

AN ECONOMIC ANALYSIS OF SRI LANKAN TEA INDUSTRY

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Introduction

Tea sector is very important to the national economy, in terms of foreign exchange earnings and securing livelihoods of people. It contributes 1.2 percent to the Gross Domestic Product (GDP), 16.57 percent of the total export income and 67.38 percent of agricultural export earnings (Anon, 2010a). As far as employment is concerned, tea industry provides direct and indirect employment for about 1.5 million people. Sri Lanka is the fourth largest tea producer in the world and contributes 8 percent of the world tea production. However, being the 3rd largest tea exporter Sri Lanka, contributes 17 percent of the world exports (Anon, 2010b). Tea auction in Colombo achieve high premium price for tea in comparison to the other tea auctions in the world.

Tea industry of Sri Lanka is about 150 years old. Tea is grown in High, Medium and Low elevation of Sri Lanka. Tea plantations are categorized in to two major production sectors, the estate sector and the small holding sector according to the extent cultivated. Tea small holding is defined by statute as having an area of less than 20 hectares in tea cultivation. Estate sector consists of state own estates (JEDB and SLSPC) and estates own by management companies.

Currently the industry is facing many challenges and some of the critical challenges are low levels of productivity, rapidly aging tea bushes, high input costs and worker shortage, maintaining Sri Lanka's reputation as a high quality tea producer/ exporter and meet new and stringent sanitary (HACCP) and other standards (eg. MRLs, environmental and social *etc.*) set by the importing countries.

An attempt was made in this paper to analyze the past performance of tea industry and estimate the profitability to tea growers. Reviewing the past performance is important to identify current position, resource allocation and to improve the performance towards the sustainability.

Materials and Methods

The analysis was based on the secondary data collected from various published documents and estates records.

a) Estimation of growth rates

Compound growth rates for tea over the years were worked out by using semi-log equation of the form of

$$\ln Y = a + bt$$

Where,

Y = Value of the variable

a = constant

t = time

b = Annual compound growth rate

“b” has been converted to the annual compound growth rate “r” by using formula $r = e^b - 1$

b) Income index

Income index was calculated to study the variation in income from tea over the years by taking 2000 as base year.

$$\text{Income Index} = \frac{\text{Income of the current year}}{\text{Income of the base year}} \times 100$$

c) Relationship between production and price

The lagged variable model (linear regression model) was employed to study the relationship between productions of different types of tea during current year with the prices of the previous year.

$$Y_t = b_0 + b_1 P_{t-1}$$

Where,

Y = Production of tea during the current year

P_{t-1} = Price of tea in the previous year

d) Financial efficiency ratio/ measures

The financial efficiency ratios/ measures were calculated using the following relationships.

Operating ratio = Operating cost/ Gross revenue (Value of made tea)

Net income (profit) = Gross revenue – Total cost

Fixed ratio = Total fixed cost/Gross revenue

Gross ratio = Total cost/Gross revenue

Benefit cost ratio (B/C) = Total benefits/Total cost

Break even productivity = Total fixed cost/(Price of made tea per kg/ variable cost per kg)

Results and Discussion

Performance of tea industry

Changes of tea extent, performance of production and productivity in different sectors for the last three decades were analyzed.

Tea extent

Tea extent in high grown tea has continuously decreased over the last three decades. Medium grown tea extent has also decreased from 1980 to 1999 and increased by 24.89 percent from 2000 to 2009. However, extent in Low country has considerably expanded by 59 percent during the last three decades. Total tea extent has increased by 17 percent during 2000 to 2009 period and national tea extent has decreased by 9 percent over the last three decades (Annex I).

Tea extent in estate sector has declined while extent in small holding sector has increased by 45 percent from 2000 to 2009. It can be observed that tea extent in estate sector has decreased by 28.81 percent during last three decades and it has increased by 12.61 percent in small holding sector (Annex II) over the same period.

Tea production

Cumulative growth rate of tea production in the medium elevation was found to be negative during 1980 to 1989 period. However, during 1990-1999 periods, growth rates found to be positive in all the regions. Cumulative growth rate of tea production in the last decade was positive only in Low country. It can be observed that growth rates were positive in high and low grown regions during the last three decade (1980-2009). It was also noted that growth rates of production in Low country were continuously positive over the considered period (Annex III).

Cumulative growth rate of tea production varied with the type of management. In small holding sector, positive growth rates can be observed over the considered period. And also the rates were higher than that of the estate sector. It can be examined that growth rate in the estate sector was positive only during 1990 to 1999 period (Annex IV).

Tea productivity

Cumulative growth rates of productivity in high grown region were found to be continuously positive over the period. However, in other elevations (mid and low grown), growth rates were negative during the last decade. Further, average growth rates of productivity in all the elevations were positive during the last three decades (Annex V).

Growth rates of productivity varied with the type of management. It can be noted that cumulative growth rates of productivity in all the sectors (JEDB, SLSPC, management companies, small holdings) were found to be negative during the last decade. However, cumulative growth rate in management companies was found to be positive during last three decades (Annex VI).

Income index

As shown in the table 1, total income from tea showed an increasing trend from 1990 to 2009 mainly due to increasing prices and production over the period. Income from tea was found to be Rs. mn. 130,444 in 2009 which was 559 percent higher as compared with income in 1990 and it is clearly explained by income index too. The income index has increased from 38.79 in 1990 to 255.56 in 2009.

Table 1. Income index

Year	Income from tea (Rs. mn)	Income index
1990	19,797	38.79
1995	23,990	47.00
2000	51,042	100.00
2005	77,327	151.50
2009	1,30,444	255.56

Source: Central Bank of Sri Lanka, 2010.

Relationship between production and price

The relationship between total production of tea in the current year and the prices received in the previous year was also calculated by using lagged model analysis (Table 2). It was found that all types of tea had a positive significant relationship with previous prices. This indicates that tea supply to the market mainly depends on the lagged prices.

Cost of tea cultivation

The cost of production (COP) of a commodity plays an important role in the economy of industry concerned. It regulates and also indicates the growth of an industry and furnishes the real base for making a policy decision. Cost of production is also an important parameter to determine the economic profitability of a particular industry. Cost of production in corporate sector is given in table 3. The estimation was done by taking average productivity in VP tea as 1888 kg per ha per yr (Diagnostic Survey, TRISL, 2008). The maintenance cost of a tea field in corporate sector was estimated as Rs. 664,303 per ha at the wage rate of Rs. 572 per day and current market price of materials. Estimated fixed cost and variable cost were Rs. 126,208 (19 percent of total COP) and 538,095 (81 percent of total COP) respectively per hectare. The cost of production per kg of made tea was Rs. 351.83.

The cost of cultivation in tea small holdings was estimated per acre basis and presented in table 4. This estimation was done by considering a VP tea field yielding 3954 kg of green leaf (GL) per acre per year (2100 kg made tea per ha per yr). The table showed that the total fixed cost was Rs. 15,816 (9.5 percent of total COP) whereas total variable cost was Rs. 1,35,756 (89.5 percent of total COP). Total cost of cultivation per kg of green leaf was Rs. 38.33.

Table 2. Relationship between production and price

Type of tea	b₀	b₁	R²
Bulk tea	227.10 (16.52)	0.31 (4.06)*	0.69
Tea packets	233.45 (17.83)	0.25 (3.80)*	0.67
Tea bags	203.74 (16.03)	0.19 (6.23)*	0.83
Instant tea	190.69 (11.96)	0.17 (5.71)*	0.80
Green tea	230.46 (26.75)	0.19 (6.45)*	0.84
Other tea	219.98 (17.57)	0.19 (5.07)*	0.77

Table 3. Cost of production in corporate sector (Rs. per ha per yr)

Operation	Worker			Cost/ kg	
	requirement (Man days)	Worker cost	Material cost	Total cost	Made tea
Fixed cost	60	34,320	91,888	126,208	66.85
Variable cost	689	393,923	144,171	538,095	285.00
Plucking	470	268,700	29,364	298,064	157.87
Fertilizer application	14	8,008	25,070	33,078	17.52
Other field operation	135	77,175	15,954	93,130	49.32
Manufacturing cost	70	40,040	73,783	113,823	60.29
Total COP	749	428,243	236,060	664,303	351.86

Agricultural Economics Division, TRISL, 2011.

Table 4. Cost of cultivation in Small holdings sector (Rs/ac/yr)

Operation	Worker requirement (Man days)	Worker cost	Material cost	Total cost	Cost/ kg GL
Fixed cost				15,816	4.00
Variable cost	280			135,756	34.33
Plucking	207	82,753		82,753	20.93
Fertilizer application	11	4,211	10,508	14,719	3.72
Other field cultivation	62	26,723	4,444	38,284	9.68
Total COP	280	113,687	14,952	151,572	38.33

Agricultural Economics Division, TRISL, 2011.

Income and financial ratios

The various income concepts and financial ratios for tea have been given in table 5. Gross income in corporate sector and small holding sector was estimated by taking tea price as Rs. 400 per kg of made tea and Rs. 58 per kg of green leaf respectively. It can be seen from the table that the net returns over total cost per hectare in corporate sector, was Rs. 90,897 whereas the net income per acre in small holding sector was Rs. 192,067. The net return over variable cost in corporate sector and small holding sector were Rs. 217,105 and Rs. 231,133 per hectare, respectively. Operating ratio, fixed ratio and gross ratios in both corporate and small holding sectors were less than one which indicated that tea business is a profitable venture.

Table 5. Various income concepts and financial ratios

Particulars	Corporate sector	Small holding sector
	(VP tea yielding 1888 kg of made tea/ha/yr)	(VP tea yielding 2100 kg of made tea/ha/yr)
Gross income/Revenue (Rs)	755,200	5,66,450
Net returns over total cost (GR-TC) (Rs)	90,897	192,067
Net returns over variable cost (GR-VC) (Rs)	217,105	231,133
Operating ratio	0.71	0.66
Fixed ratio	0.17	0.07
Gross ratio	0.88	0.66
Benefit:Cost ratio	1.14	1.51
Break even productivity (Green Leaf. kg /ha/yr)	2621	1380

Agricultural Economics Division, TRISL, 2011.

The benefit cost ratio was also greater than one which also showed the profitability of tea cultivation. However, low financial ratios in small holding sector indicate higher efficiency in small holding sector than in corporate sector. The break even productivity of corporate sector was 2621 kg per ha per yr whereas for tea small holders it was 1380 kg per ha per year.

Conclusion

The analysis concludes that there was an increase in extent and a positive growth rate of production in small holding sector during the last three decades. It can be also noted a negative cumulative growth rates of productivity in all the sectors (JEDB, SLSPC, management companies, small holdings) during the last decade. However, average growth rate of productivity in management companies was found to be positive

during the last three decades. Tea cultivation is a profitable venture for both corporate and small holdings sector at the present wage rate and market price of materials when tea fields maintain properly to achieve higher productivity. It was also observed that financial efficiency is relatively higher in tea small holding sector than in corporate sector.

References

Anon 2010a Annual Report, Central Bank of Sri Lanka.

Anon 2010b Sri Lanka Tea Review, Forbes & Walkers (Pvt) Ltd.

Anon 2009 Statistical Bulletin, Sri Lanka Tea Board

Anon 2000 Statistical Information on Plantation Crops, Ministry of Plantation Industries.

Anon 2010 Statistical Information on Plantation Crops, Ministry of Plantation Industries.

Annex I. Changes of elevational tea extent over the period

Period	High grown		Medium grown		Low grown		National	
	Extent change (ha)	% change	Extent change (ha)	% change	Extent change (ha)	% change	Extent change (ha)	% change
1980-1989	-5676	-7.20	-12888	-13.29	-4031	-5.84	-22595	-9.23
1990 -1999	-21694	-29.66	-25068	-30.12	14314	21.89	-32448	-14.63
2000-2009	-11135	-21.30	14155	24.89	29978	37.55	32998	17.46
1980-2009	-37649	-47.79	-25932	-26.75	40845	59.22	-22736	-9.29

Source: Statistical Bulletin, Sri Lanka Tea Board, 2009.

Annex II. Changes of tea extent by type of management (Estates and Small holdings)

Period	Estate sector		Small holdings sector	
	Extent change (ha)	% change	Extent change (ha)	% change
1980-1989	-18251	-14.11	-4344	-3.77
1990 -1999	-6506	-6.01	-25942	-22.85
2000-2009	-7456	-7.49	40454	45.25
1980-2009	-37279	-28.81	14543	12.61

Sources: Statistical Information on Plantation Crops, 2000 and 2010.

Annex III. Cumulative growth rate of tea production (percentage per annum) (Elevational)

Period	High grown	Medium grown	Low grown	National
1980-1989	0.11	-0.27	1.84	0.63
1990 -1999	0.83	0.68	2.07	1.40
2000-2009	-0.45	-0.91	0.42	-0.03
1980-2009	0.09	-0.09	1.80	0.84

Source: Statistical Bulletin, Sri Lanka Tea Board, 2009.

Annex IV. Cumulative growth rate of tea production by type of management (percentage per annum)

Period	Estate sector	Small holdings sector
1980-1989	-0.54	3.83
1990 -1999	0.92	2.03
2000-2009	-1.07	1.35
1980-2009	-0.10	2.33

Sources: Statistical Information on Plantation Crops, 2000 and 2010.

Annex V. Growth rate of elevational tea productivity (percentage per annum)

Period	High grown	Mid grown	Low grown	National
1980-1989	0.48	0.54	2.21	1.19
1990 -1999	3.12	2.58	1.20	2.54
2000-2009	1.18	-2.08	-1.51	-1.02
1980-2009	1.30	0.65	1.03	1.16

Source: Statistical Bulletin, Sri Lanka Tea Board, 2009.

Annex VI. Growth rate of tea productivity by type of management (percentage per annum)

Period	JEDB	SLSPC	Management companies	Small holdings
1980-1989	0.32	0.56	--	NA
1990 -1999	-1.13	-0.34	1.67	NA
2000-2009	-2.49	-1.69	-0.67	-0.45
1980-2009	-1.23	-0.71	0.38	NA

Sources: Statistical Information on Plantation Crops, 2000 and 2010.