

UNIVERSITI TEKNOLOGI MARA

**Feasibility Study on Potential Jatropha Plantation
Using GIS Technique**

NORSHAHIRAH BINTI MD AKHIR

Thesis submitted in fulfilment of

requirements for the degree of

Bachelor of Surveying Science and Geomatics

(Hons)

Faculty of Architecture, Planning and Surveying

January 2020

AUTHOR'S DECLARATION

I declare that the work in this thesis/dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student : Norshahirah Binti Md Akhir

Student I.D. No. : 2016338301

Programme : Bachelor of Surveying Science and
Geomatics (Honours) – AP220

Faculty : Architecture, Planning & Surveying

Thesis/Dissertation Title : Feasibility Study on Potential Jatropha Plantation
Using GIS Technique

:

Signature of Student

Date : January 2020

ABSTRACT

Jatropha has been identified as the most suitable oil seed-bearing plant for an alternative biodiesel source due to its various favourable attributes like favourable climate conditions, short gestation period, high oil recovery and quality of the oil. Although it has been introduced in the year 2012, the implementation was unsuccessful because lack to find suitable place but, with latest technologies for precision farming, Geographic Information System (GIS) technique can help on deciding suitable area for Jatropha plantation. Therefore, the objective of this study are to i) determine significant weightage of parameters for Jatropha plantation and ii) identify the suitable location Jatropha plantation. The study area is carried out at peninsular Malaysia and five (5) variables such as rainfall, temperature, elevation, soil and land-use data were used to achieve the analysis. The analytical hierarchy process (AHP), in the combination of Geographical Information System (GIS) methods, was applied to compute the weightage of the selected criteria, which is in geospatial data types. A map of the potential Jatropha location was generated using the criteria weightage. This study can help the cultivation of jatropha in suitable areas and may reduce the burden on fossil fuels. It can assist smallholder-based initiatives to promote Jatropha cultivation on farmer-owned to enhance their living circumstances.

TABLE OF CONTENTS

ABSTRACT	i
ABSTRAK	ii
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	vi
LIST OF TABLES	viii
CHAPTER 1	1
INTRODUCTION.....	1
1.1 Background of Study.....	1
1.2 Problem Statement	3
1.3 Research Question	4
1.4 Aim of Study	4
1.5 Objectives	4
1.6 Scope and Limitations	5
1.7 Significant of Study	5
CHAPTER 2.....	6
LITERATURE REVIEW	6
2.1 Introduction	6
2.2 Renewal Energy	6
2.3 Jatropha Curcas	9
2.4 Historical of Implementation of Jatropha Plantation in Malaysia	11
2.5 Criteria used in Selection of Jatropha Plantation Area by AHP methods	11
2.6 Determination of Jatropha Curcas using Geospatial Technologies	12
2.8 Summary	15
CHAPTER 3.....	16
METHODOLOGY	16
3.1 Introduction	16
3.2 Detail Methodology	16
3.3 Study Area	18
3.4 Data Collection	19
3.5 Data Acquisition	19

3.6	Data Processing / Research Method	21
3.6.1	Rainfall and Temperature Interpolation	21
3.6.2	Calculation of Weight Value and Consistency Ratio for Selected Criteria.....	28
3.6.3	Data Verification.....	30
3.7	Summary	30
CHAPTER 4.....		31
RESULT AND ANALYSIS		31
4.1	Introduction	31
4.2	Determination of the criteria weight and AHP Analysis	31
4.3	Site Suitability Analysis and Mapping	33
4.4	Summary	47
CHAPTER 5.....		48
CONCLUSION AND RECOMMENDATION.....		48
5.1	Introduction	48
5.2	Conclusion	48
5.3	Future Recommendation	49
5.4	Summary	49
REFERENCES.....		50
APPENDICES.....		52