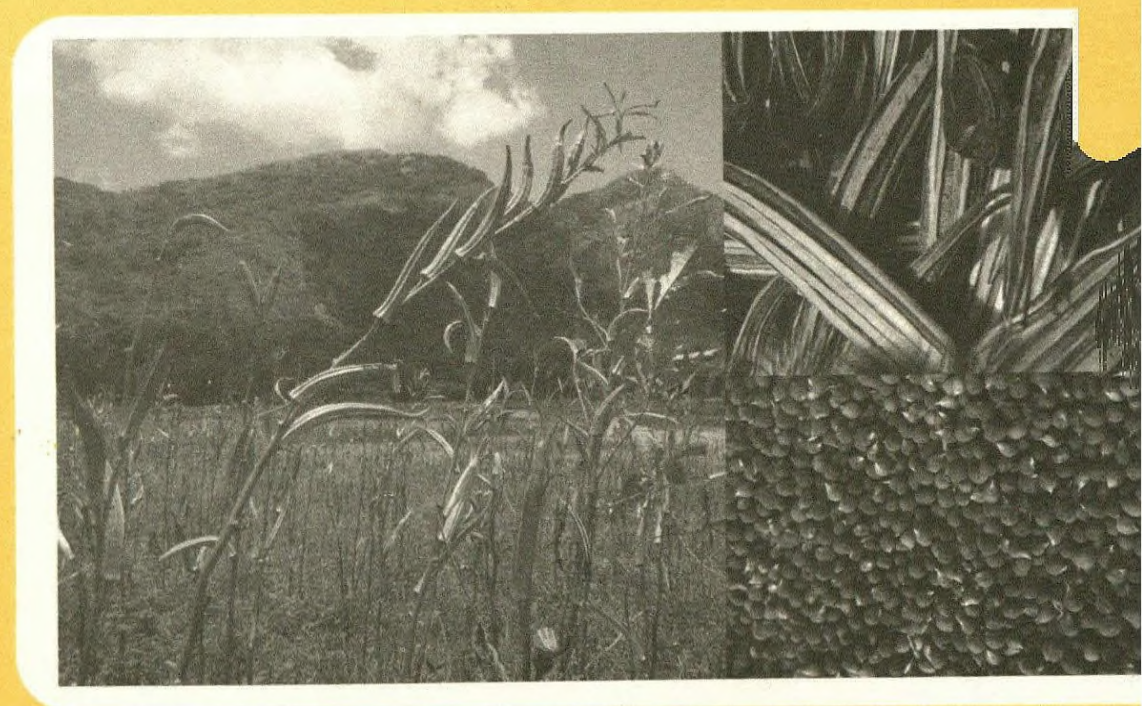


AN ANALYSIS OF CONTRACT FARMING IN VEGETABLE SEED PRODUCTION

B.A.D.S. Bamunuarachchi



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B.A.D.S. Bamunuarachchi

MFN 12867

Research Report No: 158



September 2013

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24325

24325



First Published: September 2013

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Coverpage Designed by: Udeni Karunaratne

Final typesetting and lay-out by: Dilanthi Hewavitharana

ISBN: 978-955-612-160-5

FOREWORD

Irregular supply of good quality seeds is a serious problem which prevents the realization of full potential of producing vegetables. Both the government and the private sector are engaged in production of mainly low country vegetable seeds. Therefore, it is important to understand the current status, development potential and issues related to producing vegetable seeds under contract farming which is one of the major strategies of seed production. The study covered a sample survey of seed producers under contract farming in some major seed producing districts.

The study reveals that seed production is profitable. Majority of farmers in former government contract seed Programmes have shifted from the government contracts and joined with the private sector. Therefore the Department of Agriculture (DOA) should be more concerned with this phenomena and actions should be taken to attract more contract farmers to strengthen local quality seed production. Delays in payment for seed farmers by the DOA remains a major reason for the unwillingness by producers to be participant in the government programme. The study recommends the reduction of time taken for settlement of payment by the DOA and to have written agreements between government or the private sector and farmers.

I congratulate Mrs B.A.D.S. Bamunuarachchi, the coordinator of the study for successfully completing the study and hope the findings would be useful to policy makers and the other interested parties for improving future prospects of local vegetable seed industry.

E.M. Abhayaratne
Director

ACKNOWLEDGEMENTS

I wish to acknowledge the cooperation and support given by the farming community and the other stakeholders engaged in seed production and marketing including private sector companies when collecting necessary information for the study. I owe my sincere gratitude to officers and field officers of the Seed and Planting Material Development Center (SPMDC) and Seed Certification Service (SCS) of the Department of Agriculture.

I also wish to express my gratitude to the Director of HARTI, Mr. E.M. Abhayaratne for the support given in various ways for publishing this report and to the former Director of HARTI, Mr. Lalith Kantha Jayasekara for encouragement and assistance given to initiate and conduct this study.

I thank Additional Director, Dr. L.P Rupasena, for his valuable comments and support given during the study. Special thanks go to Prof I. Siriweera for editing this report. I am also thankful to external reviewers, Prof. S.M.P Senanayake and Dr. Fedrick Aberathne for their valuable comments for improving the final report. My sincere thank are due to Head of Agricultural Policy and Project Evaluation (APPE) Division, Mr. J.K.M.D. Chadarasiri for encouragement and suggestions.

I acknowledge the dedicated services provided by Mrs. Sandhya Senanayake as the Statistical Officer in coordinating field data collection and by Mr. D.M.A.C. Dissanayake and Ms. D.M.N.K. Dalpitiya as casual investigators in data collection, coding and tabulating data.

I also thank Office Secretary and type setter in APPE Division, Mrs. S.D. Lalana Sriyani, and Ms. N.A.K Sandamali, Senior Information and Publication Officer, Mr. C.U.Senanayake and the staff of the Publication and Printing Units of HARTI for their valuable services.

B.A.D.S. Bamunuarachchi
Research Officer

EXECUTIVE SUMMARY

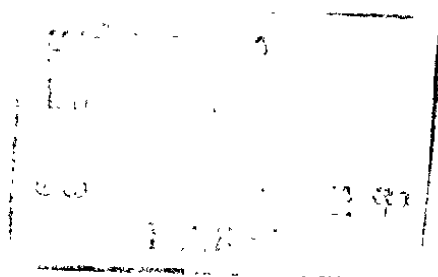
Shortage of quality seeds and planting material remains one of the major problems for increasing production and productivity. Contract seed production of government as well as private sector contributes remarkably to the local seed industry. Hence this research is focused on current issues and discusses contract farming in vegetable seed production and the roles of all the stakeholders in some major seed producing districts namely Anuradhapura, Kurunegala, Matale, Nuwara Eliya and Kandy. The study is mainly based on primary data collected through different methods such as sample survey, case studies, key informant discussions and focus group discussions.

Both the DOA and private sector contract farmers were included in the survey. According to the findings, 65% of the sample contract farmers were in 31-50 years of age categories and most of the private sector contract farmers were young and in the 31-40 age group. Further, 89% of areas under seed production were less than one acre. Majorly of the total contract (94%) and 83% of private contract farmers did not have written contracts. In the private sector there was a higher possibility of breach of contract when current seed prices were less than the agreed price. Contract farmers face problems of low investment capability (67% of total contract farmers) delayed payment for supplies (78% of DOA farmers) and lack of high level of agricultural knowledge (54% of total contract farmers). According to the overall view of the sample farmers, seed production is profitable (90%). There was significant relationship between private and government contract growers' returns per rupee of investment and it shows that government contract growers earned average profits and private contract growers earn higher level of profits. More than two rupees returns per rupee of investment were gained by 47% DOA farmers and 57% private contract farmers. There was a significant difference between time of settlement of payments under contract agreement between the DOA and the private sector. As much as 13% DOA contract farmers and 83% private contract farmers received payments within one month.

In the case of private sector, importance of having a written document should be emphasized as higher possibility of breach of contract by firms existed. DOA should take steps to attract young innovative farmers to the contract programme. Delayed payment for supplies for the farmers should be minimized in order to attract farmers to the DOA contract programme. Further, seed producing farmers should be provided with concessionary credit facilities and training on improved methods of production, processing and storing as most of the farmers have only the traditional knowledge. But the new technology should be introduced to move Sri Lanka with other countries in seed industry.

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LIST OF ABBREVIATIONS

| | | |
|-------|---|---|
| AI | - | Agricultural Instructor |
| ADA | - | Assistant Director Agriculture |
| DD | - | Deputy Director |
| DOA | - | Department of Agriculture |
| DUS | - | Distinctness, Uniformity and Stability |
| FC | - | Fixed Cost |
| FSC | - | Forward Sales Contracts |
| FYM | - | Farm Yard Manure |
| GR | - | Gross Returns |
| HORDI | - | Horticultural Crop Research & Development Institute |
| ISTA | - | International Seed Testing Association |
| NSP | - | National Seed Policy |
| NGOs | - | Non Governmental Organizations |
| OP | - | Open Pollinated |
| OIC | - | Officer In Charge |
| SCC | - | Seed Certification Center |
| SCPPC | - | Seed Certification and Plant Protection Centre |
| SPMDC | - | Seed and Planting Material Development Center |
| TC | - | Total Cost |
| VC | - | Variable Cost |

CHAPTER ONE

Introduction

1.1 Background

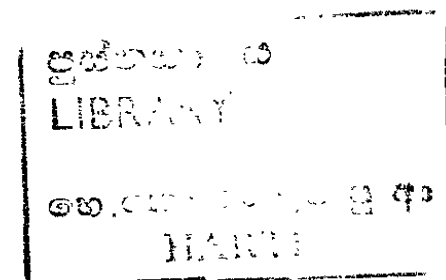
1.1.1 Vegetable and Vegetable Seed Production in Sri Lanka

Sri Lanka's tropical climate favours vegetable cultivation throughout the year. A large number of vegetable crops are commonly grown in the Island. They can be broadly divided into two categories; a) Low country group which includes indigenous types of vegetables commonly found in low elevations of the country. The most common ones of this group are gourds, pumpkin, cucumber, okra, brinjal, sweet potato, leafy vegetables, long beans, wing bean, ash plantain etc b).Up country vegetable group which includes exotic types commonly grown in higher elevations in the central hill country areas. This exotic group of vegetables includes cabbage, carrots, leeks, beetroot, beans, tomato, capsicum, cauliflower, knol kohl, potato etc. However, these vegetables are now grown in low elevations conditions as well. Vegetables are mainly grown by semi commercialized small farmers whose individual extent of land does not exceed a hectare. Private sector involvement in commercial cultivation too has been encouraged by the Sri Lankan Government with support from “Contract growing” farmers. (www.srilankaexpo.com)

Most of the low country vegetable seeds can be produced in local premises. Most of the upcountry vegetables seeds cannot be produced due to unfavourable climatic conditions. The seed requirement of low country vegetables is fulfilled from local seed production by the Department of Agriculture (DOA), provincial councils, cooperatives, farmer organizations, farmers themselves and the private sector companies along with imported hybrid seeds. But, most of the upcountry vegetable seeds are imported except seeds of vegetables like beans and raddish.

1.1.2 Importance of Seed as an Input

According to Samarasinghe (1987), seed is not only a grain planted by a farmer. It is the carrier of genetic potential for higher production and is a vehicle for introducing technological improvements. Marketing of good quality seed of improved varieties can trigger change and help to achieve agricultural production objectives. Seed enjoys a unique position among agricultural inputs and is neutral in relation to the size of the farm. Crop yields can be increased if farmers plant pure seeds of higher yielding varieties. High quality seed is the easiest input to introduce for increasing yield and to reduce production costs, because no change in farmer technology is required. It simply substitutes higher yielding seed for previously used low yielding seed. Improved seed programmes, therefore, not only enhance agricultural production but improve the lot of small-scale landholders. Improved crop varieties are developed through research programmes of the DOA. Another feature of significance in Sri Lanka is the institutionalization of the traditional system of seed exchange among farmers by means of



a system of secondary seed farms. However, it is encouraging to observe that, in general, farmers are prepared to pay more for higher quality seed if it is guaranteed to be pure, viable, packed and labeled.

1.1.3 Benefits of Contract Farming

Contracts are generally signed at the time of planting and specify how much produce the company will buy and at what price. Often the firm provides credit, inputs, farm machinery rentals, technical advice and retains the rights to reject any substandard produce.

According to Kumar (2005), benefits of contract farming for the firm were manifold. The companies know the acreage planted and are assured of the grower's output thus reducing their supply risk. The company is in control of the contract provision and stipulations that can encourage quality and production through the terms of agreement. The company knows its approximate cost of raw product in advance, as better growers tend to contract with the same company over several years and some stability in company – grower relationship is attained. Since, some of the crops have no/less domestic market (at present), the farmers have no option to sell their produce outside and the company is assured of getting regular supply of the produce. The benefits for the farmer were having an assured market for their products which will eliminate the risk of price fall during a glut. Information on market price is made available ex-ante (this instills confidence among the contract farmers), and saves the difficulties involved in timely transportation and eradicates the exploitation by middlemen. One farmer can receive assistance in the form of technical service and input supply on credit with/ without interest cost (companies often provide credit to farmers which reduce the burden of self-expenses to the farmer). This enables the farmers to escape from the evils of private money lenders and farmer is assured of better returns compared to other field crops as the companies offer relatively better prices.

1.2 Research Problem and Significance of the Study

At present, the agricultural sector faces a number of problems including low productivity, low level of technological innovation, inadequate credit flows, poor access to international markets and inadequate use of quality seeds and planting material. Shortage of quality seeds and planting material remain an issue in increasing production and productivity. At present local vegetable seed industry, seed production and trade have not developed in this country on any scientific lines and the approach is not systematic. The government as well as private sector engages in especially low country vegetable seed production. There is also a considerable level of importation of hybrid seed and lesser amount of self seed production. Except very few like Anjali, Amanda (Brinjal) other local vegetable seed varieties are produced in local premises and are open pollinated (O.P.) The nation lays emphasis on the increase of vegetable production and consumption and makes efforts for stable supply of superior seeds. Irregularity is one of the reasons of production instability. As the major stakeholders, private sector companies and DOA produce local seed mostly through contract growers. Hence, contract growers are the key

people in the vegetable seed industry. Further, DOA contract programme is formal that same procedures are adapted in any area but in the private sector this varies according to the company. In order to explore the full potential of vegetable production there should be continuous supply of good quality seeds. However, their shortage is a serious problem for increasing vegetable production. Therefore, it is important to understand about the existing vegetable seed production procedure which is contract farming. Hence this research addresses current status and potential and issues of contract farming in vegetable seed production and the roles of all the stakeholders in some major seed producing districts. The research suggests guidelines for policy makers on the potential and drawbacks in increasing of local vegetable seed production.

1.3 Objectives and Scope of the Study

General Objective of the study is to examine the current status and potential and issues of contract farming in vegetable seed production including the roles of all the stakeholders in major seed producing districts in Sri Lanka. The specific objectives are;

1. To investigate contract seed production procedure and terms of contract in vegetable seed production
2. To estimate the cost and returns in vegetable seed production
3. To analyze the problems encountered by contract seed growers and contract firms to be able to supply of quality seed continuously.
4. To suggest appropriate policy measures to overcome the constraints

1.4 Research Methodology

The study is mainly based on primary data collected through different methods such as sample survey (using pre-tested questionnaire), case studies, key informant discussions and focus group discussions. Both qualitative and quantitative data were collected. Target group was contract vegetable seed producing farmers of DOA and private sector and other stakeholders in seed production process. Following DS Divisions were selected to conduct the data collection as these areas were identified as areas of extensive vegetable seed production in Sri Lanka.

| | |
|--------------|---|
| Anuradhapura | Ipalogama DS Division (Maha Illuppallama, Ipalogama, Kagama, Senapura, Katiyawa etc), |
| Kurunegala | Nikaweratiya DS Division (Nikaweratiya) Kotawehera(Mahamitawa,Monnekulama) |
| Matale | Yatawatta DS Division (Walewela) Dambulla DS Division (Pelwehera- for Key informant discussions) |
| Nuwara Eliya | Haguranketa DS Division (Rikillagaskada, Mandaram Nuwara) |
| Kandy | Kundasale and Katugastota for Key informant discussions |

Convenience sampling was done and accordingly, government as well as private farmers were selected. It was a necessary condition for vegetable seed as well as for other seed production to have the farmers' fields near regional ADA (Assistant Director Agriculture) office and sufficient condition to have Seed Certification Service (SCS)

office nearby for convenience. The above mentioned qualities existed in selected areas namely, Maha Illuppallama SCS, Pelwehera SCS, Nikaweratiya SCS, Kundasale SCS and Rikillagaskada SCS. There were very few government contract farmers for vegetable (eg Maha Illuppallama ADA region 14 farmers, Pelwehera three farmers ADA region 2011/2012 Maha season) except in Rikillagaskada (under Bean Seed production unit- Rikillagaskada 175 farmers). Almost all possible government contract vegetable seed producing farmers of each ADA office list in considered areas were interviewed and in Rikillagaskada cluster sampling was done. In the private sector, contract vegetable seed producing farmers were selected according to the availability as sample frame was unknown and it was not possible to construct one as the contract farmers of private sector were considered as their own property and altogether 98 farmers were interviewed. Contract firms, relevant DOA officials (Seed and Planting Material Development Center (SPMDC) and SCS and private company authorities and agents/collectors who were directly or indirectly dealing with contract farmers were interviewed for data collection under key informant and focus group discussions. Table 1.1 indicates available contract farmers in selected locations.

Table 1.1: Sample Size of Contract Farmer Distribution in Study Locations

| District | No. of Farmers |
|---|-----------------------|
| Anuradapura- Ipalogama DS Division(Maha Illuppallama, Ipalogama, Kagama, Senapura, Katiyawa etc), | 45 |
| Matale- Yatawatta DS Division, Dambulla DS Division | 12 |
| Kurunegala- Nikaweratiya DS Division (Nikaweratiya) Kotawehera (Mahamitawa, Monnekulama) | 26 |
| Nuwara Eliya- Haguranketa DS Division (Rikillagaskada, Mandaram Nuwara) | 15 |

Selection of Crops: - Tomato, Bitter gourd, Okra, Beans, Raddish, Long Beans (Ma) etc.

Survey Period: - 19th April 2012 to 30th June 2012

Method of Analysis: - The collected data was analyzed through descriptive methods using statistical SPSS package. The analytical techniques used to evaluate the objectives of the present study are summarized below. The technique of tabular analysis was employed for computing the costs, returns, terms of contract and procedure and problems faced by contract farmers and contract firms.

1.5 Definition of Terms and Concepts Used in the Study

In this section, different concepts of costs and returns used in the study are presented. It is observed at the time of data collection that farmers were more familiar with acre as the unit of measuring the land area.

1.5.1 Costs

The total costs (TC) were divided into two broad categories a) Variable costs and b) Fixed costs

Total cost = Total Variable cost (TVC) + Total Fixed Cost (TFC)

a) Variable costs

These costs comprised of costs incurred on variable inputs such as seed, fertilizers, plant protection chemicals, labour (human and machine), staking sticks and gunny thread, and irrigation. The computations of different terms of variable cost components are as follows:

Seed: The cost of the seeds was computed by using the actual price paid, at the time of sowing in contract farming.

Fertilizer: The cost of fertilizer was based on the actual price including the cost of transportation and other incidental charges, if any and Farmyard manure (FYM). The value of FYM was computed by considering the rates prevailing in the locality at the time of its application.

Plant protection chemicals: The actual price paid was used to compute the cost of plant protection chemicals.

Labour (human and machine): The cost of labour (human and machine) was computed by taking the wage rate paid for human labour and machine hours.

Staking materials: These include cost of wooden poles, thread and plastic wires, which were used for staking the plant. The actual price paid by the farmer was used to compute the cost of staking.

b) Fixed cost

This includes rental value of land.

Rental value of land: Rental value of land was calculated at the prevailing rate per acre per annum in the locality and was apportioned to the vegetable crops for the period for farm business analysis.

1.5.2 Returns

The vegetable seeds were marketed by contract farmers after harvest for a prefixed price and returns were calculated using following formulas.

Gross Returns (GR) = yield × price

Net returns over variable cost = Gross Returns (GR) – Total Variable Cost (TVC)

Net returns over total cost = Gross Returns (GR) – Total Cost (TC)

Cost of production per kg = Total Variable Cost (TVC) / yield of product

Net returns over variable cost per kg = Net returns over variable cost/yield

Net returns over total cost per kg = Net returns over total cost/yield

Returns per rupee of investment = Gross Returns (GR) /Total Cost (TC)

1.6 Organization of the Report

This report is organized into six chapters. Chapter one constitutes the Introduction, and mainly focuses on background research problem and significance of the study, objectives and scope of the study, study area, research methodology, definition of terms and concepts used in the study. Review of Literature pertinent to Sri Lankan vegetable seed industry, national agricultural policy, general requirements of vegetable seed production and contract farming are presented in chapter two. Chapter Three gives an overview of local contract vegetable seed production procedure. Chapter Four reports socio economic aspects of contract farming whilst chapter five concentrates on systems of vegetable seed production in major seed producing areas in Sri Lanka. Finally, conclusion and recommendations are presented in chapter six.

CHAPTER TWO

Literature Review

2.1 Introduction

This chapter contains a literature review on Sri Lankan vegetable seed industry, national agricultural policy, general requirements of vegetable seed production and contract farming.

2.2 Sri Lankan Vegetable Seed Industry

According to Nanayakkara (2007), vegetable seed industry was at a very low level, for a long time but with the participation of the private sector, now the industry is growing fast. The country's vegetable seed production is still dominated by the locally produced O.P. Varieties. Breeder and the Foundation/Registered/Basic seed¹ (Figure 2.1) is still produced by the state farms. Private sector multiplies the Foundation/Registered/Basic seed obtained from the state. Hybrid vegetable seed is imported by the private sector. The market is increasingly dominated by hybrid vegetable seed. Hence, O.P. fields and fields planted with inferior quality hybrid seed, are now getting replaced by good quality hybrid seed. Therefore, demand for hybrid seed is increasing day by day. In the year 2007 the import value of vegetable seed remained around 3.5 million US Dollars per year. This is on increase at present. The total area of land available for vegetable cultivation in Sri Lanka is only around 100,000 hectares.

Figure 2.1: Seed Classes for Paddy, Other Field Crops (OFC) and Vegetables

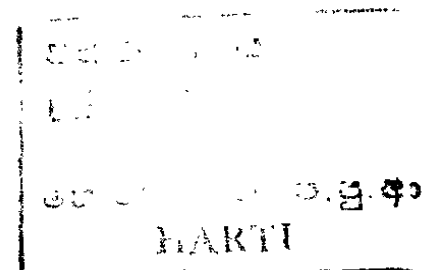
(For Paddy & OFC)

Breeder Seed
↓
Foundation Seed
↓
Registered Seed
↓
Certified Seed

(For Vegetables)

Breeder Seed
↓
Basic Seed
↓
Standard Seed

¹ Described in Chapter Three



2.2.1 Seed Production Programme in Sri Lanka

In the late 1950's the DOA took the leadership in seed production by starting an organized programme along with the development of high yielding varieties. Until recently the DOA played the major role of producing and distributing seed of about 70 varieties of 20 crops. The DOA was the sole supplier up to late 1980's but the private sector was also involved in production and supply from 1990 onwards. The Government introduced the National Seed Policy (NSP) in 1996. Its objective was to establish viable seed enterprises for farmers' easy access to high quality seed. Accordingly the NSP commercialized the seed and planting material sector. Government had already initiated action for duty free import of seed and planting material. The role of the DOA is limited to crop improvement, Foundation/Registered/Basic seed supply, technical assistance and quality assurance services. Recently another seed Act was introduced (Seed Act No. 22, 2003) and its objective is to assure the quality of seed and planting materials available to farmers.

2.3 National Agricultural Policy

According to Mahinda Chintana(Vision for the future-2010), the country has the potential to produce all its tropical fruits and vegetables for its needs and also for export. The policy of the Government is to increase the production of these items to attain near self sufficiency level by 2020(table 2.1). By expanding irrigation facilities, farmers would be productively engaged in cultivating fruits and vegetables during off seasons in existing lands in Moneragala, Hambantota, Matale, Kurunegala and Puttalam districts, and the newly opened areas in the Northern and Eastern Provinces. The cultivation of fruits and vegetables in home gardens would also be promoted by linking the marketing network directly with good quality seeds and advanced cultivating practices. By moving towards self sufficiency in these crops, opportunities will be provided for Sri Lankan farming communities to enhance their incomes and generate rural based employment.

Table 2.1: Present Production, Imports and Production Targets of Vegetables

| Vegetables 2009 | | Target 2015 | | | Target 2020 | | |
|-----------------|-------------|-----------------|-------------|-------------|-----------------|-------------|-------------|
| Production (mt) | Import (mt) | Production (mt) | Export (mt) | Import (mt) | Production (mt) | Export (mt) | Import (mt) |
| 840,450 | 260 | 1,200,000 | 200,000 | 30 | 1,500,000 | 350,000 | 5 |

Source: www.priu.gov.lk

2.3.1 Present National Seed Policy

According to the government policy document Mahinda Chintana, Vision for the Future (2010), steps would be taken to completely modernize the main Agro-Research Centers with a view to producing all varieties of seed needed locally, for agricultural purposes in

Sri Lanka. All government farms would be directed to undertake seed production. Inducements would be given to the private sector, farmer organizations and individual farmers for producing quality-certified seeds. Research institutions would be given all facilities for breeding varieties of agricultural crops that can withstand the harsh conditions of the Dry Zone and are suitable for short-term harvesting. Steps would be taken to double the production of seed for the cultivation of vegetables. In particular, hybrid varieties of vegetables of high quality and rich yield would be introduced.

Further, in Mahinda Chintana (2010), it is stated that the Government seed farms would be developed with modern technology aimed at increasing yields. Buffer stocks of certified seeds will be maintained ensuring an uninterrupted supply of seeds. There is also the necessity for developing a competitive and regulated seed industry by involving the private sector in seed production and distribution. Strict quarantine regulations would be put in place when importing seeds by enforcing the Seed Act (No 22, 2003) in order to protect and safeguard domestic agriculture.

2.4 General Requirements for Vegetable Seed Production

Thorough knowledge of vegetable crops in respect of their growth habits, mode of pollination, proper isolation distance, *etc.*, are of prime importance in the production of quality seed. The handling of the seed crop, its curing, threshing, cleaning, grading, packing and storage need specialized knowledge. With recent technological developments in agriculture, seed production has become a more complex business and requires careful planning for successful operations. The seed production is systematically organized and carefully planned based on the best information available and is aimed at achieving higher yields and best quality seed out of their resources. It is important for the seed grower to think about the seed programme in advance and adjust it according to new knowledge on technological development changes in physical and economic environments *etc.* To maintain the requisite genetic purity and to achieve high level of seed standards during seed production, it is essential to have field standards. The seed production programmes organized by public as well as private sector organizations at different locations, seasons and of various classes, have to be maintained uniformly during execution in the field. The field standards are of two types, the first one includes the isolation distance for foundation and certified seed and second is the specific requirement comprising off type, objectionable weeds and plants affected by seed born diseases. The objectives of general and specific requirements are to maintain genetic purity avoiding the genetic contamination and ultimately to meet the seed standards. (www.krishisewa.com)

According to Reusche (1987), the isolation requirement is variable among the crops and it is low in self pollinated crops while moderate in often cross pollinated crops and higher in cross pollinated crops where wind/ insects act as pollinating agent. When dry weather (i.e. low rainfall, low relative humid) follows the ripening of the crop, seed can be left to dry in the field until threshing, bagging and storage operations are undertaken (assuming that insects or other hazards are not a problem). However, if humid, wet conditions occur after physiological maturity and unacceptably high losses in seed quality may occur. It is

often necessary to harvest a seed crop when it is dry enough to store safely in bulk, and then place it in a ventilated environment where it will continue to dry. High temperature and high seed moisture will cause rapid seed deterioration. Strategies to rapidly reduce the seed moisture content, and to maintain low seed moisture content during the storage period, will prolong the life of seed.

2.5 Definition of Contract

According to definition by Wikipedia, a contract is an agreement having a lawful object entered into voluntarily by two or more parties, each of whom intends to create one or more legal obligations between them. The elements of a contract are "offer" and "acceptance" by "competent persons" having legal capacity who exchanges "consideration" to create "mutuality of obligation." Proof of some or all of these elements may be placed in writing, though contracts may be made entirely orally or by conduct. The remedy for breach of contract can be "damages" in the form of compensation of money or specific performance enforced through an injunction. Both of these remedies award the party at loss the "benefit of the bargain" or expectation damages, which are greater than mere reliance damages, as in promissory estoppels. The parties may be natural persons or juristic persons. A contract is a legally enforceable promise or undertaking that something will or will not occur. (www.wikipedia.org/wiki/Contract)

According to Fletcher I., The difference between binding and nonbinding in a legal process makes a significant difference. In contract law, nonbinding agreements are generally used in the form of letters of intent or memorandums of understanding. Their purpose is to clarify an existing or proposed legal arrangement without holding either party responsible for the text of the document. Also, binding agreements are what one would generally refer to as a "contract" or "agreement." Binding documents are enforceable in law. Similarly, the terms nonbinding and binding have similar significance in arbitration proceedings.

2.6 Contract Farming

According to definition by Wikipedia, contract farming is, agricultural production carried out according to an agreement between buyers and farmers, which establishes conditions for the production and marketing of a farm product or products. Typically, the farmer agrees to provide established quantities of a specific agricultural product, meeting the quality standards and delivery schedule set by the purchaser. In turn, the buyer commits to purchase the product, often at a pre-determined price. In some cases the buyer also commits to support production through, supplying farm inputs, land preparation, providing technical advice and arranging transport of produce to the buyer's premises. Another term often used to refer to contract farming operations is 'out-grower schemes', whereby farmers are linked with a large farm or processing plant which supports production planning, input supply, extension advice and transport. Contract farming is employed for a wide variety of agricultural products. An agricultural production contract is a contract by which a producer (sometimes called a "grower") agrees to sell or deliver all of a designated crop raised in a manner set forth in the agreement to a contractor (sometimes called a "processor") and is paid according

to a formula established in the contract. A production contract usually specifies in detail the production inputs to be supplied by the contractor, the quality and quantity of the particular commodity involved, the production practices to be used, and the manner in which compensation is to be paid to the producer. While significant attention has recently been focused on production contracts with large, corporate agricultural processors, farmers, themselves, can be contractors (www.extension.umn.edu.)

2.6.1 The Rationale for Contract Farming

Contract farming is one of the different governance mechanisms for transactions in agri food chains. The use of contracts (either formal or informal) has become attractive to many agricultural producers worldwide because of benefits such as the assured market and access to support services. It is also a system of interest to buyers who look for assured supplies of produce for sale or for processing. Processors are among the most important users of contracts, as they wish to assure full utilization of their plant processing capacity. A key feature of contract farming is that it facilitates backward and forward market linkages that are the cornerstone of market-led, commercial agriculture. Well-managed contract farming is considered as an effective approach to help solve many of the market linkage and access problems for small farmers.

2.6.2 Types of Contract Farming

These are a few globally accepted contract farming models.

1. Centralized model
 2. Nucleus Estate model
 3. Multipartite model
 4. Informal model
 5. Intermediary model
-
1. **Centralized model:** The contracting company provides support for production of the crop by smallholder farmers, purchases the crop from the farmers, and then processes, packages and markets the product, thereby tightly controlling its quality. This may involve tens of thousands of farmers. The level of involvement of the contracting company in supporting production may vary.
 2. **Nucleus Estate model:** This is a variation of the centralized model. The promoter also owns and manages an estate plantation (usually close to a processing plant) and the estate is often fairly large in order to provide some guarantee for the plant. It is mainly used for tree crops, but can also be applied to fresh vegetables and fruits for export.
 3. **Multipartite model:** The multipartite model usually involves the government, statutory bodies and private companies jointly participating with the local farmers. The model may have separate organizations responsible for credit provision, production, and management, processing and marketing of the produce.

4. **Informal model:** This model is basically run by individual entrepreneurs or small companies who make simple, informal production contracts with farmers on a seasonal basis. The crops usually require only a minimal amount of processing or packaging for resale to the retail trade or local markets, as with vegetables, watermelons, and fruits. Financial investment is usually minimal. This is perhaps the most speculative of all contract-farming models, with a risk of default by both promoter and farmer.
5. **Intermediary model:** This model has formal subcontracting by companies to intermediaries (collectors, farmer groups, Non Governmental Organizations (NGOs)). The intermediaries have their own (informal) arrangements with farmers. The main disadvantage in this model is it disconnects the link between company and farmer.

2.6.3 Issues of Concern Related to Contract Farming

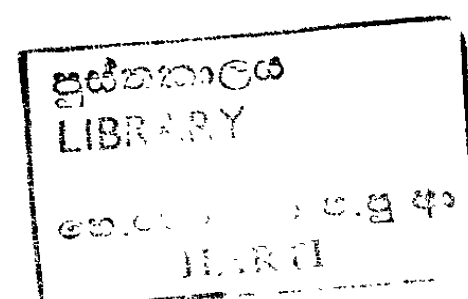
According to wikipedia, as with any form of contractual relationship, there are potential disadvantages and risks associated with contract farming. If the terms of the contract are not respected by one of the contracting parties, then the affected party stands to lose. Common contractual problems include farmer sales to a buyer other than the one to whom the farmer is contracted (side selling or extra-contractual marketing), a company's refusal to buy products at the agreed prices, or the downgrading of product quality by the buyer. Side selling by farmers to competing buyers is perhaps the greatest problem constraining the development of contract farming. Contractors also may default by failing to pay agreed prices or by buying less than the pre-agreed quantities. Another concern about contract farming arrangements is the potential of buyers to take advantage of farmers. Buying firms, which are invariably more powerful than farmers, may use their bargaining clout to their financial advantage. Indeed, if farmers are not well organized or where there are few alternative buyers for the crop or when it is not easy to change the crop, there is a danger that farmers may have an unfair deal. Tactics sometimes used are changing pre-agreed standards, downgrading crops on delivery offering lower prices, or over-pricing for inputs and transport provided. Strengthening farmer organizations to better access of appropriate services such as credit, extension services and market information and improving their contract negotiating skills can redress the potential for exploitation of farmers and poorly formulated contracts and their enforcement. Despite the typical problems listed above, contractual arrangements are gaining popularity as they are being used more frequently in agriculture worldwide.

According to Malaviarachchi there are three types of contract farming in Sri Lanka; Forward Sales Contract (FSC), Contract Farming Agreement made between a private firm and the producer and Seed production Programme of the DOA. Under Seed production programme of the DOA, only basic seeds are provided and there are no other inputs. The DOA guarantee price, maintain quality through field officers, certify based on seed lab report and purchase seeds.

According to Abeygunasekara *et.al* the problems identified in DOA contract seed production programme were difficulty in finding suitable/reliable growers, unexpected rains during harvesting period so that difficulty in drying of seed lots (moisture content 12%-paddy) and reluctance of growers to re-dry rejected lots, seed quality related problems, inadequate funds (on time), inadequate staff, infrastructure problems (transport/processing), unattractive seed purchasing price, tendency of growers to keep some seed with them/piracy. The authors concluded that Sri Lanka has great potential for sustainable competitive contract farming and that cultivators expect proper contract systems. Further they state that it needs consistent policies, finance facilities, infrastructure, and improved market facilities.

Hence, this study intends to find out the status of contract farming in vegetable seed production of the DOA and the private sector in a comparative context.

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CHAPTER THREE

Overview of Local Contract Vegetable Seed Production Procedure

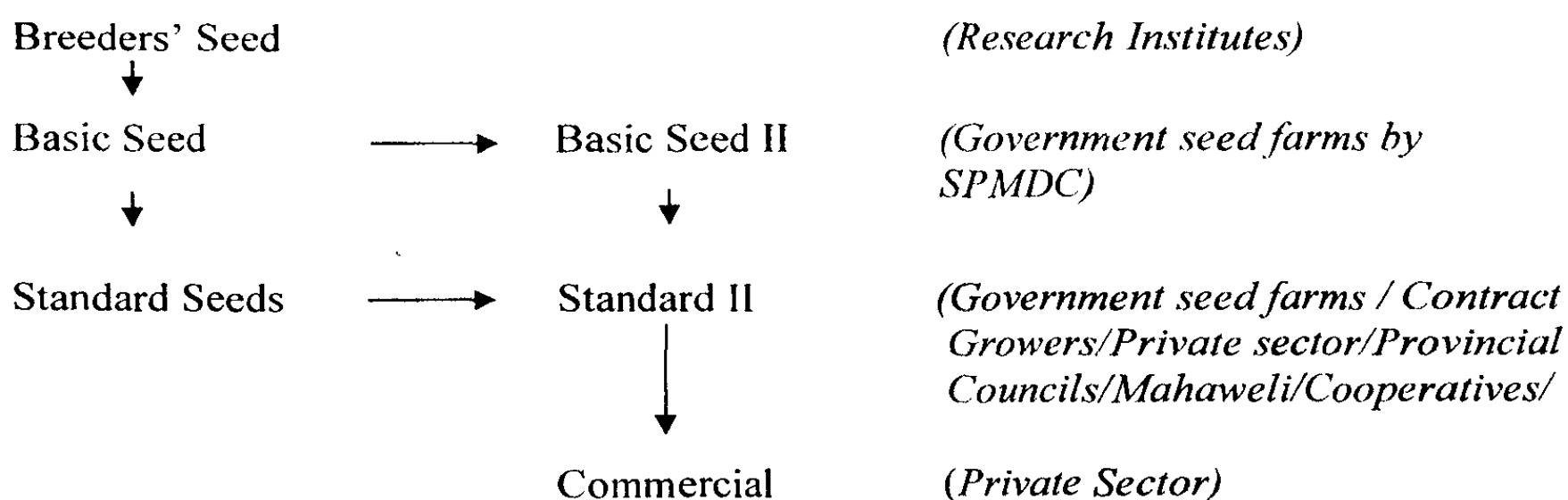
3.1 Introduction

This chapter is focused on local vegetable seed multiplication Programme, vegetable seed certification Programme, contract grower system in vegetable seed production involving DOA and private farmers. Both government sector and private sector are engaged in local vegetable seed production. As discussed in chapter one, local vegetable seed production is concentrated only in few areas. Nikaweratiya, Mandaram-Nuwara, Rikillagaskada, Walewela, Ambana, Maha-Illuppalama, Senapura, Katiyawa, Eppawala are some of the main areas concerned. Seed production requires suitable specific climatic conditions so that even if a crop grows well in some areas; it is not suitable for seed production. Further, farmers have to face several problems unless they have a contract person to sell their output as the crop has to be kept for longer than the harvesting stage. Seed can't be kept for long periods without proper storage facilities (specially cold rooms) due to loss of germination and pest attacks. Thus contract growing system plays significant role in local vegetable seed production.

3.2 Local Vegetable Seed Multiplication Programme

Figure 3.1 shows the flow of local vegetable seed multiplication process and the following is a description of each stage of seed production.

Figure 3.1: Flow of Local Vegetable Seed Multiplication



Source: DOA

Breeders' Seed: Breeders' seed is maintained and multiplied by plant breeders and small quantities of these pure seeds are fed into the multiplication system every season.

Producing Breeder² seed is a responsibility of breeders of Research Institutes. In the case of vegetables it is done in Horticultural Crop Research & Development Institute (HORDI)-Division of Vegetables. According to the DOA, main emphasis is on breeding, varietal development and varietal evaluation of local and introduced varieties of tomato, winged bean, green chilli, capsicum, okra, bitter gourd, long beans and leafy vegetables.

Basic Seed (Ba): Basic seed is progeny of Breeder seed. Only the DOA produce Basic seeds in Government seed farms of SPMDC to cater to the national seed requirement. All the stakeholders in local vegetable seed production have to purchase from there. According to amendments by SCS in case of absence of Breeder seed, Basic seed itself can be used as a substitute to produce Basic Seeds and should be labeled as Basic Seed II.

Standard Seed (St): It is the progeny of Basic seed. Standard seed is produced by government farms, government contract farmers and private companies/individual farmers/ provincial councils/Mahaweli/cooperatives/farmers of seed villages etc. Standard II is the progeny of either Basic II or Standard Seed.

Commercial Seed (Cm): When origin of seed is unknown or not registered or no field inspection had been done seed producers produce seeds due to their good characteristics. These seeds other than the DOA varieties are called commercial seeds. On the other hand progeny of Standard II is also called Commercial Seeds.

Thus Local Vegetable seed production can be described as production of Standard Seed/Standard II/Commercial seed.

3.3 Vegetable Seed Certification Programme

According to DOA, Seed Certification in Sri Lanka is done by SCS which is a sub unit of Seed Certification and Plant Protection Centre (SCPPC) of the DOA. The SCS of the DOA was formally established in 1979 with the assistance of the Dutch Government Aid Programme. However the DOA has provided the service of seed testing since 1958. A seed laboratory with an annual capacity of 5000 samples was established at Peradeniya in 1970. Membership of International Seed Testing Association (ISTA) was obtained in 1974. Seed testing capabilities of the DOA were further strengthened in 1978 by building another laboratory at Maha Illuppallama while upgrading the existing laboratory at Peradeniya. Two more laboratories at Bataata and Aluttarama commenced operations in 2000. The first Field inspection and certification activity commenced with rice in 1980. This service was expanded to pulses in 1983 and vegetables in 1984. Post control testing of these crops commenced at about the same time in four fields assigned for the purpose at Gannoruwa PC 1, Gannoruwa PC 2, Maha-Illuppallama and Seeta-Eliya.

The SCS, over time, has established 23 regional units around the country to facilitate the field inspectorate. Distinctness, Uniformity and Stability (DUS) testing of new varieties an activity undertaken by the SCS commenced in 1984.

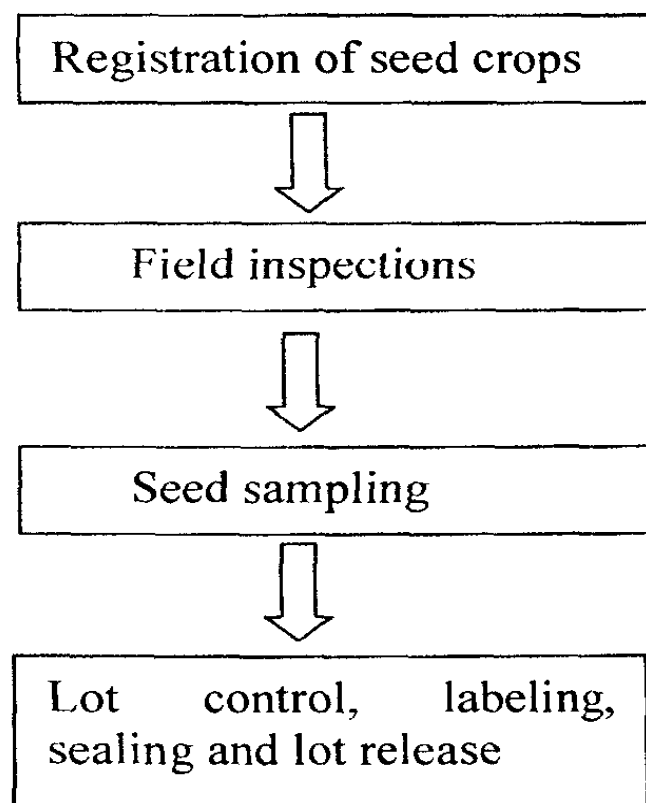
² New varieties can be imported or developed for national plant breeding activities, once a variety meets criteria specified by the breeder after test with Distinct(D),Uniform(U) and Stable(S)-DUS testing

3.3.1 Seed Certification of Local Vegetable Seed

Seed certification is done by government farms, government contract growers and private companies/ farmers etc. Any stakeholder specially the private sector (government sector obviously obtain Basic seed for multiplication Programme) should purchase Basic seed from the DOA.

Figure 3.2 shows the process of seed certification and reveals that even SCS is responsible for the duration of production process.

Figure 3.2: Process of Seed Certification



Source: DOA

a) Registration of Seed Crops

Deputy Director (DD) (SCS) should be informed regarding a crop with a copy to Officer In Charge OIC (SCS of regional area) within two weeks after planting. Factors considered at the stage of registration are minimum extent, field condition, proof of origin (genital purity) trueness to variety, isolation distance, other distinct variety, and being free from weeds (less), insect infection (less) and disease.

b) Field Inspection

This is done several times during the crop but mainly on three occasions

1. Two weeks after seed planting
2. Flowering stage
3. Harvesting stage

In the first and second field inspections, whether the field is on par with the instructions given by the field inspector at registration including plant growth, other varieties, other

crops, weeds and health are checked. In the final field inspection it is decided whether to accept or reject the seed of the crop and if accepted, expected yield is estimated. Farmers are advised to harvest at correct maturity and avoid undue delays in harvesting. When handing over the harvested crop farmers are instructed to be careful to avoid admixture, to ensure enough dryness and cleanliness. Clean and dried bags should be used for packing and stored in good condition.

c) Seed Sampling

In the process of seed certification three reports are taken. A sample representative of the whole lot is being tested.

A Report: This is obtained at the farmer premises by Agricultural Instructor (AI) / OIC (depending on the regional office) in order to check whether the seed lot is suitable for processing and purchasing (government contractor growers). At that point the seed lot is sealed by the officer.

B Report: This is provided after processing to certify that the particular seed lot is suitable to be issued to be used as seed for cultivation. Both private sector and government sector need to obtain this report. In some incidences of government contract programme the SCS officers can assure (farmers are supplied with simple processing equipments and they do processing by themselves) about the seed lot so that directly B report is taken. Generally A report is not taken by the private sector as they witness about the quality of seed by the authorized person (who can take decision to purchase by himself) at that point and B report is directly taken.

C Report: It is obtained to find whether the stored seed lot is suitable to be issued for cultivation. Mostly all the three reports are taken for seed paddy production and it is very rare for C report to be taken in vegetable seed production.

Figure 3.3: Recommended Varieties Under Seed Certification Programme

| Crop | Variety |
|--------------|---|
| Thampala | Green |
| Spinach | Giant |
| Okra | MI-5, MI-7 , Haritha |
| Capsicum | Hungarian Yellow Wax (HYW), C.A. – 8 |
| Cucumber | LY58, Kalpitiya white |
| Pumpkin | Ruhunu |
| Luffa | LA 33 |
| Tomato | Rajitha, Ravi, T-245 Tharindu, Thilina, Maheshi(Hybrid), Lanka Sour, Bhatiya(hybrid), K.C.1, Lanka Cheri |
| Bitter Gourd | Thinnavelly white, MC43, Matale Green |
| Bean | Balangoda Nil, Kappetipola Nil, Lanka Butter, Sanjaya, Bandarawela Kola Gannoruwa Kola, Pole bean - Kentucky Wonder Green |
| Winged Bean | SLS – 44, Krisna |
| Raddish | Japan ball, Beerulu rabu |
| Brinjal | Padagoda(BW 11), SM- 64, Thinnavelli Purple, Amanda (F1 hybrid), HORDI –Lena eri(F1) |
| Snake gourd | MI Short, Thinnaveli, TA 2 |
| Ma | Hawari Ma, Polon Ma, Gannoruwa Hawari, BS1, Bushita, Bush Polon Ma |

Source: Standard Seed Suppliers Catalog-2012 Yala, SCS, DOA

According to figure 3.3 only selected varieties are considered under Seed Certification Programme as DOA is able to issue basic seed of these varieties. Lot control, labeling, sealing and lot release is described under 3.4 and 3.5.

3.4 DOA Contract Vegetable Seed Production Programme

This Programme is handled by SPMDC of DOA with government contract growers. In the DOA Vegetable Seed Contract Programme, selection of growers is done and then Basic seed is issued on payment by regional SPMDC ADA offices. Thereafter, registration of seed crops for certification is done at SCS regional offices. Then farmers are trained by SPMDC, SCS and extension staff jointly. Preliminary and final field inspections are done by SCS to determine whether to accept/reject the crop. If accepted, after the harvest and initial processing, sampling of seed lot is done at grower's premises and "A" sample taken and sent to seed lab (nearby seed lab) and "A" report is issued. Based on the "A" report, bagging, labeling (with red/pink label) and transportation of seed lots to the DOA processing unit at Kundasale is done. After machine processing different lots and varieties are separated and bagged (another red/pink label is attached after processing). Sampling ("B" Sample) of processed seed lot is done by SCS officers of Kundasale and "B" report is issued from Gannoruwa seed lab. Seed growers are paid by ADA (SPMDC) based on the "B" Report. Labeling (with Blue

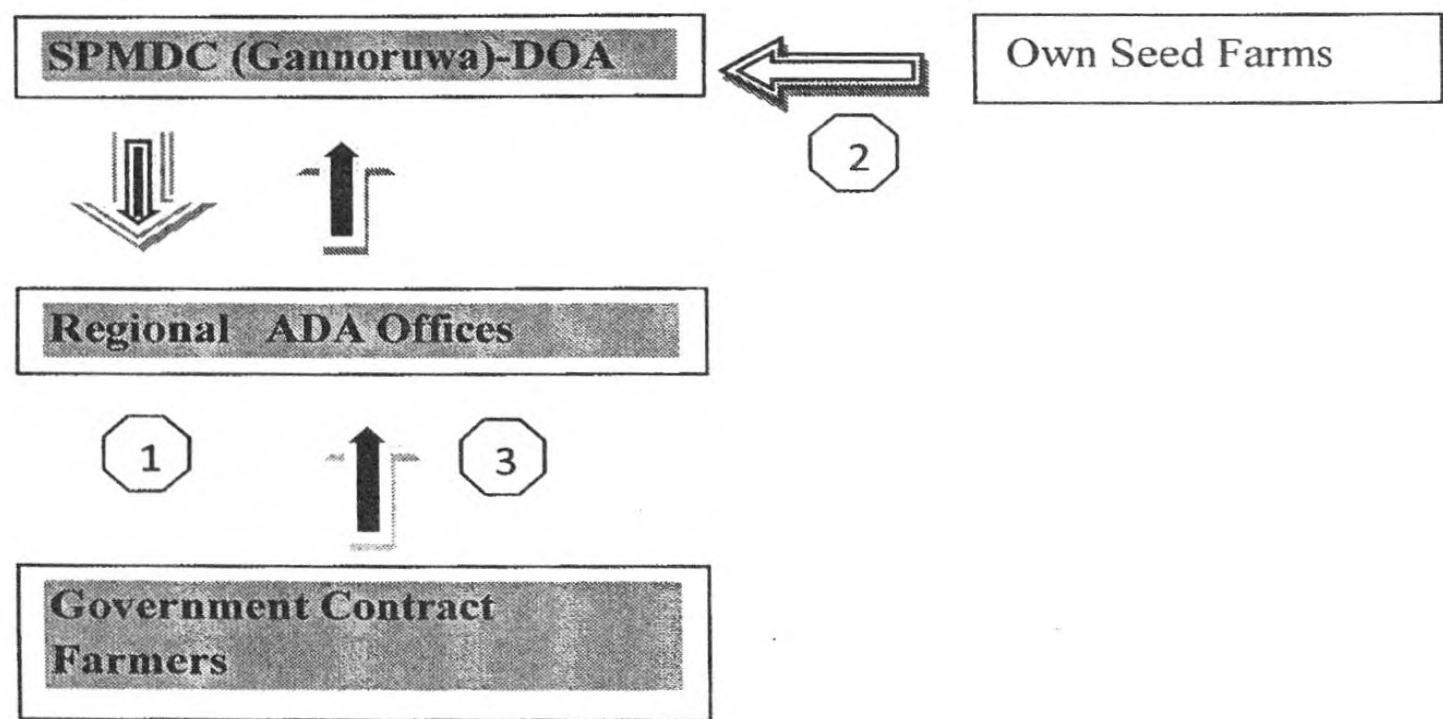
label) and sealing of accepted seed lot (based on “B” Report) is done by SCS officers. Finally distribution or sale or storage is done. If stored in cool rooms at Kundasale, “C” report is taken when the lot is released.

3.4.1 Selection Criteria for Contract Farmers

Selection of contract farmers is done by considering the following criteria.

- Reliability, knowledge, resourcefulness, willingness to cooperate
- Adequate land area (Seed Certification requirement) Vegetable – 0.25 ac
- Distance from the regional ADA office (20 km radius)
- Accessibility
- Facilities available for processing, drying & storage etc

Figure 3.4: DOA Standard Seed Production and Distribution Flow



Source: HARTI Survey 2012

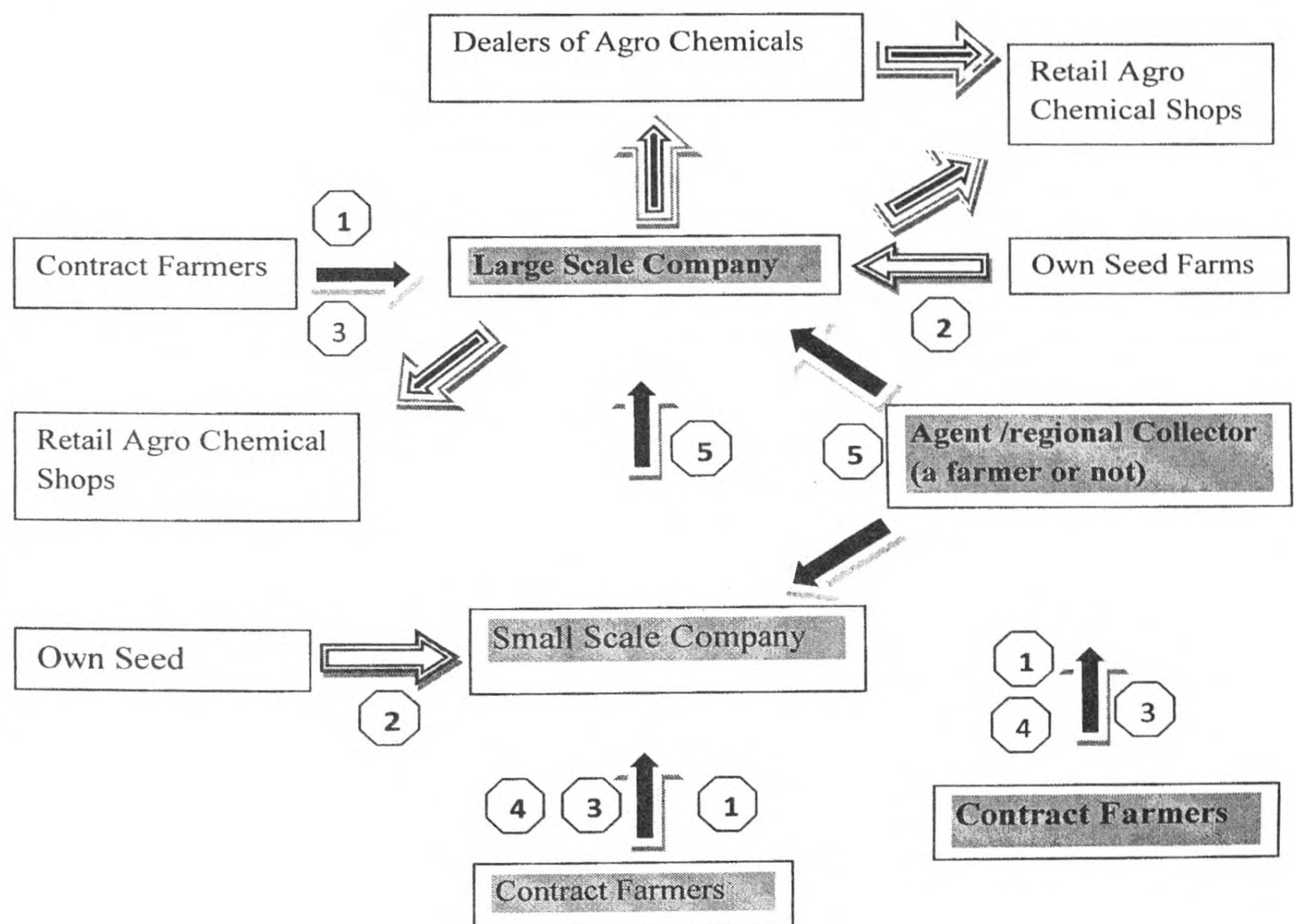
Figure 3.4 illustrates DOA standard seed production flow along with contract Programme. The contract Programme is the main process of DOA standard seed production. Different contract models can be explained as follows.

1. **Centralized model:** The DOA provides support for production of the crop by small holder farmers, purchases the crop from the farmers, and then processes, packages and markets the product, thereby tightly controlling its quality.
2. **Nucleus Estate model:** DOA also owns and manages a farm and it is (often fairly large) in order to provide some guarantee of seed.
3. **Multipartite model:** Involves the government, provincial councils and private companies jointly participating with the local farmers meaning that this process is linked with other stakeholders.

3.5 Private Contract Seed Production Flow

After selection of growers by company agents, companies *etc* according to their own criteria, Basic seed, purchased from DOA is issued on payment. After that registration of seed crops for certification is done by relevant authorities at regional offices of SCS. Preliminary and final field inspections are done by the agent or company along with SCS in order to accept or reject the crop for seed production. “B” Sample is taken from processed seed lots by SCS officers and “B” report is issued. Payments to seed growers are done according to their terms of contract. Packing (labeling and sealing) of accepted seed lot is done under the company name after getting approval under the Seed Act. Then seeds are released for distribution or storage.

Figure 3.5: Private Sector Local Vegetable Seed Production and Distribution



Source: HARTI Survey, 2012

Private seed production and marketing channel is a more complex and involves more intermediaries. The figure 3.5 indicates different contract channels and models. Different models identified can be explained as follows.

1. **Centralized model:** The contracting company provides support for the production of the crop by smallholder farmers, purchases the crop from the farmers, and then processes, packs and markets the product, thereby tightly controlling its quality.
2. **Nucleus Estate model:** The company also owns and manages a farm (often fairly large) in order to provide some guarantee of seed
3. **Multipartite model:** The multipartite model usually involves the government, provincial councils and private companies jointly participating with the local farmers.
4. **Informal model:** Small companies or agents make simple, informal production contracts with farmers on a seasonal basis.
5. **Intermediary model:** This model has formal subcontracting by companies to intermediaries (collectors, farmer groups,) and the intermediaries have their own (informal) arrangements with farmers..

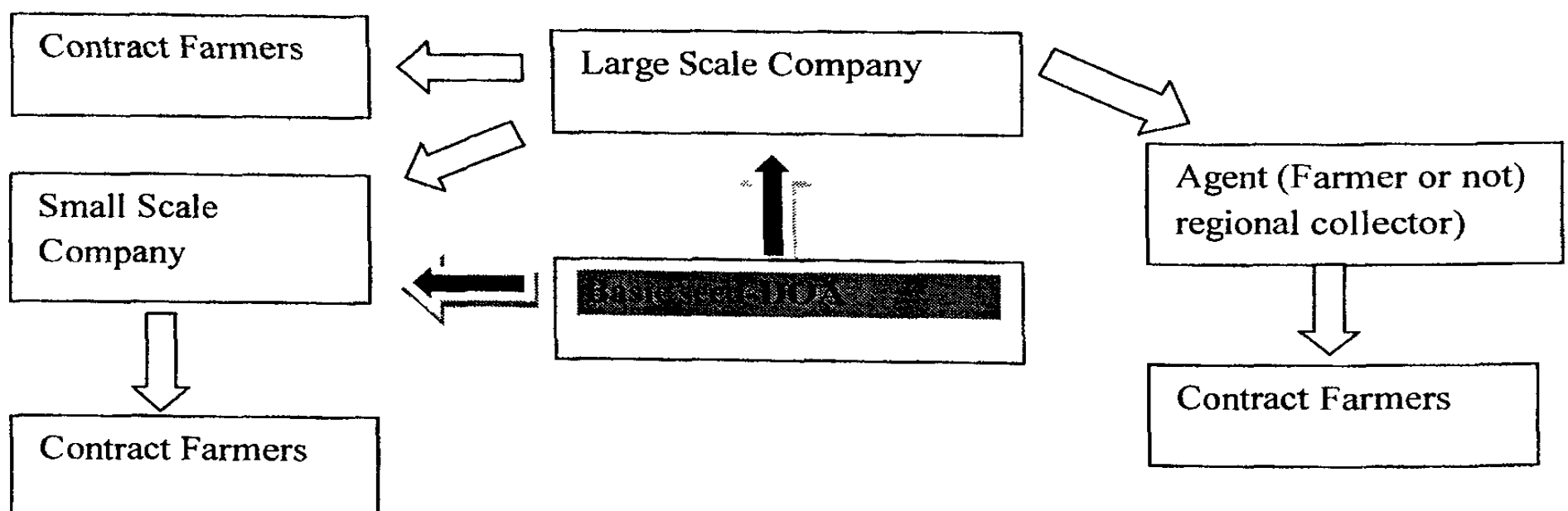
Contract Farmers → Agent /regional collector → Large Scale Company

Above channel can be mentioned as the main and consistent channel of large scale companies whilst the channel mentioned below can be considered as the prominent channel of small scale companies.

Contract Farmers → Small Scale Company

Further, most large companies and small companies except a few have their own farms for seed production. Even most agents/ regional collectors do vegetable seed production so that they have the experience and are able to provide necessary instructions for their contract farmers.

Figure 3.6: Basic Seed Distribution for Private Contract Farmers



Source: HARTI Survey 2012

According to figure 3.6 Basic seed of DOA is purchased by either small company or large company owners and distributed among their contract farmers (farmers have to pay for that) with the intention to buy back Standard seed.

CHAPTER FOUR

Socio-economic Aspects of Contract Farmers

4.1 Introduction

This chapter is mainly focused on socio-economic aspects of both government and private contract farmers and costs and returns. Further, contract seed production procedure and problems encountered by them are discussed under this section.

4.2 Social Aspects

4.2.1 Age Distribution and Household Size

According to table 4.1, majority of the contract farmers were in 31-40 and 41-50 years of age categories. This reveals that middle aged farmers were engaged in vegetable seed production. Further, it can be noted that most of the young contract farmers (31- 40 age group) were connected to the private sector and majority of the government contract farmers were in 51-60 age group. Average household size of this sample was 4.08 and male to female ratio was 1:1.04. Further, out of the total sample population 50.24% could be considered as the labour force and ratio between male and female who engage in agricultural activities was 1:0.66.

Table 4.1: Age Distribution of Contract Farmers

| Age of Farmer (Years) | Government (n=46) % | Private (n=52) % | Total (n=98) % |
|-----------------------|---------------------|------------------|----------------|
| 20-30 | 6.5 | 7.7 | 7.1 |
| 31-40 | 28.3 | 38.5 | 33.7 |
| 41-50 | 28.3 | 34.6 | 31.6 |
| 51-60 | 30.4 | 17.3 | 23.5 |
| 61-70 | 6.5 | 1.9 | 4.1 |
| | 100 | 100 | 100 |

Source: HARTI Survey, 2012

4.2.2 Educational Level

According to table 4.2 majority (60.2%) had passed O/L or are with a higher education background so that the farmers engaged in seed production were somewhat educated.

Table 4.2: Educational Level of the Contract Farmers

| Educational level | Government (n=46) % | Private (n=52) % | Total (n=98) % |
|---------------------|------------------------|---------------------|-------------------|
| Primary education | 8.7 | 15.4 | 12.2 |
| Secondary education | 17.4 | 36.5 | 27.6 |
| Ordinary level | 34.8 | 30.8 | 32.7 |
| Advance level | 34.8 | 17.3 | 25.5 |
| Graduate or above | 4.3 | 0.0 | 2.0 |
| No schooling | 0.0 | 0.0 | 0 |
| | 100 | 100 | 100 |

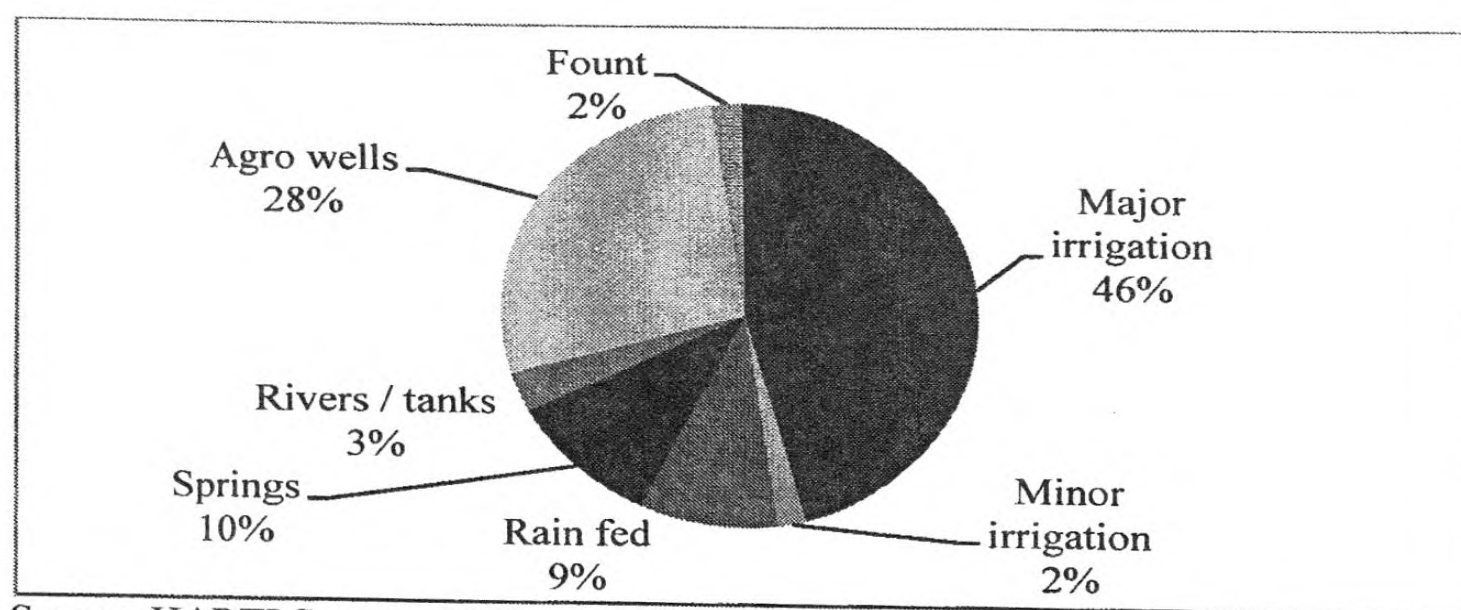
Source: HARTI Survey 2012

According to the results of the Chi-Square Test ($X^2=8.479, df=3, p=.037$) at 95% confidence level, null hypothesis (there is no difference between government and private contract farmers' educational level) rejected. There was significant relationship between private and government contract growers educational level and it shows that government contract growers were more educated than private sector growers.

4.2.3 Source of Water

Figure 4.1 illustrates that 45.9% farmers of the sample get their crop irrigated through major irrigation schemes and 27.6% through agro wells. Rest irrigated their crops from various other ways.

Figure 4.1: Source of Irrigation of the Vegetable Seed Growers of the Sample



Source: HARTI Survey, 2012

4.3 Economic Aspects

4.3.1 Cultivated Extent

This sample survey covered the areas of Anuradhapura, Matale, Kurunegala and Nuwara Eliya districts including local vegetable seed growers who cultivate paddy and several other crops along with vegetable seeds. Table 4.3 shows the cropping extent in 2011 *Yala* and 2011/2012 *Maha* in both upland and paddy lands. The crops grown in 2011/2012 *Maha* and 2011 *Yala* were Paddy Ma, Bitter gourd, Okra, Snake gourd, Wing bean, Luffa, Pumpkin, Brinjal, Cucumber, Capsicum, Kekiri, Tomato, Cabbage, Bean, Maze, Chillie, B'Onion, Banana, Elabatu, Soya bean and Black gram.

Table 4.3: Cultivated Extent by Vegetable Seed Growers in 2011/2012 *Maha* and 2011 *Yala*

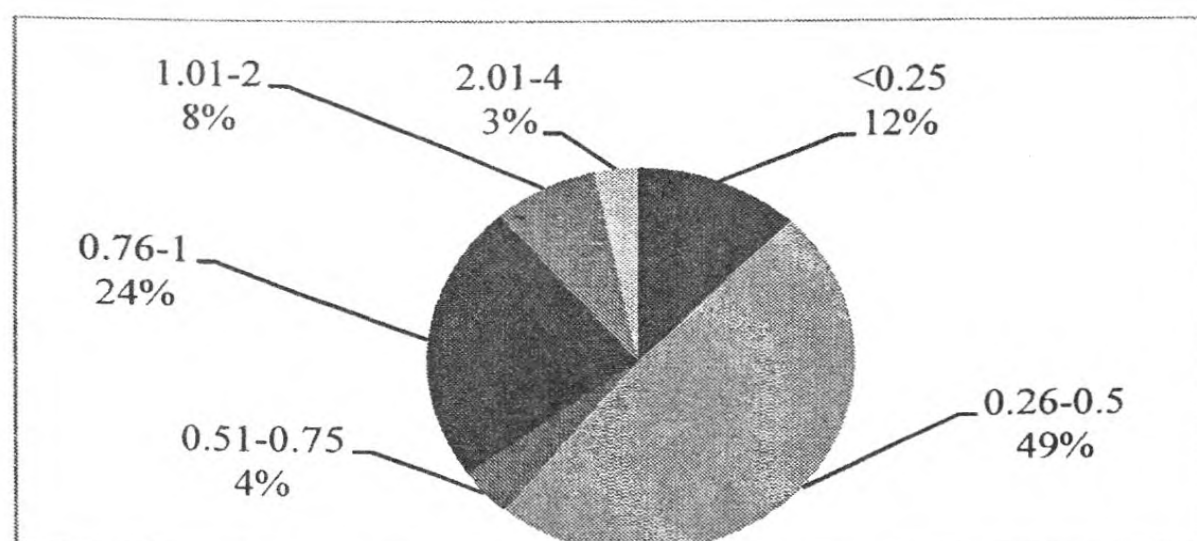
| Cultivated Extent (Acres) | 2011/2012 Maha (n=98)% | 2011 Yala (n=98)% |
|---------------------------|------------------------|-------------------|
| <0.25 | 14.3 | 14.3 |
| 0.26-0.5 | 7.1 | 23.5 |
| 0.51-1 | 24.5 | 23.5 |
| 1.01-2 | 22.4 | 17.3 |
| 2.01-5 | 27.6 | 19.4 |
| 5.01-10 | 3.1 | 1.0 |
| >10.01 | 1.0 | 1.0 |

Source: HARTI Survey, 2012

4.3.2 Extent of Areas of Vegetable Seed Production/Crop

According to figure 4.2, in this sample most of the farmers (48.8%) had land area of 0.26-0.5 acres for vegetable seed production and 88.7% of the sample had land area less than one acre for each crop considered. Accordingly, even in major producing areas small scale seed production is the predominant form.

Figure 4.2: Cultivated Extent of Areas of Vegetable Seed Production/Crop (Acres)



Source: HARTI Survey, 2012

4.3.3 Costs and Returns in Vegetable Seed Production

Both private sector and government sector were considered and the purchasing prices of standard seed of both sectors were taken into account.

Table 4.4: Basic Seed Prices and Average Standard Seed Purchasing Price as at 17.08.2012 of DOA and Private Sector

| Crop | Basic Seed Price Rs/Kg | Average Standard Seed (Purchasing) Price Rs/Kg | |
|-----------------------------|------------------------|---|--------------------|
| | | Private | Government |
| Thampala | 3000 | | 1250 |
| Bush beans | 800 | | 480 ³ |
| Bitter gourd(Thinnaveli) | 6000 | 3400 | 3000 |
| Bitter gourd (MI43) | 5500 | | 1500 |
| Bitter gourd (Matale green) | 4500 | | 1750 |
| Bitter gourd (Kalu) | | 1900 | |
| Brinjal | 5000 | | 1750 |
| Bushita | 1200 | 360 | 400 |
| Capsicum | 9000 | 6000(HYW) | 5000 |
| Cucumber | 4000 | | 1750 |
| Luffa | 5000 | 1100 | 1750 |
| Ma(Hawari) | 3000 | | 1100 |
| Ma(Polon) | 2700 | 750 | 900 |
| Ma(Bonchi) | | 500 | |
| Ma(Mas) | | 500 | |
| Ma(Mahaweli) | | 450 | |
| Okra(MI 5) | 2000 | | 600 |
| Okra(MI 7 / Haritha) | | 355(Haritha) | 600 |
| Pole beans | 850 | ⁴ | 500 ⁵ |
| Pumpkin | 3500 | 2250 | 1500 |
| Pumpkin(Meemini) | | 1450 | |
| Raddish | 2800 | 1150 | 700 |
| Snake Gourd | 4000 | 1500 | 1200 |
| Spinach | 4000 | | 1750 |
| Tomato(Thilina) | 20000 | 14(fruits ⁶),13000 | No price available |
| Tomato(T-245) | 15000 | | No price available |
| Wing beans | 2000 | 675 | 800 |

Source: DOA (SPMDC) 2012 and HARTI Survey, 2012

³ (500-since 25.06.2012)

⁴ During the survey period no demand from private sector due to drought condition prevailing and price of DOA has increased.

⁵ since 25.06.2012 - KWG-600, Balangoda Nil/Kappa. Nil-650, Lanka Butter-700

⁶ Sold before processing as ripe fruits but not as seed

Government seed purchasing price was obtained from the DOA' directly as it had a set price relevant to anywhere in the country during that particular period. But the private sector average price was obtained during that period (April – June 2012). Table 4.4 shows basic seed prices and average standard seed purchasing price of DOA and private sector (as at 17.08.2012).

Table 4.5: Average Cost of Production and Average Net Returns over Total Cost for Standard Seed and Returns per Rupee

| Crop (Variety) | Average Cost of Production* Rs/Kg | Average Net Returns over Total Cost* Rs/Kg |
|--------------------------|--|---|
| Bitter gourd(Thinnaveli) | 2125 | 900 |
| Bitter gourd (Kalu) | 850 | 1100 |
| Tomato(Thilina) | 4750 | 4500 |
| Bushita | 175 | 225 |
| Okra(Haritha) | 250 | 250 |
| Pumpkin(Meemini) | 325 | 650 |
| Raddish | 350 | 350 |
| Ma(Hawari) | 550 | 450 |
| Ma(Polon) | 550 | 425 |
| Ma(Mas) | 225 | 275 |
| Snake Gourd | 750 | 750 |
| Wing beans | 450 | 250 |
| Bean | 350 | 325 |

Source: HARTI Survey, 2012

*Excluding imputed cost (only cash cost included)

Average costs and returns with reference to each crop are presented in table 4.5 after calculating cost of cultivation and net returns (mentioned in the methodology) reveals that considerable amount of profit was earned by contract farmers.

4.3.3.1 Returns per Rupee of Investment

According to table 4.6 a large majority (31.7%) was earning Rs 1.01-2 (excluding imputed cost) per Rupee of investment and 23.6% were earning Rs 2.01-3(excluding imputed cost). Further, when imputed cost was included 32.5% were earning less than one rupee. Figure 4.3 and 4.4 shows frequency of the return per Rupee of investment (excluding and including imputed cost) and its distribution. Distribution of return per Rupee of investment (excluding and including imputed cost) can be stated as left skewed which means more likely to earn lesser amounts and reveals that more family labour is involved in vegetable seed production. But on the whole 84.6 % (excluding imputed cost -only cash cost included) of the farmers were earning more than one rupee returns per rupee of investment whilst 55.3 % (including imputed cost) of the farmers were earning more than one rupee returns per rupee of investment. So it can be said that seed production is a profitable venture.

Table 4.6: Returns per Rupee of Investment

| Return per Rupee (Rs) | No. of Farmers * ¹ (n=98) | No. of Farmers * ² (n=98) % |
|-----------------------|---|---|
| 0 - 1.00 | 15.4 | 32.5 |
| 1.01 - 2.00 | 31.7 | 43.9 |
| 2.01 - 3.00 | 23.6 | 11.4 |
| > 3.01 | 29.3 | 12.2 |

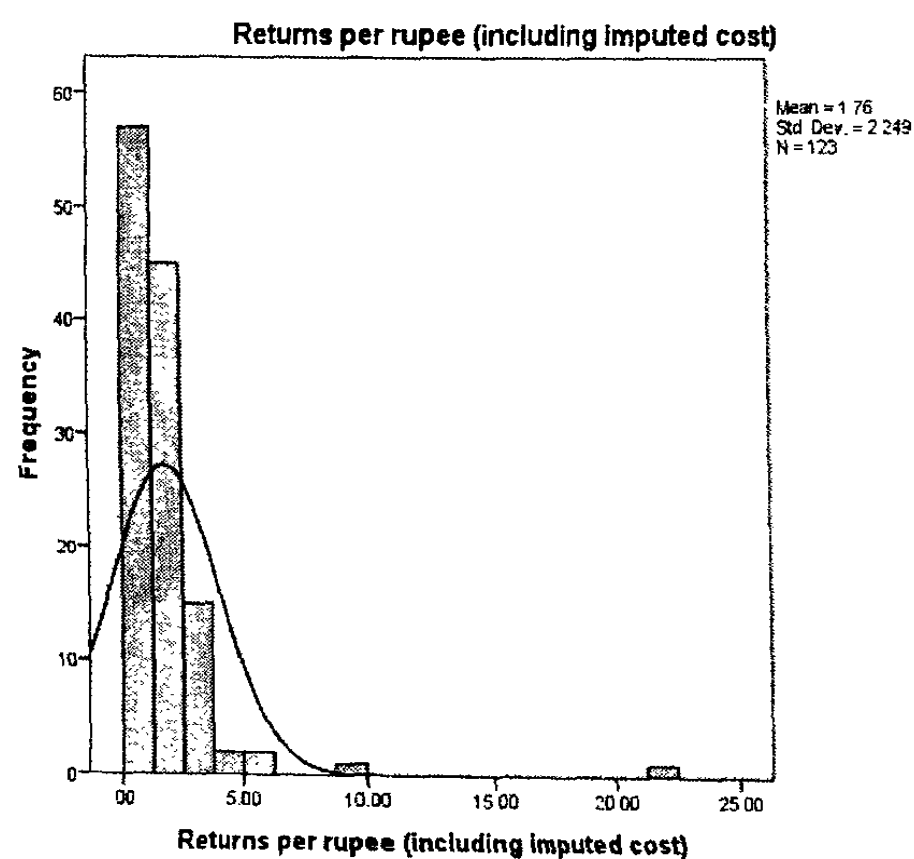
Source: HARTI Survey, 2012

*¹Excluding imputed cost per crop

*²Including imputed cost per crop

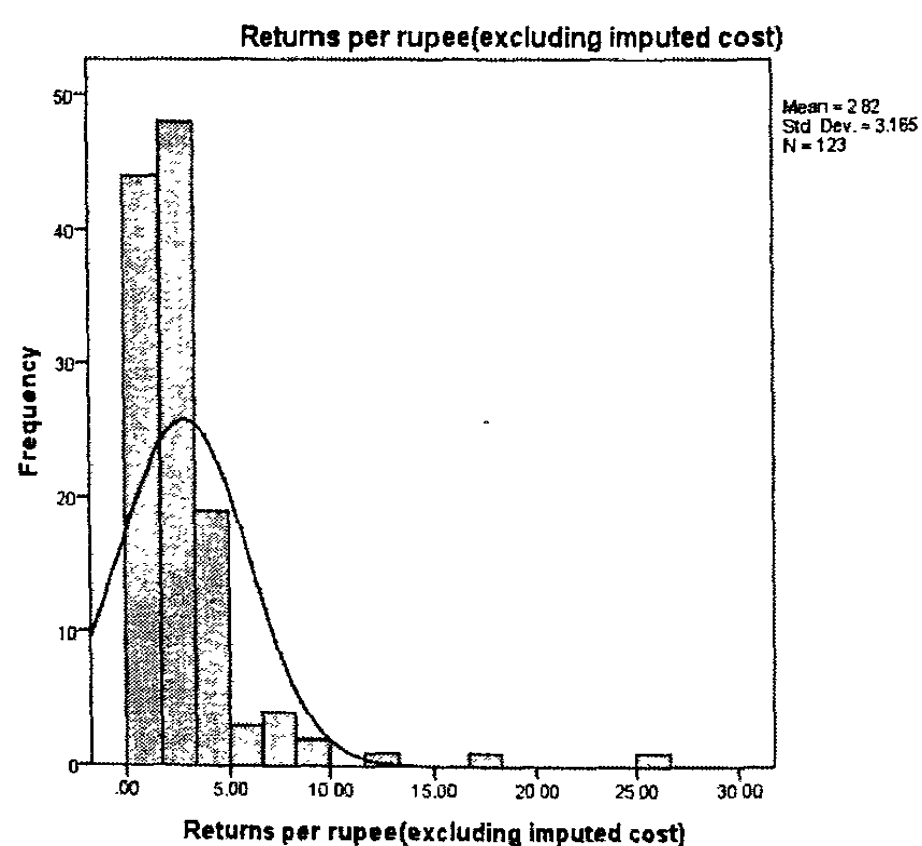
Weight³ for each crop is given below

Figure 4.3: Returns per Rupee of Investment/Crop (including imputed cost)



Source : HARTI Survey, 2012

Figure 4.4: Returns per Rupee of Investment/Crop (excluding imputed cost)



Source: HARTI Survey, 2012

3

| Ma | Gourds | Tomato | Okra | Winged bean | Cucurbits | Beans | Other |
|------|--------|--------|------|-------------|-----------|-------|-------|
| 0.29 | 0.24 | 0.11 | 0.12 | 0.05 | 0.06 | 0.05 | 0.08 |

4.3.3.2 Relationship between Returns per Rupee (per crop)/Type of Contractor

Table 4.7 describes returns per rupee among government and private sector.

Table 4.7: Returns per Rupee (per crop)/Type of Contractor

| Returns per Rupee (excluding imputed cost) | Government (n=46) % | Private (n=52) % | Total (n=98) % |
|--|---------------------|------------------|----------------|
| 0 - 1.00 | 7.3 | 22.1 | 15.4 |
| 1.01 - 2.00 | 45.5 | 20.6 | 31.7 |
| 2.01 - 3.00 | 29.1 | 19.1 | 23.6 |
| > 3.01 | 18.2 | 38.2 | 29.3 |
| Total | 100 | 100 | 100 |

Source : HARTI Survey, 2012

According to the results of the Chi-Square Test ($X^2=15.694$, $df=3$, $p=.001$) at 95% confidence level, null hypothesis (there is no difference between government and private contract farmers' returns per Rupee/crop) was rejected. So, there was significant relationship between private and government contract growers returns per rupee of investment and it shows that government contract growers earned an average profit and private contract growers were more likely to earn higher level of profits.

4.4 Contract Seed Production Procedure

4.4.1 Type of Contract

Majority of the total sample (93.88%) did not have written contracts. Government did not have written contracts at all. It was said that even in case of breach of contract the farmers can't be fined. In the case of private sector, importance of having a written document was emphasized by most farmers as higher possibility of breach of contract by firms existed when seed prices were less than the agreed price.

4.4.2 Frequency of Field Visits by Field Officers

Compared with the DOA, private firms (agents/collectors/company authorities) make more frequent visits which reveal that they were more concerned about their output and made sure to achieve their target (table 4.8). Unlike in vegetable cultivation or in any other crop cultivation one can't enter in to a decision by considering just appearance but have to do a clear supervision from the beginning as his survival in this industry depends on reliability of seed. As more parties are involved in private sector seed supply chain, the purchaser at farm gate has more responsibility regarding the quality of seed as it affect his continuation in business than any other stakeholder.

Table 4.8: Frequency of Field Visits by Field Officers

| Frequency of Field Visits | Type of Contract Firm | |
|---------------------------|-----------------------|------------------|
| | Government (n=46) % | Private (n=52) % |
| Once a week | 0 | 28.8 |
| Once in two weeks | 0 | 32.7 |
| Once a month | 89.1 | 36.6 |
| Once in two months | 10.9 | 1.9 |

Source: HARTI Survey 2012

4.4.3 Number of Farmers Who Deal with more than One Contract Firm

Lesser number (23.5%) dealing with more than one contract firm reveals that most of the farmers have one contract at a time, as seed industry depends to some extent on confidence dealing with one at a time.

4.4.4 Time Taken for Settlement

One of the important scenarios in local vegetable seed industry is time taken to settle the payments. According to the field observations more emphasis was given to that as most of the farmers were small scale farmers with less investment capabilities. Table 4.9 shows how government and private sector settled money due to the farmers.

Table 4.9: Period of Settlement from the Date of Final Harvest

| Period of Settlement from the Date of Final Harvest | Government (n=46) % | Private (n=52) % | Total (n=98) % |
|---|---------------------|------------------|----------------|
| Within one month | 13 | 83 | 50 |
| Within two months | 37 | 13 | 24.49 |
| Within three months | 46 | 4 | 23.47 |
| Within four months | 4 | 0 | 2.04 |

Source: HARTI Survey 2012

4.4.5 Relationship between Type of Contract and Period of Settlement

According to the chi square results ($\chi^2=49.564$, $df=2$, $p=.000$) at 99% confidence interval, null hypothesis (there is no difference between time taken either by government or private sector to settle money to farmers) was rejected and there was a significant relationship between time taken for payment by DOA and private firms as DOA generally takes more time due to procedures it has to follow.

4.5 Problems Encountered by Contract Seed Producers

4.5.1 Production Problems

According to Table 4.10 high wage rate and non availability of trained labour could be considered as most serious problems. When the problems are further elaborated it can be noted that the level of perception regarding some parameters was different among private and government contract holders. 90.8% of the sample said that non-availability of basic seed on time was not a problem and further majority of private contract farmers strongly emphasized it. Regarding admixture in basic seed, 92.5% of the sample showed that this was not a problem along with the majority of private contract farmers. Above two parameters reveal that private sector farmers were supplied with quality basic seed on time.

Table 4.10: Production Problems

| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|---|-------------------------------------|-------------------------------------|-----------------------------------|-----------------------------|-----------------------|
| | % | % | % | % | % |
| 1. Non-availability of basic seed on time | 69.4 Gov.(38.2) Priv.(61.8) | 21.4 Gov.(66.7) Priv.(33.3) | 1.0 | 7.1 | 1.0 |
| 2. Admixture in basic seed | 68.4 Gov.(38.8) Priv.(61.2) | 24.5 Gov.(66.7) Priv.(61.83) | 0 | 6.1 | 1.0 |
| 3. Non-availability of trained labour | 18.4 | 25.5 | 13.3 | 40.8 | 2.0 |
| 4. High wage rate | 1.0 | 13.3 | 37.8 | 33.7 | 11.2 |
| 5. Improper identification of pests and diseases | 12.2 | 77.6 | 5.1 | 3.1 | 0 |
| 6. Inadequacy of irrigation water | 13.3 | 42.9 | 7.1 | 29.6 | 3.1 |
| | | Gov.(43.5) Priv.(67.3) | | Gov.(52.2) Priv.(15.4) | |
| 7. Difficulties in technical(agrono mical) operations | 11.2 | 81.6 | 4.1 | 3.1 | 0 |
| 8. Climatic factors | 5.1 | 24.5 | 23.5 | 38.8 | 5.1 |

Source : HARTI Survey, 2012

4.5.2 Financial Problems

According to table 4.11, higher investment requirement was the most critical issue as the farmers had to invest large sum of money for a longer period without any return till crop is matured and seed got dried and certified. Other than that inadequate and timely unavailability of capital for purchase of inputs was a problem to some extent.

Table 4.11: Financial Problems

| | Strongly Disagree | Disagree | Neither agree nor Disagree | Agree | Strongly Agree |
|---|------------------------------|-----------------|-----------------------------------|----------------------------|-----------------------|
| | % | % | % | % | % |
| 1. Inadequate and timely unavailability of capital for purchase of inputs | 25.5 | 29.6 | 5.1 | 36.7 | 3.1 |
| | Gov.(45.65) Priv.(63.5) | | | Gov.(47.8) Priv.(32.7) | |
| 2. Non-availability of crop loan | 24.5 | 38.8 | 4.1 | 26.5 | 4.1 |
| 3. Non prevalence of crop insurance | 6.1 | 61.2 | 1.0 | 0 | 0 |
| 4. Higher investment requirement | 3.1 | 10.2 | 22.4 | 51.0 | 12.2 |
| | Gov.(10.87) Priv.(15.4) | | | Gov.(76.09) Priv.(51.9) | |

Source : HARTI Survey 2012

4.5.3 Problems with the Contract Firm

The most predominant problem for farmers created by the contract firms was irregular payment or not paying on time and late payment (table 4.12) (accordingly this problem is mostly borne by government contract farmers) . As mentioned in section 4.5.2 higher investment requirement was a problem for local seed producers and they were affected by irregular payment by the firms. According to data, problem of late payment was mainly by DOA and the reason was the long procedure. That takes time and at the end farmers move away from the DOA contract programme.

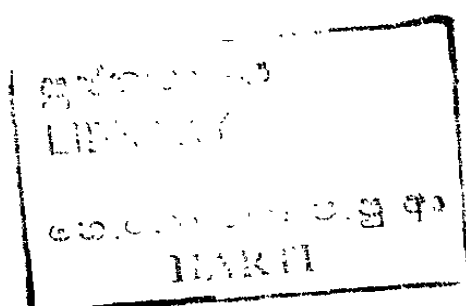


Table 4.12: Problems with the Contractor

| | Strongly Disagree | Disagree | Neither Agree nor disagree | Agree | Strongly Agree |
|--|--------------------------------------|--------------------------------------|-----------------------------------|-------------------------------------|-----------------------|
| | % | % | % | % | % |
| 1. Poor technical assistance | 30.6 | 64.3 | 0 | 2.0 | 3.1 |
| 2. Irregular payment | 29.6 Gov.(4.348) Priv.(51.9) | 23.5 Gov.(13.04) Priv.(32.7) | 0 | 40.8 Gov.(78.26) Priv.(7.69) | 6.1 |
| 3. Manipulations of norms by firm/ Breach of contract | 30.6 | 60.2 | 3.1 | 6.1 | 0 |
| 4. Higher rejection rate | 31.6 Gov.(8.7) Priv.(51.9) | 63.3 Gov.(89.13) Priv.(40.4) | 2.0 | 2.0 | 0 |
| 5. Low contract price | 28.6 | 65.3 | 2.0 | 2.0 | 2.0 |

Source: HARTI Survey, 2012

4.6 Contract Farmers' Views Regarding Local Vegetable Seed Industry and Seed Production

According to the table 4.13, most of the farmers agree that local vegetable seed industry is a profitable business for which planning and high level of agricultural knowledge is required. Otherwise one will not be able to survive in that industry.

Table 4.13: Contract Farmer's Views Regarding Local Vegetable Seed Industry and Seed Production

| | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|--|--------------------------|-----------------|-----------------------------------|--------------|-----------------------|
| | % | % | % | % | % |
| 1. Is a profitable business | 2.0 | 1.0 | 7.1 | 53.1 | 36.7 |
| 2. Is a risky business | 11.2 | 27.6 | 34.7 | 22.4 | 3.1 |
| 3. Need well planning for the business | 1.0 | 3.1 | 15.3 | 71.4 | 9.2 |
| 4. Required high level of agricultural knowledge | 0 | 24.5 | 21.4 | 53.1 | 1.0 |

Source: HARTI Survey 2012

CHAPTER FIVE

Systems of Vegetable Seed Production, Problems and Potentials

5.1 Introduction

This chapter is devoted to study systems of vegetable seed production in major seed producing areas: Walewela, Mahaweli H area, Nikaweratiya, Rikillagaskada and Mandaram Nuwara based on case studies, focus group discussions and key informant discussions.

Table 5.1: Varieties and Areas of Vegetable Seed Production

| Crop | Variety | Growing Areas Identified by the Study |
|--------------|--|--|
| Okra | MI-5, MI-7 , Haritha | Mahaweli H(Ipalogama, Katiyawa, Maha Illuppalama, Adiyagala, Mahawilachchiya, Nikaweratiya, Ballala, Kirimatiyawa, Ridebendiella |
| Capsicum | Hungarian Yellow Wax(HYW), C.A 8 | Moragollegama, Nikaweratiya |
| Cucumber | LY58, Kalpitiya white | Nikaweratiya, Ballala |
| Pumpkin | Ruhunu, Local variety, Meemini Wattakka | Madawachchiya, Vilachchiya, Malsiripura, Senapura, Adiyagala(Meemini wattakka) |
| Luffa | Asiri, LA 33 | Matale(Ambana), Meegalawa(Nikaweratiya area) |
| Tomato | Rajitha, Ravi, T-245, Tharindu, Thilina, Maheshi(Hybrid), Lanka Sour, Bhatiya(hybrid), K.C.1, Lanka Cheri | Walewela-Matale Rikillagakada, Marassana |
| Bitter Gourd | Thinnaweli White, MC43, Matale Green, Kalu Karawila | No specific area but in Mahaweli H((Ipalogama, Katiyawa, Maha Illuppalama, Senapura) |
| Bean | Balangoda Nil, Kappetipola Nil Lanka Butter, Sanjaya, Bandarawela Kola, Gannoruwa Kola, Pole bean a)Kentucky Wonder Green, b)Kentucky Wonder Wax, c)Other promising varieties -Pees Butter, Katugastota, Lanka Nil | Rikillagaskada, Mandaram Nuwara, Udalumada, Maturata, Munwatta |

Cont.

| Crop | Variety | Areas |
|-------------|---|---|
| Winged Bean | SLS – 44, Krisna, Varieties recommended but not yet released officially UPS-122, SLS- 40 | Moragollagama, Galgamuwa, Meegalawa, Monnekulama, Ahetuwewa(Kurunegala dis), Ambana (Matale) |
| Raddish | Japan ball, Beeralu rabu, Table radish | Haguranketa, Mandaram Nuwara, Udawalawa, Elamulla |
| Brinjal | Padagoda (BW 11) SM- 64 Thinnavelli Purple Amanda ((F1 hybrid) HORDI – Lena eri(F1)Anjalee (F1 hybrid),Lena eri | Nochchiyagama, Nikaweratiya |
| Snake gourd | MI Short ,Thinnaveli ,TA 2 | Nikaweratiya, Mahaweli H (Maha Illuppalama, Senapura), |
| Ma | Hawari Ma, Polon Ma, Gannoruwa Hawari, BS1, Bushita, Bush Polon Ma | Ipalogama, Eppawala, Senapura, Adiyagala(Anuradhapura Dis) Kotawehera, Meegalawa, Balalla, Moragollegama(Kurunegala Dis) Dambulla, Kalundewa, Kalakuttiya(Matale Dis) |

Source: HARTI Survey 2011/2012, Maha

Table 5.1 shows the areas where local vegetable seed production is done and varieties available according to collected data.

5.2 Vegetable Seed Production: Walewela (Matale District)

In this area, paddy and upcountry vegetables are cultivated under rain-fed conditions and the area is well known for tomato seed production due to prevailing agro climatic conditions. According to farmers in this area commercial tomato seed production was being done since mid 1980's. Even before, farmers had produced their own requirement of tomato seed. In mid 1980's the government had conducted a contract seed Programme. The farmers were provided with basic seeds and produced standard seed by themselves. Seed was purchased at a high price. At that time there was a proper procedure to select suitable farmers for that contract seed Programme.

Tomato seed producing farmer of Walewela

According to him, during the time of his father (mid 1980's) 25 good farmers were selected after careful inspection. They were given seed, fertilizer free of charge and were able to get a good harvest. Though there was excess harvest they were able to sell excess to a food producing company. But since then the company has been closed and farmers had to throw away the excess most of the time since the selling price was very low and the transport cost was high.

Earlier farmers had built up a good rapport with the field officers and were able to get a good harvest and could earn much. This system had broken some time ago due to mistakes of both farmers and officers as proper selection was not done and whole harvest of some farmers were bought and others were neglected. Then the neglected farmers were idling.

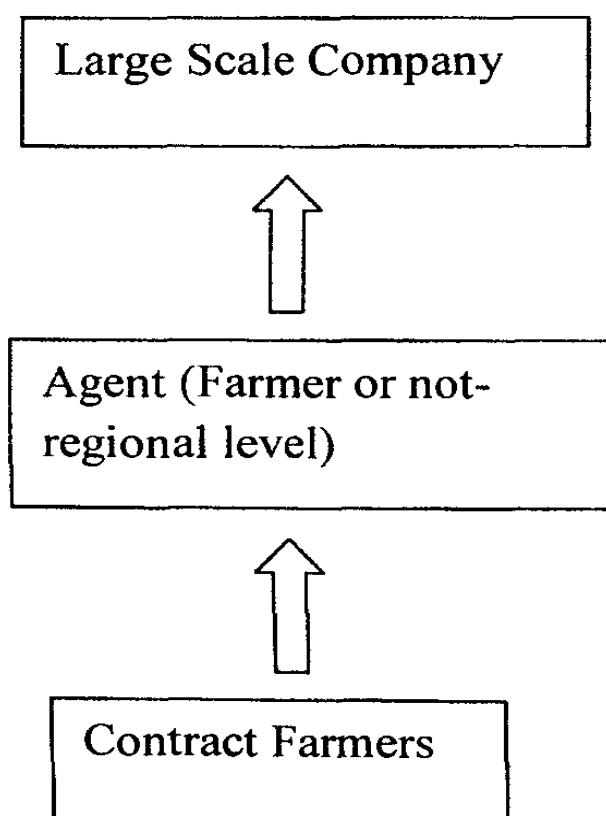
Source: HARTI Survey 2011/2012, Maha

This reveals that in the past there was a good seed production and even in the very recent past this area was well known for tomato seed production and the farmers were paid high prices by the government. But at the time of the survey there was minimum government involvement and private sector was predominantly engaged in seed production.

Flow of Existing Seed Production at Walewela

According to the figure 5.1 the company purchased basic seed from DOA (SPMDC) and sold to an agent who was one of company's dealers. Agent had several contract farmers and he had sold those basic seeds to his contract farmers. The cultivation was done under his supervision and direction. Sometimes basic seed was given on credit. This business was done with confidence built during period of time. Tomato was purchased as fruits and the dealer himself did the processing and drying. That was because he wanted to ensure that seed was of good quality. Here the intermediary model of contract farming can be observed as formal subcontracting by a company to intermediary (collector) and the intermediary had his own (informal) arrangements with farmers.

Figure 5.1 Flow of Existing Seed Production of Walewela



Source: HARTI Survey 2011/2012, Maha

It was observed that the farmers who engaged in this business were dissatisfied and wanted to give up. Due to high cost of production, farmers were unable to earn profit. In this area labour cost was high due to shortage of labour. Total harvest was not purchased so that farmers had to sell the rest of the product to Dambulla at a very low price leading to breach of contract. Almost all the farmers' land holding size was small (between $\frac{1}{4}$ - $\frac{1}{2}$ acres). It was said that cultivation was done in small land plots due to land fragmentation. As rain fed cultivation was done, water scarcity problem was experienced. Water can't be pumped using motors due to the risk of spreading fungal diseases. As tomato was sold as fruits and the price margin between selling for consumption and selling for seed was less. Earlier there was a spring for supply of water but due to the erroneous development in the

field of construction no more water was there for tomato. Farmers had to obtain credit from various sources. (Pawning, obtaining private loans at Udarata development bank etc.)

Most of the farmers emphasized the importance of having written contracts so that the farmers are more protected. They also emphasized the importance of government to be actively involved in seed production process through directing private sector and improving by minimizing undue delays for payments to attract contract farmers for their programme. Common view of the farmers in Walewela area was that the seed vegetable production was not a profitable business and that compared with the past, current contribution of DOA was less.

5.3 Vegetable Seed Production in Mahaweli H Area

According to the field observations, vegetable seed production in Mahaweli H area was very competitive and Meegalewa, Nochchiyagama, Eppawala, Galnewa could be mentioned as the famous areas for local vegetable seed production. Most of the low country vegetable seed was produced (Ma, Bittergourd, Okra, Snakegourd, Pumpkin) using Mahaweli irrigated water but lack of rain on time has badly affected it as the tanks were not filled sufficiently. Still most of the farmers had traditional knowledge and use traditional management practices.

Large scale companies, small scales companies and other seed handlers deal with available number of seed producers. Almost all the large scale companies had their own agents who were middlemen and played roles of agents/collectors from Mahaweli H area. Often these middlemen deal with more than one company. Collectors/agents of large companies had bought seed from their contract farmers and sold to those companies. On the other hand small scale companies in that area bought seed from the producers of that area and also from other areas (where other crops were grown).

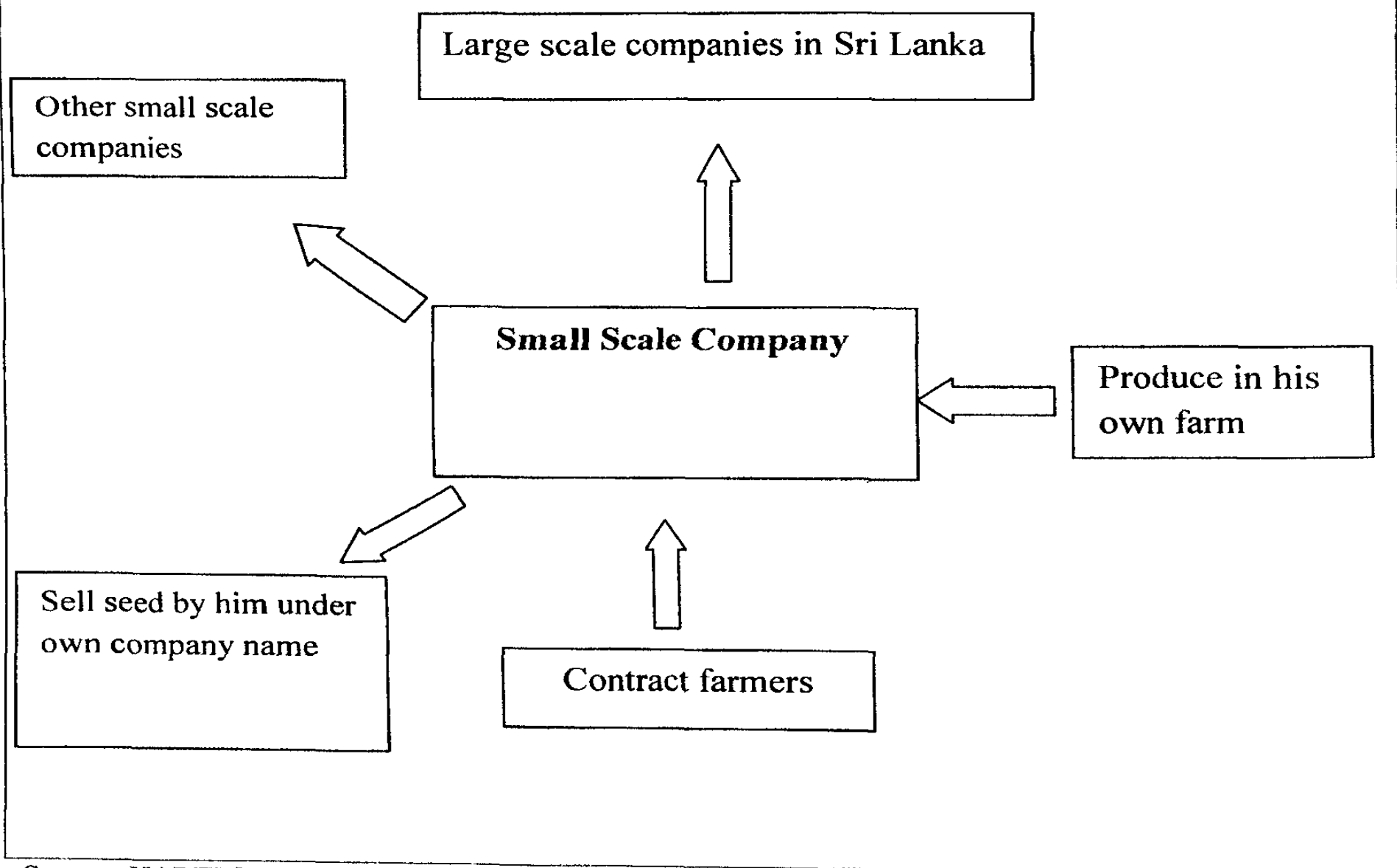
Due to this contract system, farmers tend to get credit from the company or from the agent. Then repayment was done through deduction from the return (at the time of the survey price of vegetables had been decreased drastically). According to majority farmers' views and survey results they were able to earn sufficient income only for survival but not a high profit.

According to the view of most of the small scale company owners, in time to come their business is going to collapse. Their opinion was that the government should intervene through giving a helping hand for the small scale companies to sustain in this industry competing with imported hybrid seed. On the other hand they did not have cold room facilities to store seed for some time without loss of germination and stocks getting deteriorated.

A Small Company Owner in Mahaweli H Area

In this case (Figure 5.2) small scale company owner had sold seed to several large seed companies in Sri Lanka and some other small companies. Other than that he had sold seed under his own company name. Though he didn't have a high level of education background with the experience he had gained so far, he was capable enough to develop his business. Further he maintains his own seed farm. As a farmer he didn't have licensed lands so that he was facing a problem of getting credit from bank. According to him as a small scale business owner he needs the support of the government as well as private sector.

Figure 5.2 : Flow of Vegetable Seed Production and Distribution of a Small Scale Company



Source: HARTI Survey 2011/2012, Maha

An Agent who Collects Seed from his Contract Farmers in the Mahaweli H area

According to him agents / collectors sometimes pay 25% of money (from total due amount) for their contract farmers in case of delays of payment from the company. He informed that they are concerned more about the quality of the seed they purchase. Profit margin kept by them deviate from crop to crop. He had kept full confidence on his farmers. According to him several agents/sub contractors/collectors could be identified in this area but they purchase seed only from their own contract farmers, but outsiders to this area who engage in this business do not have such control but purchase from other farmers. He said that it was not that much hard to find contract farmers than finding companies to sell. Further, experienced people can survive in this business but the newcomers have to struggle for survival with much effort.

According to him seed production had decreased as there were existing stocks. Within Mahaweli H area the risk was high but it was less outside Mahaweli H area. Further, he mentioned that to start seed production in the coming season, 50% of seed of previous seasons' stock should be sold but that didn't happen and for the forthcoming season farmers were reluctant to produce seed.

He has stated that due to the "Divinaguma Programme" demand for local seed have been increased so that risk had been reduced to some extent.

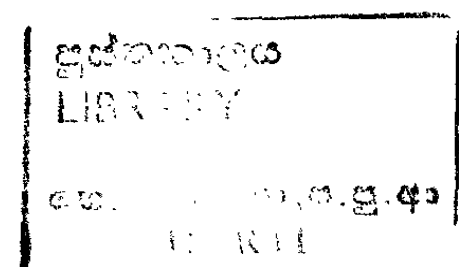
Source: HARTI Survey 2011/2012, Maha

A Small Scale Company Owner in Mahaweli H area

According to him large companies provide bigger commissions such as 40%-50%. Though it was possible for him to continue his business giving such a large amount of commission, finally the producer cannot be given a high price.

Same as in earlier cases he had had several contract growers' who built confidence with time. In case the farmers produced more than the targeted amount he had managed to buy the excess after some time. According to him at that time he was in a critical stage having excess seed for coming months. He has emphasized that as seed production was bound with the lower level of farmers' economy the government should draw more attention to their problems.

Source: HARTI Survey 2011/2012, Maha



A Small Scale Company Owner in the Mahaweli H area

Another small scale company owner stated that there had been a problem in local seed production and that was because the popularity of hybrid seed as demand for local seed has been decreased. Price of certain seed had been reduced as most farmers grow one particular crop at the same time which leads to excess seed stock

Source: HARTI Survey 2011/2012, Maha

5.4 Vegetable Seed Production in Areas in the Kurunegala and Puttlam Districts

As identified by the study, areas where vegetable seed production was done in the Kurunegala district were Nikaweratiya, Galgamuwa, Abanpola, Ehetuwewa, Maho, Balalla, Moragollagama, Meegalewa, Ibbagamuwa, Mahamookalanyaya, Heelogama etc and the areas where vegetable seed production was done in the Puttlam District were Anamaduwa, Marungoda, Mahauswewa, Danduwa, Maagallegama, Mahamitta, Munuekulama etc. Source: ADA Office (Nikaweratiya)

There is a good potential for vegetable seed production in Nikaweratiya area and mostly produced vegetable seed are Brinjal, Okra, Cucumber, Luffa, Capsicum, Snake gourd, Wing bean, Ma and Bitter gourd. During 2012 Yala, there were about 21 farmers attached to the government contract programme and other than that vegetable seed production was done in Madagama Government seed farm.

In this area, the government contract programme was predominant. But according to officials there was an issue of avoiding the government contract programme by large scale farmers. According to the findings, the problem was long time taken for money repayment. Farmers' and officials' view was the contract programme should be given more publicity. On the other hand the people with entrepreneurial skills should be attached to the programme so that they are capable enough to invest large sums of money till they get repayment back (in government programme). This concept is practiced in this area.

Clearly defined problems for seed production could be identified and those are wild elephant attack and lack of water due to drought conditions. Galgamuwa, Ehetuwewa, Mahameruwa, Moragollagama, where there was no water scarcity, was vulnerable to wild elephant attack during the harvesting season. Farmers tend to sell the crop than keeping for seed production to minimize the losses. According to the farmers in this area, when they were young there was no such problem but now this has happened may be due to the fact that wild elephants had lost their original habitats. Farmers had constructed electric fences with their own expenses to overcome this. But that was costly and many farmers couldn't afford such an expense. In Nikaweratiya area, there was water scarcity problem in places such as Rideebendi-ela and Mahamikawa. Therefore some farming areas were abandoned and even the agro wells were with less water. Due to drought conditions farmers had to pump from agro wells so that the cost of production for seed was further increased. Other than that Bitter gourd and Snake gourd were affected with

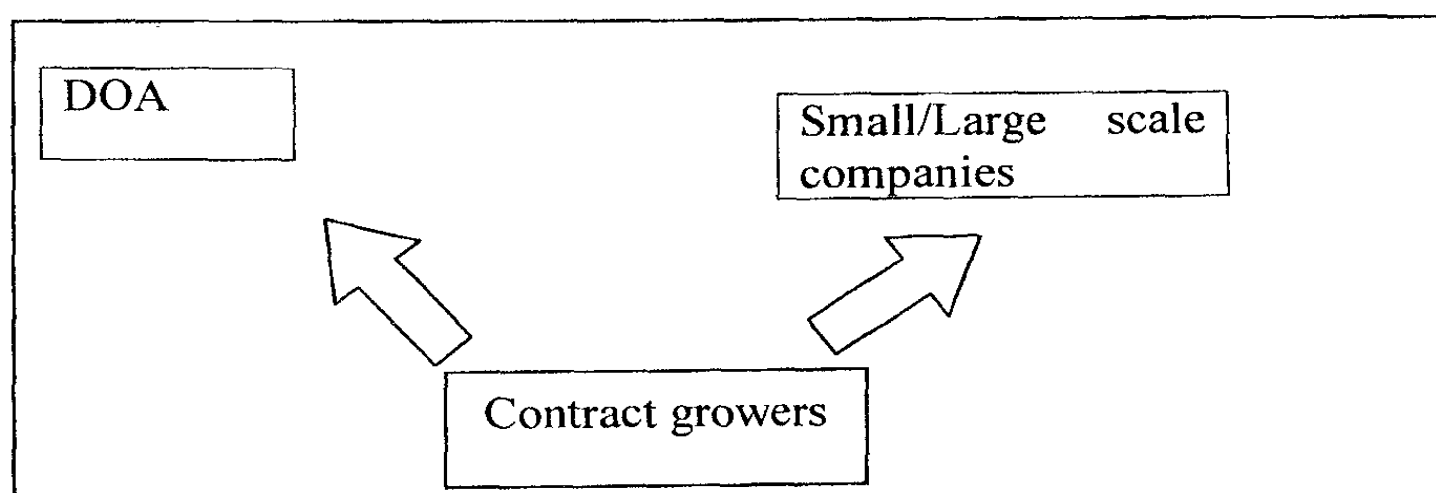
uncontrollable virus problems. Some farmers stated that they had the problems of quality of basic seeds. Another problem was that farmers were not supplied with basic seed when the water was supplied on time.

Due to high cost of production most of the farmers and officers stated that there was a need to increase the prices of seed (for some crops DOA pays high price but for some not during the survey period).

5.5 Vegetable Seed Production in Rikillagaskada and Mandaram Nuwara Area

Rikillagaskada and Mandaram-Nuwara areas are in the Nuwara-Eliya district. Even beans and raddish are cultivated in this area for seed production and for raddish most suitable area for seed production is Mandaram Nuwara. There were both the DOA contract farmers and private contract farmers in the area. Therefore several prominent seed companies dealt in this area and the majority of farmers directly dealt with the DOA or companies. (Figure 5.3)

Figure 5.3: Common Flow of Contract Grower Vegetable Seed Production in Rikillagaskada and Mandaram Nuwara Area



Source: HARTI Survey, 2011/2012 Maha

Bean Seed Production

According to the study, bean seed production was mostly done in Mandaram Nuwara, Udalumada, Maturata, Munwatta areas.

Three local beans varieties have been certified by SCS.

1. K.W.G.(Kentaky Wonder Green)
2. Kappettipola Blue
3. Lanka Butter

Few commercial beans varieties have been identified.

1. Karunarathne Bean
2. Diga sitthi
3. Kapri
4. Balangoda Nil
5. Koturul
6. Kota sitthi

Other than that a hybrid “Top crop” was grown. A new variety called “Sanjaya” had been introduced by the DOA.

In 2012 *Yala* season price paid for DOA recommended bean seed had increased (Table 5.2). As a result majority of the contract farmers prefer to sell to DOA. But during the previous season demand from the private sector was very high so that the prices had increased to Rs.1000-Rs.1500/kg.

Table 5.2: Prices of DOA Recommended Bean Varieties in 2012 *Yala*

| Variety | Price (previous) Rs/Kg | Price (2012 <i>Yala</i>) Rs/Kg |
|------------------|---------------------------|------------------------------------|
| Lanka Butter | 500 | 700 |
| Kappetopola Blue | 500 | 650 |
| K.W.G. | 500 | 600 |

Source: DOA

According to a former Agricultural Instructor (AI) in Rikillagaskada area large amount of seed production could be observed and other than Bean seed, Bittergourd, (Thinnaveli), Luffa (LA 33) seed were produced. It was revealed that before the Seed Act, few intermediaries collected seed from farmers and transported to other areas like Bandarawela and Badulla. But if they were not registered transport was not allowed. Therefore, the formal procedure was followed to some extent. According to the climatic conditions, in *Yala* 5% seed production was done whilst in Maha 90% seed production was done. In the DOA seed programme only B report was taken for beans as the farmers could process using sieves by themselves but both A, B reports were taken for raddish, Luffa, Snakegourd and Bittergourd.

Raddish Seed Production was very well done in Mandaram Nuwara, Uda Walawa (512-D) and Elamulla (511-E).

In Elamulla area there was a seed grower’s society with around 80 members. Their main target of establishing the society was to have a good price for their seed and find solutions for the problems in seed production.

As this region is hilly, cultivation was done in limited areas and the land size was a problem. There was another problem of supplying sticks for beans. In raddish seed processing, extracting seed was costly so that farmers suggest increasing the price of Raddish seed from Rs.750 to Rs.1000/kg.

But it should be stated that farmers of Rikillagaskada area had a positive view on seed production. The reason was the ideal climatic conditions for beans and raddish in this area and they had some market power as there were no competitors operating from other areas.

CHAPTER SIX

Conclusions and Recommendations

6.1 Conclusions

Key stakeholders of the local vegetable seed production industry are DOA, contract farmers, large scale companies, small scale companies and agents/ collectors. Contract farmers (private/DOA) were mostly small scale farmers (0.25-0.5 Acres) and they very rarely grow more than one acre. Vegetable seed producers face problems of high cost of labour, unavailability of skilled labour, water scarcity, wild elephant attack, low investment capability, inadequate and timely unavailability of capital to purchase inputs and irregular payment. During the survey importance of increasing the DOA purchasing price for certain crops was highlighted by key informants as well as farmers. The farmers did not complain about the price as they were generally rational and had shifted to contractors who gave high price for a particular crop.

According to the overall view of the sample farmers, seed production was profitable. Majority of farmers except a few, were satisfied regarding seed production but shifting from the DOA to private sector could be observed as there was a significant difference between time of settlement of payments under contract agreement between the DOA and the private sector. In case of private sector, importance of having a written agreement was emphasized by most farmers as there was higher possibility of breach of contract by firms as well as contract farmers.

Non availability of cold room facilities remained as one of the main issues faced by small company owners. That was because they needed to store excess stock without deteriorating quality as the seeds were highly prone to germination loss and pest attack. According to small scale company owners' views they didn't have or had less capacity of importing hybrids as done by large scale companies. It was very difficult for them to compete with hybrids imported by large scale companies as there was a good demand for hybrid seeds with wide publicity regarding their improved characteristics and with attractive packing.

Large companies in vegetable seed industry engaged not only in local vegetable production but also mass scale importation of hybrid seed. They invested in importation and had the capacity to engage in research on imported seeds. Higher portion of seed market share of such company was played by imported hybrid seed. But importation was short term focused business which wholly targeted profit but not future sustainability. The large scale companies emphasized the need of improving in house research and development activities and expressed willingness to invest.

The agent's role was different and they did the collection of seed from contract farmers and handed over seeds to the contract firm keeping a profit margin. They faced less risk in this business, if they were sure about the quality of seed purchased from the farmers.

The main stakeholder of local vegetable seed industry is the DOA and it has to be more efficient on every aspect of seed production such as research and development activities, production of basic seed, popularity of contract seed production programme, settlement of payment in time and field supervision. The government's role on the future of the local vegetable seed industry should be more broad and vital. According to the survey it was revealed that current involvement in this field by the DOA is not enough and farmers had lost their confidence on the government contract programme. Initially most of the seed producing farmers were trained by the DOA for a period of time but at present, farmers have moved away from the DOA and deal with the private sector.

6.2 Recommendations

1. DOA should take steps to attract more innovative young contract farmers for vegetable seed production programme.
2. Seed certification process should be accelerated so that DOA would reduce time taken for settlement of payment.
3. It is important to have a written document for both parties involved in contract farming either in government or private sector and it will discourage breach of contract by firms or by farmers.
4. Concessionary credit facilities should be provided for farmers as well as small scale companies and they should be given support by government to construct cold rooms.
5. Seed production farmers should be trained with improved methods of production, processing, storing as most of the farmers have the traditional knowledge but the new technology should be introduced to move Sri Lanka with other countries in seed industry.
6. Large scale land owning entrepreneurs should be motivated for vegetable seed production through making awareness programmes regarding it's profitably while increasing their earning as well as country's local seed production.
7. Potential areas for vegetable seed production should be identified and attention should be focused on such areas to increase production by taking steps to overcome problems like wild elephant attack, water scarcity Eg: Nikaweratiya.

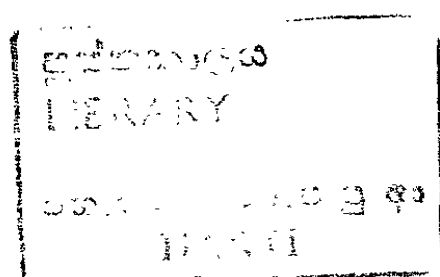
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APPENDICES

Appendix 1: Target Vegetable Seed Production for 2012 - Yala

| SCS Regional Office | Crop | Variety | Expected Yield(Kg) | |
|---------------------|------------------|--------------|--------------------|--------|
| Maha-illuppallama | Ma | Hawari | 1,025 | 1,400 |
| | | Polon | 375 | |
| | Okra | MI 5 | 3,525 | 5,775 |
| | | Haritha | 2,250 | |
| | Bitter gourd | Matale green | 1,000 | 1,500 |
| | | MC 43 | 500 | |
| | Snake gourd | TA2 | 3,875 | 5340 |
| | | Thinnaveli | 790 | |
| | | MI Short | 675 | |
| | Vegetable Cowpea | BS 1 | 2,175 | 2,175 |
| Cucumber | Kalpitiya white | LY 58 | 120 | 320 |
| | | | 200 | |
| Luffa | L. A. 33 | 60 | 60 | |
| Spinach | Giant | 400 | 400 | |
| Wing Bean | Krishna | 200 | 200 | |
| Nikaweratiya | Okra | MI 5 | 650 | 1,550 |
| | | Haritha | 900 | |
| | Ma | Hawari | 200 | 1,450 |
| | | Polon | 700 | |
| | | BS 1 | 550 | |
| | Cucumber | KW | 100 | 100 |
| | Nivithi | Yodha | 100 | 100 |
| | Brinjal | SM 164 | 100 | 100 |
| | Bitter gourd | | 200 | 200 |
| | Snake Gourd | MI Short | 100 | 100 |
| Wing Bean | Krishna | 150 | 400 | |
| | SLS 44 | 250 | | |
| Kundasale | Snake Gourd | TA2 | 125 | 125 |
| | Capsicum | CA8 | 150 | 150 |
| | Tomato | Thilina | 275 | 275 |
| Rikillagaskada | Raddish | Beeralu | 1,605 | 1,605 |
| | Tomato | Thilina | 210 | 445 |
| | | TA245 | 135 | |
| | | | | |
| | Bean | KWG | 6,800 | 19,400 |
| | | LB | 3,900 | |
| | | KP/Nil | 8,700 | |
| Bitter gourd | Matale green | 240 | 240 | |
| Seetha Eliya | Tomato | Rajitha | 25 | 25 |

Source: Standard Seed Suppliers Catalog -2012 Yala

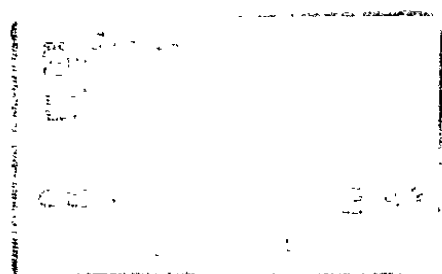
Appendix 2: Minimum Isolation Requirement for Seed Production –Vegetables

| Group | Species | Crop | Minimum Isolation Requirement (m) | | | |
|------------------|------------------------------------|--------------|-----------------------------------|-------|----------|-------------|
| | | | Breeder | Basic | Standard | Standard II |
| Leafy vegetables | | Spinach | 2000 | 2000 | 1000 | - |
| | <i>Amaranthus oleraceus</i> | Amaranth | 1000 | 1000 | 500 | - |
| Vegetables | <i>Momordica charantia</i> | Bitter gourd | 1600 | 1600 | 800 | - |
| | <i>Cucumis sativus</i> | Cucumber | 1600 | 1600 | 800 | - |
| | <i>Luffa acutangula</i> | Loofah | 1600 | 1600 | 800 | - |
| | <i>Raphanus sativus</i> | Radish | 1600 | 1600 | 800 | - |
| | <i>Trichosanthes cucumerina</i> | Snake guard | 1600 | 1600 | 1000 | - |
| | <i>Cucurbita maxima</i> | Pumpkin | 1000 | 500 | 500 | - |
| | <i>Citrullus lanatus</i> | Water melon | 800 | 800 | 400 | - |
| | <i>Capsicum annum</i> | Capsicum | 400 | 400 | 200 | - |
| | <i>Abelmoschus esculentus</i> | Okra | 400 | 400 | 200 | - |
| | <i>Solanum melongena</i> | Brinjal | 200 | 200 | 100 | - |
| | <i>Vigna unguiculata</i> | Veg.Cowpea | 20 | 20 | 10 | - |
| | <i>Lycopersicon esculenum</i> | Tomato | 50 | 50 | 15 | - |
| | <i>Phaseolus vulgaris</i> | Bean | 20 | 20 | 10 | - |
| | <i>Psophocarpus tetragonolobus</i> | Wing bean | 20 | 20 | 10 | - |

Source: DOA

Separation

- If adjoining crop is of the same variety as the seed crop to be certified, the seed crop separated by a definite barrier or a space of at least two meters provided the health of the adjoining crop and varietal purity is satisfactory if not isolation distances should be adhered to.
- Highlighted standards are amended.



Appendix 3: List of Seed Standard for Seed Quality Testing-Local Vegetables

| Crop | Seed Class | Pure seed | Inert matter | Germination | OCS by wt. | ODV | No: Damaged seed | Moi sture | | Weed Seed |
|--------------|----------------|-----------|--------------|-------------|------------|---------------------------|------------------|--------------------|-----------------------|-----------|
| | | (% min) | (% max) | (% min) | (% max) | (%ma(No. max. per 100g)x) | (% max) | % (max) (M. proof) | % (max) Non M. proof) | % |
| Amaranthus | Breeder/Basic | 98 | 2 | 55 | 0 | . | - | 8 | - | 2 |
| | Standard/Com** | 97 | 3 | 55 | 0 | . | - | 8 | - | 2 |
| Bean | Breeder/Basic | 99 | 1 | 75 | 0 | 3 | 5 | 12 | - | 0 |
| | Standard/Com** | 99 | 1 | 75 | 0 | 5 | 5 | 12 | - | 0 |
| Bitter gourd | Breeder/Basic | 99 | 1 | 75 | 0 | . | - | 9 | - | 0 |
| | Standard/Com** | 98 | 2 | 75 | 0 | . | - | 9 | - | 0 |
| Brinjal | Breeder/Basic | 99 | 1 | 75 | 0 | . | - | 9 | - | 0 |
| | Standard/Com** | 98 | 2 | 75 | 0 | . | - | 9 | - | 0 |
| Bushitavo | Breeder/Basic | 98 | 2 | 75 | 0 | 3 | 5 | 12 | - | 0 |
| | Standard/Com** | 98 | 2 | 75 | 0.5 | 6 | 5 | 12 | - | 0 |
| Capsicum | Breeder/Basic | 99 | 1 | 75 | 0 | . | - | 9 | - | 0 |
| | Standard/Com** | 98 | 2 | 75 | 0 | . | - | 9 | - | 0 |
| Cucumber | Breeder/Basic | 99 | 1 | 75 | 0 | . | - | 9 | - | 0 |
| | Standard/Com** | 98 | 2 | 75 | 0 | . | - | 9 | - | 0 |
| Luffa | Breeder/Basic | 99 | 1 | 75 | 0 | . | - | 9 | - | 0 |
| | Standard/Com** | 98 | 2 | 75 | 0 | . | - | 9 | - | 0 |
| Okra | Breeder/Basic | 99 | 1 | 75 | 0 | . | - | 11 | - | 0 |
| | Standard/Com** | 99 | 1 | 75 | 0 | . | - | 11 | - | 0 |
| Pumpkin | Breeder/Basic | 98 | 2 | 75 | 0 | . | 5 | 12 | - | 0 |
| | Standard/Com** | 97 | 3 | 75 | 0 | . | 5 | 12 | - | 0 |
| Radish | Breeder/Basic | 98 | 2 | 75 | 0 | . | 5 | 6 | - | 1 |
| | Standard/Com** | 97 | 3 | 75 | 0 | . | 5 | 6 | - | 1 |
| Snake gourd | Breeder/Basic | 99 | 1 | 75 | 0 | . | - | 9 | - | 0 |
| | Standard/Com** | 98 | 2 | 75 | 0 | . | - | 9 | - | 0 |
| Spinach | Breeder/Basic | 99 | 1 | 60 | 0.1 | . | - | 10 | - | 0 |
| | Standard/Com** | 98 | 2 | 60 | 0.2 | . | - | 10 | - | 0 |
| Tomato | Breeder/Basic | 99 | 1 | 75 | 0 | . | - | 9 | - | 0 |
| | Standard/Com** | 98 | 2 | 75 | 0 | . | - | 9 | - | 0 |
| Winged bean | Breeder/Basic | 99 | 1 | 75 | 0 | 3 | 5 | 12 | - | 0 |
| | Standard/Com** | 99 | 1 | 75 | 0 | 5 | 5 | 12 | - | 0 |

Source: DOA

- *No. of seeds: Calculated for 100, from randomly selected 400 seeds
- ODV: Other Distinguishable Varieties
- OCS : Other Crop Seed
- ** Standard/Com: Standard and Commercial
- . ODV test is not conducted

Appendix 4: List of Government Key Informant Officials

| Name | Official Address |
|--------------------------------|--|
| 1. Dr. Wasantha Chitral | Director, SPMDC, DOA, Peradeniya |
| 2. Mr. H.B.Thilakarathne | DD, SPMDC, DOA, Peradeniya |
| 3. Dr.(Ms) Rohini Nanayakkara | DD, SCS, Gannoruwa |
| 4. Mr. S.A.M.R.Abekoon | ADA ,SCS, Gannoruwa |
| 5. Mr. S.M.C.B.Molagoda | SCS, Gannoruwa |
| 6. Mr. K.M.A.S.Kappagoda | SCS, Gannoruwa |
| 7. Mr. Hemachadra | ADA, ADA Office, DOA, Nikaweratiya |
| 8. Mr.E.M.R.A.Ekanayake | OIC ,SCS, Nikaweratiya |
| 9. Mr.R.B Jayasundara | OIC ,SCS , Palwehera |
| 10. Mr. H.M.S.P.Herath | ADA ,ADA Office, DOA Palwehera |
| 11. Mr.Herath | ADA,ADA Office, DOA, Mahalluppalama |
| 12. Mr.Jayakody | AI,ADA Office, DOA, Mahalluppalama |
| 13. Mr. D.M.Senevitathne | OIC,SCS, Rikillagaskada |
| 14. Mr. R.M.M.B.Rathnayake | Seed Beans Unit, Rikillagaskada |
| 15. Mr.U.B.Rathnayake | (Former AI) ,Rikillagaskada |
| 16. Mr.H.M.W.A.Herath | OIC, SCS, Kundasale |
| 17. Mr.Wijerathne | AI,SCS, Kundasale |
| 18. Mr .S.M.S.E.S.Koralegedara | AI, ADA Office, Kundasale |
| 19. Mrs M.G.S.S.K.Absekara | OIC,Vegetable Seed Processing Unit, Kundasale |
| 20. Mr.Niroshan Kadigamuwa | Farm Manager, Madagama Government Farm, Galgamuwa. |
| 21. Mr.P.H.S.Shantha | SCS, Colombo |

Appendix 5: List of Private Sector key informants

| Name | Address |
|----------------------------|---|
| 1. Mr.U.LJayasinghe | Walewela-Matale District |
| 2. Mr.Priyanga Dematawa | CIC, Dambulla |
| 3. Mr .M.H.W.Senevirathene | Lakbima Saruketha Agro, Ipalogama |
| 4. Mr Wimal ALahakoon | Slagro, Maha Illuppallama |
| 5. Mr Ajith Prasanna | Isara Lak Seeds ,Eppawala |
| 6. Mr.Thushara Herath | Regal Seeds, Senapura |
| 7. Mr. Ajith Herath | -do- |
| 8. Mr.W.M Thilakarathne | Isusru Lanka , Senapura |
| 9. Mr.Keshan Guruge | Guruge Seeds, Senapura |
| 10. Mr U.N.Gunasingha | CADC Crown Seeds, Nawayalattanne, Katugastota |
| 11. Mr. SR.K.Samansiri | Sasiri Agro Seeds |
| 12. Mr.K.A.S.Hemachandra | Dambulu Agro seeds |

Appendix 6: List of Farmers

| Farmer Name | Address |
|--------------------------------|--|
| 1. H.W.J.S.Hulangamuwa | Welpahala, Walewela, Matale |
| 2. T.G.Darmadasa | Polwatta, Walewelw, Matele |
| 3. R.G.Ariyadasa | Polwatta, Walewelw, Matale |
| 4. Eakanayaka | Walewela, Matale |
| 5. K.G.Tennakoon Bandara | Welpahala, Walewela, Matale |
| 6. Wijerathna Banda | Unaweruwa, Walewela, Matale |
| 7. U.G.Rathnayaka | Unaweruwa, Walewelw, Matale |
| 8. Anulawathi | Unaweruwa, Walewela, Matale |
| 9. H.M.Jayatilake | Welpahala, Walewela, Matale Unaweruwa, |
| 10. U, G. Shantha | Walewela, Matale |
| 11. D. A. Sarath Samarasinghe | Kadiyangalla Farm, Ipalogama |
| 12. K. K. Ajith Ranasinghe | Kuda Meegaswewa, Ipalogama |
| 13. W.A.Samantha Kumara | No 30, Dangollagama, Mahailuppallama, 0718489536 |
| 14. H.M. Weerasuriya | Wediligama, Ipalogama |
| 15. A.M.Wickramasinghe Bandara | Hiripitiyagama, Ipalogama |
| 16. Navarathna | Kadiyangalla Farm, Ipalogama |
| 17. M.P.Pemarathna | No 47, Ihala Obadayagama, Kalankuttiya 0719726886 |
| 18. D.B.Seetha Kumari | Kudamegassegama, Ipalogama 0776583126 |
| 19. Rohan Thilakasiri | No 48, Dangollagama, Mahailuppallama |
| 20. A.M.Susantha Kumara | Hiripitiyagama, Ipalogama |
| 21. U.P.Janath Chandana | Jayagaga road, Kadiyangalla, Ipalogama 0724257081 |
| 22. H.M.Nawarathna | No 47, Ihala Obadayagama, Kalankuttiya 0719726886 |
| 23. H.B.Salahakoon | Hiripitiyagama, Ipalogama |
| 24. D.M.Premachandra | No 90, Samanalapura, Mahalluppallama |
| 25. Y.G.Weerasooriya | Kudamegassegama, Ipalogama |
| 26. E.K.R.Thilakarathna | No 48, dangollagama, Mahalluppallama |
| 27. K.P.Heenbanda | No 04, Track 06, Senapura |
| 28. R.Rohan Peramune | Track 09, Katiyawa |
| 29. K.A.Sarath Weerasiri | No 93, Track 09, Katiyawa 0710568926 |
| 30. M.P.C.Indika Patirana | No 95, Track 09, Samagipura, Katiyawa |
| 31. D.D.Sarath Dunusinghe | No 90, Track 09, Katiyawa 0711192982 |
| 32. M.P.Patum Chintaka | No 95 Track 09, Katiyawa 0758906091 |
| 33. A.G.Wasantha Bandara | Agunawelpalassa, Kalundawa, Dambulla 0714256587 |
| 34. Mutukumarana | KItulhitiyawa, Madatugama |
| 35. U.G.Chandralatha | No 1/663, Palwehera, Dambulla 0665719600 |
| 36. A.M.Nihal Bandara | Track 01, Senapura |
| 37. Imalka Harishchandra | Dangollagama, Mahalluppallama |
| 38. Gamini Balasooriya | Dangollagama, Mahalluppallama |
| 39. G.J.Ruwan Kumara | Dangollagama, Mahalluppallama |
| 40. Wasantha Bandara | Narangalegama, Senapura |
| 41. D.M.A.E.Dissanayaka | Galagedaragama, Senapura 0257920464 |
| 42. M.A.Podibandara | Pattinigama, Kalankuttiya |
| 43. Premadasa Guruge | Wedinigama, Senapura |
| 44. B.M.A.C.Ekanayaka | Aluthdabewatana, Senapura |
| 45. R.B.W.C.B.Rajakaruna | Aluthdabewatana, Track 02, Senapura |
| 46. U.K.Ekanayaka | Aluthdabewatana, Second section, Kagama |
| 47. W.M.Thilakarathna | Wedinigama, Senapura |
| 48. D.M.Janaka Bandara | Aluthdabewatana, Second section, Kagama 0255616871 |
| 49. E.Y.D.M.K.Ekanayaka | Aluthdabewatana, Second section, Kagama 0711124057 |
| 50. Sarath Dissanayaka | Aluthwatta, Adiyagala - 0257918052 |
| 51. J.M.Somathilaka | Palbadiyawa, Adiyagala |
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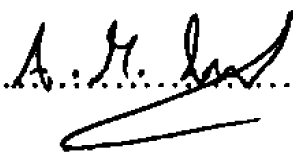
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