TEA RESEARCH INSTITUTE OF SRI LANKA

GUIDELINES FOR USE OF MOTORIZED TEA HARVESTING MACHINES

Issued In: January 2026 **Guideline No:01/26**

(This Guideline supersedes the Guideline for Use of Motorized Tea Harvesting Machines issued in July 2013; Guideline No. 01/2013)

1. Introduction

Harvesting of tea, known as 'plucking' is considered to be the most labour intensive and expensive field operation in tea cultivation. Usually, more than 70% of the workforce in a plantation is employed daily for plucking. Manual harvesting of shoots at regular intervals is the most appropriate strategy for achieving potential productivity levels and leaf quality if an adequate work force is available. Nevertheless, in order to increase plucking efficiency and ensure minimum damages to leaf during harvesting the growers can use the TRI Selective Tea Harvester (TRI shear) as an alternative to manual harvesting. Please refer to the TRI Guidelines for Use of Selective Tea Harvester issued in July 2009. However, when severe shortages of workers are encountered and all the tea fields cannot be timely harvested, motorized tea harvesting machines can be used to harvest pluckable shoots and improve worker productivity. Also use of machines will prevent the plucking fields being overgrown or abandoned.

2. Type of motorized tea harvesting machines and their cutting/collecting mechanisms

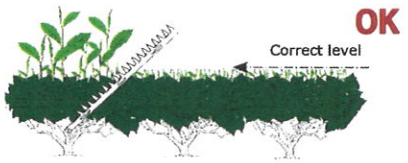
There are different types of motorized machines available for tea harvesting and commonly used in Sri Lanka are the portable machines driven by either fuel-powered engines or battery powered motors. Shoots are cut and harvested either by reciprocating or rotating blades and collected into containers (bags, trays, *etc.*) through air-flow, blade propulsion or using an integrated physical collecting mechanism. The motorized harvesting machines also differ in their lengths of cutter blades. Generally, the length of blades in the harvesting section of portable machines varies from 30 to 120 cm. The blades are either flat or dome shaped. These portable machines are designed to be used by one or two operators. The output of portable harvesting machines tested in tea plantations of Sri Lanka varied from 50-150 kg per day, depending on the length of blade and field conditions.

3. Proper use of motorized machines in the fields

- Motorized machines should only be operated and used with a skill.
- Operators should be properly trained for using the machines and servicing them. They should be educated periodically on the required safety measures as per manufacturer's instructions.
- Avoid using motorized machines during heavy rains and adverse weather conditions.
- In the event that all tea fields cannot be timely harvested with the available work force, motorized machines can be used with a ratio of approximately 2:1 worker replacement. On average, harvesting machines cover about 0.2 ha (single-operator machines) to 0.5 ha (two-operator machines) per day, depending on field terrain, bush stand, and operator's skill.
- Machines can be used for a few rounds during rush crop periods to manage exceptionally high worker demand for plucking.
- High yielding fields (excluding tea fields planted to use harvesting machines) should not be continuously harvested by the motorized machines unless it is unavoidable.
- Low-yielding fields facing extended plucking rounds or abandonment due to worker scarcity can be mechanically harvested. This strategy enables efficient use of available labour for standard manual and selective harvesting in high yielding fields.
- Motorized machine harvesting before the first formative prune and during the 6–12 month recovery period after pruning should be best avoided.
- Before switching from manual to motorized harvesting, make the plucking table even and maintain a convenient height to operate the machine.
- Ensure the plucking table is entirely cleared of any stray weeds or surface debris (e.g.: shade tree litter) to avoid harvest contamination and machine obstruction.
- Single-operator battery harvesters are more manoeuvrable than two-men operated fuel-driven machines.
- Motorized machine harvesting should not be practiced during a period of stress *viz.*, a drought or a severe pest and disease attack, and immediately after a period of stress, as it could lead to bush debilitation.
- Harvesting of shoots across the entire length of the cutter blade should be done only with a single pass. Repeated passes on the same plucking points should be avoided as it damages small buds and maintenance foliage in addition to collecting more coarse leaves into the harvest.

- Ensure the following for proper cutting depth control:
    - Avoid making deep cuts into the mature (red-wood) stems. Deep cuts can delay shoot regeneration, extend plucking rounds and add more over-mature parts to the harvest.
    - Instead, operate the blade at the same depth as manual harvesting (green-wood) to leave immature leaves, which helps accumulating maintenance foliage and minimizes damage to small arimbu shoots (Figure).

a)



a1)



b)



b1)



Figure: Depth control guidelines for harvesting mcahines. a) Correct cutting depth targeting green-wood stems; a1) Resultant healthy maintenance foliage following correct operation. b) Incorrect deep cutting into mature red-wood stems; b1) Resultant thin maintenance foliage layer and delayed regeneration resulting from excessive cutting depth.

- Coarse leaves and other sub-standard materials (twigs, *etc.*) in the harvest unsuitable for manufacture should be removed before supplying to the factory.
- Tea fields should be properly fertilized by ground and foliar zinc sulphate ($ZnSO_4$) applications as per the TRI recommendations.
- Use of motorized machines, tend to form more dormant shoots (banji) and hence, manual removal of banjies after every few rounds of mechanical harvesting is beneficial.
- It is essential to rest (withhold harvesting) tea fields harvested by the motorized machines for two months prior to pruning.

- A slight curve (domed-shape) plucking surface can be maintained to facilitate the efficient operation of domed-shaped motorized machines. However, these larger machines with curved-blades are not very feasible on 2 ft × 4 ft conventional planting arrangement and on hilly terrains.

4. New planting of tea to facilitate the use of machines

For a tea field to be planted with the intention of using machines, the double hedge row method can be established to facilitate machines, as described in the Guideline No: 03/2019 of the Tea Research Institute of Sri Lanka.

5. Causes of concerns

- Motorized machines are non-selective, and continuous use can cause considerable yield reduction compared to standard manual harvesting. However, this yield loss is not significant when compared to the impact of continuously delayed manual plucking rounds.
- The crop harvested by motorized machines may contain more coarse leaves than standard manual harvesting, particularly when the cutting depth is not carefully controlled. However, the leaf standard from machine harvesting can be superior to a crop harvested from continuously extended manual plucking rounds.
- Use of motorized machines is difficult on steep terrains and in fields nearing pruning. Therefore, selection of fields and periods of harvesting should be done with utmost care as per the above guidelines.

6. Safety and Maintenance

- Never place hands near the operating blade. Always stop the engine/motor before inspecting or clearing the blade.
- Maintain extreme care on slopes, slips can cause significant personal injury and machine damage.
- Daily inspect for loose bolts, fuel leaks (petrol) or faulty wire connections/battery health (electric) before starting.
- At the end of operations:
    - Drain the fuel tank and run the engine at idle until the carburetor is empty to ensure easy starting next time.
    - Clean the machine and apply a few drops of oil between blades to prevent them from sticking together or corroding due to plant sap/debris.
- In long-term storage of machines, thoroughly clean them, drain all fuel / ensure batteries are charged.

- Regularly grease and oil the machine as specified by the manufacturer.
- Always use recommended safety wears.
- To ensure optimal efficiency, safety, and durability, strictly adhere to the manufacturer / distributor guidelines for all routine maintenance and servicing.

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