

A STUDY OF LAND COVER CHANGES AT PAHANG RIVER
CATCHMENT AREA USING REMOTE SENSING AND GEOGRAPHIC
INFORMATION SYSTEM (GIS) TECHNIQUE

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INFORMATION SYSTEM (GIS) TECHNIQUE**

By
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Research Report submitted in partial fulfillment of
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**DEPARTMENT OF MARINE SCIENCE
FACULTY OF MARITIME STUDIES AND MARINE SCIENCE
UNIVERSITI MALAYSIA TERENGGANU**

DECLARATION AND VERIFICATION FORM

FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled:

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LIST OF ABBREVIATIONS

ARSM	Malaysian Remote Sensing Agency
DID	Department of Irrigation and Drainage
ECER	East Coast Economic Region
EPA	Environmental Protection Agency
ERTS	Earth Resources Technology Satellite
ETM+	Enhanced Thematic Mapper Plus
FAO	Food and Agriculture Organization
GCP	Ground Control Point
GIS	Geographic Information System
GPS	Global Positioning System
IHDP	International Human Dimensions Programme
IPCC	Intergovernmental Panel on Climate Change
IRS	Indian Remote Sensing Satellites
MIS	Management Information System
MPOB	Malaysian Palm Oil Board
MSS	Multispectral Scanner System
NASA	National Aeronautics and Space Administration
RBV	Return Beam Vidicon
RM	Ringgit Malaysia

SPOT	Système Pour l'Observation de la Terre
TM	Thematic Mapper
U.S.	United States
N	Northing
E	Easting
°	Degree
%	Percent
m	Meter
km	Kilometer
ha	Hectare
km ²	Kilometer Square

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ABSTRACT

The study was conducted in order to determine the temporal and spatial land cover changes from year 2000 to year 2010 at Pahang river catchment area using remotely sensed data GIS. The combination of satellite data and GIS give an advantage in determination of the changes and also as a tool for monitoring the environmental impact on study area. Landsat ETM+ (2000) and Landsat TM (2010) images were classified using the maximum likelihood classifier to produce the land cover map for each year. The land cover map for both year were then overlay to detect the changes. Seven types of land cover were produced for each land cover map which are forest, palm oil, rubber, cropland, mangrove, rural and open land area. Between 2000 and 2010, the forest area was declined by 1776 km² and covered 57.9 % of total land cover in study area. The area of rubber plantation also showed the declined over the past ten years to become 4586 km² from 4921 km² in area. Mostly area of rubber was converted into palm oil plantation and represent about 73.7 % of total loss of rubber area. Cropland and mangrove covers declined from 625 km² and 76 km² in 2000 to 578 km² and 46 km² in 2010 respectively. Palm oil plantation in the study area experienced the increasement from 4443 km² in 2000 to be the second highest land cover type in catchment area, which is 6256 km² in 2010. The study highlights the importance of integrating remotely sensed and local knowledge to generate the information that could be used to overcome the catchment management problem.

SATU KAJIAN TENTANG PERUBAHAN LITUPAN TANAH DI KAWASAN TADAHAN SUNGAI PAHANG DENGAN MENGGUNAKAN PENDERIAAN JAUH DAN SISTEM INFORMASI GEOGRAFI

ABSTRAK

Kajian ini dijalankan untuk menentukan perubahan litupan tanah dari segi masa dan tempat daripada tahun 2000 sehingga tahun 2010 di kawasan tadahan sungai Pahang dengan menggunakan teknologi penderiaan jauh dan GIS. Gabungan data satelit dan GIS memberikan kelebihan dalam menentukan perubahan dan juga sebagai alat untuk memantau kesan alam sekitar di kawasan kajian. Imej daripada satelit Landsat ETM+ (2000) dan Landsat TM (2010) telah dikelaskan menggunakan pengkelas kemungkinan yang maksimum untuk menghasilkan peta litupan tanah bagi tahun 2000 dan 2010. Seterusnya dengan menggunakan teknologi daripada GIS, kedua-dua peta litupan tanah ini akan ditindankan untuk melihat kawasan litupan yang mengalami perubahan sepanjang 10 tahun itu. Tujuh jenis litupan tanah telah dikelaskan untuk setiap peta tersebut, iaitu hutan, kelapa sawit, kawasan tanaman getah, tanah pertanian, bakau, kawasan penduduk dan juga kawasan terbuka. Antara tahun 2000 hingga 2010, jumlah kawasan hutan dikawasan kajian telah mengalami penurunan sebanyak 1776 km² yang mana kawasan hutan meliputi 57.9 % daripada keseluruhan kawasan litupan tanah di kawasan kajian. Kawasan penanaman pokok getah juga mengalami penurunan sebanyak 332 km² sepanjang 10 tahun untuk menjadikan jumlah keseluruhan kawasan tanaman tersebut sebanyak 4589 km² pada tahun 2010 berbanding 4921 km² 10 tahun sebelumnya. Turut mengalami penurunan ialah kawasan pertanian dan kawasan bakau, masing-masing

menurun sebanyak 47 km² dan 31 km² untuk tempoh 10 tahun. Pembangunan pesat dikawasan kajian menjadi faktor kepada peningkatan jumlah kawasan penempatan yang mana bertambah sebanyak 164 km² untuk menjadi keluasan keseluruhan sebanyak 324 km² pada tahun 2010. Faktor ekonomi juga menyebabkan pertambahan keluasan kawasan penanaman kelapa sawit sepanjang 10 tahun ini, daripada 4443 km² pada tahun 2000 menjadi 6256 km² 10 tahun kemudian. Kajian ini menggambarkan kepentingan integrasi antara teknologi penderiaan jauh dengan pengetahuan tempatan untuk menghasilkan suatu sumber maklumat yang mana ianya mungkin berguna untuk mengatasi masalah berkenaan pengurusan kawasan tadahan ini.