

The second secon

# PROGRESS REPORT 2

## **AUGUST 2023**

**Post-Disaster Needs Assessment (PDNA)** for the Development of Disaster Resilient Recovery (DRR) Strategies in Jajahan Pasir Mas, Kelantan



#### **Prepared for:**

**MERCY Malaysia Headquarters** 1st Floor, MCOBA Building, 42 Jalan Syed Putra, 50460 Kuala Lumpur

© 2023. Disaster Preparedness and Prevention Centre (DPPC), Malaysia-Japan International Institute of Technology (MJIIT), Universiti Teknologi Malaysia (UTM)



# ACKNOWLEDGEMENT

- 1. ANGKATAN PERTAHANAN AWAM MALAYSIA
- 2. JABATAN BOMBA DAN PENYELAMAT
- 3. POLIS DIRAJA MALAYSIA
- 4. JABATAN PERANGKAAN MALAYSIA
- 1. UNIVERSITI TEKNOLOGI MARA
- 2. UNIVERSITI MALAYSIA KELANTAN
- 3. UNIVERSITI MALAYSIA PAHANG
- 4. UNIVERSITI PERTAHANAN NASIONAL MALAYSIA
- 5. UNIVERSITI SAINS MALAYSIA





# EXECUTIVE SUMMARY

This project supports the co-implementation of Post-Disaster Needs Assessment (PDNA) to co-develop a national Disaster Resilient Recovery (DRR) model as a result of large-scale flood disaster in February and December 2022 in Jajahan Pasir Mas, Kelantan. This nationally-supported and locally-led programming is co-owned by the National Disaster Management Agency (NADMA) Prime Minister's Department, Kelantan State Secretary Office, and Jajahan Pasir Mas District Office, with the strong support of Malaysia Civil Defence Force (APM), Fire and Rescue Department (BOMBA), Department of Statistics Malaysia (DOSM), Department of Social Welfare (JKM), and other strategic partners.

MERCY Malaysia and Disaster Preparedness and Prevention Centre (DPPC), Malaysia-Japan International Institute of Technology (MJIIT), Universiti Teknologi Malaysia (UTM) are co-implementers in this national study to establish a national benchmarking for the Post-Disaster Needs Assessment (PDNA) model development and co-designing the disaster resilient recovery strategies based on the worst-case developed in Jajahan Pasir Mas, Kelantan.

After a long series of Post-Disaster Needs Assessment (PDNA) data collection, about 2595 data regarding the flood event during MTL 2022/2023 was collected and completed on 22 March 2023. Then, a rigorous data cleaning processes, field verification and, the 2249 final data are reported officially. ArcGIS, a powerful Geographical Information System (GIS) software, has been employed to visualize the spatial distribution of flood impacts in Jajahan Pasir Mas, allowing for a deeper understanding of the disaster's extent and severity.

Geographical Information System (GIS) was utilized to conduct sophisticated spatial analysis, enabling the identification of high-risk areas, vulnerable communities, and the impact of anthropogenic activities on the flood disaster. This comprehensive analysis has shed light on the systemic risks and extreme weather events that contributed to the flood's magnitude.

Furthermore, detailed statistical reports and field evidence have been synthesized, providing essential insights into the socioeconomic consequences of the flood disaster in Jajahan Pasir Mas. The systematic analysis was carried out and complemented the spatial analysis, further enriching the understanding of the disaster's multifaceted impacts.

Looking ahead, the Resilience Living Lab Pasir Mas is committed to promoting a transdisciplinary approach in disaster risk reduction and resilience by harnessing the power of data, evidence-based strategies, and stakeholder engagement. To achieve this, a multi-stakeholder workshop and living lab is planned this year, bringing together key stakeholders, technical experts, and local communities.

The programme aims to leverage new insights to advance the local implementation of the Humanitarian-Development Nexus (HDN) approach, promoting a transdisciplinary approach towards disaster resilience, and contribute to the global agenda for disaster risk reduction and resilience. The Resilience Living Lab in Jajahan Pasir Mas, Kelantan, developed as a result of this study, will serve as a multi-stakeholder and practical demonstration of the Build-Back-Better (BBB) approach, emphasizing the importance of sustainable recovery strategies for disaster-affected communities.

#### TABLE OF CONTENTS

PAGE

	EXECUTIVE SUMMARY	4
	TABLE OF CONTENTS	6
	LIST OF TABLES	8
	LIST OF FIGURES	9
	LIST OF ABBREVIATIONS	11
CHAPTER 1	INTRODUCTION	12
1.1	Post-Disaster Needs Assessment (PDNA) Jajahan Pasir Mas Implementation	13
1.2	Objectives	18
1.3	Expected Outcomes	18
1.4	Project Collaborators	19
1.5	Project Management	20
CHAPTER 2	MILESTONES	22
2.1	Project Timeline	23
2.2	Chronology of Project Design and Development	29
2.3	Upcoming Activities	33
CHAPTER 3	PROGRESS	36

CHAPTER 3	PROGRESS	36
3.1	Data Cleaning	37
3.2	Data Visualization	41

CHAPTER 4	ANALYSIS	43
4.1	Flood Data Analysis	44
4.2	Spatial Analysis	57
4.3	Multidimensional Poverty Index (MPI)	66
4.4	Post-Disaster Need Assessment (PDNA) Jajahan Pasir Mas : Multidimensional Poverty Index (MPI)	67
CHAPTER 5	WAY FORWARD	79
	Resilience Living Lab Pasir Mas 2023 & Disaster Risk Reduction (DRR) Workshop Post-Disaster Needs Assessment (PDNA)	80
CHAPTER 6	DISASTER RESILIENT RECOVERY (DRR) MODEL	82
CHAPTER 7	BUDGET AND FINANCIAL	85
7.1	Cost Summary	86
7.2	Cost Breakdown	89
CHAPTER 8	CONCLUSION	92

	LIST OF TABLES	
TABLE NO	TITLE	PAGE
Table 1.5.1	List Name of Volunteers	21
Table 2.1.1	DRR-PDNA Jajahan Pasir Mas Workplan	23
Table 2.1.2	DRR-PDNA Jajahan Pasir Mas Workplan	24
Table 2.1.3	DRR-PDNA Jajahan Pasir Mas Workplan	25
Table 2.1.4	DRR-PDNA Jajahan Pasir Mas Workplan	26
Table 2.1.5	DRR-PDNA Jajahan Pasir Mas Workplan	27
Table 2.1.6	DRR-PDNA Jajahan Pasir Mas Workplan	28
Table 2.3.1	Resilience Living Lab Pasir Mas Workplan	34
Table 4.1.1	Categories of flood levels in Jajahan Pasir Mas	46
Table 4.2.1	List of temporary evacuation center	59
Table 4.2.2	List of temporary evacuation center	60
Table 4.2.3	List of temporary evacuation center	61
Table 4.2.4	List of temporary evacuation center	62
Table 4.2.5	List of temporary evacuation center	63
Table 4.4.1	Multidimensional Poverty Index (MPI) for Jajahan Pasir Mas	67
Table 4.4.2	Multidimensional Poverty Index (MPI) for Jajahan Pasir Mas	68
Table 4.4.3	Multidimensional Poverty Index (MPI) for Kampung Gual Tok Deh	69
Table 4.4.4	Multidimensional Poverty Index (MPI) for Kampung Gual Tok Deh	70
Table 4.4.5	Multidimensional Poverty Index (MPI) for Kampung Gual Tok Deh	71
Table 4.4.6	Multidimensional Poverty Index (MPI) for Kampung Terusan and Kampung Tersang	73
Table 4.4.7	Multidimensional Poverty Index (MPI) for Kampung Terusan and Kampung Tersang	74
Table 5.1.1	Program Agenda	80
Table 5.1.2	Program Agenda	81
Table 7.1.1	Total cost for Post-Disaster Need Assessment Project	86
Table 7.1.2	Operational and implementation cost	87
Table 7.1.3	Summary of expenditures	88
Table 7.1.4	Payment allocation for Progress Report 2	88
Table 7.2.1	Project cost breakdown	89
Table 7.2.2	Project cost breakdown	90
Table 7.2.3	Project cost breakdown	91

#### LIST OF FIGURES

FIGURE NO.	TITLE	PAGE
Figure 1.1.1	Map of Kelantan State Total Loss in 2022	14
Figure 1.1.2	Location of Jajahan Pasir Mas, Kelantan; Right: Map of Jajahan Pasir Mas District	16
Figure 1.1.3	Main census of population and housing indicator	17
Figure 1.4.1	Post-Disaster Needs Assessment (PDNA) project collaborators	19
Figure 1.5.1	Post-Disaster Needs Assessment (PDNA) Organizational chart	20
Figure 2.2.1	Project chronology	29
Figure 2.2.2	Project chronology	30
Figure 2.2.3	Post-Disaster Need Assessment Dashboard	31
Figure 2.2.4	Dashboard for 5 series data collection	32
Figure 2.2.5	Dashboard QR Code	32
Figure 2.3.1	Upcoming activities	33
Figure 3.1.1	2,249 data remained after the data cleaning process	37
Figure 3.1.2	Example of eliminated data during data cleaning	38
Figure 3.1.3	Example of blank section in Transfer column	39
Figure 3.1.4	Example of blank section in School's Needs column	39
Figure 3.1.5	Example of type of occupation	40
Figure 3.1.6	Example of type of transportation access	40
Figure 3.2.1	Flood level in Jajahan Pasir Mas	41
Figure 3.2.2	Types of occupation status in Jajahan Pasir Mas	42
Figure 4.1.1	The flood level during the 2022 flood in Jajahan Pasir Mas.	45
Figure 4.1.2	Flood level in Jajahan Pasir Mas	47
Figure 4.1.3	Transportation access in Jajahan Pasir Mas	49
Figure 4.1.4	Type of transportation access in Jajahan Pasir Mas	50
Figure 4.1.5	Distribution of occupations status in Jajahan Pasir Mas	52
Figure 4.1.6	Employment distribution in Jajahan Pasir Mas	53
Figure 4.1.7	School's needs in Jajahan Pasir Mas	55
Figure 4.1.8	School's needs in Jajahan Pasir Mas	55
Figure 4.1.9	Type of school's needs in Jajahan Pasir Mas	56
Figure 4.2.1	Flood level more than 3m in Jajahan Pasir Mas	57

FIGURE NO.	TITLE	PAGE
Figure 4.2.2	Flood level more than 3m at Kampung Gual Tok Deh, Kampung Terusan and Kampung Tersang	58
Figure 4.2.3	Nearest temporary evacuation center at Kampung Gual Tok Deh	64
Figure 4.2.4	Nearest temporary evacuation center at Kampung Gual Tok Deh	65
Figure 4.4.1	Location of the household for Kampung Gual Tok Deh	72
Figure 4.4.2	Location of the household for Kampung Terusan and Kampung Tersang	75
Figure 4.4.3	Location of the household for Kampung Terusan and Kampung Tersang	76
Figure 6.1.1	Disaster Resilient Recovery (DRR) Model, build by Disaster Preparedness & Prevention Centre (DPPC)	83

#### LIST OF ABBREVIATIONS

AOI	Area of Interest
APM	Angkatan Pertahanan Awam
BRC	Building Resilient Communities
BSMM	Bulan Sabit Merah Malaysia
DOSM	Department of Statistics Malaysia
DPPC	Disaster Preparedness and Prevention Center
DRR	Disaster Resilient Recovery
GIS	Geographical Information System
HDN	Humanitarian Development Nexus
KRT	Kawasan Rukun Tetangga
LGU	Local Government Unit
MIRA	Multi-sector Initial Rapid Assessment
MJIIT	Malaysia-Japan International Insititute of Technology
MTL	Monsun Timur Laut
NADIM	National Disaster Management Agency
NADMA	National Disaster Management Association
NGO	Non-Governmental Organization
PDNA	Post-Disaster Needs Assessment
РКОВ	Pusat Kawalan Operasi Bencana
PLSB	Projek Pembangunan Lembangan Sungai Bersepadu
PPAD	Pegawai Pertahanan Awam Daerah
QA	Quality Assurance
QC	Quality Control
RTB	Rancangan Tebatan Banjir
SUK	Setiausaha Kerajaan Negeri Kelantan
ТоТ	Trainer of Trainer
UNDRR	United Nations Office for Disaster Risk Reduction
UTM	Universiti Teknologi Malaysia
<b>МАС</b> П	Water Sanitation and Hygiene

**WASH** Water, Sanitation, and Hygiene

# INTRODUCTION

# 1.1 Post-Disaster Needs Assessment (PDNA) Jajahan Pasir Mas Implementation

#### for the Development of Disaster Resilient Recovery (DRR) Strategy in Kelantan

A Post-Disaster Needs Assessment (PDNA) study for the development of a disaster resilient recovery strategy is conducted in Jajahan Pasir Mas, Kelantan in the wake of a series of flood disasters in February and December 2022 as a national case study and build-back-better model. This study is conducted in partnership with several organizations and specialized sectors by the National Disaster Management Agency (NADMA), Prime Minister's Department, Kelantan State Secretary Office, MERCY Malaysia, Disaster Preparedness and Prevention Centre (DPPC), Malaysia Japan International Institute of Technology (MJIIT), University of Technology Malaysia (UTM), Kuala Lumpur, and the National Disaster Management Association (NADIM). This study analyses the impact of disasters within the Northeast Monsoon (MTL) 2021-2022 and Northeast Monsoon (MTL) 2022 – 2023 timeframes in order to develop an effective recovery strategy for Jajahan Pasir Mas, Kelantan.

This study establishes a national benchmark for putting research into practice and transforming societal resilience, which can be upscaled to the regional level.





This study aims to develop a more disaster resilient recovery model based on a pilot and benchmark project carried out in Jajahan Pasir Mas, Kelantan, from January to December 2023. This study covers the implementation of data collection work, mapping the impact of flood disasters (damages, losses & needs), field observations, and the development of a resilient disaster recovery strategy plan. Figure 1.1.1 shows the total loss in each district in Kelantan during the 2022 flood. This study is carried out in an integrated, cross-sector (public-NGOacademic-private) and diverse expertise towards forming a national model in the development of resilient recovery strategies based on data method, collection method, impact mapping and post-disaster assessment including the use of Post-Disaster Needs Assessment (PDNA), which is used internationally. This impactful initiative supports Malaysia's commitment to the United Nations Office for Disaster Risk Reduction (UNDRR) Sendai Framework for Disaster Risk Reduction 2015-2030 and advances the country's goals for disaster risk reduction and building local resilience as a result of climate change and extreme weather events.

This impactful study also supports the Humanitarian Development Nexus (HDN) agenda by ensuring that disaster-affected areas can be quickly recovered, that aid can be channeled in a targeted manner, that the build-back-better concept can be successfully implemented and that the communities are empowered to be more resilient. This study assists the government and the private sector's efforts to direct aid needs toward the creation of a resilient society based on data, empirical evidence, and technical studies.

The Resilience Living Lab in Hulu Langat as well as the early findings of Post-Disaster Needs Assessment (PDNA) in Jajahan Pasir Mas for resilient disaster recovery strategies were presented by MERCY Malaysia at an inter-agency meeting attended by 13 ministries and agencies on January 13, 2023, which was presided over by NADMA. The development of a national model for resilient disaster recovery strategies presented has the full backing of NADMA and the Kelantan State.

#### Case Study: Jajahan Pasir Mas, Kelantan

There are 11 districts in total in the state of Kelantan, one of which is Jajahan Pasir Mas (Figure 1.1.2). Jajahan Pasir Mas district is bordered by Tumpat district in the north, Tanah Merah district in the South while Kota Bharu is in the East and borders Thailand in the west. The area of Jajahan Pasir Mas district is 57,800 hectares or 614.15 square kilometers, which is 3.9% of the area of Kelantan State. Jajahan Pasir Mas district has 10 sub-districts which are administered and led by Penggawa and Penghulu.



*Figure 1.1.2: Location of Jajahan Pasir Mas, Kelantan; Right: Map of Jajahan Pasir Mas District Source: Wikipedia* 



Figure 1.1.3: Main census of population and housing indicator (Source: Portal Rasmi Banci Penduduk dan Perumahan Malaysia 2020, Department of Statistics Malaysia, DOSM )

According to the Portal Rasmi Banci Penduduk dan Perumahan Malaysia 2020 (Figure 1.1.3), Department of Statistics, Jajahan Pasir Mas district has a total population of 230,424 people with a total of 54,924 houses. 23 out of 50 districts (46%) were affected by floods. The 2022 flood disaster impact survey assessment for the state of Kelantan recorded a total loss of RM29.8 million and Jajahan Pasir Mas, in particular, suffered a loss of RM26.1 million (87.5%). This assessment was carried out following the floods brought on by the Northeast Monsoon in February and March 2022.

### **1.2 Objectives**

Data and field evidence can be used to develop better strategies and actions for disaster risk management that involves response operations. Effective data and mapping, along with disaster assessment, help disaster management, making it more systematic and enhanced disaster preparedness.

Three main objectives for this study are given as follows: -

- i. To map the impact of flood disaster and its cascading impacts
- ii. To carry out the Post-Disaster Needs Assessment (PDNA) and support the government's efforts in recovery and re-development
- iii. To co-design a multi-scale resilient recovery strategy to promote the Humanitarian Development Nexus (HDN) agenda

### **1.3 Expected Outcomes**

Among the expected outcomes of the implementation of the post-flood needs assessment programme for resilient recovery are understanding the primary needs and urgent local needs, exploring sources of unique opportunities at the local level, and developing integrated strategies and actions (commonality, connectivity and various benefits). Damage and loss, housing and settlement issues, clean water supply issues, health service issues, livelihood issues, and community development are some of the data and information that can be gathered for impact mapping and post-disaster assessment. Collaboration between government organizations, academic institutions, non-governmental organizations (NGOs), the private sector, and stakeholders is necessary to create resilient communities and for the communities to quickly recover from disasters. An effective and efficient data insight systems and targeted actions must also be developed. The support and involvement from other parties such as RAKAN NADMA which consists of 38 non-governmental organizations (NGOs) also help in the recovery phase of disaster-affected communities. In Build-Back-Better, it is important to focus on and implement a total rejuvenation process, explore opportunities, and develop effective and feasible strategies to empower vulnerable communities. With the implementation of the post-flood disaster assessment programme for resilient disaster recovery in Jajahan Pasir Mas, Kelantan can become a pilot project and a benchmark for other areas in the country by developing its own guidelines, models, techniques, strategies, actions, and solutions.

## **1.4 Project Collaborators**



Figure 1.4.1: Post-Disaster Needs Assessment (PDNA) project collaborators

#### 1.5 Project Management

A structure for project management has been established, which is intended to ensure the study runs smoothly with the Steering Committee at the top of the chart, which is then divided into various technical and operational roles under the Technical Committee and Working Committee (Figure 1.5.1).



Figure 1.5.1: Post-Disaster Needs Assessment (PDNA) Organizational chart

In order to carry out the data collection process in Pasir Mas, Kelantan, a team of 14 individuals has been assembled. This team is composed of 12 volunteers, who have been selected for their diverse backgrounds and expertise, and two individuals from the operation department, who will provide necessary logistical support (Table 1.5.1). Prior to the commencement of data collection activities, the team will be briefed on the objectives and goals of the study as well as the specific tasks that each member will be required to perform. In order to ensure optimal productivity and efficiency, the team will be divided into two to three groups each day, with each group being assigned to specific locations that have been determined by the coordinator.

Table	1.5.1:	List Na	ame of	Volur	nteers
	Source	: Progi	ress Rej	oort i	1

No.	Name	Contact No	Mykad	Task
1.	Sharifah Raudzah Syed Akil	012-9559695	730824-03-5076	Operation
2.	Mohd Kamaruddin Ibrahim	017-5050923	700607-03-5451	Operation
3.	Hashim Ab Wahab	019-5819278	781207-03-5273	Volunteer
4.	Nor Aslinda Kamaruzaman	017-9771713	940213-03-5012	Volunteer
5.	Nor Hafiza Kamaruzaman	010-9780267	960105-03-5268	Volunteer
6.	Muhd Firdaus Abd Aziz	011-23011632	951113-03-5191	Volunteer
7.	Muhamad Rafiza Zakaria	014-5123681	900319-03-5859	Volunteer
8.	Wan Nur Farinie Wan Zee	016-3699700	900305-03-5874	Volunteer
9.	Ikhwan Firdaus	010-4557154	001025-12-1453	Volunteer
10.	Mohd Luqman Hakim Sukri	017-9293657	904504-13-6017	Volunteer
11.	Ahmad Zeeyadi Zahalani	014-8032968	880918-11-5521	Volunteer
12.	Muhd Redzuan Mat Yusoff	013-3859960	881012-03-5589	Volunteer
13.	Zatil Hanan Mohd Azlan	019-7071947	891005-03-5328	Volunteer
14.	Nur Adilah Mohd Azlan	018-2754341	971209-03-7528	Volunteer



# MILESTONES

#### 23 2.1 Project Timeline

Table 2.1.1 shows the project timeline for co-implementing Post- Disaster Needs Assessment (PDNA) data collection, analysis and interpretation towards contributing to the development of Disaster Resilient Recovery (DRR) model and strategies in Malaysia.

DRR-PDNA PASIR MAS WORKPLAN				
No	Workplan	Day	Start	End
1	START	0		
2	PROJECT DESIGN & WORK DEVELOPMENT	21	28/12/22	17/01/23
2.1	Project design for rapid assessment	17	28/12/22	13/01/22
2.1.1	Field Observations (Series 1)	2	28/12/22	29/12/22
2.1.2	Field Observations (Series 2)	2	07/01/23	08/01/23
21.3	Field Observations (Series 3)	6	08/01/23	13/01/23
2.2	Project design and planning	2	14/01/23	15/01/23
2.2.1	Stakeholder engagement sessions	1	14/01/23	14/01/23
2.2.2	Expert consultation sessions	1	15/01/23	15/01/23
2.3	Project work development	2	16/01/23	17/01/23
2.3.1	Establishing Steering, Technical and Working Committee	1	16/01/23	16/01/23
2.3.2	Documentation and compilation	1	17/01/23	17/01/23
3	PDNA METHOD VERIFICATION	11	13/01/23	23/01/23
3.1	Re-development of PDNA method, digitalization and mapping, and PDNA implementation strategy	1	18/01/23	18/01/23
3.2	Reviewing and selecting best method for PDNA	1	19/01/23	19/01/23
3.3	Meeting with NADMA, DOSM & 13 ministries/departments & verified the methods	1	13/01/23	13/01/23
3.4	Meeting with Director General of NADMA	1	17/01/23	17/01/23

and President of MERCY Malaysia

Table 2.1.1: DRR-PDNA Jajahan Pasir Mas Workplan Source: Progress Report 1

No	Workplan	Day	Start	End
3.5	Verification of the method on-site and method improvement	1	20/01/23	20/01/23
3.6	Conducting Trainer of Trainer (ToT) sessions	1	20/01/23	20/01/23
3.7	Organizing pilot case studies (4 samples location)	1	21/01/23	21/01/23
3.8	Preparing the Guidebook for PDNA (new methods)	2	22/01/23	22/01/23
4	PROJECT IMPLEMENTATION	233	19/01/23	08/09/23
4.1	Preparing the PDNA data collection requirement	1	24/01/23	24/01/23
4.2	Setting up the Temporary BaseCamp (Operation Center) @ Balai Bomba Rantau Panjang	5	19/01/23	23/01/23
4.3	Resources (Man-power, logistics, materials/equipments, office stationeries, utilities bills, internet connection, etc.)	1	24/01/23	24/01/23
4.4	Selecting Permanent Basecamp (accommodation, discussion & small operation office)	6	25/01/23	30/01/23
4.5	Collaborative Platform (academia, professional) for Disaster Resilient Recovery (DRR) & PDNA - Meeting, Engagement & Partnership	8	24/01/23	31/01/23
4.6	Phase 1: PDNA Data collection & Analysis	62	20/01/23	23/03/23
4.6.1	Series 1	14	20/01/23	02/02/23
4.6.1.1	PDNA Data Collection & Impact Assessment	7	20/01/23	26/01/23
4.6.1.2	Conducting QA& QC dataset (daily/weekly)	1	27/01/23	27/01/23
4.6.1.3	Integrating field data & google system	1	28/01/23	28/09/23
4.6.1.4	Initial spatial data analysis	1	29/01/23	29/01/23
4.6.1.5	Identifying Area of Interest (AOI) for zoning (data collection)	1	30/01/23	30/01/23
4.6.1.6	Reporting & documentation	3	31/01/23	02/02/23

*Table 2.1.2: DRR-PDNA Jajahan Pasir Mas Workplan Source: Progress Report 1* 

No	Workplan	Day	Start	End
4.6.2	Series 2	13	03/02/23	15/02/23
4.6.2.1	PDNA Data Collection & Impact Assessment	6	03/02/23	08/02/23
4.6.2.2	Conducting QA& QC dataset (daily/weekly)	1	09/02/23	09/02/23
4.6.2.3	Integrating field data & google system	1	10/02/23	10/02/23
4.6.2.4	Initial spatial data analysis	1	11/02/23	11/02/23
4.6.2.5	Identifying Area of Interest (AOI) for zoning (data collection)	1	12/02/23	12/02/23
4.6.2.6	Reporting & documentation	3	13/02/23	15/02/23
4.6.3	Series 3	13	16/02/23	28/02/23
4.6.3.1	PDNA Data Collection & Impact Assessment	6	16/02/23	21/02/23
4.6.3.2	Conducting QA& QC dataset (daily/weekly)	1	22/02/23	22/02/23
4.6.3.3	Integrating field data & google system	1	23/02/23	23/02/23
4.6.3.4	Initial spatial data analysis	1	24/02/23	24/02/23
4.6.3.5	Identifying Area of Interest (AOI) for zoning (data collection)	1	25/02/23	25/02/23
4.6.3.6	Reporting & documentation	3	26/02/23	28/02/23
4.6.4	Series 4	14	20/01/23	02/02/23
4.6.4.1	PDNA Data Collection & Impact Assessment	7	20/01/23	26/01/23
4.6.4.2	Conducting QA& QC dataset (daily/weekly)	1	27/01/23	27/01/23
4.6.4.3	Integrating field data & google system	1	28/01/23	28/09/23
4.6.4.4	Initial spatial data analysis	1	29/01/23	29/01/23
4.6.4.5	Identifying Area of Interest (AOI) for zoning (data collection)	1	30/01/23	30/01/23
4.6.4.6	Reporting & documentation	3	31/01/23	02/02/23

*Table 2.1.3: DRR-PDNA Jajahan Pasir Mas Workplan Source: Progress Report 1* 

No	Workplan	Day	Start	End
4.6.5	Series 5	10	13/03/23	16/03/23
4.6.5.1	PDNA Data Collection & Impact Assessment	4	13/03/23	17/03/23
4.6.5.2	Conducting QA& QC dataset (daily/weekly)	1	17/03/23	18/03/23
4.6.5.3	Integrating field data & google system	1	18/03/23	19/03/23
4.6.5.4	Initial spatial data analysis	1	19/03/23	21/03/23
4.6.5.5	Identifying Area of Interest (AOI) for zoning (data collection)	1	20/03/23	22/03/23
4.6.5.6	Reporting & documentation	2	21/03/23	13/03/23
4.7	Phase 2: PDNA Data Collection & Analysis	42	23/03/23	03/05/23
4.7.1	Reviewing PDNA data for recovery strategies	14	23/03/23	05/04/23
4.7.2	Updating new field dataset (spatial & temporal)	14	06/04/23	19/04/23
4.7.3	Analysing the recovery-related dataset	14	20/04/23	03/05/23
4.8	Reporting to multi-stakeholders	8	04/05/23	11/05/23
4.8.1	Reporting session to MERCY Malaysia	2	04/05/23	05/05/23
4.8.2	Reporting session to NADMA Malaysia	2	06/05/23	07/05/23
4.8.3	Reporting session to relevant agencies & stakeholders	2	08/05/23	09/05/23
4.9	Rapid PDNA data assessment & impact analysis for disaster recovery, preparedness and response	2	10/05/23	11/05/23

*Table 2.1.4: DRR-PDNA Jajahan Pasir Mas Workplan Source: Progress Report 1* 

No	Workplan	Day	Start	End
5	DATA ANALYTICS, VISUALIZATION & NEEDS ASSESSMENT	121	04/05/23	01/09/23
5.1	Preparing data architecture for GIS system	14	04/05/23	17/05/23
5.2	Co-developing PDNA-GIS system for disaster resilient recovery (DRR)	7	18/05/23	24/05/23
5.3	Verifying PDNA-DRR GIS SYSTEM	3	25/05/23	27/05/23
5.4	Designing multi-scale visualization platform	14	28/05/23	10/06/23
5.5	Matching Needs & demands (damage, loss, needs)	14	11/06/23	24/06/23
5.6	Harmonizing Needs assessment (phase 1, 2)	121	04/05/23	01/09/23
5.6.1	Phase 1	61	04/05/23	03/07/23
5.6.1.1	Engaging funders/donors (international & national)	30	04/05/23	02/06/23
5.6.1.2	Meeting with stakeholders (public, private, academia & NGO)	30	03/06/23	02/07/23
5.6.1.3	Assessing Local Needs for Better Recovery, Preparedness & Response	1	03/07/23	03/07/23
5.6.2	Phase 2	121	04/05/23	01/09/23
5.6.2.1	Engaging funders/donors (international & national)	30	04/05/23	02/06/23
5.6.2.2	Meeting with stakeholders (public, private, academia & NGO)	30	03/06/23	02/07/23
5.6.2.3	Assessing Local Needs for Better Recovery, Preparedness & Response	1	03/07/23	03/07/23
5.6.2.4	Reporting for data analytics (multi- stakeholders)	60	04/07/23	01/09/23

#### *Table 2.1.5: DRR-PDNA Jajahan Pasir Mas Workplan Source: Progress Report 1*

Table 2.1.6: DRR-PDNA Jajahan Pasir Mas Workplan
Source: Progress Report 1

6	DISASTER RESILIENT RECOVERY & PDNA WORKSHOP 2023	91	25/06/23	23/09/23
6.1	Establishing steering & technical committee	7	25/06/23	01/07/23
6.2	Preparing venue, resources, and workshop theme	21	02/07/23	22/07/23
6.3	Inviting the workshop participants & relevant stakeholders	14	23/07/23	05/08/23
6.4	Engaging potential consortium partners (public, private universities, professional bodies, research institutes, NGOs, local authorities, etc.)	14	06/08/23	19/08/23
6.5	Workshop requirement (Banner, bunting, flyers, etc.)	14	20/08/23	02/09/23
6.6	Organizing DRR-PDNA Workshop in Kota Bahru (theme: Humanitarian-Development Nexus (HDN) agenda	3	03/09/23	05/09/23
6.7	Launching of DRR-PDNA Consortium 2030	1	06/09/23	06/09/23
6.8	Conducting post-mortem sessions	3	07/09/23	09/09/23
6.9	Preparing DRR-PDNA Workshop report	14	10/09/23	23/09/23
7	REPORTING, DOCUMENTATION & PUBLICATIONS	99	24/09/23	31/12/23
7.1	Writing final draft of project reports	22	24/09/23	15/10/23
7.2	Engaging multistakeholder for report draft (internal & external review)	21	16/10/23	05/11/23
7.3	Updating & preparing Final Reports	7	06/11/23	12/11/23
7.4	Managing data storage (digital & manual)	7	13/11/23	19/11/23
7.5	Preparing Knowledge Note - DRR & PDNA (national case study)	14	20/11/23	03/12/23
7.6	Preparing Policy Brief - DRR & PDNA (national case study)	14	04/12/23	17/12/23
7.7	Issuing publications (technical & policy)	14	18/12/23	31/12/23
8	FINISH	0	31/12/23	31/12/23

### 29 2.2 Chronology of Project Design and Development

Figure 2.2.1 presents the chronology of project design, project development, and project implementation that supports the development of the Disaster Resilient Recovery (DRR) model for the PDNA project implementation





Figure 2.2.2: Project chronology

#### 31

A dedicated dashboard (Figure 2.2.3) for Post-Disaster Needs Assessment (PDNA) has been co-developed as an excellent tool. It can help organize and analyze large amounts of data quickly and easily, allowing for the centralization of data from various sources, including databases, spreadsheets, and external files, into a single dashboard. This makes it easier to manage and analyze the data. Moreover, the dashboard helps visualize everyday collected data through charts, graphs, and tables, which can aid in identifying trends, patterns, and insights. These visual representations can also be used to communicate findings to others. Additionally, the dashboard can automate data collection, saving time and effort, and ensuring that data remains up-to-date. It can analyze data through filtering and sorting, helping to identify relationships between different data sets and answer complex questions.



Figure 2.2.3: Post-Disaster Need Assessment Dashboard

The dashboard in Figure 2.2.4 displays the progress of each series and their respective completion percentages. It also includes start and end dates for each series. This dashboard provides a visual representation of the progress made in each series, making it easier to track and understand the timeline of activities.



Figure 2.2.4 Dashboard for 5 series data collection

Figure 2.2.5 displays a QR code that provides convenient access to view the dashboard mentioned above. Scanning this QR code with a mobile device or QR code scanner allows users to quickly and easily access and view the dashboard. This streamlined method of access enhances user convenience and efficiency, enabling seamless interaction with the dashboard's contents.



#### SCAN HERE TO ACCESS ON OUR PDNA PROGRESS DASHBOARD

Figure 2.2.5: Dashboard QR Code

### 33 2.3 Upcoming Activities

Continue from our past activities and program and without delay we shift to next planning, preparing and conducting upcoming activities (Figure 2.3.1).



Figure 2.3.1: Upcoming activities

### Resilience Living Lab Pasir Mas 2023 & Disaster Risk Reduction (DRR) Workshop Post-Disaster Needs Assessment (PDNA)

Table 2.3.1 shows the list of activities and planning for upcoming works towards preparing workshop and co-developing a high-impact resilience living lab in Kelantan:-

No.	Workplan	Start	End
1.	Establishing steering & technical committee.	25/06/23	01/07/23
2.	Preparing venue, resources, and event theme.	02/07/23	22/07/23
3.	Site visit at Jajahan Pasir Mas for Resilience Living Lab Pasir Mas 2023 & Disaster Risk Reduction (DRR) Workshop Post-Disaster Needs Assessment (PDNA)	05/08/23	05/08/23
4.	Inviting the event participants & relevant stakeholders.	07/08/23	13/08/23
5.	Workshop and living lab requirement (Banner, bunting, flyers, etc.)	20/08/23	04/09/23
6.	Organizing Disaster Risk Reduction (DRR)-Post Disaster Needs Assessment (PDNA) Jajahan Pasir Mas Workshop & Resilience Living Lab agenda. The details of this program can be viewed on page 80.	05/09/23	05/09/23
7.	Conducting post-mortem sessions.	11/09/23	11/09/23
8.	Preparing Disaster Risk Reduction (DRR)-Post Disaster Needs Assessment (PDNA) Jajahan Pasir Mas Workshop & Resilience Living Lab report.	11/09/23	23/09/23

#### Table 2.3.1: Resilience Living Lab Pasir Mas Workplan

# <sup>b</sup> Living Lab Implementation

Living Lab aims to harmonize the innovation process among four main stakeholders: companies, users, public organizations, and researchers.

These stakeholders can benefit from the Living Lab approach in many different ways for instance, companies can get new and innovative ideas, users can get the innovation they want, researchers can get study cases and public organizations can get increased return on investment towards exploring technological solution and innovation projects.

Jajahan Pasir Mas Resilience Living Lab will be launched in September 2023 and this project uses the Hulu Langat Resilience Living Lab as a benchmark.

#### Building momentum and rejuvenating local Disaster Risk Reduction (DRR) action

- 1. Exploring system-thinking and knowledge-driven approaches from various multistakeholders (national, state district, and local)
- 2. Empowering DRR local champions and resources (UTM & Salford University; DPPC Satellite Office & Living Lab @ Selangor)
- 3. Revitalizing DRR investment at a local level

# Humanitarian action – Risk-informed sustainable Humanitarian Development Nexus (HDN)

MERCY has established an **integrated HDN Living Lab in Hulu Langat** with the idea of practically translating the concept of a living lab into a field knowledge learning hub by empowering local, indigenous knowledge, advancing science and technology, and promoting a transdisciplinary approach to **building resilience communities** in the most devastating areas. **HDN Living Lab** initiated by MERCY Malaysia is **living evidence of the humanitarian-development nexus**, demonstrating the targeted response, early recovery, rehabilitation, community-based disaster risk management, disaster preparedness, prevention, mitigation, and **resilient capacity building** in a short-, mid-, and long-term co-implementation.



# PROGRESS
# 3.1 Data Cleaning

Jajahan Pasir Mas Post-Flood Disaster Assessment Data



Figure 3.1.1: 2,249 data remained after the data cleaning process

A comprehensive data collection effort was undertaken in the Jajahan Pasir Mas, Kelantan region, spanning a period from 20 January 2023 to 22 March 2023, after flood disaster event during Northeast Monsoon (MTL) 2022/2023. A total of 2,595 data were meticulously gathered from five distinct zones within this area. Subsequently, these collected data underwent a thorough cleaning process, which involved eliminating inadvertent or extraneous information, standardizing formats, and categorizing certain values. As a result, after the data-cleaning procedure, a refined dataset of 2,249 entries remained.

The data cleaning stage demanded meticulous attention to detail, as it involved handling a substantial volume of information obtained from each respondent. It was crucial to exercise caution and precision during this phase to ensure the accuracy and integrity of the data. With the completion of the data cleaning process, the dataset was deemed ready for further analysis.

## 1. Eliminated inadvertent or extraneous information

As part of data processing and post-analysis, it involves the elimination of inadvertent or extraneous information. Some keywords and incomplete information are as below:

- a) Empty House (Rumah Kosong)
- b) Uninhabited House (Rumah Tidak Berpenghuni)
- c) Madrasah
- d) Homestay
- e) Prayer hall (Surau)
- f) Going to work (Keluar Bekerja)

	D	E	F
1	No Kod 💌	Tarikh 🔹	Nama 🗈
124	GPK_KLC_025_Ikmal	2/2/2023	8 Madrasah
152	MRE_KBJ_024_Zimin	17/2/2023	Madrasah Banggol Jering
216	GPK_KLC_017_Ikmal	2/2/2023	8 Madrasah Mohd Ramli
224	MJP_KBL_015_Daus	25/2/2023	8 Rumah Dirobohkan
227	MJP_KBL_016_Daus	25/2/2023	8 Rumah Dirobohkan
232	MJP_KBL_017_Daus	25/2/2023	8 Rumah Dirobohkan
402	BKT_TGN_018_Fiza	25/1/2023	Rumah Kosong
417	MRP_BKL_022_Arifah	7/2/2023	Rumah Kosong
419	MRP_JSC_006_Rini	2/7/2023	Rumah Kosong
1613	MRP_KKC_020_Daus	7/2/2023	Rumah Tidak Berpenghuni
1615	BKT_KGS_010_Daus	8/2/2023	Rumah Tidak Berpenghuni
1617	BKT_KGS_021_Daus	8/2/2023	Rumah Tidak Berpenghuni

Figure 3.1.2: Example of eliminated data during data cleaning

## 2. Standardized formats

The next step is to standardize the formats of the collected values. This standardization ensures that the data is organized in a consistent and uniform manner, making it easier to work with and visualize in tools such as ArcGIS. For example, in Figure 3.1.2 and Figure 3.1.3, there is missing information because it was not filled out. To standardize the data, the blank sections have been marked as 'NIL.

Standardized formats are particularly crucial for effective visualization in ArcGIS. When the data values are consistent and presented in a uniform manner, it becomes easier to create visual representations that accurately reflect the underlying patterns and relationships within the data. This enhances the interpretability of the visualizations and allows for more accurate and meaningful insights to be derived from the data.

Transfer (Perpindahan)

	AM				AM	
1	Perpindahan	<b>.</b> T	1	Perpindahan		T,
49			49	NIL		
53			 53	NIL		
56			56	NIL		
60			60	NIL		

Figure 3.1.3: Example of blank section in Transfer column

## School's Needs (Keperluan Persekolahan)



Figure 3.1.4: Example of blank section in School's Needs column

## 3. Categorized certain values

Categorizing certain values is an additional significant step in the data preparation process. It involves grouping or classifying specific components or variables into distinct categories or classes based on their characteristics or attributes (Figure 3.1.5 and Figure 3.1.6). This categorization is particularly valuable for variables such as occupation, that have numerous distinct values.

By organizing values into categories, it becomes possible to visualize and analyze data at a higher level of aggregation. This can be beneficial when dealing with large datasets, as it reduces clutter and facilitates the identification of meaningful patterns or clusters. Additionally, categorization allows for easier communication of results and findings, as it simplifies the representation of complex information into more digestible and intuitive forms.

Occupation (Pekerjaan)



Figure 3.1.5: Example of type of occupation

## Transportation Access (Akses Kenderaan)



Figure 3.1.6: Example of type of transportation access

## **3.2 Data Visualization**

Once the data has been thoroughly cleaned and prepared in Excel, the next step involves leveraging the powerful capabilities of ArcGIS for data visualization and mapping purposes. ArcGIS is a widely-used geographic information system software that enables the creation of visually compelling and informative representations of spatial data.

By utilizing ArcGIS, the cleaned data can be transformed into visually appealing maps, allowing for a deeper understanding of the geographic patterns, relationships, and distributions inherent within the dataset. By assigning different symbols, colors, or attributes to the data points based on their characteristics or values, patterns can be easily discerned, and insights can be derived.

The figure 3.2.1 shows the plot of each house in Jajahan Pasir Mas area:



Flood Level Based on Field Data Collection

Figure 3.2.1: Flood level in Jajahan Pasir Mas

Figure 3.2.2 illustrates the importance of categorizing values into two broad categories: "Employed" and "Unemployed"



Figure 3.2.2: Types of occupation status in Jajahan Pasir Mas

By categorizing the occupation variable into these two categories, the figure provides a clear visual representation of the distribution of individuals based on their employment status. The use of distinct colors or labels distinguishes between those who are actively engaged in work (Employed) and those who are not currently employed (Unemployed).

Such categorization can be valuable for various analyses and decision-making processes. It allows for a high-level understanding of workforce participation rates, providing a basis for discussions on labor market dynamics, economic conditions, and social welfare considerations.

# ANALYSIS AND METHODOLOGY

## 4.1 Flood Data Analysis

This report presents the findings obtained after a comprehensive analysis. The objective of the analysis was to gain insights, identify patterns, and draw meaningful conclusions from the collected data. The analysis encompassed various aspects related to the flood that occurred in Jajahan Pasir Mas in 2022.

The flood data generated from the analysis provides actionable insights and serves as a foundation for evidence-based decision-making. It includes visualizations and data representation.

The data is represented through ArcGIS using ArcMap, and infographics are employed to present the analyzed data. These visual representations provide a clear and concise understanding of the findings. Furthermore, the visualizations generated include interactive maps, charts, and diagrams that effectively convey the spatial and statistical patterns observed during the analysis.



The visualizations and statistical summaries resulting from the analysis provide valuable insights into the flood event in Jajahan Pasir Mas. They equip stakeholders with the necessary information to make informed decisions, prioritize resources effectively, and work towards building a more resilient community in the face of future floods.

In conclusion, the output obtained after the analysis presents a comprehensive view of the flood that occurred in Jajahan Pasir Mas in 2022. The findings provide valuable insights into the location of high-risk flood areas and the specific needs of the local community. These insights facilitate informed decision-making and strategy formulation. The visualizations, statistical recommendations summaries, and generated from the analysis serve as essential tools for stakeholders to drive meaningful change and achieve their desired outcomes."

# 1. Flood Level

The ArcMap spatial analysis provides insights into the location of the flood levels experienced by 2,249 houses in Jajahan Pasir Mas, Kelantan (Figure 4.1.1). The flood levels are categorized into distinct ranges, including less than 0.3m, 0.3 - 0.6m, 0.7 - 1.0m, 1.1 - 3.0m, and more than 3m. Based on Figure 4.1.1, it shows that the majority of the houses affected by flooding were concentrated in Zone 1 and Zone 4, indicating the areas with the highest vulnerability to flooding.



#### Flood Level Based on Field Data Collection

Figure 4.1.1: The flood level during the 2022 flood in Jajahan Pasir Mas.

The flood levels in Jajahan Pasir Mas, Kelantan vary depending on the specific areas and flood events. However, based on available data, flood levels in Jajahan Pasir Mas Kelantan have been categorized into different ranges (Table 4.1.1) :

Category	Description
Less than 0.3 meters	Areas with floodwater depth less than 0.3 meters.
0.3 - 0.6 meters	Areas with floodwater depth between 0.3 meters and 0.6 meters.
0.7 - 1.0 meters	Areas with floodwater depth ranging from 0.7 meters to 1.0 meter.
1.1 - 3.0 meters	Areas with floodwater depth between 1.1 meters and 3.0 meters.
More than 3 meters	Areas where floodwater depth exceeds 3 meters.

Table 4.1.1	: Categories	of flood	levels il	n Jajahan	Pasir Mas

The Ministry of Natural Resources, Environment, and Climate Change plans to undertake 40 projects aimed at building flood barriers, walls, and environmentallyfriendly drainage systems in order to reduce the risk of flooding in the eastern states of Kelantan and Terengganu (News Strait Times). In Kelantan two primary Flood Mitigation Plan (RTB) projects are currently underway, including the Sungai Kelantan Integrated River Basin Development Project (PLSB), with an investment totaling RM456 million.



Flood Level in Jajahan Pasir Mas



Figure 4.1.2: Flood level in Jajahan Pasir Mas

The pie chart in Figure 4.1.2 shows the distribution of flood levels in houses, offering valuable insights into the extent of flooding experienced by different households.

According to the chart, the majority of houses, comprising approximately 65% of the surveyed properties, experienced a flood level ranging from 1.1 to 3.0 meters. This range indicates a significant flood impact, with water levels posing considerable challenges to the affected households. Understanding the prevalence of this flood range is essential for disaster response and recovery efforts, as it underscores the need for targeted support and mitigation measures to aid those dealing with substantial flood damage.

Furthermore, the chart reveals that 13% of the houses encountered a flood level between 0.7 and 1.0 meters. While less severe than the previous range, this still represents a substantial flood impact that likely necessitates relief and recovery initiatives. These households may have experienced damage to their belongings, infrastructure, and properties, emphasizing the importance of tailored assistance to help them recover and rebuild.

Additionally, the data shows that 11% of the houses had an even higher flood level, exceeding 3 meters. This category indicates the most severe flooding, likely causing significant damage and disruption to the affected households. It is crucial to prioritize assistance to these households and implement robust flood prevention and mitigation measures to reduce the future impact of such severe flooding events.

The remaining 6% of houses faced flood levels less than 0.3 meters, while 5% of the properties experienced a flood level ranging from 0.3 to 0.6 meters. Although these ranges represent relatively lower flood levels, the flooding can have adverse effects on homes and communities, appropriate measures to address their specific needs.

## 2. Transportation Access

During a flood in Jajahan Pasir Mas, transportation options can be severely impacted, posing challenges for the local community.

1. Road Closure and Inaccessibility: Floodwaters can render roads impassable, resulting in widespread road closures and limited accessibility to different parts of Jajahan Pasir Mas. High water levels, debris, and damage to road infrastructure make it unsafe or impossible for vehicles to travel through affected areas.

2. Emergency Response and Rescue Operations: During a flood, emergency response teams prioritize rescue and evacuation efforts. Emergency vehicles, including boats and high-clearance vehicles such as 4WD are utilized to reach and assist those in need. These vehicles may have limited capacity and are primarily focused on saving lives and ensuring the safety of affected individuals.

3. Alternative Transportation Modes: In certain situations, alternative transportation modes may be employed to facilitate movement during a flood. These can include boats, makeshift rafts, or amphibious vehicles that can navigate through flooded areas. However, these alternative modes are typically limited in capacity and may only be available for emergency services and critical needs.



**49** During the flood events that occurred in Jajahan Pasir Mas in 2022, the floodwaters rendered many roads impassable, disrupting transportation routes and isolating communities from essential services.

In response to these transportation challenges, local authorities and relief organizations played a pivotal role in coordinating evacuation efforts and providing transportation assistance to affected communities. Boats and other amphibious vehicles were deployed to reach isolated areas and rescue stranded residents. These efforts were instrumental in ensuring the safety and well-being of those caught in the flood's path.

From Figure 4.1.3, the distribution reveals that the majority of residents opted to use walking as a means to save themselves from the floodwaters. This observation highlights the resilience and resourcefulness of the community in facing the challenges posed by the flood events. A significant proportion of residents, especially those residing in Zone 1 and Zone 4, relied on walking as a primary mode of evacuation and self-preservation during the floods.



Figure 4.1.3: Transportation access in Jajahan Pasir Mas

The preference for walking can be attributed to various factors, including the accessibility of safe evacuation routes, the proximity of higher ground or designated evacuation centers, and the adaptability of walking as a mode of transportation even amidst challenging conditions. Walking offered residents the advantage of maneuvering through narrow or flooded streets, enabling them to navigate areas where vehicular access might have been limited or compromised.

Moreover, the choice of walking could also be influenced by the residents' familiarity with the local terrain and knowledge of alternative pathways to avoid flood-prone areas. Such local knowledge plays a crucial role in disaster response and highlights the importance of community-based disaster preparedness initiatives, and enhancing the community empowerment.

While walking as a means of evacuation demonstrated the community's resilience, it also underscores the need for comprehensive disaster preparedness plans and robust evacuation strategies. Authorities should identify and establish safe and efficient evacuation routes, ensuring that residents in all zones have accessible pathways to reach higher ground or designated shelters.

Additionally, investments in flood-resistant infrastructure and early warning systems are imperative to provide timely and accurate flood alerts, enabling residents to take necessary precautions and evacuate safely. Coordinating with local communities and conducting regular drills can enhance awareness and preparedness, empowering residents with the knowledge and skills to respond effectively during flood events.



Figure 4.1.4: Type of transportation access in Jajahan Pasir Mas

Figure 4.1.4 indicates that approximately 1,058 individuals used regular vehicles, such as cars or motorcycles, to evacuate during the flood. The survey form lacks specific options for cars and motorcycles, which is why the precise numbers for these vehicles cannot be provided. Additionally, 504 respondents chose to evacuate on foot, 174 by boat, while 37 used 4WD, and 2 used a lorry.

## 3. Occupation Status

The type of occupations in Jajahan Pasir Mas, Kelantan is diverse, with individuals engaged in various occupations and sectors.

1. Small Businesses and Trade: The town of Jajahan Pasir Mas is home to various small businesses and trading activities. These include shops, retail stores, restaurants, and other small enterprises that contribute to the local economy. Individuals work as shopkeepers, traders, or in supporting roles within these businesses.

2. Services Sector: The services sector also plays a role in the working status of Jajahan Pasir Mas. This includes professionals such as teachers, healthcare workers, government employees, and individuals engaged in the hospitality industry. Services such as education, healthcare, and public administration provide employment opportunities in the region.

3. Informal Sector: Like many other regions, Jajahan Pasir Mas may also have an informal sector comprising self-employed individuals or those engaged in casual labor. These workers may be involved in activities such as street vending, day labor, or small-scale services.

To simplify the analysis, the types of occupations were grouped as "*Bekerja*" or "Employed," while individuals who were not working, including housewives and pensioners, were grouped as "*Tidak Bekerja*" or "Unemployed." This grouping helps facilitate the analysis process and provides a clearer distinction between those who are actively employed and those who are not.

The employed category refers to individuals who are actively engaged in employment, whether as full-time, part-time, or self-employed workers. This group represents individuals who have a source of income and are contributing to the local economy through their work. They play a vital role in the socioeconomic development of Jajahan Pasir Mas by generating income, fostering economic growth and supporting local businesses.

On the other hand, the unemployed category includes individuals who are not currently employed. This category encompasses individuals who may be unemployed, students, retirees, or individuals not seeking employment actively. It is important to note that individuals in the unemployed category may have diverse circumstances, such as those pursuing education, caring for dependents, or facing barriers to employment such as health-related issues or personal circumstances.

Figure 4.1.5 illustrates the distribution of both employed and unemployed categories in Jajahan Pasir Mas. The visual representation provides valuable insights into the town's workforce and the proportion of individuals actively employed versus those who are not currently working.

This analysis serves as a foundation for designing comprehensive and effective policies that address the needs of each category. It highlights the importance of investing in education, skill development programs, and support structures to empower the unemployed category, while also acknowledging and appreciating the hard work and contributions of those within the Working category.

The array of occupations in Jajahan Pasir Mas reflects a dynamic and interconnected community that thrives on the contributions of its working individuals. From small businesses and trading ventures to the service sector and the informal economy, each sector plays a crucial role in shaping the town's identity and fostering growth.



Figure 4.1.5: Distribution of occupations status in Jajahan Pasir Mas



Figure 4.1.6: Employment distribution in Jajahan Pasir Mas

The data presented in Figure 4.1.6 reveals the distribution of respondents based on their employment status. According to the findings, a significant proportion of the respondents, accounting for approximately 65% (728 respondents) of those surveyed, are actively involved in some form of employment.

On the other hand, the chart illustrates that 35% of (1352 respondents) are currently unemployed. Understanding the composition of this group is crucial for policymakers and local authorities to identify potential areas for intervention and support. It provides a nuanced perspective on the circumstances of individuals within the community and underscores the importance of developing inclusive policies that cater to the needs of every demographic.

This provides an invaluable understanding of the town's labor landscape, showcasing the active participation of a majority of individuals in the workforce and identifying opportunities to support those who are currently not working. Armed with this data, stakeholders can work together to create a more inclusive and prosperous community that harnesses the potential of its workforce to achieve sustainable growth and shared prosperity for all.

## 4. School's Need

After a flood event in Jajahan Pasir Mas, parents in the area may find themselves facing various critical needs as they endeavor to recover from the disaster's aftermath. Among these needs, one significant concern is the restoration of educational resources for their children. Floodwaters can wreak havoc on essential materials, such as textbooks, workbooks, and educational resources, leaving parents grappling with the challenge of ensuring their children's academic progress and continuity.

Textbooks and educational materials are the backbone of a child's learning journey, providing them with knowledge and tools to succeed in their studies. However, the destructive impact of flooding can render these vital resources unreadable, damaged, or entirely destroyed. In such circumstances, parents may face the daunting task of replacing these materials to ensure their children can continue their education without undue interruptions.

To address this need, immediate and targeted support is essential. Parents require assistance in accessing new textbooks, workbooks, and other educational resources that align with their children's curriculum and grade level. This support can help bridge the gap caused by the loss of academic materials and enable children to pick up their studies seamlessly.

By offering supplementary resources and teaching aids can enhance the learning experience, enabling students to grasp concepts effectively and participate actively in their studies. As parents navigate the challenges of post-flood recovery, these additional resources can play a crucial role in reinforcing their children's understanding and knowledge retention.

The provision of textbooks and educational materials is a fundamental need for parents in Jajahan Pasir Mas after a flood event. By recognizing the significance of these resources and prioritizing their restoration, we can empower parents to support their children's academic journey despite the challenges posed by the disaster. Together, we can create a supportive environment that nurtures the educational growth of children, instilling hope and resilience in the face of adversity.



#### School's Need



Figure 4.1.7: School's needs in Jajahan Pasir Mas



Figure 4.1.8: School's needs in Jajahan Pasir Mas

Figure 4.1.7 shows the distribution of school's need in Jajahan Pasir Mas. The pie chart in Figure 4.1.8 illustrated that 65% (1469 respondents) of them reported that their school's needs were not affected by the flood. However, the remaining 35% (780 respondents) shared that their school's needs were indeed affected by the flood.

Educational materials such as textbooks, workbooks, and other learning resources were also adversely affected by the flood. The destruction or damage to these materials hindered students' ability to access the necessary educational content and created additional challenges for teachers in delivering the curriculum effectively.



Figure 4.1.9: Type of school's needs in Jajahan Pasir Mas

Figure 4.1.8 shows that the school's needs were affected (35%). The bar chart in Figure 4.1.9 reveals that 597 students required all three essential school items, namely school uniforms, books, and stationery.

The requirement for school uniforms signifies the importance of providing students with appropriate attire, which fosters a sense of identity, equality, and inclusion within the school environment. Uniforms contribute to a cohesive and disciplined learning atmosphere while promoting a sense of belonging among students.

The need for books reflects the crucial role that educational resources play in facilitating effective teaching and learning. Books serve as fundamental tools for students to acquire knowledge, deepen their understanding of subjects, and engage in independent study. Having access to the necessary books enables students to fully participate in the curriculum and achieve their academic potential.

Similarly, the necessity for stationery items highlights the significance of providing students with the tools required for active learning. Stationery supplies, such as pens, pencils, notebooks, and other writing materials, are essential for note-taking, completing assignments, and engaging in classroom activities. These items empower students to participate effectively in classroom discussions and express their ideas through written work.

# 4.2 Spatial Analysis

An in-depth analysis of the flood situation can be conducted by examining the map and focusing on areas where the flood level exceeds 3 meters. By isolating these high flood-risk zones, we can narrow down our attention to 253 houses that are most likely to be affected by severe flooding. This selective approach allows for a more targeted and efficient assessment of the potential impact.

Within these identified areas, it becomes crucial to scrutinize plots of land with high population density. By examining such plots, we can gain valuable insights into the vulnerability and potential consequences of flooding in densely populated communities. After zoomed in (Figure 4.2.1) on Zone 4, which encompasses locations like Kampung Gual Tok Deh, Kampung Terusan & Kampung Tersang.

The map provides a visualization of the flood-prone areas, indicating that previous incidents of flooding have occurred in these locations. This historical evidence emphasizes the importance of understanding and addressing the flood risk in Zone 4. By identifying the occurrence of past disasters in this area, we can better comprehend the potential threats, the impact on residents, and the need for proactive measures to mitigate future flood-related risks.





Location: Kampung Gual Tok Deh, Kampung Terusan and Kampung Tersang

*Figure 4.2.1: Flood level more than 3m in Jajahan Pasir Mas Source: ArcGIS* 

Figure 4.2.2 shows **four** (**4**) **zones indicating high-density plots** which are the respondent's houses that are able and willing to give their information regarding damage, loss, and need after flood disaster event during MTL 2022/2023.

Location: Kampung Gual Tok Deh, Kampung Terusan & Kampung Tersang



*Figure 4.2.2 Flood level more than 3m at Kampung Gual Tok Deh, Kampung Terusan and Kampung Tersang Source: ArcGIS* 

Next, distance of Temporary Evacuation Center (PPS) from the 4 zones can be analysed. The information on the list of Temporary Evacuation Center (PPS) locations in Jajahan Pasir Mas was taken at Official Portal eBanjir Negeri Kelantan (<u>https://ebanjir.kelantan.gov.my/</u>). This list was updated on 28 December 2022.

Table 4.2.1: List of temporary evacuation center
Source: Official Portal eBanjir Negeri Kelantan

No.	Description
1.	BALAI PENGGAWA BUNUT SUSU
2.	DEWAN KAWASAN (KRT) GUAL SITOK
3.	DEWAN SEBAGUNA KAMPUNG SERONGGA
4.	DEWAN TAMAN RANTAU MAS
5.	KELAS KEMAS KAMPUNG ATAS PINGGIR
6.	KETIK TERESEK
7.	KOLEJ KEMAHIRAN TINGGI MARA, JAJAHAN PASIR MAS
8.	KAWASAN RUKUN TETANGGA (KRT) GUAL SITOK RANTAU PANJANG
9.	KAWASAN RUKUN TETANGGA (KRT) LUBOK SETOL
10.	MADRASAH BANGGOL CHE DOL
11.	MADRASAH BARU LIMAU PURUT
12.	MADRASAH BECHAH KAKI
13.	MADRASAH BUKIT TANDAK
14.	MADRASAH CHABANG 3 KAMPUNG PALOH
15.	MADRASAH CHERANG HANGUS
16.	MADRASAH GERTAK TIGA
17.	MADRASAH GUAL MEKONG
18.	MADRASAH GUAL TUALANG
19.	MADRASAH HAJI DAUD
20.	MADRASAH HAJI GHAFAR
21.	MADRASAH HAJI YUSOFF
22.	MADRASAH HJ. SALLEH KAMPUNG SENOR
23.	MADRASAH KUBANG HAKIM
24.	MADRASAH KEDAI RANTAU PANJANG
25.	MADRASAH KAMPUNG KUSAR

*Table 4.2.2: List of temporary evacuation center Source: Official Portal eBanjir Negeri Kelantan* 

No.	Description
26.	MADRASAH KAMPUNG RAHMAT HILIR
27.	MADRASAH KAMPUNG RAHMAT HULU
28.	MADRASAH KAMPUNG TERSANG (BARU)
29.	MADRASAH KAMPUNG TERSANG (LAMA)
30.	MADRASAH KOLAM TENGAH
31.	MADRASAH KOMPLEKS PENGGAWA RANTAU PANJANG
32.	MADRASAH KUALA ITEK
33.	MADRASAH KUBANG KUAL
34.	MADRASAH KUBANG RAMBUTAN
35.	MADRASAH KUBOR SENA
36.	MADRASAH LAMA JERAM PERDAH
37.	MADRASAH MAJLIS DAERAH PASIR MAS
38.	MADRASAH NASRULLAH POHON BULOH (PUSAT TARBIAH)
39.	MADRASAH PADANG BUKIT
40.	MADRASAH PAK ADIK YAMIN
41.	MADRASAH PAK KELONG
42.	MADRASAH PAK TEH MAT HASSAN
43.	MADRASAH PASIR PADANG
44.	MADRASAH PASTI TELAGA MAS
45.	MADRASAH PEKAN RANTAU PANJANG
46.	MADRASAH PUTAT TUJUH
47.	MADRASAH RANTAU MAS
48.	MADRASAH RONG CHENOK
49.	MADRASAH SUNGAI KELADI
50.	MADRASAH TANJUNG BARU
51.	MADRASAH TASEK BAKONG
52.	MADRASAH TASEK TANDAK
53.	MADRASAH WAN SALLEH KAMPUNG SENOR
54.	MASJID MUKIM PADANG LICHIN
55.	MASJID AT TAQWA RANTAU MAS

*Table 4.2.3: List of temporary evacuation center Source: Official Portal eBanjir Negeri Kelantan* 

No.	Description
56.	MASJID BANGGOL SETOL
57.	MASJID BINJAL
58.	MASJID BUKIT TUKU
59.	MASJID CHASI
60.	MASJID GABUS
61.	MASJID GUAL SITOK
62.	MASJID JEJAWI
63.	MASJID KUBANG GENDANG
64.	MASJID KEDEPIL
65.	MASJID KERASAK
66.	Masjid Kubang pak hitam
67.	MASJID LUBOK GONG
68.	MASJID LUBOK KAWAH
69.	MASJID LUBOK STOL
70.	MASJID MUKIM GUAL PERIOK
71.	MASJID MUKIM KUBANG TEMBESU
72.	MASJID MUKIM PALOH
73.	MASJID PEROL
74.	MASJID PONDOK JELOR
75.	MASJID PONDOK LATI
76.	MASJID RONG CHENOK
77.	MASJID YB ADUN MERANTI
78.	RUMAH AZMI BIN YUSOFF
79.	SEKOLAH KEBANGSAAN KUBANG CHENOK
80.	SEKOLAH ARAB LUBOK GONG
81.	SEKOLAH KEBANGSAAN BUKIT PERAH
82.	SEKOLAH MENENGAH KEBANGSAAN BAROH PIAL
83.	SEKOLAH KEBANGSAAN BAROH PIAL
84.	SEKOLAH KEBANGSAAN BAYU LALANG
85.	SEKOLAH KEBANGSAAN BANGGOL CHICHA

*Table 4.2.4: List of temporary evacuation center Source: Official Portal eBanjir Negeri Kelantan* 

No.	Description
86.	SEKOLAH KEBANGSAAN BUKIT JARUM
87.	SEKOLAH KEBANGSAAN BUKIT PERAH
88.	SEKOLAH KEBANGSAAN CINA
89.	SEKOLAH KEBANGSAAN GUAL PERIOK
90.	SEKOLAH KEBANGSAAN GUAL TINGGI
91.	SEKOLAH KEBANGSAAN KELAR
92.	SEKOLAH KEBANGSAAN KEPAS
93.	SEKOLAH KEBANGSAAN RANTAU PANJANG 2
94.	SEKOLAH KEBANGSAAN TOK UBAN
95.	SEKOLAH MENENGAH KEBANGSAAN CHETOK
96.	SEKOLAH MENENGAH KEBANGSAAN KANGKONG
97.	SEKOLAH KEBANGSAAN GUAL SITOK
98.	SEKOLAH KEBANGSAAN BECHAH KELUBI
99.	SEKOLAH KEBANGSAAN BUNUT SUSU
100.	SEKOLAH KEBANGSAAN CHABANG 3 CHETOK
101.	SEKOLAH KEBANGSAAN CHICHA TINGGI
102.	SEKOLAH KEBANGSAAN GUAL TINGGI
103.	SEKOLAH KEBANGSAAN GUAL TOK DEH
104.	SEKOLAH KEBANGSAAN KEDAI TANJONG
105.	SEKOLAH KEBANGSAAN KUBANG KUAL
106.	SEKOLAH KEBANGSAAN LATI
107.	SEKOLAH KEBANGSAAN SRI KIAMBANG
108.	SEKOLAH KEBANGSAAN BAKONG
109.	SEKOLAH KEBANGSAAN BENDANG PAUH
110.	SEKOLAH KEBANGSAAN CHETOK
111.	SEKOLAH KEBANGSAAN GELANG MAS
112.	SEKOLAH KEBANGSAAN GUAL SITOK
113.	SEKOLAH KEBANGSAAN KUBANG CHENOK
114.	SEKOLAH KEBANGSAAN KAMPUNG RAHMAT
115.	SEKOLAH KEBANGSAAN KAMPUNG BARU

*Table 4.2.5 List of temporary evacuation center Source: Official Portal eBanjir Negeri Kelantan* 

No.	Description
116.	SEKOLAH KEBANGSAAN KOK PAUH
117.	SEKOLAH KEBANGSAAN LUBOK SETOL
118.	Sekolah kebangsaan othman talib
119.	SEKOLAH KEBANGSAAN PANGKAL KALA
120.	SEKOLAH KEBANGSAAN TANJONG CHENOK
121.	SEKOLAH KEBANGSAAN TOK DEH
122.	SEKOLAH KEBANGSAAN TOK SANGKUT
123.	SEKOLAH MENENGAH PEREMPUAN JAJAHAN PASIR MAS
124.	SEKOLAH MENENGAH TO' UBAN
125.	SEKOLAH MENENGAH AGAMA (ARAB) LATI
126.	SEKOLAH MENENGAH AGAMA (ARAB) (QARIAH) BANGGOL SETOL
127.	SEKOLAH MENENGAH AGAMA (ARAB) KAMPUNG BONGGOR
128.	SEKOLAH MENENGAH AGAMA (ARAB)POHON BULOH
129.	SEKOLAH MENENGAH ARAB (AGAMA) MERANTI
130.	SEKOLAH MENENGAH KEBANGSAAN TENGKU PANGLIMA RAJA
131.	SEKOLAH MENENGAH SULTAN IBRAHIM (1), JAJAHAN PASIR MAS
132.	SEKOLAH KEBANGSAAN BANGGOL PETAI
133.	SEKOLAH KEBANGSAAN KELAR
134.	SEKOLAH KEBANGSAAN RAHMAT
135.	SEKOLAH KEBANGSAAN SRI RANTAU PANJANG 2
136.	SURAU RAHMAT HILIR
137.	TOKONG CINA

Figure 4.2.3 shows observation of the geographical distribution of flood-prone areas, specifically Zone 1 and Zone 2. In the context of mitigating the impact of flooding on these zones, the nearby Temporary Evacuation Center (PPS) is located in the Sekolah Kebangsaan Gual Tok Deh.



Figure 4.2.3: Nearest temporary evacuation center at Kampung Gual Tok Deh Source: ArcGIS

During times of flooding, when residents in Zone 1 and Zone 2 are faced with the need to temporarily relocate and seek shelter, the temporary evacuation center (Figure 4.2.3) serves as a convenient and suitable option. Due to its proximity to these zones, it offers a viable and accessible location for individuals to move and stay temporarily until the flood subsides and it is safe to return to their homes.

In contrast to Zone 1 and Zone 2, Zone 3 and Zone 4 (specifically Kampung Terusan and Kampung Tersang) do not have a nearby Temporary Evacuation Center (PPS) within their immediate vicinity. In such cases, residents in these zones would need to relocate to other PPS locations, such as Sekolah Kebangsaan Gual Tok Deh (Figure 4.2.4), which is situated in Kampung Gual Tok Deh.



Figure 4.2.4: Nearest temporary evacuation center at Kampung Gual Tok Deh Source: ArcGIS

The absence of a nearby Temporary Evacuation Center (PPS) in Zone 3 and Zone 4 indicates a potential gap in the provision of immediate shelter and support for residents during flood events. It highlights the need for alternative evacuation plans and arrangements to ensure the safety and well-being of individuals in these areas.

## 4.3 Multidimensional Poverty Index (MPI)

The subsequent step in the cleaning process is to utilize the refined dataset to analyze deprivation for the Multidimensional Poverty Index (MPI). However, before proceeding with the analysis, additional steps are necessary to effectively assess the degree of deprivation within the given context. These steps might involve various statistical techniques, mathematical calculations, and evaluation frameworks specifically tailored to the MPI methodology. Only through this comprehensive analysis can a holistic understanding of multidimensional poverty within the Jajahan Pasir Mas, Kelantan region be achieved.

The global Multidimensional Poverty Index (MPI) identifies multiple deprivations at the household level in health, education, and

standard of living. It uses microdata from household surveys, and —unlike the Inequality-adjusted Human Development Index — all the indicators needed to construct the measure must come from the same survey.

> Converted, suitable to study area and PDNA survey form

Multidimensional Poverty Index (MPI) for Post-Disaster Needs Assessment (PDNA) Jajahan Pasir Mas will be focused on **the flood level above a 3-meter area only**.



## 4.4 Post-Disaster Needs Assessment (PDNA) Jajahan Pasir Mas: multidimensional Poverty Index (MPI)

(Area of Kampung Gual Tok Deh, Kampung Terusan and Kampung Tersang)

The multidimensional Poverty Index (MPI) of Post-Disaster Needs Assessment (PDNA) Jajahan Pasir Mas is different from the 2022 global multidimensional Poverty Index (MPI), instead of following the 10 indicators in three dimensions. We decreased the indicators to 6 indicators referring to limited data and the number of questions asked in the survey form related to multidimensional Poverty Index (MPI) calculation. We also change the dimension from the original study, instead of health, education and standard of living. We convert the health dimension to the economy dimension. There is no questionnaire about the health in form and we are also agreed that the economy is affecting the poverty in the household.

With three dimension-Standard of living, education, and economy-and 6 indicators. Each person is assigned a deprivation score according to his or her household's deprivation in each of the 6 indicators. The maximum deprivation score is 100 percent, with each dimension equally weighted; thus. The maximum deprivation score in each dimension is 33.3 percent, or more accurately, 1/3. The standard of living dimension has four indicators, so each is weighted as 1/12. The economy and education dimensions have one indicator each, so each indicator is weighted as 1/3.

Standard of livingHousingAt least one of the households is made of inadequate materials - that is, the wall is made of wood or partially made from wood. The house structure is partially or major damage. The door or windows are partially or major damage.1/12Water supplyThe household does not have access to water supply because the source which is piped water or public tab were partially or major damage.1/12SanitationThe household toilet and sanitation are partially or major damage.1/12AssetAt least one of the household items such as a mattress, dining table, wardrobe or electrical items such as television, washing machine, and refrigerator are partially or major damaged.1/12EconomySurvivalAny adults lack basic necessities and resources needed to sustain their life and well-being. Individuals are deprived of essential elements crucial for their survival such as food, water, shelter, healthcare, or other vital resources.1/3EducationSchool needsWhen the student needs the school supplies such as clothes, books, or school equipment.1/3	Dimension	Indicator	Deprived if	Weight
Water supplyThe household does not have access to water supply because the source which is piped water or public tab were partially or major damage.1/12SanitationThe household toilet and sanitation are partially or major damage.1/12AssetAt least one of the household items such as a mattress, dining table, wardrobe or electrical items such as television, washing machine, and refrigerator are partially or major damaged.1/12EconomySurvivalAny adults lack basic necessities and resources needed to sustain their life and well-being. Individuals are deprived of essential elements crucial for their survival such as food, water, shelter, healthcare, or other vital resources.1/3EducationSchool needsWhen the student needs the school supplies such as clothes, books, or school equipment.1/3	Standard of living	Housing	At least one of the households is made of inadequate materials - that is, the wall is made of wood or partially made from wood. The house structure is partially or major damage. The door or windows are partially or major damage.	1/12
SanitationThe household toilet and sanitation are partially or major damage.1/12AssetAt least one of the household items such as a mattress, dining table, wardrobe or electrical items such as television, washing machine, and refrigerator are partially or major damaged.1/12EconomySurvivalAny adults lack basic necessities and resources needed to sustain their life and well-being. Individuals are deprived of essential elements crucial for their survival such as food, water, shelter, healthcare, or other vital resources.1/3EducationSchool needsWhen the student needs the school supplies such as clothes, books, or school equipment.1/3		Water supply	The household does not have access to water supply because the source which is piped water or public tab were partially or major damage.	1/12
AssetAt least one of the household items such as a mattress, dining table, wardrobe or electrical items such as television, washing machine, and refrigerator are partially or major damaged.1/12EconomySurvivalAny adults lack basic necessities and resources needed to sustain their life and well-being. Individuals are deprived 		Sanitation	The household toilet and sanitation are partially or major damage.	1/12
EconomySurvivalAny adults lack basic necessities and resources needed to sustain their life and well-being. Individuals are deprived of essential elements crucial for their survival such as food, water, shelter, healthcare, or other vital resources.1/3EducationSchool needsWhen the student needs the school supplies such as clothes, books, or school equipment.1/3		Asset	At least one of the household items such as a mattress, dining table, wardrobe or electrical items such as television, washing machine, and refrigerator are partially or major damaged.	1/12
Education School When the student needs the school supplies such as clothes, books, or school equipment. 1/3	Economy	Survival	Any adults lack basic necessities and resources needed to sustain their life and well-being. Individuals are deprived of essential elements crucial for their survival such as food, water, shelter, healthcare, or other vital resources.	1/3
	Education	School needs	When the student needs the school supplies such as clothes, books, or school equipment.	1/3

Table 4.4.1: Multidimensional Poverty Index (MPI) for Jajahan Pasir Mas

In the given context, an "indicator" refers to a specific criterion or measure used to assess certain aspects or conditions within households. These indicators are used to determine whether households are deprived or not based on the responses provided by the respondents.

For each indicator, a value of either '1' or '0' is assigned to indicate whether the indicator applies to a particular household or not. If the indicator is applicable and relevant to a household based on the respondent's answer, a value of '1' (interpreted as "Yes") is assigned. If the indicator does not apply to the household, a value of '0' (interpreted as "No") is assigned.

Table 4.4.2: Multidimensional Poverty Index (MPI) for Jajahan Pasir Mas

Dimension	Indicator	Deprived if	
Standard of living	Housing	At least one of the households is made of inadequate materials - that is, the wall is made of wood or partially made from wood. The house structure is partially or major damage. The door or windows are partially or major damage.	
	Water supply	The household does not have access to water supply because the source which is piped water or public tab were partially or major damage.	-
	Sanitation	The household toilet and sanitation are partially or major damage.	YES = 1
	Asset	At least one of the household items such as a mattress, dining table, wardrobe or electrical items such as television, washing machine, and refrigerator are partially or major damaged.	NO = $0$
Economy	Survival	Any adults lack basic necessities and resources needed to sustain their life and well-being. Individuals are deprived of essential elements crucial for their survival such as food, water, shelter, healthcare, or other vital resources.	-
Education	School needs	When the student needs the school supplies such as clothes, books, or school equipment.	

To make decisions about assigning values to indicators, guidance and explanation should be provided for each indicator. This guidance and explanation help determine whether a household is deprived or not based on specific limitations or criteria that have already been established. The table below shows some examples to assign the deprivation of each household on each indicator. After assigning all the values, it will calculate the total percent of deprivation, and if the deprivation is less than 1/3, <33.3%, the household is not multidimensionally poor but if the deprivation is more than 1/3, >33.3%, the household is multidimensionally poor.

Table 4	4.4.3:	Multia	limensior	nal Povert	v Index	(MPI) i	for Kal	mpung	Gual	Tok I	Deh
						( )		1 - 3		-	-

Indicator	Ind	icator	waight	Household				
Indicator	ma	cator	weight	029	030			
Household size				1	2			
Standard of living								
Housing	1/12	4	8.33%	1	1			
Water supply	1/12	4	8.33%	0	0			
Sanitation	1/12	4	8.33%	0	0			
Asset	1/12	4	8.33%	0	0			
Education								
School needs	1/3	1	33.33%	0	0			
Economy								
Survival	1/3	1	33.33%	1	0			
Results								
Individual deprivation score, c (sum of each deprivation multiplied by its weight) for each household				41.66%	8.33%			
Is the household multidimensionally poor (c>1/3)				YES	NO			
				1	1			
Not multidimensionally poor is less than <33.33 %								

Multidimensionally poor is more than >33.33%

Based on multidimensional Poverty Index (MPI) analysis, 253 households are affected by the flood level above 3 meters according to the survey form. This report focuses only on the area of Kampung Gual Tok Deh, Kampung Terusan and Kampung Tersang.

Table 4.4.4 displays household numbers 221, 222, and 223, which were randomly selected to demonstrate the varied results of the Multidimensional Poverty Index (MPI).

	المحد ا			Household			
Indicator	Indicator weight			221	222	223	
Household size				4	3	1	
Standard of living							
Housing	1/12	4	8.33%	0	1	1	
Water supply	1/12	4	8.33%	0	0	0	
Sanitation	1/12	4	8.33%	0	0	0	
Asset	1/12	4	8.33%	1	1	1	
Education							
	4.10		<b></b>	•	_	•	
School needs	1/3	1	33.33%	0	1	0	
Economy							
Survival	1/3	1	33.33%	1	1	1	
Results							
Individual deprivation score, c (sum of each deprivation multiplied by its weight) for each household				41.66%	83.29%	49.99%	
Is the household multidimensionally poor (c>1/3)				YES	YES	YES	
				1	1	1	

Table 4.4.4: Multidimensional Poverty Index (MPI) for Kampung Gual Tok Deh

71

household

(c>1/3)

Is the household

multidimensionally poor

Table 4.4.5 displays household numbers 234, 236, 242, and 245, which were randomly selected to demonstrate the varied results of the deprivation score. Household numbers 234 and 245 show the highest deprivation scores at 99.95%. Nevertheless, all four households are considered multidimensionally poor because their scores are higher than 33.33%.

Indicator	Indicator weight			Household				
Indicator				234	236	242	245	
Household size				3	3	6	4	
Standard of living								
Housing	1/12	4	8.33%	1	1	1	1	
Water supply	1/12	4	8.33%	1	1	0	1	
Sanitation	1/12	4	8.33%	1	1	1	1	
Asset	1/12	4	8.33%	1	1	1	1	
Education								
School needs	1/3	1	33.33%	1	0	1	1	
Economy								
Survival	1/3	1	33.33%	1	1	1	1	
Results								
Individual deprivation score, c (sum of each deprivation multiplied by its weight) for each				99.95%	66.65%	91.62%	99.95%	

YES

1

YES

1

YES

1

YES

Table 4.4.5: Multidimensional Poverty Index (MPI) for Kampung Gual Tok Deh



## Detail Household No. 234

Name: Fatimah Binti Dollah Age: 74 Marriage Status: Widow Employment: Not Working House: Made of wood School needs: 1 child Dependents: NA

Deprivation score: 99.95%

### Detail Household No. 242

Name: Mohamad Amir Bin Mat Halim Age: 38 Marriage Status: Married House: Made of bricks School needs: 2-4 child Dependents: Senior citizen and orphan

Deprivation score: 91.62%

Name: Muhamad Noor Bin Hamzah Age: 60 Marriage Status: Married Employment: Working House: Partially made of wood and bricks School needs: 1 child Dependents: NA

Deprivation score: 99.95%

Figure 4.4.1: Location of the household for Kampung Gual Tok Deh
In Table 4.4.6, one can observe household numbers 170, 171, 173, and 176, which were selected at random to illustrate the diverse outcomes of the deprivation score. Among these households, numbers 171, 173, and 176 exhibit the highest deprivation scores, each reaching 99.95%. Nevertheless, it's important to note that all four households are classified as experiencing multidimensional poverty because their scores surpass the 33.33% threshold.

Indicator	Indicator weight				Household			
Indicator	inai	cator	weight	170	171	173	176	
Household size				1	4	5	9	
Standard of living								
Housing	1/3	4	8.33%	1	1	1	1	
Water supply	1/3	4	8.33%	0	1	1	1	
Sanitation	1/3	4	8.33%	0	1	1	1	
Asset	1/3	4	8.33%	1	1	1	1	
Education								
School needs	1/3	1	33.33%	0	1	1	1	
Economy								
Survival	1/3	1	33.33%	1	1	1	1	
Results								
Individual deprivation score, c (sum of each deprivation multiplied by its weight) for each household				49.99%	99.95%	99.95%	99.95%	

# *Table 4.4.6: Multidimensional Poverty Index (MPI) for Kampung Terusan and Kampung Tersang*

Is the household multidimensionally poor (c>1/3)

1 1 1 1

YES

YES

YES

YES

Table 4.4.7 presents data for household numbers 187, 188, 195, and 196, which were selected randomly to illustrate the varying outcomes of the deprivation score. Among these households, 188, 195, and 196 exhibit the highest deprivation scores, each at 99.95%. Nevertheless, it's worth noting that all four households are categorized as multidimensionally poor, as their scores surpass the threshold of 33.33%.

lu di sata u	Indicator waisht			Hous	ehold		
Indicator	Ind	Icator	weight	187	188	195	196
Household size				4	4	4	4
Standard of living							
Housing	1/3	4	8.33%	0	1	1	1
Water supply	1/3	4	8.33%	0	1	1	1
Sanitation	1/3	4	8.33%	0	1	1	1
Asset	1/3	4	8.33%	1	1	1	1
Education							
School needs	1/3	1	33.33%	1	1	1	1
Economy							
Survival	1/3	1	33.33%	1	1	1	1
Results							
Individual deprivation score, c (sum of each deprivation multiplied by its weight) for each household				74.96%	99.95%	99.95%	99.95%
Is the household multidimensionally poor (c>1/3)				YES	YES	YES	YES
				1	1	1	1

# Table 4.4.7: Multidimensional Poverty Index (MPI) for Kampung Terusan and Kampung Tersang



#### **Detail Household No. 171**

Name: Muhammad Kamarulzaman bin Shamsudin Age: 49 Marriage Status: Married Employment: Working House: Made of bricks School needs: 1 child

Damage: Total/Major Dependents: NA

Deprivation score: 99.95%

## Detail Household No. 173

Name: Osman Bin Kamal Age: 46 Marriage Status: Married Employment: Working House: Made of bricks School needs: 1 child

Damage: Partially Dependents: Disable people

Deprivation score: 99.95%

#### **Detail Household No. 176**

Name: Che Omar Bin Ismail Age: 69 Marriage Status: Married Employment: Working House: Made of bricks School needs: 1 child

Damage: Partially Dependents: Senior citizen

Deprivation score: 99.95%

Figure 4.4.2: Location of the household for Kampung Terusan and Kampung Tersang



### **Detail Household No. 188**

Name: Mohd Rodi Bin Zakaria Age: 55 Marriage Status: Married Employment: Not Working House: Partially made of wood and bricks School needs: 1 child

Damage: Partially Dependents: Bedridden patient

Deprivation score: 99.95%

### **Detail Household No. 195**

Name: Mahizan Manaf Age: 39 Marriage Status : Married House: Made of bricks School needs: 1 child

Damage: Partially Dependents: Disable people

Deprivation score: 99.95%

### **Detail Household No. 196**

Name: Mariana bt Manaf Age: 43 Marriage Status : Married House: Made of bricks School needs: 1 child

Damage: Partially Dependents: NA

Deprivation score: 99.95%

Figure 4.4.3: Location of the household for Kampung Terusan and Kampung Tersang Furthermore, calculating all the data from 253 houses can be carried out for the incidence of multidimensional poverty, the intensity of poverty, and the Multidimensional Poverty Index (MPI).

Incidence of multidimensional poverty (H)=q/n

$$H = \frac{907}{943} = 0.96$$

The headcount ratio (H) calculates the proportion of multidimensionally poor people in the areas. This calculation shows about **96 percent** of people are multidimensionally poor with deprivation scores above 33.33%.

Intensity of poverty, A=s/q 
$$A = \frac{673.53}{907} = 74.26\%$$

The intensity of poverty (A) reflects the average proportion of the weighted component indicators in which multidimensionally poor people are deprived. For multidimensionally poor people only (those with a deprivation score s greater than or equal to 33.3 percent), the deprivation scores are summed and divided by the total number of multidimensionally poor people. This calculation shows about on average the multidimensionally poor person is deprived in **74.26 percent** of the weighted indicators.

MPI=H·A 
$$MPI = 0.96 \times 0.7426 = 0.71$$

The MPI value is the product of two measures: the incidence of multidimensional poverty and the intensity of poverty. The MPI value for PDNA Jajahan Pasir Mas in the area of Kampung Tok Deh, Kampung Terusan and Kampung Tersang is **0.71**.

# Contribution of deprivation in: Standard of living:

*Contrib*<sub>1</sub> =  $\frac{174.51}{943} \div 0.71 = 25.91\%$ 

This dimension refers to the conditions in which people live, including access to basic amenities such as clean water, sanitation, housing quality, and electricity. It takes into account factors that directly impact an individual's well-being and quality of life.

### Education:

$$Contrib_2 = \frac{206.33}{943} \div 0.71 = 30.63\%$$

Education is an essential aspect of human development and plays a crucial role in breaking the cycle of poverty. This dimension considers indicators such as school attendance, educational attainment, and the quality of education received. Deprivation in education reflects a lack of opportunities for individuals to acquire knowledge and skills, limiting their ability to improve their circumstances.

### Economy:

$$Contrib_3 = \frac{295.67}{943} \div 0.71 = 43.90\%$$

The economic dimension of poverty focuses on people's economic well-being, including income, employment, and access to productive resources. It considers factors such as income levels, access to basic necessities through employment or social protection programs, and the ability to participate in economic activities. Economic deprivation can perpetuate poverty by limiting individuals' opportunities for income generation and economic mobility.

The findings indicate that the economy contributes the most significant percentage to the deprivation observed in that specific area.

Variance of deprivation score among the poor:

$$V = \frac{47.55}{943 - 1} = 0.051$$

The variance of deprivation scores of multidimensionally poor people are used to measure inequality among those people

# WAY FORWARD

The proposed plan is to convene a comprehensive multi-stakeholder platform alongside an official event, and the intended venue is situated at Dewan Serbaguna, Masjid Jubli Perak Sultan Ismail Petra, located in the district of Jajahan Pasir Mas, Kelantan. The specific date for this event is yet to be determined.

# Programme Schedule

	lable s.r.r. riegram agenaa
MASA	ΑΚΤΙVΙΤΙ
8.30 Pagi – 9.15 Pagi	Ketibaan Para Peserta, Pendaftaran dan Sarapan di Dewan Serbaguna, Masjid Jubli Perak Sultan Ismail Petra
9.15 Pagi – 9.30 Pagi	Ketibaan Para VIP
9.30 Pagi – 9.40 Pagi	Ucapan Pembukaan oleh Pengerusi Majlis Nyanyian lagu Negaraku, Nyanyian Lagu Negeri Kelantan & Bacaan Doa
9.40 Pagi – 9.45 Pagi	Ucapan Aluan 1 Pejabat Jajahan dan Tanah Pasir Mas, Kelantan
9.45 Pagi – 9.50 Pagi	Ucapan Aluan 2 MERCY Malaysia
9.50 Pagi – 9.55 Pagi	Ucapan Perasmian
9.55 Pagi – 10.00 Pagi	Gimik Perasmian Video Montaj Pelancaran Resilience Living Lab Pasir Mas 2023
10.00 Pagi – 10.05 Pagi	Sesi bergambar
10.05 Pagi – 10.15 Pagi	Taklimat Resilience Living Lab Pasir Mas 2023 Dr Khamarrul Azahari bin Razak Pengarah,
	Disaster Preparedness and Prevention Center (DPPC), Malaysia-Japan International Institute of Technology (MJIIT),
	Universiti Teknologi Malaysia (UTM), Kuala Lumpur
10.15 Pagi – 10.45 Pagi	Pembentangan Pelaksanaan dan Inisiatif DRR oleh MERCY Malaysia
10.45 Pagi – 11.00 Pagi	Taklimat Sesi Pembelajaran Lapangan

Table 5.1.1: Program agenda

Table 5.1.2: Program agenda

MASA	AKTIVITI
11.00 Pagi – 1.00 Petang	Sesi Pembelajaran Lapangan Tema 1: DRR Infrastructure Early Warning System (EWS) Tema 2: Shelter Resilient Recovery Tema 3: Post- Disaster Livelihood Continuity Tema 4: Water, Sanitation and Hygiene (WASH)
1.00 Petang – 2.00 Petang	Rehat dan Makan Tengah Hari
2.00 Petang – 2.30 Petang	Focus Group Discussion (FGD) Tema 1: Kelestarian Alam Semula Jadi Tema 2: Pengetahuan dan Pembelajaran Tema 3: Komuniti, Kebudayaan dan Tapak Warisan Tema 4: Risiko dan Keupayaan Berdaya Tahan: Dari Perspektif Pemegang Taruh
2.30 Petang – 3.15 Petang	Pembentangan Focus Group Discussion (FGD) Tema 1: Kelestarian Alam Semula Jadi Tema 2: Pengetahuan dan Pembelajaran Tema 3: Komuniti, Kebudayaan dan Tapak Warisan Tema 4: Risiko dan Keupayaan Berdaya Tahan: Dari Perspektif Pemegang Taruh
3.15 Petang – 3.30 Petang	Kesimpulan Dr Khamarrul Azahari bin Razak Pengarah, Disaster Preparedness and Prevention Center (DPPC), Malaysia-Japan International Institute of Technology (MJIIT), Universiti Teknologi Malaysia (UTM), Kuala Lumpur
3.30 Petang – 3.45 Petang	Ucapan Penutup

Note: Programme subject to change

# DISASTER RESILIENT RECOVERY (DRR) MODEL

82

# **Disaster Resilient Recovery (DRR) Model**

Swift action is necessary for a paradigm shift to build systemic resilience to natural hazards in development planning and asset management. This requires a participatory and inclusive approach, bringing together civil society, government, private sector, academia, think tanks, and the international community around a common vision. Stakeholder engagement will be necessary to inform the scope, design, institutional arrangements, and a monitoring and accountability framework for a comprehensive resilient recovery program. Such a program should prioritize the urgent needs of the affected population while ensuring that results are delivered in an efficient, equitable, and transparent manner. Building on global good practices of recovery and integrating the specific socioeconomic, cultural, and institutional context through a people centric approach will be crucial. Thus, a model can be build which can portray to grasp the understanding of Disaster Resilient Recovery (DRR).



*Figure 6.1.1: Disaster Resilient Recovery (DRR) Model, build by Disaster Preparedness & Prevention Centre (DPPC)* 

This model consists of five (5) key enablers (Transboundary Disaster, Climate Change, Extreme Whether Event, Systemic Risks, and Multi-Hazard Vulnerability). Moreover, five (5) key aspect (People, Governance, Finance, Data, and Technology) are explored and guided by 5 key principles (Participating Approach in Decision Making, Effective Disaster Resilient and Recovery (DRR) Investment, Strategic Resource Allocation, Integrated Disaster Informatics, Equitable & Evidence-Based DR3). Then it will be supported by four (4) key elements, known as the (Build-Back Better, Risk-Informed Sustainable Development, Disaster Risk Reduction, & Resilience (DR3), and Resilient Culture).

# "Everything in some way connects to everything else" -Leonardo Da Vinci

The proposed model promotes the resilient culture and correlates with every key involve in understanding Disaster Resilient and Recovery (DRR) concept.

The agenda of disaster risk reduction and resilience (DR3) has become increasingly important in recent years due to the growing impact of transboundary disasters, climate change, extreme weather events, and systemic risks. To make a rapid movement for effective DR3, crucial action must be taken, including an understanding of multi-hazard vulnerability and the ability to address the root causes of disasters. Additionally, key aspect, including people, governance agency, finance, data, and technology, must all working together and be useful for ensuring DR3 efforts are effective.

A number of key principles must be upheld to facilitate disaster risk reduction and resilience (DR3). These include adopting a participatory approach to decision-making, investing in Disaster Resilient and Recovery (DRR) successfully, allocating strategic resources to Disaster Resilient and Recovery (DRR) efforts, adopting integrated disaster informatics, and basing Disaster Resilient and Recovery (DRR) efforts on equitable and evidence-based approaches. In order to effectively achieve disaster risk reduction and resilience (DR3), certain key elements must be present. These include building back better after disasters, ensuring risk-informed sustainable development practices, adopting disaster risk reduction strategies, and cultivating a resilient culture that can withstand the impact of emerging hazards, systemic risk and compounding disasters.

In summary, disaster risk reduction and resilience (DR3) is an important concept that requires a comprehensive approach to disaster management and resilience. With key enablers, responsible stakeholders, guiding principles, and essential elements in place, it is possible to develop effective strategies that can help minimize the impact of disasters and ensure communities are able to recover more quickly in the aftermath of a disaster.

# BUDGET AND FINANCIAL

# 7.1 Cost Summary

The estimated total cost for the PDNA study is RM 160,000.00 as shown Table 7.1, covering the expenses for project design and work development, PDNA on-site method verification, field data collection January to April 2023, PDNA workshop, the development of framework for data analytics, visualization, and needs assessment as well as the Living Lab conceptual model design, and finally the preparation stage for reporting and publications. The costs for the implementation and completion of data analytics, visualization, and needs assessment as well as the completion of reporting and publications will be further broken down in the subsequent phases of the project.

No.	Programs	Total Cost (RM)
	Operational and Implementation Costs	
Α	PDNA Project Design and Work Development	5,060.00
В	PDNA method verification & Digitalization (January 2023)	6,000.00
С	Field Data Collection & Preliminary Analysis (January - April 2023)	70,600.00
D	Data Analytics, Visualization & Needs	8,160.00
E	Workshop PDNA (Rejuvenating Resilient Recovery Strategies)	17,600.00
F	Reporting, Documentation & Publication (National Case Studies)	8,000.00
G	Living Lab	7,000.00
н	Contigency	5,580.00
	Administrative and Service Fees	
I	Administrative Fee (MERCY Malaysia) - 15%	24,000.00
J	Service Fee (MJIIT) - 5%	8,000.00
	GRAND TOTAL (RM)	160,000.00

Table 7.1.1: Total cost for Post-Disaster Need Assessment Project

## 87

The operational and implementation costs (RM 128,000.00) in addition to the service fee to Malaysia-Japan International Institute of Technology (MJIIT) (RM8,000) as shown in Table 7.2 will be channeled to Disaster Preparedness & Prevention Centre (DPPC) through the Universiti Teknologi Malaysia (UTM) company Uni-Technologies Sdn Bhd (UTSB) registered with the Ministry of Finance and co-managed by MERCY Malaysia and supervised by the committees.

# Table 7.1.2: Operational and implementation cost

### **A)** Payment Phases

ltem	Description	Price per unit	Percentage
1.	Reimbursement Cost (Inc. Advanced from MERCY: RM8,000)	RM 41,000	30%
2.	Submission of Inception Report (February 2023)	RM 13,600	10%
3.	Submission of Progress Report 1 (June 2023)	RM 27,100	20%
4.	Submission of Progress Report 2 (August 2023)	RM 27,100	20%
5.	Submission of Final Draft Report (September 2023)	RM 13,600	10%
6.	Submission of Final Report (November 2023)	RM 13,600	5% + 5%
	+ Service Fee (MJIIT, 5%)		
		Total 136,000	100%
*as per	August 2023		

# Table 7.1.3: Summary of expenditures

# B) Summary of Expenditures / Advanced Cost (March 2023)

ltem	Programs	Expenditures /
		Advanced Cost (RM)
С	Field Data Collection & Preliminary Analysis	12,944.00
	(February/March 2023)	
	Rental (Accommodation, Transportation, Utilities)	
	Volunteer allowance	
	Meals	
	Operational Needs	
D	Data Analytics, Visualization & Needs	860.00
	Workplan/framework design for data management	
	system, data manipulation, data analysis, visualization	
	and needs assessment	
	Temporary cloud storage and server	
F	Reporting, Documentation & Publication	1200.00
	Preparation for documentation and reporting,	
	compilation, pictures, digital data	
	GRAND TOTAL (RM)	15,004.00

# Table 7.1.4: Payment allocation for Progress Report 2

# **C)** Payment Allocation

A)	Submission of Progress Report 2	
A.i)	UTM	RM 27,100.00
B)	Total Claim	RM 27,100.00

# 7.2 Cost Breakdown

# Table 7.2.1: Project cost breakdown

No.	Item	Detail	Cost per unit (RM)	Quantity	Total Price (RM)
А	PDNA Project Design and Work Development				5,060.00
1	Topography maps		20.00	13	260.00
2	Development of PDNA form, Guide Book (initial work plan, organizational chart, task distribution, data collection requirement etc) and framework for Module		1,500.00	1	1,500.00
3	Banner, bunting, and set-up of Temporary Operation Center (Bilik Gerakan Balai Bomba Rantau Panjang)		300.00	1	300.00
4	Stakeholder engagement sessions (meeting and discussions)		3,000.00	1	3,000.00
В	PDNA Method Verification & Digitalization (January 2023)				6,000.00
1	Re-development and reviewing of PDNA method, digitalization and mapping, on-site method verification, PDNA implementation strategy, and Training-of-Trainers (ToT) sessions	2 рах	1,500.00	2	3,000.00
2	SME research officer/volunteer for PDNA method verification including work flow design, zoning determination with site visit, daily operational strategy, data collection projection, and finalisation of Guide Book	4 pax	1,500.00	2	3,000.00
с	Field Data Collection & Preliminary Analysis				
C1	(January - April 2023) Data Collection Phase 1 (January) *On-site method verification				20,800.00
1	Rental Vehicle	5	300.00	3	4,500.00
2	Transportation (toll, petrol)	5	500.00	1	2,500.00
3	Accomodation	5	150.00	7	5,250.00
4	Breakfast	5	5.00	50	1,250.00
5	Lunch	5	8.00	50	2,000.00
6	Tea Break	5	5.00	50	1,250.00
8	Mineral water	carton	30.00	15	450.00
9	Air fare	Return flight	900.00	4	3,600.00

\*Volunteers registered under MERCY Malaysia

No.	Item	Detail	Cost per unit (RM)	Quantity	Total Price (RM)
C2	Data Collection Phase 1 (February)				27,000.00
1	Homestay rental (Operation Center)	1 month	2,100.00	1	2,100.00
2	Accommodation for field checkers	RM200 x 3 rooms x 4 nights	600.00	4	2,400.00
3	Volunteer* allowance (meal & fuel) for field data collection	RM50 x 14 pax x 28 days	700.00	28	19,600.00
4	Utility bills (electricity & water)	1 month	500.00	1	500.00
5	Mineral water (500ml & 125ml)	20 carton	400.00	1	400.00
6	Stationery supplies, daily printing (paper and printer ink), first aid kits, volunteer name tags, clipboards, and disposable raincoats	1 month	1,500.00	1	1,500.00
7	Wi-Fi router, portable broadbands, and monthly plan for high-speed Wi-Fi	1 month	500.00	1	500.00
C3	Data Collection Phase 1 (March)				22,800.00
1	Homestay rental (Operation Center)	1 month	2,100.00	1	2,100.00
2	Accomodation for field checkers	RM200 x 3 rooms x 4 nights	600.00	4	2,400.00
3	Volunteer* allowance (meal & fuel) for field data collection	RM50 x 14 pax x 22 days	700.00	22	15,400.00
4	Utility bills (electricity & water)	1 month	500.00	1	500.00
5	Mineral water (500ml & 125ml)	20 carton	400.00	1	400.00
6	Stationery supplies, daily printing (paper and printer ink), first aid kits, volunteer name tags, clipboards, and disposable raincoats	1 month	1,500.00	1	1,500.00
7	Wi-Fi router, portable broadbands, and monthly plan for high-speed Wi-Fi	1 month	500.00	1	500.00
	Workplan/Framework for Data Analytics				
D	Visualization & Need Assessment				8,160.00
1	Volunteer* allowance (meal and fuel) for raw data entry and compilation	RM50 x 2 pax x 50 days	100.00	50	5,000.00
2	Workplan/framework design for data management system, data manipulation, data analysis, visualization and needs assessment		1,500.00	1	1,500.00
3	Temporary cloud storage and server	1 TB	160.00	1	160.00
4	Data architecture for GIS system framework development		1,500.00	1	1,500.00

# Table 7.2.2: Project cost breakdown

Tab	le	7.2.3:	Project	t cost	break	kdown
			_			

No.	Item	Detail	Cost per unit (RM)	Quantity	Total Price (RM)
E	Workshop PDNA (Rejuvenating Resilient Recovery Strategies)				17,600.00
1	Air fare	4 pax x return flight	500.00	4	2,000.00
2	Accommodation	6 rooms (3 Expert & 8 Secretariat) x 3 days	1,800.00	3	5,400.00
3	Meal (Catering)	110 pax x 1 days	3,000.00	1	3,000.00
4	Ground Transportation	3 days	400.00	3	1,200.00
5	Hall Rental	2 days	2,000.00	2	4,000.00
6	Workshop collaterals (printing, etc)	lump sum	1,000.00	1	1,000.00
7	Participants collaterals (goodies, etc)	lump sum	10.00	100	1,000.00
F	Reporting, Documentation & Publication (National Case Studies)				8,000.00
1	Preparation for documentation and reporting, compilation, pictures, digital data		3,000.00	1	3,000.00
2	Half-day workshop for reporting, preparation for Knowledge Note and Policy Brief (national case study)		5,000.00	1	5,000.00
G	Living Lab Conceptual Model Design				7,000.00
1	Development of Conceptual Model for Living Lab, initial site visits and multi-stakeholders engagement sessions		7,000.00	1	7,000.00
н	Contingency				5,580,00
1	Contingency		5,580.00	1	5,580.00
I.	Administrative Fee				24,000.00
1	Administrative fee (MERCY Malaysia) - 15%		24,000.00	1	24,000.00
L	Service Fee				8,000.00
1	Service fee (MJIIT) - 5%		8,000.00	1	8,000.00
					160,000.00

\*Volunteers registered under MERCY Malaysia

# CONCLUSION

In conclusion, the data ar

In conclusion, the data analysis conducted on flood-related information has provided valuable insights and understanding of the dynamics, impacts, and vulnerabilities associated with flood disasters. The analysis has revealed the frequency and magnitude of flood events, helping us identify areas and populations at high risk. By understanding the contributing factors, such as localized climate change and extreme weather events, we can co-develop targeted strategies to mitigate and manage transboundary flood risks effectively.

Furthermore, the data analysis has shed light on the social, economic, and environmental impacts of floods. We have assessed the damage to infrastructure, and communities. These findings emphasize the urgency and importance of implementing comprehensive flood management plans and resilience-building measures. The use of tools like ArcGIS has enabled spatial analysis and flood inundation mapping, providing a visual representation of flood-prone areas and aiding in decision-making processes. This spatial perspective has facilitated the identification of critical infrastructure, vulnerable populations, and areas in need of immediate attention and adaptation.

It is crucial to acknowledge that the conclusions drawn from the data analysis are the foundation for informed decision-making, policy formulation, and disaster management strategies. By adopting a proactive approach and considering future climate scenarios locally, we can enhance preparedness, promote resilience, and minimize the impacts of future flood events.

Moving forward, it is essential to ensure stakeholder collaboration, public awareness, and continuous monitoring and evaluation. Regular updates of flood risk assessments, adoption of sustainable land and water management practices, and investment in long-term resilience measures will contribute to a comprehensive and adaptive approach to flood management. By leveraging the insights gained from the data analysis, we have the opportunity to develop effective flood mitigation strategies, protect vulnerable communities, and build resilient societies capable of adapting to the challenges posed by flood disasters. This will be done through a series of Workshop and Living Lab at Jajahan Pasir Mas in September 2023.



#### For more information:

## DR. KHAMARRUL AZAHARI BIN RAZAK

Director, Disaster Preparedness and Prevention Center (DPPC) Malaysia-Japan International Institute of Technology (MJIIT) Universiti Teknologi Malaysia (UTM), 54100 Jalan Sultan Yahya Petra, Kuala Lumpur, Malaysia Tel (office): +60322031585; +60322031517 Tel (mobile):+60193649495; Fax (office): +60322031266 Email: khamarrul.kl@utm.my; khamarrulrazak@gmail.com Official Website @ https://mjiit.utm.my/dppc/