop varieties, cropping patterns, seasonality, environmental factors, marketing channels, in the area, through a detailed research. Further, activities performed by the previous projects and their impact need to be considered.

- In selection of crops, priority should be given to the industrial processing and export oriented crops such as maize, soya bean, green gram, black gram, gingerly and gherkin.

- It is also essential that smallholders organize themselves into farmer organizations(FO) as a prerequisite to enter into contract farming because farmer organizations are more likely than individual smallholders working alone to obtain a beneficial arrangement. It minimizes the transaction costs and both parties could benefit from the arrangements. Therefore, strengthening of FOs is vital when implementing contract farming programmes.

- Establishing proper crop insurance and credit programmes for contract farmers and increasing the awareness of all stakeholders are vital.

- The most suitable facilitator was development or commercial banks operating in the producing areas. Development of specific guidelines and mechanism for contract farming practices is a prerequisite for success (Forward Trade Commission in India).

- There is a need to evaluate buyer's capacity to continue FSCs. Questions such as do they have an assured market, whether it is economical for the selected buyer to continue with FSCs, should be answered. It is necessary to build a successful relationship between the farmers and the buyers rather than a written agreement.

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Annex 1: Number of Contracted Farmers according to the Crop by District

Maize

Year	Ampara		Moneragala		Hambantota		Anuradhapura		Total	
	Yala	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*
2006					70		2,662	4,136	2,732	4,136
2007							5,449	12,111	5,449	12,111
2008			125	94	85	83	458	9,535	668	9,712
2009				223		209	56	5,935	56	6,367
2010		656	136	245	20	33		12,929	156	13,863

Source: Central Bank of Sri Lanka

Soya

Year	Ampara		Moneragala		Hambantota		Anuradhapura		Total	
	Yala	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*
2006							4,150	587	4,150	587
2007							2,500		2,500	-
2008			120					95	120	95
2009							1,778		1,778	-
2010							677	738	677	738

Source: Central Bank of Sri Lanka

Blackgram

Year	Ampara		Moneragala		Hambantota		Anuradhapura		Total	
	Yala	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*
2006			407		35				442	-
2007			367	807	73			60	440	867
2008			533	399				100	533	499
2009				1,120					-	1,120
2010			3	106	6			54	9	160

Source: Central Bank of Sri Lanka

Cont'd..

Annex 1: Number of Contracted Farmers according to the Crop by District

Greengram

Year	Ampara		Moneragala		Hambantota		Anuradhapura		Total	
	Yala	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*
2006					164	700	102	548	266	1,248
2007			400		149	179		24	549	203
2008				445	110	124			110	569
2009				10		104			-	114
2010				2	36	90			36	92

Source: Central Bank of Sri Lanka

All Pulses Crops

Year	Ampara		Moneragala		Hambantota		Anuradhapura		Total	
	Yala	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*	*Yala*	*Maha*
2006			407		269	700	6,914	5,271	7,590	5,971
2007			767	807	222	179	7,949	12,195	8,938	13,181
2008			778	938	195	207	458	9,730	1,431	10,875
2009				1,353		313	1,834	5,935	1,834	7,601
2010		656	139	353	62	123	677	13,721	878	14,853

Source: Central Bank of Sri Lanka

Annex 2

.mfx

Marginal effects after logit

y = Pr(contract_or_not) (predict)

= .59966656

variable	dy/dx	Std. Err.	z	P>|z|	[95% AC.I.]		X
age	-.1430343	.10909	-1.31	0.190	-.356847	.070778	1.56835
educ	.1279141	.12219	1.05	0.295	-.11157	.367398	2
experi~e	.1865788	.0788	2.37	0.018	.032133	.341025	2.02878
Social~a	.0426319	.07423	0.57	0.566	-.102855	.188119	1.55396
total_~d	.2541339	.11105	2.29	0.022	.036475	.471792	2.47482
landex~p	-.2530819	.09165	-2.76	0.006	-.432709	-.073455	1.81295
fa_la_ft	.1287576	.24928	0.52	0.605	-.35983	.617345	1.06475
agric_in	.6564902	.31354	2.09	0.036	.041956	1.27102	2.80576
samurdhi*	-.0737903	.1265	-0.58	0.560	-.321724	.174144	.28777