DEVELOPMENT OF AN INDEX FOR PROJECT EVALUATION OF COMMUNITY WATER SYSTEMS IN SRI LANKA

BY

A.D.K.K. VVijayagunawardana

Supervised by

Dr. A.A.D.A.J Perera

The Dissertation was submitted to the Department of Civil Engineering of the University of Moratuwa in partial fulfillment of the requirement for the Degree of Master of Science in Construction Project Management.

DEPARTMENT OF CIVIL ENGINEERING
UNIVERSITY OF MORATUWA
MORATUWA SRI LANKA

2010

94862

Abstract

Community Water Systems (CWS) perform a vital role in providing safe drinking water to the rural populations in the whole world. In Sri Lanka, National Water Supply & Drainage Board (NWSDB) holds the monopoly for supplying safe drinking water to the whole nation. Presently it has covered more than 75% of the urban population but a mere 14% from the country's rural population where as 78.5% of the total population is rural. The NWSDB targets to cover 75% rural population by the year 2025.

Along with this tremendous scope for growth, CWS face significant resisting forces due to increasing difficulty in finding reliable water sources that require less improvement costs, stricter water quality regulations, decreasing financing and investment capabilities, increasing public scrutiny and increasing infrastructure replacement costs.

Despite for both these tremendous scope and significant resistance, there is no real measure or some kind of standard to assess the performance of these CWS. This has greatly hindered the development and improvement of CWSs. To cater the tremendous need that this absence has created for a standard performance evaluation tool, this research was intended towards the development of a 'Composite Performance Index Value' (CPIV). Thee concept is based on an index, as the Performance Indicators are widely known for its importance and effectiveness in the process of evaluating achievement or progress. They have become important management tool by giving directions to managerial policy and decision making. This report presents the results of the research project to develop CPIV, which has been developed as a holistic evaluation tool to measure the performance of CWS.

The study was carried out using the Delphi method which is a structured process of collecting and refining knowledge from a group of experts through survey instruments. Tire survey instruments used in this study were questionnaires and interviews. Cross impact analysis was adopted to measure the correlation between

variables in analyzing the recommended Performance Indicators across several factors. Factor analysis was also used through weighting assignment in data analysis

The CPIV has produced an assessment for eleven key performance areas of a CWS which includes variables in access, use, environment, finance, and management and user capabilities. Thus this index integrates the physical, social, economic and environmental aspects that link water and management issues. Hence the index will be an inter-disciplinary tool that combines and presents a cluster of data that are directly and indirectly related to water system and management into a single number, thus simplifying the complexity of various issues that Community Water Managers presently encounter in evaluating the performance of CWS.

The index value will also serve as a tool for identifying prioritization of needs for Intervention and provides ground for decision-makers to act impartially by allowing them to justify their choices, based on a rational and transparent framework. Also the development of the index provides an opportunity to express the needs, expectations and achievements of CWS in a more standardized manner that can be put into the comparable evaluation model.

Declaration

I certify that this dissertation does not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any university and to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text.

Signature of Candidate: ..... Date: ..../..../.....

S.K.M Senarath
Department of Civil Engineering,
University of Moratuwa.

I certify that the above declaration is true and correct to the best of my knowledge

UOM Verified Signature

Signature of Supervisor: .....

Dr. L.L Ekanayaka,
Department of Civil Engineering,
University of Moratuwa.

Acknowledgement

I take this opportunity to thank supervisor Dr. L.L Ekanayaka, Department of Civil Engineering, University of Moratuwa for his kind support and direction given to me throughout the project. And also I would like to express my sincere gratitude to Dr. A.A.D.A.J Perara, Dr R U Halwatura guidance, continuous encouragement and kindness extended to me throughout the M.Sc. programme.

Also I am much grateful to the course coordinator, of the Msc program and all the staff members of Construction Engineering & Management Division, Department of Civil Engineering, and University of Moratuwa for their support and guidance on this project. Also I am thankful to all the respondents who helped me in collecting data during their very busy working time and officer in charge of institutions who gave their support me. Especially for officers at sustainable energy authority, central environmental authority and Ceylon centricity board gave me great help.

SKM Senarath.

TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLES

Annex

Annex 1 : Questionnaire Form 1

Annex 2 : Questionnaire Form 2

ABBREVIATIONS AND ACRONYMS

CDM	Clean Development Mechanism
CEA	Central Environmental Authority
CEB	Ceylon electricity board
CEI	Chief Electrical Inspector
GNP	Gross National Product
GHG	Green House Gases
GOSL	Government of Sri Lanka
HH	House Holds
MOPE	Ministry Of Power and Energy Sri Lanka
NCRE	Nonconventional Renewable Energy
NCREP	Non-Conventional Renewable Energy Plan
PUCSL	Public Utility Commission of Sri Lanka
RE	Renewable Energy
RERED	Renewable Energy for Rural Economic Development
SHP	Small Hydro Power
SHS	Solar House Hold System
SEA	Sustainable Energy Authority