

Working Capital Management Efficiency: A study on some selected Proprietary Tea Estates in Jorhat District of Assam

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Abstract

The study of the paper is an attempt to examine the efficiency of working capital management of some selected proprietary tea estates registered under Tea Board of India, operating in Jorhat district of Assam during 2008-09 to 2012-13. Instead of calculating common working capital ratios; working capital management efficiency has been measured in terms of Utilization Index (UI), Performance Index (PI), and Efficiency Index (EI) following the model suggested by Bhattacharya (1997). This paper also tests the speed of achieving target level of efficiency by an individual tea estate during study period using arithmetic mean indices as target level of efficiency. Findings of the study reveal that overall performance of selected tea estates was not bad, but performance of individual tea estates fluctuated during the period of the study.

Keywords: Working capital management, proprietary, Tea Estates, Utilization Index, Performance Index, Efficiency Index, Efficiency.

Introduction

The Tea Industry of India is about 174 years old. It is one of the major traditional industries in the Indian history. It has been playing an important role in the national economy. Robert Bruce in 1823 discovered tea plants growing wild in upper Brahmaputra Valley. In 1838 the first Indian tea from Assam was sent to United

Kingdom for public sale. Thereafter, it was extended to other parts of the country particularly during 1950's and 1960's of the last century. In all aspects of tea production, consumption and export, India has emerged to be the world's leader, mainly because it accounts for 31 p.c. of global production. In India, there are 1887 tea estates

registered with Tea Board of India¹. Tea Industry provides direct employment to more than a million workers mainly drawn from the backward and economically weaker section of the society. The discovery of the tea plants in Assam is attributed to Bruce Brothers, Robert and C.A Bruce. The wild tea plants were discovered at Rangpur, in Upper Brahmaputra Valley by Robert Bruce in 1823 and after him, C.A Bruce nurtured the tea plantation. Of the agriculture –based industries, tea occupies an important place in the history of Assam. Tea Industry plays a very crucial role in the State economy in particular and national economy in general. There are 51,605 tea gardens in Assam covering 3, 22,214 hectares of land². Tea Industry has been contributing substantially to the economy of Assam in various areas. About 17 p.c. of the workers of Assam are engaged in tea industry. Assam produces 51p.c. of tea produced in India which occupies 10.67 p.c. of the tea produced in the world. It is worth mentioning that Small tea growers are also significantly contributing to the development of tea industry of Assam in recent years. As per Tea Board of India, there are 52,000small tea growers in Assam till March, 2009 out of which 3,767 are registered with the Tea Board of India. Small tea growers produce more than 100 million ton of tea leaf annually and produced 14,185 lakh kg. green tea during the year 2009-2010. In Jorhat District there are 177 Small tea growers registered with the Tea Board of India and they covered 343.76 hectares of land under cultivation as on 31st March, 2010³.

¹ Tea Board Directory, Registered Estates, 2010, pp.1-125. (computed)

² Statistical Handbook Assam, 2010; p.193.

³ Statistical Handbook Assam, 2010; P. 200

Working capital management deals with the problems of decision making for investment in current assets with an objective of maintaining the liquidity of funds of the firm to meet its day to day administration. Working capital management refers to all managerial decisions and actions that ordinarily influence the size and effectiveness of the working capital. It is the process of planning and controlling the level and mix of current assets of the firm as well as financing these assets. Efficient management of working capital is one of the pre-condition thus concerned with the most effective choice of working capital sources and the determination of appropriate levels of current assets and their uses. In the present day of raising capital cost, the importance of working capital needs special emphasis and it is very much particular in tea industry. The main objective of working capital management is therefore, to maintain an optimal balance between each of the working capital components. An optimal level of working capital would be the one in which a balance is achieved between risk and efficiency⁴. It requires continuous monitoring of working capital to maintain proper level of its various components i.e. cash, receivables, inventory and payables etc. However, it is a difficult task to estimate the working capital actually required, because it varies across companies over time depending upon operational scale, nature of business, credit policy, production cycle, inventory availability and other distinctive factors. Business success in case of tea industry heavily depends on the ability of financial executives who effectively manage receivables, inventory and payables⁵. Efficient management of working capital means management of various components of working capital in such a way that an adequate amount of working capital is maintained for smooth running for fulfillment of twin objectives of liquidity and profitability. While inadequate amount of working capital impairs the firm's liquidity, holding of excessive working capital results in the reduction of the profitability. On the other hand, proper management of working capital leads to a material savings and ensures financial returns at the optimum level even on the minimum level of capital employed. Working capital management policies of tea industry have a great effect on its profitability, liquidity and its structural health. Further, working capital has to play a vital role to keep pace with the scientific

⁴ Yadav,R.A.,“Working capital Management-A Parametric Approach”,The Chartered Accountant,May,1986,p.952

⁵ Filbeck, G. and Krueger, T. Industry Related Differences in Working Capital Management. Mid-American Journal of Business, 20(2), 2005, pp. 11-18

and technological developments which is a very regular feature of the industry. Working capital comprises of different components like raw materials, work-in-progress, debtor, bills receivable and cash etc. as stated earlier. The management of receivables is very crucial in order to control collection cost and bad debt. The cash management is also very significant because firm should have optimum level of cash during the year. The raw material and work-in-progress and finished goods are very important part of inventory, therefore, these should be properly managed. The performance of a tea unit reveals the overall financial position of its business. The cost of production affects the profitability heavily. In the recent years, the cost of almost all elements of tea production like raw materials, fertilizers, pesticides, labour, excise duty, power and fuel, interest burden, administrative expense, marketing expenses etc. have been increasing tremendously, which is not commensurate to the increase in selling price as revealed by the market indicator.

Financial soundness and profitability of a business enterprise largely depend upon the effective management of working capital and Tea Industry is not an exception to it. Expenditure pattern of tea industry is different from other industries. From the initial years of plantation, a substantial amount is required for the tea estates during its gestation period. It may be mentioned that, a tea plant is ready for full harvest only when it completes five years. Thus expenditure incurred in the estates at the beginning of the years may be treated as fixed. Besides a tea estate does need a huge amount of fund for the expenditures like- purchase of machinery, construction of buildings, roads, bridges, drains, bungalows, labor quarters, permanent fencing, other welfare expenditures including schooling and health facilities, expenditures of tea cultivation, renovation of tea factory, replacement of planting, uprooting and replanting etc. Hence, finance required by a tea estate may be classified mainly into two heads viz. long term and short term finance. Usually short term finance required by the tea estates is utilized in payment of wages, purchase of food items to be distributed among the workers at a subsidized rate, to purchase other inputs required for tea cultivation, tea processing and tea distribution etc. Presently, short term finance or working capital required by the tea estates has been supplied by the nationalized commercial and co-operative banks adequately after getting proper security and crop hypothecation. But in regard to

working capital, the amount required is not adequately available. From reliable sources it comes to our notice that the management of proprietary tea estates has no any distinct policy for adequate and proper management of working capital. Hence, the study relating to working capital management of proprietary Tea estates thus undertaken with reference to Jorhat district of Assam.

Objectives of the Study

The study will look into the overall aspects of working capital management of selected proprietary tea estates with reference to the Jorhat district of Assam. However, the study will specifically probe into the following objectives:

- (a) To examine the efficiency of working capital management of selected proprietary tea estates.
- (b) To know the efficiency of working capital management of individual tea estate with respect to the average efficiency of the tea estates.

The rest of the paper is organized as follows: Section-II some literature on working capital management has been reviewed. Section -III of the paper covers the population, database and methodology adopted in the study. Empirical analysis of the data presented in section-IV and conclusions are included in section-V.

Literature Review

A good number of literatures on tea industry on its long history and economic importance are available. But very few studies have been made in relation to working capital management in the tea industry of Assam. Therefore, an attempt has been made to undertake a study on working capital management of proprietary tea estates with reference to Jorhat district of Assam. Some of the related literatures reviewed are taken here under:

Padachi ⁶(2006) made a study on working capital management and its impact on firms' performance. His sample consisted of 58 small manufacturing firms of Mauritius for the Periods 1998-2003. He examined the trend in working capital needs and profitability of the firms to identify the causes for any significant differences between the industries. He used dependent variable, return on total assets as a measure of profitability and by using panel data analysis investigating the relation between working capital management and corporate profitability. The key variables used in the analysis were inventory days, accounts payable days, accounts receivable days and cash conversion cycle. Findings of the study revealed an increasing trend in the short term components of working capital financing. A study was made by Reheman and Nasr⁷ on Working capital management and its effect on liquidity as well as profitability of the firms. They have selected a sample of 94 Pakistani firms listed in Karachi Stock Exchange for 6 years from 1999-2004. The main objectives of the study was to study the effect of different variables of working capital management including the average collection period, inventory turnover in days ,average payment period, cash conversion cycle and current ratio on net operating profitability of Pakistani firms. As control variables they have used Debt ratio, size of the firm and financial assets to total assets ratio and for analysis Pearson's correlation and regression analysis were used. They observed that, there is a strong negative relationship between variables of working capital management and profitability of the firm, significant negative relationship between liquidity and profitability ,significant negative between debt used by the firm and its profitability and a positive relationship between size of the firm and its profitability. Ramachandran and Janakiraman⁸ in his paper entitled "Relationship between Working Capital Management Efficiency and EBIT" made a study work with the objectives: (a) To analyze the firm's efficiency in Working Capital Management (WCM) in the paper industry

⁶ Padachi, K. "Trends in Working Capital Management and its Impact on Firms' Performance: An Analysis of Mauritian Small Manufacturing Firms", *International Review of Business Research Papers*, vol.2, no.2, October- 2006, pp.45-58.

⁷ Raheman, A. & Nasr, M., "Working Capital Management and Profitability –Case of Pakistani Firms", *International Review of Business Research Papers*, vol.3, no.1, March2007, pp.279-300.

⁸ Ramachandran, A. & Janakiraman, M., "The Relationship between Working Capital Management Efficiency and EBIT, *Managing Global Transitions*, Vol.7, No.1, spring 2009, pp.61-74.

in India.(b)To analyze the relationship between WCM efficiency and EBIT in selected companies in the paper industry in India. They conducted the study work for the periods 1997-1998 to 2005-2006. To measure the working capital management efficiency (WCME) three index values viz., Performance Index (PI), utilization Index (UI), and Efficiency Index (EI) were computed which were associated with explanatory variables, viz., Cash Conversion Cycle (CCC), Accounts Payable Days (APDAYS) Account Receivable Days (ARDAYS), Inventory Days (INVDAYS). They considered Fixed Financial Assets Ratios (FIXDFARA), Financial Debt Ratio (FINDBTRA) and Size (Natural log of sales) as control variables in the analysis which were associated with the EBIT. The study revealed that the Paper industry has managed the working capital satisfactorily and performs remarkably well during the period. Singh and Chekol⁹ made a study on working capital management: comparison of policies and performance of Indian firms. The purpose of the study was to investigate the impact of working capital management policy on performance of Indian firms. They have collected data from PROWESS data base for 10 years from 1999 to 2008 and analyzed these with SPSS and STATA software. They have applied descriptive statistics and panel data regression to test the impact of working capital management policy of firms. They found that there is a positive relationship of CATA ratio and profitability. They also found negative relationship of working capital aggressive financing policy and profitability. The study revealed a contrary finding on working capital investment and financing policy of firms from the scholarly results and theoretical concept of positive relationship of aggressiveness and profitability. Working Capital Management is concerned with the problems that arise in attempting to manage the current assets, current liabilities and the interrelation that exist between them. A two dimensional study has been made by Kaur¹⁰ to examine the policy and practices of cash management, evaluate the principles, procedures and techniques of Investment Management, Receivable and Payable Management deals with analyzing the trend of working capital management in Indian Tyre Industry. The study covered a production of 8 years from 1999-2007.The study revealed that there is a standoff between liquidity and profitability and the selected corporate has been achieving a trade off between risk and return. Efficient management of working capital and its components

⁹ Singh, K. & and Chekol, F., “Working Capital Management: Comparison of policies and performance”, The Indian Journal of Commerce, vol.62, no.4, October-December 2009, pp.34-44.

¹¹Kaur, J., “Working Capital Management in Indian Tyre Industry”, international Research Journal of Finance and Economics, issue 46(2006), pp.7-15.

have a direct effect on the profitability levels of tyre industry. Prasad ¹¹(2001) conducted a research study on the working capital management in paper industry. His sample consisted of 21 paper mills from large, medium and small scale for a period of 10 years. He reported that the chief executives properly recognized the role of efficient use of working capital in liquidity and profitability, but in practice they could not achieve it. The study also revealed that 50 percent of the executives followed budgetary method of planning working capital and working capital management was insufficient due to sub-optimum utilization of working capital. Ghosh and Maji¹² (2003) made a study on “Working Capital Management Efficiency on the Indian Cement Industry” for the period 1992-93 to 2001-02. For measuring the efficiency of working capital management they have calculated performance, utilization and overall efficiency indices instead of using some common working capital management ratios. Setting industry norms as target efficiency levels of the individual firms, they have also tested the speed of achieving target level of efficiency by an individual firm during the study period. They concluded that the Indian cement industry did not perform remarkably well during the period. Srivastava and Yadav¹³(1986)developed a multiple discriminant model in determining the effectiveness of working capital management using four ratios and a sample test of 40 textile companies of which 20 ‘not effective’ (sick) and 20 effective’ (healthy) .They empirically found that their model correctly classified 95 percent of the companies in the sample. Saravanan¹⁴ (2001) made a study on working capital management in 10 selected non-banking financial companies. For this he employed several statistical tools on different ratios to examine the effective management of working capital. He concluded that the sample firms had placed more importance upon the liquidity aspect compared to that of the profitability. In the year 1988 one book published on “working capital structure of private enterprises--A study

¹¹ Prasad, R.S., “working Capital Management in Paper Industry”, Finance India, vol.xv. no.1, March 2001, pp.185-188.

¹² Ghosh, S.K. & Maji, S.K., “Working Capital Management Efficiency: A Study on the Indian Cement Industry”, The Management Accountant 39(5): 363-372.

¹³ Srivastava, S.S.and Yadav, R.A. “Management and Monitoring of Industrial Sickness.”New Delhi, Concept publishing Company, 1986.

¹⁴ Saravanan, P., “A Study on Working Capital Management in Non-Banking Finance Companies”, Finance India, vol.xv, no.3, September, 2001, pp.987-994.

of cement industry” by J.Panda and A. K.Satapathy¹⁵ It covers a study of 10 private sectors company engaged in production of cement. The study covers the various aspects of working capital period from 1965-1985. They have analyzed working capital position of selected units as a whole and as well as individual analysis. Finally they have made suggestions for the better utilization of various components of working capital. Filbeck and Krueger¹⁶ (2005) highlighted the importance of efficient working capital management in their work entitled “Industry related difference in working capital management....”in 2005 by analyzing the working capital management policies of 32 non-financial industries of USA. According to their findings significant differences exist between industries in working capital practices over time. Moreover, these working capital practices, themselves, change significantly within industries over time. Chundawat & Bhanawat¹⁷ analysed the working capital management practices in IDBI assisted tube and tyre companies for the period 1994-1998 by using some relevant ratios and concluded that the working capital management of IDBI assisted companies was more effective than the industry as a whole. Rehman,A.R.M.and Doley,M.¹⁸ made a study on Working Capital Forecast with a view to making working capital forecasting as scientific as possible. They concluded that, a reasonable degree of accuracy can be achieved in forecasting methods by knowing past mistakes and it can be done by variance analysis showing reasons for changes in each figure between different forecasts. A study made by Choyal,S.R.¹⁹ on working capital management efficiency of Rajasthan State Warehousing Corporation for the periods 1973-74 to1977-78 by using some ratios. He concluded that, for maximum utilization of all the financial resources the corporation requires more finance for developing its storage capacity due to rapid

¹⁵ Panda, J. and Satapathy, A.K., “working capital structure of private enterprises--A study of cement industry”, Discovery Publishing House, New Delhi.

¹⁶ Filbeck, G. and Krueger, T. (2005). Industry Related Differences in Working Capital Management. *Mid-American Journal of Business*, 20(2):pp. 11-18.

¹⁷ Chundawat,D.S.and Bhanawat,S.S.,“Working capital Management Practices in IDBI assisted tube and tyre companies”, *The Management Accountant*,Vol.35,No.2,February 2000,pp.99-102.

¹⁸ Encyclopedia of Accounting-Financial Management, Vol.1, Arihant Publishing House, Jaipur, 1993, pp.175-186.

¹⁹ Encyclopedia of commerce and Management-Financial Planning and Management, Vol.8, Anmol Publications pvt.Ltd. New Delhi,1993, ,pp.318-331.

increasing the agricultural production. Bhowal, A.²⁰ of Assam University, Diphu Campus in his Ph.D. work also attempted to explain the different aspects of working capital management in public sector enterprises. His works therefore help us immensely in achieving goals of our work with respect to impact of value addition and size of working capital in those enterprises.

Research Design and Methodology

Jorhat district of Assam is located between the Brahmaputra on the north and Nagaland on the south at 26.46°N and 96.16°E in the central part of Brahmaputra valley. The district covers an area of 2859.3 sq. km. and has a population of 10, 91,295 in 2011²¹. The area under tea cultivation is about 1.66 thousand hectares. It has a total of 101 tea gardens and spread over 24,274 hectares of area. However, in 2011 the district has a total of 139 numbers of tea gardens including small tea growers which is significant for our study reference²². As mentioned earlier, there are 101 tea estates in the district of Jorhat and these estates are registered with the Tea Board of India. Table-1 below shows the ownership status and the number of tea estates operating in the district in 2011.

²⁰ Bhowal,A.,“A Study of “working capital management with respect to selected state level public enterprises in Assam”, Ph.D Thesis, 1997.

²¹ Census India, Govt. of India, 2011-prov-results

²²DRDA, Jorhat, Assam, 2011

Table-1: Showing Ownership Status and Number of Tea estates, Jorhat District of Assam

Ownership Status	No. of Tea Estate in Jorhat district
Public limited	23
Private limited	35
Proprietary	19
Others (other than Public Ltd., Private Ltd. & Proprietary)	24
Total	101

Source: Tea Board of India, Licensing Department; Registered Tea Estates, pp.106 -110.

Out of the 19 proprietary tea estates 4 tea estates have been purposively selected for the purpose of our study. The selected tea estates are- Haroocharai tea estate, Singarijan tea estate, Meleng tea estate and Sotai tea estate. The study covers a period of five years i.e. from 1998-99 to 2012-2013 and the data has been collected from primary and secondary sources. Primary data have been collected through garden (tea estate) visits from respective sources and secondary data have been collected from the available sources including Tea Board of India, Statistical Abstract, Directorate of Industries, Assam, Directorate of Economics and Statistics, Assam and many others. To examine the efficiency of working capital management (WCM), the model suggested by Bhattacharya (1997) have been applied. The first part of the analysis is to measure the WCM efficiency for which three indices are used, viz., Performance Index (PI), Utilization Index (UI) and Efficiency Index (EI). For measuring the efficiency of working capital management (WCM), first the Utilization Index of Working Capital Management (UI_{WCM}) is to be calculated by applying the following model:

$$UI_{WCM} (it) = \frac{A_{t-1}}{A_t} \dots\dots\dots (i)$$

Where, A = current assets/sales.

Again, to measure the working capital efficiency based on 'Performance Index of Working Capital Management' (PI_{WCM}), the following method is used as:

$$PI_{WCM} = \frac{I_s \sum_{i=1}^n \frac{W_{i(t-1)}}{W_{it}}}{N} \dots\dots\dots (ii)$$

Where,

- I_s = Sales index defined as: S_t / S_{t-1} ,
- W_i = Individual group of current assets,
- N = Number of current assets group,
- and $i = 1, 2, 3, \dots, n$.

Finally, the Efficiency Index of Working Capital Management (EI_{WCM}) is calculated by multiplying the overall performance index of working capital management with the working capital utilization index, which stands as under:

$$EI_{WCM (it)} = UI_{WCM} \times PI_{WCM} \dots\dots\dots (iii)$$

Average performance indices of four selected tea estates have been used to compare the efficiency of individual tea estates.

Empirical Analysis

Performance Index of WCM

Performance Index of WCM represents the average performance index of various components of current assets. A firm may be said to have managed its working capital efficiently if the proportionate rise in sales volume is more than the proportionate rise its current assets during a particular time period. Numerically, if performance index of a firm is more than 1, it indicates that the firm managed their working capital efficiently. Average performance index of four tea estates (Table-6) shows that performance index

was more than 1 in 3 years out of study period of 5 years. The performance of the tea estates as a whole was mostly efficient during the study period. In the year 2012-2013 average performance of four tea estates shows good condition and the indexes were 1.70128721. On the other hand in the year 2008-2009 average index of four tea estates were very low which was only 0.82039485. A year wise comparison shows that the number of efficient tea estates varied from 0 to 3. In the year 2008-09 no tea estate could cross performance level (≥ 1). In the year 2011-12 only one tea estate out of four selected tea estates could cross the level. In the year 2009-10 and 2010-11 three tea estates had managed their current assets efficiently and crossed performance level. Analysis of the individual tea estates shows that, Haroocharai tea estate performed working capital in better way as three years out of the study period of five years and performance index crossed 1 (Table-1). Other three tea estates had managed their working capital efficiently in two years out of the five years study period.

Utilization Index of WCM: While performance index represents the average overall performance in managing the components of current assets, utilization index indicates the ability of the firm in utilizing its current assets as a whole for the purpose of generating sales. If an increase in total current assets is coupled with more than proportionate increase in sales, the degree of utilization of these assets with respect to sales is said to have improved and vice-versa. This ultimately reflects the operating cycle of the firm. This can be shortened by means of increasing the degree of utilization. Thus, if the value of utilization index of a firm is more than 1 it is a sign of improvement. In the study period, overall group performance of the selected tea estates was not so good. Out of five years the group average for two years was more than 1 (Table-6). In the year 2011-12 group average was not satisfactory this was only 0.73988017 as compared to the years 2008-09 (0.95550387), 2009-10 (0.95982597) and 2010-11 (1.05698121). Analysis of the individual tea estate (Table-2) shows that, Haroocharai tea estate is at the top in utilizing current assets to sales. Out of five years study period three years indices of them are showing greater than 1. Singarigan tea estate could efficiently handle current assets to increase sales only one year out of five years.

Efficiency index of WCM: Efficiency index is the product of performance index and utilization index. It is the measure of ultimate efficiency in working capital management. In the years 2009-

10, 2010-11 and 2012-13 group efficiency of the tea estates was best as two tea estates out of four tea estates efficiently managed working capital and indices crossed 1. 2008-09 and 2011-12 is the worst year for the group of tea estates as no tea estate could perform well. Highest index was found only 0.989280600 and lowest index was 0.34156462(Singarigan Tea estate).Tea estate wise analysis shows that, Meleng tea estate, Satai tea estate and Singarigan Tea estate crossed the efficiency level 1 in two years out of five years as compared to the Haroocharai Tea estate they crossed only one year (Table-3).

Conclusion

In the present study an attempt has been made to investigate the efficiency of four proprietary tea estates of Jorhat district of Assam for the periods from 2008-09 to 2012-13. Instead of calculating common method of analyzing different working capital management ratios three index values Performance index, Utilization index and Efficiency index have been used to measure the efficiency of working capital management. Taking average indices of four tea estates a comparison has been made with regard to the efficiency of individual tea estates during the study period. From the present study it is observed that, average performance efficiency level was satisfactory during the study period. Average performance index was more than 1 in three years during the study period of five years. In the year 2011-12, average utilization index was more than 1 in three tea estates out of selected four tea estates.

The Present study was conducted only for four tea estates for a period of five years. There may be a huge scope for further studies taking into consideration the maximum number of tea estates so that problems of managing working capital and its solution can be identified by the management for managing working capital efficiently.

Table-1: Performance index of four tea estates

Years	Haroocharai Tea estate	Meleng tea estate	Satai tea estate	Singarigan Tea estate	No. of tea estates having>1
2008-2009	0.03381690	0.92732650	0.97780791	0.34890373	0
2009-2010	1.02058937	1.01598673	3.80502105	0.90622876	3
2010-2011	1.38181052	0.78895412	1.06304498	1.01958509	3
2011-2012	0.74702159	1.02479573	0.50615795	0.98862760	1
2012-2013	2.53939473	0.88678484	0.97877252	3.94507099	2
Number of times>1	3	2	2	2	

Table-2: Utilization index of four tea estates

Years	Haroocharai Tea estate	Meleng tea estate	Satai tea estate	Singarigan Tea estate	No. of tea estates having>1
2008-2009	0.96276486	0.91752053	0.97896524	1.02754124	1
2009-2010	1.00274087	1.01645468	0.81736747	0.91588304	2
2010-2011	1.20377599	0.81451580	1.00585708	1.70547020	3
2011-2012	0.47000223	1.01342387	1.00609236	0.95835782	2
2012-2013	2.02196303	0.88466437	0.98152771	0.99452049	1
Number of times>1	3	2	2	1	

Table-3: Efficiency index of four tea estates

Years	Haroocharai Tea estate	Meleng tea estate	Satai tea estate	Singarigan Tea estate	No. of tea estates having>1
2008-2009	0.98928060	0.89279737	0.89715883	0.34156462	0
2009-2010	0.91839336	1.01877142	3.86763145	0.74072191	2
2010-2011	2.05300408	0.94972403	0.86586693	1.02555688	2
2011-2012	0.45043031	0.48165628	0.51295255	0.99465068	0
2012-2013	0.87713030	1.79304616	0.86588517	3.87219649	2

Number of times >1	1	2	2	2	
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Table-4: Maximum and Minimum values of respective index (2008-09 to 2012-13)

Sl. No.	Name of the tea estates	Performance index		Utilization index		Efficiency index	
		Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
1	Haroocharai Tea estate	2.5393947 (2012-13)	0.0338169 (2008-09)	2.0219630 (2012-13)	0.4700022 (2011-12)	2.0530040 (2010-11)	0.4504303 (2011-12)
2	Meleng Tea estate	1.0247957 (2011-12)	0.8867848 (2012-13)	1.0164546 (2009-10)	0.8145158 (2010-11)	1.7930461 (2012-13)	0.4816562 (2011-12)
3	Satai Tea estate	3.8050210 (2009-10)	0.5061579 (2011-12)	1.0060923 (2011-12)	0.8173674 (2009-10)	3.8676314 (2009-10)	0.5129525 (2011-12)
4	Singarigan Tea estate	3.9450709 (2012-13)	0.3489037 (2008-09)	1.0054702 (2010-11)	0.9158830 (2009-10)	3.8721964 (2012-13)	0.3415646 (2008-19)

Table-5: Number of efficient tea estates (>1)

Index	2008-09	2009-10	2010-11	2011-12	2012-13
Performance index	0	3	3	1	2
Utilization index	1	2	3	2	1
Efficiency index	0	2	2	0	2

Table-6: Average index of all tea estates

Index	2008-09	2009-10	2010-11	2011-12	2012-13
Performance index	0.82039485	1.66077990	1.14426360	0.86948478	1.70128721
Utilization index	.95550387	0.95982597	1.05698121	0.73988017	1.19252954
Efficiency index	0.78020035	1.63637953	1.22353797	0.60992245	1.85206453

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