9.0 BIBLIOGRAPHY

- Baffes, J 2003, '*Tanzania's Tea Sector, Constraints and Challenges*', World Bank, May.
- Central Bank of Sri Lanka, 2002,2003 *Central Bank Annual Report*, Colombo
- Chacko K, Ramakrishna P 1999, '*Computerised Process Control in Tea Manufacture*': In NK Jain , (Ed.)Global Advances of Tea Science (pp837-840) Vedams, India
- Chacko K, Ramakrishna P,(1999), '*Computerized Process Controls in Tea Manufacture*' In NK Jain , (Ed.)Global Advances of Tea Science (pp 837-840) Vedams, India
- Chakrawartee, J 1999, '*Transfer of Technology to Large Tea Plantations in North East India*' : In NK Jain , (Ed.)Global Advances of Tea Science (pp225-232) Vedams, India
- Dhanapala K, Wijethunga P 2002, '*Economic and Environment impact of microhydro and bio mass based electricity generation in the Sri Lanka tea plantation sector*' Energy for Sustainable Development Vol VI No 1, March
- Ekanayake PB (2004), '*Management of Tea Lands through "Sloping Agricultural Land Technology" (SALT)*' Journal of the Soil Science Society of Sri Lanka, volume 15 , pp 19-26 , Soil Science Society of Sri Lanka, Gannoruwa
- Fernando RM, 2002 'Recent Innovations in the Plantations Sector' Proceedings Tea Conference 2002
- Ghosh A, ' GIS Anchored Integrated Plantation Management : Tea', http://www.gisdevelopment.net/application/agricuture/overview/mi04111pf.htm (Accessed August 2004)
- Gnanapragasam NC 1999, '*Sri Lankan Tea Industry*': In NK Jain , (Ed.)Global Advances of Tea Science (pp103-120) Vedams, India

- Herath N 1995, ' *The Principles of Tea Manufacture'.:* In Sivaplan P. Gnanapragasam N, Kathiravetpillai A(Ed), Field Guide Book, Tea Research Institute, Talawakele, Sri Lanka
- Illukpitiya P, Shanmugaratnam N, Kjosavik D J(2004) '*Tea Agroecosystems in the Uva Highlands of Sri Lanka'* Mountain Research and Development (24,1) pp 52-59 http://www.bioone.org/bioone.html
- Jain N K 1999 Global Advances in Tea Science, Vedams, India
- Joshi G '*Information Resource Management on Tea Contributions of Tocklai:* A Case Study' https://drtc.isibang.ac.in/retrieve/17/Paper-AC.PDF.
- Kapur P(1999), '*Electronic Instrumentation and Control Systems for Critical Manufacturing Stages in Tea Industry'*, In NK Jain , (Ed.)Global Advances of Tea Science (pp 825-836) Vedams, India
- Khalil T M 2000, '*Management of Technology : The Key to Competitiveness and Wealth Creation'* McGrawHill, USA
- Kuanhao C 1999, *'Information Activities in Tea Industry'* : In NK Jain , (Ed.)Global Advances of Tea Science (pp215-224) Vedams, India
- Liyanage MPD (2003), '*An Analysis of the reasons for Quality Decline of Made Tea*', in Twentieth Century Tea Research in Sri Lanka, WWD Modder (Ed), pp 365-375, Tea Research Institute Sri Lanka, Talawakele
- Ministry of Plantation Industries, Sri Lanka 2002, 2003 '*Plantation Sector Statistical Pocket Book'*, Colombo
- Mohamed MTZ 2004, '*Current Trends and Future Challenges in Tea Research in Sri Lanka*' Proceedings of the First Symposium on Plantation Crop Reseach, Colombo Sri Lanka, July
- Mohomed MT, Botheju WS, Koneswaramoorthy S, Raveendran K, Dahanayake DLDH(2003), ' *Tea Processing Technology in Sri Lanka*', in Twentieth Century Tea Research in Sri Lanka, WWD Modder (Ed), pp 237-258, Tea Research Institute Sri Lanka, Talawakele
- Mohomed MTZ, Dahanayake DLDH(2003), ' *Studies and Opinion on up-country Tea Manufacture*', in Twentieth Century Tea Research in Sri Lanka,

WWD Modder (Ed), pp 361-365, Tea Research Institute Sri Lanka, Talawakele

- Muraleedharan N 2004, 'Recent Advances in Tea Research in South India' Proceedings of the First Symposium on Plantation Crop Reseach, Colombo Sri Lanka, July
- Porter M 1998, '*The competitive Advantage of Nations*' Macmillan Business
- PORTER, M 1985, '*Competitive Advantage: Creating and Sustaining Superior Performance*' The value chain and competitive advantage(pp33-61). Free Press, New York,
- Rajapakse RMSS, Jayakody JAAM., Jayawardane M, '*Prepare Sustainable Strategic Development Plans for a Selected Tea Estate in Mid- Country Region in Sri Lanka using GIS.*', http://www.gisdevelopment.net/application/agricuture/production/agric0010pf.htm (Accessed August 2004)
- Rajesshwari CR, 2003, 'Strained by Problems' Business Line- Internet Edition, October. http://www.blonnet.com/iw/2003/10/12/stories/2003101200411400.htm
- Ramakrishna P 1999, '*Energy for Tea Manufacture*': In NK Jain , (Ed.)Global Advances of Tea Science (pp841-847) Vedams, India
- Ramanathan K, 1990 '*Management of Technology: Issues of Management Skills and Effectiveness* ' International Journal of Technology Management 5 (4) (pp 409- 422)
- Ramanathan K, 1994, ' *The polytrophic Components of Manufacturing Technology*' Technological Forecasting and Social Change (pp 221-258) Elsevier Science Inc
- Ranasinghe S, Fonseka M 1998, '*Research Methods in Management*' Post Graduate Institute of Management, University of Sri Jayawardanapura, Colombo, Sri Lanka.
- Rudramoorthy R, Sunil Kumara CP, Velavan R, Sivasubramanium S 2000, '*Innovative Measures for Energy Management in Tea Industry*' Energy

Engineerign Division, Department of Mechanical Engineering PSG College of Technology , Coimbatore

- Sharif N 1993 Technology Management Indicators for Developing Countries ,Published in *TDRI Quarterly Review* Vol. 8 No. 2 June 1993, pp.17-24
- Sharif N 2003, Presentation at the University of Moratuwa, Sri Lanka
- Sivaram B, 2000, *Productivity Improvement and Labour Relations in the Tea Industry in South Asia*, International Labour Organisatoin September (http://www.ilo.org/public/english/dialogue/sector/papers/proschem/proasia3.htm)
- *Social Dialogue as a Means of Enhancing Productivity and Quality of Work Life: A Case Study of the Maha Oya Group of the Bogawantalawa Plantations Company*
  http://www.ilo.org/public/english/region/asro/newdelhi/download/savpot/bplstudy.pdf
- Tallontire A, 2001, '*The implications of value chains and responsible business for the sustainable livelihoods framework: case studies of tea and coco*' November (http://www.livelihoods.org.uk)
- Tea Research Institute of Sri Lanka 2003, '*A Guide to Tea Research* Institute', Talawakelle
- Tea Research Institute of Sri Lanka 2001,2002,2003 *Annual Report Tea Research Institute of Sri Lanka* , Talawakellie
- Tea Research Institute of Sri Lanka. 2003, '*Agricultural Profile of the Corporate Tea Sector. Report of Advisory & Extension Service*', Talawakelle
- Tidd J, Bassant J, Pavitt K 1998, '*Managing Innovation :Integrating Technological, Market and Organisational Change*" John Wiley & Sons Ltd, England
- Watson M, 1986, '*Plucking*' : In Sivapalam P. Kulasegaram S. Kathiravetpillai A. Ed. Handbook on Tea, Tea Research Institute, Talawakele, Sri Lanka

- Wijeratne MA (2003), '*Twin Problems of the Tea Industry, Causes and Way out*', Tea Bulletin (18, 1& 2) pp 5-9, Tea Research Institute of Sri Lanka, Talawakelle.
- *www.kiasia.org/download/competitiveness/6SriL%20Tea.pdf, beyond two lwaves and bud sri Lankan tea cluster*
- Yogaratnam N 2004, Daily News '*Need for integrated management of* agricultural resources', October 15 Colombo Sri Lanka

10.0 APPENDICES

Appendix 1: Questionnaire for the estate managers

Ranking of Technology position in the Tea Estate/ Factory

Name of Estate:

	Excellent	Good	Satisfactor	Poor	Very Poor
Assessing the present technology status					
Level of Mechanization					
In the field activities					
In the tea processing activities					
In Tea packaging activities					
Condition/ Advance ness of machinery					
Tea Processing machinery –level of upgrade					
Other machinery – transport equipment					
Investment in machinery in the last five years					
Human Resource Component					
Availability (sufficient) of unskilled labour					
Availability of skilled labour(eg. Technicians)					
Level of training & skills of the labour force					
Labour motivation, interest in work					
Social development aspects towards labour issues					
Opportunities for skill development					
Inforware component- Information Availability					
Information on new machinery					
Information on latest processing techniques					
Information on clones and field practices					
Information about the latest market direction					
IT					
Level of IT utilization					
e- communication with the Head Office					
Access to market information through email/ internet					
IT literacy level of staff					
Organisational Aspects					
Support & encouragement from head office for the introduction of advanced machinery					
Support from head office to introduce better practices to the tea industry					
Support towards skill development of labour					

Appendix 2 : The general set of questions used for the interviews with the estate managers

1. What are the general problems faced by you in managing the estate and the factory?
2. Which would you rank as the highest priority?
3. What is the status of mechanization and new advancements in your estate?
   - Field activity – planting, pruning, harvesting, transporting
   - Processing activity – factory automation, electronic sensors, computer systems, IT systems
   - Packaging activity
4. What is the level of worker involvement in the technological advancements
   - Worker training, acceptance of new trends, resistance
5. Do you have skilled people to maintain the machinery?
6. How is the information availability for the latest advances in tea science
7. What is the main source of information of such advances

8. What is the situation with regard to adoption of best practices?
   - ISO Certification, HACCP, 5S,
   - Other agricultural practices
9. Is there any immediate requirement for the upgrade of machinery in your estate?
10. What are the main categories of equipment required
11. Who makes the decision to buy new equipment?
12. How is the management acceptance to the recommendations made by you for upgrading?
13. What is the main problem is introducing better / latest equipment?
    - Training, cost, availability, attitude
14. Management support for the development of innovative ideas

15. What to be done for the development and sustainability of the industry
16. What is your opinion on mechanization?
17. What are the areas where technological advances can play a role for the development of the tea industry?
18. How can Sri Lanka be competitive in the global market?
19. What is the role expected from the TRI in the introduction of technological developments to the industry?
20. What is the role expected by the Tea Board and the government ministries.?

Appendix 3 : Analysis of Agalawatta Plantations Limited Data

	Tea Estates	Mohomadi		Delgoda (factory)		Dolosewala		Niriella		Noragala		Watapotha		Labookelle		Frotoft		Wedamulla	
		2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002
	Region	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H
	Production in 2002 (kg 000)	46	45	474	443	557	531	32	31	493	453	373	305	510	455	595	633	460	431
	Mature extent	44	39	2	2	128	116	30	34	84	81	75	71	298	293	535	531	338	328
	Yield	1045.5	1153.8	668.0	970.0	1694.0	1475.0	1066.7	911.8					1711.4	1552.9	1112.1	1192.1	1360.9	1314.0
	Bought Leaf	-		472,473	471,048	341,005	360,291	-	-	344,124	335,278	273,640	224,666	-	-	-	-	42,686	11,026
	Own Leaf	46,402	44,923	1,349	1,960	216,374	170,674	32,387	31,110	149,027	117,660	99,091	80,579	509,677	484,580	594,584	632,666	417,952	420,098
1	Financial Performance																		
	COP	167.94	176.24	147.05	146.63	138.68	143.19	147.30	148.78	136.72	143.44	142.32	158.64	145.69	156.79	150.95	147.29	148.12	138.66
	NSA	145.97	149.06	149.78	154.86	148.66	151.79	145.95	143.94	145.71	150.01	146.33	154.02	136.7	136.52	123.1	121.32	128.39	125.91
	Overal Profit of Estate ('000)	-1019	-1221	4	16	2159	1468	-44	-151	1340	773	397	-372	-4582	-9214	-16559	-16430	-8246	-5356
	Profit per kilogram of tea produced	-21.97	-27.18	2.73	8.23	9.97	8.6	-1.35	-4.48	8.99	6.57	4.07	-4.62	-8.99	-20.27	-27.85	-25.97	-19.97	-12.75
	Profit per Ha	-24921	-31701	0	0	32944	29543	0	0	21426	14817	13204	7843	-15361	-31428	-30985	-30987	-25453	-16947
2	Quality certifications																		
	ISO 9001: 2000																		
	HACCP																		
3	Implementation of best practices such as 5S																		
	Quality circle concept																		
4	Age of Plantation																		
	Less than 10 years	5.8	5.8	0		27	27	0	0	12.35	12.35	2	2	28.15	30.15	36.9	31.9	29	25
	10 to 25 years	29.73		0		50.5	50.5	15	15	40.99	40.99	14.55	14.55	63.3	81.7	100.25	100.25	34	27.75
	25 to 40 years	3		0		17.25	17.25	10.5	10.5	5.28	5.28	20.5	20.5	93.45	94.85	160	144	60	74.75
	Over 40 years	0		0		14	14	9.5	9.5	17.61	17.61	34.25	34.25	40.26	83.63	251.1	251.1	205.1	193.85
	Total Tea Planted extent VP Tea	43.53	38.53			116.2	104.25	27	30.5	66.34	62.9	56.7	52.7	209.6	209.6	303.6	299.7	141	141.25
	Seedling Tea	0	0	2.02	2.02	11.5	11.5	3	3	17.6	17.6	18.6	18.6	88.6	83.6	230.9	230.9	196.35	196.35
5	Uncultivated extent	245	201.62	4	4	237.05	237.05	387	374	35	39	152	152	191	178	377	377	174	175.85

CORPORATE APPRAISAL 2003 - TEA

	Estate Company	Planted Area (Ha)	Staff Bungalows	Staff Quarters (Units)	Staff Houses Let	Yield (Kgs/Ha)	Production (Mill Kgs)	Average Price (Rs/Kg)	Revenue (Total) (Mill Rs)	Net Cost (Rs/Kg)	Net Profit (Rs/Kg)	Profit (Loss) (Rs mn)
1	Agalawatte	1,533	9	4	5	63	3.541	1,349	144.69	139.44	-5.24	-18.57
2	Agarapatana	6,731	21	11	10	29	9.951	1,459	132.88	132.57	-0.31	-3.08
3	Balangoda	5,160	22	6	16	43	10.002	1,233	133.50	128.32	-5.19	-51.90
4	Bogawantalawa	3,881	9	6	3	57	9.796	1,741	145.32	146.92	1.60	15.67
5	Elpitiya	2,739	13	8	5	57	7.473	1,782	131.89	129.85	-2.04	-15.25
6	Hapugastenne	5,427	19	11	8	46	8.589	1,177	136.07	140.71	4.65	39.90
7	Horana	2,357	10	6	4	57	4.644	1,811	140.10	144.68	4.58	21.27
8	Kahawatte	4,081	17	5	12	59	7.564	1,092	151.54	139.49	-12.05	-91.12
9	Kegalle	1,348	7	3	4	38	2.955	1,363	130.96	135.76	4.79	14.17
10	Kelani Valley	4,092	22	12	10	55	7.602	1,646	143.81	148.24	4.43	33.71
11	Kotagala	2,750	14	7	7	74	6.283	1,787	144.28	139.55	-4.73	-29.72
12	Madulsima	3,892	12	2	10	39	5.679	1,285	159.27	140.29	-18.98	-107.78
13	Malwatte Valley	5,156	16	9	7	30	7.650	1,315	130.21	127.55	-2.66	-20.33
14	Maskeliya	5,913	20	17	3	48	10.243	1,667	129.51	153.44	23.93	245.12
15	Maturata	5,046	19	9	10	38	7.063	1,165	122.61	130.74	8.13	57.45
16	Namunukula	2,711	18	14	4	38	8.067	1,213	135.83	142.59	6.76	54.53
17	Pussellawa	2,964	16	11	5	61	5.009	1,440	133.66	140.70	7.04	35.27
18	Talawakelle	4,069	19	12	7	53	8.307	1,589	149.09	161.06	11.97	99.41
19	Udapussellawa	3,740	13	6	7	35	5.365	1,290	133.49	128.95	-4.53	-24.32
20	Watawala	4,431	17	4	13	61	9.104	1,495	150.72	143.11	-7.61	-69.28
	TOTAL	78,621	313	163	150	47	144.886	1,429	138.84	140.12	1.28	185.13

CORPORATE RANKING 2003 - TEA

	Privatized Plantation Company	2001 Rank	2001 Profit / Loss (Rs.mn)	2002 Rank	2002 Profit / Loss (Rs.mn)	2003 Rank	2003 Profit / Loss (Rs.mn)
1	Agalawatte	15	20.28	16	-22.55	13	-18.57
2	Agarapatana	6	111.88	5	82.89	11	-3.08
3	Balangoda	17	-1.40	17	-30.69	17	-51.90
4	Bogawantalawa	2	145.41	11	27.53	9	15.67
5	Elpitiya	5	124.98	8	70.45	12	-15.25
6	Hapugastenne	8	95.96	2	152.56	5	39.90
7	Horana	4	144.26	9	70.26	8	21.27
8	Kahawatte	20	-13.55	20	-116.61	19	-91.12
9	Kegalle	13	27.85	18	-40.12	10	14.17
10	Kelani Valley	10	58.86	15	1.56	7	33.71
11	Kotagala	11	52.66	12	16.41	16	-29.72
12	Madulsima	18	-2.32	19	-94.92	20	-107.78
13	Malwatte Valley	7	107.89	4	100.54	14	-20.33
14	Maskeliya	1	330.11	1	282.93	1	245.12
15	Maturata	19	-4.45	7	75.43	3	57.45
16	Namunukula	9	79.98	6	82.22	4	54.53
17	Pussellawa	16	3.25	10	44.40	6	35.27
18	Talawakelle	3	145.22	3	111.26	2	99.41
19	Udapussellawa	12	35.86	13	12.72	15	-24.32
20	Watawala	14	25.94	14	4.09	18	-69.28
	TOTAL		1,488.66		830.44		185.13

Appendix 6 : Extracts from Some of the Interviews Conducted

Interviews

The interviews were carried out with numerous parties representing differed perspectives of the industry. The categories include the estate managers who are directly involved with the day to day operations of the factory and the field activities, the plantation management company personnel who are involved in administration and overall management with high authority levels for decision making, industry experts who have been involved in estate management, authoritative personnel in Tea Board, Tea Research Institute personnel, private estate managers, and plantation ministry personnel.

The face to face interviews flowed with open ended questions posed to them which enabled a free flow of information. The interviews were recorded and have been put in to a written form below.

Interview 1

Interviewee : Mr. Abeynanda Dias

Designation : Director General, Tea Board and Director, Tea Development Project Ministry of Plantation

Location : Sri Lanka Tea Board

The discussion with Mr. Dias in his capacity as the Director General of the Tea Board Sri Lanka and the Tea Development Project in the Ministry of Plantations, combined with his long standing industry expertise was able to give me a useful insight to the overall industry situation. The interview with him being one of the very first interviews I conducted, the overall insight was a very useful as an entry point to the research.

Q: Can you give me a brief overview of the status of the tea industry today?

A: Tea industry in Sri Lanka has been a success story for over a century now. The main players are the plantation companies and the tea small holders who have now taken over as the major producer of tea. Although Sri Lankan is about the third largest producer of tea in the world it is the world largest exporter.

Q: What are the major problems in relation to the tea industry of Sri Lanka?

A: There are several issues that need to be addressed. They range from the fields to the market.

In the fields, most of the tea land is owned by the Regional Plantation Companies. However their yields are low in comparison to the small growers. One main reason is that most of their teas are uneconomical due to age and low levels of maintenance

they have received prior to privatization. Replanting is essential to improve the plantations however it is a costly affair with a long payback and most of the RPCs are not replanting enough to at the moment. Ministry proposed a replanting rate of 2% however present rate is less than one percent.

In comparison the small holders are doing well with better yields. Their teas are relatively new and are from the improved VP clones. In addition they are able to maintain the plantations better due to private ownership with quick decision-making. This lack of red tape in decision-making is better seen in the factory improvements.

Taking about the factories, Sri Lanka produces about three hundred million kilogram's of tea with about 570 factories where as Kenya seems to be producing the same amount with about 75 factories. There is no real control mechanism for setting up factory operations and this abundance of tea processing factories has in fact created unnecessary competition for the green leaf. This has led to some factories running under capacity and wasting resources.

Other major problem is the issue of labour shortage specially seen in the low country tea production for RPCs. The workers are moving out of plantation work to other types of employment making the heavily labour intensive industry suffer.

Q: Can mechanization be a successful solution to the labour problem?

A: Mechanization is a solution to the problem, however it has several downfalls on its part. For example the highest labour requirement comes in the harvesting and there are certain labour saving devices developed for this purpose such as mechanical shears. These have the tendency to cut through the leaves of the same level where as in manual harvesting the workers do a pick and choose plucking. Thus in manual plucking the quality of the harvest is very high. Further when the leaves are cut in half the cells are damaged and the fermentation process starts from the point if harvesting and deteriorates the quality. Thus there is a trade off between quality and mechanization.

Q: How do you rank the cost of production (COP) in Sri Lanka with the competing nations?

A: the main contributors to the COP are the yields, the labour costs and the fuel costs. In a Sri Lankan context none of these are very favorable. The yields can be better and this is constant demands for the labour rates to be increased for RPCs. Further the electricity cost is high and the factories should be looking in to energy saving methods and alternative energy sources.

Q: Why isn't Sri Lankan moving in with CTC production which is considered to be a low cost method.

A: Sri Lanka is predominantly in to the production of black tea through the Orthodox manufacturing process. Sometime back there was an initiative to promote CTC production where financial aid was given to set up CTC operations. However, it was felt that the Sri Lankan tea or Ceylon Tea is demanded more for its original flavors thorough the orthodox production system. It is true that we have lost some of our

market to CTC teas, but overall it was felt that we have better opportunities in presenting the orthodox teas rather than CTC teas.

Q: In terms of processing systems what improvements can be made ?

A: As far as the processing of teas is concerned we seem to be having a good system for processing. I don't think much improvement is required there. The traditional system seems to be doing fine and we do have some improves machinery such as the color sorters etc that have come in to the play.

But I think there is a shortage of good engineering firms in operation in Sri Lankan at present. In the early seventies there were many engineering firms in Sri Lankan who designed and produced lot of machinery for the tea industry. But now most of them are not in existence and some of the machinery that come form India are not ideally suited for our operations. I think this is a problem the industry is facing today.

Interview 2

Interviewee : Dr. Ziyad Mohamed

Designation : Director Rea Research Institute of Sri Lanka, Talawakelle

Location : Colombo

Highlights of the Interview are as follows:

The Role of TRI in the Sri Lankan Tea Industry

TRI was established in 1925 with the intention of carrying out research and improving the productivity of the tea sector.

Sri Lanka is the largest exporter of tea although it is about the third producer of tea. And our auction averages are the highest in the world and that speaks about the volumes of the tea industry in Sri Lanka. Tea is the largest Net foreign exchange earner for the country. Sri Lankan tea is considered to be one of the cleanest teas in the world with minimal pesticide residue in the tea. These are primary due to the efforts of TRI. TRI has done research and made appropriate recommendations to the industry .In the open economy there are many promoters who are bringing in many products and trying to promote their products to the industry. The industry has recognized and accepted that unless it is recommended by the TRI not to use it. This shows the confidence the stakeholders have in TRI. We would like to consider ourselves as a 'partner in progress for the industry'.

Tea Cultivation Practices

Answering a question on the cultivation practices as to why TRI sometimes still recommend seedling tea as opposed to VP tea, he answered highlighting a hidden problem associated with the Sri Lankan tea industry;

"Unlike VP tea, seedling teas have high withstanding to drought conditions because of their deep roots. There are certain areas where there is high droughts and we recommended the seeding tea for such areas. The seedling teas will never give the high yields of the VPs and there is less uniformity amongst the plants."

"There is another problem. When we introduced our VP materials in the 1950s the yields of seedling teas were in 800kg range and we wanted a quantum jump. In the process of developing the VP with high yield, we have destroyed some of out quality material. Some of the seedlings may not have the yields but could have the very good quality potential. In our search the high yield we have lost the genetic base for variety. I am sorry to say that 85% of the VP teas we have developed have come from the same parent material. This is a bit tricky situation because for some reason a disease or a pest attracts this variety most of our plantations could suffer. Luckily this is unlikely for perennial crops."

Replanting of Tea

The government suggested that we do a replanting rate of at least 2%. The idea was then within 50 years you would have replanted all your seedling tea.

The reasons for the lack of replanting

- cost of replanting
- lack of planting material
- In 1999 TRI stated a programme to establish mother bushes of 85 Ha. Now we are in a position to issue planting material. When TRI develop new varieties we give out these for other parties so that they can establish mother bushes of these new varieties. However they have not done their job and not kept proper records and to that extent there is a shortage.

Research on Tissue Culture and Molecular Biology

He stated that the potential for tissue culture in Sri Lankan tea has been very low, since they have not been able to achieve positive results in this area.

However TRI is using molecular biology in the research. But it is not used for genetic modification but to identify the traits and to speed up the analysis process, i.e. rather than putting it in to fields and waiting for results DNA fingerprints of the plants are analysed for its qualities.

TRI is not doing any transgenic modifications. Earlier what ever the new variety of teas TRI developed was named as CLONES. The western world has views on the word clone. After several inquires from the western world on genetic modification the new breeds are now renamed as CULTIVA.

Processing Highlights

When compared with South India they are far ahead of us in the cultivation, and are getting yields far beyond us. However their teas are selling at much lower rate than that of us in Sri Lanka. The reason is being the fine-tuning that has been done to our processing. Even compared with Kenya we have strength in the processing.

India has done several modifications to the processing and machinery however they have not been very successful as we are in fine-tuning them to our requirements.

Sri Lanka has been a manufacturer and exporter of tea machinery in the by gone days. But the open market economy has made it difficult for Sri Lanka to be competitive with the imports from other countries that have the raw materials and cheap labour. Thus for example India could produce and sell us the machinery at a much cheaper rate.

Interview 3

Interviewee : Mr. T T Christie

Designation : General Manager Plantations, Maskeliya Plantations Limited

Location : Colombo

Q: Looking at the statistics of the plantations, Maskeliya plantations seems to be ranking the first in terms of NSA, COP and the profits. Is there any specific reason as to how you outstand in comparison to most of the other plantation companies?

A: We start with an advantageous position from the location of our estates, most of our plantations located at the Maskeliya region where the best quality teas are produced in Sri Lankan. We try to make the best of the climatic and geographical advantage that is endowed to us and that is one reason we have very good NSAs in the auctions.

Q: What activities have you carried out to capitalize on your existing advantageous position?

A: Our motto is 'Best quality and lowest cost. We maintain best possible standards in our factories. We focus on customer requirement and factory development to meet the quality requirements. Today the customers are very keen on quality and maintenance of quality standards. Of our twenty estates, we already have five factories under ISO 9001:2000 certification. Our Koslanda estate became the first Tea Plantation in Sri Lankan to receive ISO 14001 environmental management certification. We try to adopt the best practices such as 5S in factory operations and we have been winning the Taiki Akimoto 5S national competition awards. Laxapana estate secured the winner of the Plantation Sector whilst three other estates won merit and compliance certificates. We have seen that there is tremendous improvement in the work practices through the introduction of these best practices methods.

Q: Maskeliya is plantation company with largest mature tea extent and you have the highest tea production in year 2003. Further your yields are much higher than the average yields of the corporate sector. How is this achieved?

A :We have our own policy and we do stick to the basics and do the basic thing correct. Thus we follow the best practices and recommendations which are the basic features for the success in an agricultural business. We maintain our fields with proper fertilization and good agricultural practices.

Q : In addition to the highest NSA your COP seems low in comparison to the rest of the players. What are the measures towards cost reduction?

A: We focus in the areas of harvesting, fertilizing and energy cost reduction. As mentioned before we have introduced mechanization in the harvesting and pruning which results in improved productivity. In addition change of the fertilizer mix enabled us to have the same nutrient levels in the soil with much reduced costs. Specific research in relation to these were carried out with the collaboration with the TRI.

In the combat of escalation of power costs, we have looked in to the harnessing of Hydro power resources. In addition efficient use of energy is being actively pursued. These have resulted in a saving of 10%-14% of the overall power consumption of the respective estates.

We have undertaken to replace the liquid fuel heaters with solid fuel boilers with and aim of reducing firing costs and eliminating smoke taints.

Q: Industry replanting is less than the plantation ministry target rates. How is the situation with Maskeliya plantations?

A: Replanting is a must for the sustainability of the industry. However the priorities have changed in the industry setup. The agricultural business has long payback periods and most of the companies do have other priorities.

The money is spent on factory development, power generations etc where the returns are high and faster.

Other reason is many plantations are short of workers and this is another reason the plantations are not keen on replanting. They concentrate on the already cultivated land and try to obtain a quality output out of that. In our case too, although we are engaged in replanting, it is at a lower priority level. We try to reap the best from the existing extent. Not that we have stopped replanting, the priorities have changed and we would get back to it little by little.

Q: In general the plantation sector is facing a shortage of labour. How is the situation in your case?

A: We have excess labour in the Western sector but shortage of labour in the other areas such as Bandarawela and Talawakellie where other forms of employment are available. In the areas of shortage of labour we have introduced mechanizations.

Q: How is the worker receptiveness towards mechanization?

A: Initially they were resistive against the machinery. However in the areas of labour shortages they have really welcomed the mechanization. We have been providing them with training and they have accepted the changes. We have good relationships with our workforce and they have been quite well behaved even in the times of worker unrest in the plantation sector.

We have our own worker ethics have encouraged them to come up with their suggestions through schemes such as introduction 5S. Thus we have managed to improve the attitude of our workers considerable.

Q: In most cases they say there is a trade off on quality in the mechanization. What is your view on this?

A: I think mechanization can actually improve quality. But it needs lot of time to develop the workers. And in the case of say harvesting the tea bushes also need to be trained for mechanical harvesting process. Thus it is a learning exercise and with the proper training mechanization actually improves quality and definitely increases efficiency.

It is true that Sri Lankan terrains are not ideal for the mechanization. In other countries for example in Kenya the tea lands are flat in comparison to our steep slopes. Thus there are practical difficulties involved in mechanization in field activities. However in our own way we could do a lot to introduce mechanization and thus improve efficiency and reduce costs.

Q: Are you involved in bought leaf processing too? How do you maintain the quality aspects in bought leaf operations?

A: We have some factories processing bought leaf as well. And our margins are low with bought leaf because there is a special formula where we have to pay to the leaf producer based on our NSA.

The quality assurance is through stringent checking and also with education. We educate them about the handling of leaf and we reject any thing which does not fit in to our specifications. Thus we have managed to maintain our aspirations of quality and built up a good relationship with the suppliers.

Q: What specific measures are done to ensure the product quality?

A: The main focus in achieving a consistent product quality is the harvesting operations. Training programmes with the participation of executives and field staff enabled to create and awareness of the planning, implementing and monitoring of the harvesting programme. The training is extended to areas in the process of manufacturing.

In addition our factories are striving for highest quality levels. We have adopted latest technology in the factories such as computer aided withering and fermenting processes in five factories and this has actually helped in maintaining our product quality. Quality assurance programme with quality monitoring has been implemented both at the factory level and at head office level. We are in a move towards total quality.

Q: In the management of estates what kind of authority is with the estate management?

A: Subject to a frame work of policies we have given our estate managers a fair amount of autonomy. Of course there are regulations in relation to capital investments where there is a tender procedures to be followed through the head office. However they send their recommendations for such requirements. Even fertilizer we buy in bulk to get the discounts available. In other operations of the estates they have full autonomy in running their day to day operations.

Q: What is the level of IT utilization in your organization?

A: We have introduced a wide area network connecting all our estates. The accounting package is used running parallel in all estates we can monitor estate accounting system through the head office. The WAN has helped reducing the communication costs as well.

Q: What other measures have been adopted in the reduction of costs on estate levels?

A: with the introduction of best practices such as ISO and 5S we have reduced the waste and the streamlining has improved the efficiency levels leading to reduction in costs. In addition, we have introduced many energy conservation mechanisms. Power factor correction systems, converting boilers from oil to fire wood. This actually reduces contamination of teas through smoke. We have moved in to mini hydro power generation which reduces the energy cost as well as generating additional income through sale of power.

Q: What opportunities do the employees have for career development and training?

A: We do not have a formal training programme structured for the employees. We see that they trained in house through the work itself. We sometimes offer thrainign through NIPM, National Institute of Plantation Management. And we offer training to the factory staff as and when it is required.

We follow the policy of promoting our own superintendents and we have been successful in retaining them. We have a fairly young group of estate managers who are enthusiastic and energetic.

Q: What is your involvement with TRI?

A : TRI collaboration is very high and we do lot of collaborative trial with them. Maskeliya plantations are well involved with them. I would say that each superintendent has direct access to the TRI.

Q: There is lot of criticism about the inadequate role of TRI. What is your opinion on the TRI role?

A: We are in the agricultural business. In agriculture each plot of land is different and it is your duty to use the basic knowledge from research activities and use it to serve your purpose rather than criticizing others. We follow the basic rules and have been successful in capitalizing on this practice.

For example if I have a problem in my plantation, I can initiate the dialogue with TRI for finding solution to the problem without waiting for their extension service to come to me. In that aspect by being proactive we have actually made use of the TRI resources extensively. TRI do have their own problems, but it is up to the planters and the plantation companies to get the best out of the resources available.

Q: What about TRI role beyond the field work?

A: Sri Lankan has developed a good processing practice over the years and that is reason behind our quality teas. In the processing we should not be going for drastic changes and the TRI have introduced certain improvements which are consistent with our quality.

We bought some Indian machinery here and we actually got in to trouble with them. They promised high output and efficiency, but we really lost on the quality. Today the quality tea is the one which is getting the highest price and we cannot really trade off with quality.

TRI recognizes this fact and have been very careful in recommending the changes to the tea processing. They have come up with good designs and innovations for example the FBD drier (Fluid bed drier) was invented by TRI but presently we are importing it from India.

Up to now if we can do what TRI recommends I think we can be successful in our operations. We at Maskeliya are achieving No. 1 NSA in the country according to TRI recommendations. I think there should be more support from the government to promote their research .

Q: In your opinion what are the main challenges faced by the tea industry at present?

I think the biggest challenge we face at the moment is the adverse political intervention. The trade unions are so powerful and there is no fair play. There is no doubt that the workers need a wage increase, but the industry needs a certain amount of output as well. For example there is demand for a wage increase and the plantation companies are finding it very difficult to manage their cash flows in this sudden wage increases. We do agree that the workers need a rise in the wages, but what should be done is it should be an incentive in relation to the productivity and efficiency. With the present situation there is no net benefit to the plantations and it does erode away the money available for reinvestment. This ultimately affects the long term sustainability of the plantation sector.

The other issues is the lack of support from the government and Tea Board should be more in promoting Sri Lankan Tea. Still Tea is the major net foreign income earner for the country and there are so many millions of people involved with the tea industry. Thus the improving the export earnings have a big impact in the Sri Lankan economy. I feel that the role played by the Tea Board is not sufficient.

Q: Tea industry is over 100 years old. How is the general attitude of the industry and its people?

A: The industry has seen lot of changes over its existence, Privatization, government ownership, re-privatization has necessitated lot of worker awareness programmes to move in with the changes and attitude changes. Of course there is the group of resistive people which always oppose change. It is a matter of how to deal with them.

Q: In your opinion are we how could the technological advances be introduced to the industry?

I think the we should be adopting the only the suitable technologies to us depending on the environment. For example we can propose a fully automated factory for processing all our teas as done in some other countries. However we have to consider the labour issues associated with the decision. That is one extreme case, but what I thin is we should go for appropriate technological advances and they need to be implemented with care.

Q: How is Maskeliya handling the new product developments?

A: Maskeliya has the whole range of tea products. The Orthodox, the leafy grades, CTC , bio tea etc. thus we can cater to all the market equipments.

Q: Why isn't CTC popular in Sri Lanka?

A: CTC teas are mainly used in the Tea Bags which are widely used in the western world. Kenya is geographically situated in a better location to the west and we used to value our CTC mainly to the Pakistan market. However in comparison to Sri Lankan Orthodox production quality, our CTC are of lower grade and are used mainly as the secondary mix in tea blending. Our areas are not best suited for CTC teas and are ranked secondary to Kenyan tea. Thus most of our companies are really focusing in the orthodox production which fetches high prices in the market as Sri Lankan Teas.

Interview 4

Interviewee : Mr. Parakrama Hettiarachchi, General Manager Tea, APL

Mr. Ravi Bandaranayake, Mr.Lal Munasinghe

Location : Colombo

Highlights of the interview are as follows:

Planting and Field Related Activities

In the plantations it was identified that one major problem is the low yields. For APL the main reason is the aging plantations in general. The plantations, which came under APL at the privatization , were not the best that were available. Although there were over 1500 Ha of low country tea, most of them were uneconomical and initially the company had to concentrate of a small area of economical tea to survive in the

business. State sector has not invested in the field development and most of the estate had old tea.

Replanting is the solution to overcome the problem. However it is a costly affair and the board does not consider investing in replanting very positively. Replanting costs approximately Rs 800,000 per Ha of which includes 25% as general charges. The planted bush takes about 3 to 4 years to reach the harvesting stage. Thus, replanting is long-term investment with a high pay back period.

Describing the process adopted in the planting process he also stresses the importance of following the basics right. First step is the field selection process, where the land o be replanted is identified based on the old tea, the terrain conditions, soil erosion, etc. these are specified in more detail in field guidebooks.

Land preparation involves several important steps. The uprooting of old tea, taking measures for pest control and disease control which could propagate from old tea to new tea, soil reconditioning and rehabilitating through planting break crop such as Guatemala or Mana. Specific measures has o be adopted to prevent soil erosion such as the drainage systems and terraces. With the planting of rehabilitation grass, shade trees and shelterbelts for wind barriers should be planted.

All these information is available for the planters as information booklets and most of this is embedded within the people with their experiences.

Selection of the type of tea to be planted is also an important area. The selection will depend on the terrain, the yield , the quality, resistance to climatic condition etc. The TRI has guidance and advisor services for these. TRI has developed several clones, which possess specified qualities, and the growers can select the clones from a range available.

Where do the plants come for replanting?

This is a process, which needs planning for about a two-year period. A nursery has to be set up based on the selected type. Vegetative Propagation is preferred as it gives more uniform plantation, however if the terrain is subject to sever weather conditions such as droughts seedling tea developed through previous VP teas are suitable to withstand these conditions.

One major problem faced in replanting is the shortage of the nursery plants. To plant a Ha of tea a nursery of 15,000 plants should be developed. A mother bush can produce about 30 cuts and a 5000 mother bushes are required to set up the nursery. There is a shortage of latest clones such as the 4000 series. Although TRI has done certain development in the tissue culture area it had not been very successful in providing the industry with planting material.

Commenting on the success of TRI clones he said, 'It takes about 10 years to develop a mother bush to obtain cuts, to develop substantial plantations. TRI tests its clones in ideal conditions and when they are field tested of course we do not get the yields that are available under test conditions. However they have come up with several good varieties. However compared to the Indian counterpart of TRI, we have not done so

well. Being a crop, which lasts about 30-40 years it, is very difficult to assess the success of a new clone in the short run. But overall I think they have done well to introduce good planting material to the industry'.

Talking about India, unlike in Sri Lanka they have private companies operating their own research centers and they do not wait for government institutions do the research for them. Of course they are multinational companies such as Unilever and TATA.

APL has pioneered in the introduction of mechanized pruning and harvesting machines, considering the fact that Mackwoods is an importer and distributor in these equipment. However it is not constant users of these as they seem to have deterioration of quality in the case of harvesting. But in the peak the peak periods of harvest with shortage of labour APL is also using these.

In the quality maintenance of the leaf, the own estate leaf is sent for processing thrice a day whilst strict rules are applied to the bought leaf to main the quality. In the low country there is heavy competition for the bought leaf as there are several private factories which are competing for the leaf of small holders.

Estate Management

APL has provided fair amount of autonomy for the estate managers, however the capital expenditure is mainly controlled by the head office. We also minitor their performance through reviews and meetings but say the production management and catering to the customer demand etc. they have full autonomy.

Factories

Although APL has the first ISO 90001:2000 certified tea factory in Sri Lanka, there are resource constraints in other tea factories. For example all our factories does not own a colour separator, which is an important piece of equipment in quality assurance of tea. Some of APL factories in the low country are competing with the private estate owners who operate with latest equipments and the completion is tough. The major constraining factor is the limited capital availability.

Social Development

APL has embarked on several social development programmes targeting worker welfare. These are aimed at worker retention and motivation. We have been successful in some of the estates to boost the motivation levels of the employees. However, labour shortage is sever in the low country estates.

IT Utilization

APL does not have a WAN, but recently we have provided the estates with Dialup Email connectivity where they send their reports and account to the head office. However we do not have a standard accounting package nor a MIS implemented. Still there is considerable amount of paper work flowing between the head office and estates.

Interview 5

Labookellie estate is the ISO 9001:2000 certified tea factory in the Agalawata Plantations Limited. The interview highlighted the advantages of worker involvement and in productivity improvement.

Interviewee : Mr. Lal Perera

Designation : Manager- Labookellie Estate, Agalawatta Plantations

Location : Colombo & Labookellie

Q : what would you consider to be our biggest challenge in managing the estate ?

A: I think it is to keep the labor motivations high enough so that I can retain them in the estate and reduce their attraction towards the labour unions. Most of the younger generation prefers to avoid estate work. They will engage in all other forms of employment and only come for estate work if nothing else is available. The sad part is the estate provides for the whole family with accommodation, and certain amount of supplies and other facilities and the whole family enjoys these facilities while only may be the old mother or the father is the only estate worker. And the young girls sort after other employment and may come for estate work when they are much older and with family burdens. Thus although the estate nourishes them, we usually are no able to use their most productive years for the estate. In addition I have the problem of dealing with the labour union pressure and political pressure.

Q: Taking of motivation levels, how do you propose to improve them?

A: Actually I have implemented several programmes to keep the labour involves. The issue is that the workers should see the manager as a strong leader; otherwise it is very easy for the labour unions to distract them and create problems for us. What I mean by a strong leader is not simply being arrogant or stern, you should make them feel that they can depend on you and you listen to their views, ideas and problems and you have an interest in them. Then they start to have faith in you.

Q: How have you put your philosophy in practice?

A: The estate employees are provided with housing, electricity, sanitation, medical, and other amenities through the estate. In addition I have developed several programmes to improve the participation specially the young crowd. For example we have organized sports events with the participation of both men and women, competition and celebrations in relation to various festivals, there is a proposal to set up a mini bank. Further I listen to them and get personally involved in their problems and do a follow up to see if these are resolves. Sometimes you cannot agree to some of the demands but it helps at least to listen to them and they appreciate it.

Q: What changes are practiced in relation to the work related activities?

A: Labookellie is the first factory in Sri Lanka to obtain ISO 9001:2000 certification. And we are practicing 5S in the factory as well as in the office. This has helped us to streamline our operations leading to high productivity and less bottlenecks.

In the factory we have changes the designations of the people. Earlier they were all called labourers, but now they are machine operators. They are given uniforms and working conditions are improved. Thus they take pride in what they do and the retention levels have improved dramatically.

Q: It was mentioned once that skilled staff for the maintenance of the machine is lacking. Is it a common to you too?

A: Yes. The factory is 24 hour operation and maintenance crew has to be available though out. However under the collective agreement there are salary scales agreed upon which is insufficient to retain good quality staff in an estate. Thus we should develop our own incentive from the company to retain the skilled staff.

Q: How do you feel about the support you get from the top management?

A: I thing I get a good hearing from them. They are very receptive to new ideas and are usually enthusiastic about them. However there is a lack of action in pushing the ideas in to action plans.

As for the management of the estates, I have a good say in what I do within the estate. I think it is a matter of correctly identifying the requirements of the estate and putting it to the board in a convincing manner to make tem look at it favourably.

Q: what about issues such as replanting?

A: I believe the same rules apply there as well. For example if you think you would not have enough labour to maintain the estate in the future them promoting replanting is not a very good idea. At the same time you have to consider about the cost benefit of the idea.

I think we should go for a niche in the Labookellie estate. We do not do bought leaf here and we promote branded, value added tea from Labookellie. I feel that we should concentrate more on this rather than bulk tea production.

Q: Being the first tea factory in Sri Lanka to obtain the ISO 9001:2000 certification and the only tea factory in the group to obtain the certification, what benefits have you achieved through this?

A: I believe the certification to be a very good think. Not so much the certificate, but the practices that were introduced with the system. We have been able to streamline the operations to avoid unnecessary waste and improve the efficiency of the operations. The streamline process has given better order in the operations. The introduction of the 5S system within the factory has had benefits beyond the factory. Some of the workers have improved the conditions of their own houses with the practices learned through the operations. It is very encouraging to notice that they are themselves making an effort to use the new gained knowledge in the day to day life.

Q: In addition to the social development and interaction with them are there any other development programmes for your labour force?

A: definitely. We have regular training session for them on various topics. We have set up a lecture room and auditorium with adequate facilities to provide regular training to all levels of staff, in addition to the on the job training. In addition I have developed a practice of taking them to see a factory of a higher standard and lower standard and let do a bench mark on their factory and to come up with suggestions and action plans for the continuous improvement.

Q: The tea factor operation is an operation with high involvement in both machinery and humans. Do you think that there is room for improvement?

A: definitely. We have been using the same old systems which are almost 100 years old. I think there are plenty of areas for improvement. I think new mechanical systems as well as electronic system can be used well in these operations.

Q :Can you give an example of a such instance.

A: One area is actually in withering, where one has to constantly monitor the humidity levels to determine the temperature of the air that flows to withering troughs. Presently these are recorded every half hour or so using wet-and-dry bulb reading difference of an anemometer. This is area where electronic thermostats can come in to play. Although these are available in the industry we have not yet introduced them here due to capital budget limitations.

Some of these are ideas I would not be able to practice without the help of some expert knowledge, such as a university research team. I feel that the engineering faculties of the country should come forward to assist the tea industry improvements. I am very enthusiastic to cooperate with them to use the factory for the test purposes. However I have not been successful in interacting them so far.

Interview 6

Interviewee : Mr. Herath

Designation : Manager- Delgoda Estate, Agalawatta Plantations

The Delgoda Estate of APL is mainly a tea processing factory situated in a small plantation of five hectares. The factory processes mainly bought leaf from small growers .

Q: Can you brief me of the operations of the factory.

A: Delgoda factory has been set up to process green leaf of the small holders under government regime. And at privatization it has been transferred to APL in 1992. Although the estate tea is minimal for Delgoda, the factory operates at almost full capacity with the bought leaf.

Q: what would you consider the main challenge faced by you in your day to day operation?

A: I would say the labour shortage and how to ensure the supply of good quality green leaf for my operations.

Unlike in the up country, there are many avenues for people to get themselves employed. In addition most of the villages have a small plot of tea land. Thus they are not keen on estate work. I have to incur high costs for the supply of labour some of them have to be sourced from far away places as well.

The demand for the green leaf is high because there are several private factories operating in the vicinity. Some of them offer a higher price than what can be offered by us to the small growers and we face sever competition due to this.

Q: How can the private factories offer a higher price?

A: usually there are stipulated prices, based on the net sale averages of the previous months' sales. Some of the private factory owners use certain mal practices to earn their revenues mostly through private sales where as we are focusing our total production for the auction.

Q: How would you compare the productivity levels of the private factories in comparison to you?

A: the productivity levels of the private factories are much higher compared to that of ours. They have better machinery and equipment. For example, almost all the private factories have at least 3 colour separators, which is crucial equipment for the maintenance of the quality of the output. But we have only one colour separator with us, which is a real bottleneck in our process.

The issue is they have one factory to concentrate on an they invest heavily with quick decision making, whereas being a company we have to go through many procedures and work on a limited budget. The colour sorters are expensive machinery but an essential component.

Q: You highlighted the problems due o labour shortages. What do you feel about the automation process as a solution to this?

A: Automation will reduce our about needs. But I think it is a very costly affair and we do not have money to fund such expenditure. There is a new factory which has come up with a conveyer system and with much reduction in the man power usage. However I think it is too costly for us to consider.

Q: How do you focus your production towards market changes?

A: the market information is gathered through brokers. They do certain projections based on the market conditions and we try to model our production towards the market needs. However since there are several variable that determine the tea produced, the flexibility is limited to a certain extent.

Q: where do you get the information in relation to the latest development in the tea industry?

A: the information in relation to the machinery and equipment usually comes directly from the machinery and equipment suppliers. They come with their catalogues and try to persuade us to move into the new processes.

As for the information on planting and plant management, TRI is very helpful. Their bulletins provide a vast amount of information and they are very helpful in clarifying any queries.

Q: Do you think the support available from TRI is sufficient?

A: TRI has been good in their agricultural development activities with new clones, better agro practices pest and weed control. However I feel that they have not done much in relation to the factory operations.

Q: You highlighted the problem of labour shortages and lack of enthusiasm of people to come for estate wok. Are there any practices you have adopted to develop the motivation levels of the labour force.

A.: The estate does lot of things to improve the living standards of the people. We provide them housing, sanitation, crèches for their children, medical facilities. However the perception of being an estate worker is not so promising considering the other opportunities they have in the area. Thus they consider the estate work to be the last resort.

Points gathered over several other interviews with other estate managers of APL and through the questionnaire to estate managers

Labour

- Most of the estates are facing a labour shortage problem.
- The motivation levels are low and the problems with the unions and political issues is a problem for the operations.
- Availability of skilled labour is low, such as technicians.
- There is some work done towards social development aspects of the work force, however this could be improved.

Information availability

- Information on the market directions, latest processing techniques new products, new machinery is widely available
- TRI information sources provide good guidance

IT Utilization

- Level of IT utilization is satisfactory but there is mcih room for improvement
- Only some estates have email conductivity

- Needs training to improve the IT literacy levels

Other points

- Fair amount of autonomy is available from head office
- Head office is not promoting replanting
- Encouragement towards introduction of technology is good; however there is a capital limitation.
- Encouragement towards introduction of better practices is present in the company
- The equipment in the factories are at satisfactory level but there is much room for improvement in all areas.