PATTERN OF CONSUMPTION OF FRUITS AND FACTORS AFFECTING CONSUMPTION IN THE WESTERN PROVINCE OF SRI LANKA

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HARTI

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FOREWORD

Fruit is an important component in the food structure and consumption of fruits contributes to an increase of one's nutrient level. Low fruit consumption is an important modifiable risk factor that contributes to the rising global level of chronic diseases. However, per capita consumption of fruits in Sri Lanka is lower than the quantities recommended by nutritionists. There is a huge potential for growth of this sector and to do this it is essential to be aware of the consumers' needs, wants and their fresh fruits consumption patterns. In the process of developing the fruit sector, it is very important to study the needs, preferences and behavior of consumers and the factors affecting the consumption of fruits. Such a study also will throw light on bottlenecks preventing consumers from buying and consuming more fruits.

The study revealed that, consumers are more concerned about the way of ripening fruits. They were reluctant to buy inappropriately ripened fruits and such fruits had no real taste and also were harmful for health. Level of pesticide used by cultivators and over spraying of some chemicals on fruits to ripen is not monitored in Sri Lanka as well as in most of the developing countries. As the consumers' health and food safety consciousness has increased significantly, they expect fruits which are tasty, readily available, affordable, convenient to acquire, safe and healthy. Hence, effective policies and initiatives to promote adequate consumption of fruits in the community are urgently needed. Information on health benefits of sufficient fruit consumption should be widely disseminated. There is a need for policies to promote and support fruit consumption. Majority of consumers wished that naturally ripened good quality fruits are needed to improve the fruit consumption. So, effective policies and programs and initiatives may have to focus on this matter to improve fruit consumption in future.

I congratulate the team of researchers for successfully undertaking this study and hope the findings and suggestions of the study would be useful to policy makers and the key players of the fruit supply chains.

E.M. Abhayaratne
Director

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EXECUTIVE SUMMARY

Fruits play a major role in the health of the consumer and consumption of fruits contributes to an increase of his nutrient level. Eating five or more servings of colorful fruits and vegetables a day is part of an important element for healthier living because, fruits and vegetables provide a wide range of vitamins, minerals, and fiber which human body needs to maintain good health and energy levels and to protect against the effects of ageing and to reduce the risk of cancers and heart disease (Ministry of Health, 2006). Low fruit and vegetable consumption is an important risk factor that contributes to the rising global level of chronic diseases. However, Per capita consumption of fruits in Sri Lanka is lower than the quantities recommended by nutritionists. Medical experts have recommended that each person's diet must contain at least 100 grams of fruits per day. But in Sri Lanka per capita consumption of fruits is 40grams per day. In the process of developing the fruit sector, it is very useful to study the needs, preferences and behavior of consumers and the factors affecting the low consumption of fruits. Hence, there is a clear need to understand the factors influencing the consumption and consumer preferences for fresh fruits and the bottlenecks preventing consumers from buying and consuming more fruits.

The major objective of the study is to identify the factors influencing low consumption of fruits. To identify the existing consumption pattern and buying behavior of fruits among the different income group of households in the Western Province of Sri Lanka, and to probe the consumer awareness of the health benefits of fruit consumption are the other objectives of the study. All three districts (Colombo, Gampaha and Kalutara) in the Western province were purposively selected for this study. Six DS Divisions were selected from each district to represent different contexts, such as Least poor (Rich), Average, and Poor according to the Head Count Index of the Department of Census and Statistics in 2002 (Head Count Index is defined as the percentage of population below the poverty line). 450 households were selected randomly for questionnaire survey.

According to the findings, inadequate fruit consumption was common in all the income categories in selected districts. Non availability of fresh and tasty fruits due to using chemicals to ripen them, high price, and seasonality were identified as the major significant factors responsible for low consumption of fresh fruits. The results from the study revealed that monthly consumption of fresh fruits is highly dependent on family income and number of family members. Main occupation and education level of the main householder and age of the main consumers were other significant contributing factors for the consumption of fruits. The rest of the factors like, religion, gender, family type and nationality were not significant with respect to the quantity of fruit consumption.

When considering the expenditure on fruits in all the three districts as a whole, it only occupies a tiny fraction of the monthly total food expenditure and is recorded at nearly 3%.

Banana is the most consumed variety as a single fruit by the respondents in all the three districts. Banana is consumed by 65% of the consumers in Colombo, 72% of the consumers in Gampaha and 51% of the respondents in Kalutara, followed by Papaw. Among the banana varieties, *seeni* and *ambul* are the most popular varieties consumed by the sample respondents.

Age differences in fruit consumption can also be seen in all the areas. Small children are the major fruit consumers; both local and imported fruit varieties in all the three districts, followed by young children.

There are six factors considered by the sample respondents when purchasing fruits; 1) The way of ripening fruits (Quality), 2) Price, 3) Family preferences, 4) Availability, 5) Appearance, 6) Convenience of purchase. Within these factors the way of ripening fruits (Quality) was the first factor considered by the sample respondents in all the three districts and family preferences and price were the next considerations. However when analyzing the income category, higher percentage of consumers in poor category were more concerned about the price than the quality while rich and average category consumers were more concerned about the quality (the way of ripening the fruits) than the price.

A notable proportion (49% in both Colombo and Gampaha, 48% in Kalutara) of the consumers were unaware about the health benefits of fruits and more than 92% of the sample respondents in all the three districts reported that they were not aware of the quantity of minimum daily intake of fruits.

The study revealed that, consumers are more concerned about the way of ripening fruits. They were reluctant to buy fruits due to poor ripening methods and majority of them reported that the fruits which are not naturally ripen, have no real taste. They also thought it was harmful for their health specially their children' health. Level of pesticide used by cultivators and over spraying of some chemicals on fruits to ripen is not monitored in Sri Lanka as well as in most of the developing countries. In consumers' point of view, they expect fruits which are tasty, readily available, affordable, convenient to acquire, safe and healthy. There is a need for policies to promote and support fruit consumption. The general principles to promote fruits such as availability, accessibility and affordability have been already addressed by the government to some extent, but proper attention has not been paid still for the factor of acceptability (quality, taste safety). Majority of consumers required the availability of naturally ripened good quality fruits to improve fruit consumption.

This study recommends that, existing Government policies and rules which support the fruit availability, affordability, and accessibility have to be improved. Imposition of new policies and regulations regarding the acceptability (Quality, taste, safety) are also urgently required. Information on health benefits of sufficient fruit consumption should be widely disseminated to consumers through awareness programs. Policies are needed to empower farmers and traders to ensure supplies of safe and quality fruits. Providing education to farmers, retailers, wholesalers, and supermarkets etc. on

safety fruit production, improving harvesting and selling practices are also needed. The product must be fit for human consumption. Hence, pesticide levels and over sprays of some chemicals on fruits to ripen have to be monitored by the government by using relevant authorities. New regulatory framework for that is also urgently required. It is urgent to educate parents on food and nutrition regarding children's dietary intake of fruits at home. Through Pre-schools, schools, government offices, messages could be passed on to the public and it will help to increase fruit consumption.

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CHAPTER ONE

Introduction

1.1 Introduction

Sri Lanka's topography and climate provide ideal conditions for cultivating wide range of fruit crops. The range of the agro-ecological zones has blessed the island with diverse tropical temperate types. Thus, the island is blessed with a huge variety of fruits (about 55 varieties). Fruits such as banana, mango, pineapple, rambuttan, avocado, durian, passion fruit, lime, oranges and other citrus fruits, papaya, pomegranate, mangosteen, wood apple, pears, grapes etc. can be identified as commonly grown important crops (Bogahawatta, 2003).In addition to major fruit crops there are large number of underutilized fruits in Sri Lanka such as anoda, slimappple, grapefruit, hinnaran, jambu, jackfruit, lovi, madan, nasnaran, nelli, ratanelli, sapodilla, tamerind, uguressa, veralu which are commonly found in home gardens, natural reserves and forests. The commercial cultivation is reported only for few numbers of fruits such as banana, pineapple, papaw, passion fruit and rambuttan. Other fruit varieties such as mango, wood apple, guava, pomegranate, and avocado are supplied mainly from home gardens. Moreover, a considerable proportion of supply of banana, papaw, passion fruit and rambuttan come from home gardens as well. The demand for local fruits such as banana, mango, pineapple, and papaw is met mainly through local production and only negligible quantity of these has been imported to meet specific requirements of tourist hotels. However the local demands for certain fruits such as apples, oranges, grapes and dates are met through imports.

Fruit sector has much potential to increase the level of national income, export revenue, new employment opportunities, farm income and nutrition and health of the people. The potential for cultivating fruit crops for the domestic and export markets is also high. The average area under fruit cultivation in the country was about 109,500ha in 2010 out of which 48% was under banana cultivation. Annual overall production of fruits was 558,430mt in 2010 with most of this production consumed locally and only 3% exported and around 20% was lost due to poor post harvest handling. During 2010, Sri Lanka imported around 51, 800 metric tons of fresh and dried fruits (Central Bank Sri Lanka, 2010). The major importers of Sri Lankan fruits are the Maldives, Middle Eastern and European countries.

In Sri Lanka, the production of fruits is highly seasonal. Therefore, the prices and, supply and demand normally fluctuate throughout the year. Besides, all the people involved in the supply and demand have an effect on the quality and price of fruits and vegetables. They participate in order to obtain a better market. Even if they harvest a very high quality product, after harvesting, the quality and the quantity of fresh products decrease every day due to poor postharvest practices and inadequate packaging. This requires sorting and removal of spoiled and badly damaged fruits and vegetables. This widens the price gap between the grower and the consumer (Asian Productivity Organization, 2005).

The Agriculture policy statement of the Government envisages establishing specialized fruit production zones and villages through large and medium scale

investment. A package that includes introduction of superior varieties, market oriented production; improved post harvest handling is also suggested in the policy statement of the government. It has identified potential crops for different districts of the country. Each of the districts is expected to grow agro ecologically most suitable two or three of the suggested fruit crops, which include: pineapple, rambuttan, mangosteen, passion fruit, banana, wood apple, citrus fruits, papaya, mango, slime apple, avocado, durian, pears, strawberry, guava, anona and grapes (Bogahawatta, 2003). According to the corporate plan of the Ministry of Agriculture for 2011-2013, the objective of the government is to improve the quality, sustainability and standards of fruit production and minimize the post harvest losses. Further, the ministry plans to increase the production of fruits over the years and also increase domestic value by establishing fruit processing units.

In developing agricultural countries like Sri Lanka, fruit marketing caters to the tempo of promoting and sustaining the rural economic development. In the marketing of fruits a large number of people such as farmers, collectors, retailers, and wholesalers are engaged. The Sri Lankan fruits are in high demand abroad but a major challenge faced by exporters is finding quality fruits in sufficient quantities for export. An effective marketing system is important for price stability, equitable distribution of produce and rapid economic growth. Therefore, fruit marketing plays a pivotal role in stimulating production and consumption as well as in accelerating the pace of rural economic development (FAO, 1989).

Fruits play a major role in the health of the consumer and consumption of fruits contributes to an increase of his nutrient level. Consumers are the only ones with an insight in to their own preferences and values. It is simply not possible for others (nutritionists, food scientists, farmers or anyone else) to decide what is pleasing to consumer. Different types of consumers acquire and utilize fruits in different ways. Some consumers produce their own fruits (Auto consumers), some totally depend on markets to procure fruits (Market-dependent consumers) and others both produce and purchase fruits (Mixed consumers). According to the Household Income and Expenditure Survey in 2009/10 conducted by the Department of Census & Statistics (DCS); the per capita consumption of fruit per month is as follows.

Table 1.1: Fruit Consumption and Expenditure (monthly average per person) 2009/10

Varity	Unit	Per capita Consumption per Month	Value (Rs.)
Banana	number	11.86	40.75
Pineapple	number	0.06	3.37
Papaw	number	0.60	18.07
Mangoes	number	0.55	6.56
Apple	number	0.30	8.01
Avocado	number	0.16	2.09
Wood apple	number	0.15	1.15
Oranges	number	0.16	2.94
Grapes	grams	3.88	2.27

Source: Household Income & Expenditure Survey, DCS, 2009/10

According to the Household Income and Expenditure Survey in 2009/10 conducted by the DCS, average monthly household expenditure on fruits was higher in the urban sector than the rural or as estate sector. Of the provinces the Western province was reported the province with highest percentage of expenditure on fruits out of the total monthly household expenditure. However, consumers in the Western province also spent a tiny fraction for fruits from their total food expenditure. The following table shows the average monthly household expenditure on fruits by sector and province in Sri Lanka.

Table 1.2: Monthly Average Household Expenditure on Fruits by Sector and Province

Category	Expenditure Rs.	% from Monthly Average Total Food Expenditure
Sector		
Urban	547.00	3.4
Rural	371.00	2.9
Estate	179.00	1.5
Province		
Western	488.00	3.2
Central	353.00	2.8
Southern	384.00	3.0
Northern	447.00	3.0
Eastern	357.00	2.9
North- Western	338.00	2.8
North- Central	317.00	2.6
Uva	295.00	2.7
Sabaragamuwa	302.00	2.5
Districts		
Colombo	560.00	3.4
Gampaha	428.00	2.9
Kalutara	468.00	3.3

Source: Household Income & Expenditure Survey, DCS, 2009/10

Fruit is an important component in the food structure. Eating five or more servings of colorful fruits and vegetables a day is part of an important element for healthier living because, fruits and vegetables provide a wide range of vitamins, minerals, and fiber which human body needs to maintain good health and energy levels and to protect against the effect of ageing and to reduce the risk of cancers and heart disease (Ministry of Health, 2006). Low fruit and vegetable consumption increases the risk of obesity, coronary heart disease and stroke, type 2 diabetes, diverticulitis, hypertension, and epithelial cancers, such as cancer of the lung, esophagus, mouth, stomach, colon, and pancreas. Low fruit and vegetable consumption is an important modifiable risk factor that contributes to the rising global level of chronic diseases. In 2000, it was estimated that 2.7 million deaths (4.9%) and 26.7 million disability adjusted life years were attributable to low fruit and vegetable intake globally. Further, 31% of ischemic heart disease, 20% of esophageal cancer, 19% of ischemic stroke, 19% of gastric cancer, and 12% of lung cancer worldwide could be prevented by increasing dietary intake of fruits and vegetables to the minimum recommended daily intakes established by the WHO. The WHO panel on diet, nutrition, and

prevention of chronic diseases recommended an individual intake of at least 400g of fruits and vegetables a day—the equivalent of five servings of 80g each. Low fruit and vegetable consumption was defined by the WHO panel on diet, nutrition, and prevention of chronic diseases as consuming fewer than five servings of fruits and/or vegetables daily. The panel recommends an individual intake of at least 400g of fruits and vegetables a day, the equivalent of five servings, which was used as the cutoff for low fruit and vegetable consumption (Justin N. Hall *et al.* 2009). The recent joint FAO/WHO expert consultation on diet, nutrition and the prevention of chronic disease, recommendation adds to the already strong case for the health benefits to be gained from the consumption of fruits and vegetables and paves the way for concrete action advocating increased consumption of these commodities.

1.2 Problem Focus and Justification

The present government of Sri Lanka has given high priority to expand fruit cultivation for local consumption and for export as well as for developing the processed fruit industries. The policy of the government is to increase production of fruits to attain near self sufficiency level by 2020. The recently published Agriculture Policy Statement of the government has clearly identified fruit crop development as an important priority area. It is expected to develop fruit crops as economically profitable crops, fruit processing and compliment human nutrition. However, per capita consumption of fruits in Sri Lanka is lower than the quantities recommended by nutritionists. Medical experts have recommended that the consumption of fresh fruits could create a healthy human society and that each person's diet must contain at least 100 grams of fruits per day. But in Sri Lanka per capita consumption of fruit is 40grams per day. It shows that the per capita consumption of fruits in Sri Lanka is below the required level of medical recommendation and also lower than that of developed nations. Current per capita consumption of fruits is very low in Sri Lanka with the potential for further increases and there is a great deal of opportunity for expansion just for domestic consumption alone. The Department of Census and Statistics of Sri Lanka (2006/2007) also revealed that households spend 3.8% for fruit consumption from their total expenditure on food items. The low consumption of fruits has contributed to nutrition deficiency among Sri Lankan and low fruit and vegetable consumption is an important risk factor for chronic diseases, but for many (mainly developing) countries, no data have ever been published. Overall, 77.6% of men and 78.4% of women from the 52 mainly low- and middle-income countries consumed less than the minimum recommended five daily servings of fruits and vegetables and many developing countries lack any data on fruit and vegetable consumption patterns in their populations. To develop effective policies and implement comprehensive programs aimed at increasing fruit and vegetable consumption, governments require country level baseline information on the prevalence of low fruit and vegetable consumption (Justin N. Hall, *et al*, 2009).

The final success of food production and marketing decisions hinges on consumer choices. Understanding the consumer's needs, wants and buying behavior is at the heart of delivering successful products to the market place. Failure to recognize the primacy of consumer preferences in the economic systems has resulted in the downfall of many firms, and even entire industries (Richard & Joseph, 2005). There is a huge potential for growth and development of this sector and to do this it is

essential to be aware of the consumers needs, wants and their fresh fruits consumption patterns. Hence, such a study is very important to marketers to understand and make appropriate and timely adjustments on the supply side to match the supplies of various fruits according to potential demand. It also can provide a guideline to policy planners for making adjustments in planning for the reallocation of scarce productive resources for the creation and expansion of future capacity. On the other hand, adequate consideration has not been given to the needs, preferences and consumer behavior by the producers or those who involve in marketing (Rupasena, 1999). For an understanding of operation of the existing market system with a view to modification it is also essential to quantify the present level of consumption of fruits and vegetables (FAO report, 2011).

Increasing fruit and vegetable consumption becomes a global priority and most people's diets still fall short of the mark. Some of the world's most widespread and debilitating nutritional disorders, including birth defects, mental and physical retardation, weakened immune systems, blindness, and even death, are caused by diets lacking in vitamins and minerals (commonly referred to as "micronutrients"). Encouraging people to eat more fruits and vegetables is therefore often at the top of nutrition educators' list. Still, most populations do not consume enough, according to the FAO/WHO Expert Report on Diet, Nutrition and the Prevention of Chronic Diseases, released earlier this year. Increasing fruit and vegetable consumption is a major public health challenge at the moment," says Kraisid Tontisirin, Director of FAO's Food and Nutrition Division. *(http://www.media-office@fao.org.)*

This issue is also identified by the Ministry of Agriculture as one of the Current National Agricultural Issues and "Lack of understanding of consumer perception" is also one of the research issues identified by the National Research Priority Document according to the priority research areas in agricultural marketing. Governments in the past as well as the present have been concerned towards the cultivation of fruits, but the marketing of fruits and marketing activities had not received sufficient attentions. In the process of developing the fruit sector, it is very useful to study the needs, preferences and behavior of consumers and the factors affecting the low consumption of fruits. Hence, there is a clear need to understand the factors influencing the consumption and consumer preferences for fresh fruits and the bottlenecks preventing consumers from buying and consuming more fruits.

1.3 Objectives of the Study

Main objective of the study is to identify the factors influencing low consumption of fruits. Specific objectives are,

1. To identify the existing consumption pattern and buying behavior of fruits among the different income group of households in the Western Province of Sri Lanka

2. To probe the consumer awareness of the health benefits of fruit consumption

1.4 Organization of the Report

This report is organized into five chapters. The introductory chapter discusses the fruit sector in brief and the problem which gave rise to the need for this study and the objectives of the study. The next chapter provides literature on factors influencing consumption of fruits, consumption pattern and consumer behavior, consumer awareness of the health benefit of fruit consumption and health benefits of fruit consumption. The third chapter explains the methodology and nature of the study locations. The fourth and fifth chapters are devoted to presentation and analysis and the last chapter draws conclusions and sets out recommendations.

CHAPTER TWO

Review of Literature

2.1 Consumption Pattern & Consumer Behavior

According to the Darrah (1971) consumers are the key to our marketing economy. Although their actions differ widely, in total they determine what products and how much of each will be produced. Marketing is aimed at giving consumers what they want at a particular time, in a particular place and in the form they wish. It is therefore, important to study consumers to see how many are there, where they live, how they earn money, how much they earn, how they spend it, and how each of these considerations affect their patterns of consumption. Peoples operate as a family rather than as individuals in the purchase and use of food, as well as many other products. Thus, the decisions of the family as a consuming unit are important in the demand for food products. Hence, consumption pattern and consumer behavior is a complex phenomenon that is influenced by various factors such as income, occupation, education, life style and geographical location. A great number of consumer characteristics influence the purchase and consumption of food products. There are hidden, unseen, motivating reasons involved in customers' buying decisions as they strive to gain maximum satisfaction in purchasing. There are more obvious characteristics of the population that influence buying and consumption patterns.

Gronroos (1989) revealed that, buying behavior is the decision process and acts of people involved in buying and using products. There is a need to understand;

1. Why consumers make a particular purchase?
2. What factors influence consumer purchase?
3. The changing factors in society

Consumer buying behavior refers to the buying behavior of the ultimate consumer. A firm needs to analyze buying behavior for;

1. Buyers reactions to firms marketing strategy has a great impact on the firm's success
2. The marketing concept stresses that a firm should create a marketing mix that satisfies (give utility to) customers. Therefore there is a need to analyze what, where, when and how consumers buy. Marketers can better predict how consumers will respond to marketing strategies
3. When does the consumer buy?- the time influence (Day, week, season)
4. Where consumers buy?-the place a decision is made (home, point of purchase)
5. How consumers buy (bulk etc.)

According to Kashyap and Raut (2006) to meet the wants and needs of selected customers, it is important to understand consumer behavior. This behavior guide and directs the entire set of activities that constitute the marketing program. Demand estimation, segmentation, targeting, product development, positioning, developing the 4ps of the marketing mix and finally the marketing efforts to eliminate post purchase

decisions and ensure customer retention. However, consumer behavior is extremely complex to study and understand despite the most precise procedures for mapping and prediction. Following factors affect the consumer behavior,

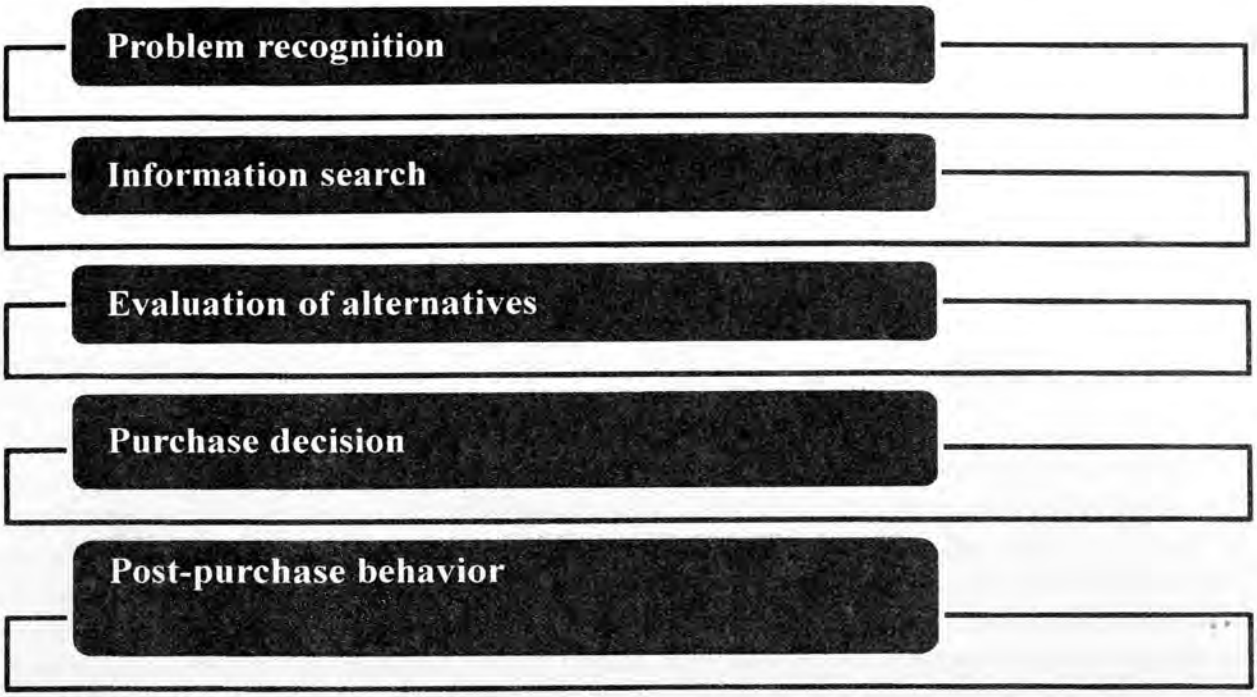
1. Cultural factors
   - Collective social sanction
   - Influence of social customs
   - Traditions
   - The influence of caste
2. Sub culture
   - Regional influences
   - Social class
   - Changing behavior
3. Social factors
   - Family
   - Roles and status Products and status symbol
   - Sociability
4. Technological factors
5. Economic factors
6. Political factors

Consumers pass through five stages while making a purchase decision. In low – involvement purchases, rural and urban consumers may skip some of these stages. A woman buying her regular brands of groceries daily will identify the need and purchase from the shop, skipping two stages. The following chart depicts the stages in buying process. For many products, the buying roles are similar in rural and urban. Purchasing a high-involvement product is a collective decision. There are five roles in the buying process

1. Initiator-one who suggests the idea of buying
2. Influencer- one whose views influence the decision
3. Decider- one who decides to buy or not
4. Buyer- one who makes the actual purchase
5. User- one who consumes or uses the product

According to the Kashyap and Raut (2006) there are five stages in buying process as shown figure 2.1.

Figure 2.1: Stages in Buying Process



Gronroos (1989) reported that consumers choose their diet to satisfy their needs and wants. Because these choices condition all of the food industry's production and marketing decisions, it is important to understand the nature of consumer food preferences. Moreover, humans are social creatures and their food preferences and eating patterns are culturally bound and socially influenced. It is also revealed that, food consumers are price conscious, but they do not always buy the least expensive foods.

Schultz and Dev (2005) stated that, 'consumer behavior is the study of what, why, how, and where people do or do not buy a product. It blends elements from psychology, sociology, social anthropology and economics. It attempts to understand the buyer's decision making process, both individually and in groups. It studies characteristics of individual consumers such as demographics and behavioral variables in an attempt to understand people's wants. It also tries to assess influences on the consumer from groups such as family, friends' reference groups and society in general. Consumer behavior study is based on consumer buying behavior, with the customer playing three distinct roles of user, payer and buyer.

According to Freshfel (2010) consumers' food purchase behavior is not only decided according to taste and lifestyle, but is also heavily influenced by the marketing of that food, including the packaging. Consumers need truthful and trustworthy information when they make purchasing decisions and should not be misled. There is currently a lot of discussion on how the increased awareness of consumers on the benefits of consuming fruit and vegetables is not translated into a behavioral change. Perhaps a relatively large part of consumers believe that their food choices are in line with increasing fresh produce consumption without this being the case.

Kanungsukkasem *et.al*, (2009) in his paper on Nutrition and consumption Data (NCD) supplement, examined the fruit and vegetable consumption patterns and the inadequate fruit and vegetable consumption among the adult population in rural surveillance sites in five Asian countries. The study revealed that, inadequate fruit and vegetable consumption was common in all study areas. It also showed that being in the oldest age group and low level of education were significantly related to inadequate fruit and vegetable consumption. Since, such a large proportion of adults in Asia consume an inadequate amount of fruits and vegetables, despite the abundant availability, education and behavior change programmes are needed to promote fruit and vegetable consumption.

According to Jayathilake *et.al*, (2007) the vegetable and fruit production play a major role in domestic food production in Sri Lankan agricultural sector. In the process of developing the fruit and vegetable sector, it is very useful to consider the needs, preferences and behavior of consumers. This research study was carried out by using a combination of cross sectional survey and case studies due to explanatory nature of the study. A total of 100 consumers were interviewed and four case studies were carried out in Monaragala District. Five fairs were selected from five of 10 Divisional Secretariat Divisions. To statistically analyze the data, frequency distributions and chi-squire tests were used. The majority (77%) of the consumers of the Pola in the Monaragala District were regular purchasers. The main reason for their preference was low price (40%) and freshness (34%). The consumer's main vegetable purchasing market was the Pola (97.9%) and the next was the village retailer (65.5%). The consumers' main consideration in buying vegetables and fruits is price (56.8%). Their next considerations are appearance (52%), freshness 40%, and nutritive value (42.4%) respectively. Consumers were interested in both price and quality (appearance, freshness and nutritive value) when they purchase vegetables and fruits at the Pola.

Adenegan and Adeaye (2011) did a study about fruit consumption among undergraduate students in Ibadan, Oyo State, Southwest, in Nigeria. The objectives of the study were to determine the proportion of students' income spent on fresh fruits and processed fruits; to determine the level of acceptability of processed fruits by students and to examine the factors affecting the consumption of fresh and processed fruits. One hundred students were selected for the study using random sampling technique and data was collected using well structured questionnaires. Data obtained was subjected to descriptive and regression analysis. The results of the study show that out of N6487.09 earned by students on the average, 4.58%, 4.4% and 9.29% were spent on fresh, processed and both kinds of fruits, respectively. Majority of students made their choice on fruit consumption based on the prices in the market. Also, more than 60% of the respondents preferred the fresh fruits to processed fruits. Students' incomes and tastes were significant determinants of the amount spent on fresh fruits ($P<0.05$). On the other hand, there only students' income ($P<0.05$) had significant effect on the quantity of processed fruit consumption. Based on the findings of this study, stakeholders should be encouraged to employ technique of preserving fresh fruits due to the preference shown for fresh fruits over processed product. This study had been able to determine factors that encourage fresh and processed fruit consumption. About 96% of the sampled population consumed fruits. Taste, cost and season of fresh fruit affected the consumption of any kind of processed fruits. The results from regression showed that income was statistically significant for the

consumption of processed fruits as well as fresh fruit intake. Income and preference were significant; as they increase consumption also increases. The study also established the fact that various products can be produced from fresh fruits in this form processed fruit to avoid excessive loss during the on or peak season. From the study the average income of the students interviewed is N6487.09 while 4.85% and 4.44% of the monthly income was spent on fruits consumption respectively

Wen *et.al*, (2011) has analyzed the basic characteristics of tropical fruit consumption behavior of consumers in Guangdong province in China and differences in region, season and variety. They discussed economic factors influencing buying behavior and consumer preference, and consumer propensity to consume tropical fruit and the sales prospects of domestic market. The results showed that most residents have the habit of consumption of tropical fruits. The residents' income and relative price have a marked influence on residents' consumption behavior of tropical fruit. The supermarket is the most important place to purchase. Children, young and middle-aged people are the main target consumers. Nutrition is the most important factor in consumer buying decision-making process. Chinese residents' consumption of tropical fruit is mainly fresh-fruit-based, while consumption of juice and other processed products is relatively low. With the continued growth of per capita income in China, and the formation of new consumption habits, China's consumption of tropical fruits and processed products will have capacious growth space and market potential

According to Schiffman and Kanuk (2008) consumer behavior focuses on how individuals make decisions to spend their available resources (time, money, effort) on consumption related items. That includes what they buy, why they buy, when they buy, where they buy, how often they buy, how often they use, how they evaluate it after the purchases, and how they dispose of it. In order to succeed in any business, and especially in today's dynamic and rapidly evolving marketplace, marketers need to know everything they can about consumers- what they want, what they think, how they work and, how they spend their leisure time. They need to understand the personal and group influences that affect consumer decisions and how these decisions are made.

2.2 Factors Influencing Purchasing Decisions and Consumption

Darrah (1971) stated that, consumers' purchasing decisions are often guided by economic reasoning. They are interested in favorable prices, good buys, saving money, and in keeping within reasonable or budgeted expenditures. The basic motivating reasons involved in purchasing decisions may be classified as follows,

1. Economic
2. Market knowledge
3. Health and nutrition
4. Prestige and achievement
5. Aesthetics
6. Family wishes
7. Time pressure

Generally, those lacking knowledge of a product, its quality, grade, method of preparation or use, or other characteristics do not buy, while those who know are purchasers. Obviously, health and nutrition represent an important motivating factor in buying especially for those with the responsibility of feeding families. High income families are expected to buy prestige and status products. Thus, prestige and achievement represent a motivating force in buying. Further, family wishes to play a major role in purchases. Not only is the father's desire for certain items is important, but the children's desires are too. Family wishes play a significant role in determining what is bought. The most important characteristic of consumers affecting the purchasing and consumption of food products is income. In addition following factors are also very important.

1. Type of occupation
2. Weather
3. Geographical region
4. The size of the family
5. The nationality
6. Religion
7. Age
8. Education
9. Knowledge of products- by advertising
10. Individual- There are great numbers of people today with food allergies, ulcers, or other afflictions that force them, for health's sake, to omit certain items from their diets

All these situations tend to vary consumption pattern in ways beyond that explained by income or other differences.

Stranieri *et.al*, (2010) have analyzed consumer interest towards nutrition labeling and claims and examines the information consumers consider important when their purchasing decisions are made the main characteristics of those consumers interested in nutrition claims and nutrition labeling use. For consumers concerned about nutrition claims, the survey shows significant links with attributes influencing purchasing behavior, such as price, brand, certification; etc. Socio-demographic characteristics are statistically significant and show a positive link with age, gender and a negative linkage with income. With reference to gender and education effects, the study pointed out that women are more likely to read food labels and that higher education levels lead to increasing levels of information searching. It also showed that nutrition labeling is important for high- income consumers. In this way it is possible to explain the effects of perceived quality on the final decision on purchasing.

Kashyap and Raut (2006) have reported that, the level of involvement in buying products and services depends on various factors such as price, availability, variety, and knowledge and purpose. The level of involvement in purchasing some products and services depends on knowledge and experience e.g. purchasing cereal and plusses is a high involvement activity for an urban consumer because of poor knowledge, whereas for a rural consumer it is a low – involvement activity because he is more knowledgeable. Further it's also revealed that women's involvement in family buying decision process is also increasing.

The study conducted by Aida and Ramon (1972) in Philippines, revealed that the quantity demanded of a certain commodity is a function of its prices, prices of other related commodities, income and consumer's taste and preferences. In developing countries with relating low income per capita the demands for fruits and vegetables are expected to be relatively elastic with respect to both price and income. This is especially so because these food items are relatively a small proportion of the average food expenditure.

According to a study conducted by Justin *et.al*, (2009) data from 196,373 adult participants from 52 countries who took part in world health survey (2002-2003) were analyzed in the summer of 2008. Low fruit and vegetable consumption was defined according to the WHO guidelines as minimum of five servings of fruits and vegetables daily. Low fruit and vegetable consumption prevalence ranged from 37 % (Ghana) to 99% (Pakistan). The low fruit and vegetable consumption tended to increase with age and decrease with income. Although, urban nature was not associated overall with low fruit and vegetable consumption, urban and rural differences were significant for 11 countries. Overall, 77% of men and 78% of women from the 52 mainly low- and middle- income countries consumed less than the minimum recommended five daily servings of fruits and vegetables.

The National Sample Survey Organization (NSSO) (2005) in India has provided information on consumption expenditure on food and non-food items. One of the major factors responsible for the low consumption of fruits is the non- availability of fruits throughout the year at an affordable price both in urban and rural areas. In order to ensure sustained increase in fruits consumption, it is important to improve availability, affordability, access and awareness of the need for increased fruits intake. The reason for very low vegetable consumption in semi tropical rural India producing plenty of vegetables and fruits is another poorly understood phenomenon. However, the consumption of fruits is much higher in urban areas as compared to rural areas.

Braun *et.al*, (2009) revealed that the majority of the sample who liked fruits and vegetables, report eating one serving of each. This is far below the recommended intake and could influence long-term health. While all Americans eat less than the daily recommended intake of fruits and vegetables, those with lower incomes eat even less. Direct education on ways to better manage food resources to be able to incorporate fruits and vegetables in daily eating and cooking habits may have an effect on increasing consumption. One management tool for reducing the cost of fruits and vegetables is gardening which could be combined with nutrition education. While availability and accessibility of food were not reported as problems, affordability was. Paying for food was challenging for the participants. Most were not on public assistance so they were paying for food from earned income. With nearly half of the mothers and grandmothers reporting low or very low food security, clearly their health and that of their children/grandchildren is at-risk. Low levels of income and low levels of food security could have a negative impact on the health of multiple generations though at the time of the study, the majority of the mothers and grandmothers reported good health. A longitudinal study would produce evidence of change on several measures over time.

According to the research findings of "Market potential of Tropical Fruit in China, conducted by Wen *et.al*, (2011) many factors such as economic, cultural, environmental, and geographic can affect food consumption and demand. There are also social factors like population size and population structure. Economic factors are main factors affecting fruit consumption, for it determines people's consumption capacity and consumption levels. Economic factors include residents' income levels, the relative price of consumer goods etc. In addition, people's propensity to consume, such as consumption habits, consumer psychology and other factors also influence consumer demand.

Irish Universities Nutrition Alliance (2006) revealed that the influence of family on children's food choices is very powerful. Repeated exposure to a greater variety of foods with variable textures, flavours and taste during childhood leads to greater acceptability of foods including fruits and vegetables. The preliminary results from the National Children's Survey in ROI demonstrate that children with parents who show food neophobia, ie. adverse to introducing new foods into their diet, also demonstrated food neophobia themselves. In adolescents who are taking greater responsibility in food choices, peer pressure and social acceptability plays a greater role. Taste was also identified as a barrier to the consumption of certain fruits and vegetables in the qualitative discussion groups conducted for this review.

Hagdrup, *et al.* (1998) and Maclellan *et al.* (2004) stated that, skills and confidence in preparing and cooking fruits are frequently reported as factors affecting consumption, of which the perceived effort and time are most commonly cited.

According to Cox and Anderson (2004), findings from the qualitative discussion groups supported these factors. The inconvenience associated with the preparation of a number of fruits and vegetables, including lettuce, potatoes, cabbage and spinach were cited as a barrier to consumption. Other barriers to consumption that emerged from the discussion groups included the feared presence of pesticides and other chemical sprays, and genetic modification. Socio-demographic factors are well known to affect food choice. Lower socio-economic status and lower education level are associated with lower consumption of fruits and vegetables. Higher social classes and those with a higher educational status are in general more health conscious and better able to conceptualize the relationship between diet and health.

Hagdrup, *et al.* (1998) revealed that disposable income and the amount of money available to spend on food influence the consumption of fruits and vegetables. In the qualitative discussion groups conducted for this review, participants also identified cost as a barrier to consumption, in particular for those who did not purchase in large quantities. Cost has been identified in research studies as a barrier to fruit and vegetable consumption across different socio-economic groups.

Friel and Conlon (2004) reported that the access and availability of good quality fruits and vegetables can be a key barrier to the consumption of fruits and vegetables. This is further compounded by the perceptions that fruit and vegetables are not "filling" and can have a lot of wastage. Thus poorer households often opt for cheaper, energy containing foods that are perceived as being filling and not wasteful.

According to the Safe food (2007), both men and women are more likely to achieve the fruit recommendations than vegetable recommendations. The percentage of individuals achieving the dietary recommendations for fruit and vegetables was found to increase with social class and increasing level of education.

Health Promotion Unit (2003) has Surveyed Lifestyle Attitudes and Nutrition of adults in ROI (Republic of Ireland). It described 70 percent of females and 68 percent of males eating four or more portions of fruits and vegetables per day. This study also reported that there was a connection between social class and age effect on fruit and vegetable consumption.

The Eating for Health Survey carried out by the Health Protection Agency (2004)reported that one in five boys and one in eight girls in NI aged five to 17 years did not eat any fruit and vegetable on a daily basis. This survey also demonstrated a lower consumption of fruit and vegetables among lower socio-economic groups.

Sharma (1997) conducted a study in India to determine the factors influencing food consumption in general. The results indicated that price was an important factor which influenced the consumers' choice of food items. Other factors like sensory attributes, regional preferences, age, gender, interest, motivation, discrimination and income also influenced food consumption

Riediger and Moghasian (2005) carried out study on the patterns of fruit and vegetable intake in Canadian elderly and identified socio-demographic factors that were associated with low consumption. The survey results revealed that 47% of Canadian elderly sample consumed fruits and vegetable equals to or greater than five times daily. A strong positive association was found between fruit and vegetable consumption and total household income and highest household education. Gender and marital status were other important contributing factors for fruit and vegetable intake among elderly. Ethnicity did not influence fruit and vegetable intake. Younger males reported consuming less fruit and vegetable than older males did, but consumption of fruit and vegetable was comparable among all four age groups of females. Elderly living in the Maritime Provinces and the Yukon/Northwest Territories/Nunavut had a lower level of fruit and vegetable consumption, as compared to elderly living in other provinces. These results indicate that >50% of Canadian elderly do not consume fruit and vegetable five or more times per day. Gender and several socio-demographic factors significantly influence fruit and vegetable intake in Canadian elderly.

2.3 Consumer Awareness about Health Benefits of Fruits

According to the NCD news (2006), eating five or more servings of colorful fruits and vegetables a day is an important element for healthier living. That is because deeply hued fruits and vegetables provide a wide range of vitamins, minerals, fiber and phytochemicals body needs to maintain good health and energy levels and to protect against the effects of ageing and to reduce the risk of cancer and heart disease.

Freshfel (2010) revealed that the European consumers are becoming increasingly health-conscious in their buying choices. According to the "Health, Food and

Nutrition" Euro barometer of 2006, a majority of European consumers believe that healthy eating includes a balanced and varied diet rich in fruit and vegetables. 58.5% of EU consumers find that eating a healthy diet involves above all "eating more fruits and vegetables". In the new wave of health-conscious consumers, it has become more and more common to have reference to fruit or see images of fresh fruit and vegetables depicted on all types of products. Based a number of robust scientific research around the world demonstrates the health benefits resulting from the increased daily intake of fresh fruit and vegetables. The opinion from several public institutions (i.e. WHO,FAOEESC), point out that fruits and vegetables have an essential role to play in the fight against obesity. Some figures elaborated by the university of Tilburg in the Netherlands in 2007 revealed that health costs of insufficient fruit and vegetable intake amounts to 633million $/year only in the Netherlands. The cost of obesity to the economies of the whole EU27 has been calculated to reach $150 billion plus per year. However, WHO/FAO recommendations that adults should consume a minimum of 400 grams of fruit and vegetables per day to reduce health risks and encourage a better quality of life are not being achieved.

According to Kanungsukkasem, *et.al,* (2009) fruits and vegetables are important components of a healthy diet, since they have low energy density and are sources of micronutrients, fiber, and other components with functional properties. So there is convincing evidence that consumption of fruits and vegetables decrease the risks of cardiovascular disease, obesity, and diabetes In spite of the growing body of evidence which highlights the protective effect of fruits and vegetables. Their intakes are still inadequate in many low and middle-income countries.

Fruits contain essential minerals and vitamins that help and protect body from diseases. All kinds of fruits are a natural remedy for many diseases and also all kinds of fruits are antioxidant which protect against cancer diseases and prevent cell damage. Health Benefits of fruit are uncountable and all kinds of fruits have many benefits for health and high nutrition value. Fruits have many health benefits for body and contain many kind of vitamins like vitamin C, E, D, and B complex. Also Fruits have many benefits for our body as they contain many kinds of minerals like iron, manganese, sodium, magnesium and potassium. Also fruits protect against many chronic diseases like cancer, hypertension, cholesterol, and diabetes. Fruits are beneficial for those who want to lose weight, improve health, and regulate the blood circulation and digestion (http://en.wikipedia.org/wiki/Fruit,).

Rui (2003) reported that, cardiovascular disease and cancer are ranked as the first and second leading causes of death in the United States and in most industrialized countries. Regular consumption of fruit and vegetables is associated with reduced risks of cancer, cardiovascular disease, stroke, Alzheimer disease, cataracts, and some of the functional declines associated with aging. Prevention is a more effective strategy than treatment of chronic diseases. Functional foods that contain significant amounts of bioactive components may provide desirable health benefits beyond basic nutrition and play important roles in the prevention of chronic diseases. The key question is whether a purified phytochemical has the same health benefit as does the whole food or mixture of foods in which the phytochemical is present. They found, for example, that the vitamin C in apples with skin accounts for only 0.4% of the total

antioxidant activity, suggesting that most of the antioxidant activity of fruit and vegetables may come from phenolics and flavonoids in apples. The additive and synergistic effects of phytochemicals in fruit and vegetables are responsible for their potent antioxidant and anticancer activities, and that the benefit of a diet rich in fruit and vegetables is attributed to the complex mixture of phytochemicals present in whole foods. Food provides not only essential nutrients needed for life but also other bioactive compounds for health promotion and disease prevention. Previous epidemiologic studies have consistently shown that diet plays a crucial role in the prevention of chronic diseases. Consumption of fruits and vegetables, as well as grains, has been strongly associated with reduced risk of cardiovascular disease, cancer, diabetes, Alzheimer disease, cataracts, and age-related functional decline. Heart disease, cancer, and stroke are the top 3 leading causes of death in the United States and most industrialized countries. It is estimated that one third of all cancer deaths in the United States could be avoided through appropriate dietary modification. This convincing evidence suggests that a change in dietary behavior such as increasing consumption of fruits, vegetables, and grains is a practical strategy for significantly reducing the incidence of chronic diseases. Increasing the consumption of fruit and vegetables, whole grains, and soy is a practical strategy for consumers to optimize their health and to reduce the risk of chronic diseases. Use of dietary supplements, functional foods, and nutraceuticals is increasing as industry is responding to consumers' demands. However, there is a need for more information about the health benefits and possible risks to ensure the efficacy and safety of dietary supplements. It is recommended that consumers follow the US Department of Agriculture dietary guidelines to meet their nutrient requirements for health improvement and disease prevention. The evidence suggests that antioxidants are best acquired through whole-food consumption, not as a pill or an extract.

Joshipura (2007) revealed that, the fruit and vegetable consumption indicator estimates the age-standardized proportion of the population in India. Age 12 years and older have reported consuming fruits and vegetables five or more times per day. Research has shown that diets containing substantial and varied amounts of vegetables and fruit:

- may prevent certain types of cancer
- are associated with reduced risk of cardiovascular disease
- are associated with healthy weights and decreased risk of obesity

Inadequacy of fruit and vegetable consumption has become an important public health issue. According to the Canadian Community Health Survey (2.2), 59% of Canadian children 2-17 years of age consume fruit and vegetables less than five times a day. These children are significantly more likely to be overweight or obese compared to those who consume fruits and vegetables more frequently. Fruit and vegetable consumption is influenced by many factors, including: physical access within a community, food affordability, and knowledge of healthy food choices, food skills such as shopping, budgeting, preparation, and storage.

Public health programs and services related to healthy eating and food security issues target both individuals, to build food skills and promote healthy behaviors, and

communities to promote food security and awareness of healthy eating. Programs and services that support healthy eating and food security include:

- community gardens
- school nutrition programs
- awareness campaigns including comparisons of the cost of a nutritious food basket to the cost of living

The annual tracking of the cost of the Nutritious Food Basket for an Ontario family is used to monitor food affordability across Ontario in Canada and to advocate for food access and security for specific populations. Data for the 2008 cost of the Nutritious Food Basket across Ontario are shown within the Health Unit Profile table. The Northern Fruit and Vegetable Program is a provincial initiative that aims to increase fruit and vegetable consumption and increase awareness of the importance of fruits and vegetables among elementary school children in select communities in Northern Ontario, and to educate elementary school-aged children and their families about the importance of eating fruit and vegetables, and the associated benefits of healthy eating and physical activity to overall health. The project provides fresh Ontario produce twice a week in conjunction with a curriculum-based resource that outlines the benefits of eating fruits and vegetables. Northern Ontario was selected for the project because of the higher proportion of overweight children, the higher cost of the Nutritious Food Basket in Northern Ontario, and because 62% of children in the region aged 12-19 do not eat five or more servings of fruits and vegetables daily. In 2007, 42% of individuals age 12 years and older reported consuming fruits and vegetables five or more times per day. Based on 36 public health units in Ontario, the highest proportion of people age 12 years and older that consumed fruits and vegetables five or more times per day was 50% and the lowest was 29%.

A landmark study published in the medical journal, *Nutrition and Cancer* (Nutr. Cancer 1992; 18:1-29), surveyed 156 cancer studies and found that of those studies, 128 showed a protective effect from eating fruits and vegetables. For example, in this survey of cancer studies, fruits and vegetables were shown to have a protective effect in:

- Major breast cancer studies
- Colorectal and bladder cancer studies
- Pancreas and stomach cancer studies
- Lung cancer studies
- esophageal cancer studies

Many health professionals emphasize the importance of nutritious, balanced food, adequate exercise and dietary supplements for overall good health.

Bazzano *et.al*, (2002) stated that, when compared to those who had one serving of fruits or vegetables daily, the results showed that consuming three or more servings of fruits or vegetables daily was linked to a 27% decrease in stroke risk, 42% decrease in stroke deaths, 24% decrease in ischemic heart disease deaths, and a 27% decrease in CVD deaths. The authors concluded that this study 'showed an inverse association of fruit and vegetable intake with the risk of cardiovascular disease and all-cause mortality in the general US population.

According to Ford *et.al*, (2001) fruits and vegetables had a demonstratively positive, protective effect against diabetes. According to the study, "A healthy diet including fruits and vegetables could help prevent diabetes from ever occurring. A study of U.S. adults reported that higher levels of fruit and vegetable consumption might decrease the risk of diabetes in adults, particularly women. Researchers from the Centers for Disease Control and Prevention in Atlanta base that conclusion on a group of individuals between the ages of 25 and 74 who participated in the first National Health and Nutrition Examination Survey. These people had their diets closely followed for about 20 years. The average daily intake of fruits and vegetables as well as the number of participants consuming five or more fruits and vegetables per day was lower among the participants who developed diabetes than among the participants in the study who remained free of this disease. The investigators concluded that these results suggest that fruit and vegetable consumption may decrease the risk of diabetes.

Fruit in their whole form (with the pulp intact) can be a healthy source of dietary fiber, which can help slow down the absorption of the sugar into the bloodstream, thus preventing blood sugar bouncing. Fresh fruits and vegetables are some of the "SUPERFOODS" for promoting natural slimness. They have none of the artificial sweeteners, colors or additives that can actually stimulate appetite and lead to overweight and obesity. Therefore, fresh, whole fruits are useful to keep away sugar cravings and are a good source of pectin, a soluble fiber. [Whenever possible, It is better to buy organic fruits (and vegetables) to reduce exposure to pesticide residues.] Health experts recommend an individual should get 25-35 grams of fiber daily, yet Americans average only 7-14 grams per day. Whole fruits can be an important wellness tool in helping to meet key health objectives such as increasing fiber in the diet and providing a rich source of antioxidants and other phytonutrients to strengthen the immune system, balance blood sugar and promote overall health. Dr. Francisco Contreras, M.D. says, "The best fast foods are **fruits.** According to the World Health Organization, ***'eating fruit has real health benefits, and can prevent up to 20% of all death'" (www.HealinandHealth.org.com).***

Research in the past 20 years has shown that fruits and vegetables not only prevent malnutrition but also help in maintaining optimum health through a host of chemical components that are still being identified, tested, and measured. Research from the United States, United Kingdom, and The Netherlands suggests that the role of fruits and vegetables in preventing heart disease is a protective one. Risk reduction was estimated as high as 20 - 40 percent among individuals who consumed substantial amounts of fruits and vegetables. People
Who were already diagnosed with coronary heart disease was able to reduce blockage modestly through exercise and an extremely low-fat, vegan-like diet rich in fruits and vegetables. (www.extension.iastate.edu/Pages/pubs)

Huijbregts, *et al*, 1997; Hu,Rimm *et.al*, 2000; Quatromoni, *et.al*,2002,revealed that the health benefits of fruit and vegetables are well recognized. A rich and varied consumption of fruit and vegetables is an internationally recognized key feature of dietary patterns associated with reduced risk of chronic disease.

Gillman, *et al.* 1995; Ness and Powles 1997; Joshipura, *et al.* 1999; Liu, Manson *et al.* 2000; Joshipura, et al. 2001; WHO 2003,have revealed that a low intake of fruit and vegetables has been shown to be independently associated with an increased risk of CVD in a number of prospective and ecological studies.

Appel, *et al.* 1998; Moore, Vollmer *et al.* 1999,have reported that the effects of a diet rich in fruit and vegetables alone and in combination with a low fat diet were investigated in the Dietary Approaches to Stop Hypertension study. The most effective diet was the combination of low fat dairy products and fruit and vegetables. However, an increase in fruit and vegetables alone was shown to result in a small but significant reduction in blood pressure that could significantly impact on the public health risk of CVD at a population level.

In the EPIC study conducted by Khaw, *et al.* (2001), the authors estimated that adding two more daily portions of fruit and vegetables could reduce the risk of premature death by as much as half. These findings hold regardless of age, blood pressure or smoking. Whether vitamin C is a marker of fruit and vegetable intake or a protective agent has yet to be confirmed. The intake of folate has also been negatively associated with colorectal cancer (WHO 2003), while dietary fiber intake has been associated with reduced cancer risk in particular with colorectal cancer.

This is particularly troubling given the surge of new science suggesting that fruits and vegetables can not only help prevent nutrient deficiency disorders, but also reduce the risk of cardiovascular diseases. The rise of such non-communicable diseases in both wealthy nations and poorer countries is partly due to declining physical activity and excessive food energy intake. But WHO attributes approximately 3 million deaths a year from such diseases to inadequate fruit and vegetable intake. (http://www.*media-office@fao.org.*).

FAO report, (2004) has indicated that according to the world Health Report 2002, low fruit intake is estimated to cause about 31% of heart disease and 11% of stroke worldwide. Overall it is estimated that up to 2.7 million lives could potentially be saved each year if fruit consumption was sufficiently increased.

According to Taylor, (1999) a fruit which is among the perishable commodities is an important ingredient in the human dietaries. Due to its high nutritive value, it makes a significant nutritional contribution to human well being. Fruits have been significantly singled out in human nutrition for the supply of minerals and vitamins, some hormone precursors in addition to protein and energy.

CHAPTER THREE

Methodology

3.1 Description of the Study Areas

All three districts (Colombo, Gampaha and Kalutara) in the Western province were purposively selected for this study. According to the poverty statistics of the Department of Census and Statistics in 2002, the lowest Head Count Index was recorded in the Colombo district, followed by Gampaha and Kaluthara districts (Head Count Index is defined as the percentage of population below the poverty line). The highest average monthly household income and the highest population are also reported from the Western province. On the other hand, urban sector spends more on fruits than the rural sector or estate sector and the availability of all fruit varieties is also high in the western province. Further, the Western province is more prone to urbanization comparing to other provinces in Sri Lanka and scarcity of adequate cropping lands has become a critical problem in those areas and this has led to low accessibility of fresh fruits.

3.1.1 Colombo District

The population density (persons per sq.km) in Colombo district was recorded as 3305. The urban population in this district was stated as 1,200,000 while the rural population was 1,000,000. Total population represents 41.9% Sinhalese, 28.9% Sri Lankan Tamil, 1.9% Indian Tamil, 23.3% Sri Lankan moor and 4% others. Average monthly per capita income was given as Rs: 3000 – 5300. The Head count index and the Household Population below Poverty Line were stated as 6 and 144106 accordingly. This district is divided into 13 divisional secretary divisions (DS Divisions). According to the Head Count Index, Dehiwala, Sri-Jayawardenepura (Least poor) Homagama, Kolonnawa (Average) and Hanwella, Colombo (Poor) were selected randomly for the questionnaire survey.

The following table shows the DS divisions and their categories based on the Head count Index.

3.1.2 Gampaha District

The population density in Gampaha district was recorded as 1541. The urban population was stated as 300,000 while rural population was 1,800,000. Average monthly per capita income was given as Rs: 3000 – 5300. The Head count index and the Household Population below Poverty Line were stated as 11 and 218447 accordingly.

Table 3.1: DS Divisions in Colombo District based on the Poverty Category

Category	DS Divisions	No. of GN Divisions	Head Count Index	Population below the Poverty Line (thousands)
Least Poor (Rich)	Kaduwela	57	6.0	11,614
	Maharagama	41	3.5	5,973
	Sri- Jayewardenepura	20	2.7	2,750
	Thimbirigasyaya	20	4.4	9,672
	Dehiwala	15	2.1	1,896
	Rathmalana	13	4.2	4,058
	Kesbewa	73	5.2	10,326
Average	Kolonnawa	46	8.2	12,292
	Homagama	81	6.4	10,797
Poor	Colombo	35	12.1	39,819
	Hanwella	68	14.2	12,562
	Padukka	46	10.7	5,439
	Moratuwa	42	10.3	16,908
Colombo District	13	557	6.0	144,106

Source: Department of Census and Statistics

This district is divided into 13 divisional secretary divisions. According to the Head Count Index, Wattala, Kelaniya(Least poor) Mahara, Biyagama (Average) and Dompe, Mirigama, (Poor) were selected randomly for the questionnaire survey.

Table 3.2: DS Divisions in Gampaha District based on the Poverty Category

Category	DS Divisions	No. of GN Divisions	Head Count Index	Population below the Poverty Line (thousands)
Least Poor (Rich)	Negambo	39	7.1	9,625
	Katana	79	7.7	14,089
	Wattala	46	6.1	9,089
	Ja-Ela	57	7.8	13,313
	Gampaha	101	9.9	16,276
	Kelaniya	37	6.9	8,556
Average	Minuwangoda	121	12.5	18,424
	Mahara	92	12.1	20,438
	Biyagama	49	11.3	16,675
Poor	Divulapitiya	123	13.7	17,022
	Mirigama	149	18.2	25,296
	Attanagalla	151	15.4	23,100
	Dompe	133	21.1	26,544
Gampaha District	13	1,177	11.0	218,447

Source: Department of Census and Statistics

3.1.3 Kalutara District

The population density in Kalutara district was recorded as 673. The urban population was stated as 100,000 while rural population was 1,000,000. Average monthly per capita income was given as Rs: 2300 – 2600. The Head count index and the Household Population below Poverty Line were stated as 20 and 179604 accordingly.

This district is divided into 14 divisional secretary divisions. According to the Head Count Index, Panadura, Bandaragama (Least poor), Dodangoda,Beruwala(Average), and Palinda Nuwara, walallawita (Poor),were selected randomly for the questionnaire survey.

Table 3.3: DS Divisions in Kalutara District based on the Poverty Category

Category	DS divisions	No. of GN Divisions	Head Count Index	Population below the Poverty Line (thousands)
Least Poor (Rich)	Panadura	72	7.4	11,571
	Bandaragama	59	8.2	6,854
	Horana	61	8.4	7,275
	Millaniya	44	16.9	7,332
	Kalutara	87	12.5	16,642
Average	Ingiriya	31	17.4	7,663
	Madurawala	33	18.6	5,393
	Beruwala	82	22.1	30,671
	Dodangoda	45	21.2	11,441
Poor	Bulathsinhala	54	27.4	16,042
	Mathugama	57	29.4	20,903
	Agalawatta	34	26.4	8,683
	Palindanuwara	43	30.7	13,599
	Walallawita	60	31.4	15,535
Kalutara District	14	762	20.0	179,604

Source: Department of Census and Statistics

3.2 Sampling Design

Multistage stratified random sampling technique was adopted for this study. In the initial stage, all District Secretary (DS) divisions in each district have been grouped in to the 1) Least Poor (Rich) 2) Average and 3) Poor based on the Head Count Index (Department of Census and Statistics, 2006). Then two DS divisions from each poverty category within each district were randomly selected and altogether six DS divisions were selected from each district as follows

Colombo District

Least Poor	Average	Poor
• Dehiwalà • Sri Jayawardanapura	• Homagama • Kolonnawa	• Hanwella • Colombo

Gampaha District

Least Poor	Average	Poor
• Wattala • Kelaniya	• Biyagama • Mahara	• Mirigama • Dompe

Kalutara District

Least Poor	Average	Poor
• Panadura • Bandaragama	• Dodangoda • Beruwala	• Palindanuwara • Walallawita

Based on the resources and time, the sample size was decided as 450 households and 450 samples were allocated proportionately among three districts based on the total population of the district. According to that 188 sample households from Colombo district, 173 samples from Gampaha district and 89 samples from Kalutara district were selected.

The sample size for an each poverty category within the district was allocated based on the total population of the selected DS divisions in each category *(see Box 01.)*

Box 01: Distribution of Sample Size for each Category

Colombo District

Least poor DS Divisions 07 (Sample size 100)

Average DS Divisions 02 (Sample size 29)

Poor DS Divisions 04 (Sample size 59)

Total DS Divisions 13 (Total sample size 188)

Gampaha District

Least poor DS Divisions 06 (Sample size 85)

Average DS Divisions 03 (Sample size 41)

Poor DS Divisions 04 (Sample size 47)

Total DS Divisions 13 (Total sample size 173)

Kalutara District

Least poor DS Divisions 05 (Sample size 44)

Average DS Divisions 04 (Sample size 23)

Poor DS Divisions 05 (Sample size 22)

Total DS Divisions 14 (Total sample size 89)

In the next stage, all GN divisions from each DS divisions were categorized according to the classification of GN divisions by the Department of Census and Statistics in 2007, based on the unsatisfied basic needs. Considering that, two GN divisions were selected randomly from each DS division. According to that, 4 "Least poor" GN divisions, 4 "Average poor" GN divisions and 4 "Poor" GN divisions were selected randomly from each district. Finally, according to the population of each GN division, proportionate sample was selected randomly from each GN division. The Table3.4 depicts the sample selection.

Table3.4: Sample Distribution by DS Divisions and GN Divisions

Districts	Category	DS divisions	GN Divisions	Sample size of GN
Colombo (188)	Least poor (100)	Dehiwala (47)	Kalubowila	26
			Kohuwala	21
		Sri Jayawardhanapura (53)	Gangodawila (East)	20
			Pagoda	33
	Average (29)	Homagama (13)	Hiripitiya	10
			Meegoda (south)	03
		Kolonnawa (16)	Gothatuwa	07
			Himbutana(west)	09
	Poor (59)	Hanwella (12)	Ihalakosgama (south)	05
			Eswatta north	07
		Colombo (47)	Grandpass (south)	28
			Madampitiya	19
Gampaha (173)	Least poor (85)	Wattala (46)	Pamunugama	24
			Elakanda	22
		Kelaniya (39)	Polhena	20
			Dalugamgoda	19
	Average (41)	Biyagama (20)	Daranagama	10
			Walgama (East)	10
		Mahara (21)	Dalupitiya (west)	10
			Henegama	11
	Poor (47)	Meerigama (25)	Weweldeniya pahalagama	12
			Bothale ihalagama	13
		Dompe (22)	Meethirigala	10
			Ranwala	12
Kalutara (89)	Least poor (44)	Panadura (29)	Hirana (west)	14
			Punchideniya	15
		Bandaragama (15)	Senapura	08
			Raigama (north)	07
	Average (23)	Dodangoda (06)	Serupitiya (east)	03
			Nebada	03
		Beruwala (17)	Warapitiya	09
			Malewangoda	08
	Poor (22)	Palindanuwara (11)	Lathpandura (east)	05
			Bellana	06
		Walallawita (11)	Walallawita (south)	05
			Miriswatta	06
Total		**(DS _ 18)**	**(GN _ 36)**	**450**

Source: Department of Census and Statistics

3.3 Collection of Data

To evaluate the objective of the study, required data were collected from primary sources as well as secondary sources.

Primary Data
The data required for the study were collected from the selected respondents by personal interview method using well-structured and pre-tested questionnaire. Questionnaire had open and close ended questions to acquire Information on the following aspects.

1. General information from the individual respondents regarding their social, economical and demographic characteristics (age, education status, occupation, monthly income, religion, family size and family type).
2. Monthly family expenditure on food items in general and fresh fruits in particular.
3. Information regarding the buying behavior of fresh fruits (what, when, where and how).
4. Attributes influencing the preferences of fresh fruits.
5. Other factors influencing the low consumptions of fresh fruits.

Secondary Data
The secondary data on location, demography and other details about the study areas was collected from the relevant sources and consumer surveys done by the Department of Census and statistics.

3.4 Analytical Tools and Techniques Employed

The data were computerized to an EXCEL/SPSS worksheet and using SPSS windows 16.

Tabular analysis
Percentage analysis was used to study the distribution of the socio-economic characteristics of the sample respondents like age, educational status, occupation and family size and type. The buying behavior of consumers for fresh fruits, purchase decision, place of purchase, frequency of purchase and quantity purchased were also analyzed using percentage analysis.

Regression Analysis
Multiple linear regression analysis was performed to find the influence of some external socio- economic factors on quantity fruit consumption. The quantity of monthly consumed fresh fruits (Y) is used as a dependent variable and the independent variables used were monthly family income, age, education, religion, and number of family members. The functional form of regression model used is

$$Y_i = B_0+B_1X_{1i}+\ldots\ldots\ldots\ldots B_pX_{pi}+E_i$$

Likert Scaling technique

A type of psychometric response scale called Likert scale was employed for studying the reasons for not preferring for some fruits by the sample respondents. Traditionally, a five-point scale is used namely; strongly agree, agree undecided, disagree, and strongly disagree responses to indicate the level of agreement to a particular statement. The scores assigned for 5,4,3,2, and 1 respectively. The mean score was considered for interpretation.

The following definitions were used for the study

Respondents - The persons who is the subject of the inquiry or investigation

Monthly household Income - Income of the respondents' household in last month of the survey period

Monthly household Expenditure - Expenditure of the respondents' household in the last month of the survey period

Monthly consumption of fruit - Consumption of fruits by the respondents' household in the last month of the survey period

Processed Fruits - Jam cordial, chutney etc

Monthly consumption of Proceed fruits- Consumption of Processed fruits by the respondents' household in the last month of the survey period

CHAPTER FOUR

Consumption Pattern and Consumer Behavior

4.1 General Characteristics

The percentage distribution of General characteristic like education, occupation, religion, and family type etc of the sample are shown in Table 4.1. The distribution of the sample based on educational profile of the main householder, indicated that, majority of the respondents included in "Rich" category in all the three districts had G.C.E. A/L and above education levels amounting to 64% in Colombo, 57% in Gampaha, and 67% in Kalutara. More than 30% of the respondents which include in "average" category had followed G.C.E. O/L. Most of the respondents in "Poor" category in Colombo district had received education up to grade 6-10 and around 36% in Gampaha district and 41% in Kalutara district had followed G.C.E. O/L. It was further observed that, the highest percentage of respondents in all the three districts had followed G.C.E. O/L.

Highest percentages of sample householders in all the three districts were employed in private sector which amounted to 35% in Colombo, 31% in Gampaha and 34% in Kalutara districts. Further, the top three slots were occupied by private sector employees, government employees and business in "Rich" category in all the three districts while the government employees were the highest in "Average" category in all the three districts. In case of "Poor" category, 35% were found among labor employees, followed by private sector employees 26% in the Colombo district. Highest percentage of private sector employees followed by labor employees was found in "poor" category of both Gampaha and Kalutara districts.

As a whole, majority of the respondents were living in Nuclear families. In each category of all the three districts, the scene was not much different. About 44% of sample respondents in Colombo district, 40% in both Gampaha and Kalutara districts were living in joint families while the majority of the respondents were living in nuclear families.

Analyzing religion of the sample households, Buddhists were a majority in all the three districts. Looking into the "Rich" category in Gampaha district, higher percentage of sample respondents belonged to the Catholic religion followed by Buddhist occupying a share of 60% and 35% respectively.

Under the gender classification, higher percentage of sample respondents was females in all the three districts accounting 54% in Colombo, 51% in Gampaha and 53% in Kalutara.

Analyzing the type of family members of the sample households, the majority of them in all the three districts were old age people (over 40 years) accounting 41% in Colombo 47% in Gampaha and 44% in Kalutara. The percentages of children in all the three districts were lower than that of the old age, young and middle age family members. It is 26% in Colombo, 22% in Gampaha and 26% in Kalutara.

The average family size was about 5 in Colombo, and about 4 in both Gampaha and Kalutara districts and the average number of children in the households was about 2 in all the three districts. The following table 4.2 depicts the situation.

Table 4.1: Percentage Distribution of Socio-economic Factors of the Sample among Districts

variables	Categories	Colombo				Gampaha				Kalutara			
		R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Level of Education	Illiterate	-	-	07	02	-	-	-	-	-	-	04	01
	Grade 1-5	04	03	21	09	02	07	19	08	-	-	14	03
	Grade 6-10	08	17	34	18	13	25	23	18	02	13	36	13
	G.C.E. O/L	24	43	29	28	28	34	36	32	31	52	41	38
	G.C.E. A/L	37	27	06	26	40	32	20	33	40	26	05	29
	Degree	23	10	03	15	14	02	02	07	27	05	-	15
	Post graduate	04	-	-	02	03	-	-	02	-	04	-	01
	(N)	100	29	59	188	85	41	47	173	44	23	22	89
Occupation	labor	-	-	35	11	-	-	22	06	-	-	18	04
	Agri -sector	-	06	10	04	06	02	10	06	-	13	15	07
	Government	20	44	08	20	25	38	18	26	09	35	05	15
	Forces	10	06	02	07	03	10	04	05	10	04	05	07
	Private sector	40	34	26	35	38	33	35	36	41	23	34	34
	Skilled jobs	-	03	16	05	-	-	11	03	-	-	16	04
	Business	24	-	-	13	20	05	-	11	25	16	07	19
	Foreign	-	-	-	-	01	-	-	01	13	-	-	07
	Retired	06	07	03	05	07	12	-	06	02	09	-	03
	(N)	100	29	59	188	85	41	47	173	44	23	22	89
Religion	Buddhist	78	100	63	77	35	78	100	63	98	100	96	98
	Hindu	02	-	03	02	04	02	-	02	-	-	-	-
	Catholic	07	-	12	07	60	15	-	33	02	-	04	02
	Muslim	13	-	22	14	01	05	-	02	-	-	-	-
	(N)	100	29	59	188	85	41	47	173	44	23	22	89
Gender	Female	53	53	58	54	53	53	45	51	54	50	51	53
	Male	47	47	42	46	47	47	55	49	46	50	49	47
	(N)	100	29	59	188	85	41	47	173	44	23	22	89
Family type	Nuclear	57	57	52	56	55	63	63	60	65	53	56	60
	Joint	43	43	48	44	45	37	37	40	35	47	44	40
	(N)	100	29	59	188	85	41	47	173	44	23	22	89
Family Members	Old Age(>40)	45	44	34	41	51	45	42	47	48	45	37	44
	Middle & young(18-40)	33	32	34	33	25	34	37	31	29	29	31	30
	Children (<18)	22	24	32	26	24	21	21	22	23	26	32	26
	(N)	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012.R-Rich (least poor), A-Average, P- Poor, N- Sample size

Table 4.2: Average Family Size and Average Number of Children of the Sample

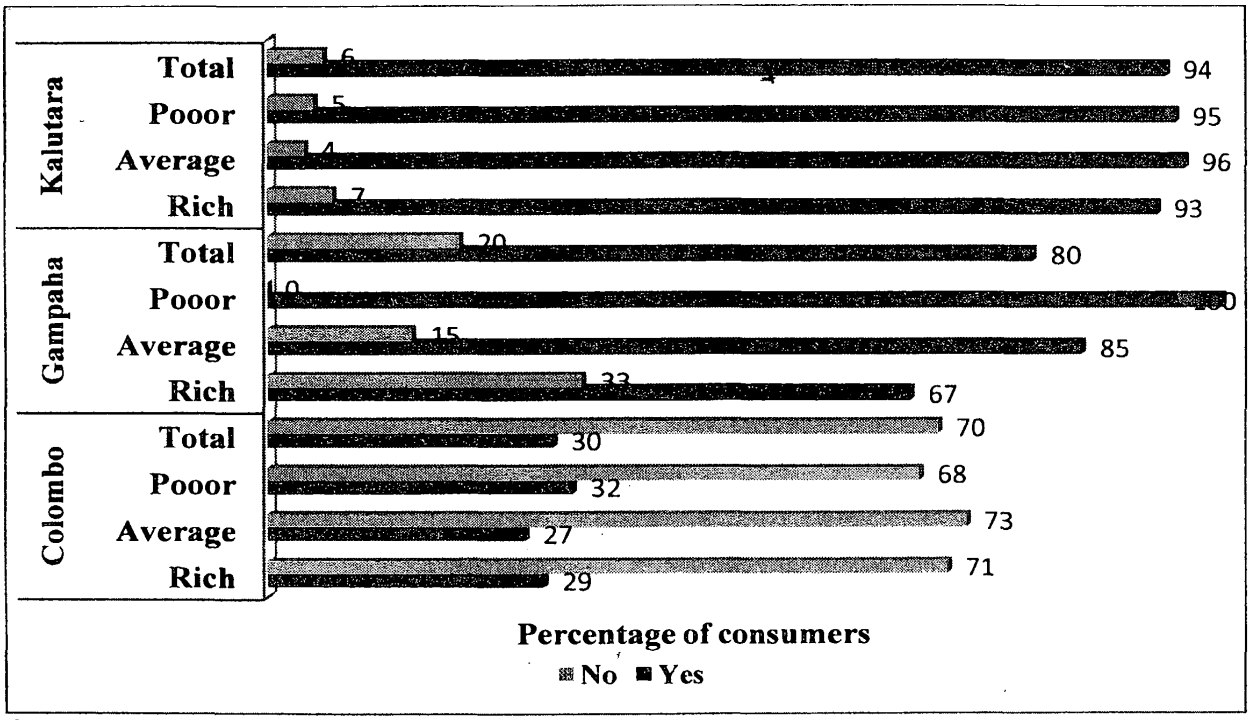
Category	Colombo				Gampaha				Kalutara			
	R	A	P	T	R	A	P	T	R	A	P	T
Average Family Size	4.44	4.33	4.98	**4.60**	3.91	4.27	4.34	**4.11**	4.04	4.57	4.45	**4.28**
Average no. of children per households	1.81	1.41	2.02	**1.82**	1.74	1.76	1.79	**1.76**	1.68	1.69	1.55	**1.63**

Source: HARTI Survey Data, 2012. R-Least poor (Rich), A- Average, P- Poor, T-Total

4.2 Cultivation of Fruits

The percentage of households who grow at least some fruits is shown in Figure 4.1. The results revealed that, 70% of the respondents do not cultivate any fruits in the Colombo district, while 80% of the respondents in Gampaha and 94% of the respondents in Kalutara districts cultivated fruits in their home gardens. This trend is same for each poverty category.

Figure 4.1: Cultivation of Fruits

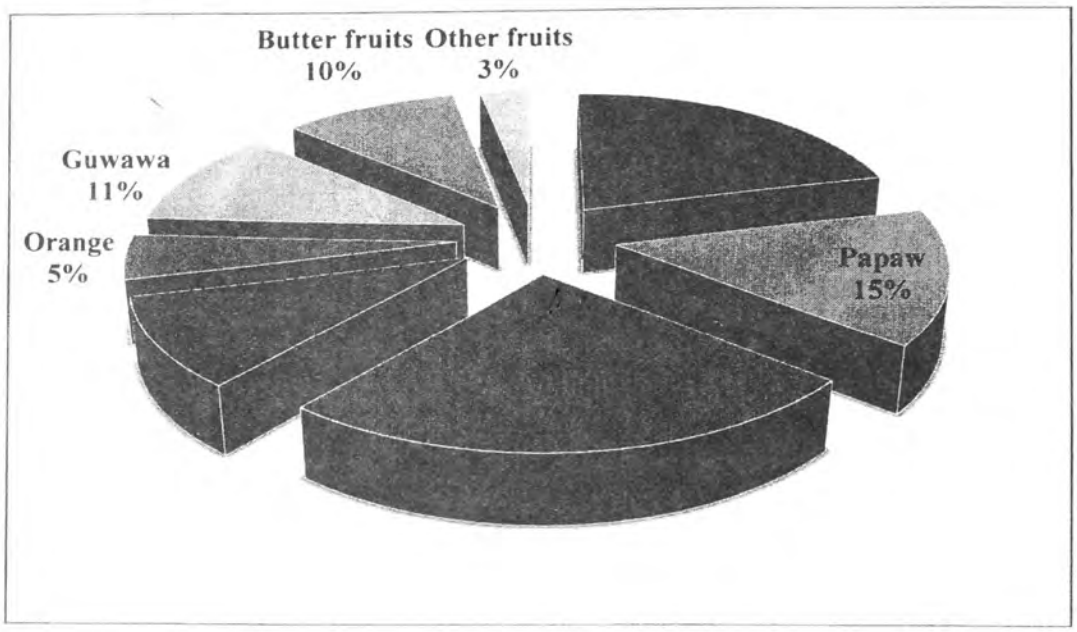


Source: HARTI Survey Data, 2012.

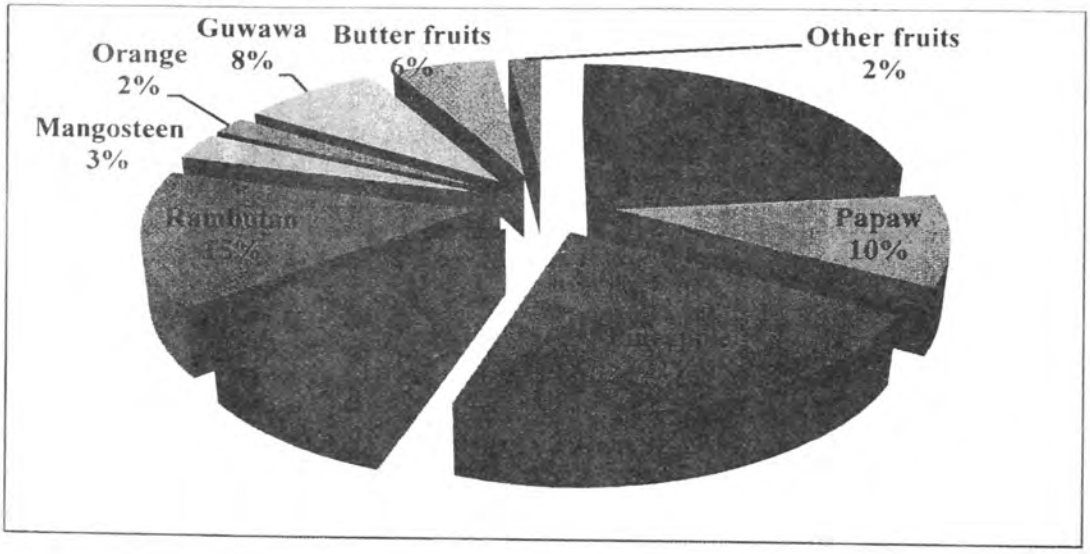
The survey also indicated that among the respondents who cultivated fruits in the Colombo district, highest percentage (25%) reported that Mango is the most cultivated variety followed by Banana (21%) and Papaw (15%). In the Gampaha district, 23% of respondents cultivated Banana, 22% respondents cultivated Pineapple and 12% respondents cultivated Mango. In the Kalutara district, majority of the respondents (22%) cultivated Mangosteen and followed by Banana (20%), Mango (15%), and Papaw (13%).Figure 4.2 shows that, the major cultivated fruit varieties by the sample respondents in their home gardens.

Figure 4.2: Cultivation of Fruit Varieties

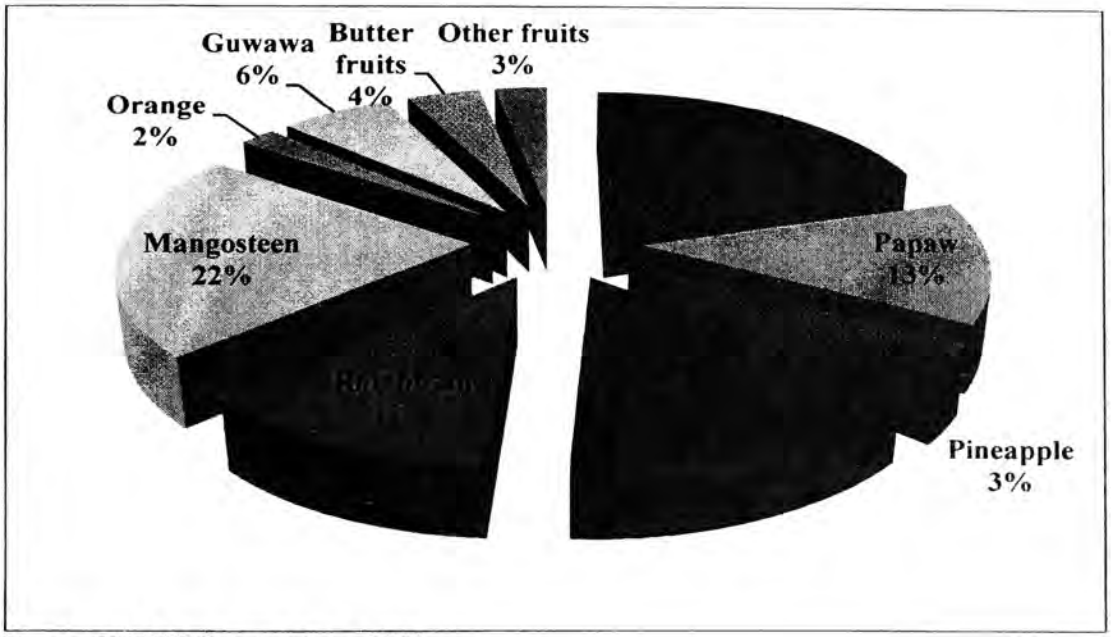
Colombo District



Gampaha District



Kalutara District



Source: HARTI Survey Data, 2012

As shown in the Table 4.3, the majority of the respondents who cultivated fruit varieties in their home garden cultivated fruits only for the purpose of home consumption. Percentage of respondents cultivating fruits only for selling purpose was very low and it was only 1% in Gampaha district and 2% in both Colombo and Kalutara districts.

Table 4.3: Purpose of Cultivating Fruits

Purpose	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Home consumption	97	91	80	89	97	83	72	85	86	96	71	85
Selling	_	_	01	02	_	_	03	01	02	_	05	02
Both	03	09	19	09	03	17	25	14	02	04	24	13
N	29	08	19	56	59	35	47	141	41	22	21	84

Source: HARTI Survey Data, 2012. *N (No. of respondents who cultivated fruits in their home gardens)

4.3 Fruits Consumption Pattern and Buyers' Behavior

4.3.1 Mean Income and Expenditure of the Households

Consumer's income decides their purchasing behavior; it is the determinant of buying decision. The mean monthly household income was Rs.53, 673 (rich), Rs.35, 038 (average) and Rs.24, 744 (poor) in Colombo district and it was Rs.50,608 (rich), Rs.36,000 (average), Rs.24,187 (poor) in Gampaha district. In kalutara district the

monthly mean income of respondents' household was Rs.40, 667 in rich category, Rs.35, 685 in average category and Rs.25, 000 in poor category. Not considering the income category the mean monthly household income in Colombo district was, Rs.52,000, Rs.49,000 in Gampaha and Rs.36,000 in Kalutara. The results of the Household Income and Expenditure survey in 2009/2010 by the Department of Census and Statistics have not shown much difference when considering the results of this study. The results from regression analysis show that, monthly household income was statistically significant for the consumption of fruits. This also agrees with the findings of Adenegan *et.al*, (2011), in their study. Ayandiji *et al*, (2009) conducted a study an Economic analysis of consumption fresh and processed fruits in Bowen University, Nigeria. The results of this survey also revealed that the monthly income of respondents was a significant determinant of the amount spent on consumption of fresh fruits. Mean income and expenditure of the households is shown in Table 4.4.

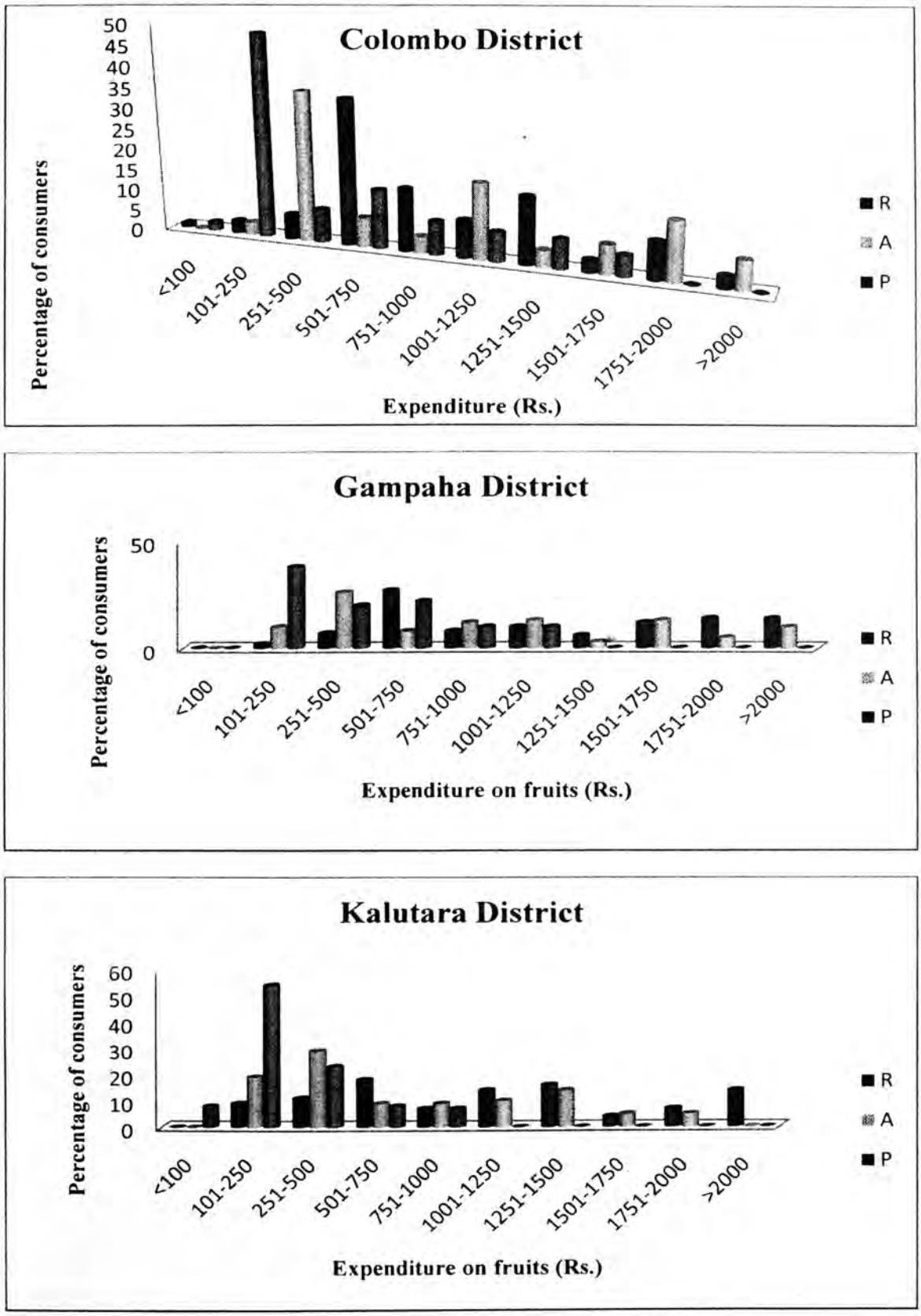
Table 4.4: Mean Income and Expenditure of Households

Mean income & expenditure	Colombo			Gampaha			Kalutara		
	R	A	P	R	A	P	R	A	P
Mean income (Rs.)	43,673	34,038	24,744	43,608	34,000	28,187	45,602	35,667	25,000
Mean expenditure (Rs.)	34,475	28,917	22,097	34,099	29,329	21,064	34,111	25,326	18,409

Source: HARTI Survey Data, 2012.

Respondents' monthly purchases of fruits for more than Rs.2,000 accounted for 7% in Colombo, 13% in Gampaha and only 3% in Kalutara district indicating that the most of the respondents in Kalutara district had not spent much money on fruits when compared to the other two districts. Most of the respondents in the Kalutara district consume their own produce as the district is one of the fruit producing districts in Sri Lanka. The average monthly expenditure on fruits was found to be the highest in the case of "Rich" category in the Gampaha district followed by the "Rich" category in the Colombo district. The expenditure pattern of sample households for the fruits in each income category of the three districts is given in the Figure 4.3.

Figure 4.3: Monthly Household Expenditure for Fruits



Source: HARTI Survey Data, 2012

Food Ratio

The ratio of expenditure on foods and drinks to total expenditure is called the "Food Ratio" and it is generally presented as a percentage and is given below. The table 4.5 depicts the ratio of expenditure on foods and fruits by the respondents of different income groups.

$$\text{Food Ratio (\%)} = \frac{\text{Household expenditure on food and drink}}{\text{Total household expenditure (food +non food)}} \times 100$$

The survey results show that the lowest food ratio is from the Colombo district (36%) when compared to the other two districts. It is clear that those who live in Colombo district spend more on housing, education, transport, electricity, health etc. But when considering the absolute expenditure values for foods in the Colombo district, it is higher than that of the other two districts. The results of the Household Income and Expenditure survey in 2009/2010 conducted by the Department of Census and Statistics are not much different from the results of this study. Accordingly, food ratios of these three districts were 34% in Colombo, 35% in Gampaha and 39% in Kalutara. However, when analyzing the "Rich", "Poor" and "Average" categories, food ratio Is more than 50% in "poor" category in all the three districts as the poor category people haven't spent more on housing or other activities like rich and average category peoples. Looking in to the percentage spent on fruits from their total household expenditure, sample respondents in all the three districts recorded 1%. But when considering the absolute value spent on fruits, respondents of the Kalutara and Gampaha district have spent less money than the respondents of the Colombo district as these two districts are fruit producing districts. Expenditure ratio on fruits from total monthly food expenditure has shown that, the respondents of almost all three districts have spent nearly 3% on fruits. This result is not much different from the results of the household income and expenditure survey in 2009/2010. However, when considering the income category, respondents of the "rich" category in all the three districts spent 4% on fruits from their total food expenditure and it is revealed that the consumers with higher income are more likely to incorporate fruits in their diet. However, expenditure on fruits only occupied a tiny fraction of the total monthly household expenditure in all the districts in the western province.

Table 4.5: Average Monthly Household Expenditure on Foods and Fruits and Food Ratio

Category	Colombo				Gampaha				Kalutara			
	R	A	P	T	R	A	P	T	R	A	P	T
1.Average monthly total household expenditure (food+nonfo-od) (Rs.0000)	4.99	3.26	2.32	4.84	4.25	3.02	2.20	4.12	4.03	3.50	2.40	3.56
2.Average monthly household expenditure on foods (Rs.0000)	1.85	1.24	1.23	1.74	1.62	1.16	1.14	1.57	1.61	1.41	1.22	1.43
Food Ratio =2/1*100	37%	38%	53%	36%	38%	38%	52%	38%	40%	40%	51%	40%
3.Average monthly household expenditure on fruits(Rs.)	740	433	175	620	680	463	167	525	653	325	153	427
Fruit expenditure Ratio from total expenditure=3/1 *100	1%	1%	1%	1%	2%	1%	1%	1%	2%	1%	1%	1%
Fruit expenditure Ratio from food expenditure=3/2 *100	4%	3%	1%	3.5%	4%	4%	1%	3.3%	4%	2%	1%	2.9%

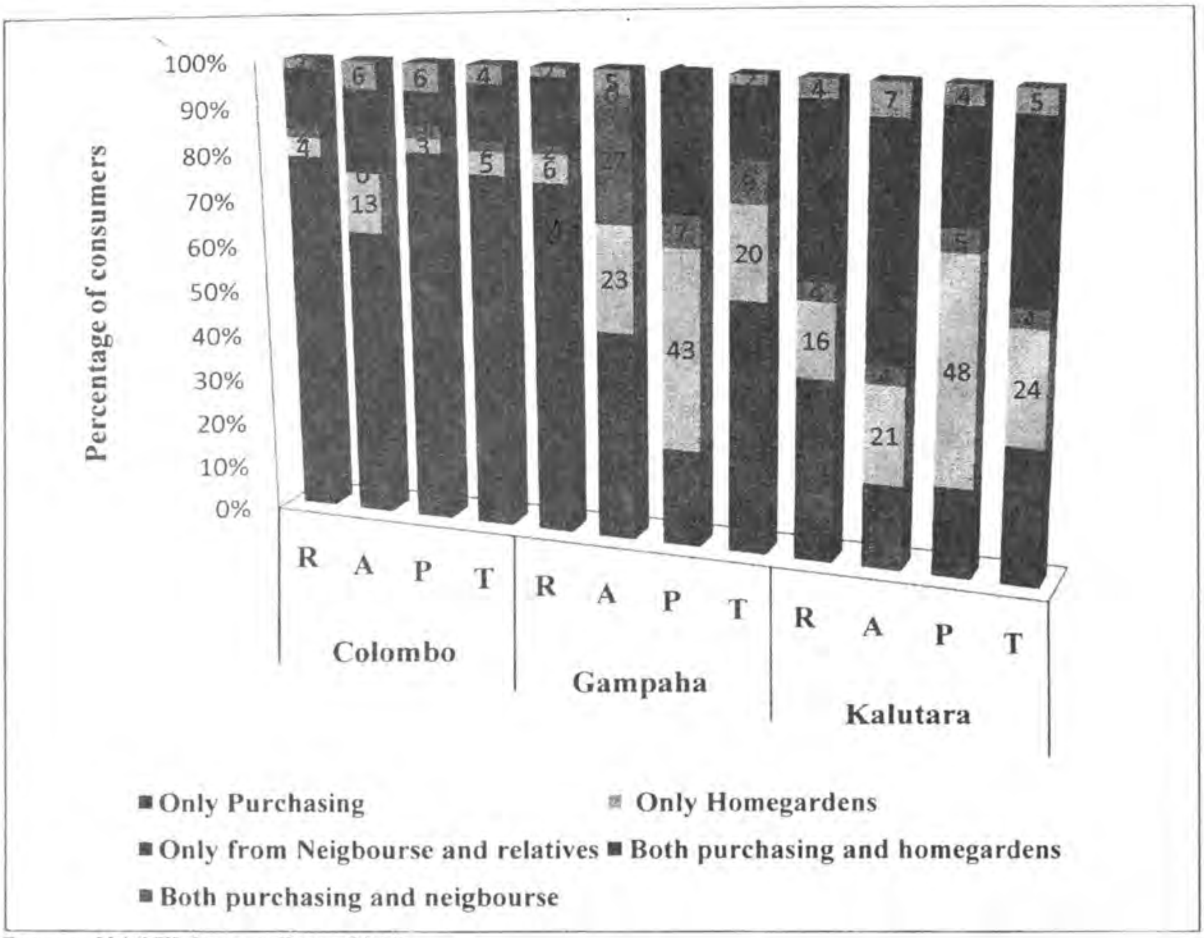
Source: HARTI Survey Data, 2012

4.3.2 The Way of Obtaining Fruits for Consumption

The way of obtaining local fruits for consumption by sample households of Colombo, Gampaha and Kalutara across the different income groups is presented in figure 4.4. It reveals that 77% of the respondents in Colombo district obtained their fruits only by purchasing (market dependent consumers) and 13% by both purchasing and from their home gardens (mixed consumers). There is not much difference observed across the different categories in Colombo district. In Gampaha district, highest percentage (54%) of respondents obtained their fruits by purchasing and 20% from home gardens. However, the situation is much different in Kalutara district and the highest percentage of respondents (38%) obtained their fruits from both home gardens and through purchasing (mixed consumers), and 29% only by purchasing (market dependent consumers) and 24% only from the home gardens (auto consumers). It clearly reveals that the consumers in Kalutara and Gampaha districts who obtained their fruits from home gardens are higher than those of the Colombo district, as those

districts are fruit producing areas. In the case of imported fruits, 100% of the respondents in all the three districts obtained imported fruits through purchasing and negligible amount of respondents got them from the relatives.

Figure 4.4: The Way of Obtaining Fruits



Source: HARTI Survey Data, 2012

4.3.3 Consumed and Non- consumed Fruits

4.3.3.1 Purchased and Consumed Major Fruit Varieties

As shown in the Table 4.6, Banana is the most consumed fruit variety by the respondents in all the three districts and it is 65% in Colombo, 72% in Gampaha and 51% in Kalutara, followed by papaw. Among the Banana varieties, *Seeni* and *Ambul* are the most popular varieties consumed by the sample respondents. About 28% of the consumers in Colombo, 22% in Gampaha and 41% in Kalutara have consumed all local fruit varieties (banana, papaw, mango, pineapple).Considering the imported varieties, apple is the most consumed verity in all the three districts. A different situation was not recorded from different income categories in all the three districts. A slight difference existed in the consumption varieties of fruits in the three districts, but banana was the most preferred variety and papaw were also very popular among the consumers. Mainly purchased imported fruit was apple and grapes came after the first.

Table 4.6: Major Fruit Varieties Consumed by the Sample Respondents in Last Month of the Survey Period

Fruits	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Local Fruits												
Banana(Only)	53	65	80	65	50.	56	75	72	51	50	52	51
Seeni	17	23	27	21	28	23	42	38	21	19	34	22
Ambul	16	22	26	20	08	17	28	16	10	15	09	12
Kolikuttu	12	11	15	12	11	11	05	14	13	10	_	10
Ambun	03	_	05	04	03	05	_	04	03	06	09	04
Anamalu	05	09	07	09	_	_	_	_	04	_	_	03
Papaw(Only)	05	02	05	04	03	04	03	03	05	04	03	04
Pineapple(only)	02	01	_	01	02	01	01	01	02	01	01	01
Mango(only)	03	02	_	02	02	03	02	02	02	02	04	03
All local fruits (banana+papaw +pineapple+ mango)	37	30	15	28	43	36	19	22	40	43	40	41
Total	100	100	100	100	100	100	100	100	100	100	100	100
Imported Fruits												
Orange(only)	15	10	30	18	10	16	13	13	16	18	17	18
Apple (only)	52	42	43	46	48	51	44	48	44	40	43	42
Grapes(only)	20	38	21	26	35	22	28	28	28	29	31	29
All imported fruits(orange+ apple+grapes)	13	10	06	10	07	12	15	11	12	13	08	11
Total	100	100	100	100	100	100	100	100	100	100	100	100

Source: HARTI Survey Data, 2012

4.3.3.2 Fruits not Used by the Sample Respondents

As in the rest of the world in Sri Lanka too, people have some food taboos. They think some fruits are heaty and some are cooling and some are not suitable for certain diseases. However, when asked about the fruit varieties not consumed by the sample consumers in all the three districts they revealed that some fruit varieties were not consumed. Table 4.7 presents the reasons for not consuming certain fruit varities by all respondents using Likert scaling technique and scores given by the respondents are analyzed and presented in the table. For *pineapple*, the respondents attached highest mean score (4.92) due to the reason of heat, followed by allergy (4.66), Disliked by the family members (4.30) and high price (3.10). Similarly, for *durian*, *mangos teen* and *rambutan,* the respondents attached more mean score to heat. For grapes, oranges and apples, consumers affixed highest mean score based on their importance to, high price, unsuitability for some diseases, prevalence chemicals which were used to keep quality and dislike by the family members were the main reasons for not preferring a particular kind of fruit.

Table: 4.7. Mean Scores for the Reasons for not Consumption of Some Fruits

Reasons	Fruits										
	Pineapple	Durian	Passion fruit	Mangos teen	Grapes	Oranges	Apple	Wood apple	Slim apple	Rambutan	Other fruits***
	Mean Scores										
Heat	4.92	4.90	4.21	4.92	3.00	2.10	1.20	2.83	1.45	4.95	2.10
Allergy	4.66	4.79	2.74	2.21	2.21	2.23	2.21	2.13	2.10	4.72	3.21
Disliked by family members	4.30	3.94	4.50	4.85	3.31	3.15	4.33	4.83	4.75	4.88	4.10
High price	3.10	4.66	2.30	3.05	4.95	4.83	4.75	3.10	2.31	3.10	3.95
Not suitable for some disease	2.66	2.00	2.10	3.21	4.25	4.10	2.12	2.16	1.36	3.83	3.82
Non availability	1.23	2.74	4.79	4.70	2.11	4.22	2.13	4.50	4.10	4.10	4.92
Using chemicals to keeping quality	2.10	1.15	1.05	2.00	4.15	3.25	4.58	1.39	2.11	1.10	3.80
Poor taste	2.00	1.92	3.30	2.15	2.05	3.50	3.11	3.73	4.25	1.16	4.05

*** Naminan,pomengonate,Anona,Gaduguda, Uguressa etc.
Source: HARTI Survey Data, 2012

4.3.4 Reasons for Frequent Consumption of Fruits by the Sample Respondents

The survey results revealed that the banana and papaw are the major fruit varieties consumed by the sample respondents in all the three districts. However, when considering the reasons for frequent use of major fruit varieties by the respondents, majority in Colombo district (41%) revealed that the main reason for consumption of fruits was preference of children. 27% revealed that they used fruits as the suitability for prevention of some diseases and 18% showed the higher availability as one of the reasons. This situation is much different in Gampaha and Kalutara districts. Highest percentage of respondents in both these districts i.e. 35% and 45% respectively revealed that they consumed major fruit varieties due to higher availability, followed by the preferences of children. Low price is a not significant reason even in "Poor" category of all the three districts. The following table depicts the situation.

Table 4.8: Reasons for Frequent Consumption of Major Fruits by the Sample Respondents

Reasons	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Low Price	02	10	10	06	0	0	09	02	0	0	0	0
Preferences of children	29	40	62	41	24	28	44	31	23	30	50	33
Preferences of adults	10	15	03	08	14	12	03	10	17	10	04	11
Free availability	16	20	18	18	30	36	41	35	42	50	45	45
Beliefs of Suitability to prevent some diseases	43	15	07	27	32	24	03	22	18	10	01	11
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

4.3.5. Frequency of Purchase of Fruits

Table 4.9 depicts the frequency of purchase of fruits by the sample respondents in all the three districts across different income categories. According to the table, it is revealed that the higher percentage of consumers in Colombo and Kalutara districts purchased fruits on Daily basis. It is 28% in Colombo and 22% in Kalutara district. In the Gampaha district, highest percentage of consumers (25%) purchased their fruits on weekly basis.In the case of "Rich" category in each district, highest percentage of respondents purchased fruits on daily basis which is 35% in Colombo, 29% in Gampaha and 32% in Kalutara. About 28% of the respondents of "Average" category in Colombo, 34% in Gampaha and 29% in Kalutara districts purchased major fruit varieties weekly. However, higher percentage of consumers which include "Poor" category in Gampaha (31%) and Kalutara (38%) purchased their major fruit varieties once a month while the higher percentage of poor category consumers in Colombo district purchased fruits weekly.

Table 4.9: Frequency of Fruit Purchase and Consumption

Frequency	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Daily	35	22	21	28	29	21	06	21	32	21	04	22
Once in two days	10	06	06	09	07	04	09	07	08	07	04	09
Once in three days	10	06	06	09	15	04	06	10	06	11	04	08
Once in four days	02	06	03	03	02	04	03	03	02	0	04	02
Weekly	21	28	29	24	25	34	20	25	18	29	18	21
Fortnightly	04	11	12	07	10	13	06	11	08	11	14	09
Once in three weeks	02	0	0	01	0	0	0	0	0	0	0	0
Once in a month	06	06	15	09	05	08	31	13	12	04	38	16
Occasionally	06	09	06	07	02	04	09	04	06	11	10	08
During the season only	04	06	02	03	05	08	10	06	08	06	04	05
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012.

4.3.6. Sources of Purchase of Fruits by Different Income Groups

Table 4.10: Sources of Purchase of Fruits

Sources	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Local Fruits												
Super market	14	08	0	09	13	13	0	10	27	0	0	15
Retail shop	50	67	36	48	68	62	33	58	48	76	60	56
Fair	33	17	50	36	16	19	40	23	18	18	30	20
Mobile vendor	03	08	14	07	03	06	27	09	07	06	10	09
N	100	29	59	188	85	41	47	173	44	23	22	89
Imported Fruits												
Super market	57	20	0	30	67	33	0	38	66	57	0	44
Retail shop	29	80	54	45	27	50	45	39	27	29	57	36
Fair	14	0	36	21	06	17	55	23	07	14	43	20
Mobile vendor	0	0	10	04	0	0	0	0	0	0	0	0
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

The sources of purchase of fruits are presented in Table 4.10. It was observed that, majority of the consumers of "Rich" and "Average" category in all the three districts purchased local fruits from retail shops. In the case of "Poor" category in Colombo and Gampaha, most of the respondents preferred to purchase fruits from fairs while the majority of the respondents of "Poor" category in Kalutara district purchased from retail shops. As a whole, highest percentage of respondents in all the three districts purchased their local fruits from retail shops and it is 48% in Colombo, 58% in Gampaha and 56% in Kalutara. With regard to the imported fruits, majority of the

consumers of "Rich" category in all the three districts preferred to buy imported fruits from the super markets, percentages are 57% in Colombo, 67% in Gampaha and 66% in Kalutara followed by the retailers. Meanwhile, the majority of the "Average" category consumers in Colombo and Gampaha purchased imported fruits from retail shops and the highest percentage (57%) of "Average" category of consumers in Kalutara district preferred to purchase fruits from super markets. However, consumers in poor category often purchased in small amounts because of shortage of cash. Hence they do not to get benefits from supermarkets.

4.3.7 Major Fruit Consumers in the Sample Households

At an individual level food performances play a major role in consumption of fruits. Hence, the influence of family on children's food choices is known to have been very powerful. As shown in Table 4.11, small children are the major fruit consumers of both local and imported fruit varieties than the other age categories in almost all districts. Middle age and old age people consumed fruits less frequently than young adults and young children in all the three districts.Kanugsukkasem.U.*et.al*, (2009) in a study of "fruit and vegetable consumption in rural adult population in INDEPTH HDSS sites in Asia", have shown similar results like in the present study. That is older men and women aged 55-64 years consumed fruits less frequently than younger adults (25-29 years).All the family members in "Rich" category households in all the three districts, consumed fruits more than the respondents of the other two categories. However, the results revealed that majority of the respondents in all the three districts purchased fruits mainly for their children. The old age people, middle age people and young adults consumed fruit less frequently than children.

Table 4.11: Major Fruit Consumers in the Sample Households

Consumers	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Local Fruits												
Small children	33	30	82	48	13	68	77	43	23	81	55	46
Young children	02	0	12	05	02	24	11	10	04	08	30	12
Young adults	08	05	03	06	02	04	08	05	02	07	15	06
Middle age	08	0	0	04	04	0	0	02	04	04	0	03
Old people	04	05	0	03	02	0	0	01	0	0	0	0
All the family members	45	60	03	34	77	04	04	39	67	0	0	33
N	100	29	59	188	85	41	47	173	44	23	22	89
Imported Fruits												
Small children	47	60	93	63	40	55	77	54	58	50	90	65
Young children	13	20	07	12	37	32	23	32	35	43	10	30
Young adults	07	0	0	04	13	09	0	09	07	07	0	05
Middle age	0	0	0	0	02	0	0	01	0	0	0	0
Old people	0	0	0	0	02	0	0	01	0	0	0	0
All the family members	33	20	0	21	06	04	0	03	0	0	0	0
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

4.3.8 Per Capita Consumption of Major Fruits

Table 4.12 reveals the monthly per capita consumption of fruits by different income groups in all the three districts. Thus, highest per capita consumption is reported for banana and it is 0.59kg in Colombo, 0.70kg in Gampaha and 0.80kg in Kalutara, followed by papaw which is 0.38kg in Colombo, 0.34kg in Gampaha and 0.27kg in Kalutara. Monthly per capita consumption of pineapple, mango and watermelon was recorded at a very low level. Considering the imported fruits, highest monthly per capita consumption was recorded for apples and it is 0.26kg in Colombo, 0.28kg in Gampaha and 0.35kg in Kalutara. However, no any significant change was observed for the monthly per capita consumption of major fruit varieties among the different income categories. When considering the monthly per capita consumption of total fruits the survey results reflected to some extent that the higher the income, the higher per capita consumption of fruit. Fruit consumption per capita was affected by income level to some extent and with income increase of consumers as well as enhanced awareness on food nutrition and health, fruit consumption showed a higher level in the proportionate share of expenditure on foods. The survey results also revealed that daily per capita consumption of fruits in all the study areas was very low and it was below the required level of medical recommendation. In the Colombo district, per capita consumption of fruits is 35grams per day, 38 grams per day in Gampaha district and 43 grams per day in Kalutara district. Accordingly, the highest per capita consumption of fruits per day was observed in Kalutara district followed in Gampaha as these two districts are fruit producing areas.

Table 4.12: Monthly and Daily per Capita Consumption of Fruits

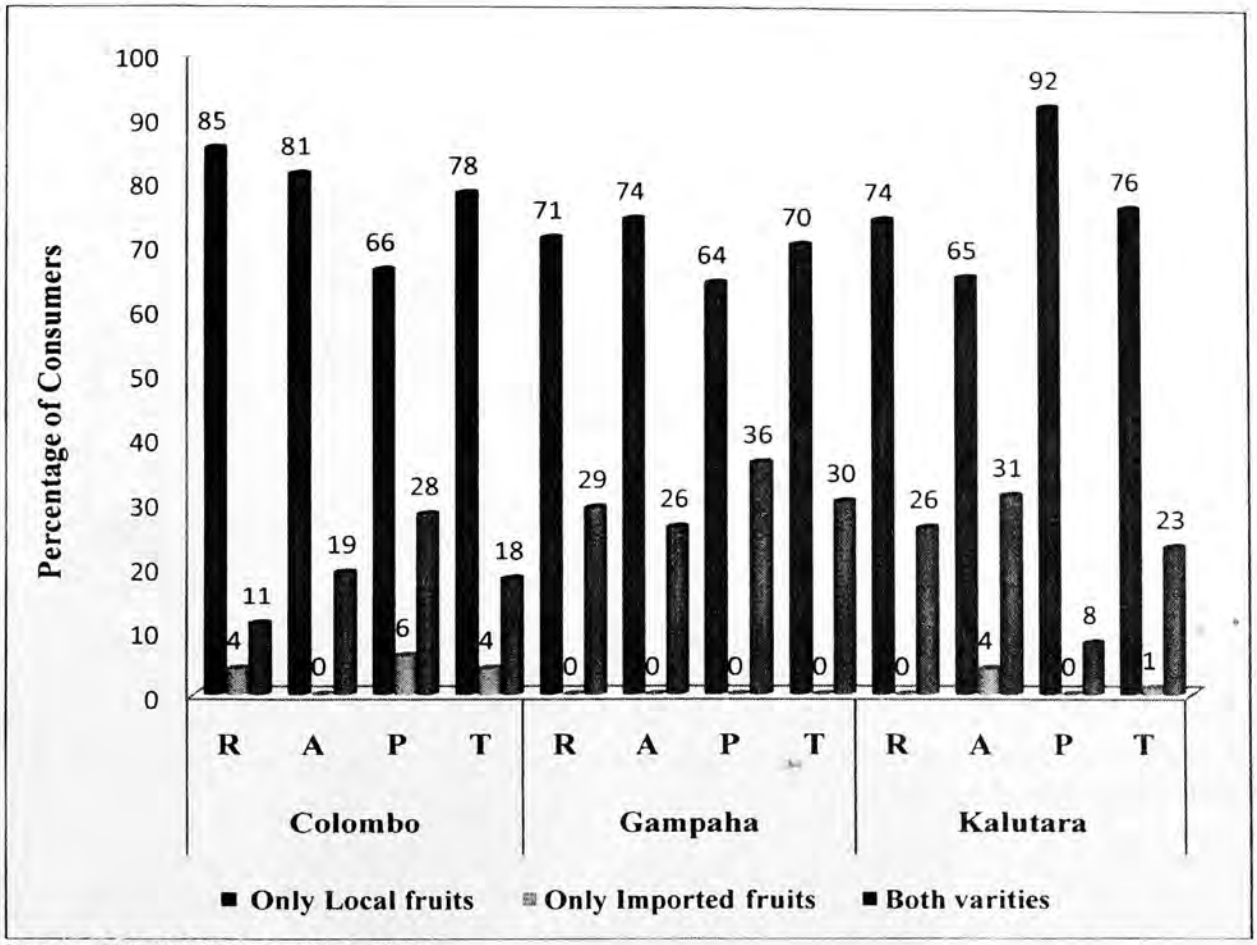
Fruits	Colombo				Gampaha				Kalutara			
	R	A	P	T	R	A	p	T	R	A	P	T
Monthly per capita consumption of total fruits(Kg) (Total fruit kg /Total family members)	1.28	0.90	0.80	1.05	1.31	1.12	0.91	1.15	1.54	1.18	0.91	1.28
Daily per capita consumption of total fruits(Kg) (Monthly per capita consumption/ 30days)	0.04	0.03	0.03	0.035	0.04	0.04	0.03	0.038	0.51	0.04	0.03	0.043

Source: HARTI Survey Data, 2012

4.3.9 Preferences of Fruits

As shown a figure 4.5, more than 60% of the respondents of all the income categories in all the three districts supported the idea that they mostly preferred local fruits than the imported fruits.

Figure 4.5: Preference of Fruits



Source: HARTI Survey Data, 2012

According to the Table4.13, there are five factors affecting the Preferences of respondents for only local fruits. In Colombo district, higher percentage of consumers in "Rich" (40%) category and "Average" (30%) category preferred only local fruits as they think local fruits are more nutritious than the imported fruits. However, higher percentage of "Poor" category consumers (29%), preferred only the local fruits as they are reasonably priced. It means they think that the prices of imported fruit varieties are higher than those of the local fruit varieties. Considering the Colombo district as a whole, first priority factor is nutrition value and other main preventive factor is use of chemicals for imported fruits for longer keeping. "Rich" category consumers in both Gampaha and Kalutara districts, liked more local fruits for their nutrition value, but the "Average" and "Poor" category respondents like to use only local fruits as they were available freely. When considering the Gampaha and Kalutara districts, majority of the respondents use only local fruits as they are available more and it is 28% in Gampaha and 36% in Kalutara. Among the consumers who preferred only imported fruit varieties, majority revealed that they purchase imported fruits due to preferences of their small children.

Table 4.13: Factors Affecting the Preferences for Local Fruits

Factors	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Taste	18	15	13	16	16	13	04	12	11	10	0	08
Availability	07	10	21	12	24	26	39	28	27	28	63	36
Reasonable price	0	20	29	11	08	22	36	19	04	24	26	16
Using chemicals for imported fruits	35	25	25	30	18	22	10	17	28	21	11	21
Nutrition value	40	30	12	31	34	17	11	24	30	17	0	19
N	100	29	59	188	85	41	47	173	44	23	22	89

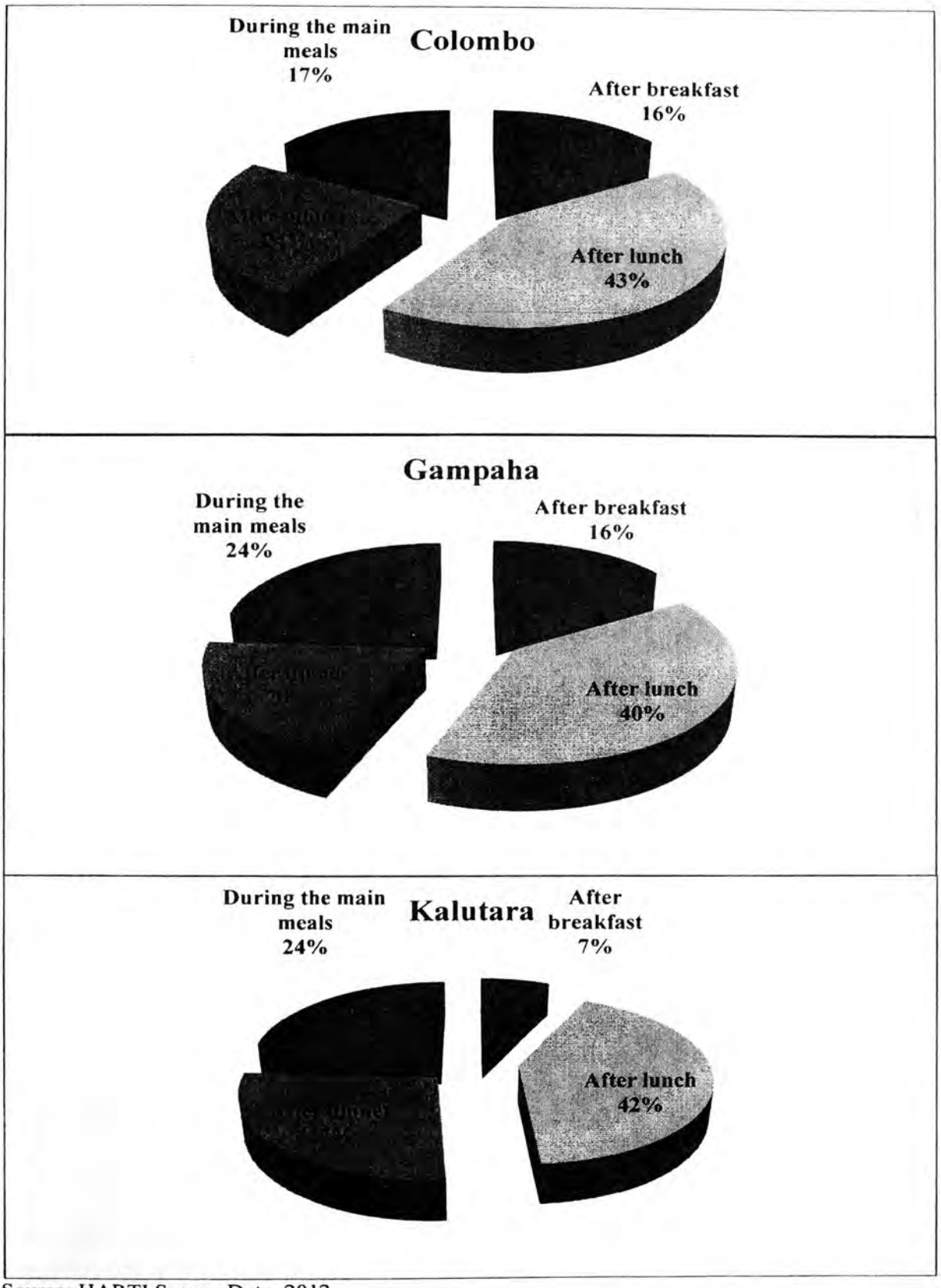
Source: HARTI Survey Data, 2012

4.4. Consumption and Purchasing of Fruits

4.4.1 Time of Consumption

According to the Figure 4.6, majority of the respondents in all the three districts consumed fruits after lunch and it is 43% in Colombo, 40% in Gampaha and 42% in Kalutara. Those who consumed fruits after breakfast were recorded as the lowest percentage in all the three districts. However, no significant difference was observed within the income categories.

Figure 4.6: Time of Consumption of Fruits



Source: HARTI Survey Data, 2012

4.4.2 Decision Makers in Fruit Purchasing

The decision makers in purchase of fruits across different income groups in the selected three districts are presented in Table4.14. It could be noticed from the table that Rich category in Colombo district, higher percentage (30%), housewives (mothers) were the decision makers and at an overall district 28% of them agreed that father and mother (husband and wife) of their family were equally involved in taking decisions of fruit purchasing. In the poor category higher percentage of respondents reported that husbands (fathers) were the main decision makers in purchasing fruits. Moreover, in Average category in Colombo district, joint decisions by both husband and wives were noticed as the highest percentage (31%) and overall it presents 24% in Colombo district. In Gampaha district, decisions regarding purchase of fruits were made by housewives and it was the highest percentage (38%) in both Rich and Average category consumers and as a whole district, it is 34% (highest). In Poor category, only the husband made decisions on consumption of fruits; it is the highest 38% and on the whole district it constitutes 31% of the respondents. In Kalutara district, fathers are the main decision makers in the households as a whole district and it's reasonable that they accounted for over 40% of respondents. As a whole district, 22% of respondents reported that only the housewives make decisions of buying fruits and joint decisions by all the family members were recorded as the lowest percentage (8%).

Table 4.14: Decision Makers in Fruit Purchasing in Different Income Groups

Decision makers	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Only mother	30	19	27	28	38	38	23	34	23	07	36	22
Only farther	25	25	34	28	30	25	38	31	47	30	40	42
Both mother and farther	27	31	15	23	12	25	08	14	16	22	08	16
Children	10	06	12	10	10	08	19	12	08	26	12	12
All the family members	08	19	12	11	10	04	12	09	06	15	04	08
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

4.4.3 Fruit Buyers in the Sample Households

In Colombo district highest percentage of consumers of Rich, Average and Poor category, purchase of fruits were made solely by the housewives (mothers). In Gampaha district highest percentage of respondents in Rich and Average category reported that, housewives were the main purchasing persons of fruits while the highest percentage of respondents in Poor category reported that, only the husbands (Fathers) made the purchases of fruits. Meanwhile in Kalutara district, highest percentage of consumers in Rich, Average and Poor category reported that only husbands (Fathers) made the purchasing decisions of fruits. It is shown by the Table 4.15.

Table 4.15: Fruit Buyers in the Sample Households

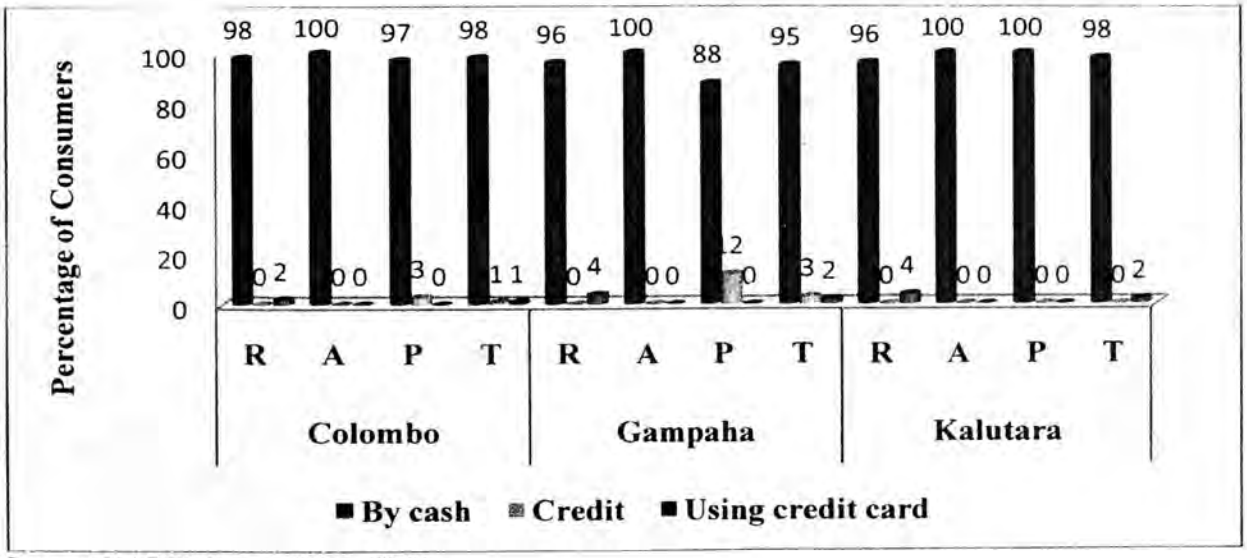
Buyers	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Only mother	32	35	42	36	45	39	22	37	23	22	38	26
Only farther	27	30	35	30	31	26	50	35	53	30	37	43
Both mother and farther	30	23	10	23	14	26	07	15	16	22	13	17
Children	11	12	13	11	10	09	21	13	08	26	12	14
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

4.4.4 The Way of Fruit Purchasing

When considering the way of fruit purchasing 98% of consumers of the entire category in Colombo and Gampaha districts purchased their fruits in cash and it accounts 95% in Gampaha district. Use of credit cards for purchasing of fruits was recorded only among Rich category consumers and it is 1% in Colombo and 2% in both Gampaha and Kalutara . Meanwhile, purchase of fruits on credit basis was reported only in Poor category people in Colombo (1%) and Gampaha (3%). It is shown in figure 4.7.

Figure 4.7: The Way of Fruit Purchasing



Source: HARTI Survey Data, 2012

4.4.5 Major Factors Considered by Consumers when Purchasing Fruits

Many factors can affect purchasing of fruit; economic, cultural and environmental factors and geographical conditions. There are also social factors like population size and population structure. In addition to economic factor, peoples' consumption habits, consumer psychology and other factors also influence the purchasing of fruits. The study revealed that, highest percentage of respondents of Rich and Average category in all the three districts were concerned most about the way of ripening fruits. They

are most worried about the availability of quality fruits as most traders use chemicals to ripen fruits. Hence, most of the consumers were reluctant to buy fruits. In contrast, highest percentages of Poor category consumers in all the districts were concerned most about the price, followed by the way of ripening fruits. When considering the Colombo district as a whole, 45% consumer reported that the quality (whether using chemicals to ripen the fruits) is the most considered factor, followed by the family preferences (20%) and price (19%) and the availability was the least considered factor (2%). In Gampaha district, 37% of the consumers reported that quality is the most serious factor and about 22% and 17% respondents were concerned about family preference and the price respectively. In Kalutara district, 40% of consumers reported that they were concerned most about the way of ripening fruits (Quality), followed by family preference (21%), appearance (16%) and the price came as the next important factor (12%). The results revealed that, with the improvement of living standards and people's enhanced awareness on health and food safety, people put forward higher requirements on the nutrient, variety, quality, convenience and safety of fruits. New trends of consuming are also formed; higher consumer demands on quality, safety and nutrition of fruits are raised. Preferences of consumers affected significantly for the fruit purchasing in the sample households. According to the economic analysis of consumption of fresh and processed fruit in Bowen University IWO,Osun State, in Nigeria conducted by Ayandiji.A. *et al*,(2009), consumer preference was the significant determinant of the amount of fruit consumption. The Table 4.16 shows the situation mentioned above.

Table 4.16: Major Factors Considered by Consumers when Purchasing Fruits

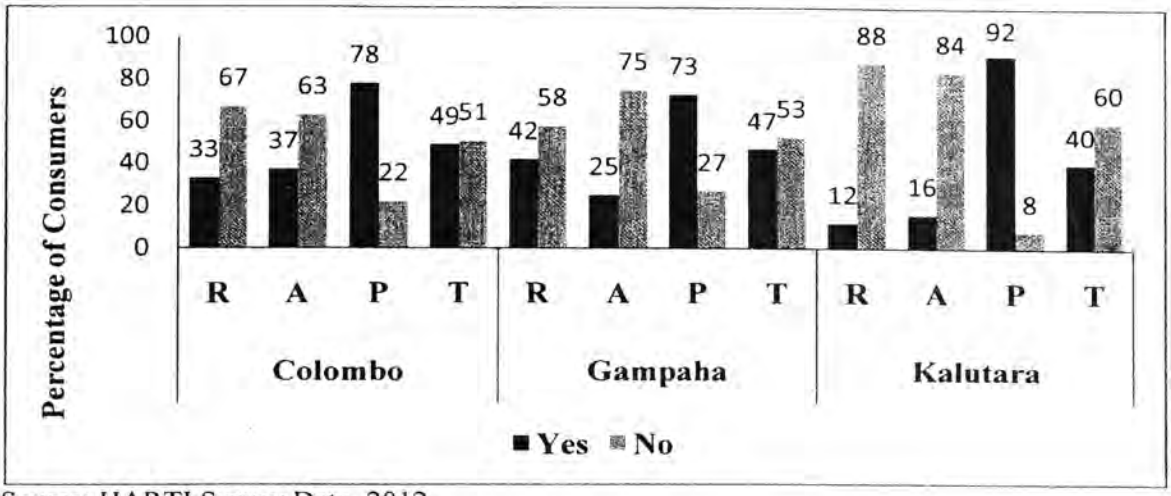
Factors	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Price	13	12	32	19	13	10	29	17	07	16	19	12
Family preferences	22	24	22	21	20	28	21	22	21	12	28	21
The way of ripen the fruits (quality)	51	41	32	45	43	40	21	37	49	44	15	40
Availability	02	06	01	02	02	0	08	03	0	0	15	03
Appearance	07	11	10	08	17	18	13	16	13	20	14	16
Conveniences of purchase	05	06	03	05	05	04	08	05	10	08	09	08
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

4.5 Purchasing Pattern

More than half of the respondents of Rich and Average category in all the three districts said that they would not increase the consumption of fruits when prices dropped due to reasons mentioned in Table 4.17. However, according to the Figure 4.8, the highest percentage of Poor category consumers in all the three districts reported that they like to increase fruit consumption if there is price decrease.

Figure 4.8: Relations between Increasing Fruit Consumption and Decreasing the Prices



Source: HARTI Survey Data, 2012

However, when answering the question that why they do not like to increase fruit consumption, it was revealed that there were five reasons which caused the purchasing behavior. According to the Table 4.17, more than half of the respondents of Rich and Average category in Colombo district do not like to increase their fruit consumption even, when price is reduced as they have no confidence about the way of ripening the fruits. Non availability of good quality fruits was also reported as the second significant factor among the Rich and average category consumers. However, in contrast, highest percentage of Poor category consumers (86%) in Colombo district reported that, they do not like to increase fruit consumption as they are unable to spend more on fruits. Further, they also consider the quality and the way of ripening the fruits too some extent. In Gampaha district, highest percentage of Rich category consumers (56%) reported that they do not like to increase fruit consumption with price reduction as they have no confidence about the way of ripening the fruits. About 23% stated that they can get fruits from their own home gardens. Hence, there is no any effect on price reduction for increasing of fruit consumption. In Average category, highest percentage of consumers reported that (37%) they got their fruits from their own home gardens and 28% of consumers reported that they have no confidence about the way of ripening fruits. However, 70% of Poor category consumers revealed that they had no idea of increasing fruit consumption with price decrease, and 21% reported that they got their fruits from own home gardens. The survey results in Kalutara district also reported the same results regarding "Rich" and "Poor" category in Gampaha district. But highest percentage of "Poor" category consumers (62%) in Kalutara district revealed that they do not like to increase fruit consumption as they obtained fruits from their own home gardens. When considering the districts as a whole, highest percentage of consumers in Colombo (43%) and Gampaha (36%) reported that they do not like to increase their fruit consumption with the price decrease as they had no confidence about the way of ripening fruits, while the highest percentage of respondents in Kalutara district (36%) reported that they obtained fruits from their own home gardens and hence there was no need to increase fruit consumption with the price decrease.

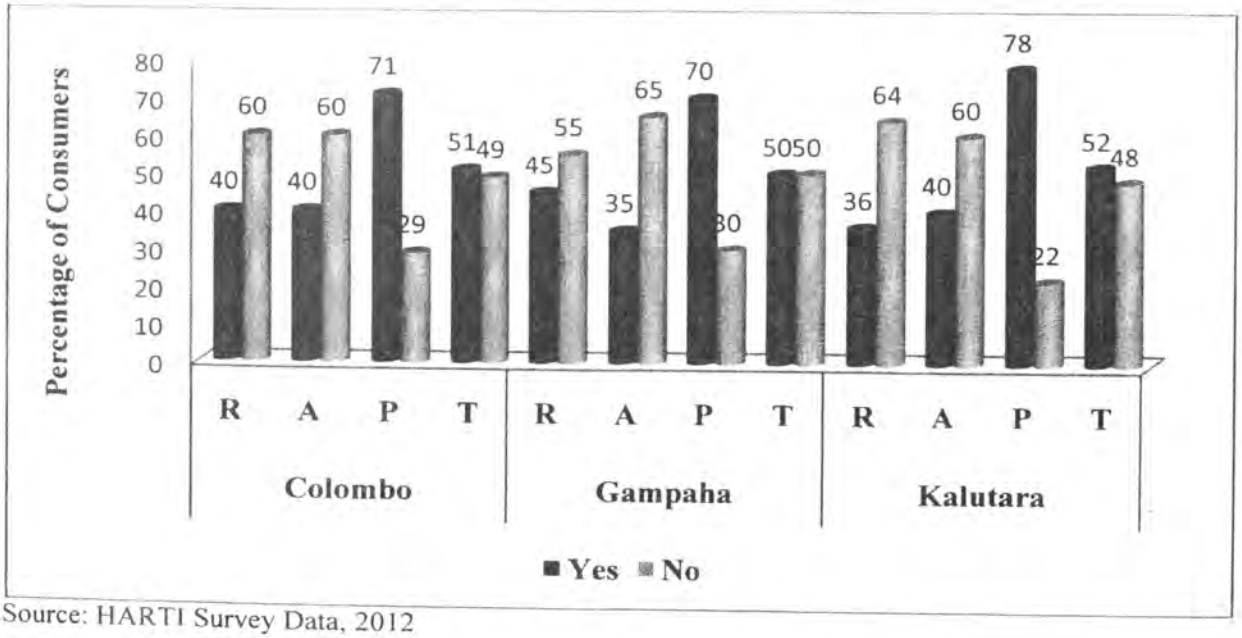
Survey results also indicated that, more than half of the respondents of "Rich" and "Average" categories in all the three districts had not increased their fruit purchasing during their salary period while the highest percentage of Poor category consumers in Colombo (71%), Gampaha (70%) and Kalutara (78%) districts reported that they increased their fruit purchasing during their salary period. It is shown in the Figure 4.9.

Table 4.17: Reasons for not Increasing Fruit Consumption when Prices Decrease

Reasons	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Non availability of good quality fruits	18	17	02	13	13	12	01	10	18	25	02	17
Consumed enough fruits at this moment	15	13	05	12	08	10	03	06	18	10	05	12
No confidence about the way of ripen fruits	64	52	02	43	56	28	05	36	36	28	01	26
Get from their own home gardens	03	13	05	05	23	37	21	26	28	31	62	36
Could not spent on fruits as high cost of living	0	05	86	27	0	13	70	22	0	06	30	09
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

Figure 4.9: Increasing Fruit Purchase during the Payment of Salaries



Source: HARTI Survey Data, 2012

4.6 Consumption of Processed Fruits

According to the Table 4.18, more than half of the respondents of Rich and Average category in all the three districts consumed processed fruits while more than half the consumers of Poor category did not consume processed fruits in all the three districts. The corresponding percentages of not consuming are, 77%, 56% and 54% in Colombo, Gampaha and Kalutara districts respectively.

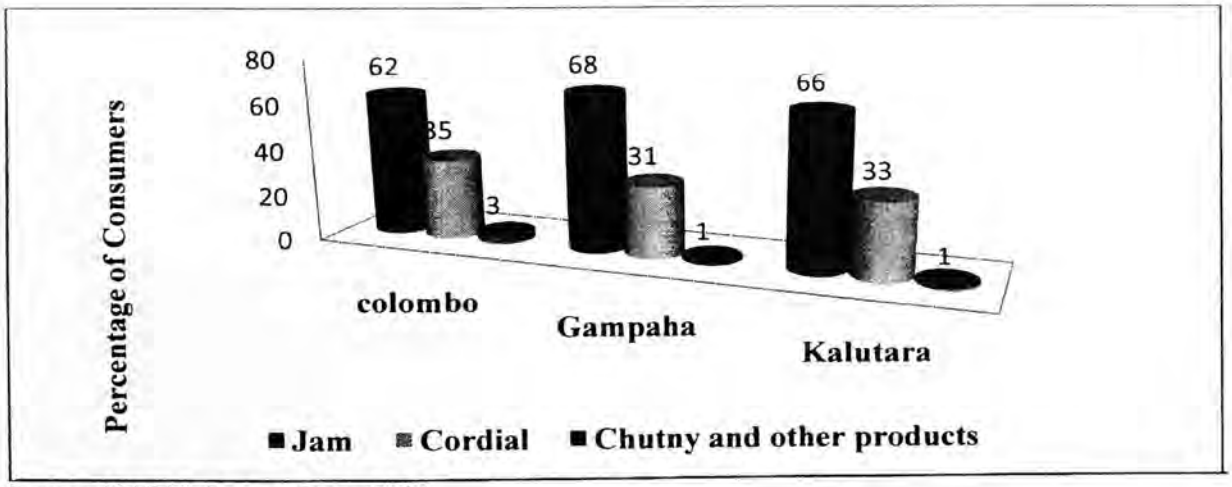
Table 4.18: Monthly Consumption of Processed Fruits

Response	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Yes	69	69	23	55	74	70	44	65	76	69	46	66
No	31	31	77	45	26	30	56	35	24	31	54	34
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

According to the Figure 4.10, the main processed fruit product consumed by the sample respondents in all the three districts was Jam and it is 62% of consumers in Colombo, 68% of consumers in Gampaha and 66% of consumers in Kalutara districts. Cordial was the second highest processed fruit product consumed by the sample respondents and it is, 35% of consumers in Colombo, 31% of consumers in Gampaha and 33% of consumers in Kalutara. However, chutney and other products were consumed in negligible quantities by the sample respondents in all the districts.

Figure 4.10: Major Processed Fruit Varieties Consumed by the Sample Respondents



Source: HARTI Survey Data, 2012

Table 4.19, reveals that, among the consumers who do not purchase the processed products, 82% of rich category consumers in Colombo district, 60% of respondents in Gampaha district, and 50% of consumers in Kalutara district reported that they did not purchase processed fruit products because their family members disliked them and they liked to consume natural fruits. Meanwhile, high price was the main reason for not consuming processed fruit products by 42% of Poor category consumers in

Colombo, 47% of Poor category consumers in Gampaha district and 50% consumers in Kalutara district. Higher percentage of consumers (more than 60%) of average category in all the districts also reported that they did not purchase processed fruit products because of dislikes by their family members as they liked to consume natural fruits.

Table 4.19: Reasons for Not Purchasing the Processed Fruit Products

Reasons	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
No preference by family members	82	62	39	58	60	63	43	56	50	67	47	55
High price	02	28	42	27	21	29	47	32	10	16	50	25
Believes of not suitable for some diseases	16	10	19	15	19	08	10	12	40	17	03	20
N	31	09	45	85	22	12	26	60	11	07	12	30

Source: HARTI Survey Data, 2012

CHAPTER FIVE

Factors Influencing Consumption of Fruits and Consumer Awareness

5.1 Major Factors Affecting Low Consumption of Fruits

The reasons consumers frequently give for not eating more fruits include traditional and individual indifference towards certain fruits, high prices, and variable availability of many fruits, their taste and concerns about quality and safety. Consumers want fruits that are tasty, available, affordable, and convenient to acquire, socio-culturally appropriate, safe and healthy (FAO report, 2004).In order to find out the major factors which affect the low consumption of fruits we asked the question: what do the consumers think about their level of fruit consumption? It means whether they consumed enough fruits or not? According to the Table 5.1, more than half of the respondents in all the three districts stated that they had not consumed enough fruits. However, consumers in Kalutara and Gampaha districts have consumed more fruits than the consumers in Colombo district.

Table 5.1: Adequacy of Consumption of Fruits

Response	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Yes	30	25	10	26	45	48	40	45	49	48	46	48
No	70	75	80	74	55	52	60	55	51	52	54	52
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

According to the Table 5.2, highest percentage of Rich and Average category consumers in all the three districts were most unhappy about the non availability of fresh and tasty fruits as using of chemicals to ripen fruits. About 73% of Rich category consumers, 70% of Average category consumers in Colombo district and 71% of Rich category consumers, 67% of Average category consumers in Gampaha district as well as 79% of Rich category consumers, 61% of Average category consumers in Kalutara district reported that using chemicals to ripen fruits is the most significant factor for their low consumption of fruits. Meanwhile, highest percentage of Poor category consumers in all the three districts stated that high price was the most serious problem which affect their low consumption of fruits. It is 58% in Colombo, 46% in Gampaha and 50% in Kalutara district. When considering the district as a whole, difficulties in buying fruits in the off seasons are the least significant factor for their low consumption of fruits. However, it's very clear that with the improvement of living standards and people's enhanced awareness of health and food safety, they place high priority to the nutrient, variety, quality, convenience and safety of fruits. Thus, new trends of consuming are formed, higher consumer demand on quality, safe and nutritious fruits are raised. Hence, most of consumers in all the study area are dissatisfied mostly about the way of ripening fruits and their taste. Small food safety risks can lead to large concerns among consumers and stop

them from eating what they should. The risks associated with not eating fruits are much greater than food safety risks associated with eating them (FAO report, 2004).

Table 5.2: Major Factors Affecting Low Consumption of Fruits

Factors	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Non availability of fresh and taste fruits due to using chemicals to ripen fruits	73	70	40	61	71	67	38	60	79	61	47	66
High price	21	23	58	34	19	16	46	27	09	27	50	24
Non availability of fruits in the off seasons	06	07	02	05	10	17	16	13	12	12	03	10
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

The socio-economic factors affecting fruit consumption were analyzed by using the multiple regression analysis to derive the relationship between the dependent and independent variables. The following table shows the regression analysis for the quantity of monthly fresh fruit consumption by the consumers in the Colombo, Gampaha and Kalutara districts.

Table 5.3: Regression Analysis in Fruit Consumption

Variables	Coefficient	Standard error	t-ratio	Significant level
Monthly household income	2.796	.600	4.662	.000
Number of family members	1.798	.452	3.980	.000
Education level of main house holder	1.225	.584	2.096	.037
Main occupation of the main householder	1.478	.635	2.323	.020
Age of the main consumers	1.492	.633	2.357	.019
Gender	.824	.681	1.210	.227
Type of family	.766	.678	1.130	.259
Religion	.827	.683	1.211	.226

Source: HARTI Survey Data, 2012

Total monthly household income has significantly affected the quantity of fruit consumption in the sample households ($p<0.05$). This also agrees with the findings of Wen *et.al*, (2011) in their study in China.

Number of family members and their age were significant determinants of the amount of fruit consumption by the sample households ($p<0.05$).This also agrees with the findings of Adeoye *et.al*, (2009) in their study in Ibadan Metropolis. Socio-economic factors influencing consumer preference for fruits in Ibadan Metropolis was investigated by Adeoye *et. al*, (2009). Their results also indicated that factors such as number of members in the family was significantly affected the fruit consumption.

Kanungsukkasem.U *et.al*, 2009, in a study of fruit and vegetable consumption in rural adults' population in Asia has showed that education level was significantly related to inadequate fruit consumption. These results are consistent with those obtained by Braun.B.,*et al*,2009, who concluded that education level of parents are significantly affected by the level of fruit consumption among children. In our study education level of householder also affects the consumption of fruits having significant t-ratio (t-2.096, significance level 0.37).

Main occupation of householder is also affecting the consumption of fruits in the family significantly with significant t-ratio (t-2.323, significance level .020).

However, type of family has not statistically affected the consumption of fruits. This also agrees with the findings of Kanungsukkasem.U. *et.al,* 2009 , in their study. As same the factor that type of family, the religion of the sample respondents has not affected the consumption level of fruits.

Economic analysis of consumption of fresh and processed fruit in Bowen university IWO,Osun State, in Nigeria conducted by Ayandiji.A. *et al*,(2009).Their results indicated that gender of the student affect the consumption of fruits. But in our study, there is no any significant relationship between gender and quantity of fruit consumption within the sample respondents.

5.2 Awareness of the Consumers

5.2.1 Awareness of the Health Benefits and Minimum Daily Intake of Fruits

Table 5.4 shows awareness of consumers about the health benefits of using fruits across different income groups in all the three districts. Accordingly, more than half of the respondents of Rich and Average category in all the three districts were aware of health benefits of using fruits and more than 30% of the respondents of Poor category in all the three districts were also aware of health benefits of using fruits. However, the proportion of unaware consumers was high in Poor category in all the districts. The results revealed that in eating habits of the consumers, fruit is often seen as non- essential, and consumers still do not realize that fruit should be an important part in daily diet. When considering the districts as a whole, more than 50% of the consumers are aware of health benefits of fruit consumption as consumer's health and food safety consciousness has increased and they enhanced awareness of health and food safety. Consumers were also questioned on their awareness of minimum daily intake of fruits and more than 93% of the consumers in all the three districts were not aware of the minimum daily intake of fruits. The proportion of unaware consumers about health benefit of fruit consumption also was significant in all the three districts and it has revealed that the importance of the initiation of awareness program in future.

Table 5.4: Awareness of the Health Benefits and the Minimum Daily Intake of Fruits

Response	Awareness about the health benefits of fruit consumption											
	Colombo				Gampaha				Kalutara			
	R%	A%	P%	T%	R%	A%	P%	T%	R%	A%	P%	T%
Yes	63	50	30	51	60	53	35	51	62	51	32	52
No	37	50	70	49	40	47	65	49	48	49	68	48
N	100	29	59	188	85	41	47	173	44	23	22	89
Response	Awareness about the minimum daily intake of fruits											
	Colombo				Gampaha				Kalutara			
	R%	A%	P%	T%	R%	A%	P%	T%	R%	A%	P%	T%
Yes	06	10	05	06	10	06	02	06	08	05	04	07
No	94	90	95	94	90	94	98	94	92	95	96	93
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

5.2.2 Sources of Awareness of Health Benefits of Fruit Consumption

Table 5.5 indicates that the sources of awareness of health benefits of fruit consumption by the sample respondents. Accordingly, about half the respondents of Rich, Average and Poor category in Colombo district reported that media was the major source of awareness. However, midwives were the source of awareness for about 29% (second highest) of Poor category consumers. The second highest source for Rich and Average category people in Colombo district was doctors and it was 27% and 38%respectively. Similar results were found in the Gampaha and Kalutara districts. Considering the districts as a whole, highest percentage of respondents in Gampaha (44%) and Kalutara (46%) received their awareness of health benefits of fruit consumption by media followed by doctors (22% in Colombo and 15% in Kalutara) and by education (12% in Gampaha and 15% in Kalutara). However, the source of getting awareness about the health benefits of fruits by midwifes was higher in the Poor category consumers in all the districts when compared to other sources.

Table 5.5: Sources of Awareness of the Health Benefits of Fruit Consumption

Sources	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Doctors	27	30	0	22	18	35	17	22	20	14	04	15
Media	52	50	50	51	50	27	44	44	44	46	64	46
Education	14	09	10	13	14	06	17	12	20	14	04	15
Books	04	06	05	04	12	04	04	09	06	11	09	09
Family members	04	01	06	04	06	19	04	09	04	11	09	07
Midwives	0	04	29	06	0	09	14	04	06	04	10	08
*N	63	15	18	96	51	22	16	89	27	12	07	46

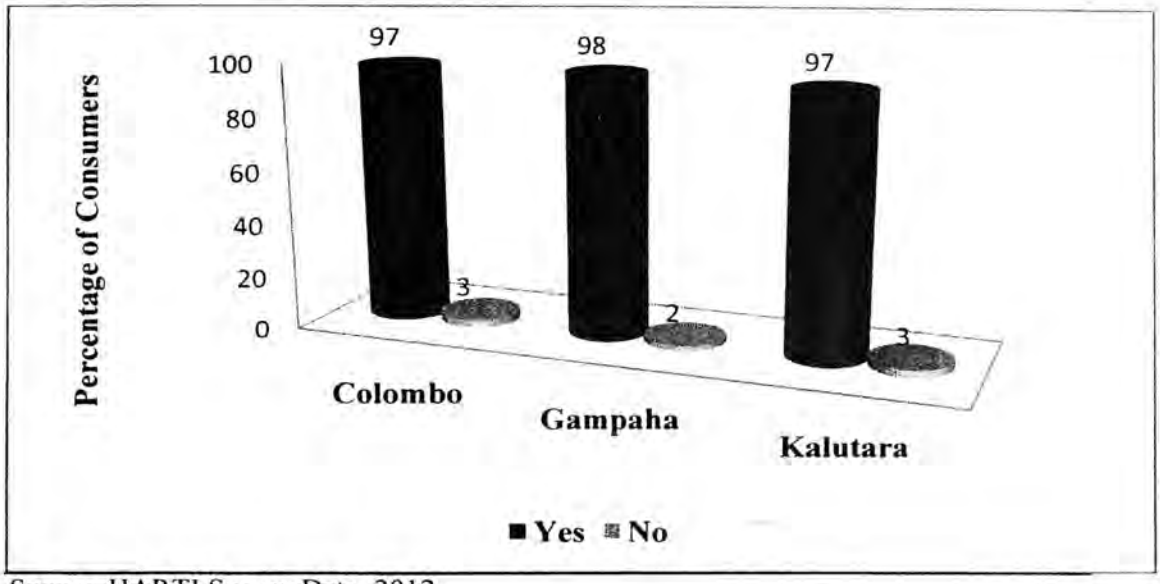
*N-Number of consumers who aware about the health benefits of fruit consumption

Source: HARTI Survey Data, 2012

5.2.3 Awareness of Using Chemicals to Ripen Fruits

Consumers were also questioned on their awareness of using chemicals to ripen fruits. Figure 5.1, clearly shows that more than 95% of the consumers in all the three districts were aware of too many sprays (over spray) of chemicals to ripen the fruits. It is revealed that the presence of residues and freshness also featured highly in consumer concerns.

Figure 5.1: Awareness of the Use of Chemicals to Ripen Fruits



Source: HARTI Survey Data, 2012

5.2.4 Awareness of the Identification of Naturally Ripen Fruits

According to the Table 5.6, more than 60% of the respondents of all income categories in Colombo district, reported that they could not identify whether chemicals had been applied to ripen the fruits or not. In contrast, more than half the consumers of all income categories in both Gampaha and Kalutara reported that they could identify whether chemicals had been applied or not to ripen fruits, as these two districts are fruit producing areas. Among the consumers who could identify whether chemicals had been used or not for ripening of fruits, highest percentage of consumers in all the three districts reported that they could identify this by appearance (57% in Colombo, 54% in Gampaha and 51% in Kalutara) and by color. The Table 5.7 depicts the situation mentioned above.

Table 5.6: Identification of the Naturally Riped Fruits

Response	Colombo				Gampaha				Kalutara			
	R %	A %	P%	T %	R %	A %	P %	T %	R %	A %	P %	T %
Yes	06	07	37	16	54	67	65	62	65	66	60	64
No	94	93	63	84	46	33	35	38	35	34	40	36
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

Table 5.7: The Way of Identification of Naturally Riped Fruits

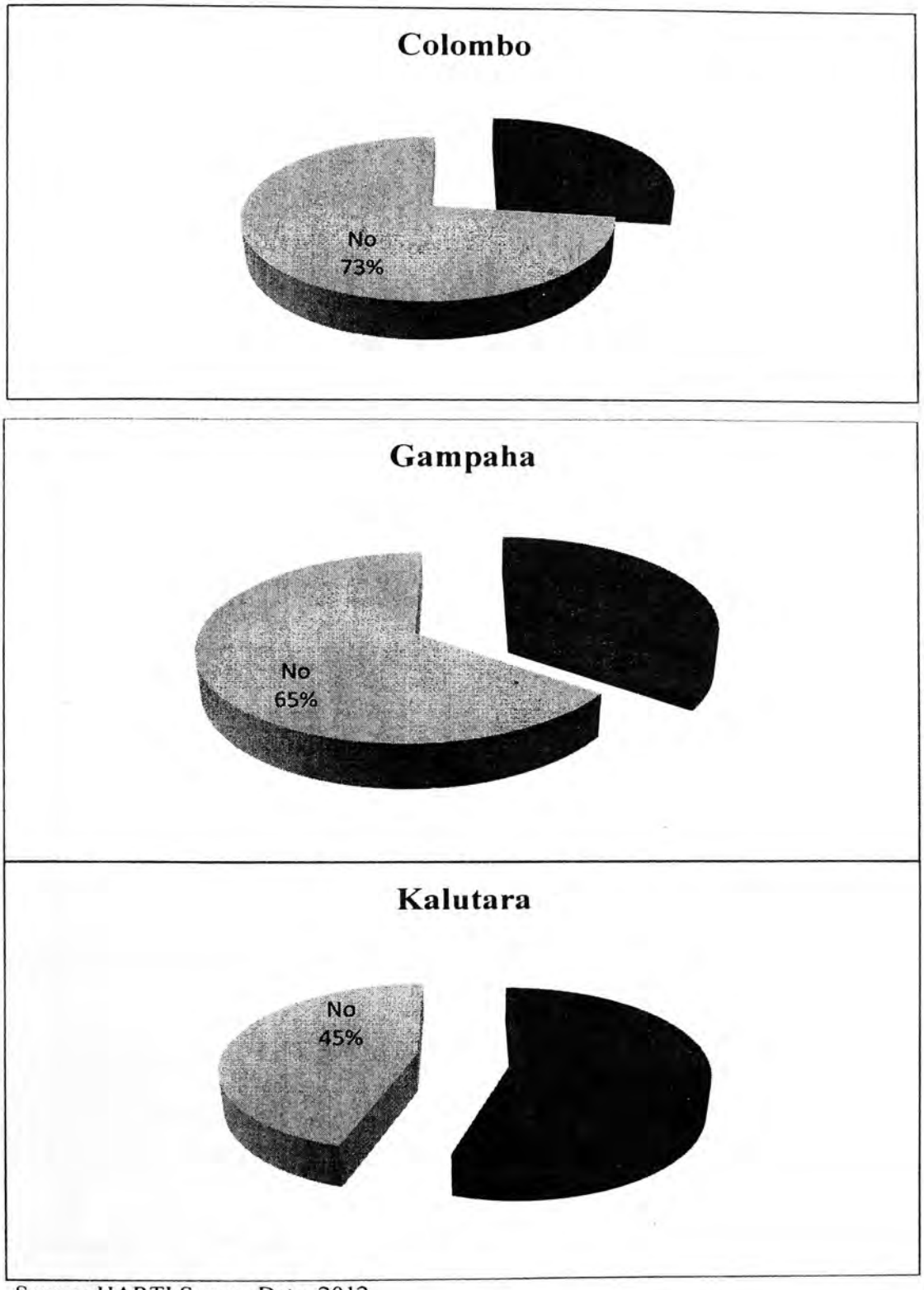
Ways	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Appearance	68	32	46	**57**	61	50	43	**54**	52	48	41	**51**
Color	09	26	29	**16**	20	19	27	**21**	18	21	35	**23**
Ripen pattern	11	21	04	**11**	07	23	13	**12**	15	10	18	**14**
Taste and smell	10	15	21	**13**	12	04	13	**11**	13	17	06	**10**
By experience	02	06	0	**03**	0	04	04	**02**	02	04	0	**02**
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: HARTI Survey Data, 2012

5.2.5 Confidence about the Availability of Naturally Ripen Fruits within the Purchasing Point

Figure 5.2 reveals that availability of naturally ripen good quality fruits at the purchasing spot was a factor in purchase by the sample respondents. 73% consumers in Colombo district noted that they were not sure about the availability of naturally ripen fruits in their purchasing point. It is 65% in Gampaha and 45% in Kalutara district. However, in Kalutare district, highest percentage of consumers (55%) reported that they were sure about the availability of naturally ripen fruits at their purchasing point as they purchased most of the fruits from village itself.

Figure 5.2: Confidence the Availability of Naturally Riped Fruits



Source: HARTI Survey Data, 2012

5.2.6 Factors Influencing Confidence of the Consumers

The Table 5.8 depicts the factors influencing consumers' confidence regarding the availability of naturally ripens fruits at their purchasing spot. Accordingly, among the

respondents who had confidence about purchasing fruits, 71% of consumers in Colombo district had built a confidence about their purchasing of naturally ripen fruits by regular purchasing and 16% reported that they had confidence about fruits as they bought fruits from neighbors. In Gampaha district, 48% of consumers reported that they bought their fruits from village sellers. Hence they were sure about the fruits they purchase as they were naturally ripened. 24% of respondents reported that they had confidence about the fruits they used as they received them from their own home gardens. In Kalutara district, 53% of the consumers reported that they were sure about purchasing of naturally ripened fruits as they bought them from village sellers, and 25% respondents reported that they got their fruits from their own home gardens and 12% reported that they buy their fruits from neighbors. Hence, they had confidence about the availability of naturally ripened fruits.

Table 5.8: Factors Affecting Confidence Building among the Sample Respondents

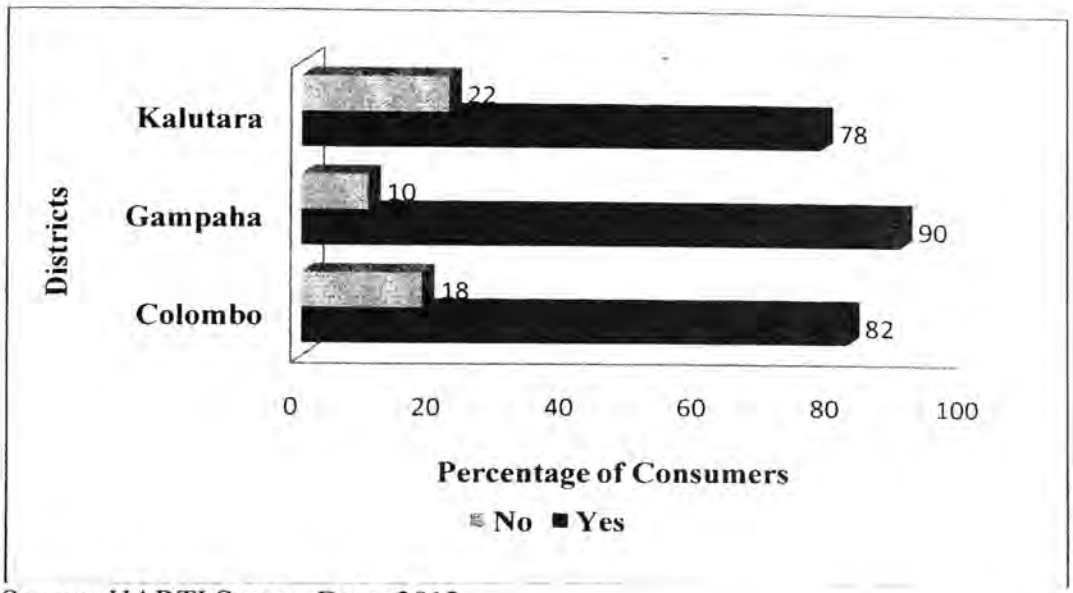
Factors	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Buy from village sellers	04	13	26	08	42	54	50	48	50	68	42	53
By regular purchasing	79	73	46	71	21	18	08	18	13	07	0	10
Buy it from neighbors	15	12	23	16	05	20	15	10	11	07	18	12
Get from own home gardens	02	02	05	05	32	08	27	24	26	18	40	25
Total	100	100	100	100	100	100	100	100	100	100	100	100

Source: HARTI Survey Data, 2012

5.3 Increasing Fruit Consumption with Availability of Naturally Riped Good Quality Fruits

According to the Figure 5.3, 82% of the consumers in Colombo district, 90% consumers in Gampaha district and 78% consumers in Kalutara district are ready to increase their fruit consumption if naturally ripen good quality fruits are available. There is no significant difference within income categories and majorities are willing to increase fruit consumption.

Figure 5.3: Relationship between Increasing Fruit Consumption and the Availability of Naturally Riped Fruits



Source: HARTI Survey Data, 2012

5.4 Willingness to Pay Higher Prices for Naturally Riped Good Quality Fruits

According to the Table 5.9, 94% of the respondents in both Rich and Average categories in Colombo district were ready to pay higher prices for naturally ripen good quality fruits while 75% of the respondents of Poor category reported that they were not ready to pay higher prices for quality fruits as they had no ability to pay higher prices for fruits. Around 94% of Rich category consumers and 87% of Average category consumers in Gampaha district and 96% of Rich category consumers and 84% of Average category consumers in Kalutara district liked to pay higher prices for naturally ripen fruits. As same as the results of Poor category consumers in Colombo district, higher percentage of Poor category consumers in Gampaha(59%) and Kalutara (88%) districts also were not ready to pay higher prices for naturally ripen good quality fruits as they had no capability to spend more money on fruits. However when considering all the three districts as a whole more than 70% of the consumers are ready to pay higher prices for good quality naturally ripen fruits.

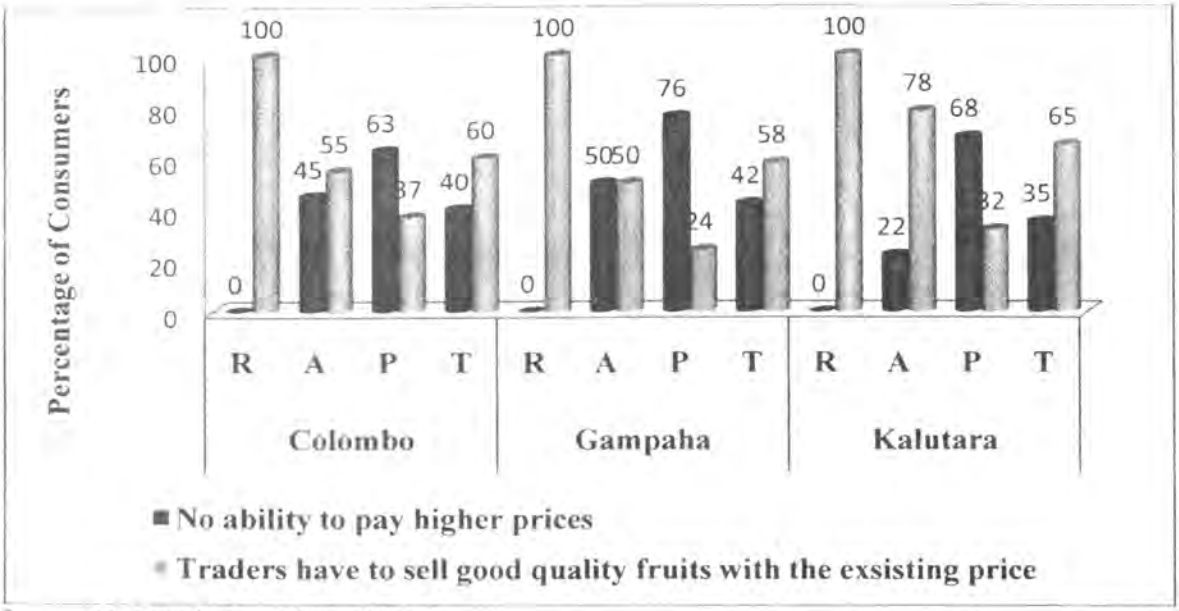
Table 5.9: Willingness to Pay Higher Prices for Good Quality Fruits

Response	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Yes	94	94	25	72	94	87	41	78	96	84	2	71
No	06	06	75	28	06	13	59	22	04	16	88	29
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

According to the Figure 5.4, there are two reasons which affect unwillingness pay higher prices on quality fruits by the sample respondents. Almost all Rich category consumers in all the three districts who were not ready to pay higher prices reported that traders must give quality fruits for the existing price while the higher percentage of Poor category consumers reported that they did not have ability to spend higher prices on fruits.

Figure 5.4: Reasons for Not Willing to Pay Higher Prices for Good Quality Fruits



Source: HARTI Survey Data, 2012

5.5 Consumers' Suggestions to Improve Fruit Consumption

As shown in Table 5.10, the highest percentage of Rich category consumers in Colombo district (47%), pointed out that naturally ripen good quality fruits should be sold and 43% of consumers of the same category in Colombo district, reported that government should impose a regulatory framework and should issue a quality certification to assure availability of naturally ripen fruits. Further, 61% of the Average category consumers in Colombo district reported that, naturally ripen fruits should be available for sale and 21% pointed that government should impose a regulatory frame work, and 15% consumers reported that, fruits should be sold at a reasonable price to increase the fruit consumption in future. In contrast, the highest percentage of Poor category consumers in Colombo district (47%), pointed out that fruits should be sold at reasonable prices and 44% of them insisted that the availability of naturally ripen fruits is also important to increase fruit consumption in future. The same results have been shown in the other two districts also within the various categories of consumers. However, considering the districts as a whole, the highest percentage of consumers reported that availability of naturally ripen good

quality fruits is the most significant suggestion to increase the fruit consumption in future and it accounts 47% in Colombo, 50% in Gampaha and 52% in Kalutara. The second most important suggestion is imposing a proper regulatory framework and issuing quality certification for naturally ripened fruits by the government. It is pointed out by 27% of consumers in Colombo district, 25% of consumers in Gampaha district and 27% of consumers in Kalutara district. Third important suggestion is that fruits should be sold at a reasonable price. It is reported by 19% of consumers in both Colombo and Gampaha and, 17% of consumers in Kalutara district.

Table 5.10: Consumers' Suggestion to Improve Fruit Consumption

Suggestions	Colombo				Gampaha				Kalutara			
	R %	A %	P %	T %	R %	A %	P %	T %	R %	A %	P %	T %
Should be sell naturally ripen good quality fruits	47	61	44	47	59	56	20	50	57	63	32	52
Should be sell with reasonable price	04	15	47	19	12	08	42	19	04	01	56	·17
Should be imposed a regulatory frame work and should be issued the quality certification by the government	43	21	03	27	22	32	31	25	31	33	9	27
Should introduce a packing system	02	01	03	03	04	01	03	03	04	01	01	01
Should conduct an awareness program to farmers, and traders about how to produce a quality products	04	02	03	04	03	03	04	03	04	02	02	03
N	100	29	59	188	85	41	47	173	44	23	22	89

Source: HARTI Survey Data, 2012

CHAPTER SIX

Conclusions, Recommendations and Suggestions

6.1 Summary of Findings

Fresh fruits are key components of a healthy diet. Due to their high nutritive value, they make a significant nutritional contribution to human well being. However, the consumption of fruits among Sri Lankans is still relatively low than in other developing countries and far below the required level of medical recommendation (MRI). Hence, this study was aimed to find out the factors affecting low consumption of fruits. It focuses on the Western province as a major consuming area. The important findings of the study are presented below.

6.1.1 Consumption Pattern and Consumer Behavior

When considering the daily per capita consumption of total fruits, virtually no one consumed sufficient amount of fruits in all the study areas. Though the MRI recommendation of daily per capita consumption of fresh fruits is 100 grams, daily per capita consumption of fruits in each district is 35grams in Colombo district, 38grams in Gampaha district and 43grams in Kalutara district. However, daily per capita consumption of total fruits among the consumers in rich category was comparatively higher than that of the other categories.

The survey found that 70% of the respondents in Colombo district do not cultivate any fruits while 80% of the respondents in Gampaha district and 94% of the sample consumers in Kalutara district cultivate fruits in their home gardens.

The monthly household expenditure on fruits was found to be highest in the case of rich category in all the three districts. When compared to the districts, majority of the respondents in Kalutara district consume their own produce obtained from their home gardens. Therefore, most of the consumers in Kalutara district have not spent much money on fruits when compared to the other districts.

When considering income categories, respondents of the rich category in all the three districts spent 4% on fresh fruits from their total food expenditure while average category consumers spent 3% (Colombo), 4% (Gampaha) and 2% (Kalutara) from their total food expenditure. Sample respondents of poor category in all the three districts spent 1% for fresh fruits from their total food expenditure.

The percentage spent on fruits from their total household expenditure of sample respondents in all the three districts, is 1%. But when considering the absolute value spent on fruits, respondents of the Kalutara and Gampaha districts have spent less than the respondents of the Colombo district as those two districts are fruit producing districts. However, when considering the expenditure on fruits in all the three districts as a whole, it only occupied a tiny fraction of the monthly total food expenditure. It is recorded at nearly 3%.

The study found that highest percentage (77%) of consumers in Colombo district, are "Market dependent consumers" and it means that, majority of consumers obtained their fruits only by purchasing. About 12% of the consumers are "Mixed consumers" (both purchasing and producing) in Colombo district. In Gampaha district, 54% of the respondents are market dependent and 20% are "Auto consumers" (Produce their own fruits). However, in Kalutara district, 38% of the consumers got their fruits from both home gardens and through purchasing (mixed consumers), 29% are "Market dependent consumers" and 24% are "Auto- consumers".

Banana is the most consumed variety as a single fruit by the respondents in all the three districts. Banana is consumed by 65% of the consumers in Colombo, 72% of the consumers in Gampaha and 51% of the respondents in Kalutara, followed by Papaw. Among the banana varieties, *seeni* and *ambul* are the most popular varieties consumed by the sample respondents. Considering the imported fruits, apple is the most consumed variety by the sample households in all the three districts.

In Colombo district, 43% of the consumers in rich category consumed fruits as their suitability to prevent some diseases and 29% of the consumers reported that children's preference was the main cause for purchasing of fruits. However, 40% of the consumers in average category and 62% of the respondents in poor category consumed fruits because of their children' preferences. In Gampaha district as a whole, 39% of the respondents consumed fruits because of higher availability and 38% of the consumers reported that the preferences of children was the main reason of fruit consumption. The situation in Kalutara district was same as the situation in Gampaha district. The study revealed that, consumers of rich category in all the three districts paid more attention to their health and food safety than the consumers in other two categories.

Higher percentage of consumers in all the three districts purchased their fruits weekly. It is 28% in Colombo district, 25% in both Gampaha and Kalutara districts. However in the case of rich category in each district, highest percentage of consumers purchased their fresh fruit requirements on daily basis. This is 35% in Colombo, 29% in Gampaha and 32% in Kalutara.

About 50% of the respondents in each district purchased their fruit requirements from retail shops followed by fairs.

Small children are the major fruit consumers; both local and imported fruit varieties in all the three districts, followed by young children. However, older, middle age and young adults consumed fewer amounts of fruits than the children in their household.
There are six factors considered by the sample respondents when purchasing fruits; 1)The way of ripening fruits (Quality), 2)Price, 3)Family preferences, 4)Availability, 5)Appearance, 6) Convenience of purchase. Within these factors the way of ripening fruits (Quality) was the first considering factor by the sample respondents in all the three districts and family preferences and price were the next considerations. However when analyzing the income category, higher percentage of consumers in poor category were more concerned about the price than the quality while rich and average category consumers were more concerned about the quality (the way of ripening the fruits) than the price.

More than 50% of the respondents of all the income categories in each district supported that they preferred local fruits than the imported fruits. Rich category consumers in all the three districts and average category consumers in Colombo district prefer for local fruits as they think local fruits are more nutritious than the imported fruits. In contrast, highest fraction of average category and poor category consumers in both Gampaha and Kalutara districts, most preferred the local fruits due to their ready availability.

More than half of the respondents of rich and average category in all the three districts had consumed processed fruits while more than half of the respondents in poor category did not consume processed fruits due to high cost of living. Jam is the most consumed variety followed by cordial. However, chutney and other products were consumed in negligible quantities by the sample respondents in all the three districts.

6.1.2 Factors Influencing Consumption of Fruits

When considering the socio-economic factors affecting fruit consumption of the sample respondents as a whole, this study revealed that, numbers of children in family and monthly household income are highly significant. Education level and main occupation of the householder and age of the main consumers were also significant, while, rest of the factors like, religion, gender, family type and nationality were not that significant.

The study also found that, 82% of the consumers in Colombo district, 90% of the consumers in Gampaha district and 78% of the consumers in Kalutara district are ready to increase their fruit consumption if naturally ripen good quality fruits are available. There is no any difference within the income category for this preference and majority of the entire category are willing to increase fruit consumption.

More than 80% of the respondents in rich and average category in each district are ready to pay higher prices for naturally ripened good quality fruits while more than 50% of the respondents of poor category reported that they were not ready to pay higher prices for quality fruits as they had no ability to pay higher prices on fruits.
According to the consumers, there are three major factors associated with low consumption of fruits. More than 60% of the consumers in rich and average category in all the three districts are worried about the non availability of fresh and tasty fruits because of chemicals application to ripen fruits. In contrast, more than 45% of the consumers in poor category in each district felt high price is the most serious problem affected their low consumption of fruits. Non availability of fruits in the off seasons was a least important factor for low consumption of fruits.

6.1.3 Awareness of the Consumers

The study found that, about half the respondents of rich and average category in all the three districts were aware of health benefits of using fruits and more than 45% of the respondents of poor category in all the three districts were also aware of health benefits of using fruits. The proportion of consumers who were unaware of health benefits also were insignificant in all the categories.

Consumers were also questioned about their awareness of the quantity of minimum daily intake of fruits and more than 92% of the sample respondents in all the three districts reported that they were not aware of the quantity of minimum daily intake of fruits. Further, more than 95% of the consumers in all the three districts were aware of over spraying of chemicals to ripen fruits.

More than half the respondents of the entire income category in Colombo district, could not identify naturally ripen fruits, but more than half the consumers of entire category in both Gampaha and Kalutara districts could identify naturally ripen fruits as these districts are fruit producing areas. It is revealed that, most of the consumers in fruit producing areas have a good knowledge of the quality of fruits.

More than half the respondents in all the three districts noted that they had not consumed enough fruits. However, consumers in Kalutara and Gampaha districts had consumed more fruits than the consumers in Colombo district.

According to the consumer suggestions to improve fruit consumption they pointed out that, availability of naturally ripen good quality fruits is a very important factor. 47% of the consumers in Colombo, 50% of the respondents in Gampaha and 52% of the consumers in Kalutara districts approved that suggestion. The second important suggestion is imposition of a regulatory framework and issuing quality certification by the government. Maintaining a reasonable price is the third important suggestion by the sample respondents in all the three districts. Conducting an awareness program to farmers and traders about how to produce quality fruits, increasing quality fruit production and introducing a packing system are other important suggestions made by the sample respondents.

6.2 Conclusion

Many factors; such as economic, cultural, environmental and social affect consumption of fruits. Economic factors are the main factors as they determine people's consumption capacity and consumption levels.

The results from the study revealed that consumption of fruits is highly dependent on family income and number of members in the family. Main occupation and education level of the householder and age of the main consumers were other significant contributing factors affecting consumption of fruits. Other variables such as gender, type of family, nationality and religion did not in any way influence fruit consumption.

Inadequate fruit consumption was common in all the income categories in the selected districts. Non availability of fresh and tasty fruits because of using chemicals to ripen fruits, high price, and seasonality were identified as the major significant factors responsible for low consumption of fresh fruits. The study revealed that, consumers were more concerned about the way of ripening fruits. They were reluctant to buy fruits ripened by spraying chemicals and majority of them reported that the fruits which are not naturally ripen, have no real taste. They also thought it was harmful for their health specially their children' health. Small food safety risks can lead to large concerns among consumers and stop them from consuming what they should. Levels

of pesticide used by cultivators and over spraying of some chemicals on fruits to ripen are not monitored in Sri Lanka as well as in most of the developing countries. So the levels of contamination are not known. Consumers need truthful and trustworthy information when they take purchasing decisions and should not be mislead. As the consumers' health and food safety consciousness has increased significantly, most of them are aware of the health benefits of using fruits but almost all consumers had no idea of the minimum daily intake of fruits. In consumers' point of view, they expect fruits which are tasty, readily available, affordable, convenient to acquire, safe and healthy. Hence, effective policies and initiatives to promote adequate consumption of fruits in the community are urgently needed. Information on health benefits of sufficient fruit consumption should be widely disseminated. There is a need for policies to promote and support fruit consumption. The general principles to promote fruits may have to include availability, accessibility, affordability, acceptability (quality, taste, safety etc.). Though the availability, accessibility and affordability have been already addressed by the government to some extent, proper attention has not been paid still for the acceptability (quality, taste safety). Majority of consumers required the availability of naturally ripened good quality fruits to improve fruit consumption. So, effective policies and programs and initiatives may have to focus on this matter to improve fruit consumption in future.

6.3 Recommendations and Suggestions

- Need to frame proper policies and impose a regulatory framework
  Consumers are concerned more on safety of fruits and their effects on health. Hence, policy and other implications related to increasing quality and safety fruit production should be considered and the government needs to conduct adequate monitoring programs to assure safety of fresh fruits and tolerable levels of chemical spraying. Existing Government policies and rules which support fruit availability, affordability, and accessibility have to be improved and imposition of new policies and regulations regarding the acceptability (Quality, taste, safety) are also urgently required.

- Need to conduct awareness programs for consumers
  The general public must be made aware of the nutritional importance of consumption of fresh fruits and about the minimum daily intake of fruits through campaigns, media etc.

- Need to conduct awareness programs for farmers and traders to improve harvesting practices
  Farmers and traders are key players in overall strategies aimed increasing fruit consumption. Hence, policies are needed to empower farmers and traders to ensure supplies of safe and quality fruits. Providing education to farmers, retailers, wholesalers, and supermarkets etc. on safety fruit production, improving harvesting and selling practices as the consumer attitudes and perceptions are very important factors to be considered by the government.

- Need to increase safe and fresh fruit marketing
  The public health challenge is enforcement of strict hygiene measures and agricultural practices that ensure safe, fresh produce for the consumers. In

European countries, officers of the relevant authorities carry out inspections and other central procedures on fruit under EU and national plant health and marketing standards legislation. This includes the enforcement of EU quality standards covering most fruit and vegetables market in IOI through inspections at wholesale and retail level. The product must be fit for human consumption. Hence, pesticide levels and over sprays of some chemicals on fruits to ripen have to be monitored by the government by using relevant authorities. New regulatory framework for that is also urgently required.

- Need to increase fruit consumption
  The cultivation of fruits as well as their levels of consumption should be enhanced. Proper guidance on consumption of fruits should be strengthened. It is urgent to educate parents on food and nutrition regarding children's dietary intake of fruits at home. Through Pre-schools, schools, government offices, messages could be passed on to the public and it will help to increase fruit consumption.

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