Coastal Landuse Change Detection Using Remote Sensing Technique:  
(Case Study in Banten Bay, West Java Island, Indonesia)

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ABSTRACT

Various forms of coastal landuse covering the study area has been observed to have undergone changes as evidently detected between the satellite images sensed in 1994 and 2001 at Banten Bay. It is important to identify what these changes are. Therefore, an appropriate change detection must be selected. In this study, three main objectives were set: 1) To determine the image preprocessing and image processing techniques that is needed for digital coastal landuse change detection, 2) To perform digital coastal landuse supervised classification, and 3) To study the coastal landuse change of Banten bay in two dates.

The image preprocessing step involved removing errors from the raster data. This was done performing basic processes, such as, radiometric correction, geometric correction and image calibration. The image processing step comprised of supervised classification and change detection techniques. Supervised classification was employed in this study to transform multispectral image data into user defined thematic information classes and to serve as a reference for the quantitative results of the change detection techniques. On the other hand, change detection techniques tested on this study to show the best results included Red Green Method, Image Differencing Method, Image Ratioing Method and Principal Component Analysis Method (PCA).

Red Green Method gave the best result for detecting the coastal landuse change because the number of changed area closely resembled the total number of changed area reference. Through careful comparison it was observed that Red Green Method is suitable for detecting areas changes in the paddyfields increase and settlement increase; Image Differencing Method is better to detect areas changes in agriculture increase, fishponds decrease and natural area decrease; Image Ratioing Method gave the best result for monitoring areas change in fishponds increase, paddyfields decrease and agriculture decrease because the number of each changed area (per hectare) nearly coincides more with the size of changed area (per hectare) of each increase and decrease reference.

Every coastal landuse category increased in utility area except for the natural area. The observed reduction in the area size of the natural area is due to the growth rate of the population and increased activities along this area. Based from field checking, some parts of agriculture and paddyfields became fishponds in LONTAR zone.

Key words: Coastal Landuse, Remote Sensing, Landsat, Supervised Classification and Change Detection.
DECLARATION LETTER

I, Mr. Puvadol Doydee, hereby declare that the thesis title:

Coastal Landuse Change Detection Using Remote Sensing Technique:
(Case Study in Banten Bay, West Java Island, Indonesia)

contains correct results from my own work, and that it have not been published ever before. All data sources and information used factual and clear methods in this project, and has been examined for its factualness.

Bogor, August 2002

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THESIS

Coastal Landuse Change Detection Using Remote Sensing Technique: (Case Study in Banten Bay, West Java Island, Indonesia)

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A Thesis Submitted to Graduate School of Bogor Agricultural University, Indonesia
In fulfill of the requirements for the degree of Master of Science in Information Technology for Natural Resources Management

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Mr. Puvadol Doydee was born on December 20, 1975 at Phetchaburi Province, Thailand. He grew up in a modest family together with 2 younger sisters. High school days not only involved enjoying the company of friends at Phrommanusorn Phetchaburi Province high school, but also making careful decisions after graduation. It was a time of making big decisions for a very expansive future that lay ahead. Decisions and circumstances lead him in becoming a fisheries biologist. This choice was made because of his interest in knowing more about fisheries science, its nature and the field study involved. Up till now, he never regretted making this decision.

Mr. Puvadol was deeply enthusiastic with Fisheries, learning as much as he could in this field. This lead him in earning a Bachelor’s Degree from the Department of Fishery Management, Faculty of Fisheries, at Kasetsart University, Bangkok, Thailand in 1998. As soon as he graduated he started working as a fisheries biologist at the Department of Fishery Management, Faculty of Fisheries, at Kasetsart University. Currently, he is still working with this institution as a faculty and fisheries biologist.

Among Mr. Puvadol’s other interests are coastal zone management, coastal area planning and also small-scale fisheries management. In 2000, he was selected by SEAMEO-SEARCA (SEAMEO Regional Center for Graduate Study and Research in Agriculture) for its scholarship for the Master of Science in Information Technology for Natural Resources Management program. This program is hosted by the Bogor Agricultural University (IPB) and is based at the SEAMEO-BIOTROP campus. His decision to enroll and attend this graduate program significantly changed his life. GIS (Geographic Information System) and Remote Sensing became his life since then. He is really keen on recent developments in GIS and remote sensing in order to apply these technologies in coastal zone management.
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