

UNIVERSITI SAINS MALAYSIA  
GERAN PENYELIDIKAN UNIVERSITI PENYELIDIKAN  
LAPORAN AKHIR

IMPACT ON ENVIRONMENTAL ASSETS: ASSESSING POST-  
FLOOD ENVIRONMENTAL ASSOCIATED COMMUNICABLE  
DISEASES AND THE DISTRIBUTIONS THROUGH GEOSPATIAL  
ANALYSIS

PENYELIDIK

PROFESOR MADYA DR. AZIAH BT. ISMAIL

PENYELIDIK BERSAMA

ASSOC. PROF. AZIAH DAUD  
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DR. AHMAD FILZA ISMAIL

2017

BORANG TRGS BANJIR - P1(PROJECT)

YEAR	
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KEMENTERIAN  
PENDIDIKAN  
MALAYSIA

**FINAL REPORT**  
**GERAN PENYELIDIKAN PENGURUSAN BENCANA BANJIR**  
Laporan Akhir Skim Geran Penyelidikan Transdisiplinari (TRGS)  
Tahun 2015

**A. PROJECT INFORMATION**

YEAR: 2015

RESEARCH TITLE: IMPACT ON ENVIRONMENT ASSETS: ASSESSING POST-FLOOD ENVIRONMENTAL ASSOCIATED COMMUNICABLE DISEASES AND THE DISTRIBUTIONS THROUGH GEOSPATIAL ANALYSIS

THEME CODE:1.0  
(Please refer attachment)

SUBTHEME CODE: 1.7

Please Tick (✓)

PHASE:	01: Pre-Disaster	<input type="checkbox"/>	02: During Disaster	<input type="checkbox"/>	03: Post-Disaster	<input checked="" type="checkbox"/>
AREA:	01: Preventive	<input type="checkbox"/>	02: Preparedness	<input checked="" type="checkbox"/>	03: Rescue and Recovery	<input type="checkbox"/>
	04: Adaptation	<input type="checkbox"/>	05: Mitigation	<input type="checkbox"/>		

START DATE: 1/4/2015  
END DATE (EXPECTED): 31/12/2015

PROJECT STATUS: (ACTIVE / TERMINATED / COMPLETED) COMPLETED

PROJECT LEADER: ASSOC PROF DR AZIAH ISMAIL  
I/C / PASSPORT NUMBER: 691206-03-5168



PROJECT MEMBERS :  
(including GRA/RA/RO) 1. ASSOC. PROF. AZIAH DAUD 2. DR. NABILAH AWANG@ ISMAIL 3. DR. RAFIDAH HANIM SHOMIAD@SHUEB 4. DR. AZLINDA ABU BAKAR 5. DR. KHAIRUL MOHD FADZLI MUSTAFFA 6. ASSOC. PROF. KAMARUL IMRAN MUSA 6. DR. AHMAD FILZA ISMAIL

**B. PROJECT ACHIEVEMENT (Prestasi Projek)**

ACHIEVEMENT PERCENTAGE				
Project progress according to milestones achieved up to this period	0 - 25%	26 - 50%	51 - 75%	76 - 100%
Percentage (please state #%)				✓
RESEARCH OUTPUT				
Number of articles/ manuscripts/ books (Please attach the First Page of Publication)	Indexed Journal		Non-Indexed Journal	

12

<b>Conference Proceeding</b> (Please attach the First Page of Publication)	<b>International</b>	<b>National</b>
		Persidangan Kajian Banjir 2014 4-6 April 2016
<b>Intellectual Property</b> (Please specify)	-	
<b>Number and title of Policy Paper / SOP / Technology Solution</b> (Please specify)	1. 2. 3.	

<b>HUMAN CAPITAL DEVELOPMENT</b>					
Human Capital	Number				Others (please specify)
	On-going		Graduated		
Citizen	Malaysian	Non Malaysian	Malaysian	Non Malaysian	
<b>No. PHD STUDENT</b>					
Student Fullname: IC / Passport No: Student ID: Date of appointment:					
<b>No. MASTER STUDENT (Mixed-mode)</b>	1				
Student Fullname: IC / Passport No: Student ID: Date of appointment:	1. Mohd Nazri Abu Yazid MSc- mixed mode Pusat Pengajian Sains Kesihatan, USM				
<b>No. RA/RO</b>	2				
Student Fullname: IC / Passport No: Date of appointment:	1. Nur Nazihah Zakaria (920705-03-5230) 2. Nik Yuszrin Yusof (860729-29-5545)				
<b>Total</b>					

**C. EXPENDITURE (Perbelanjaan) as Borang K1(RMC)**

**Budget Approved (Peruntukan diluluskan)** : RM 108,570.00  
**Amount Spent (Jumlah Perbelanjaan)** : RM 106,626.87  
**Balance (Baki)** : RM 1,943.13  
**Percentage of Amount Spent (Peratusan Belanja)** : 98.2%



UserCode: NASIR / USMKKCLIVE / CIPPM      Program Code: Votebook9100      Current Program : Votebook (Header)														
Current Date : 07/06/2016 12:37:28 PM      Version: 15.124, Last Updated at 31/05/2016      DB: 13.00, 9/18/2010 VB: 13.01, 3/14/2011      Switch Language : English /Malay														
Wildcard : eg. Like 100%, Like 10%1, Like %1														
Element 1:		203		Element 2:		%		Element 4:		CIPPM				
Element 5:		6765004		Year:		2016								
Detail	Excel	Budget Rule	Budget Control	Account Description	Budget Account Code	# of over	Budget	Cash Received	Advanced	Commit	Actual	Availabilty	Percentage	
	Detail	Excel	403	L	Pembangunan Penyelidikan	203.111.0.CIPPM.6765004	0.00	0.00	0.00	0.00	0.00	0.00	0.00%	
	Detail	Excel	404	L	Pembangunan Penyelidikan	203.221.0.CIPPM.6765004	2,000.00	0.00	0.00	0.00	1,332.04	667.96	0.00%	
	Detail	Excel	404	L	Pembangunan Penyelidikan	203.227.0.CIPPM.6765004	11,586.37	-655.20	0.00	0.00	10,920.00	11.17	-1.70%	
	Detail	Excel	404	L	Pembangunan Penyelidikan	203.228.0.CIPPM.6765004	3,550.00	0.00	0.00	0.00	2,440.00	290.00	0.00%	
	Detail	Excel	404	L	Pembangunan Penyelidikan	203.229.0.CIPPM.6765004	9,144.00	0.00	0.00	0.00	8,700.00	444.00	0.00%	
	Detail	Excel	407	L	Pembangunan Penyelidikan	203.552.0.CIPPM.6765004	0.00	655.20	0.00	0.00	655.20	0.00	0.00%	
			9999		GrandTotal		26,280.37	0.00	0.00	0.00	2,440.00	21,897.24	1,943.13	0.00%

**END OF REPORT**

**Project Title: IMPACT ON ENVIRONMENT ASSETS: ASSESSING POST-FLOOD ENVIRONMENTAL ASSOCIATED COMMUNICABLE DISEASES AND THE DISTRIBUTIONS THROUGH GEOSPATIAL ANALYSIS**

**A. Project Information**

Start Date : 01/04/2015  
End Date : 31/12/2015  
Extension Date : -  
Project Status : Completed  
Project Leader : AZIAH ISMAIL  
I/C Number : 691206-03-5168  
University : Universiti Sains Malaysia  
Address : Institute for Research in Molecular Medicine, Health Campus, 16150 Kubang Kerian, Kelantan  
Contact number : 09-7672426  
Project Members : 1. ASSOC. PROF. AZIAH DAUD 2. DR. NABILAH AWANG@ ISMAIL 3. DR. RAFIDAH HANIM SHOMIAD@SHUEB 4. DR. AZLINDA ABU BAKAR 5. DR. KHAIRUL MOHD FADZLI MUSTAFFA 6. ASSOC. PROF. KAMARUL IMRAN MUSA 6. DR. AHMAD FILZA ISMAIL

**B. Project Achievement**

Project Progress : 100%  
Research Output : Indexed Journal (\_\_\_), Non-indexed Journal (\_\_\_), Conference Proceedings (\_\_\_), Book Chapter (\_\_\_),....  
Talent : RA (2), Master student (1)

**C. Expenditure**

Budget Approved : RM 108,570.00  
Amount Spent : RM 106,626.87  
Balance : RM 1,943.13  
% of Amount Spent : 98.2%

## Summary of Research Findings

### 1.0 Introduction

Brief the project introduction

Flood causes serious health consequences especially on environmental-related diseases, particularly water and vector-borne diseases. Receding flood waters and pooling water in poodle provides perfect conditions for mosquito breeding, and increase in potential freshwater breeding sites results in larger numbers of mosquitoes, which would increase the potential for outbreaks of vector-borne diseases such as dengue fever. Contact with contaminated soil and water by animal urine will lead to leptospirosis. These diseases have relationship with the environment and other geographical factors and they could be transmitted not only to the vulnerable groups but also to those who are living near affected area. Therefore, the geospatial analysis is used to determine the relationship between: i. Cases of leptospirosis and leptospira isolated from the environment (i.e. water and soil) in Pasir Mas District, Kelantan. ii. Cases of dengue fever and distribution of *Aedes* mosquitoes in Kota Bharu and Bachok District, Kelantan.

### 2.0 Methodology

Geospatial analysis: The coordinates of the cases were obtained from the Health District Offices from their databases. The cases of leptospirosis were from 6 January (epidemiological week 1) to 16 May (epidemiological week 20) of 2015 occurred in Pasir Mas District. For the dengue cases the data obtained were from 1 September 2014 to 30 April 2015 which occurred in Kota Bharu and Bachok Districts. Kota Bharu District represents the urban area while Bachok District represents suburb and rural area. All the data were cleaned and those with correct latitude and longitude coordinates were included. The coordinates were entered and analysed according to their coordinates system either Kertau RSO or WGS. The data were analysed using ArcGIS 10.3 from Esri. The data were analyzed for the proximity and relationship of cases and environmental factor, i.e. the isolation of pathogenic leptospira species from the water and soil for leptospirosis; and the presence of aedes species for dengue fever.

Analysis for leptospirosis: Soil and water samples were collected from leptospirosis patients' localities in flood affected areas in Kelantan. Patients with confirmed leptospirosis were selected for environmental sampling. All samples were filtered and cultured on Ellinghausen and McCullough modified by Johnson and Harris media. The cultures were processed according to previously described protocols. Molecular identification of the isolates was performed by partial sequences of 16S rRNA.

Analysis for dengue: Mosquito larvae were collected in Kota Bharu (flood affected area) and Bachok (non-flood affected area). Fifty sampling points were selected from each area and eight ovitraps were placed in each sampling points. Mosquito larvae were collected from the ovitraps after a week and kept in a mosquito net cages. Adult *Ae. aegypti* and *Ae. Albopictus* mosquitoes emerged from the larvae were then collected, and kept in separate tubes. The mosquitoes were kept in pools, between 6 to 30 mosquitoes. The mosquitoes were separated between abdominal and head-thorax by using forceps and blade. The abdominal parts were used for NS1 dengue viral antigen detection and heads-thoraxes parts were used for ribonucleic acid (RNA) extraction and reverse transcription polymerase chain reaction (RT-PCR).