



**SPATIAL ANALYSIS  
OF LAND USE/LAND COVER CHANGE  
DYNAMICS USING REMOTE SENSING AND  
GEOGRAPHIC INFORMATION SYTEMS:  
*A Case Study in the down stream and surroundings of  
the Ci Tarum watershed***

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## Abstract

This study is concerned with land use/land cover change detection, identification, analysis and prediction using remote sensing and GIS techniques in the downstream of the Citarum watershed and its surroundings in West Java, Indonesia. Supervised Maximum Likelihood classification of PCA and NDVI transformed images are used to classify and identify land use/land cover categories. A post-classification comparison approach was used to detect land use/land cover changes, and a Markov Cellular automata model is then used to predict possible future land use/land cover patterns in the study area. "Leaf on" and "leaf off" phenomena of the broad leaf vegetation cover have been recognised related to dry and wet season as well as rice field (planted) and rice field (unplanted) related to growing season in the study area. Forest and plantation area were extensive in wet season and less in dry season. Rice field (planted) area was large in harvesting time and less in planting time. Settlement has increased continuously and is not influenced by season or weather. Overall, the KIA of the classification was 0.89. Settlement and rice field are the main land use/land cover types that have been changed and this is related to factors such as proximity to roads and to urban and semi-urban centres. There is an indication that land use/land cover in the study area was converted from intensive agriculture land such as rice field to settlement, rather than from less intensive uses such as open/dry land, plantation or forest. Discriminant analysis as well as overlay and simple linear analysis support factors such as proximity to roads, urban and semi-urban centres, as well as slope, as being most influential in land use/land cover change in the study area. The Markov Cellular automata model affords a powerful descriptive and predictive model for land

use/land cover change and for future land use/land cover distribution in the study area, but it needs some adjustment in order to obtain suitable results. Markov transition, as well as suitability, maps of each land use/land cover category are created.

# Contents

Abstract	ii
Abbreviations and Glossary	iv
List of Figures	viii
List of Tables	xi
Declaration	xiv
Acknowledgement	xv
<b>CHAPTER ONE</b>	
1.1 Introduction	1
1.2 Aims and Objectives	7
1.3 The Context of the Study	9
1.4 Research Framework	18
1.5 Thesis Outline	21
<b>CHAPTER TWO</b>	
2.1 Introduction	22
2.2 Defining Land use/land cover change	22
2.3 The dynamic of Land use/land cover change	25
2.4 Some aspects related to Land use/land cover change	30
2.4.1 Land use and Demographic pressure	30
2.4.2 Land use conflict and Regional food security	32
2.4.3 Land use, Industry and Manufacturing	35
2.4.4 Land use and Agriculture	37
2.4.5 Spatial dimension of Land use/land cover change	39
2.4.6 The Important of Land use/land cover change detection in spatial planning	42
2.4.7 Land use evolution and demographic pressure in Indonesia	43
2.4.8 Land use/land cover change detection and spatial planning in Indonesia	47
2.5 Conclusion	50

## **HAPTER THREE**

3.1	Introduction	52
3.2	Selection of Study area	53
3.3	Socio-Economic Characteristics	55
	3.3.1 Population and demography	56
	3.3.2 Employment	57
	3.3.3 The Land Tenure	58
	3.3.4 Existing Land use	61
	3.3.5 Infrastructure	63
3.4	Biophysical Characteristics	65
	3.4.1 The Physiography and Soil type	66
	3.4.3 Climate, Irrigation and Growing season	68
3.5	The availability of spatial data	71
	3.5.1 Existing spatial data	71
	3.5.2 Satellite imagery	74
3.6	Conclusion	75

## **CHAPTER FOUR**

4.1	Introduction	77
4.2	Land use/land cover change detection techniques	78
	4.2.1 Digital change detection of land use/land cover	83
	4.2.1.1 Pre-classification	88
	4.2.1.2 Post-Classification Comparison	96
	4.2.1.3 Hybrid	98
	4.2.2 Selection of the appropriate detection and identification Techniques	99
4.3	Method	101
	4.3.1 Digital change detection techniques	103
	4.3.1.1 Image Pre-Processing	103
	4.3.1.2 Image Enhancement	104
	4.3.2 Land use/land cover Classification	106
	4.3.3 Land use/land cover change detection	107
	4.3.4 Accuracy Assessment	108
4.4	Results digital change detection and identification in the study area	108
	4.4.1 Initial recognition	108
	4.4.2 Image Enhancement	112
	4.4.3 Land use/land cover Classification	115
	4.4.4 The Land use/land cover change detection	121
	4.4.4.1 Annual Land use/land cover change from 1989 to 1993	122
	4.4.4.2 Land use/land cover change in 1993 to 1995 and 1995 to 1997	125
	4.4.4.3 Land use/land cover change 8- year time interval 1989-1997	126
	4.4.5 Land use/land cover change identification and re-classification	128
4.5	Discussion	131
4.6	Conclusion	134

## **CHAPTER FIVE**

5.1	Introduction	137
5.2	Driver factors of Land use/land cover Change	138
	5.2.1 Discriminant Analysis	139
5.3	Method	142
	5.3.1 Overlay analysis of possible driver factors	142
	5.3.2 Simple linear and Discriminant Analysis	145
5.4	Result	147
	5.4.1 Overlay analysis	147
	5.4.1.1 Static drivers	147
	5.4.1.2 Dynamic drivers	151
	5.4.2 Quantitative analysis; Discriminat function analysis	158
5.5	Discussion	166
5.6	Conclusion	170

## **CHAPTER SIX**

6.1	Introduction	171
6.2	Land use/land cover change prediction mode	172
	6.2.1 Markov chain model	174
	6.2.2 Cellular automata	177
	6.2.3 Prediction based on Markov-Cellular automata Model within GIS	181
6.3	Method	183
	6.3.1 Markov transition probability calculation	184
	6.3.2 Multi criteria evaluation approach to create land suitability	185
	6.3.3 Prediction process based on Markov-Cellular automata model	186
6.4	The Selecting Parameters and test of the Model	188
	6.4.1 Transition probability	188
	6.4.2 Land Suitability of each land use/land cover category	190
	6.4.3 The result of simulation or prediction process	193
6.5	The Future of Land use/land cover in the Study area	198
	6.5.1 Land use/land cover simulation 2007 (10-year)	199
	6.5.2 Land use/land cover simulation 2017 (20-year)	207
	6.5.3 Analysis spatial of Land use/land cover 1989, 1997,2007 and 2017 in the Study area	214
6.6	Discussion	224
6.7	Conclusion	228

## **CHAPTER SEVEN**

7.1	Summary and Findings	231
7.2	Implications	240
	7.2.1 Policy	240
	7.2.2 New Research	241

<b>REFERENCES</b>	<b>243</b>
<b>APENDICES</b>	