PERMANENT REFERENCE

# DEVELOPMENT OF A COST EFFECTIVE GEOGRAPHICAL INFORMATION SYSTEM FOR AGRICULTURAL DECISION MAKING IN THE BATTICALOA DISTRICT, USING MS EXCEL (Visual Basic INTEGRATED) AS THE SOFTWARE DEVELOPMENT PLATFORM

172

By
SOMASEGARAM PRATHEEBAN

FAG172
Project Report
Library - EUSL

LIBRARY
15 APR 2005
Eastern University, Sri Lanka.

57597

AGRICULTURAL ENGINEERING
FACULTY OF AGRICULTURE
EASTERN UNIVERSITY
SRILANKA
2004

PROCESSED
Main Library, EUSL

## Abstract:

Suitable soil types, water availability, better infrastructures and marketing facilities have been major factors determining agricultural productivity in any region of world. Attempts to identify the most suitable areas for agriculture will definitely leads to increase overall agricultural productivity in the Batticaloa district which is situated in the Eastern region of Sri Lanka. Decision-making is the important process in this manner. In view of this a spatial computer model, called **BATTI-LAND** was developed for identifying agricultural potential area with special reference and application to Batticaloa district. Furthermore, a software package was also developed as an application of Microsoft Access with Visual Basic interface referred to as Agricultural Information System for Batticaloa (**AISB**). The package contains various information on fresh water availability, infrastructures, and land cover, and allows for selection/identification of suitable areas through the user interface. This allows the user to identify an area that is suitable for a particular crop to be grown with his preference. The developed model has the potential to show the suitable Batticaloa maps of user wish. The overall goal of this project was the cost effective integration of computer-based Decision Support Systems using easily available software platforms (such as MS Excel) for identifying agricultural potential area in Batticaloa district.

**Key words:** Geographic Information System, Decision Support System, Overlaying, Buffering, Spatial modeling.

# LIST OF CONTENTS


| | Page |
|---|---|
| ABSTRACT | 1 |
| ACKNOWLEDGEMENTS | II |
| CONTENTS | III |
| LIST OF FIGURES | VI |
| LIST OF TABLE | VII |


# CONTENTS


| | |
|---|---|
| **CHAPTER 1: INTRODUCTION** | 1 |
| 1.1. Needs for identifying agricultural potential area in Batticaloa district | 2 |
| 1.2. Importance of Decision Support Systems | 2 |
| 1.3. Need of spatial computer modelling | 3 |
| **CHAPTER 2: LITERATURE REVIEW** | 6 |
| 2.1. Introduction | 6 |
| 2.2. GIS environment | 7 |
| 2.3. Characteristics of spatial data | 10 |
| 2.3.1. Maps | 10 |
| 2.4. Spatial data modelling | 11 |
| 2.5. Importance of GIS for spatial modelling | 13 |
| 2.5.1. Data management in GIS | 13 |
| 2.6. Data analysis in GIS | 15 |
| 2.6.1. Methods of data input | 17 |
| 2.6.2. Data editing | 17 |
| 2.6.3. Re-projection, transformation and generalization | 17 |
| 2.6.4. Map overlay (integrating data) | 20 |
| 2.6.5. Buffering and neighborhood functions | 23 |
| 2.6.6. Features of Microsoft Excel 2000 for spatial modeling | 24 |
| 2.6.7. Features of MS Visual Basic and MS Access | 25 |
| **CHAPTER 3: MATERIALS AND METHODS** | 26 |
| 3.1. Introduction | 26 |
| 3.2. Model development | 26 |

3.2.1. Features of Microsoft Excel 2000 for GIS 26
3.2.2. Logic formulation 27
3.2.3. Data collection 29
3.2.4. Data transfer 29
3.2.5. Development of raster model 29
3.2.6. Overlaying 37
3.2.7. Buffering 39
3.3. Result and discussion 43
3.3.1. Paddy productive area map 43
3.3.2. OFC productive maps 44
3.3.3. Overall productive map 45
3.3.4. Space availability for agriculture 46
3.3.5. Marketing facility map 47
3.3.6. Available productive area map 48
3.3.7. Productive area with marketing facility 49
3.3.8. Newly identified Paddy potential areas 50
3.3.9. Overlaid buffering maps 53
**CHAPTER 4: PACKAGE DEVELOPMENT** 57
4.1. Introduction 57
4.2. About AISB 57
4.3. Program logic 57
4.4. Data collection 59
4.5. Package development 59
4.5.1. Package handling 60
4.5.2. User interfaces 60
4.5.3. Programme codes 60
4.5.4. Database 60
4.6. Result and discussion 62
4.6.1. Land area in Batticaloa district 62
4.6.2. Land use pattern in Batticaloa district 63
4.6.3. Location and G.N division 65
4.6.4. Population Statistics 66
4.6.5. Water resource in Batticaloa district 66
4.6.6. Paddy cultivation 67