

# Assessment of Constraints and Economic Feasibility of Bought Leaf Tea Factories in Sri Lanka

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## ABSTRACT

Tea small holders contribute to more than 62 percent of the total tea production in Sri Lanka. The green leaves from small holders are mostly processed in bought leaf tea factories, which play a dominant role in the tea manufacturing sector. Presently, those factories face many problems, leading to low profitability.

This study was conducted to find out the major factors influencing the performance of bought leaf factories and to identify the constraints influencing their profitability. Furthermore, suggestions were identified to rectify the constraints. The study further extended to develop a profit function and to investigate the factors that are significantly affecting the profitability of a bought leaf tea factory. Information were collected from 24 bought leaf tea factories in up, mid and low elevations through a survey using a pre tested structured questionnaire. Those factories were ranked based on selected financial and economic parameters. Results revealed that labour shortage, high cost of production, problems related to the standard formula used in making payments for green leaf suppliers, are the most serious problems faced by the bought leaf factories.

The made tea outturn, refused tea percentage, seasonality and main grades percentage were identified as the key factors that significantly affect the profitability. Ranking test revealed that the elevation has no significant effect on the performance of factories. The paper also proposes some suggestions to increase the efficiency and the profitability of the bought leaf factories in Sri Lanka.

**KEYWORDS:** Tea, Bought leaf, Smallholders, Performance ranking, Profitability

## INTRODUCTION

Tea (*Camellia sinensis*) is one of the major plantation crops grown in Sri Lanka for more than a century, which acts as a major foreign exchange earner and employment generator. Tea sector has contributed 1.3 percent to the GDP in year 2004 and it also generates higher proportion of direct and indirect employment in agriculture sector. Sri Lanka still emerges as the world's largest tea exporter and accounted for 20.9 percent of the world tea exports in year 2004 (Anon, 2004a).

According to the Tea Small Holders Development Authority (TSDHA), there are 697 factories registered in Sri Lanka, where 640 factories are involved in tea production, while the other factories are silent. From the total number of factories only 115 factories (18 percent) are running totally based upon their own estate crop. Rest is producing tea by green leaf, bought from outside growers. From active factories, 282 (44 percent) are totally dependent on bought leaf (Anon, 2004b). According to the extent of tea land, it can be categorized into two groups, viz. state sector and small holders sector. The estate sector occupies 56 percent out of the 188,000 ha of total tea growing area but it contributes only 38 percent to the national production. Tea smallholder sector accounts 44 percent of the total tea growing area and contributes 62 percent to the total production (Anon, 2004.b). At present, 60 percent of made tea in the country is produced with the leaf by small holders. Bought leaf factories cater around 70 percent of small holders' leaf. Thus, at present nearly 42 percent of the national tea production is manufactured by private bought leaf factories. Some of these factories are not operating profitability due to several constraints viz. high cost of production, lack of skilled labourers, labour shortage,

and low Net Sales Average (N.S.A) (Kapilawanshe, 1995).

Majority of tea produced by both estate and small holders' sectors market their final made tea via Colombo tea auction (Abeygoonasekara, 2001). This traditional system of selling tea through auction is considered as inefficient system of tea marketing in the modern world due to many reasons. Price of made tea manufactured by factories depends on the auction price is one of them. Because of this, final prices cannot be predicted and they do not depend on the cost of production (Udugampola, 2005). The proportion of price that is divided between suppliers of green leaf and manufacturing factories is controlled by regulatory action that has been implementing by Sri Lanka Tea Board (SLTB) since 1987. According to this, 68 percent of the price obtained at auction to be paid to the green leaf suppliers and the balance (32 percent) to be paid to the factories. This policy was laid down assuming factory made tea out turn is 22.22 percent (Anon, 1987). Additionally the seasonal fluctuations of green leaf, supplied to the factory affect the factory running capacity.

Compare to other tea producing countries in the world, Sri Lanka holds a high cost of production per unit due to the high cost of inputs especially high labor charges. In year 2004 average production cost to produce one kilogram of made tea is Rs. 158.25 (Anon.2004.c).

The study was conducted to find the major factors influencing the profit of bought leaf factories using an econometric model. Since the constraints directly influencing to the profit margin of factories, major consideration was given to identify them. By implementing remedies and solutions proposed by factory owners, tea industry could be converted in to a viable industry.

**METHODOLOGY**

A survey was conducted using a pre tested structured questionnaire to collect information from 24 bought leaf factories located in three different elevations. Stratified random sampling was used to select factories. Accordingly ten, eight and six factories were selected from low, mid and up country respectively. As majority of bought leaf factories are located in low country, higher weight was given to low elevation in the process of stratification.

The secondary data were collected from Central Bank Report, SLTB Statistical Bulletins, TSHDA Progress Reports and other relevant documents. Other information was gathered from SLTB, TSHDA, Tea Monograph of TRI, and by personal communications with reputed persons in the industry.

Collected information was used to assess the performances of bought leaf factories, identify the constraints they face and suggestions to overcome the specified constraints. In addition, a profit function was developed.

**1. Assessment of the performance of bought leaf factories**

Assessment was based on the method followed by Sivaram (2002). Factories were ranked using selected parameters viz. ratio of running capacity to working capacity, made tea out turn, main grade percentage, refused tea percentage, out put per factory worker, net sale average and revenue labour out put.

**2. Constraints faced by bought leaf factories and suggestion stated by the factory owners**

Constraints faced by the bought leaf factories and suggestion stated by the factory owners to overcome prevailing problems were gathered using the

questionnaire and through personal communication and were analyzed descriptively.

**3. Development of profit function for bought leaf factories**

The linear model was identified as the best fitted model for explaining the profit function of the bought leaf factories. The following empirical model was adopted to estimate the effect of following quantitative and qualitative variables. Data were analyzed using Statistical Analyze System (SAS) software (SAS, 1999).

$$Y = \beta_0 + \beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 + \beta_6x_6 + \beta_7x_7 + \beta_8x_8 + \epsilon$$

Where, *Dependent Variable*

Y= profit (Rs. per 1 kg of made tea)

*Independent Variable*

X<sub>1</sub>= Green leaf (price Rs. per kg)

X<sub>2</sub>= Net sales average (Rs. per kg)

X<sub>3</sub>= Ratio of factory running capacity to working capacity as a percentage

X<sub>4</sub>= Annual average made tea out turn percentage

X<sub>5</sub>= Main grades percentage

X<sub>6</sub>= Refused tea percentage

X<sub>7</sub>= Elevation (dummy variable)

X<sub>8</sub>= Season (dummy variable)

ε = Error term

β<sub>0</sub> = Intercept term, β<sub>1</sub>... β<sub>8</sub> = Regression coefficients

**RESULTS AND DISCUSSION**

**1. Assessment of the performances of bought leaf tea factories**

Twenty four factories were ranked using financial and factory performances irrespective of their elevation (Table 1).

**Table 1. Performance of bought leaf tea factories**

ELE	FAC	R:W	Factory Performances				Financial Performances					RANK
			M.T.O.T	M.G	RT	O.P.F.W	N.S.A	R.L.O	PRO	C.O.P	T.P	
UP	A	100	22.30	68	12.87	49	183.39	2.76	3.75	164.65	81	23
UP	B	93	22.28	79	12.07	59	179.65	2.83	2.69	167.45	96	17
UP	C	95	22.78	71	9.45	43	178.69	2.65	2.95	165.23	80	24
UP	D	100	22.26	72	9.45	44	180.95	2.59	3.74	163.69	83	20
UP	E	80	20.94	80	7.04	58	176.31	3.86	2.68	166.95	106	14
UP	F	100	23.26	70	7.92	62	177.89	2.52	2.79	164.65	111	9
MID	G	83	22.69	75	9.02	43	156.06	2.63	6.78	145.28	89	19
MID	H	100	22.29	71	10.97	47	164.85	2.72	4.97	148.57	82	21
MID	I	95	22.66	81	9.97	48	166.98	2.82	5.87	148.98	117	8
MID	J	100	22.67	72	11.05	39	165.69	2.53	5.01	147.33	82	22
MID	K	100	22.28	73	11.95	53	167.26	2.84	5.99	145.59	110	10
MID	L	100	21.65	72	8.36	66	163.40	3.07	6.87	144.38	131	5
MID	M	100	21.95	71	12.97	59.5	161.30	3.01	5.25	151.27	92	18
MID	N	94	22.62	73	8.08	48.5	159.60	2.80	5.45	142.96	109	12
LO	O	93	22.86	77	8.99	59	202.76	3.03	11.65	178.97	133	3
LO	P	92	22.08	77	9.23	67	199.63	3.20	10.92	176.26	137	1
LO	Q	98	21.24	79	8.75	48	228.97	3.27	12.65	189.97	133	3
LO	R	100	19.21	70	8.29	49	230.68	2.76	13.47	198.67	104	16
LO	S	93	20.12	78	11.23	54	229.85	2.81	13.15	202.68	105	15
LO	T	100	23.23	77	12.97	62	227.45	3.08	12.40	198.28	137	1
LO	U	88	23.01	78	10.07	60	204.35	2.99	12.01	193.97	129	6
LO	V	100	23.24	79	9.16	49	229.66	2.71	13.20	204.69	129	6
LO	W	90	23.20	79	13.48	53	224.22	2.79	12.32	199.28	107	13
LO	X	93	21.02	78	9.06	49	231.65	2.80	13.65	208.42	110	10

Source: Survey data

ELE=Elevation, FAC=Factory, RW= Ratio of factory running capacity to working capacity as a percentage, MTOT= Made tea out turn percentage, MG= Main grades percentage, RT= Refused tea percentage, OPFW=Output per factory worker (kg), NSA=Net sales average (Rs. per kg.), RLO=Revenue labor output (kg per man-day), PRO= Profit (Rs. per kg.), COP=Cost of Production, TP=Total points

### 1.1. Ratio of factory running capacity to working capacity

The Factory running capacity to working capacity ratio for all the factories had an average value of more than 80 throughout the year, reflecting efficient capacity utilization.

### 1.2. Made tea out turn percentage

Percentage of made tea out turn of 8 factories (33 percent) were less than 22.22 percent. This cause difficulty in making payments for green leaf suppliers, as the factory generally uses 22.22 percent as the base. Further, lesser made tea out turn percentages (below 22.22 percent) were observed in factories in up, mid and low country areas, which were 17 percent, 25 percent and 50 percent respectively. None of the factories could achieve standard MTOT, as it depends on the quality of green leaf, elevation, type of manufacture and weather conditions. Kapilawanshe, (1995) has also observed similar results of lower made tea out turn percentages in low country factories, which is mainly due to the labour shortage prevailing in the area.

### 1.3. Main grades percentage

As main grades are highly demanded, higher main grade percentage of a factory is more beneficial. Highest percentage of main grades values were observed in mid country factories, whereas lowest values were observed in up country. There were no significant differences found between elevations of the factories.

### 1.4. Refused tea percentage

According to Tea Research Institute (TRI) recommendations, 3 to 4 percent of refused tea can be resulted in general manufacture process (Keegal, 1983). The study revealed the lowest value for refused tea as 7.04 percent and the highest value as 13.48 percent in the selected factories. Therefore, all the factories have failed to achieve the standard. This may be due to poor quality of leaves, poor leaf standards by delayed plucking cycles and malpractices in plucking. TRI has recommended that at least there should be 65 percent of good leaf on count basis (Plucking standard) for manufacturing (Keegal, 1983). However most factory owners claimed that suppliers deliver leaves which are lower than the standard level and it ultimately results poor quality made tea with higher percentage of waste tea.

### 1.5. Output per factory worker

Output per factory worker ranged from 39 kg to 68 kg. There were no significant differences between elevation of the factories and output per factory worker.

### 1.6. Net Sale Average (NSA)

It showed a range of values from Rs.156.06 to Rs.241.00. Highest NSA values were observed in low country and lowest in mid country. According to Keegal (1983) the sappy leaves found at low elevation produce blacker and better twisted tea. Therefore, they have a higher demand from Middle East countries.

### 1.7. Revenue Labor Output (kg per man-day)

Highest Revenue Labor output (RLO) of 3.27 kg was observed in low country, whereas lowest value

was observed in 2.52 kg in up country. There were no significant differences among elevation of factories and RLO.

### 1.8. Profit (Rs. per kg)

The study revealed that the higher profits were observed in low country factories and lowest profit in mid country factories. Higher profits of low country factories were due to higher Net Sale Average as a result of high price realization for strong liquoring quality of low grown tea.

### 1.9. Cost of Production

Cost of Production was highest in low country and lowest in mid country. Payment of higher prices for green leaf by low country factories is the main reason for increasing cost of production.

## 2. Constraints faced by bought leaf factories and remedial measures suggested by the factory owners

Table 2 and 3 shows the constraints and suggestions as percentages which were reported by owners of factories.

Among the identified constraints, all factories reported that the labour shortage and high cost of production were the most critical problems. The problem of labour shortage was most significant in low country followed by mid country and upcountry, respectively. The reason may be due to the existence of higher number of permanent labour force at upcountry factories, with limited alternatives and large number of residential Indian Tamil labourers. Kapilawanshe (1995) also indicated similar reason for the same problem. To overcome the labour shortage, some factory owners suggested that the attitudes of the labourers should be changed through training programs for labourers and staff. Moreover, the government intervention to uplift the living standard of the labourers should be increased.

Another crucial problem identified was that the NSA does not increase proportionately with increasing cost of production (Udugampola, 2005). On the other hand factories, which achieve high prices through value addition, do not incur extra costs as they have to pay to the green leaf suppliers based on a fixed formula. Some factories reported that some brokering firms buy their tea at lower prices during cropping season and sell them at higher prices during quality season. Brokering firms do not have a controlling system to regulate supply of tea to the auction, which results over supply which in turn leads to lower prices.

Even though at present, the government allowed to channel 50 percent of the production through direct sales, some factories are reluctant to follow. This is due to the uncertainty of the buyers, although this method is more beneficial. A frequent fluctuation of rupee value was also a problem to them as it affects to the final price they receive in the auction. As a remedial measure, most of them suggest to implement the proposed modernization of auction system, which include Dolarisation and converting

traditional system of selling tea into electronic system which in turn becomes more efficient.

Factory owners claimed that they do not have enough credit facilities to modernize their factories, which could increase the profitability. This is one of the bottle necks they found towards mechanization and automation of factories though they can produce high quality teas with low cost and fetch premium prices.

**Table 2: Problems faced by bought leaf factories**

Constraints	Factories reported (%)
Labor shortage	100
High cost of production	100
Poor quality leaf	95.83
Lack of skilled labor	87.5
Problems related with reasonable price formula	87.5
Low net sale average	66.66
Lack of credit facilities	62.3
Lack of essential machineries	58.33
Lack of working capital	45.83
Fluctuations of factory running capacity	37.5
Competition for green leaf among factories	29.16
Lack of infrastructural facilities	29.16
Limitation for forward contracts	20.83
Fluctuation of green leaf supply	20.83
Frauds done by brokering firms	12.5
Fluctuations of rupee value	8.33

**Table 3: suggestion stated by the factory owners to remedy the stated constraints**

Suggestions	Factories reported (%)
Change the attitudes of labours	83.33
Formal training programs for labours and staff	83.33
Increase credit facilities and reduction of restrictions for the credit accessibility	75.00
Conversion of auction currency into dollar	66.66
Adjustments for the reasonable price formula	66.66
Increase the opportunity for direct sale /forward contracts	66.66
Brand marketing /or promotion	62.50
Increase the transparency of the broker firms	45.83
Develop a supply regulatory system for auction	41.66
Modernization of auction system	29.16
Development of infrastructure of that area	29.16
Implementation of rules to supply green leaf to closest factory	20.83
Government support to certify factories under ISO-3720 quality certificate	20.83

Fluctuations of green leaf supply also a crucial problem to the factory owners. Because over supply of green leaf in the cropping season, reduce the final quality of made tea as factories cannot maintain their processing steps under standard levels. During the quality season the green leaf supply is not sufficient to use factories full capacities resulting high cost of

production (Kapilawanshe, 1995). As a result of the competition between factories for green leaves, rejected low quality leaves from one factory are accepted by another factory. Therefore factory owners are reluctant to reject low quality leaves, in apprehension of losing suppliers, even though it reduces the quality of final made tea.

**3. Development of profit function for bought leaf factories**

The linear model was identified as the best fitted model for explaining the profit function of the bought leaf factories. The results of this study revealed that the made tea out turn, season (cropping and quality), refuse tea percentage were significant at 5 percent probability level and main grade percentage at 10 percent probability level (Table 4).

**Table 4: Regression results for profit function for bought leaf tea factories**

Variable	Parameter Estimated	Standard Error	Significant Level
Intercept	-38.72898	13.00217	0.0074*
Made tea outturn %	2.14480	0.51705	<0.0001*
Refuse tea %	-0.28097	0.17708	0.0083*
Season	3.72546	0.47512	<0.0001*
Main grade %	0.3214	0.23148	0.0921**

Model R-Square = 0.9832, \* = Significant at 5 percent level. \*\* = Significant at 10 percent level

The variation of made tea out-turn percentage and refuse tea percentage directly influence the final made tea amount which ultimately affect to the factory profit. Because of regulatory action taken by SLTB, 68 percent of the price obtained at auction to be paid to the green leaf suppliers, considering made tea out turn percentage as 22.22 (Anon, 1987). It is clear that factories get high NSA during the quality season and lower prices during cropping season. As a result of reduction of green leaf supply during the quality season, lessening of factory made tea production can be observed. It is recorded that some factories strategically increase the green leaf supply during the quality season by paying higher prices for the suppliers than the recommended value by the SLTB for a particular month.

Among three elevations, highest auction prices were observed for low grown tea followed by up and mid grown tea respectively. As the factories have to pay much higher prices for green leaf suppliers, according to the same order mentioned above it may not be significantly affecting to the factory profit.

**CONCLUSIONS**

This study revealed that labour shortage, high cost of production, poor quality of leaf, lack of skilled labour, and problems related with reasonable price formula are as the major constraints faced by the bought leaf tea factories in Sri Lanka.

There is no such relationship between factory performances and elevation. The method used in this study could be used to asses the performance of tea factories in Sri Lanka, as a measure to evaluate and or compare their performance.

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According to the profit function, it revealed that percentage of made tea out turn, refuse tea percentage, season and main grade percentage were significantly affecting to the factory profitability. Hence, under the good factory management made tea out turn, refuse tea percentage and main grade percentage can be brought in to the economical viable range. Strategically, production can be increased during the quality season, because factories receive higher NSA which result higher profits.

In the year 2006 tea will be named as a food beverage in the international market. As a consequence the necessity will arise that every tea factory should be certified with the Hazard Analysis and Critical Control Point System (HACCP). But most of the factories are not in a position to upgrade their factory condition up to the required standards due to high cost involvement in this certification system. This will be a critical problem to the future of Sri Lankan tea industry. Therefore it is necessary to introduce suitable credit schemes or any other subsidiary system by relevant government authorities to safeguard the industry.

Finally the study suggests that there is a possibility to increase the profitability of tea factories by paying special attention on made tea outturn, refuse tea percentage, main grade percentage and increasing production during quality season.

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