

**DEVELOPMENT OF SUITABLE PLANTING
MECHANISM FOR THE ELEPHANT FORAGES IN
SRI LANKA**

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Degree of Master of Science in Civil Engineering

Department of Civil Engineering

University of Moratuwa

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DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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The above candidate has carried out research for the Masters under my supervision.

Name of the Supervisor: Prof. R. U. Halwatura

Signature of the supervisor:

Date:

Abstract

The elephants are considered the largest terrestrial mammalian in the world, requiring a larger amount of plant material for survival. The degradation and shrinking of forest of the island resulted due to anthropological activities. The ultimate result of the depletion and loss of habitats and niches is the elephant migration to explore new habitats and food sources. Food plays an important role in the elephant movement and is considered to be one of the factors leading to Human-Elephant Conflict (HEC). The within-range enhancements of the elephant forage availability led to within-range confine the elephant and reducing the gravity of the HEC.

A study was conducted aiming to increase elephant forage availability in inaccessible rangeland by establishing elephant forage plants. The study proposed a mechanism for establishing forage plants through a device made up of bamboo cells. Information on the elephant forage plants was gathered through the field and literature survey. The information was placed in a database and used to prepare a Plant matrix. A questionnaire survey was conducted on the palatability of the elephant forage plants, and based on the responses, an index, the Forage Selection Index was developed. Bamboo was chosen as a construction material since the Biological, mechanical and physical properties of the material are well suited for the purpose.

A device was designed from bamboo cells with varying diameters and cutting angles and optimum penetration depths. The optimized device was subjected to a field trial with eight elephant forage plants. The best geometric shape, diameter, and the cutting angle for the device for the optimum substrate penetration depth were shaped with double cutting, 7.5 cm and 45°, respectively.

The grasses *Pennisetum purpureum* (Ali maana), *Sacciolepis interrupta* (Beru), *Panicum maximum* (Gini thana), and *Echinochloa glabrescens* (Bajiri) demonstrated better performance in the proposed device for the purpose of establishing elephant forage plants in inaccessible elephant rangelands. Further, studies are needed to improve the device performance for free falls from higher elevations and an array of elephant forage plants to generalize the findings.

Keywords: Elephants forage availability, Device for establishing forage plants, bamboo cell mediate device, Forage plant growth performance in bamboo mediated device.

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LIST OF ABBREVIATIONS

| Abbreviations | Description |
|----------------------|--|
| ANOVA | Analysis of Variance |
| CA | Cluster Analysis |
| DWC | Department of Wildlife Conservation |
| Df | degrees of freedom |
| EHC | Elephant Human Conflict |
| FSI | Forage Selection Index |
| LSD | Least Significant Difference |
| IUCN | International Union for Conservation of Nature |
| PCA | Principal Component Analysis |
| RCBD | Randomized Complete Block Design |
| RTI | Right to Information |
| Std. | Standard |

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