

**UNIVERSITI SAINS MALAYSIA
GERAN PENYELIDIKAN UNIVERSITI
PENYELIDIKAN
LAPORAN AKHIR**

**MAPPING OF CHILDREN WITH MALNUTRITION IN
KELANTAN UTILIZING OPEN GEOGRAPHIC
INFORMATION SYSTEM (GIS) AND REMOTE SENSING
PLATFORM**

PENYELIDIK

PROFESOR DR. ZABIDI AZHAR MOHD HUSSIN

PENYELIDIK BERSAMA

**PROF. WAN MANAN WAN MUDA (PPSK)
PROF. MADYA DR. SHARIFAH MASTURA SYED
MOHAMAD (PPSK)
EN. MUHAMAD FARIS IRFAN CHE YUSOFF (PPSP)
EN. MOHD NAZRI MAT HUSSIN (PPSK)
CIK NURUL ILYANA HASHIM (RO)
EN. MOHD KHAIRUL ANUAR AYUB (RA)
EN. MOHD FAIZAL MOHD YAMAN (RA)
CIK NORHANIZA HARUM (RA)**

2013

**UNIVERSITY RESEARCH GRANT
FINAL REPORT**
*Geran Penyelidikan Universiti
Laporan Akhir*

RECEIVED

- 7 MAY 2013



A.	PARTICULARS OF RESEARCH / MAKLUMAT PENYELIDIKAN:
(i)	Title of Research: <i>Tajuk Penyelidikan:</i> Mapping of Children with Malnutrition in Kelantan utilizing Open Source Geographic Information System (GIS) and Remote Sensing Platform
(ii)	Account Number: <i>Nombor Akaun:</i> 1001/PPSP 812007
B.	PERSONAL PARTICULARS OF RESEARCHER / MAKLUMAT PENYELIDIK:
(i)	Name of Research Leader: <i>Nama Ketua Penyelidik:</i> Prof Dr. Zabidi Azhar Mohd Hussin
	Name of Co-Researcher <i>Nama Penyelidik Bersama:</i> <ul style="list-style-type: none"> • Prof. Wan Manan Wan Muda (PPSK) • Prof. Madya Dr. Sharifah Mastura Syed Mohamad (PPSK) • En Muhamad Faris Irfan bin Che Yusoff (PPSP) • En Mohd Nazri Bin Mat Hussin (PPSK) • Cik Nurul Ilyana Binti Hashim (RO) • En Mohd Khairul Anuar Bin Ayub (RA) • En Mohd Faizal Bin Mohd Yaman (RA) • Cik NorHaniza Binti Harun (RA)
(ii)	School/Institute/Centre/Unit : <i>Pusat Pengajian /Institut/Pusat/Unit :</i> Pusat Pengajian Sains Perubatan

B. Azhar

G. COMPREHENSIVE TECHNICAL REPORT
(REFER APPENDIX III)

List the key words that reflect our research:

Senaraikan kata kunci yang mencerminkan penyelidikan anda:

English	Bahasa Malaysia
Malnutrition	Malnutrisi
Growth Monitor System USM	Sistem Growth Monitor USM
Integration System	Sistem integrasi
Under severe	Kekurangan berat

H. a) **Results/Benefits of this research**
Hasil Penyelidikan

No. Bil:	Category/Number: <i>Kategori/ Bilangan:</i>	Promised	Achieved
1.	Research Publications (Specify target journals) <i>Penerbitan Penyelidikan</i> (Nyatakan sasaran jurnal)		
2.	Human Capital Development		
	a. Ph. D Students	1	
	b. Masters Students	2	
	c. Undergraduates (Final Year Project)		
	d. Research Officers	1	
	e. Research Assistants	4	
	f. Other: Please specify		
3.	Patents <i>Paten</i>		
4.	Specific / Potential Applications <i>Spesifik/Potensi aplikan</i>	Growth Monitor USM	
5.	Networking & Linkages <i>Jaringan & Jalinan</i>	- Kementerian Kesihatan Malaysia - Agensi Remote Sensing Malaysia	
6.	Possible External Research Grants to be Acquired <i>Jangkaan Geran Penyelidikan Luar</i> <i>Diperoleh</i>	-Kementerian Kesihatan Malaysia	

- Kindly provide copies/evidence for Category 1 to 6.

b) **Equipment used for this research.**

Peralatan yang telah digunakan dalam penyelidikan ini.

Items <i>Perkara</i>	Approved Equipment	Approved Requested Equipment	Location
Specialized Equipment <i>Peralatan khusus</i>	GPS x 3 units	GPS x 3 units	Pediatrik
Facility <i>Kemudahan</i>	Server x 1 unit	Server x 1 unit	Pediatrik
Infrastructure <i>Infrastruktur</i>	Laptop x 4 units	Laptop x 4 units	Pediatrik

- Please attach appendix if necessary.

I. **BUDGET / BAJET**

Total Approved Budget : RM 188,900.00
Total Additional Budget : -
Grand Total of Approved Budget : RM 188,900.00

Yearly Budget Distributed

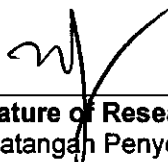
Year 1 : RM 96,300.00
Year 2 : RM 51,300.00
Year 3 : RM 41,300.00

Additional Budget Approved

Year 1 : -
Year 2 : -
Year 3 : -

Total Expenditure : RM 188,900.00
Balance : -

- **Please attach final account statement from Treasury**



Signature of Researcher
Tandatangan Penyelidik

1 March 2011

Date
Tarikh

UNIVERSITI SAINS MALAYSIA
JABATAN BENDAHARI
KUMPULAN WANG UNIVERSITI PENYELIDIKAN (RU)
PENYATA PERBELANJAAN SEHINGGA 30 NOVEMBER 2011

	RM	
Jumlah Geran :	188,900.00	Ketua Projek : Prof Dr. Zabidi Azhar Mohd Hussin
Peruntukan OKT 2007 : (Tahun 1)	96,300.00	Tajuk Projek: Mapping Of Children With Malnutrition in Kelantan Utilizing Open Source Geographic Information System (GIS) And Remote Sensing Platform.
Peruntukan OKT 2008 : (Tahun 2)	51,300.00	Tempoh Asal : 3 Tahun (Okt 2007-Sep 2010) Tempoh Perlanjutan: 3 Bulan (01/10/2010-31/12/2010)
Peruntukan OKT 2009 : (Tahun 3)	41,300.00	No. Akaun : 1001/PPSP/812007

Kwgan	Akaun	PTJ	Projek	Peruntukan Projek	Perbelanjaan Terkumpul sehingga Tahun lalu	Peruntukan Semasa	Tanggung Semasa	Bayaran Tahun Semasa	Belanja Tahun Semasa	Baki Projek
1001	11000	PPSP	812007	72,000.00	115,049.83	(43,049.83)			-	(43,049.83)
1001	14000	PPSP	812007	-		-			-	-
1001	15000	PPSP	812007	-	2,000.00	(2,000.00)			-	(2,000.00)
1001	21000	PPSP	812007	46,000.00	30,074.08	15,925.92			-	15,925.92
1001	22000	PPSP	812007	-		-			-	-
1001	23000	PPSP	812007	900.00	1,314.43	(414.43)			-	(414.43)
1001	24000	PPSP	812007	-		-			-	-
1001	25000	PPSP	812007	-	336.10	(336.10)			-	(336.10)
1001	26000	PPSP	812007	10,000.00		10,000.00			-	10,000.00
1001	27000	PPSP	812007	-	12,175.90	(12,175.90)			-	(12,175.90)
1001	28000	PPSP	812007	-		-			-	-
1001	29000	PPSP	812007	15,000.00	8,764.91	6,235.09			-	6,235.09
1001	32000	PPSP	812007	-		-			-	-
1001	35000	PPSP	812007	45,000.00	17,476.00	27,524.00			-	27,524.00
1001	A11559	PPSP	812007					42.40	42.40	(42.40)
				188,900.00	187,191.25	1,708.75	-	42.40	42.40	1,666.35

H.

COMMENTS OF PTJ'S RESEARCH COMMITTEE
KOMEN JAWATANKUASA PENYELIDIKAN PERINGKAT PTJ

General Comments:
Ulasan Umum:

.....
.....
.....
.....

.....
Signature and Stamp of Chairperson of PTJ's Evaluation Committee
Tandatangan dan Cop Pengerusi Jawatankuasa Penilaian PTJ

Date :
Tarikh :

Signature and Stamp of Dean/ Director of PTJ
Tandatangan dan Cop Dekan/ Pengarah PTJ

Date :
Tarikh :

bp Ahmad 2/5/13

PROFESOR (DR) AHMAD SUKARI HALIM
Dekan
Pusat Pengajian Sains Perubatan
Kampus Kesihatan
Universiti Sains Malaysia
16150 Kubang Kerian, Kelantan.

APPENDIX I

Abstrak

Kajian "Mapping Of Children With Malnutrition in Kelantan Utilizing Open Source Geographic Information System (GIS) and Remote Sensing Platform" telah dijalankan bermula pada 31 Oktober sehingga 30 September 2010 dan di beri tempoh lanjutan sehingga 31 Disember 2010. Kajian ini merupakan salah satu kajian di bawah geran university penyelidikan (RU) yang di ketuai oleh Prof. Zabidi Azhar Husin @ Mohd Hussin. Objektif kajian ini ialah untuk mengkaji dan mengenalpasti kanak-kanak yang berumur 1 hari hingga 6 tahun yang mengalami masalah kekurangan zat makanan (severe) dari 12 klinik di sekitar Kota Bharu melalui pemetaan lokasi kanak-kanak tersebut menggunakan perisian komputer USM Growth Monitor dan Geoinformation System (GIS). Melalui kajian ini, satu sistem pengumpulan data menggunakan perisian komputer yang diberi nama USM Growth Monitor telah dibangunkan menggunakan kepakaran pegawai penyelidik melalui system Open Source. Melalui perisian ini, data mentah daripada klinik-klinik yang terlibat dengan kajian dapat dikumpulkan secara online melalui komputer di klinik yang dihubungkan terus kepada komputer penyelidik di pusat kajian di USM melalui internet. Selain itu, maklumat Geoinformation System (GIS) seperti bentuk muka bumi, saliran dan sebagainya diperolehi daripada Agensi Remote Sensing Malaysia (ARSM) yang banyak memberi bantuan dalam kajian ini. Daerah Kota Bharu telah dipilih sebagai daerah lokasi kajian daripada 10 daerah di Kelantan selepas kajian di Tumpat (2007) berjaya dijalankan. Pada peringkat awal kajian, data antropometri kanak-kanak dan bayi 6 tahun ke bawah diperolehi daripada setiap klinik kesihatan di daerah Kota Bharu. Data yang terdapat di klinik hanyalah nama kanak-kanak, tarikh lahir, berat lahir, panjang semasa lahir dan maklumat pemakanan. Data berat dan panjang untuk setiap peringkat umur kanak-kanak ditukar kepada maklumat status pemakanan melalui program EpiInfo (Epi Info™ Version 3.4). Seramai 4616 data telah dikumpulkan yang terdiri dari 2285 (49.5%) lelaki dan 2331 (50.5%) perempuan. Hasil kajian menunjukkan 3.4% kanak-kanak dikenalpasti mengalami masalah berlebihan berat badan, 15.3% mengalami masalah kurang zat makanan [10.8% peringkat pertengahan (-2SD) dan 4.5% peringkat teruk (-3SD)]. Dalam kajian ini, lokasi tempat tinggal kanak-kanak yang bermasalah dikenalpasti dengan kaedah "Remote Sensing" dan perkaitannya dengan status pemakanan dan faktor lain dikaji menggunakan kaedah "Geoinformation System" (GIS).

Abstract

The Mapping of Children with Malnutrition in Kelantan Utilizing Open Source Geographic Information System (GIS) and Remote Sensing Platform” study was started at 31 October until 30 September 2010 and extends till 31 December 2010. This study was one of the university research (RU) grant headed by Prof. Zabidi Azhar Husin @ Mohd Hussin. The main objective of this study was to identify malnourish children (severe) from 1 day to 6 years old from 12 clinics in Kota Bharu via mapping the location of children with USM Growth Monitor and Geoinformation System (GIS). In this study, data collection was done through the “USM Growth Monitor” online system produced in this study. Through this system, raw data from all the clinic were entered by the nurses involve at the clinic and is able to retrieve direct to research centre at USM. Data regarding Geoinformation System such as soil structure, water source and so on were getting from Malaysian Remote Sensing Agency (ARSM). Kota Bharu district was chosen as a study area for this research from 10 districts in Kelantan after successful research at Tumpat (2007). At the beginning of the study, Anthropometric data such as date of birth, birth weight, birth length and also weaning information of the children aged between 1 day to 6 years old were assemble from every health clinic (Klinik Kesihatan in Kota Bharu District. Birth weight and length data according to children age were converting to nutritional status using EpiInfo programme (Epi Info™ Version 3.4). The total of 4616 data were collected consist of 2285 (49.5%) boys and 2331(50.5%) girls. Outcome from nutritional status analysis shown that 3.4% of the children were Overweight, 15.3% were undernourished [10.3% were moderate undernourished (-2SD) and 4.5% were severe undernourished (-3SD)]. From this preliminary result, Remote sensing techniques were using to identify the home location of the children and correlation with GIS information and nutritional status were assessed.