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ECONOMICS OF RAINWATER HARVESTING IN SRI LANKA

By

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Thesis submitted to the University of Sri Jayawardenepura for the award of the degree of Doctor of Philosophy in Environmental Economics

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DECLARATION

I hereby certify that the work and analysis carried out by me and presented in this thesis is to the best of my knowledge and belief are original and my own work under the supervision of Dr. U.A.D.P. Gunawardena, Senior Lecturer, Department of Forestry and Environment Science of University of Sri Jayewardenepura and Prof. Ranjith Bandara, Chairman, Sri Lanka Foundation, Colombo 07 except as acknowledged in the text. The material has not previously been submitted, either in whole or in part for a degree at this University or any other institutions.

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30th June 2013

SUPERVISORS CERTIFICATION

We certify that the statement made by the candidate is true and the thesis is suitable for submission to the Faculty of Graduate Studies of the University of Sri Jayewardenepura for the Purpose of the award of the degree of Doctor of philosophy in Environmental Economics.

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TABLE OF CONTENTS

List for Figures

List of Tables

List of boxes

References

Appendixes:

1. Interview schedule for the sample Survey/Urban & Rural
2. Collection of data from SLIDA and BMICH
3. Sri Lanka rainwater potential - annual rain fall and rainy days
4. Rainwater harvesting policy options , strategies and benefits
5. Sample: collection of rain water based on roof size & rain fall
6. Estimated cost for construction of new sump for BMICH
7. Outline of inundation areas of CMC
8. National Water Policy and strategy for Sri Lanka
9. Cost benefit analysis of RWH system based on BMICH case study
10. Different rainwater harvesting practices in Sri Lanka

LIST OF ABBREVIATIONS

A/L	General Certificate of Advance Level
ARR	Accounting Rate of Return
BCR	Benefit Cost Ratio
BFTA	Benefit Transfer Approach
BMICH	Bandaranayake Memorial International Conference Hall
BTM	Benefit Transfer Method
CBA	Cost Benefit Analysis
CBOs	Community Based Organizations
CM	Choice Model
CMC	Colombo Municipal Council
CRM	Contingent Ranking Method
CS	Consumer Surplus
CV	Contingent Valuation
CVM	Contingent Valuation Method
CWSP	Community Water Supply and Sanitation Project
DCS	Department of Census and Statistics
EEZ	Exclusive Economic Zone
EV	Equivalent Variation
FAO	Food and Agriculture Organization
GUF	Grand Utility Frontier
HPM	Hedonic Price Method
IRR	Internal Rate of Return
IS	Interview Schedule
IUCN	World Conservation Union
MOFE	Ministry of Forestry and Environment
MVSP	Maximum Value of Social Product
MWTP	Mean Willingness to Pay
NGOs	Non Governmental Organizations
NOAA	National Oceanic Atmospheric Administration - Contingent Valuation Panel
NPV	Net Present Value

NWHN	National Water Harvesters Network
O/L	General Certificate fo Advance Level
OECD	Overseas Economic Commission for Development
OUSL	Open University of Sri Lanka
RP	Revealed Preference
RRWH	Roof Rainwater Harvesting
RUM	Random utility
RWH	Rainwater Harvesting
RWHF	Rainwater Harvesting Forum
SIC	Social Indifference Curve
SLIDA	Sri Lanka Institute of Development Administration
SODIS	Solar Disinfection System
SOE	State of Environment
SP	Stated Preference
STPE	Simple Transferring Point estimate Approach
TCM	Travel cost Method
TEV	Total Economic Value
TWDB	Texas Water Development Board
UDA	Urban Development Authority
UN	United Nation
UNDP	United Nation Development Programme
UNEP	United Nation Environment Programme
USA	United State of America
USAID	United State of America programme for international Development
VCM	Voluntary Contribution Mechanism
WAC	Willingness to accept Compensation
WHO	World Health Organization
WTAC	Willingness To accept Compensation
WTP	Willingness to Pay
WTPA	Willingness to pay Amount
WWDR	World Water Development Report

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ECONOMICS OF RAIN WATER HARVESTING IN SRI LANKA

I. DISSANAYAKE

ABSTRACT

Although the roof rainwater collection has received considerable attention during the period of mid 1990s in some districts of Sri Lanka it has not lead to adequate development of harvesting practices. Even though Sri Lanka is not yet confronted with major water related conflicts, certain districts shows critical water issues which could lead to confrontations and conflicts in the near future. Benefits of conservation or wise use of roof rainwater are not usually captured through conventional markets because of the non availability of market prices for such benefits.

The main objective of the present study is therefore to outline economic reasons through comparative analysis of attitudes and perceptions for rainwater harvesting and to elicit the economic value of rain water harvesting within the total economic valuation framework. Additionally, the study aims at demonstrating roof rainwater harvesting potentials and economic viabilities for large institutions located in the wet zone through a case study.

Contingent valuation method was applied among the residents of the villages of 'Yatigammana' in Kandy and 'Kekirawa' in Anuradhapura Districts and in Urban Colombo and it's suburban areas. Logit regression models were developed to analyze the responses to identify the factors that influenced their responses and attitudes to the WTP elicitation questions.

The results indicate that there were three sets of mean willingness to pay (WTP) from the rural dry (Rs 59.06), rural wet (Rs 85.96) and Urban Rs 89.03 offered by the respondents. WTP amounts offered by the respondents expressed as a percentage equivalent of monthly income level were 0.98, 1.01 and 0.39 respectively. Aggregated WTP for the country was LKR 20,785,403,200 for a period of five years. The Rain water harvesting in Bandaranayake Memorial International Conference Hall (BMICH) was economically viable with a net present value of LKR 32,511,135. The sensitivity analysis further indicated the viability of the intervention.

The results of this study revealed that harvesting of rainwater is financially viable and socially beneficial in terms of health, labour time saving, improvement of social life etc.

The study also emphasized the possible support from both urban and rural people towards the proposed trust fund concept in generating the adequate financial contribution. However, government has to play an active role through technical assistance, information provision and further incentives in enhancing rainwater harvesting in Sri Lanka. The overall findings of this study could be used as a new approach for development of roof rainwater for wise use.