

**EFFECTIVENESS OF STEM WATER HARVESTING AND
WICK IRRIGATION SYSTEM FOR LOW GROWN TEA**

A dissertation submitted to the
Faculty of Animal Science and Export Agriculture of
Uva Wellassa University

In partial fulfillment of the requirement for the award of the degree of
Bachelor of Science in Tea Technology and Value Addition

By

SASHRIKA T.M.P.

**FACULTY OF ANIMAL SCIENCE AND EXPORT AGRICULTURE
UVA WELLASSA UNIVERSITY**

2019

ABSTRACT

Water is an important factor for all plants and different irrigation methods are practiced when and where necessary to assure the crop growth and development. Irrigation through rain water harvesting is not common in Sri Lankan tea lands at present. However, the need of any kind of irrigation is increasing in tea lands, especially when adapting to climate change. In this project the goal was to identify a rain water harvesting method by using stem flow and to evaluate the effectiveness of wick irrigation method for tea. The study was conducted at St. Joachim Estate, Ratnapura (6° 44' N, 80° 21' E) as three experiments. Experiment 1 was done for stem flow harvesting. Tea (*Cammelia sinensis*), Albizia (*Albizia mollucana*) and Gliricidia (*Gliricidia sepium*) were subjected to measuring the stem flow. Plant stems were covered by polythene gutter and a plastic can or clay pot or plastic barrel was placed at the base of each plant to collect the stem flow. Experiment 2 was done to test the effectiveness of wick irrigation technique 1 (buried plastic pipe) towards 2-years aged pot planted mature TRI 2023 and TRI 4049 tea cultivars. Experiment 3 was done to test the effectiveness of two wick irrigation techniques (technique 1- buried plastic pipe and technique 2- plastic bottle placed above ground). 1-year aged pot planted TRI 2027 young tea were tested in this experiment. Wick sources were daily filled with vacant amount of water. The responses of young and mature tea for wick irrigation were evaluated *via* several soil and plant morphological parameters during the study period. According to the results of the study Albizia gave the highest stem water collection than the Tea and Gliricidia. The average stem flow was 10.978 L for 11. 1125 mm of rainfall and the stem flows were varying depending on the plant morphological characteristics. TRI 2023 showed better performance than TRI 4049, especially for drought tolerance for the tested wick irrigation technique 1. Young tea and mature tea showed positive responses for wick irrigation methods. Water application flow rate through wick technique 1 and wick technique 2 were 212 ± 71 mL bush⁻¹ and 496 ± 80 mL bush⁻¹ respectively and wick irrigation technique 2 showed better performances. Therefore, it can be concluded that the tested wick irrigation could be more suitable for smallholder farmers when irrigating tea, as it can be practiced as a spot application even for severe drought affected areas in the field.

Keywords: Rain water harvesting, Shade trees, Stem flow, Tea, Wick irrigation