

TRANSACTION COSTS: POTATO AND RED ONION

Duminda Priyadarshana



HARTI

Hector Kobbekaduwa Agrarian Research and Training Institute

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FOREWORD

Transaction costs are the economic equivalent of the small print in disclaimers, only they are not revealed by magnification. The problem is that things that are hidden nevertheless do impact and sometimes significantly so. Moreover, and this impacts policy formulation while exacerbating inequities, they are assumed to be non-existent. All the more reason, then, for better inclusion in all equations and matrices.

This study focuses on red onion and potato but reveals details about actors, actions and their various interrelations that are probably true for most if not all crops. It therefore calls for a close examination of all transactions with respect to all crops.

The objectives of greater efficiency and the protection of farmers and traders without overburdening the consumer, the study reveals, requires a reduction in the number of intermediaries in the supply chains relevant to red onion and potato. Clearly this is valid for other crops as well. It is not a knee-jerk call for the elimination of the 'notorious' middleman but rather a streamlining through but not only with more informed policy decisions to obtain the aforementioned oft-uttered and never fully realized objectives.

This in turn brings us to the vexed question: "how?" A better organized community of growers for each crop in each location appears to be a necessary precondition. The extent to which the state can facilitate organizing of this sort is unclear, but such collectives are certainly likely to pinch other actors who benefit from their absence. That, however, is a bridge that has to be crossed much later in the day. First and foremost it is necessary to bring to light the hidden transcripts, so to speak. This study is an important first step in this direction and hopefully it will inspire a more comprehensive consideration of such complexities in the entire agriculture sector.

Malinda Seneviratne
Director/ Chief Executive Officer

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Duminda Priyadarshana

October 2021

EXECUTIVE SUMMARY

High price differences between producer and consumer is a problem that has remained unsolved in the food sector over the years. The blame has frequently and easily been assigned to middlemen but without proper scientific evidence. There are studies which have focused on marketing margins but none of them paid attention to exploring the transaction cost involved in marketing which is not directly observable. This study aims to fill this information gap by identifying sources of transaction cost and the level of their significance in the supply chain. The study limits itself to two popular commodities: potato and red onions. Data and information were gathered following both quantitative and qualitative approaches. The rapid appraisal technique was used to collect data and information from market participants and key intermediaries of different marketing channels, key informants at the field level and officials of relevant departments and authorities using semi-structured interview schedules. Primary data was collected for the period *maha* 2015/16 and *yala* 2016 from the sampled farmers through a questionnaire survey. Similarly, data on volume of business, sale and purchase price, marketing costs incurred and problems related to buying and selling of potato and red onion were collected from 240 market participants.

The study reveals that a large volume of potato and red onion moves through the traditional supply chains leading to the Dedicated Economic Centers and the Colombo Manning Market. The farmers in general sell their produce to the collectors or send them to commission agents at wholesale markets through transport agents. The commission agents and large-scale traders of the private sector play a significant role in marketing potatoes and red onions. The chain of intermediaries begins with the village level collecting agents and ends with retailers at least with three layers in the supply chain. The most common marketing channel is denoted by farmer-assembler-wholesaler-retailer-consumer. Cost and return analysis shows that cost of production per kilogram of potato in Badulla and Nuwara Eliya districts was Rs. 59.33 and Rs.58.49 respectively and it was further found that material cost contributed over 50 percent to the total cost in both districts. In the case of red onions, farmers in Jaffna and Puttalam districts spent Rs. 51.64 and Rs.57.87 to produce a kilogram of red onions respectively of which over 50 percent comprised seed costs in both districts. Analysis of transaction (indirect) cost reveals that it was about Rs.5.50 per kg for potato in Nuwara Eliya and Bandulla districts, Rs.8.48 in Puttalam and Rs.7.42 in Jaffna. The major component in transaction cost involved at the farm level was searching for information to find inputs whereas wastage is the highest at the market level.

The major problem reported is lack of access to information on both production and marketing to make informed decisions. The study concludes that there is room for improvement of both production and marketing system of potatoes and red onions. Two major recommendations given towards this direction are setting up a management information system by strengthening the use of information technology and building strong farmer organizations and linking them with buyers.

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SECTION ONE

Introduction

1.1 Study Background

The consumers in general pay far more than the farm gate price while purchasing agricultural produce mainly due to the added cost of marketing these products. Therefore, both production and marketing costs determine consumer prices. In conventional product cost calculation, directly identifiable costs of these two functions are only considered. However, the consumers pay an additional cost for food commodities which are not captured in the above cost calculations. In institutional economics, those indirect costs are labeled “transaction costs”. The transaction cost of marketing is a concept that dates back to the late 1930s (Coase, 1937). Although there are different interpretations of transaction costs (Nicholson, Staal and Delgado, 1998; Coase, 1937) they imply that transaction costs are the hidden costs that underlie the determination of the commodity prices in addition to the direct costs involved in production and marketing. That is, transaction cost is a major factor in price determination of food commodities.

Price volatility and rising prices of food commodities is a common occurrence in Sri Lanka (Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI), various years), especially due to seasonality of production with respect to certain food commodities leading to importation at a larger scale. Whether domestically produced or imported, the inclusion of indirect costs in addition to the direct cost of food affects both food production and consumption in a country. In this context, it is important to note that the transaction cost of food items cannot be underestimated. The purpose of this study is therefore to stress the importance of estimating transaction cost of food items with a view to contributing towards sustainable food production and consumption in the country.

1.2 Research Problem

It is common for prices to fluctuate throughout the year depending on the supply of agricultural products and the importation of certain food products as a remedial measure to ensure food availability in the country. As pointed out above, the prevailing prices are not the actual direct costs involved in the production and marketing of food commodities in general and in potato and red onion in particular. The indirect or transaction cost which is not accounted for in conventional cost calculation is the hidden portion of commodity prices. Consumers pay high prices without knowing this hidden cost, on the one hand. On the other hand, the local products have failed to compete with imported products due to high prices. Despite attempts to rectify the issues relating to direct cost of food commodities through various means such as subsidizing inputs, marketing arrangements and management of post-harvest losses, sufficient attention has not been paid to understand the portion of hidden cost and likely issues in food prices. Lack of empirical studies and

lack of standard procedures to assess transaction costs are identified as drawbacks in this area (Alcido Elenor Wander (2014). It is also a severe drawback in the conventional cost calculation approach used in the country.

The above description reveals that the competitiveness of local agricultural products has not been subject to in-depth analysis. This creates an information gap of the competitiveness of the locally produced food commodities and the role of transaction cost in the price determination of those products. Accordingly, the relevant research questions are; what are the transactions costs involved in and the extent to which the transaction costs contribute to the consumer price of potato and red onion produced and consumed in Sri Lanka. This empirical research gap is addressed through this study.

1.3 Rationale

All agricultural food production in general and potato and red onion farming in particular, has been severely affected by the rapid increase of production and marketing costs. Less market competitiveness of potato and red onion has resulted in a drop in production which the country experienced during the recent past. To meet the demand, they have been imported in considerably large quantities. The foreign expenditure for this sector has also increased while farm income, food security as well as nutritional status of the consumers have declined. Given this backdrop, market competitiveness of local food commodities should be sustained. Despite favorable policies and the infrastructure development in the country that took place in the agrarian sector during the past few years, domestic food production has not reached the competitive edge as envisaged. In view of the policy and infrastructure changes that have taken place, this detailed investigation of production efficiency and transaction cost of red onion and potatoe and the problems confronted by the farmers based on farm level data was initiated to generate relevant and useful information with related policy implications in the area.

Such a study based on farm level data, it was envisaged, would provide insights into the economics of cultivation of those crops with special reference to production inputs, farm management practices, farm supporting services, cost and returns, disposal of outputs and food security. Like in many other countries, Sri Lanka also adopted various policies to maintain food security of the country. Therefore, this study is intended to be a review of the current economic circumstances faced by potato and red onion growers in Sri Lanka. The study was designed with a view to capture the major trends emerging as well as to highlight the current and potential problems that could hinder improvements in the production of these two crops in the country. The findings will provide important insights to policy makers.

1.4 Objectives

The key objective of this study is to identify transaction costs involved in and to assess the extent to which the transaction costs contribute to the consumer price of potato and red onion produced and consumed in Sri Lanka.

1.4.1 Specific Objectives:

- i. To identify prominent marketing channels of potato and red onion produced in Sri Lanka
- ii. To estimate direct costs and transaction costs involved in those marketing channels with marketing margins
- iii. To identify the problems faced by the farmers in the production of potato and red onion

1.5 Organization of the Report

Including this introductory section, this report is organized into five sections. The next section provides a review of literature followed by the methodology adopted, which is presented in the third section. The fourth section is devoted to results and discussion and the final section offers concluding remarks and policy implications.

SECTION TWO

Review of Literature

2.1 Introduction

The production and marketing of vegetables is particularly important as up to 90-98 per cent of the produce is sold, except root and tuber crops of which a significant portion is saved for seeds and planting material (Singh, 1992). The marketing operations of potato and red onion have a crucial role due to seasonality of production which contribute to the determination of profits for the farmer on the one hand and the level of availability to consumer on the other.

In light of achieving the study objectives, this section will focus on reviewing the literature on the production and marketing systems and prominent marketing channels with particular reference to potato and red onion produced in Sri Lanka and estimating direct and indirect costs involved in the consumer price and estimating marketing margins.

2.2 Production of Red Onion and Potato in Sri Lanka: An Overview

Red Onion is an essential spice in the Sri Lankan diet. Traditionally, red onion cultivation was mainly concentrated in the Jaffna peninsula until the 1990s. Later, the Kalpitiya belt in the Puttalam district became the main producing area. Red onion is also grown all over the Northern and the Eastern provinces and in Puttalam and Ratnapura districts. Amongst the varieties recommended by the Department of Agriculture are Jaffna local (Sinnan) and *Vethalan*. They are cultivated in both seasons under different cropping systems and thus the production is seasonal and therefore the *maha* and *yala* harvest comes to the market from February to April and from July to September respectively.

The price of red onion is largely determined by the local supply of red onion and the relative price of big onions. According to the seasonal price index, retail market prices have dropped to the minimum during the months of March and August over the last 19 years. Meanwhile, the highest prices are recorded in January and December.

Potato

Potato, popularly known as 'The king of vegetables', has emerged as one of the most important food crops in Sri Lanka after rice and a few other crops like chilis, onion, and maize. Conventionally grown through seed tubers, potato has a high significance for its high consumer preference and high net profit. However, potato demands a heavy investment. Potato has been one of the leading cash crops grown in Sri Lanka and the annual production is in the region of 76,000 metric tons. The land utilization for potato cultivation is nearly 4500 hectare with about 30,000 growers of whom 80

per cent cultivate less than 0.4ha. However, potato demands a heavy investment during the cropping period where seed material alone accounts for about 58 per cent of the cost of production.

Potato cultivation is the most attractive cash crop in the up country farming system. Potato cultivation in Nuwara Eliya is a large scale commercial venture characterized by extensive cultivation in both *yala* and *maha* seasons. It is also widely grown in paddy fields and high lands during *yala* and *maha* seasons respectively in the Badulla District and has become the key livelihood of small scale farmers in the Welimada and Uva Paranagama areas. In addition, potato is cultivated in the Kalpitiya, Puttalam, and Jaffna areas. During 2006-2012, Badulla District accounted for 76.6 per cent of the potato cultivation in the country. Accordingly, during the five years from 2006 to 2010 cultivation in Badulla District covered an extent of 3597ha (76.6%) while nearly 1099ha came under potato in other areas. Potato production in Sri Lanka recorded 78,864 MT in 2010/2011 with the district of Badulla and other districts contributing 74.6 per cent and 25.4 per cent respectively. During these five years, the highest production was obtained in 2006, which was 78484 MT.

Productivity is determined by the trend in adoption of technology such as selecting high yielding and disease resistant varieties, irrigation methods, fertilizer and pest and disease management. Poor adoption of technology increases the cost of production and gives a low profit margin to farmers. Pests and diseases cause economic losses to growers and result in consumers having to pay higher prices (Fernando and Premasiri, 2006).

Despite many positive features, potato production is a challenging business. On the one hand, there exists a sharp competition between imported and local potatoes due to state import policies. Farmers are confronted with difficulties in marketing their products due to the availability of cheaper imports. Potato production has decreased from 88,709 MT in 2002 to 60,848 MT in 2010. Potato imports in 2011 stood at 130,000 MT, which accounts for 70 per cent of the local requirement. More than 80 per cent of total imports are from India, China and Pakistan. Until 1996, potato remained a highly protected crop. Since then the government adopted ad hoc policies with respect to potato imports. In many instances import tariff was reduced to protect the consumers. The major issue is lack of competitiveness. In recent years, the cost of production was estimated to be around Rs 42.00 – 55.00 per kg which is extremely high. Besides, poor yields have eroded the profitability of this crop. Harmful environmental effects such as soil erosion in cases where potato is grown on steep slopes are also cause for concerns. Declining profitability against the rising cost of production appears to be the most critical effect on farm households.

The quantity of potato imports has considerably increased during the last 30 years mainly due to the removal of import restrictions. Further, the value of the imports and unit prices of potatoes (CIF) has significantly increased, while, the rising trend of quantities, CIF prices and total sales have continued in the past few years. Despite the increasing trend in CIF prices, local production is not competitive vis-a-vis

imports. Nevertheless, an increasing trend of all these import variables is a key dilemma of the local potato production and marketing system.

2.3 Factors and Cost of Production of Food crops

With the growing population, rapid urbanization and increase in income, Sri Lanka is facing the problem of producing more food to feed the nation due to declining available land for agriculture. Under such circumstances, the only plausible alternative is to increase production per unit land area and pay attention to reducing the unit cost of production (CIC, 2010). According to Etaferahu (2012), cost of production is the value of all inputs for growing a specific crop such as seeds, fertilizer, irrigation water, labor and machinery time. Scholars emphasize the importance of estimating cost of production as a decision-making tool at farm level (Luca, 2013). Luca (2013) further states that knowing the profitability of the individual products can help in the planning of future production and the product cost can be used for investment justification, sourcing materials and services, new product introductions, market strategy and engineering process changes. Fixed costs and variable costs are also used to evaluate the profitability of a product, to determine the optimal production process to take pricing decisions. Comparisons of product costs structure between farms in the same areas or in different districts could also lead to greater efficiency in the production process of individual farms (Luca, 2013).

Luca (2013) further explained the importance of farm costs calculation and estimation for policy formulation purposes. Over time, policymakers have used the cost of production as a basis for farm policy (either directly or indirectly), and especially to take decisions about price support policies. When price escalation takes place the government often adopts support policies to safeguard the producers. Peter (2010) has described costs as either purchased inputs such as seed, fertilizer, pesticides, hired capital expenses such as machinery or labour, maintaining owned machinery, and the imputed opportunity cost of owned capital and unpaid labour used in the production process. Costs are valued as follows.

- Expenses on land: the amount of money or its equivalent paid as rent for the use of land during the last cropping season.
- Cost of family labour: the amount of money which would have been paid for labour if it was hired for farm operations.
- Cost of hired labour: the amount of money paid to hired labor during farm operations.
- Cost of agrochemicals: total expenses on herbicides and pesticides incurred by the farmer during the cropping season.
- Cost of inorganic fertilizers: total expenses on inorganic fertilizers such as MOP, Urea incurred by the farmer during the cropping season.
- Cost of seed: total expenses on seed incurred by the farmer during the cropping season.
- Operating Costs: these can vary directly with the rate of work and they include the costs of fuel, lubricants, tires, equipment maintenance and

repairs. Operating costs, unlike fixed costs, change in proportion to hours of operation or use. Also, they depend upon a variety of factors, many of which are under the control of the operator or equipment owner to some extent.

- Maintenance and Repair: This ranges from simple maintenance to the periodic overhaul of engine, transmission, clutch, brakes and other major equipment components, for which wear and tear are proportionate to use. Operator use or abuse of equipment, the severity of the working conditions, maintenance and repair policies, and the basic equipment design and quality all affect maintenance and repair costs

2.4 Marketing Systems

A marketing system includes all activities from production to consumption. These activities are of three kinds: 1) exchange activities (buying and selling), 2) physical distribution activities (transportation, storage and processing), and 3) facilitative activities (standardization and grading, marketing intelligence, financing and marketing risk). Marketing channels include routes or ways of the movement of products from producer to consumer and they vary by type of commodities traded, physical distance between producer and consumer, and characteristics of the consumer market.

Abeysekera and Abeysekara (2006) contend that markets are stagnant and less dynamic due to a number of reasons: a) long supply chains with little integration of the partners, b) high post-harvest losses (10%-20%), c) high price volatility, d) high market uncertainties with respect to quantity, quality and time at both producer and consumer end, e) bulk breaking, cleaning and grading by the retailers, f) large number of supply chain partners, operating independently, g) national pricing mechanism being based on the Colombo wholesale market price, and h) commission agents dominating the wholesale market transactions.

Assembling is the first step in marketing farm produce. It involves the collection of small surpluses from a number of small farms scattered over large areas and bulking the same for subsequent distribution in volume. The assembling of both crops are carried out by producers, village merchants, internet merchants, wholesale merchants, commission agents, producers of co-operative societies and supermarkets.

After assembling products, wholesaling and retailing are performed through established markets or on an individual basis. Intermediaries involved in the marketing system spend money on the one hand and seek and earn profit on the other. Expenditure refers either marketing cost or transaction cost. New intuitional economists use transaction costs and pay attention to study this concept because it affects both producers and consumers.

2.5 Transaction Costs: Definitions and Theoretical Perspectives

The concept of transaction costs was first introduced in 1937 by Coase to capture the cost associated with information, negotiation, monitoring, coordination and enforcement of contracts. Based on these transaction costs faced by individual firms, Coase theorized the natural emergence of intermediary firms to reduce these costs. Since then, a substantive volume of literature has been devoted to transaction costs in agricultural markets. After Coase, many other scholars highlight the importance of transaction cost. Two pertinent quotes are given below.

“The identification of transaction costs in different context and under different systems of resource allocation should be a major item on the research agenda of the theory of public goods and indeed of the theory of resource allocation in general.” — Arrow (1969).

“Without the concept of transaction costs, which is largely absent from current economic theory, it is my contention that it is impossible to understand the working of the economic system, to analyze many of its problems in a useful way, or to have a basis for determining policy.” — Ronald Coase (1988).

With the development of ICTs and their application to food marketing there is a need to use a narrower definition of transaction costs which provides a clear relationship with search cost. In this context, a useful elaboration is offered by Nicholson, Staal and Delgado (1998) who classify transaction costs into observable and unobservable transaction costs. Observable transaction costs include marketing costs such as transport, handling, packaging, storage, spoilage etc. that are visible when a transaction takes place. Unobservable transaction costs consider those costs associated with information search, bargaining and enforcement of contracts.

Building on Coase, Hobbs et al (2000) have classified the components of transactions as follows: information costs as arising before the transaction, negotiation costs as the cost of physically carrying out the transaction and monitoring costs as costs of ensuring that the terms of the transaction are adhered to. Singh (1992) studied the complexity of the problem of transaction costs and found that there is no perfect definition and simply defined it as costs associated with market exchange. From a different perspective, Key et al., (2000) define transactions costs as fixed and proportional [or variable] transactions costs. Here fixed transactions costs include the original search, negotiation and enforcement costs that are related to the volume of inputs as well as outputs.

Transaction Cost in economic theory is one of the “branches” of New Institutional Economics (Kerrelah and Kirsten, 2002). The fundamental argument in Transaction Cost Economics is that economic governance is a prerequisite for using resources in an economically optimal manner for enhancing economic efficiency. In Transaction Cost Economics, institutions play a major role in transaction cost-minimizing (Kherallah and Kirsten, 2002). A firm is expected to choose the governance structure

that will minimize the transaction costs associated with the specific transaction under consideration (Strydom and Terblanche, 2012).

According to the transaction-cost approach (Klein et al, 1978; Williamson, 1993), inefficiencies in contracts occur due to incomplete contracts and the presence of asset specificity (relationship specific investments). Under these conditions, opportunistic rent-seeking behavior may occur. Thus producers, who have to make specific investments in relation to such commitments, will under-invest in their production process, as a response to a firm's expected rent seeking behavior. The principle source of inefficiency, according to the Transaction Cost Theory, is due to the existence of actions not subject to contractual provisions. The margin of discretion that they leave the firm may be interpreted by producers as increasing risk, regardless of whether the feared behavior actually occurs; this threat becomes a part of the transaction cost for the producer.

Coase (1937) argues that market exchange is not cost free. The cost of a transaction has an important role in the organization of firms and contracts. This line of work has evolved over the years and has become part of a larger framework entitled New Institutional Economics, as opposed to Institutional Economics. Williamson (1993) uses the neoclassical framework, but takes transactions as the unit of analysis, relaxes the hypothesis of perfect information and emphasizes the importance of institutions as a means to reduce high transaction costs.

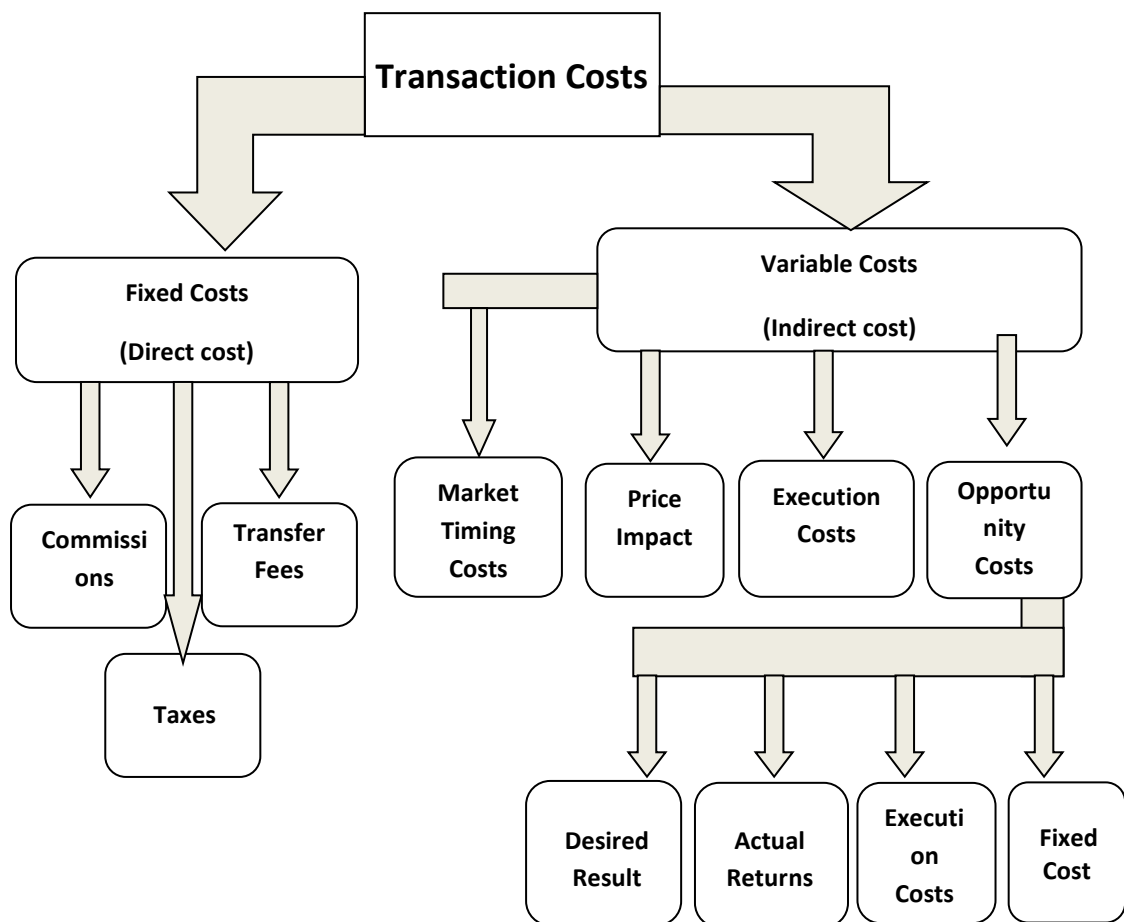
The existence of transaction costs renders the analysis of household behavior complex and results in market failures that are household specific, i.e. markets fail to exist for those who have prohibitive costs of transaction (De Janvry et. al, 1991). The spectrum of buying and selling decisions made by the household is based on the difference between the market price and the actual cost that has to be incurred. Therefore the household becomes a net seller only in cases where the differences in prices are positive. Because of this, pricing policies can have vastly different effects on the welfare of the household depending on whether the household is a net-seller or a net-buyer (Strauss et al, 1997).

The New Institutional Economics (NIE) framework argues that information was not always perfect, that transaction costs can be high and that the costs of undertaking transactions cannot be ignored. Furthermore, it is argued that institutions play an important role in economic performance, efficiency and distribution. Therefore NIE relaxes the assumption of perfect information and assumes the additional institutional constraint, thus trying to endogenize the existence of institutions in the analysis of household response. A good review of NIE literature and its implications for agricultural policy research can be found in Kherallah and Kirsten (2002).

2.6 Cost Calculation Approaches

Price impact captures the movement in the price of product that is the result of a trade plus the market maker's spread. Market timing costs refer to the movement

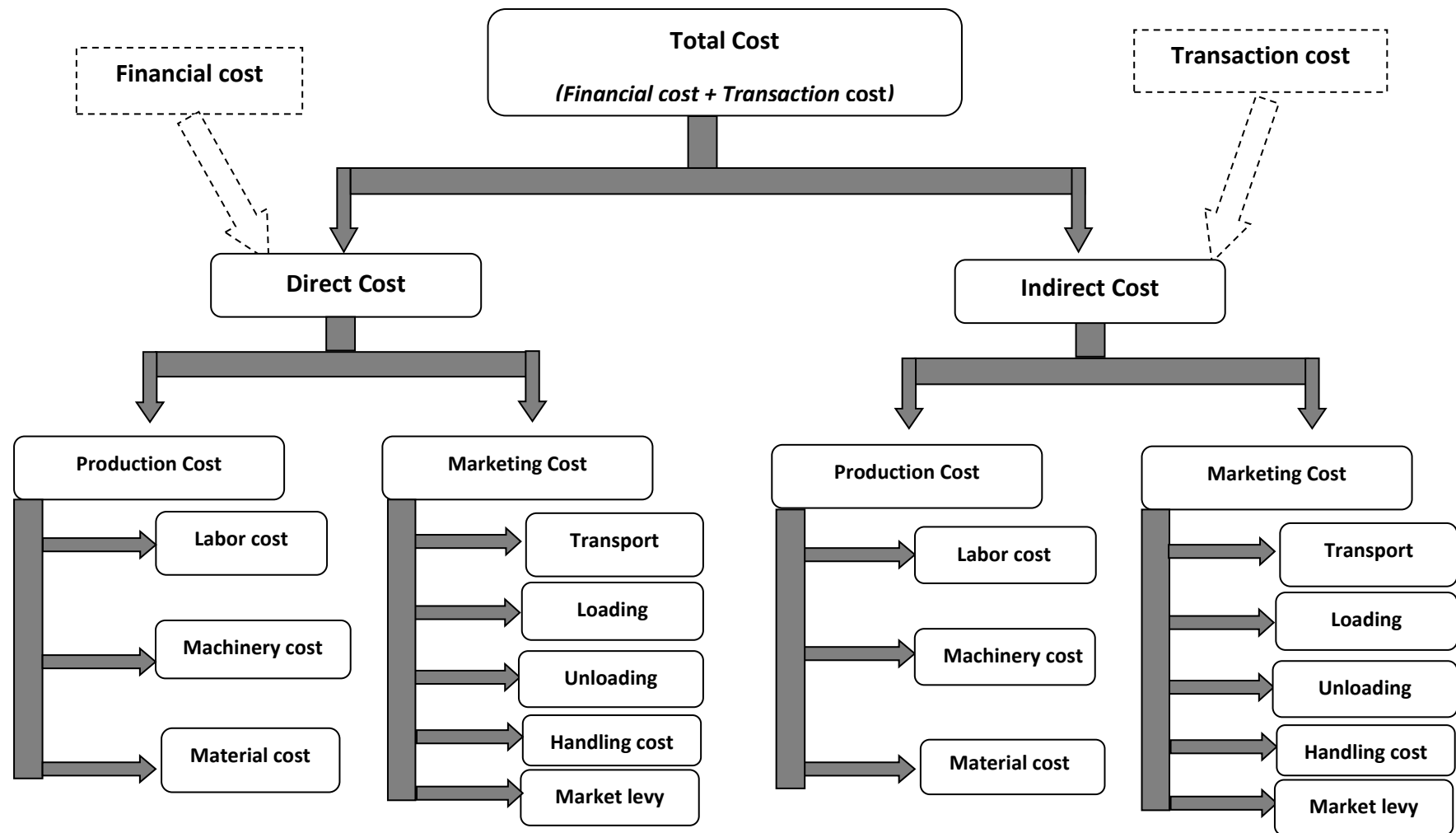
in the price of product at the time of a transaction that can be attributed to other market participants. Execution costs arise out of the demand for immediate execution and reflect both the demands for liquidity and trading activity. Opportunity costs are the difference between the performance of an actual investment and the performance of a desired investment, adjusted for fixed costs and execution cost.



Source: Adopted from Collins and Fabozzi Model (1991).

Figure 2.1: Transaction Cost Components

In the above model, transaction cost has two components: fixed or direct cost and variable or indirect cost. Fixed costs are observable because of direct payments to the persons involved in the transactions. Indirect cost are not directly added to the price because it is not paid to the traders involved in transactions and paid to the supporters. Figure 2.1 and 2.2 illustrates the components of transaction cost and total costs.



Source: Saul Klein et al. (1990)

Figure 2.2: Direct and Indirect Model of Transaction Cost Analysis

Figure 2.2 visualizes transaction cost more clearly than figure 2.1. It covers both production and marketing costs. As shown in the figure each direct cost has indirect costs. In other words behind all direct transaction costs, either production or market, lie indirect costs.

2.7 Market Performances and Marketing Margins

Market performance refers to the impact of structure and conduct on prices, costs, and volume of output (Pomeroy et. al., 1988). The marketing margin of a food commodity is the difference between the actual price paid by the consumer and the price received by the farmer for an equivalent quantity and quality of that food commodity. Investigations of market efficiency constitute one approach to evaluate the degree of market performance. Market efficiency has the following two major components: (i) effectiveness or the degree of performance in providing a marketing service and (ii) the effect, that is results of performing the service on production and consumption. These two are most important because the consumer satisfaction at the lowest possible cost must be in line with maintenance of a high volume of farm output (Ramakumar, 2001).

SECTION THREE

Methodology

3.1 Introduction

This section presents the methodology in view of the study area by selected crops, source of data and analytical techniques. The basis for the selection of study locations, market, nature and source of data are discussed first and then the data collection and analysis for measuring cost of production and transaction cost are described. Finally, the methods of analysis are presented.

3.2 Choice of Crops and Study Locations

Depending on the priorities of the National Food Security Committee of the Presidential Secretariat and the Ministry of Trade and as guided by the Research and Training Committee of HARTI, both potato and red onion were selected for this analysis as essential food items for transaction cost analysis. Accordingly, the major producing areas of these two crops were selected for the data collection. By analyzing the secondary data on the extent and production, Jaffna and Puttalam districts were selected for red onion and Nuwara Eliya and Badulla for potatoes.

3.3 Data Collection Methods

3.3.1 Secondary Data Collection

This study was based on primary and secondary data on potato and red onion production and marketing in Sri Lanka. Secondary material was collected from the data bases at the Department of Census and Statistics (production) and Department of Agriculture. In addition, secondary data were gathered from research reports and journals.

3.3.2 Primary Data Collection

Two main data collection tools were employed to gather primary data: pre-tested structured questionnaire and key informant interviews.

Questionnaire Survey

A questionnaire survey was administered to collect primary data from three categories of sample households using three different structured questionnaires. A pervasive sample technique were used for selecting both potato and red onion farmers. Among the supplementary food crops for this study, potato and red onion, two major crops grown during the *yala* and *maha* seasons, were selected. Nuwara Eliya and Badulla districts were selected for potatoes and Jaffna and Puttalam districts for red onions as the main districts where these crops are grown. Also, 25 farmers and 20 intermediaries and wholesalers relevant to each of these crops were

surveyed to calculate the transaction cost. Information was obtained through a formal questionnaire from the three main parties, the farmers, the intermediaries and the wholesalers in the main market path through which the product flows from the farmer to the end consumer.

Rapid Appraisal Technique

The rapid appraisal technique was used to collect data and information from market participants and key intermediaries of different marketing channels (collectors, traders, wholesaler and retailers), key informants at the field level and officials of relevant departments and authorities, using semi-structured interview schedules. Primary data was collected for the *maha* 2015/16 and *yala* 2016 seasons from the sample farmers through the questionnaire survey. The information related to cost items was collected on an operational basis. In addition to the hired inputs, information on family inputs such as labour was gathered. Data also included patterns related to disposal of produce and marketing costs, both direct and indirect. Similarly, data on volume of business, sale and purchase prices, marketing costs incurred and problems related to buying and selling of potato and red onion were collected from 240 selected intermediaries.

Potato and red onion wholesale markets in the country including Colombo, Dambulla, Kappetipola, Bandarawela, Puttalam, and Jaffna were selected for the analysis. Dambulla, Kappetipola, Bandarawela, Jaffna and Puttalam markets are located in major producing areas while Colombo and Gampaha are among the major consuming areas in the country. Colombo is the oldest and the largest market in the country with a commission system made of around 69 agents. Producers and collectors supply main crops to sell on a commission basis (5-10%). Dambulla is the second largest wholesale market and is located 180 km away from Colombo. There are approximately 170 traders in the market. There are about 144 outlets and most of the traders sell potato and red onion. The Norochcholai market has around 40 wholesalers of red onion. Bandarawela is one of the major potato markets in the country and is located in the Badulla District with around 8 traders. This market serves the central part of the country. The Kappetipola market is smaller comparatively with around 50 traders and is also located in the Badulla District.

3.3 Data Analysis and Analytical Techniques

3.3.1 Objective 1: To identify prominent channels of the marketing system of potato and red onion produced in Sri Lanka

This objective was achieved through the descriptive analysis of secondary information and primary data gathered from key informant interviews. The data gathered included major buyers, sales points and supplier and buyer relationship.

3.3.2 Objective 2: To estimate direct and transaction costs involved in those marketing channels with marketing margins

This objective was achieved through the analysis of secondary information and primary data gathered from key informant interviews. Marketing margins were calculated by using the “concurrent method”. The prices at consecutive levels of the marketing channels were compared in terms of the same point in time. Data included representative costs and returns from the key participants in transportation, handling and storage. Analysis estimated the costs of all inputs, subtracting those costs from returns and gave the profits at each level of the system. Hence, a marketing margin was specified as follows:

$$M_t = P_t^l - P_t^{(l-1)}$$

Where,

M_t = Marketing margin between level (L) and its preceding level (L-1) at time t

P_t^l = Price at market level (L), at time t

$P_t^{(l-1)}$ = Price at market level (L-1) at time t

Gross marketing margins were calculated using secondary price data over the years and months to find out seasonal variation.

- 1) The farmer's share of the retail price paid by the end consumer is computed as follows:

$$\text{Producer's Share} = \frac{\text{Producer Price (P}_{PP})}{\text{Retail Price (P}_{RP})} \times 100\%$$

The gross marketing margin or farm-retail price spread was computed as follows:

$$\begin{aligned} \text{Wholesaler's Gross Margin} &= \frac{P_{WP} - P_{PP}}{P_{RP}} \times 100\% \\ \text{Retailer's Gross Margin} &= \frac{P_{RP} - P_{WP}}{P_{RP}} \times 100\% \end{aligned}$$

P_{WP} = Wholesale Price

P_{PP} = Producer Price

P_{RP} = Retail Price

Net marketing margins of potato and red onion for different marketing channels were calculated in both rural and urban markets.

- 2) Net Marketing Margin = Marketing Margin – Marketing Costs

- 3) Marketing Efficiency were measured using Shepherd formula (1993).

Marketing Efficiency	=	$\frac{\text{Price paid by the consumer}}{\text{Total Marketing Cost + Margin}}$
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Least Cost Marketing Channel and Cost Items

Major marketing channels and cost items were analysed using line of vertical and horizontal integration for both crops to identify the least cost marketing channel and cost. The most recent studies have used direct cost and indirect cost analysis to test the transaction costs by using descriptive analytical methods. This is more realistic than using static market margin. Hence, in this study, the direct cost from the producer level to all market participants was calculated to obtain an understanding of gross marketing costs and secondly the indirect cost from the producer level to all market participants was calculated.

3.3.3 Objective 3: To identify problems faced by farmers in the production of potato and red onion

This objective was achieved through the descriptive analysis of primary data gathered from sample farmers.

SECTION FOUR

Results and Discussion

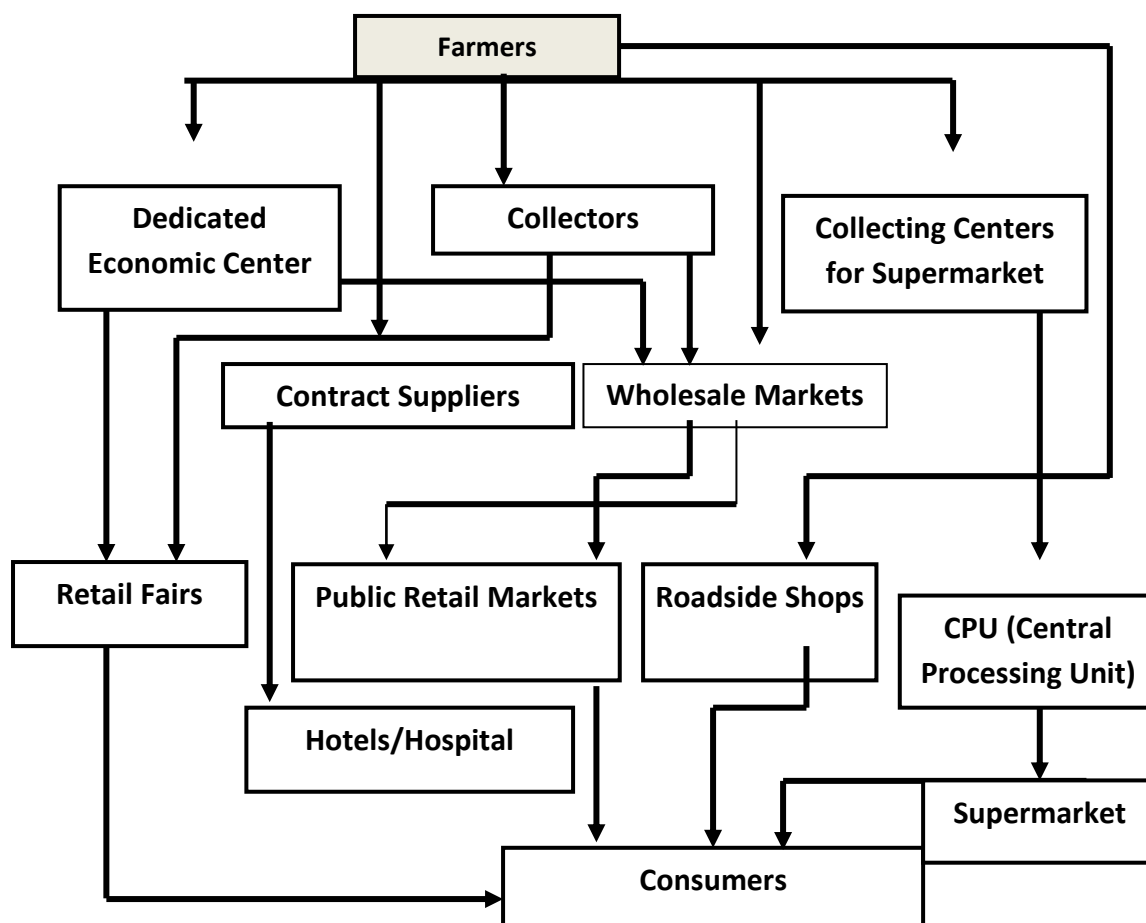
4.1 Introduction

This section presents the results of the analysis from several perspectives. It begins with an analysis of marketing channels of red onion and potato in Sri Lanka. Then it analyses costs and returns from potato and red onion followed by direct and indirect cost analysis with particular reference to transaction costs and related aspects. The section ends with a discussion on problems and constraints faced by potato and red onion farmers.

4.2 Marketing Systems of Potato and Red Onion

A marketing channel refers to a chain of middlemen involved in the process of selling food commodities. Different types of marketing channels indicating how potato and red onion reach the consumer from the producer level were identified. Marketing channels of potato and red onion appear more or less similar to those of many other agricultural commodities and they involve several types of market participants such as collectors, wholesalers, retailers, exporters, processors and institutional buyers. A majority of the farmers sell their produce to the collectors at the farm gate. Whilst the marketing channels differ from one farmer to the other, all the channels are not available for all the farmers in different localities. The weaker the road conditions the fewer the channels available as well as the lesser the production.

The study reveals that a major portion of the produce of potato and red onion moves through traditional supply chains such as the DEC and the Colombo Manning Market. Farmers in general sell their produce to the vegetable collectors or send them to commission agents at wholesale markets through transport agents. The commission agents and large-scale traders of the private sector play a significant role in this marketing channel. The chain of intermediaries begins with the village level collecting agents. It must be remembered that the most common marketing channel is denoted by farmer-assembler-wholesaler-retailer-consumer. Apart from this, the produce flows through different channels depending on the distance from the producing area to the market with the involvement of one or several intermediaries. Figure 4.1 illustrates the distribution system of potato and red onion in Sri Lanka.



Source: HARTI Survey Data, 2016

Figure: 4.1: Potato and Red Onion Distribution System in Sri Lanka

The major assembling markets of potatoes are located in Nuwara Eliya, Badulla, and Welimada and in the rural and urban centers of Kandapola, Ragala, Maturata, Kappetipola, Walapane and Mandaramnuwara. Assembling markets for red onions are located in Jaffna and Puttalam. Such key assembling markets in major producing areas channel their collections to terminal wholesale markets in Colombo, Dambulla, Norochchola and Kandy while sending a certain portion of stocks to other small regional markets.

Farmers allocate a portion of the produce to fulfil the requirement of seeds and sell the balance immediately to private dealers. Most of the farmers prefer to sell their produce to private dealers in nearby economic centers. The price of both crops fluctuates widely throughout the year. In particular, four types of market participants are involved in the trading of these two commodities by performing various activities such as assembling, sorting, packing, transporting and selling as listed below.

a) Resident collectors/Assembly agents

Assembly agents collect potato and red onion from farmers at farm gates, roadsides or their own collecting centers and sell stocks to the demand side wholesalers as well as to the markets in Dambulla, Kandy and Colombo.

b) Trucker-buyers/Demand side wholesalers

Traders who come by lorries purchase the produce through the assembly agents/resident collectors or directly from the producers. They could be either retailers or wholesalers in the consumption areas of the country.

c) Commission Agents

These are wholesale traders at major wholesale markets who sell potato and red onion on behalf of the farmers or assembly agents on a commission basis. They usually keep a 10% margin as their sale commission.

d) Retailers

Retail traders are those who sell potato and red onion at stalls, general grocery shops and at the roadsides.

Accordingly, a large number of intermediaries are involved in food supply and distribution activities leading to an increase in transaction costs and market margins. Temperate onions, which are mainly grown in the Kalpitiya area, are sent directly by farmers to the commission agents at the Colombo Manning Market (CMM) through organized transporters. Meanwhile, collectors also purchase tropical potatoes and red onion from farmers at the weekly fairs (*polas*) and send them to the CMM. Wholesaling facilitates the economic function of buying and selling by allowing the forces of supply and demand to converge and establish a single price for a commodity. The people involved in wholesaling act as merchants, buyers and sellers, brokers, commission agents, and export/import agents only dealing in foreign trade.

4.3 Marketing Channels of Red Onion

As shown in figure 2.1 traders engaged in the assembling of red onion are a) producers, b) village merchants, c) itinerant merchants, d) wholesale merchants, e) commission agents, and f) producers in co-operative societies. The major red onion assembling markets are located in the cities of Jaffna and Puttalam. Collections are sent from key assembling markets in major producing areas to terminal wholesale markets in Colombo, Dambulla, Norochcholai and Kandy while moving some stocks to other small regional markets.

With regard to potatoes, after keeping their requirement of seed, the farmers sell the surplus to private dealers. Most farmers prefer to sell their produce to private dealers in nearby Economic Centers. The price fluctuates widely throughout the year. Marketing costs are the actual expense required for bringing the produce from farm gate to the consumers. It includes a) handling charges at local points b) assembling charges c) transportation costs d) handling charges by wholesalers and

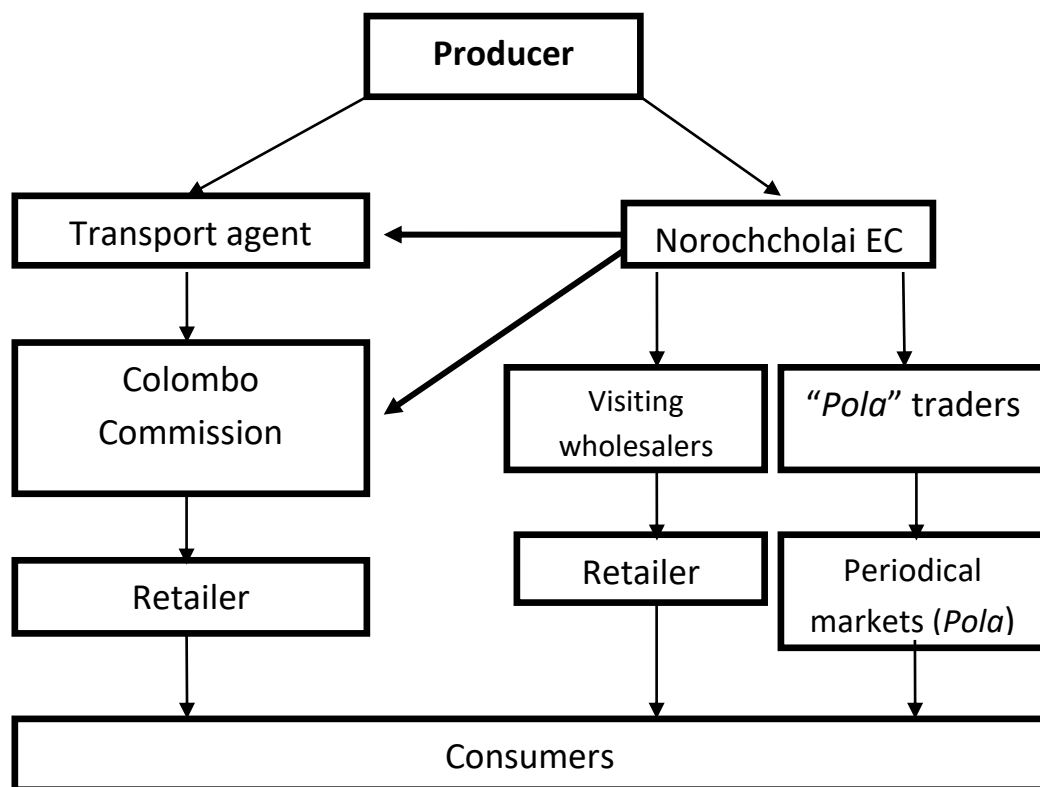
retailer to consumers, e) expenses on secondary services like financing, risk taking and market, f) intelligence, and g) profit margins taken out by different agencies.

The marketing margin of red onion is the difference between the actual price paid by the consumer and the price received by farmer for an equivalent quantity and quality of red onion. The Norochcholai Dedicated Economic Centre (NDEC) is the focal point of marketing of red onion in Sri Lanka. Farmers from distant areas such as Kalpitiya visit the NDEC to buy inputs such as seed, fertilizer and agro chemicals and to sell their produce. Accordingly, NDEC is the most important point of marketing for red onion. Farmers bring their produce directly to the NDEC and traders sell it to the demand side wholesalers on behalf of the farmers. Traders at the NDEC receive the commission for their service and the transaction takes place in the presence of the farmers. This is the most important and common marketing channel of red onion in Sri Lanka, where the farmers derive more benefits than from other channels.

Another channel comprises of resident collectors such as farmers and boutique keepers of the areas where red onion is cultivated. Resident collectors collect red onion at the farm gate or at their collecting centers and dispose the produce most often at the Dambulla Dedicated Economic Centre (DDEC) or the Colombo commission market. Those who come to collect red onion from the cultivating areas are called outside collectors. They normally get the service of an agent of the area to ease their task in the harvesting period.

Sri Lanka has not achieved self-sufficiency in red onion yet, but there is a year round demand. Local production is available only within a limited period due to perishing and difficulty in storing the excess production for a long period. However, the domestic marketing channels of red onion are the same as for other exotic vegetables. Norochcholai and Vavuniya are the major market places for red onion buyers. The terminal market in Norochcholai provides a main buying point for supplies from the Kalpitiya area (HARTI, 2011).

The DDEC receives red onions from the Jaffna peninsula and it is also the meeting place of producers/collectors, wholesalers and retailers. The Puttalam and Jaffna districts produce nearly 70 per cent of red onion in Sri Lanka and it is distributed to the deficit areas. Hence marketing of red onion is very important and it is totally handled by the private sector. Norochcholai, Vavunia, Dambulla and Colombo are crucial points in the red onion marketing system. Marketing channels of red onion is very similar to those of vegetables; in most cases red onion are transported with vegetables. Figure 4.2 explains the major marketing channels of red onion produced in the Kalpitiya belt of the Puttalam district.



Source: Priyadarshana and Vidanapathirana (2018)

Figure 4.2: Major Marketing Channels of Red Onion Produced in Kalpitiya Belt

According to Figure 4.2, red onion produced in the Kalpitiya belt reaches consumers through two major marketing channels. The transport agent collects from the producer and transports to the main wholesale market established in Colombo. Producers who use this marketing channel have personal contacts with the commission agents in the Colombo market and the transport agent functions as the facilitator. The other channel is run via the NDEC. Buyers who visit the NDEC to purchase the produce directly supplied from Kalpitiya belt are of two types; visiting wholesalers from nearby towns such as Negombo, Chilaw, Kalutara, Matugama and Kegalle, and “pola” traders from nearby areas such as Anamaduwa, Marawila, Kuliyaipitiya and Puttalam.

4.4 Cost and Returns from Potato Production

Cost of Production of Potato

The potato producing conditions during the 2018 *yala* season were different in the two districts and therefore the costs were not directly comparable. Including the imputed cost of own inputs, the total cost of potato cultivation accounted for Rs. 274,782 and Rs. 363, 071 per acre in the Badulla and Nuwara Eliya districts respectively. However, the total cost had declined compared to 2017 as a result of the government fertilizer subsidy programme. Considering the total cost, the highest component was material cost (seeds, agro-chemicals and other inputs) amounting to 54 per cent and 57 per cent of the total cost of potato cultivation in the Badulla and

Nuwara Eliya districts respectively. All farmers in Badulla and 97 per cent farmers in Nuwara Eliya had cultivated the variety “Granola”. The second largest cost component was labour and it accounted for 40 per cent (Badulla district) and 39 per cent (Nuwara Eliya). With reference to labour usage, potato cultivation is a labour intensive activity. The average labour usage per acre in Badulla and Nuwara Eliya were 111 and 114 man days respectively. In the Badulla district average wage rate for hired labour was Rs.1242.00 and it was Rs.1243.00 in Nuwara Eliya. The unit cost of production (including imputed cost) of potato was Rs. 59.33/kg and Rs. 58.49/kg in Badulla and Nuwara Eliya respectively.

4.5 Cost and Returns from Red Onion Production

Red onion is also a labour intensive crop, requiring around 300 man days per ha of cultivation. However, seeds (bulbs) was the main cost component and accounted for nearly 50 per cent of the total cost of production. Seed was supplied to the main producing areas from Jaffna.

Red Onion is primarily propagated through seed bulbs and the seed requirement to cultivate a hectare of the *Vethalan* variety is 1.5 -2.0 mt, valued at Rs. 45,000 - 60,000. In order to obtain this amount of seed bulbs, it is necessary to cultivate about 0.1 hectare. The agricultural research station at Kalpitiya has successfully produced true seeds from the red onion variety, *Vethalan*. The use of true seeds reduces the amount of land required to produce planting material and thereby reduces the cost of cultivation.

The total cost of cultivation of red onion was for Rs 330,444/ac and Rs. 221,012/ac in the Jaffna and Puttalam districts respectively. The cash cost as a percentage of total cost stands at 80 per cent in Jaffna and 85 per cent in Puttalam.

The major components of the total cost are categorized as labour, power and material. Some of the key cost items in red onion cultivation for Jaffna and Puttalam districts as a percentage of the total cost were, respectively; 42 per cent and 40 per cent for labour; 115 and 85 man days of per acre labour usage; 7 per cent and 6 per cent for machinery; 51 per cent and 54 per cent for material. The cost of machinery had often been incurred for lift irrigation and land preparation whereas the high cost of onion bulbs had accounted for a relatively high share of materials. The share of costs with respect to seeding, fertilizer application, water management, harvesting and processing are relatively intense for red onion cultivation in both the districts. The total cost share of the above operations in red onion cultivation accounted for 76 per cent in Jaffna and 89 per cent in Puttalam. The unit costs of production of red onion including imputed cost of own inputs were Rs.51.64/kg in Jaffna and Rs. 57.87/kg in Puttalam.

4.6 Analysis of Direct and Indirect Costs

The following list indicates the major components of indirect cost.

- **Search costs** are costs associated with identifying and contracting potential buyers and sellers, for example line search cost at the Pettah wholesale market.
- **Screening costs** are the costs associated with gathering information about the reliability of a particular buyer or seller and the quality of the goods being transacted.
- **Bargaining costs** are the costs of gathering information on prices in other transactions, on factors that might influence the willingness to bargain by the other party to the transaction, on implications of contract terms, etc.
- **Monitoring costs** include the costs associated with monitoring contract performance.
- **Enforcement costs** are the costs incurred in insuring, retailing, and wholesaling costs. They also include the costs associated with default provisions in contracts.
- **Transfer costs** include transport, storage, processing, retailing wholesaling costs. They also include the costs associated with commodity losses in storage and transport. This is the most important component of indirect cost.

The indirect cost category clearly includes costs associated with marketing services performed in physically handling the commodity: transport, storage, retailing, and wholesaling. The other categories are costs associated with various types of informational imperfections; certainly transactions such as loans that have no need for physical handling would still involve enforcement, monitoring, screening, searching and bargaining.

Indirect costs are caused by many factors including; marketing problems, investment risk and natural disasters, labor constraints- lack of supplies and training, socioeconomic and political problems, increasing trend of costs, issues related to fertilizer, water, seeds and planting material and land, financial problems, and economic reforms and liberalization. Therefore, higher transaction costs of agricultural production and the process of marketing and failure of market institutions were the major reasons for stagnation and reducing the speed of agricultural transformation in Sri Lanka. In both crops, wastage and search of quality seeds, maintaining cost of seeds, opportunity and information search cost were very high in all districts when considering indirect costs.

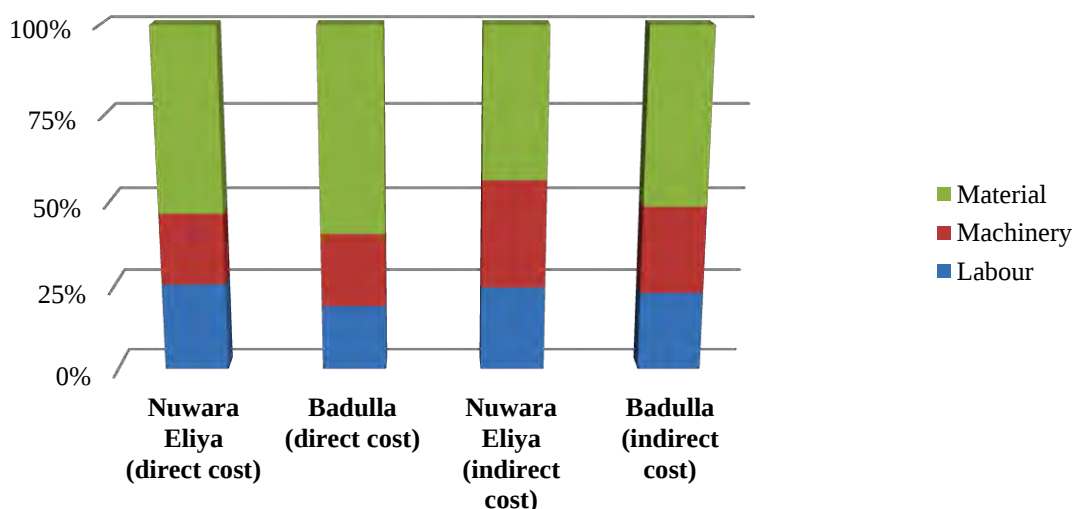
Direct Cost of Potato – Financial Aspects

The estimated direct cost of production of potatoes in the Nuwara Eliya District was Rs. 51.46/kg of which material accounts for the highest portion (53% of the direct cost and 48% of the total cost). In the Badulla District, the direct cost of potatoes accounts for Rs 39.29/kg where the material cost is the largest, accounting for 52

percent of the direct cost and 59 per cent of the total cost. High seed costs and high prices of chemicals and pesticides contribute to high material costs in the production of potatoes. Compared to Badulla, labour cost is more or less equal in the Nuwara Eliya District as it is the largest vegetable producing district in Sri Lanka and almost every household in the district has access to commercial land, mostly in the homestead. Therefore there exists a high demand for labour leading to high costs and scarcity. Owing to the conventional system of potato cultivation in the Badulla District, the machinery cost is less than that of Nuwara Eliya. Given the producer prices of potatoes in the two districts, the profit of 1kg of potatoes is Rs. 43.54 in Nuwara Eliya and Rs. 45.71 in Badulla (Table 4.1).

Figure 4.3 illustrates the percentage contribution of direct and indirect cost items of potato in the two districts. The same cost items, labour machinery and material, were considered in the analysis of indirect expenses. According to the analysis, the indirect cost of potato production in both districts is about Rs. 5.50 /kg (Rs. 5.45 and Rs 5.60). Yet, the predominant cost item in indirect cost is material especially due to the cost associated with the search for information on planting material and the cost for storage of the same (Table 4.1). It was revealed that certain farmers pay an additional payment to obtain high quality seeds. Given this, the net profit from potato in the Nuwara Eliya District is Rs 37.94/kg and Rs. 40.26/kg in Badulla.

Indirect Cost of Potato – Transactions Aspect



Source: HARTI Survey Data, 2016

Figure 4.3: Percentage Contribution of Direct and Indirect Cost Items of Potato

Table 4.1: Direct and Indirect Cost of Potato in Nuwara Eliya and Badulla Districts

Cost Components	Cost Items	Value (Rs/kg)		Value as a Percentage to the Total Cost	
		Nuwara Eliya	Badulla	Nuwara Eliya	Badulla
Direct Cost	Labour	13.17	7.49	23%	17%
	Machinery	10.74	8.45	19%	19%
	Material	27.56	23.35	48%	52%
	Sub Total 1	51.46	39.29	90%	88%
Indirect Cost	Labour	1.38	1.26	3%	3%
	Machinery	1.77	1.39	3%	3%
	Material	2.45	2.80	4%	6%
	Sub Total 2	5.60	5.45	10%	12%
Grand Total		57.06	44.74	100%	100%
Farm Gate Price		95.00	85.00	-	-
π - Direct cost – Rs/kg		43.54	45.71	46%	54%
π - Without direct cost – Rs/kg		37.94	40.26	40%	47%

Source: HARTI Survey Data, 2016

4.7 Analysis of Transaction Cost of Red Onion

4.7.1 Direct Cost of Red Onion – Financial Aspects

In the analysis of both direct and indirect cost components of red onion cultivation in the Puttalam and Jaffna districts, three major criteria; labour, machinery and material; were considered. Table 4.2 illustrates the results of the analysis. Accordingly, the high material cost has led to an increase the direct cost followed by the labour cost in both areas. Machinery is the lowest direct cost item due to the labour intensive nature of red onion cultivation in both locations. The only remarkable difference in direct cost items between the two districts is the lower material cost in Jaffna compared to the Puttalam district due to the relatively low cost of seeds. Seeds are produced in Jaffna and supplied to both locations however the cost of transportation to Puttalam has contributed to increasing the seed price. Overall, the material cost including seed cost, accounts for over 50 per cent of the direct cost in both districts. The lower material cost in Jaffna district compared to that of Puttalam district is due to the heavy use of organic manure while it has helped reduce the direct cost of red onion in Jaffna.

Table 4.2: Direct and Indirect Costs of Production of Red Onion

Cost Components	Cost Items	Value (Rs/kg)		Value as a Percentage to the Total Cost	
		Puttalam	Jaffna	Puttalam	Jaffna
Direct Cost	Labour	12.87	11.80	28%	30%
	Machinery	3.25	3.15	7%	8%
	Material	21.84	16.80	47%	43%
	Sub Total 1	37.96	31.75	82%	81%
Indirect Cost	Labour	2.96	2.73	6%	7%
	Machinery	0.72	0.69	2%	2%
	Material	4.80	4.00	10%	10%
	Sub Total 2	8.48	7.42	18%	19%
Grand Total		46.44	39.17	100%	100%
Farm Gate Price (π)		80.00	68.00	-	-
π – Direct cost		42.04	36.25	53%	53%
π – Direct + Indirect cost (Net Profit)		33.56	28.83	42%	42%

Source: HARTI Survey Data, 2016

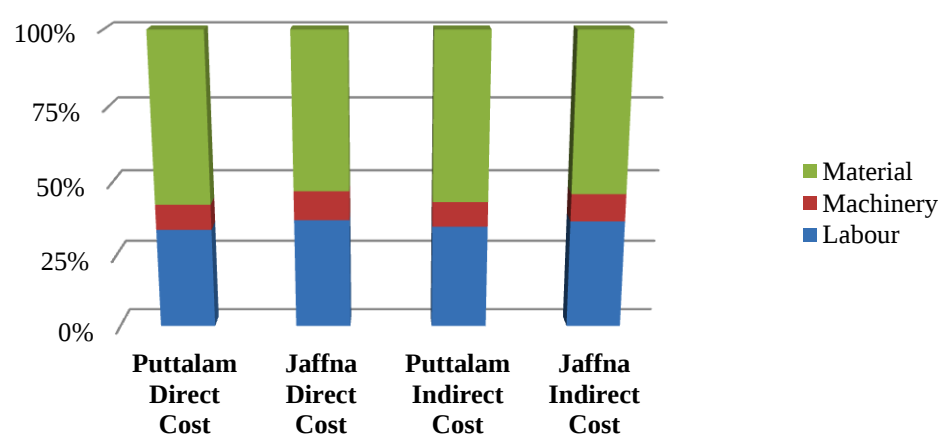
4.7.2 Indirect Cost of Red Onion – Transaction Aspects

The indirect cost items i. e. labour, machinery and material share approximately the same values as in direct cost estimation and the material is the highest cost item in the indirect cost element well. The analysis reveals that the indirect cost of one kg of red onion is Rs. 8.48/kg in Puttalam and Rs. 7.42/kg in Jaffna. Around 82 per cent of the farmers in both districts had spent an additional amount of money and incurred a high opportunity cost for searching quality seeds and cattle dung.

Thus the total cost of one kg increases to Rs. 46.44 and Rs. 39.17 respectively for two districts whereas the indirect cost accounts for 18 per cent and 19 per cent. Further, there exists a price difference of Rs. 12/kg at the farm level between the two districts leading to differences in marketing margins as further evident from the data in Table 4.2. Given this situation, red onions produced in Jaffna are cheaper than Puttalam red onions. However, the transaction cost is approximately the same in both districts.

The wastage of seeds accounts for 2-5kg/50kg whereas the cost of maintenance of seeds is also high. Such cost items are not accounted for in direct cost calculation. Labour cost is another element in indirect cost, accounting for about Rs.3.00/kg in both districts which experience scarcity of skilled labour, a major issue in red onion production. The producer has to spend several business days to find skilled labour and employees and therefore the said opportunity cost was considered in indirect cost calculation. However machinery cost was low in both districts due to the labour intensive nature of red onion production and the availability of machinery with the farmers. Of the sample, 55 per cent of producers were own operators of machinery.

According to the analysis, the net profit from one kg of red onion is Rs. 33.56 in Puttalam and Rs. 28.83 in the Jaffna District. However, the profit without indirect cost is higher than the net profit as indicated in the Table. Figure 4.4 illustrates the distribution of direct and indirect costs of red onion cultivation in the two districts.



Source: HARTI Survey Data, 2016

Figure 4.4: Percentage Contribution of Direct and Indirect Cost Items of Red Onion

4.8 Production and Marketing Costs of Potato and Red Onion

The total cost involved in a food commodity comprises of two components, production cost and marketing cost. Each of these components is made of direct and indirect costs. Marketing costs or the actual expenses incurred in channeling the produce of both crops from farm gate to the consumers includes a) handling charges at local points, b) assembling charges, c) transportation costs, d) handling charges by wholesalers and retailer to consumers, e). expenses on secondary services like financing, risk taking and market, f) intelligence, and g) profit margins taken out by different agencies.

Table 4.3 indicates both direct and indirect costs involved in the production and marketing of red onion and potatoes in the selected districts. Accordingly, the total direct cost for red onion in Puttalam and Jaffna districts accounts for 75 per cent and 72 per cent of the total cost respectively and the rest is indirect cost. The total direct costs involved in potato accounts for 82 per cent in Nuwara Eliya and 77 per cent in

Badulla. It is therefore revealed that the both food commodities involve a significant hidden or transaction cost.

Table 4.3: Production Cost and Marketing Cost for red onion and potato

Cost Component	Unit	Item	Red Onion		Potato	
			Puttalam	Jaffna	Nuwara Eliya	Badulla
Production Cost	(Rs/kg)	Direct cost	37.96	31.75	47.49	44.85
		Indirect cost	8.48	7.42	6.62	6.21
		Total cost	46.44	39.17	54.11	51.06
	(%)	IC	18.26	18.94	12.23	12.16
		DC	81.74	81.06	87.77	87.84
		Total cost	100	100	100	100
Marketing Cost - Farmer to Retail	(Rs/kg)	DC	13.97	14.14	11.28	12.19
		IC	8.42	10.44	9.12	10.22
		Total cost	22.39	24.58	20.40	22.41
	%	DC	62.39	57.33	55.30	54.40
		IC	37.61	42.47	44.70	45.60
		Total cost	100	100	100	100
Total	(Rs/kg)	DC	16.90	17.86	15.74	16.43
	%	DC	24.55	28.02	21.12	22.36

DC – Direct cost – (Financial cost) : IC – Indirect cost - (Transaction cost)

Source: HARTI Survey Data, 2016

After considering all marketing channel and cost items, least cost item and marketing channel in both crops were identified. However, search costs under transaction cost are very high in both crops given the unavailability of real information. This is a major problem in Sri Lanka and most of the other countries. The result of the analysis of production cost was Rs 54.11/kg for Nuwara eliya and Rs.51.06/kg for

Badulla. Of them, the transaction cost (indirect cost) was Rs 6.62/kg and Rs. 6.21/kg for the Nuwara Eliya and Badulla districts respectively representing 12 % in both districts. However, in the case of total transaction cost of potato at the producer and marketing level were 21.12% and 22.36% in both districts. The marketing level transaction costs were very high compared with the producer level due to the high degree of wastage at the retail level.

For red onion, the net price received by farmers sending supplies from Puttalam to Colombo and from Jaffna to Colombo is 67 % and 65 % of the consumer price respectively. Analysis of price margins shows that the Puttalam farmers ~~in~~ were highly benefited than the Jaffna farmers mainly due to good quality. Wholesalers' and retailers' net margins were 5 % and 28 % in supplies red onion from Puttalam whereas wholesalers' and retailers' net margins were 9 % and 23 % in red onion from Jaffna. Hence, the marketing efficiency is 4.18 and 3.78 for red onion supplied from Puttalam and Jaffna which indicates that Puttalam channel is more efficient. Retailer's net margin is higher due to wastage (6%) at that level.

Transaction and production costs of red onion in both the districts were Rs 54.11/kg and Rs.51.06/kg respectively. The transaction costs (indirect cost) were Rs 8.48/kg and Rs. 7.42/kg (table 4.3) representing 18 % in both districts at the producer level. However the total transaction costs of red onion at both producer and marketing levels were 24.55% and 28.02% of the total cost in both districts. Marketing level transaction cost of red onion was also were very much higher than at the producer level due to the high wastage at the retail level.

Waste at the retail market is evident in the significant degree of damage to the stocks, which is the main reason for the high market transaction costs. The significant increase in retailer margins has resulted in significant crop loss, which has contributed in turn to a significant increase in market price.

4.9 Direct and Indirect Cost for Red Onion and Potato by Marketing Channels

This section presents a further elaboration of direct and indirect costs of marketing of potato and red onions in the selected districts. Marketing channels between the producer and the consumer involve several operations/segments such as transport, loading, unloading, handling, commission, market levy and other cost. Therefore, both direct and indirect marketing costs were calculated for those operations/segments. Table 4.4 and Table 4.5 illustrate the results of the analysis of direct and indirect costs of prominent marketing channels of potato and red onions in the country.

As shown in Table 4.4, the highest direct marketing cost of Rs. 7.67/kg was reported for the Bandarawela – Colombo marketing channel followed by the Nuwara Eliya - Colombo channel with Rs. 6.76/kg. This is mainly due to high cost of commission fee which was Rs. 3.18/kg in the Bandarawela –Colombo channel as against Rs. 2.73/kg for the Nuwara Eliya –Colombo channel. The situation is different in the case of

indirect costs. The highest indirect cost of Rs. 7.00/kg was recorded in the Welimada-Colombo marketing channel followed by the Bandarawella- Colombo channel which was Rs. 3.22/kg, or less than a half. It was also found that indirect cost of the Welimada – Colombo channel was higher than that of the indirect cost of the Bandarawela - Colombo channel by Rs. 2.48 per kg. This was due to high indirect cost of wastage which was Rs. 5.60 out of Rs.7.00/kg.

Table 4.4: Direct and Indirect Costs for Potato

Channel	Cost in	Direct Cost								Indirect Cost							
		T	L	U	H	C	M	O	TOT	T	L	U	H	M	O	W	TOT
Nuwar Eliya – Colombo	Rs/55kg	125	15	20	12	150 (6%)	50	-	372	10	2	2	2	10	30	50	106
	Rs/kg	2.27	0.27	0.36	0.22	2.73 (6%)	0.91	-	6.76	0.2	0.04	0.04	0.04	0.2	0.6	1	2.12
Welimada - Colombo	Rs/50kg	60	20	20	16	-	80	-	196	20	3	2.5	2	12.5	30	280 (4%)	350
	Rs/kg	1.2	0.4	0.4	0.32	-	1.6	0.6	4.52	0.4	0.06	0.05	0.04	0.25	0.6	5.6 (4%)	7.0
Bandarawela – Colombo	Rs/55kg	150	15	20	12	175 (10%)	50	-	422	15	2	2	2	10	30	100	161
	Rs/kg	2.73	0.27	0.36	0.22	3.18 (10%)	0.91	-	7.67	0.3	0.04	0.04	0.04	0.2	0.6	2	3.22

T=Transport; L=Loading; U=Unloading; H= Handling (Wholesale market); C=Commission; M= Market Levy; O=Other ; TOT= Total ; W= Wastage

Source: HARTI Survey Data, 2016

The Jaffna – Colombo marketing channel for red onion was observed to have the higher direct cost of Rs.10.54 which was higher than that of potato (Table 4.5). Compared to the Puttalam –Colombo channel, transport cost was 87 percent higher in the Jaffna-Colombo channel. However, indirect cost was also higher in the Jaffna – Colombo channel. This is due to high wastage. Unlike potato the indirect cost was lower than the direct cost.

Table 4.5: Direct and Indirect cost for Red Onion

Channel	Cost in	Direct Cost							Indirect Cost							
		T	L	U	H	C	M	TOT	T	L	U	H	M	O	W	TOT
Puttalam-Colombo	Rs/30kg	80	15	20	12	135 (6%)	30	292	15	2	2	2	10	30	75 (500g)	136
	Rs/kg	2.67	0.5	0.67	0.4	4.50 (6%)	1.0	9.73	0.3	0.04	0.04	0.04	0.2	0.6	1.5	2.72
Jaffna – Colombo	Rs/50kg	250	15	20	12	200 (5%)	30	527	15	2	2	2	10	30	150 (1kg)	211
	Rs/kg	5.0	0.30	0.40	0.24	4.0 (5%)	0.60	10.54	0.3	0.04	0.04	0.04	0.2	0.6	3.0	4.22
Colombo-Gampaha	Rs/50kg	70	15	20	15	-	60	180	15	2	2	2	10	40	240	311
	Rs/kg	1.40	0.30	0.40	0.30	-	1.20	3.60	0.3	0.04	0.04	0.04	0.2	0.8	4.8	6.22
Pettah-Jaela	Rs/30 kg	50	15	15	12	-	50	142	15	2	2	2	10	20	120	171
	Rs/kg	1.67	0.50	0.50	0.40	-	1.67	4.73	0.50	0.07	0.07	0.07	0.33	0.67	4	5.7

T=Transport; L=Loading; U=Unloading; H= Handling , C= Commission ;(Wholesale market); M= Market Levy; O=Other ; TOT= Total ; W= Wastage

Source: HARTI Survey Data, 2016

Table 4.6 and 4.7 further illustrate financial and transaction costs of potato from Badulla and Nuwara Eliya at the production level. When transaction cost is added to the financial cost, the total cost of potato produced in Badulla district goes up to Rs. 44.74/kg, up by Rs. 5.45 from the financial cost (Table 4.6). As a result, profit is reduced to Rs. 40.26 per kg from Rs. 45.71.

Table 4.6: Financial and Transaction Cost for Potato –Badulla District

Cost Component	Unit	Labor Cost	Machinery Cost	Material Cost	Total Cost
Financial cost	Rs/ac	54500	61500	170000	286000
Transaction cost	Rs/ac	9148	10148	20400	39695
Financial cost	Rs/kg	7.49	8.45	23.35	39.29
Transaction cost	Rs/kg	1.26	1.39	2.80	5.45
Farm Gate Price	Rs/kg				85
π - With Transaction cost	Rs/kg				40.26
π - Without Transaction cost	Rs/kg				45.71

Source: HARTI Survey Data, 2016

In the case of potato in Nuwara Eliya, the transaction cost at farm level was Rs.5.60 per kg, a little higher than that of Badulla. This was due to the higher transaction cost of searching for labour and machinery resulting from high demand. However profit per kg even including transaction cost is higher for the Nuwara Eliya farmers than Badulla farmers because of the higher producer price which was Rs. 95/kg compared to Rs. 85 that Badulla farmers fetched. It must be noted that consumers prefer the Nuwara Eliya potato to the Badulla potato due to taste and keeping quality.

Table 4.7: Financial and Transaction Cost for Potato –Nuwara Eliya District

Cost Component	Unit	Labor Cost	Machinery Cost	Material Cost	Total Cost
Financial cost	Rs/ac	100059	81602	209429	391090
Transaction cost	Rs/ac	10491	13464	18587	42542
Financial cost	Rs/kg	13.17	10.74	27.56	51.46
Transaction cost	Rs/kg	1.38	1.77	2.45	5.60
Farm Gate Price	Rs/kg				95
π - With Transaction cost	Rs/kg				37.94
π - Without Transaction cost	Rs/kg				43.54

Source: HARTI Survey Data, 2016

In both crops, wastage and search of quality seeds, maintaining cost of seeds, opportunity and information search cost were very high in all districts under indirect cost.

4.10 Transaction Cost for Production to Marketing

Table 4.8 presents examples of information search costs at each stage.

Table 4.8: Information Search Costs at Each stage

Stage	Examples of search costs
Deciding	• Cost of visits to meet the officials' of the farmers' association to decide on a crop • Cost of phone calls to agriculture officers to find information about the crops
Finding seeds/ planting material	• Cost of finding information about a particular type of seed/planting material • Cost of traveling to purchase seeds/planting material if they were not available
Land preparation and planting	• Cost of finding labour • Cost of finding machines to prepare the land
Growing	• Cost of finding fertilizer, pesticides, weedicides etc • Cost of traveling to purchase fertilizer, pesticides, weedicides etc if those were not available
Harvesting, packing and storing	• Cost of finding market prices • Cost of finding labour • Cost of finding storage, packing materials etc
Selling	• Costs of comparing prices of different traders • Costs of finding transport

4.11 Direct and Indirect Cost related Constraints faced by Farmers

Respondent producers reported production problems such as lack of information, manpower, finance/credit, inputs, insect/pest and diseases, synchronous maturity and theft. Marketing problems included poor transportation, standardization and grading, infrastructure, unfair deductions, storage, information and bargaining. Middlemen had problems of uncertainty regarding the arrival of producers and consumers, produce quantities, standardization and grading, storage, information on market prices, quality of produce, varied mixture of the produce and its highly perishable nature. Consumers' problems were quality and mixture of produce, bargaining, fluctuation in prices, freshness, standardized and graded produce, poor storability of produce and cheating during weighing.

CHAPTER FIVE

Concluding Remarks and Policy Implications

5.1 Concluding Remarks

The identification of the level and nature of cost of production, transaction cost, marketing margin and marketing costs of potato and red onion is very important due to many reasons especially for reducing the high cost of production and transaction cost. Marketing operations of these crops play a crucial role due to seasonality of produce and deciding the profit of the farmer on one hand and the level of availability to the consumer on the other. Transaction costs and high marketing margins are serious issues in this scenario. This study was undertaken to understand the complexities involved and to identify bottlenecks with a view to providing efficient services in the transfer of farm products and inputs from producers to consumers and vice versa. An efficient marketing system minimizes costs and maximizes benefits to all sections of society.

The government aims to achieve self-sufficiency in field crops especially potatoes and onions that can be cultivated in the country to reduce import costs. However, the prices of local varieties are higher than the imported varieties of these crops. High marketing margins of local crops puts more pressure on prices. Producers, consumers and traders are concerned about the size of the marketing margins, changes in marketing margins and the incidence of changes in margins. Producers seek the best possible price for their surplus produce. Consumers need sufficient quantities and good quality at the lowest possible price. Further, market middlemen are interested in a marketing system which provides them with a steady and increasing income from the purchase and sale of food commodities.

The government tries to provide the maximum share of the consumer's rupee to the producer, food of the required quality and the lowest possible price to the consumers, and enough margins to enable middlemen to remain in the trade and not drop out and thereby jeopardizing the whole marketing mechanism. The government also seeks out the marketing system to bring overall benefits to all segments of society. Volatility of the red onion market is one of the concerns that government needs to give attention to considering the welfare of both the consumer and the producer. The study concludes that both production and marketing costs hinder the achievement of these twin objectives, i.e., higher prices to producers and lower prices to the consumers.

5.2 Policy Implications

The high price difference between farmer and consumer is indicative of large inefficiencies and relatively poor marketing efficiency. Hence, there is a great need to improve the marketing of these crops. The study recommends reduction in the

number of intermediaries in the supply chain by organizing farmers and linking them directly with buyers such as supermarkets, hotels, restaurants, hospitals and retailers. Organizing growers will also lead to more and more contract cultivation and when the products are systematically stored will help them with better bargaining options. Traders and farmers need to be organized in a better way to serve and protect their interests, since the current structures mostly serve a few market participants. Also, the cost of information searching can be reduced substantially through well-organized farmers.

An efficient marketing information system and reduction in transport costs will improve marketing margins and pricing efficiency of the marketers. To strengthen market information at the producer level it is necessary to have an efficient information dissemination system at the regional level. Information and communication technology (ICT) can be applied to increase speed and access to information. This will reduce the transaction cost.

Market infrastructure should be improved through storage facilities, cold storages, loading and weighing facilities. Improvement in the road network and cold-chain facilities is also of substantial importance. Encouragement of proper transport and packing systems reduces the high transaction cost with high wastage.

5.3 Recommendations for Future Research

The lack of empirical studies on transaction costs and the lack of standard procedure to assess transaction costs are persisting drawbacks in the domestic food sector. Since transaction cost is an important aspect in agricultural produce marketing, more empirical studies need to be done to reveal what is going on with transaction costs.

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