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PRODUCTION AND MARKETING OF BANANA: ESTIMATING THE PROFITABILITY USING WALAWA REGIO SRI LANKA

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ABSTRACT

Banana is one of the prominent cultivation fruits in Sri Lanka and at present, approximately 54 percent of the total fruit cultivation lands are used to cultivate Banana. There is a wide range in cultivating practices and sales channels which all are linked together into the supply chain in the country. The domestic Banana supply chain is a good example of the fruit and vegetable supply chain of the country. This study attempts to determine the relative profitability of banana using data collected from 'Walawa region' during the period of July to September 2017. Total cost, profit and benefit cost ratio for indifferent marketing channels such as banana producers, wholesalers and retailers ware investigated. The results show that, the profit margin of the retailer is greater than that of the farmers and wholesalers. It is also found that average benefit cost ratio of the producer has the highest, however the retailer has the largest impact on determining the price of banana in the intermediate chain. The results of this study can be used to make appropriate policies for increasing the competition in different value chain of the Banana production and marketing in Sri Lanka.

Keywords: banana, profitability, supply chain, Sri Lanka

Introduction

Banana is an important crop grown in Sri Lanka and there is a dearth of information on its genetic diversity to assist in crop breeding and improvement programs. It is one of the prominent cultivation fruits in the country and at present, approximately 54 per cent of the total fruit cultivation lands are used to cultivate Banana. In Sri Lanka 29 banana cultivars and two wild species have been reported. Five of those are cooking types and the rest except the two wild species are dessert types. Although bananas occupy the largest cultivated area among fruits cultivation in Sri Lanka it is primarily grown on small subsistence farms (plots of less than 0.25 ha). In addition to be a major food staple, bananas are an important source of income, with excess production sold in local markets (approximately 43 per cent). At present, banana productivity is about 13 Mt/ha in the country. However, this amount is very low when comparing with major banana growing countries of the world where average productivity is recorded as 45-50 Mt/ha. It has become an attractive perennial fruit crop for farmers in the country due to its relatively high economic gains throughout the year. Currently, nearly 60,000 hectares of land is under banana cultivation in the country and annual banana production is around 780,000 metric tons. However, from the total production there are about 35-45 per cent under post-harvest losses and export amount is approximately 5 per cent (Department of Census and Statistics 2014). In Sri Lanka banana is the only fruit crop, which is available throughout the year and consumption rate is also higher than any other fruits. Major Districts of cultivating banana in the country are Kurunagala, Rathnapua, Hambantota, Monaragala, Ampara and Jaffna. Generally, banana plants are found throughout the country in most of the rural homesteads.

Production and distribution system of Sri Lanka agricultural products have many unsolved supply chain issues (Vidanagama and Priyathilaka 2011). Farmers do not have a good price for their crop and consumers have to pay higher prices even though the quality of the products are lower. Markets are over flowed with excess supply of seasonal products but there is no proper system to manage excess supply which can be used during off seasons as well. No proper system is found to solve these issues while protesting of farmers and consumers are escalating everywhere. In the country, commercially cultivated fruits and vegetables go through different types of distribution channels and it reaches the consumers at high price with considerable amount of waste. Banana is a major year-round fruit crop in the country. It is the most important fruit crop in terms of production, consumption and land used for its cultivation (Vidanagama and Priyathilake 2011). It fulfills more than 40% of local fruit requirement and it has a close cultural and traditional relationship with local society. Given this background, this study empirically evaluates the profitability of the banana market and the role of intermediates on determining the banana price in Sri Lanka.

Banana Market and Issues

Contribution of Banana is relatively highest in marketing and consumption in Sri Lanka. Monthly household expenditure of banana is 0.16 % within total expenditure of household foods. When we explore the profitability of banana in Sri Lanka, we should concern it with meaning of production side as well as the marketing side. There is a strong and stable intermediation chain for banana, relatively other fruit crops because, banana is a year-round fruit crop. Further extent of banana cultivation is increasing but cost-benefit ratio of banana has been systematically decreasing (Kudagamage et al. 2002).

However, it can be identified some common situation in production and marketing of banana in developing countries compare with developed countries (Gray, 1997). Banana marketing system is complex, and it consists with large number of links and also they get unequal benefit

each other in the marketing chain (Deshmukh et al. 2003, Mukul and Rahaman 2013). The intermediation chain is considered here as the reticulation of the relationship from the banana producer to consumer that exchange the product and value. Then the combined mechanism of the producers and traders will create to establish the reticulation of the relationship (Kudagamage et al. 2002). The intensity of it depends on number of intermediates and frequency of deals. When the number of chain operators relatively increase, distance will widen the mechanism of coordination among farmers, market and consumers (Gray 1997). Therefore, profitability of banana depends on behavior of production and market factors. In production side it depends on fluctuating cost of land, labor and other inputs (Joel 2005, Ambio 2013, Perming 2013). Transport, storage, post-harvest losses, uncertainty of market and various kind of intermediaries' activities have significant impact on banana profitability in market side (Singgih and Woods 2003, Nzioka 2009, Abdala et al. 2015). Banana market intermediation chain is combined with number of classification of media in Sri Lanka (Gray, 1997). Basically, this reticulation of intermediation has been created with rural fair system. Fair is the courtyard which consists with number of small-scale business activities (Jayathilaka, 2007). However, it creates activate dedication for maintain and empowerment of the rural agrarian economic System. It is consisting with farmers, retailers, wholesalers, collectors and brokers which activate aspect objectives and layers.

When it is considered the basic implication of present banana production in Sri Lanka, there are some significant issues faced by the local banana sector. They are explained by basic factors such as quantity of production, profitability, consumer price, farm gate price, productivity, extent of production of banana etc. When we consider the banana production with time period, there some reciprocity has created among the above factors. Some issues in this field can be given as follows:

- There is a huge gap expanding between banana production and productivity
- Banana production and productivity relatively stable in low level.
- Although farm gate price of farmer increase, farmers net income decreases because of the farmer production cost increase continuously
- The gap between income and cost of banana fluctuating and increasing.

At present only few studies are available about the value chain of banana in Sri Lanka. It is expected that the marketing process from farm-gate level to retail must convey information not only about prices but also must ensure the reliability at distribution chain. As the distance between the farmer and the consumer widens, the level of credibility becomes more difficult to establish. Therefore, it can be argued that value chain issues have arisen in a number of connections with the distribution of banana sector.

Material and Methods

This study is attempting to determine relative profitability of banana in 'Walawa Region' during the period July to September 2017. In this study it was investigated total cost, profit and benefit cost ratio for different marketing channel such as banana producers, wholesalers and retailers. Banana supply chain is selected here as a fruit crop for the study because it is a significant fruit crop in the country and study can be narrowed down to a manageable level. It is the major fruit which is consumed by local population. According to the statistics, Walawa region is the main commercial banana cultivation area in Sri Lanka. Most dominant banana supply chains start from this region and end in different areas of the country (Vidanagama and Priyathilaka 2011). Cost of production and profitability study of banana would provide valuable information to the individual farmers for effective operation and management of their farms. For this study, descriptive method was applied to classify data in order to derive

meaningful findings by using simple statistical measures like means, percentage, average ratios and simple equation.

To achieve the objectives of the present study, a preliminary survey was conducted focusing production side factors and market side factors. In this study, survey for data collection was conducted during July to September 2017. Primary data were collected from Walawa region purposively because a large number of people are engaged in banana production and easy accessibility and good communication facilities were prevailing in this area. Structured interview (based on questionnaire) and field observation was used as data collection techniques in this study. The interviews are divided into three major groups: the farmers, wholesalers and retailers. The farmers, wholesalers and retailers of banana were considered as the population of the study. Data were collected through personal interviews with the 40 selected banana growers and 40 selected banana traders (20 wholesalers and 20 retailers). And also snowball sampling method was used for exploring the length of intermediate chain and identifying the complexity of intermediate impact on banana price in this widely used supply chain mechanism. We have also collected qualitative information about different problems which are facing to continue their business activities for producers' side.

In the data collection process, it was collected farm-gate price (Walawa Region), wholesaler price (Colombo- MANIN Market price), Retailer price (Maradana, Boralla, Kotuwa) and transaction cost from farm-gate to final consumers. In the first step two verities of banana were selected in Walawa region which are most commercially cultivated in there. Further, farmers and traders personal data were collected to elaborate the findings. Two case studies were conducted separately base on production side factors and market side factors. Collected information and data are qualitatively and quantitatively analyzed and come to a conclusion with recommendations.

Analyzing Model

Break-Even Point: This study is used break-even point calculation which was used by Rymbai et al (2012) to measure pineapple producers' break-even point in India. Break- Even Point is calculated using total cost curve and total revenue curve. The point where these two curves intersect each other is called as break-even point. It shows producer neither loss money nor makes a profit through his/her activity in Banana production per acre in a particular farm.

$$BEP = \frac{TFC}{ASR - AVC}$$

Where:

TFC = Total Fixed Cost of Banana
ASR=Average Sales Revenue of Banana per kg
AVC=Average Variable Cost of Banana per kg

Benefit-Cost Ratio (BCR): The study was employed the Benefit-Cost Ratio (BCR) which was used by Kamal et al (2015) in Bangladesh to estimate cost and return of banana cultivation. Kudagamage (2002) has also used this method to study return of banana growers in Sri Lanka. An undiscounted Benefit-Cost Ratio (BCR) is a relative measure, which is used to compare benefits per unit of cost. The BCRs of two types of banana farms were calculated and also BCR calculated per kg for farmer, wholesaler and retailer separately to determine who is gaining the highest margin through the banana supply chain. BCR of banana farmers was estimated as a

ratio of gross return to total cost. But BCR for the wholesaler and retailer estimated as a ratio of total return to total cost.

$$BCR = \frac{Present\ Market Value}{Total\ Cost\ \left(For\ farmer,\ wholesaler\ and\ retailer\right)}$$

Cost and Return of Banana: In the study area farmers used both purchased and home supplied inputs for cultivate banana. Both inputs and outputs were valued at the farm gate price during the survey period. It was easier for a farmer to determine the cost of the purchased inputs such as: suckers/seeds, fertilizers, insecticides etc. but it was not so easy to determine the cost of home supplied inputs such as family labor, and their own capital for which no payment was actually made. For solving this problem of such home supplied inputs the principle of opportunity cost was employed in this study. In estimating total costs, both variable and fixed input costs were considered. Fixed cost was calculated with adding land value, machinery and equipment value and family labor value (as opportunity cost).

Results and discussion

In Sri Lanka, Banana is cultivated mainly for the commercial as well as semi-subsistence nature. According to the Department of Census and Statistics in Sri Lanka, banana farms that are more than quarter an acre are grown for the commercial purpose. This study used survey data which were collected covering approximately 40 banana sellers and 40 banana sellers Walave region in Rathnapura district. Surveys in all farmers and traders were carried out by administering a questionnaire through a face-to-face interview with the head or any other working member of the households. Descriptive statistics of the interviewed farmers as well as traders are given in Table 1.

Table 1: Social Facts of Banana Producers and Traders

Indicators	Farmer (%)	Wholesaler (%)	Retailer (%)
Age			
20-35	10.0	35.0	20.0
35-50	30.0	55.0	40.0
50-65	50.0	10.0	25.0
Above 65	10.0	0.0	15.0
Education Level			
Primary education	30.5	05.0	25.0
O/L	47.5	40.0	40.0
A/L	22.5	55.0	35.0
Civil State			
Married	100.0	90.0	95.0
Unmarried	0.0	10.0	05.0
Children			
No	0.0	20.0	05.0
3 or Below 3	45.0	50.0	65.0
Above 3	55.0	30.0	30.0
Occupation			
Farming/Trading	70.0	15.0	75.0
Farming/Trading with other	30.0	85.0	25.0

Sources: Calculated from field research

After identifying the main characteristics of the surveyed group, relevant estimations were done. All the input costs which were considered in this study were taken into account per acre basis for banana cultivation. The total average fixed cost were Rs.312,327 and Rs.304,168 respectively for both banana variety but is varied according to location, soil type, soil quality and topography in the study area. The cost of land used was estimated taking into account the valuation of land at its cash rental rate. The average per acre cash rental value of cropland for the cropping period covering a year was estimated at Rs.108,500 and Rs.108,100 for the growers of Kolikuttu and Ambul banana cultivation (see Table 2). Family labor cost also calculates as opportunity cost of labor. Both male and female labor engaged in banana cultivation in this area. For the purpose of estimation, the cost items were discussed as cost of human labor, cost of mechanical power, sucker/seeds, fertilizer, insecticides, irrigation, land use cost. Variable cost was calculated with adding variable cost item which all mentioned above. According to the study result total average variable cost for banana per acre was Rs.386,342 and Rs.384,802 respectively for Kolikuttu and Ambul banana. The total average cost of banana cultivation was estimated as Rs.698,670 and Rs.688,970 respectively for above banana varieties.

Economic performances as well as relative profitability of banana were calculated on the basis of gross revenue analysis. Gross revenue is the difference between total revenue and total variable cost. It will help us to understand the farmers return over total variable cost. According to the study result gross average revenue of the banana per acre were Rs. 635789 and Rs. 606982 respectively for Kolikuttu and Ambul banana. Total average revenue was Rs. 1,022,132 and Rs. 991,784 respectively for both variety of banana. To identify whether banana production is profitability or not, it was calculated Brake-Even Point (BEP) for banana producers. This analysis determines the minimum output that must be produced to get profit. Analysis showed that minimum products of Kolikuttu and Ambul banana per acre was 4,463 kg and 5,885 kg respectively to exceed to cost of production. An economic feasibility of banana can be showed using benefit-cost ratio. According to the results which is depicted in Table 1 showed that farmers' BCR were 0.91 and 0.88 for Kolikuttu and Ambul banana varieties respectively. This ratio very clearly indicates that investment in banana cultivation is economically profitable and viable investment because if farmer invests for Kolikuttu banana production he will get positive earn after harvest. This is similar to varieties such as Ambul banana.

Table 2: Farmer's Cost and Return of Banana Production

Cost items		**Cost for Kolikuttu per acre (Rs)**	**Cost for Ambul per acre (Rs)**
Fixed Cost	Land value	108,500	108,100
	Machinery and equipment	95,542	87,728
	Family labour	108,285	108,340
	Total Fixed Cost	312,327	304,168
Variable Cost	Sucker	59,008	51,359
	Land preparation	10,000	10,100
	Irrigation	85,370	91,070
	Fertilizer	86,545	85,900
	Pesticide	24,757	25,347
	-Planting	*9,856*	*10,143*
	-Weeding	*14,901*	*15,204*

	Labour cost	120,663	121,025
	-Land preparation	*25,100*	*26,249*
	-Panting	*24,537*	*24,650*
	-Display Pesticide	*8,483*	*8,345*
	-Display Fertilizer	*14,035*	*13,766*
	-Desuckering	*7,180*	*84,271*
	-Watering	*37,447*	*38,538*
	-Other	*3,880*	*1,050*
	Total Variable Cost	386,343	384,802
Total Cost (A)		698,670	688,970
Total Revenue (B)		1,022,133	991,784
Gross Revenue (C)		635790	606982
BEP		4,463	5,885
BCR		0.91	0.88

Sources: Calculated from field research

Local banana production and supply chain consists of different types of distribution networks/chain. In Walawa region there were more than 9th types of intermediate chain before reaching banana from farmer to consumer (Collect from farm gate and sell at the fair, Collect from farm gate and sell at wholesale, By at the fair and sell at the same fair, Buy at the fair and sell at the wholesale, Buy from small scale farmers and sell at fair after making big volume, Transport from farm gate to fair and gets profit margin depend on prevailing price, Transport from fair level collectors to wholesale/retail and get profit margin depend on prevailing price. they work as middleman between fair level collector and wholesaler/retailer to exchange banana and money, Buy from wholesalers and sell to retailers, Buy wholesale and sell at retail). However, this study was considered main two intermediate chains which were showed in Figure (1). Other seven types were consisted in wholesaler and retailer category.

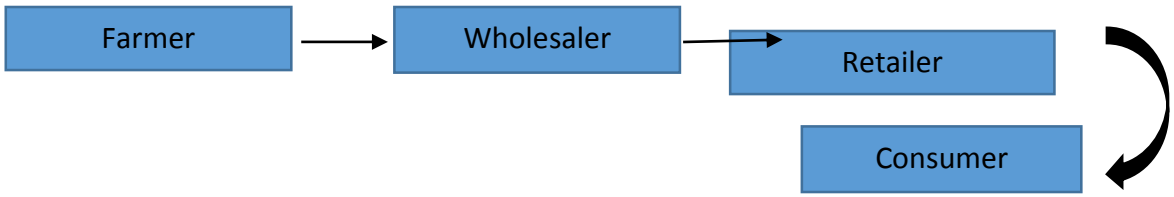

Figure 1: Intermediate Chain of Banana Production

Survey results regards to cost, profit, margin and Cost-Benefit Ration of Kolikuttu and Ambul banana per kg were given in Table 2. An average variable product cost was Rs.43 and total cost was Rs. 81.55 for Kolikuttu banana and this farmer's profit was Rs.36.45 per kg. These values for Ambul were Rs.31, Rs. 58.62 and Rs. 24.06 respectively. The profit was calculated with reducing total cost from total revenue per kg. Producer margin was calculated by difference between producer variable cost and Producer price per kg. It was Rs.75 and Rs.51.68 respectively for Kolikuttu and Ambul banana. These results showed that cost was higher to produce Kolikuttu banana kg as well as profit, margin and BCR were also higher on this variety kg compere with Ambul Banana kg.

Farm gate prices were respectively Rs.118 and Rs. 82.68 per kg for Kolikuttu and Ambul banana. Wholesaler's total cost was Rs.135.12 including operational cost which consists with transport cost, labor cost, post-harvest cost, product cost and other cost. Others cost consists with personal expenses, security, electricity bill, mobile bill etc. Wholesale price of Kolikuttu

banana was Rs.173.75 and wholesaler profit was Rs.38.63 per kg. Those values for Ambul banana were Rs.132.61 and Rs.22.36 per kg respectively. According to this calculation wholesaler BCR's were 1.29 and 1.22 per kg for Kolikuttu and Ambul banana. At the wholesale market is also comparatively BCR is higher for Kolikuttu banana than Ambul banana (see Table 3).

Wholesaler prices were Rs.173.75 and Rs.123.61per Kg for Kolikuttu and Ambul banana respectively. Total costs at retail level for these two varieties of banana were respectively Rs. 181.46 and Rs. 132.11 including transport cost, labor cost, post-harvest cost, product cost and other cost per kg (see Table 3). Retailer profit was Rs.70.79 per Kg of Kolikuttu banana and Rs.47.89 per kg of Ambul banana. Results reviled that BCR of retailer for these two variety was not much difference but retail profit as well as BCR higher than wholesaler and farmer for both banana varieties.

Table 3: Cost, Profit, Margin and Cost-Benefit Ration of Kolikuttu and Ambul Banana (per Kg)

Items	**Kolikuttu**			**Ambul**		
	Farm gate (Rs)	***Wholesale (Rs)***	***Retail (Rs)***	***Farm gate (Rs)***	***Wholesale (Rs)***	***Retail (Rs)***
Fixed cost	34.76	-	-	24.50	-	-
Variable cost	43.00	-	-	31.00	-	-
Post-harvest cost	0.07	5.00	5.50	0.08	5.33	5.80
Transport cost	3.72	7.11	1.20	3.05	8.34	1.60
Operating cost	-	17.12	7.71	-	18.57	8.50
Storage cost	-	-	0.25	-	-	0.30
Labor cost	-	0.89	0.01	-	0.9	0.07
Product cost	-	0.25	0.74	-	0.20	0.72
Other cost	-	3.87	0.01	-	3.8	0.01
Total cost	81.55	135.12	181.46	58.62	101.25	132.11
Farm gate/ Wholesale/Retail Price	118.00	173.75	252.25	82.68	123.61	180.00
Profit	36.45	38.63	70.80	24.06	22.36	47.89
Margin	75.00	55.75	78.50	51.68	40.93	56.36
BCR	0.91	1.29	1.39	0.88	1.22	1.36
BEP						

Sources: Calculated from primary data

Study result reveal some common implications for both varieties. The highest profit and price margin of banana (per kg) gain by the retailer in the concerned intermediate chain. Cost margin is explained the difference between price margin and profit margin in the chain. According to the study, cost margin differs among the form of traders and producer. But retailer add the highest post-harvest cost for the banana Price (Rs.5.50: Kolikuttu and Rs.5.00: Ambul). The conspicuous thing is post-harvest cost of producer was relatively very small. Study reviled that intermediate chain have more power to increase consumer price in several times of the product cost (more than 43% for Kolikuttu and 39% for Ambul Banana). Producer Benefit-Cost Ratio is relatively low. This profit was for period of 12-14 months but wholesaler and retailer profit were for 2-7days. Therefore, cumulative profit of marketing channels was very high compare with banana producers. Price margin explains the total impact by each form of the traders and producer on banana price. According to the results, price margin differs among the traders and

producer. Profit margin per kg explains with sum of the cost margins and profit margin. According to the kolikuttu banana, study result showed that price margin for wholesaler was Rs.55.75 and retailer was is Rs.78.5 per kg. This margin for Ambul banana was 40.93 and Rs.56.36 per kg respectively. Therefore, on one hand, it is clear that higher margin in wholesale and retail effected to increase consumer price of banana. On the other hand, wholesaler and retailer gains are high than the banana producer.

Conclusion and Policy Implications

Local banana production and supply chain consists of different types of distribution networks/ chain. In Walawa region, there were more than ninth types of intermediate chain for banana distribution to ultimate consumer. And also, rural fair system was major outlet of trading banana. Despite of some limitations, the findings of the study confirm that the farmers can obtain positive net return from cultivation of banana. In the context of income generation and poverty reduction, production of crop like banana may play a crucial role in meeting the cash needs of the farmers. Banana is not only important source of nutrition but also an important source of cash income to producers. The findings of the study also revealed that the trading of banana is a profitable venture to different intermediaries. According to the survey result wholesaler and retailer gains are high than the banana producer. The profit, of retailers was higher than that of other intermediaries and the profit was found reasonable.

There is huge gap between producer's price and consumer's price. Therefore, from ultimate price farmer do not get reasonable share for their product. On the other hand, the intermediaries especially the retailer's net marketing margin is very high and ultimately the consumers are the main sufferer of this marketing system. As a result of intermediaries' impact retailer banana price is higher than producer price approximately three times. Result clear that, retailer have highest impact on creating market price of banana. Retailer profit margin is higher than both of producer and wholesaler in the intermediate chain. The most important conclusion is retailer and wholesaler can considerably manipulate banana price than the producers. There are a number of marketing channels in banana trading and they are more complex. According to the results of the study, the profit and margin of the retailer is greater than that of the farmers and wholesalers. And also, the cost benefit ratio of retailer has the highest value than farmer and wholesaler. However, producer gets this profit for 09-12 months period when retailer and wholesaler get their profit less than 7 days after their investment. In this context retailer and wholesaler are gain the real value of the banana production.

Study results revealed that introduction of standard market efficiency method for banana market is important to minimize irregular price impact and reduce unnecessary market intermediation. Promoting new methods for managing the supply chain of Banana, regulating information transmissible mechanism of banana market through rural agrarian societies, organizing farmers against to the price bargain of cooperated traders, practicing with spot prices to minimize the autocratic power of intermediates and avoiding from contractual price, constructing a vertical strategic relationship between marketing group and supply chain, as well as building a horizontal strategic relationship concerning efficient and technical input usage among the producers will help to avoid existing inefficiencies in the market. Furthermore, widening export-oriented production and trading for expanding the banana production, marketing and profitability of banana, building a competitive supply chain with technical advantages and consumer preferences and promoting the advantage of cost of production and quality of production as a strategic for gain the advantage of global banana production can help improve the banana sector in the country in long run.

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