THE TEA RESEARCH INSTITUTE OF SRI LANKA

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Interim Guidelines on Strategic Cost Component Management in Tea Cultivation with Special Reference to Rational Use of Plant Nutrients and Tea Manufacture

1. Background/Rationale

Ultimate objective of any enterprise is optimizing the profits and the same is true for the stakeholders in tea supply and value chain as well. The profit is defined as the difference between the sale price and cost of the product (COP). Therefore, it is imperative to maintain the cost components as minimum as possible and obtain higher prices to accrue higher profit margins. Ensuring the best quality of end-product and adding value to them will also increase the Net Sale Average (NSA) of graded tea.

With limited availability and higher input costs, it is necessary to identify appropriate strategies for the rational use of such inputs in order to manage costs and minimize impacts on sustainable production.

The purpose of this interim guideline is to advise the growers and producers on key strategies to manage cost components in tea cultivation and processing. However, it should be cautioned that the curtailment of inputs such as fertilizers need not be continued as a routine practice as they adversely affect productivity.

2. Strategic cost management in tea cultivation

2.1 Rational use of plant nutrients for tea fields

The costs of plant nutrients and applications vary from 6 - 12% of total cost of production (COP). Hence, rational use of plant nutrients is important to maintain tea lands profitably.

- Do not curtail fertilizer inputs for tea nurseries and immature tea (up to formative pruning) in the use of T 65, and T 200 and T 750 mixtures respectively and continue as recommended (Refer Advisory Circulars SP1 and SP2)
- An interim recommendation on a fertilizer mixture containing Sulphate of Ammonia (SA), Eppawela Rock Phosphate (ERP) and Muriate of Potash (MOP) formulated as T1240 is made for the use in mature tea fields.
- The composition and nutrient concentrations of T 1240 are given in Table 1.

Table 1. Composition and nutrient concentrations of the T 1240 mixture

Mixture	Composition (parts)			Concentration (%)			
	SA	ERP	MOP	N	P_2O_5	K_2O	S
T1240	970	103	167	16.1	2.3	8.0	18.7

- Use nitrogen (N) rationally for mature tea based on the average yields as detailed in Tables 2 and 3 for corporate sector and small holdings respectively so that every 100 kg of made tea below and above the yield level of 1400 made tea kg per ha per year receives on average 08 kg and 10 kg of N respectively.

Table 2. Number of applications and per application quantity of T1240 for corporate sector

Average yield (Made tea kg/ha/year)	N requirement (kg/ha/year)	Number of applications per year	Per application quantity (kg)
Less than 800	65	2	200
From 800 up to 1400	90	3	180
From 1400 up to 1900	165	4	250
Over & above 1900	200	4	310

Table 3. Number of applications and per application quantity of T1240 for small holdings

Average yield (Green leaf kg/ac/month)	N requirement (kg/ac/year)	Number of applications per year	Per application quantity (kg)
Less than 130	25	2	75
From 130 up to 220	35	3	70
From 220 up to 300	70	4	110
More than 300	80	4	125

- Apply T1240 mixture 2, 3 and 4 times a year for tea fields yielding less than 800 kg, 800-1400 kg and above 1400 kg of made tea per ha per year (<130, 130-220 & >220 kg green leaf per ac per month) respectively.
- Apply fertilizer from plant to plant for tea fields yielding less than 800 kg of made tea per ha per year (<130 green leaf per ac per month)
- Test soil pH regularly and correct soil acidity (optimum range of pH being 4.5-5.5) by applying dolomite prior to chemical fertilizer application to improve nutrient availability and plant uptake as given in Table 4 as per the recommendations (Refer Advisory Circular SP3).
- Use compost to improve nutrient use efficiency and soil pH buffering capacity. However, compost made from municipal waste is not permitted due to possible contamination with heavy metals.
- Apply compost preferably at the rate of 5 metric tons per ha per year (2 metric tons per acre per year) in low country and 2.5 metric tons per ha per year (1 metric ton per acre per year) in up country, mid country and Uva regions or 20 metric tons per hectare (8 metric per acre) at the prune in low country and 10 metric tons per hectare at the prune in up country, mid country and Uva regions depending on the availability. Wherever possible, incorporate compost into soil by envelope forking.

Table 4. Correction of soil pH with dolomite applications

Soil pH	Dolomite			
	kg/ha	No. of Bags/ha	kg/ac	No. of bags/ac
Below 3.9	2500	50	1000	20
From 3.9 up to 4.2	2000	40	800	16
From 4.2 up to 4.5	1500	30	600	12
Above 4.5	1000	20	400	8

2.2 Adopt shorter plucking rounds to improve tea yield, leaf standard and quality of made tea

2.3 Give priority and deploy maximum workforce for plucking (harvesting)

2.4 Use suitable machines for labour intensive operations such as plucking, pruning and weeding

2.5 Adhere to rest fields prior to pruning and advocate correct length of pruning cycle (3 year cycle for VP tea in low country and 4-5 year cycle for VP tea in up country, mid country and Uva regions). Undue shortening of cycles will lead to more non-productive periods (recovery after pruning).

2.6 Adopt alternative worker deployment models (AWDMs) such as offering work to estate workers on contractual basis, cash plucking, block plucking, contract farming systems and out grower system to overcome labour scarcity and improve labour productivity.

2.7 Monitor key field operations such as plucking, pruning, fertilizer application to ensure high worker productivity and quality of field operations)

2.8 Adhere to soil and moisture conservation and integrated fertility management strategies as per TRI guidelines to ensure minimize input losses.

2.9 Adhere to integrated approaches as per TRI guidelines on seasonal and perennial pest and disease incidences affecting yield and quality.

2.10 Adhere to integrated weed management strategies as per TRI guidelines to ensure higher yield. Consolidate ground cover by infilling and planting of mana in vacant patches to suppress weed growth.

2.11 Improve productivity of tea lands by infilling of vacancies, replanting, timely management of pest and diseases, and adoption of other key good agricultural practices.

2.12 Diversify tea lands with poor soil conditions into appropriate use such as establishment of fuel-wood blocks and thatch banks/grass planting.

3. Strategic cost management in tea manufacture

3.1 Process only standard leaf with a view to reducing processing time and thereby reducing cost of worker and energy; and minimize ware and tare of machinery in tea factories.

3.2 Use suitable size dryer and required number of machineries only for optimizing performance and productivity

3.3 Implement formal energy audits with TRI assistance and determine critical points in factory operations for corrective measures

3.4 Strictly monitor and reduce energy consumption by an appropriate energy (electrical and thermal) management plan. For example, maintain required stock of cut, split and dried firewood and use it to generate hot air for withering and drying processes.

3.5 Implement GMPs (Good Manufacturing Practices); follow properly designed rolling programme and grading programme and control process parameters such as hygrometric difference in air for withering, dryer temperatures and airflow for withering and drying, and introduce monitoring and controlling systems in tea manufacturing to ensure implementation of GMPs.

3.6 Suitably re-siting machinery and automate/conveyorise appropriately for smooth tea manufacture

3.7 Avoid operating the factory under-capacity.

3.8 Train factory staff and workers on all the aspects in relation to tea manufacture and factory operations to improve their performance/productivity

3.9 Introduce proper record keeping approach for routine monitoring of cost components

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