UNIVERSITI PUTRA MALAYSIA

ANALYSIS OF LOGGING AREA FOR AGRICULTURAL PURPOSES IN GUA MUSANG AND LOJING DISTRICT, KELANTAN YEAR 2004 AND 2014 USING SPOT 6 IMAGES

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FP 2016 70

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171142

A project report submitted to Faculty of Agriculture, University Putra Malaysia, in fulfillment of the requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Agricultural Science.

Faculty of Agriculture

University Putra Malaysia

2015/2016

ENDORSEMENT

This project report entitled "Analyze Logging Rates for Agricultural Purposes In Gua Musang and Lojing District, Kelantan year 2004 and 2014 Using Spot 6 Images" is prepared by Mohd Dzahari bin Ahmad Rafik and submitted to the Faculty of Agriculture in fulfillment of the requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Agricultural Science.

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ACKNOWLEDGEMENT

Alhamdulillah, all praises to Allah s.w.t for the strength and His blessing in completing this project report. I would like to gratitude by thankfulness and appreciation to all those who contributed to the overall success of my research to complete this final year project.

First and foremost, I would like to express my deepest gratitude to my supervisor, Dr. Farrah Melissa binti Muharam for her guidance, advice, patience, and support in duration of this study. I am thankful for her willingness to spend time for me in giving a valuable knowledge, information and experiences.

Besides that, I would like to express my sincere gratitude to all post-graduate students from Universiti Putra Malaysia especially to Mohammad Hilmi bin Mohd Zahir who willing to spend times and their remote sensing expertise. Without their cooperation and guidance, the objectives of this research could not be achieved.

Finally, from the bottom of my heart, I would like take this opportunity to express my ultimate gratitude to my beloved wife, Amizah binti Mohd Razali and also to my mother, Dahriah binti Jauri for their support, encouragement, understanding and endless love for me to accomplish this research and make my research successful.

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ABSTRACT

In efforts to improve the agricultural sector, the opening of new areas through logging activities within a country is inevitable. Among the areas that turned into logging areas for agricultural purposes is Gua Musang and Lojing district in Kelantan. Uncontrolled opening of new area has resulted in environmental problems such as extinction of flora and fauna (destruction biodiversity), land degradation, floods, air pollution and temperature increase. The study was conducted to classify agriculture crops cultivated in Gua Musang and Lojing district and to investigate logging rates for agricultural purposes form year 2004 to 2014 using SPOT-6 satellite image. The result showed that there were changes in forested areas that was converted for agriculture in Gua Musang and Lojing district after 10 years. Maximum Likelihood classifier was used in order to classify land use classes prior to changes detection of conversion from forest to agricultural areas. Classification results showed that in 2004, the total area of primary forest and secondary forest area was 640,882.65 ha. Oil palm was the highest agricultural crops converted from forest (88%), followed by rubber (1%), horticulture (0.44%), mixed horticulture (0.03%) and herbs (0.02%). In conclusion, SPOT 6 images can be used to quantify and analyze logging rates for agricultural purpose to an acceptable accuracy.

ABSTRAK

Dalam usaha untuk meningkatkan sektor pertanian, pembukaan kawasan-kawasan baru melalui aktiviti pembalakan di dalam sesebuah negara tidak dapat dielakkan. Antara kawasan yang bertukar menjadi kawasan pembalakan untuk tujuan pertanian ialah daerah Gua Musang dan Lojing, Kelantan. Pembukaan kawasan baru yang tidak terkawal telah mengakibatkan masalah alam sekitar seperti kepupusan flora dan fauna (kemusnahan biodiversiti), kemusnahan tanah, banjir, pencemaran udara dan peningkatan suhu. Kajian ini dijalankan untuk mengklasifikasikan tanaman pertanian yang ditanam di daerah Gua Musang dan Lojing, serta untuk menyiasat kadar pembalakan bagi tujuan pertanian pada tahun 2004 hingga 2014 menggunakan imej satelit dari SPOT-6. Hasil kajian menunjukkan bahawa terdapat perubahan di kawasan hutan yang telah ditukar kepada pertanian di daerah Gua Musang dan Lojing selepas 10 tahun. Pengelas Kemungkinan maksimum digunakan untuk mengelaskan kelas penggunaan tanah sebelum mengesan perubahan penukaran daripada hutan kepada kawasan pertanian. Hasil pengelasan menunjukkan bahawa pada tahun 2004, kawasan hutan primer dan kawasan hutan sekunder adalah 640,882.65 hektar. Kelapa sawit telah digambarkan sebagai kawasan paling tinggi ditukar daripada hutan (88%), diikuti oleh getah 1%, hortikultur 0.44%, hortikultur campuran 0.03% dan 0.02% herba. Kesimpulannya, imej SPOT-6 boleh digunakan untuk mengukur dan menganalisis kadar pembalakan untuk tujuan pertanian kepada ketepatan yang boleh diterima.

CHAPTER 1

INTRODUCTION

1.1   Introduction

Agricultural sector plays an important role in the economic development of country. Agriculture provides employment in rural areas, improve rural incomes and ensure national food security. In effort to improve the agricultural sector, the opening of new areas through logging activities within a country is inevitable. Logging is defined as big trees that have been cut and cleaned from branches and trunks, and produced a logs acquired in the certain regions (Kamus Dewan Bahasa dan Pustaka, Second Edition 1984).

Among the areas that logged areas for agricultural purposes is Gua Musang district and 'Lojing' or 'Lujing' small district in Kelantan. Gua Musang is a district located south of the State of Kelantan of which forms the border between the state of Pahang, Terengganu and Perak. It is the entrance to the State of Kelantan from the south by road Kuala Lipis or Kuala Lumpur. Lojing district is located in another

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territory and adjacent with Gua Musang district, the area is a highland area and located at Titiwangsa Range that forms the backbone of the Peninsular Malaysia and nearby to Cameron Highlands, Pahang. Area of Gua Musang district is 53% of the total area of 797.977 ha of Kelantan state and the most of the area is covered with forests and hills (Gua Musang District Council). Meanwhile, the total area of Lojing is 181,700 ha located in the south-western corner of Kelantan state. It has an altitude from 610 - 1500m above sea level, and the temperature of the highlands ranges from 18°C - 25°C. Lojing is covered with highland tropical rainforest which is rich of flora, fauna, and preliminary exploration in Lojing was initiated by indigenous peoples in the River Belatop and Brooke River.

Opening of new area that has resulted in environmental problems uncontrolled such as extinction of flora and fauna (destruction biodiversity), land degradation, floods, air pollution and temperature increase. Logging activities in the Gua Musang and Lojing highland also has caused environmental problems and destroyed the ecology because many areas that rich with flora and fauna have been endangered due to loss of habitat for multiply/breeding and lack of food resources (Utusan, 2013). Effects of logging has led to the formerly area is rich in flora and fauna has become a barren area and looks like a desert. River on Kuala Koh Forest Reserve which is located about 100km from the town of Gua Musang that is popular for sport fishing because the area is rich with Kelah fish is now has the species of Kelah dwindling (Utusan, 2013 and Bernama, 2015).

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Additionally, deforestation in the slope of the hill has caused the area being exposed and erosion occurred increasingly critical and dangerous to hundreds of indigenous people living in the highland hill of Lojing (Bernama, 2015). Land surface that was eroded had been brought to nearby river and become a settlement at river bed which caused river shallow and also water quality pollution happened. According to the head aboriginal (Pos) Blau, Salleh Ngah, 52, water of Brooke river was clear and clean in the 1980s and now become murky since illegal logging activities happened in the middle of the reserve forest quietly to avoid detection from public (Utusan, 2013 and Kosmo, 2014).

Besides, the effect of deforestation in the Gua Musang and highland of Lojing has led to an increase environmental temperature because there is no canopy layer from forest trees that prevents insolation from reaching the ground. Most of the explored area especially Lojing area has been replaced with vegetable garden and rain shelter house that were built in the hillside (Kosmo, 2014). For the purposes of agricultural development in the country, deforestation cannot be avoided because the agricultural sector is one of the country's economic resources. Therefore, the opening of new areas should be undertaken with caution and controlled so that it does not affect ecological system drastically and bring an environmental disaster to us.

1.2   Objectives

The main objective of this study is to analyze logging rates for agricultural purposes at Gua Musang and Lojing, Kelantan by using satellite images form year 2004 and 2014. The specific objectives of this study are:

i.   To classify agriculture crops cultivated at Gua Musang and Lojing.

ii.   To compare logging rates for agricultural purposes for year 2004 and 2014 using SPOT-6.

1.3   Benefits of the Study

It is expected that from this study, we can identify changes in forested areas in 2004 that were replaced with agriculture in 2014. From the satellite images, thematic maps that illustrate the types of agricultural and forested areas and statistical area will be generated. Any additions or changes to the information in terms of the areas of agriculture and forestry can be assessed from time to time with the use of satellite data.

1.4   Area of Study

This study was carried out in Gua Musang and Lojing district, Kelantan, Malaysia. Areas of study for Gua Musang was located at 04° 53'N latitude, 101° 58'E longitude dan Lojing at 4º 42'16.35 "latitude N, 101º 49'32.37" longitude E. Figure 2.1 shows the district of Gua Musang and Lojing. Gua Musang and Lojing are two of districts in Kelantan that have a large area of forest and commodity crops.
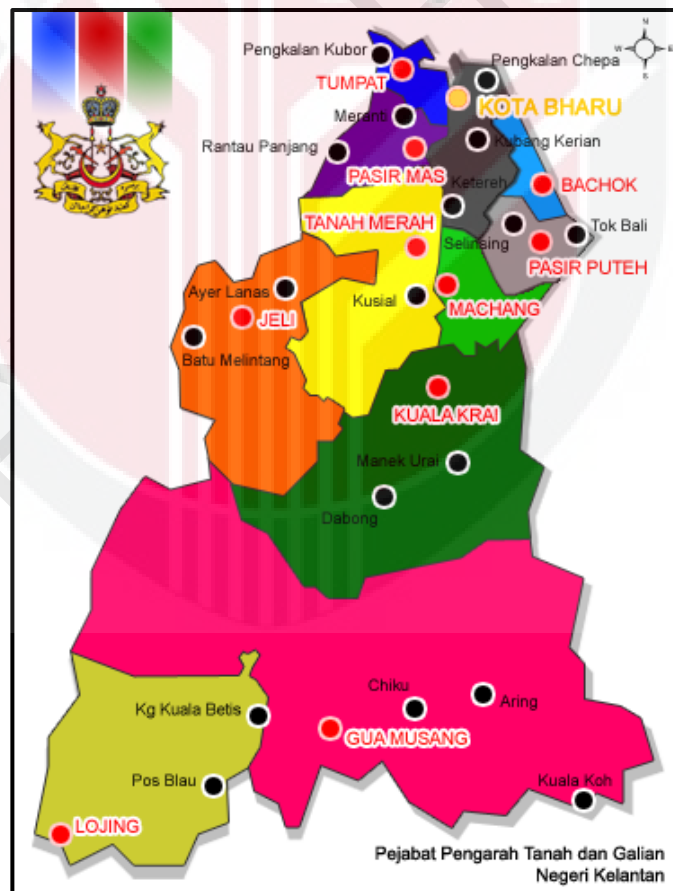

Figure 1.1. Gua Musang and Lojing District

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