ENVIRONMENTAL CHANGES IN IRRIGATION AND FLOOD CONTROL SCHEMES:

A CASE STUDY OF GIN GANGA REGULATION PROJECT

A Dissertation submitted to the University of Moratuwa as partial Fulfillment of the requirements for the Degree of Master of Engineering in Environmental Engineering and Management

By

L.W. SENEVIRATNE
B. Sc. Eng., P.G. Dip. M. Eng., C. Eng. FIE (Sri Lanka)

Supervised by

Dr. N.T.S.WIJESEKERA

Department of Civil Engineering
Faculty of Engineering
University of Moratuwa
Sri Lanka

November 2000

DECLARATION

I declare that the work included in this thesis in part or in whole, has not been submitted for any other academic qualification at any institution.

Signature:
Candidate: L. W. Seneviratne
Date: 24th November 2000

This work is dedicated to my mother and grandmother who brought up the author in the village of Niyagama in Galle District. My grandmother Mrs. Babunnona Jayasekera was born in 1878 in Kimulawala of Weihena village and given in marriage to Mattaka village and my mother Isurumathee Mattaka Gamage was born in 1917. This work is a symbol of their kindness and efforts.

Eng. L. W. Senevirathne

ACKNOWLEDGEMENTS

Author selected this study since it is a very important topic for irrigation engineers in a world of diminishing resources. This study adds to strengthening of the planning and design aspects of flood control works. Author wishes to note with gratitude the members of staff of University of Moratuwa, Mr. S. Pathinather, the course coordinator and other lecturers of the PG Diploma course, Mr V. Regunathan, and others of the Department of Irrigation who promoted this research study. Author also thanks all state officials and farmers of Galle district and the friends and relatives who have assisted data collection efforts in various ways. Irrigation Engineer of Gin Ganga Division and staff, Irrigation Engineers in the Computer Branch, Divisional Secretary of Baddegama Mr. S. Vithanapathirana and staff including grama sewa officers, Divisional Secretary of Akmimana and his staff including grama sewa officers, Medical Officer of Health of Ambalangoda, District Medical Officer of Baddegama, Officers of Meteorology Department, Personnel of National Water Supply & Drainage Board and Census & Statistics Department, who assisted in data collection and in making this research a success are gratefully acknowledged.

Dr. Sohan Wijesekera spent most of the valuable time supervising this study despite his busy schedule of work and made arrangements for the final examination. His instructions motivated me to select this research to fill a void in real applications related to environmental assessments.

Moral support extended by my wife Mallika and son Chathura by devoting time and effort was a great strength. Dr. Anura Senevirathne extended help in data collection. Dr. Ranjith Gallappatti and Prof. Mrs. N. Rathnayaka who served as examiners are thanked wholeheartedly. Author is grateful to all those who helped in making this work a reality.

Eng. L. W. Senevirathne

ABSTRACT

ENVIRONMENTAL CHANGES IN IRRIGATION AND FLOOD PROTECTION SCHEMES- A CASE STUDY OF GIN GANGA REGULATION PROJECT

Gin River which is 113km long is situated in the South-West of Sri Lanka. Its lower basin has a flood history, which usually destroys about 6000ha of paddy and 3000ha of highland crops. The South-West of Sri Lanka receives an annual average rainfall of 2600mm.

Gin River flood control project was completed in 1980. Lower basin of the catchment was protected by electric pumps in 3000ha and gravity drainage was newly provided for 1740ha of Holuwagoda Tract. The project occupied 250ha in between flood bunds in the flood corridor on each river bank. 78ha of paddy lands in the upper catchment were subjected to added flooding and backwater effect after the project. New 800ha of marshy lands were converted in to paddy lands. Normal drainage was provided during non-flood periods. The Project is presently maintained by Irrigation Department.

Many paddy tracts were abandoned after the drought in 1992. Many environmental issues have contributed to present situation. The achievements and adverse effects are studied to identify the needs in planning and designs of flood control projects.

The objectives of this study could be listed as:

1) Identification of environmental issues prior to the implementation of the irrigation and flood control project.
2) Identification of present environmental issues after the completion of the irrigation and flood control project.
3) Identifying the environmental issues, which require to be considered in case of irrigation and flood control projects.

In order to carry out this as a case study, Gin Ganga Regulation Project (GRP) was selected as the project area.

Literature survey identified many environmental issues and initial site visits were used to compile all possible issues related to the project area. The issues were separated into processes and were summarised for analysis. Environmental changes due to the project were assessed using these issues.

Assessment

Site visits were carried out to assess the changes in selected locations. Significant issues were listed and micro analysis was done for every locality of the project using a questionnaire. Verification was done using collected data.

The main achievements of GRP are, an increase in land value (150%) and infrastructure development (28%).

The social processes are improved due to this project. The land use for rice was improved initially and two seasons per annum were properly cultivated. After 15 years some areas were abandoned due to low income. Some areas were rejected as planned by the project in the unprotected area. Some areas can be cultivated after desilting of canals. Soil subsidence has led to abandoning of some areas. Anticipated targets were reduced by abandoning of lower Holuwagoda tract. Soil subsidence has caused water-logging in this area. Ganegama lower tract has lost cultivation due to subsidence.

An overall assessment 84% of land use was retained for paddy under GRP. If the project was not effective this value will be reduced to 50% as in Bentara Dedduwa Scheme.

ENVIRONMENTAL CHANGES IN IRRIGATION AND FLOOD CONTROL PROJECTS-A CASE STUDY OF GIN GANGA REGULATION PROJECT

CONTENTS

LIST OF FIGURES

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES