

**Utilizing Traditional Agricultural Knowledge for Ecological  
Restoration of the Knuckles Range in Sri Lanka: Potentials  
and Constraints**

**By**

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**Thesis Submitted to the University of Sri Jayewardenepura  
for the award of the Degree of Master of Philosophy in  
Geography on**

**15<sup>th</sup> August 2018**

## **DECLARATION**

The work described in this thesis was carried out by me under the supervision of Prof (Mrs) T.M.S.P.K. Thennakoon, and a report on this has not been submitted in whole or in part to any University or any other Institution for another Degree/ Diploma.

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I certify that the above statement made by the candidate is true and that this thesis is suitable for submission to the University for the purpose of evaluation.

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“I certify that candidate has incorporated all the corrections, additions and amendments recommended by the examiners in this version of the M.Phil. thesis”

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## **ACKNOWLEDGEMENT**

I am deeply indebted to my principal supervisor, Prof (Mrs) T.M.S.P.K.Thennakoon of Department of Geography, the University of Sri Jayewardenepura whose stimulating motivation, tremendous support and invaluable ideas helped me in completing this research. It is a great honour to work under her supervision and without her guidance and steadfast support this thesis would not have been possible.

I sincerely acknowledge the support given by all the academic and non-academic staff of the Department of Geography, University of Sri Jayewardenepura. A special thank goes to Mr. Nalaka Hashan and Mr. Sajith Kulathunga, University of Sri Jayewardenepura, for the tremendous support given throughout this research. I am eternally grateful to my dear friend Mr. R.T.Thrimawithana of the University of Sri Jayewardenepura for his, encouraging words, affection and for being with me at my difficult times, and Mrs. Methmali Thrimawithana for the dedicated support given to me. I express heartfelt gratitude to my loving parents, brother and sister who continuously gave me confidence, motivation and priceless love, for being my strength in the journey of education. I appreciate the support given by all the GN Officers of the related areas for helping me to collect data. Their immense contribution made this research a success. I would also like to express my sincere thanks to Mr. Suranga Sirisena of the non-academic staff of Department of Geography, the University of Sri Jayewardenepura for all his support especially for providing me with accommodation in his own house when there were hurdles in transportation arose.

In conclusion, I wish to place on the record my gratitude for everyone whose names have not been mentioned above, but supported me in many ways, even by a word!

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## **ABBREVIATIONS**

TEK	Traditional Ecological Knowledge
GND	Grama Niladhari Division
DSD	District Secretariat Division
SD	Sustainable Development
ER	Ecological Restoration
IK	Indigenous Knowledge
TAK	Traditional Agricultural Knowledge

**Utilising Traditional Agricultural Knowledge for Ecological  
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**G.G.R. Nandana**

**ABSTRACT**

The traditional knowledge in Sri Lanka has developed for a long period of time which has been perfected over the years to be a wealth of experiential knowledge. The utilities of this particular knowledge, which was built upon the human-environmental interconnections, are of high quality and have significantly assisted in preserving environmental sustainability. The analyzing of agricultural ecosystems in Sri Lanka proves this point. Due to the novel and technical developments occurred during the last five decades, a large number of traditional agricultural knowledge (TAK) strategies are facing the danger of extinction from local agricultural bodies. Furthermore, the balance of these environmental systems has fragmented, resulting in a number of environmental concerns. There is a dire need to mitigate the development of environmental degradation as well as for ecological restoration. The main purpose of this research was to identify the potentials and constraints for the aforementioned aspects by leveraging traditional agricultural knowledge.

For this particular research, the Knuckles range has been identified as the study area. This study was conducted in selected 7 Grama Niladhari (GN) divisions, out of 77 in the Knuckles Conservation Region. Selection of GN divisions was done through

vulnerable cluster analysis of the Purposive Multi-Dimensional Optimization method. Both primary and secondary data were used for the study, and the primary data were collected through interviews, observations and questionnaires. For data analysing, qualitative methods such as classification and regionalizing methods, case studies were used. With the help of simple statistical methods, as well as regression, correlation and multidimensional equations, the data were analysed quantitatively. Additionally, soil sampling tests were used to reconfirm details of TAK practices. Manual systematic methods were used to analyze data qualitatively and for spatial analysis, GIS Software was used. The statistical tool of Minitab was also used for analysis.

The study found that 68 TAK methods which are used to analyse vegetation, water, animal and soil the micro-components of the three main agroecosystems paddy, home garden and chena. When analyzing the quality characteristics and process of these methods, it was found out that there are methodologies to modify environmental adaptation qualities and other ecological elements as well as systematically develop ecosystem resistors. The 68 TAK methods were systematically categorized under method classification, process classification and utility classification and within each ecosystem, the human-ecological interconnectivity differs. With the use of utility classification, 32 potential methods that can be used for ER, which will be useful in the modern context, were identified.

Fifteen methods were identified to recognise environmental degradation. The spatial differentials of TAK methods which were classified underwent a map analysis which showed the variation of TAK methods in correspondence to ecological and climate variables.

Regression, Anova, Fisher Pairwise comparisons and Kruskal-Wallis Test were used to examine the potentials and constraints of TAK methods and the capabilities and trends to restore components of each of these ecosystems were also examined. These examinations also paved a way to identify methods to protect the ecological quality and the effectiveness of these methods were proven statistically. The limitations in usage was identified as a constraint and the extinction of TAK methods and the limitations of using TAK on large scale were identified as practical limitations.

A reference ecosystem model was developed based on the characteristics of the ecosystems in the Knuckles range, and a separate model was identified to revitalize a degraded ecosystem. It shows a high possibility of using TK for ER and thus it indicates the potential of verifying these TK methods and applying them in the modernized society is at a higher level. The identified Potetial practices can be recommended for sustainable agriculture in Sri Lanka through ecological restoration and minimizing environmental degradation.

**Key Words:** Ecological Restoration, Traditional Agricultural Knowledge, Reference Ecosystem, Environmental Degradation, Cultural Geography