



UNIVERSITI PUTRA MALAYSIA

**THE CHANGES IN AGRICULTURE LAND USE IN KUALA KRAI BEFORE
AND AFTER FLOOD INUNDATION**

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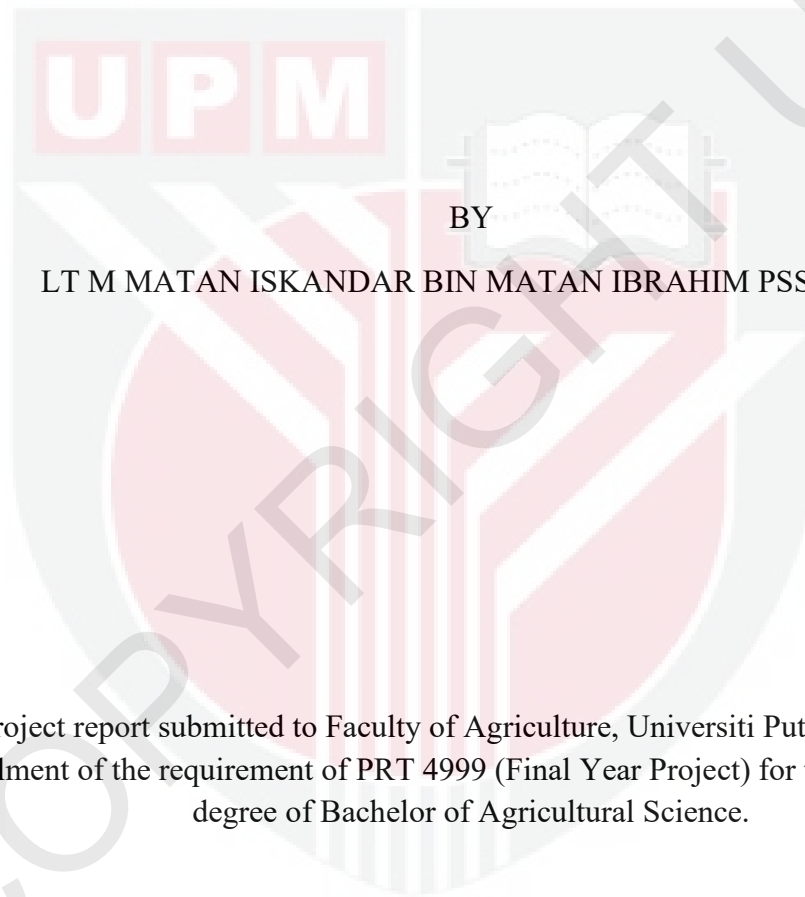
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FACULTY OF AGRICULTURE
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BY

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A project report submitted to Faculty of Agriculture, Universiti 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

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ENDORSEMENT / CERTIFICATION

This project report entitled THE CHANGES IN AGRICULTURE LAND USE IN KUALA KRAI BEFORE AND AFTER FLOOD INUNDATION is prepared by LT M MATAN ISKANDAR BIN MATAN IBRAHIM PSSTLDM 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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ABSTRAK

Pada akhir setiap tahun di Pantai Timur Malaysia musim tengkujuh berlaku. Akan ada kelantangan yang tinggi dan besar yang membawa kepada banjir di kawasan-kawasan tertentu Pantai Timur. Kawasan yang paling teruk dilanda banjir dan terjejas pada tahun 2014 ialah Kuala Krai yang menyebabkan banyak kehilangan nyawa dan rumah. Banjir itu telah meningkat kira-kira 3 tingkat tinggi. Orang mendapatkan perlindungan di bangunan tinggi seperti sekolah, bukit dan hospital. Peningkatan aktiviti manusia di hilir dan hulu sungai menyebabkan sistem sungai rosak seterusnya menyebabkan banjir yang lebih besar dari segi saiz dan kekerapan. Ia telah menyebabkan sungai menjadi cetek tahun demi tahun dan mengakibatkan banjir apabila terdapat jumlah hujan yang tinggi di kawasan itu. Dua sebab utama banjir berlaku sebelum ini adalah corak iklim yang berubah di mana menyebabkan kesan cuaca yang buruk serta pengurusan tanah yang tidak terkawal yang meningkat eksploitasi sumber tanah. Oleh itu, tujuan kajian ini adalah untuk menilai kesan tahap banjir di kawasan penggunaan tanah pertanian di Kuala Krai, Kelantan. Guna tanah analisis perubahan dalam kajian ini dijalankan dengan menggunakan Sistem Maklumat Geografi (GIS). Guna tanah dikelaskan kepada 5 kategori berdasarkan Anderson *et al.* (1976) iaitu skim kawasan pertanian, hutan, kawasan terbuka, kawasan bandar dan air.

Kata kunci: Aktiviti manusia, hujan, banjir , GIS, perubahan guna tanah , pemetaan

ABSTRACT

At the end of each year in the East Coast of Malaysia the monsoon season occurs. There will be high volume of rainfall that leads to flood in certain areas of the East coast. The worst flooded and affected area in 2014 is Kuala Krai which caused lots of lost lives and houses. The flood has risen about 3-storey high. People found shelter at high buildings such as schools, hills and the hospital. Increasing human activity downstream and upstream of the river system results in greater flood damage in terms of size and frequency. It has caused the stream to become shallower year after year and resulted in flood when there is high volume of rainfall in that area. Two main reasons for the unprecedented flooding magnitude are the changing climatic patterns that cause adverse weather effects and uncontrolled land management that increased exploitation of land resources. Hence, the aim of this study is to assess the effect of flood severity on area of agriculture land use in Kuala Krai, Kelantan. The land use change analysis in the study is undertaken using the Geographical Information System (GIS). The land use is classified into 5 categories based on Anderson *et al.* (1976) scheme which are agriculture area, forest, open area, urban area and water.

Keywords: Human activity, Rainfall, Flood, GIS, land use changes, mapping

CHAPTER 1

Introduction

1.1 Background

At the end of each year in the East Coast of Malaysia the monsoon season occurs. There will be high volume of rainfall that leads to flood in certain areas of the East coast. The most tragic year was 2014 and the most damaged area was Kuala Krai. There are limited conventional methods of assessing flood hazard thus unable to provide quick, efficient and effective solutions. In recent years, risk based approaches that feature geospatial tools such as remote sensing and geographical information system have been pursued as a viable means to manage flood hazard. This work will be carried out at selected areas within the Kelantan River Basin. The basin covers 85 percent of the state's surface area. The Kelantan River comprises seven major sub-catchments (Kota Bahru, Gullimard, Pergau, Kuala Krai, Galas, Lebir and Nenggiri) that covers a drainage area of 13,170 km. Four major towns are located along the river: Kota Bahru, Pasir Mas, Tumpat and Kuala Krai. Over the past 30 years, floods have been the most catastrophic natural disaster affecting about 80 million people per year causing economic damage worth over USD11 million annually around the world. Apparently, the water level of the Kelantan River at Tambatan Diraja, which had a danger level of 25 m, reached 34.2 m in December of 2014 compared to 29.7 m in 2004 and 33.6 m in 1967.

1.2 Justification & Problem statement

In Malaysia, the National Security Council (NSC) had classified the recent flooding events in Kelantan as the worst in the history of the state. Increasing human activity downstream and upstream of river systems results in greater flood damage in terms of size and frequency. Two main reasons for the unprecedented flooding magnitude are:

- i) Changing climatic patterns that cause adverse weather effects and
- ii) Uncontrolled land management and increased exploitation of land resources.

1.3 Hypothesis & Objective

H_0 : There is no change in agriculture land use in Kuala Krai before and after flood inundation.

H_A : There are changes in agriculture land use in Kuala Krai before and after flood inundation.

Objective of this study is:

- To assess the effect of flood severity on area of agriculture land use in Kuala Krai, Kelantan.

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