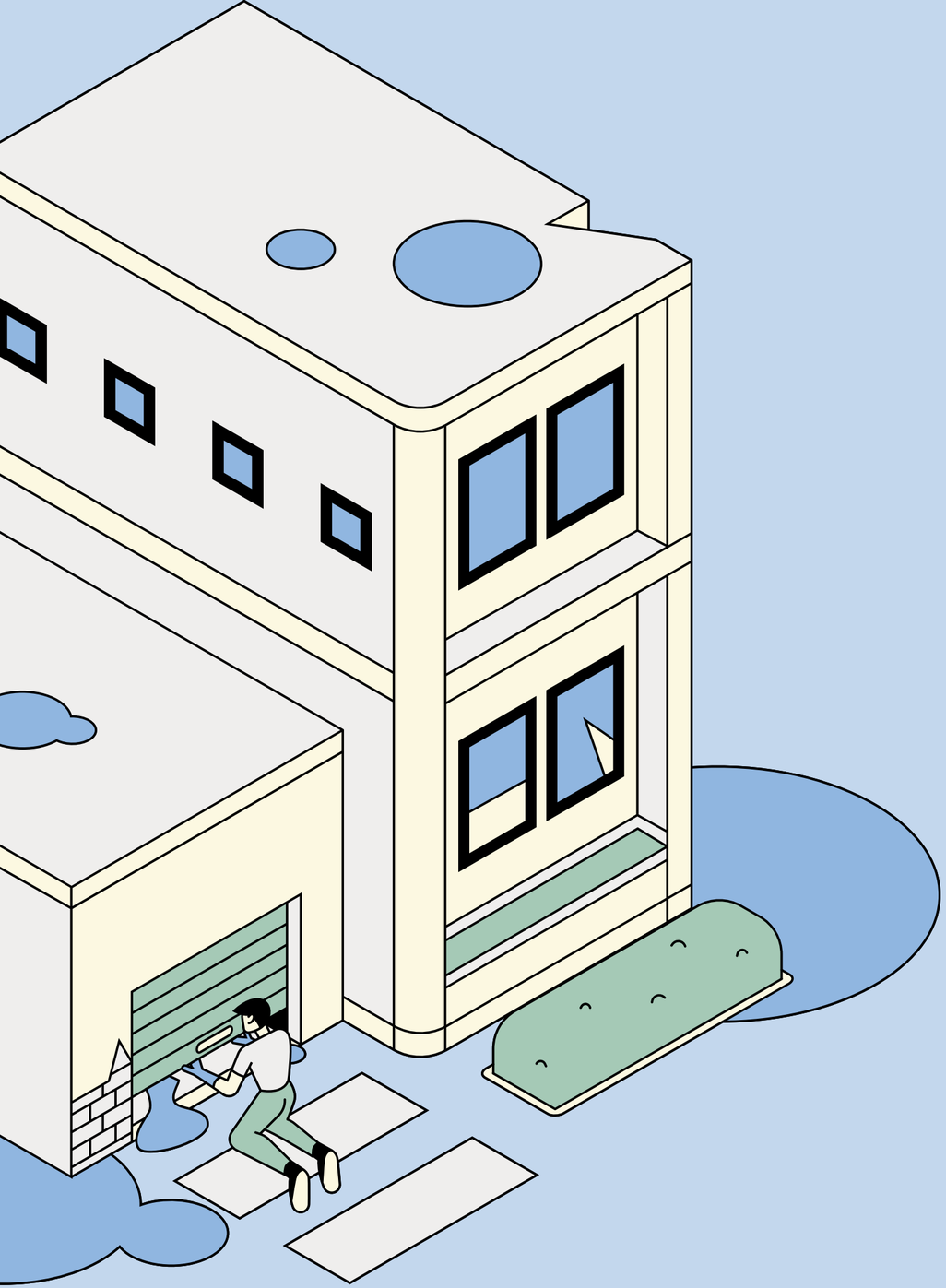


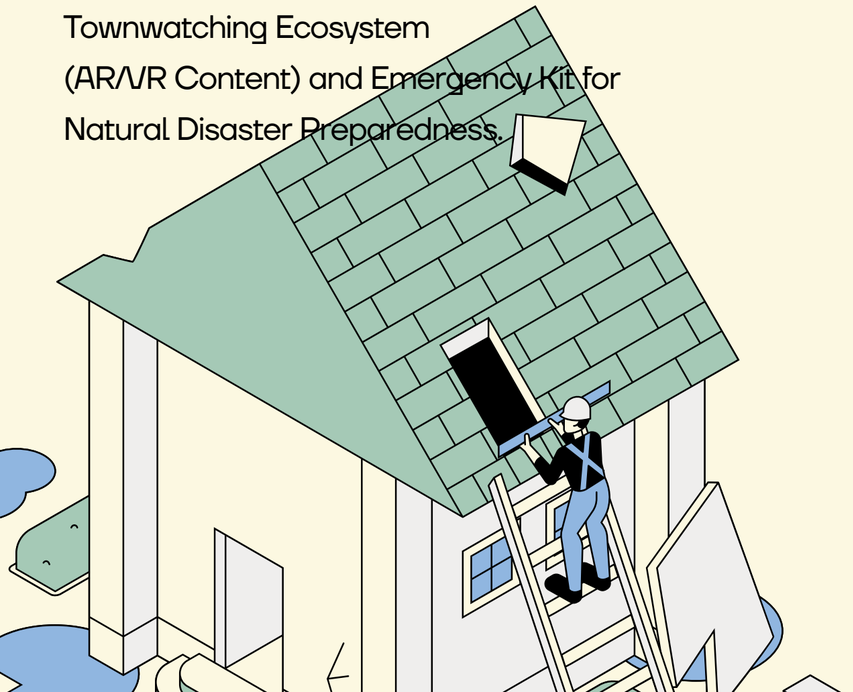
Introduction

to Sustainable Living

Assignment 2

Task Groups

This project is a continuation of the outcome from work carried out by students of April 2025 semester on Flood Preparedness Training Module, Townwatching Ecosystem (AR/VR Content) and Emergency Kit for Natural Disaster Preparedness.



Task 1 Group

Flood Preparedness Training Module

Task 2 Group

Townwatching Ecosystem (AR/VR Content)

Task 3 Group

Emergency Kit for Natural Disaster Preparedness

Kampung Kasipillay

LAND USE & SETTLEMENT TYPE

part of a **rubber estate plantation** → **residential area**

The neighbourhood remains mostly residential rather than commercial; it retains a "**kampung-settlement**" character, albeit urbanized over decades.

ACCESSIBILITY & AMENITIES

- **Good connectivity**: accessible via major roads
- **Public transport access**: near to railway / transit nodes
- **Amenities** and **services** nearby: schools, shops, local businesses (but the area retains its traditional "kampung" vibe and low-rise housing profile)

Kampung Kasipillay is a dense **residential** enclave with older infrastructure and it's part of a large city (Kuala Lumpur) with **limited natural catchment** of natural landscape, it is particularly vulnerable to **urban flooding**.

The **social composition** plus **limited commercial land use** means that floods impact households, daily living, mobility, evacuation, and social fabric.

Aims & Objectives

TASK 1 GROUP

TASK 2 GROUP

TASK 3 GROUP

AIM

- To improve the existing training module that strengthens volunteer readiness and improves community coordination during all stages of flooding.

- To understand how residents use and respond to digital flood-preparedness tools and evaluate improvements for the MyEvac app.

- To determine the essential contents, materials, and distribution methods for an effective flood emergency kit suitable for Kampung Kasipillay.

OBJECTIVES

Identify gaps in community preparedness, response, and recovery.

Identify community needs, concerns, and behaviour during floods.

Identify critical items needed in the proposed flood survival kit.

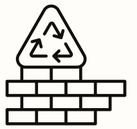
Integrate expert insights on drainage, climate, and early-warning systems.

Identify usability issues (e.g., wet screens, AR/VR difficulty, unclear info).

Evaluate reliability of current flood-kit delivery systems.

Provide clear, actionable steps for volunteers (evacuation, communication, clean-up).

Gather resident and expert feedback to refine MyEvac for real flood conditions.



Determine durable and sustainable packaging materials.

Key Survey Respondents

01 THE COMMUNITY / RESIDENTS

WHY?

THEY EXPERIENCE THE FLOODS FIRST-HAND

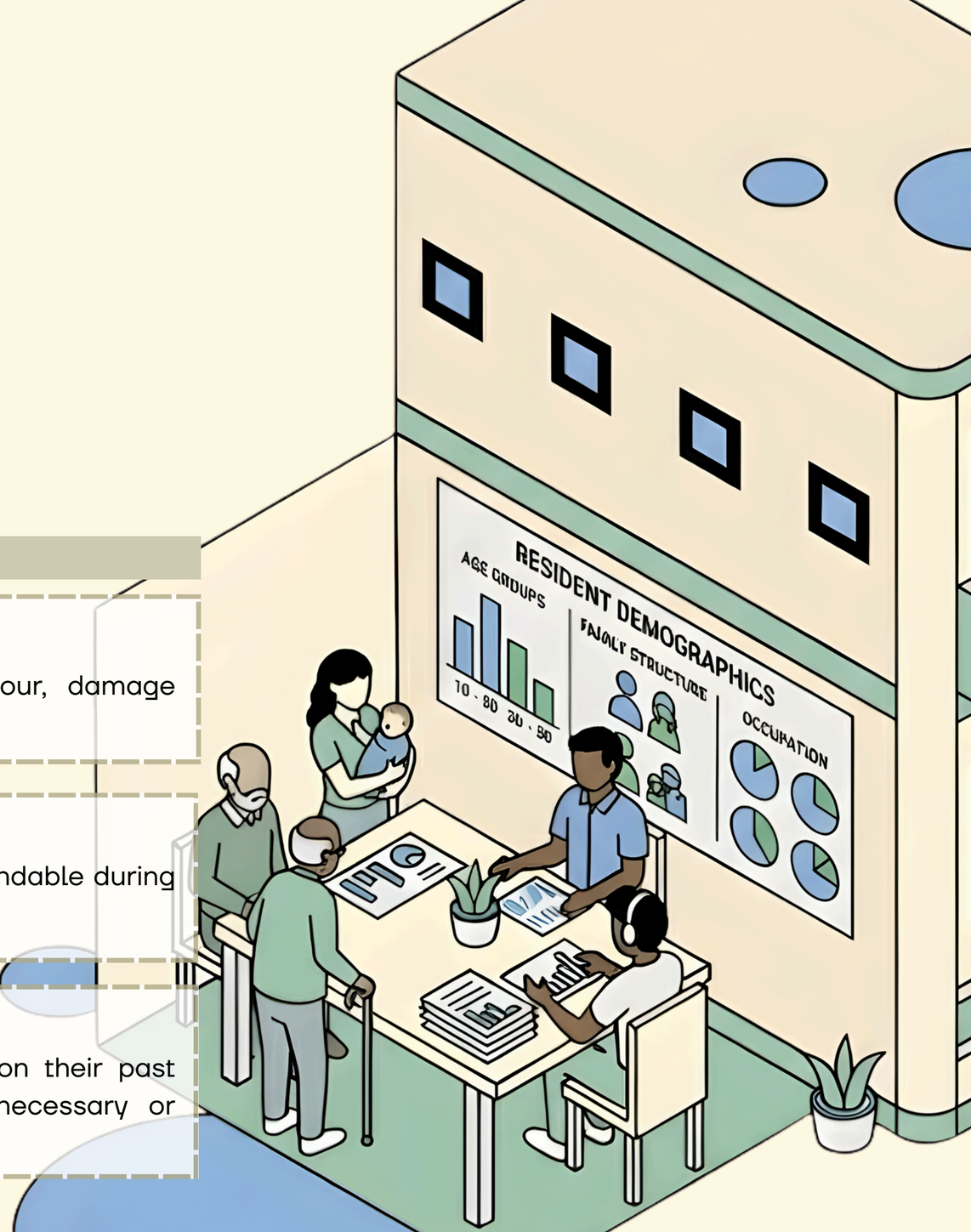
Residents hold lived knowledge about warning signs, water behaviour, damage patterns, and the real challenges faced during evacuation or recovery.

THEY EVALUATE THE USABILITY OF DIGITAL TOOLS

Residents provide direct feedback on whether app features are understandable during stress, accessible in poor weather, or usable by elderly or low-tech users.

THEY IDENTIFY PRACTICAL ITEMS THEY NEED DURING FLOOD

Residents can identify the most essential flood-survival items based on their past experiences, revealing what is urgently needed and preventing unnecessary or irrelevant contents in the kit.



02 THE EXPERTS

01

Ir. Ts. Dr Safari
National Water Research Institute of Malaysia (NAHRIM)

Expert in flood mitigation and planning

02

Dr Cyril
Solnovation (SMART technology)
(more to data analytics)

Expertise in SMART system technologies and sensor-based monitoring.

03

Associate Professor Ts. Dr. Afizan
School of Computer Science (Taylors)
Digital Innovation & Smart Societies Impact Lab Director

Expert in digital image processing, data mining, and data science/analytics.

WHY?

TO UNDERSTAND REAL CAUSES AND PATTERNS OF FLOODING

Helps validate whether the environmental assumptions in AR/VR, preparedness, and planning are realistic.

TO INTEGRATE DATA, SENSORS, AND EARLY WARNINGS EFFECTIVELY

Helps to understand how real-time information can enhance townwatching and preparedness.

TO ASSESS USABILITY AND LIMITS OF AR/VR AND AI FEATURES

Evaluates whether the visual and detection systems can work in real flood conditions.

TO VALIDATE MITIGATION AND PREPAREDNESS STRATEGIES

Ensures the flood kit, community actions, and educational content align with national standards.

TO CONFIRM DIGITAL AND AR FEATURES ARE FEASIBLE

Helps in clarifies what current technology can realistically support in your system.

TO STRENGTHEN DATA-DRIVEN INTELLIGENCE IN YOUR PROJECT

His data science expertise supports better analysis, predictions, and user-driven insights.

Task 1

Flood Preparedness Training Module

Prepared by
Task 1 Group K, L & M

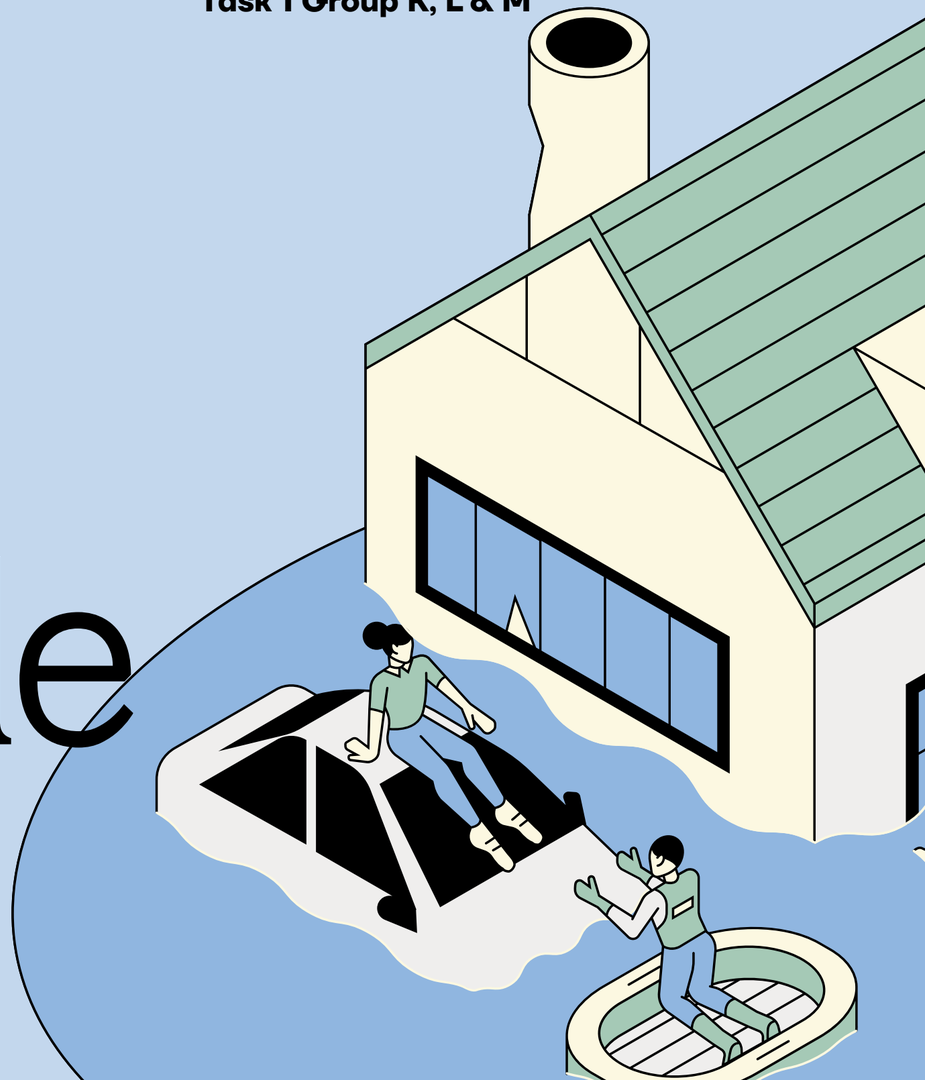


Table of Content

Background Studies

a. The Infrastructures

b. Roles & Responsibilities

c. Volunteer Standard Operating System

d. Evacuation Routes

e. Goals in Recovery State

The Infrastructures

Blue Infrastructure

CHARACTERISTICS

FLOOD SENSORY CAMERAS

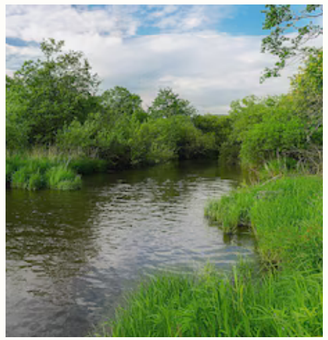
Provide early visual alerts for rising water levels.

RIVER PROXIMITY

Allows volunteers to observe water level changes directly.

Green Infrastructure

CHARACTERISTICS



RIVERBANK VEGETATION

Helps absorb rainwater and slow runoff.

SMALL GREEN POCKETS

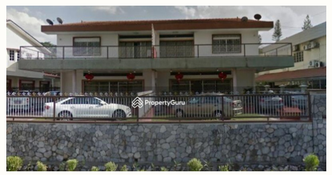
Offer opportunities for community planting or rain gardens.

Red Infrastructure

CHARACTERISTICS

ROL & DBKL PROGRAMMES

Provide policy framework for flood mitigation.



ELEVATED HOUSE DESIGNS

Reduce flood impact in specific areas.

Grey Infrastructure

CHARACTERISTICS

CURB DRAINAGE SYSTEMS

Help channel water if maintained properly.

EXISTING PATHWAYS

Provide potential evacuation routes.

Roles & Responsibilities

AUTHORITIES

Manage warnings, infrastructure, and emergency response during floods.

ORGANIZATIONS

Provide training, resources, and support for community flood efforts.

COMMUNITY

Participate in preparedness and help neighbours during floods.

VOLUNTEERS

Assist with monitoring, evacuation, and on-ground response.

FLOOD MANAGEMENT INITIATIVES BY AUTHORITIES

DBKL, JPS, NADMA, AND PLAN MALAYSIA

Zoning & flood-resilient land use
Capacity building & emergency preparedness
Monitoring, forecasting & early warning systems
Infrastructure upgrades & maintenance

POTENTIAL INSTITUE PARTNERS IN FLOOD RESPONSE

NEARBY SCHOOLS, PRESCHOOLS, AND COLLEGES

Integrate flood preparedness into school curriculum
Use schools as temporary shelters

COMMUNITY-BASED SUPPORT & MOBILISATION

RUKUN TETANGGA, YOUTH AMBASSADORS, FLOOD WARDENS, AND NGOS

Community monitoring & hazard reporting
Neighbourhood response & emergency kits

COMMUNITY ACTIONS FOR FLOOD RESILIENCE

PUBLIC AWARENESS & CLEAN-UP CAMPAIGNS

COMMUNITY PROJECTS

COMMUNITY EDUCATION AND AWARENESS PROGRAMS

Volunteer Standard Operating System

To ensure volunteers are organized, informed, and ready to respond efficiently before flooding occurs.

WHY?

- **Practical**
- **Scalable**
- **People-Centered**
- **Fills The Gap**

VOLUNTEER REGISTRATION SYSTEM

Physical

- Local gathering points
- Event booth
- KRT(Kawasan Rukun Tetangga)
- Community leaders

Online

- Google Form
- KRT website page
- QR code posters
- WhatsApp group

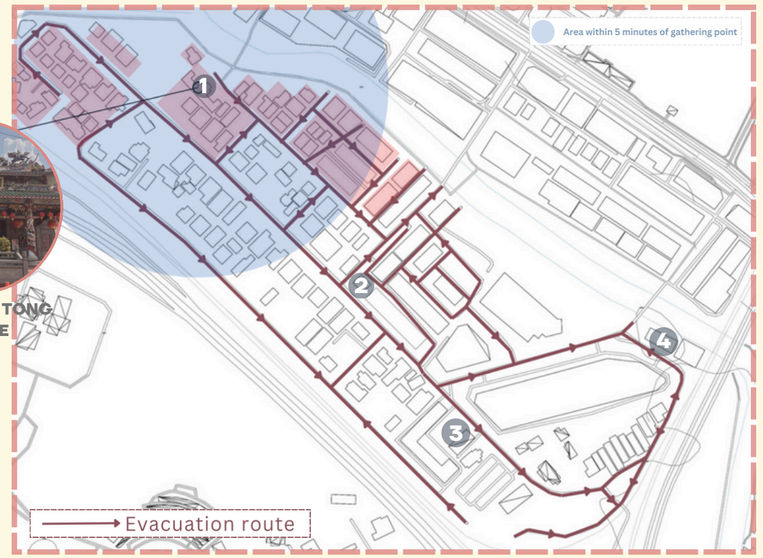
STEPS TO PARTICIPATE

1. personal information
2. volunteer requirements (statement)
3. availability
4. preferred roles
5. agreement

Evacuation Routes

RED ZONE

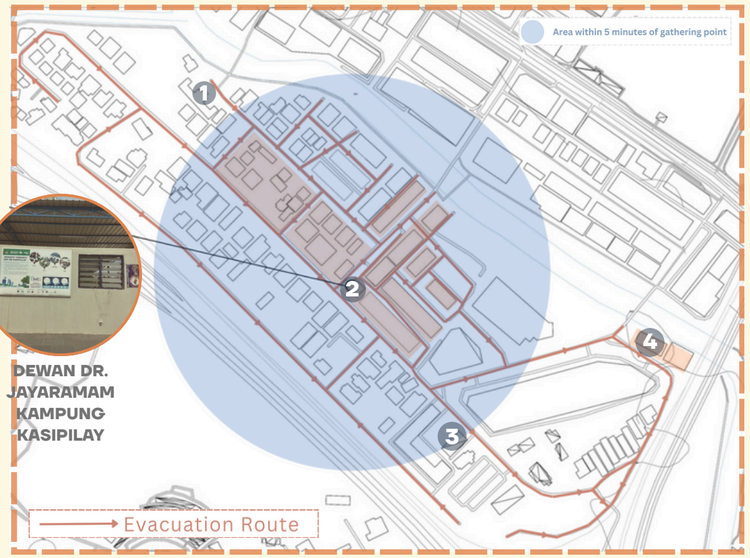
CHOO SING TONG TEMPLE



Severe flooding, immediate danger to life and property, urgent evacuation needed.

ORANGE ZONE

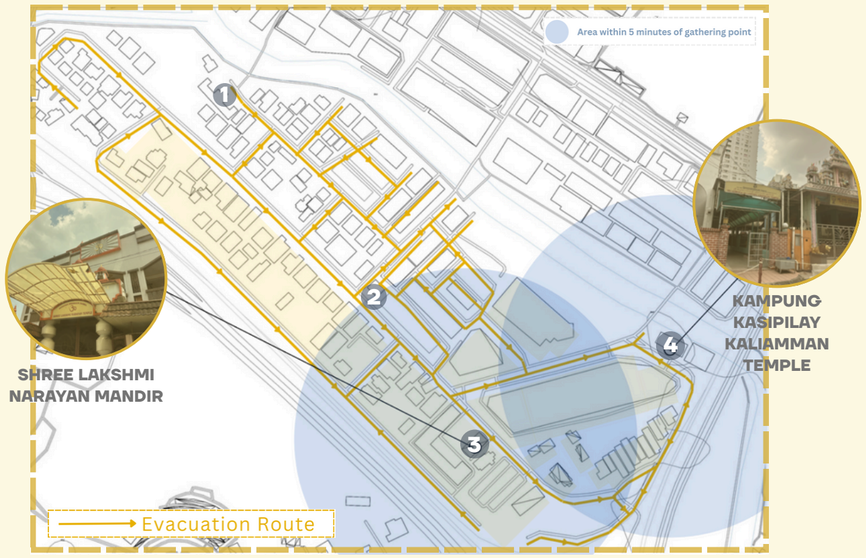
DEWAN DR. JAYARAMAM KAMPUNG KASIPILAY



Moderate flooding, potential evacuation.

YELLOW ZONE

SHREE LAKSHMI NARAYAN MANDIR



KAMPUNG KASIPILAY KALIAMMAN TEMPLE

Minimal flooding, monitoring and preparedness focus.

CHECKPOINTS

SUPPORT POINTS FOR MANAGING AND AIDING EVACUEES.

1. CHOO SING TONG TEMPLE
2. DEWAN DR. JAYARAMAM KAMPUNG KASIPILAY
3. SHREE LAKSHMI NARAYAN MANDIR
4. KAMPUNG KASIPILAY KALIAMMAN TEMPLE

Goals in Recovery State

FEELING

Empathetic communication
Emotional support structures
Safe spaces for emotional processing
Community- driven recovery initiatives
Accessible mental health services

COST

Funding emergency medical relief
Supporting shelter operation costs
Donation

WASTE

Health & Safety Waste
Bulky Waste
Organic and General

HEALTH

Preventing disease outbreaks
Providing access to medical care
Ensuring clean water & sanitation
Controlling vector breeding after floods

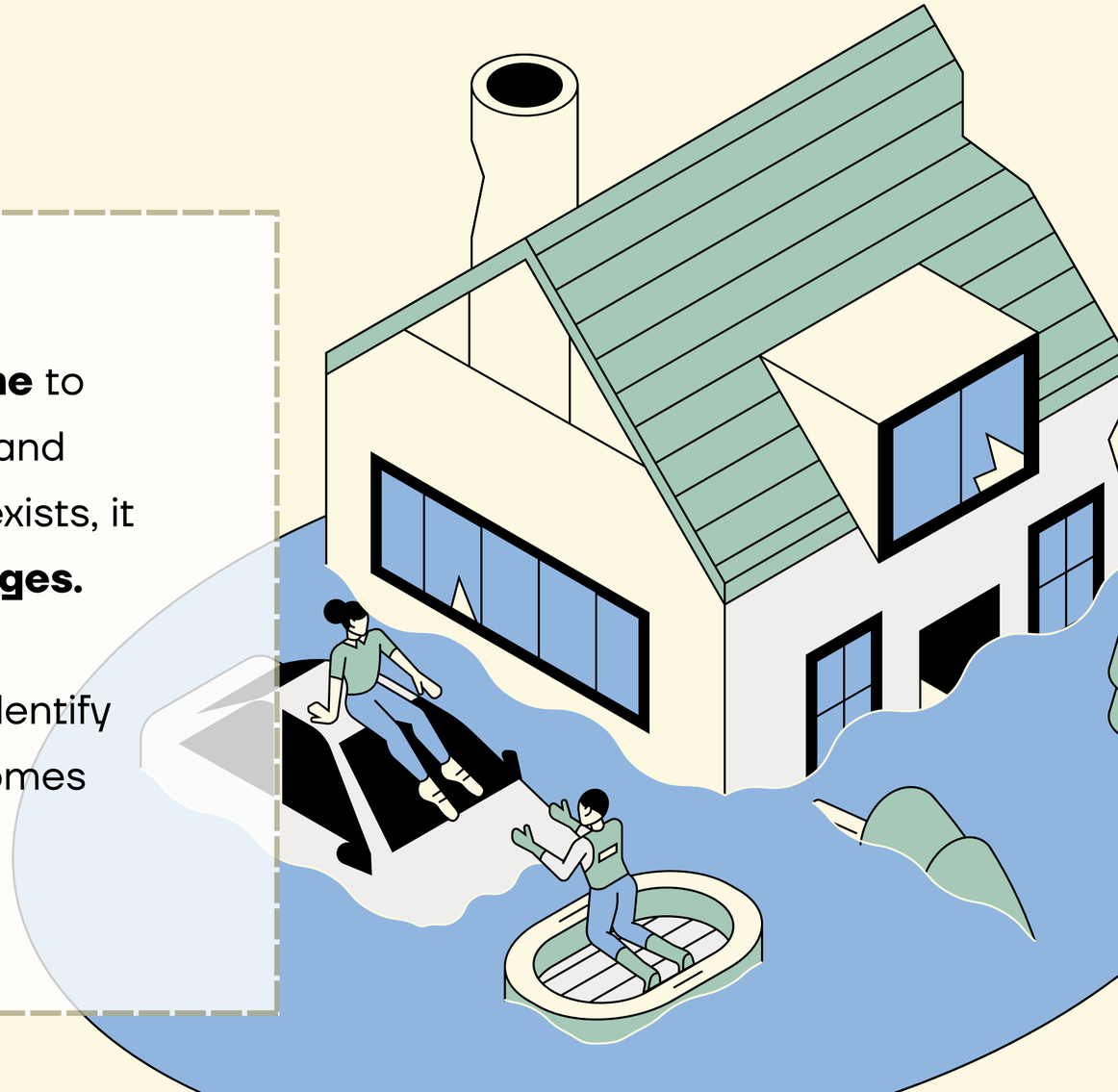
SAFETY

Safe Lives and Health
Less Health Risks after Floods
Strengthen Community Preparedness
Fast Rebuilding of Community Safety

Problem Statement

Kampung Kasipillay's **low-lying location** makes it **highly prone** to **flash floods** during sudden heavy rainfall, affecting **daily life** and **community safety**. Although a volunteer framework already exists, it requires **refinement** to better match **real on-ground challenges.**

This survey collects **insights** from **residents** and **experts** to identify **gaps** and **improvements**, ensuring the volunteer system becomes more **effective** across all phases of a flood event.



Research Methodology: Online Surveys

METHOD CHOSEN

Online questionnaire (via Google Forms)

REASON FOR CHOOSING THIS METHOD

- Allows collection of both quantitative and qualitative data.
- Reaches a large number of residents efficiently.
- Captures personal experiences, opinions, and perceptions.
- Easy to analyze and compare results for planning purposes.

Survey Participant

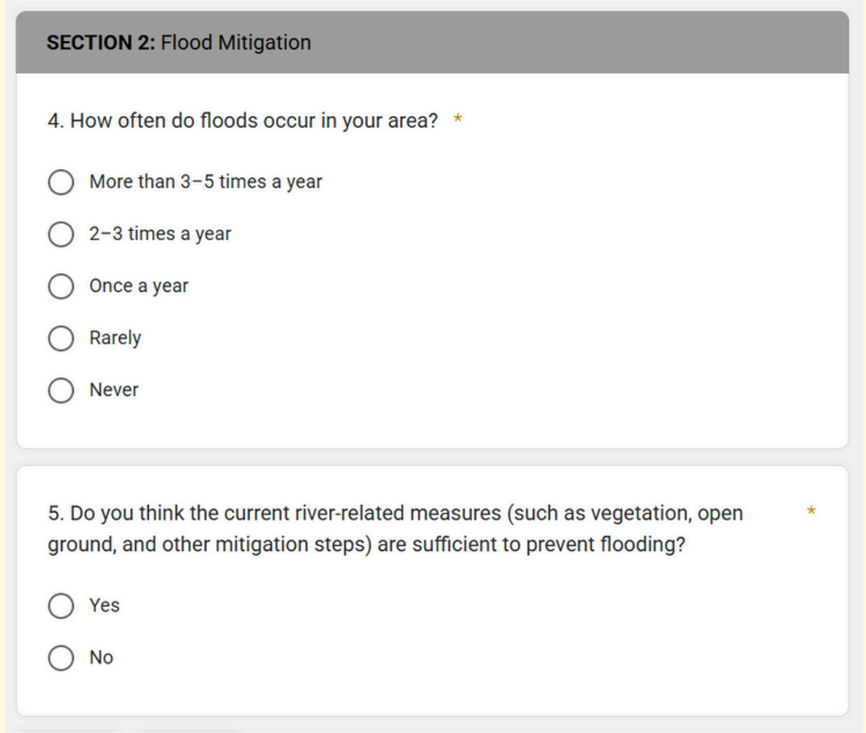
Residents

Kampung Kasipillay, Kuala Lumpur

MAIN PURPOSE OF SURVEYS

- Collect **community-wide data** on **residents' flood experiences and needs.**
- Identify **common patterns and issues** across households.
- Assess residents' **preparedness and awareness** of flood risks.
- Provide evidence to **support planning and flood mitigation strategies**.

Questionnaire (Google Form)



Questions included **multiple-choice, Likert-scale, and open-ended responses** to capture both quantitative and qualitative data.

Residents Flood Survey

Themes for Sections

Section 1
Respondent Background

Understand who the respondents are to interpret their flood experiences accurately.

Section 2
Flood Mitigation

Identify how well the community reduces flood risks and strengthens protection before disasters happen.

Section 3
Flood Preparedness

Assess how ready the community is to face floods through planning, tools, awareness, and support systems.

Section 4
Flood Response

Examine how quickly and effectively the community and authorities act during a flood event.

Section 5
Flood Recovery

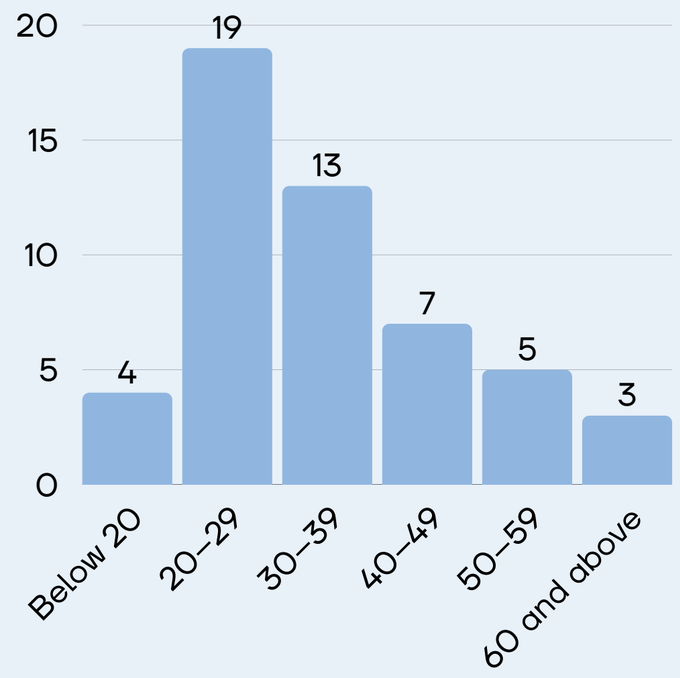
Understand the support needed for communities to return to normal life after a flood.

Task 1 Survey Questionnaire & Results

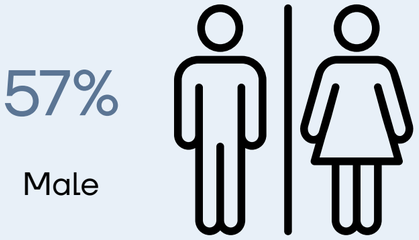
A total of 51 responses were collected.

Section 1: Respondent Background

AGE GROUP



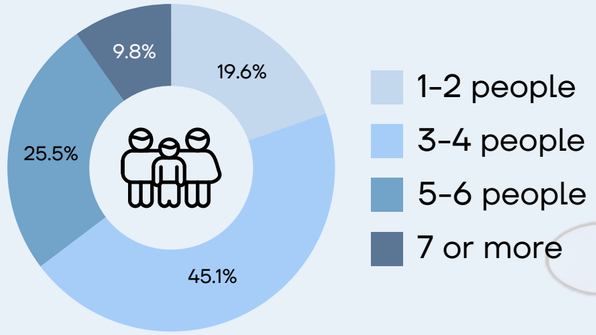
GENDER



57% Male

43% Female

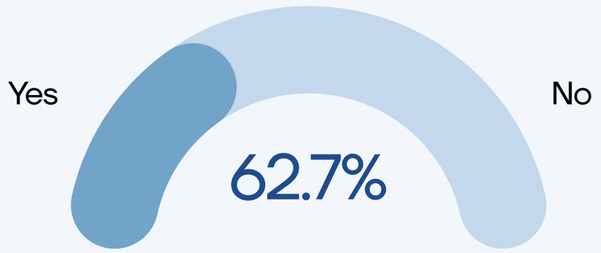
HOUSEHOLD MEMBERS



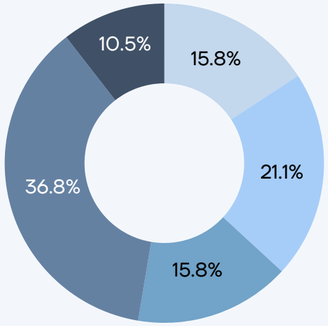
Task 1 Survey Questionnaire & Results

Section 2: Flood Mitigation

Q1: "Do you think the current river-related measures (such as vegetation, open ground, and other mitigation steps) are sufficient to prevent flooding?"

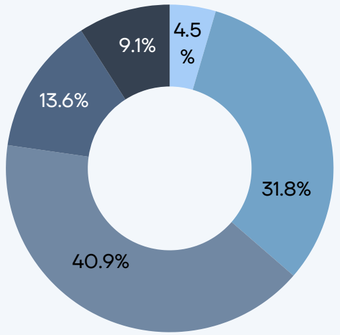


If Yes, why?



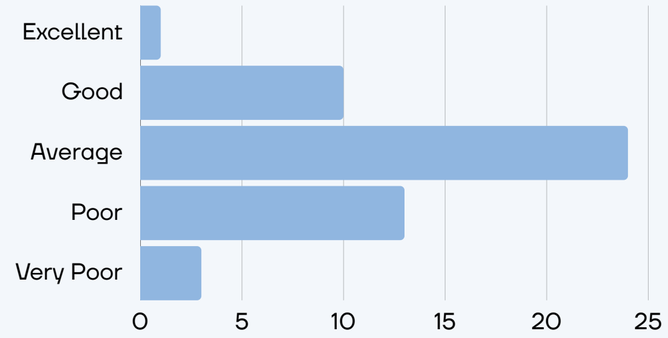
- Drains are better maintained and less often clogged now.
- New improvements like floodwalls, sensors, and pumps are functioning well.
- Rainwater clears quickly after heavy downpours.
- The drainage system and vegetation already help control flooding.
- The river and plants seem effective in managing excess water.

If No, why?

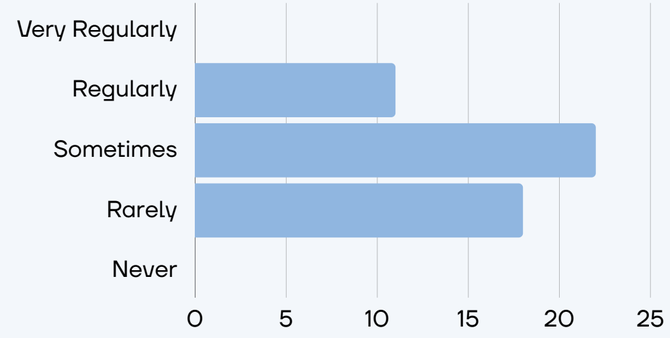


- Flooding still occurs whenever there is heavy rain.
- Riverbanks are poorly maintained, with rubbish or erosion issues.
- Some drains are clogged or too narrow to handle excess water.
- There isn't enough greenery or open space for water to absorb naturally.
- Too much concrete surfaces causes water to flow too quickly.

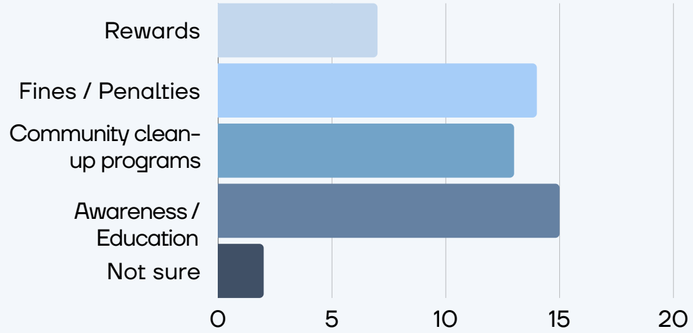
Q2: "How well do DBKL / JPS maintain flood mitigation measures (drains, riverbanks)?"



Q3: "Do you think your street drainage is regularly cleaned by authorities?"



Q4: "What is the best way to encourage residents to keep drains clean?"



Task 1 Survey Key Findings

MAJOR ISSUES

- Poor maintenance of drains/riverbanks
- Irregular cleaning
- Excessive concrete surfaces
- Lack of greenery
- Clogged and narrow drains

KEY IMPROVEMENTS SUGGESTED

Strengthen awareness & education
Educate residents on proper waste disposal and how their actions impact flooding.

Community clean-up programs
Encourage collective neighborhood clean-ups to reduce drain blockages.

Improve drainage / riverbank maintenance
Increase frequency and quality of drain cleaning and riverbank upkeep.

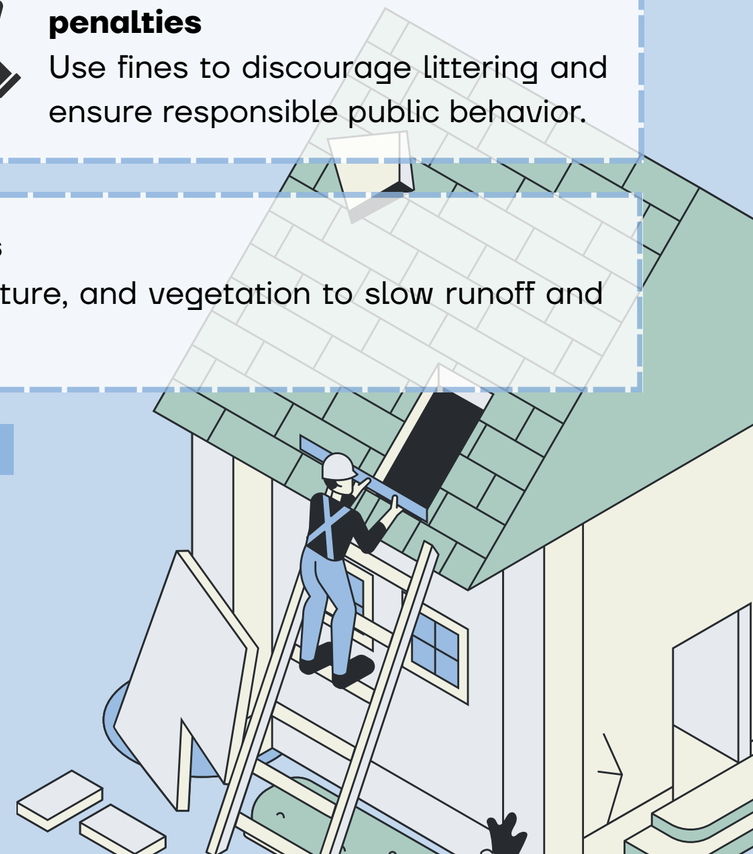
Strategic use of fines / penalties
Use fines to discourage littering and ensure responsible public behavior.

Reduce concrete surfaces & increase green zones
Introduce more permeable surfaces, green infrastructure, and vegetation to slow runoff and improve water absorption.

LEARNING IMPACTS

Growing community awareness of both environmental factors and maintenance gaps

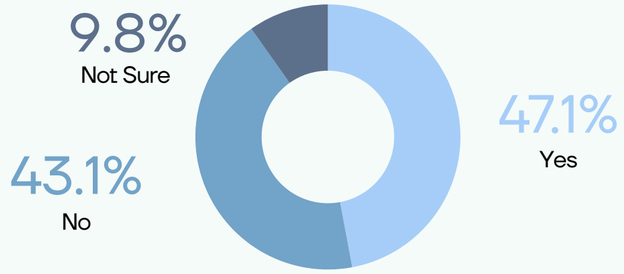
Human behavior seen as a key factor in flood mitigation



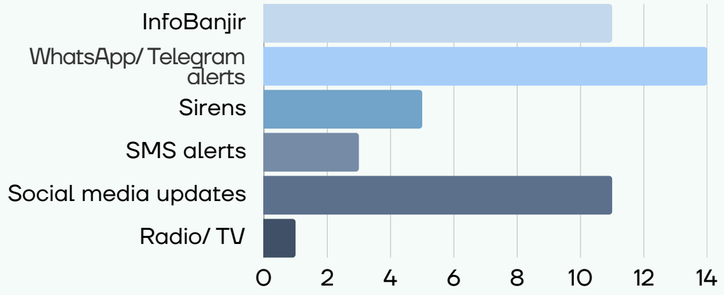
Task 1 Survey Questionnaire & Results

Section 3: Flood Preparedness

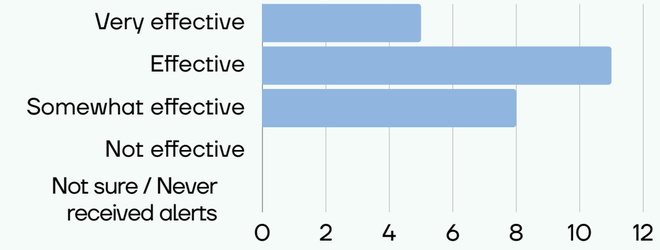
Q1: "Are you aware of any early warning tools (InfoBanjir, WhatsApp alerts, sirens)?"



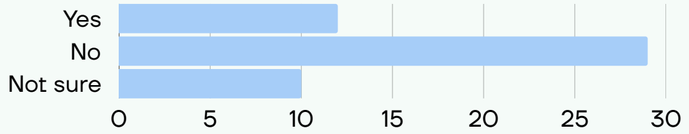
If Yes, which ones do you use?



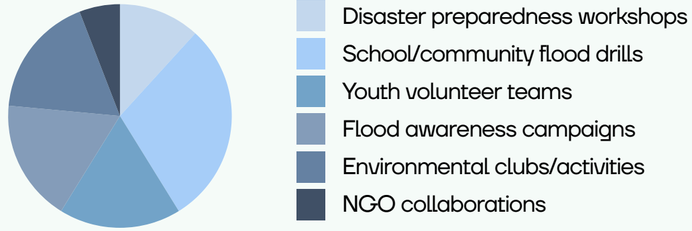
How effective are early warning tools?



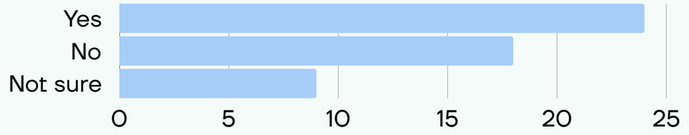
Q2: "Are you aware of any youth programmes for flood awareness?"



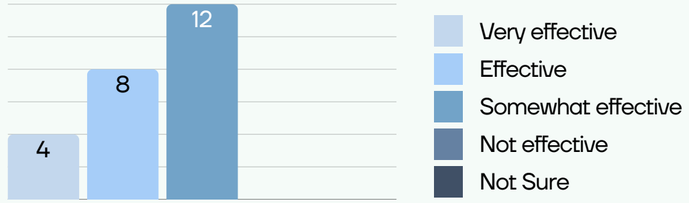
If Yes, which ones?



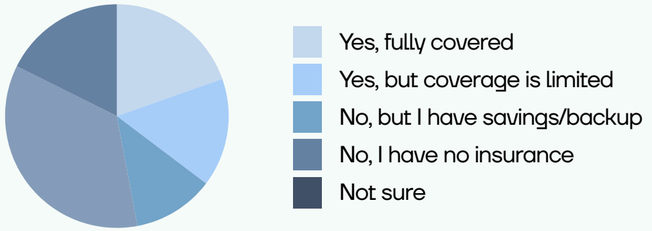
Q3: "Are public awareness campaigns about flood safety available in your area?"



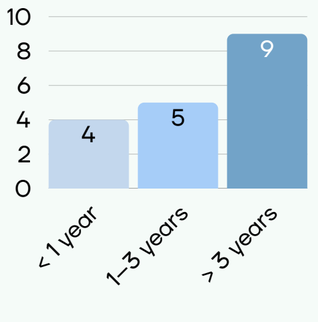
If Yes, how effective are they?



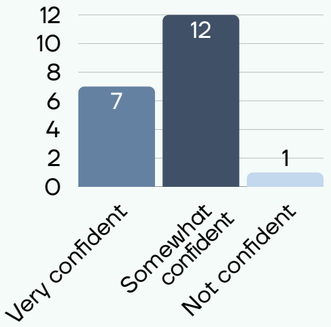
Q4: " Do you have flood insurance?"



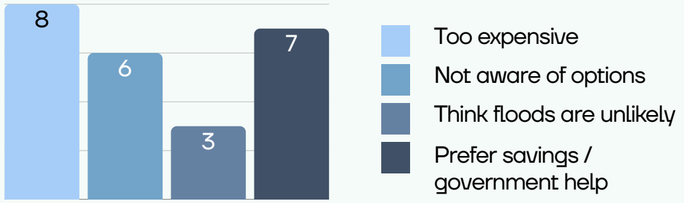
If Yes,
How long have you had flood insurance?



How confident are you with your coverage?



If No,
Why don't you have flood insurance?



Task 1 Survey Key Findings

MAJOR ISSUES

Low awareness of youth flood programmes.

Early warning tools are only somewhat effective.

Public awareness campaigns are inconsistent or not visible.

Many residents lack flood insurance due to cost or lack of information.

KEY IMPROVEMENTS SUGGESTED

Increase visibility of awareness campaigns

Make campaigns more frequent and accessible so more people understand flood risks and preparation steps.

Improve reliability of early warning alerts

Ensure alerts (WhatsApp, sirens, InfoBanjir) are timely and reach all residents.

Provide clearer information on insurance options

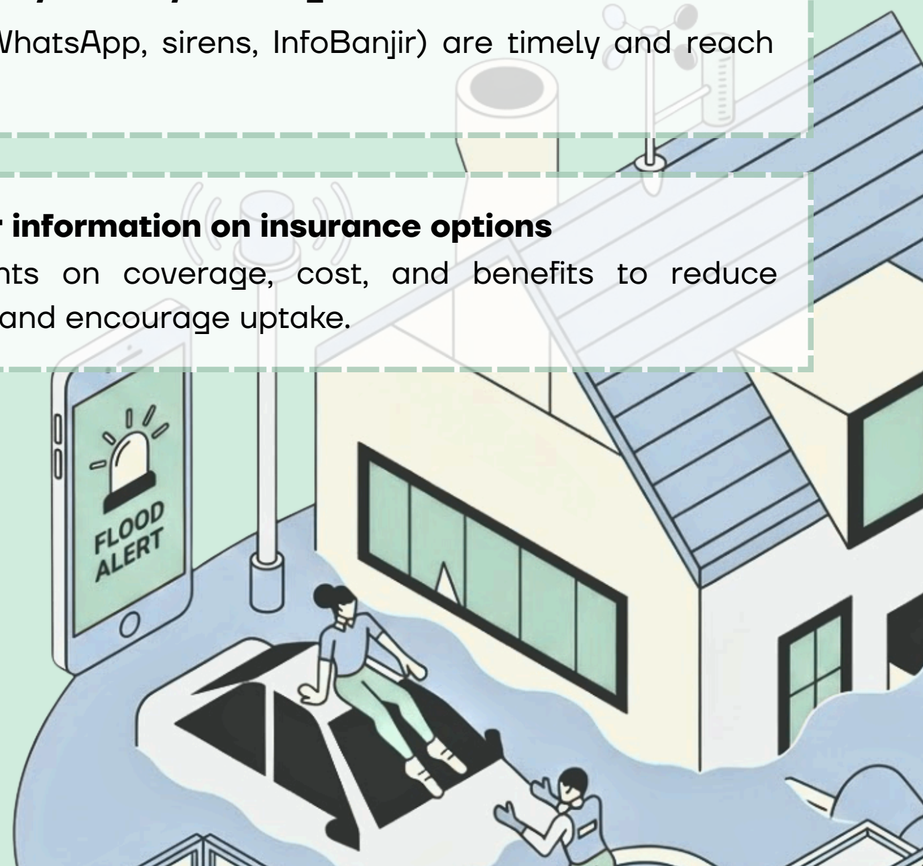
Educate residents on coverage, cost, and benefits to reduce misconceptions and encourage uptake.

LEARNING IMPACTS

Residents know tools exist but lack deep preparedness.

Financial and knowledge barriers limit insurance adoption.

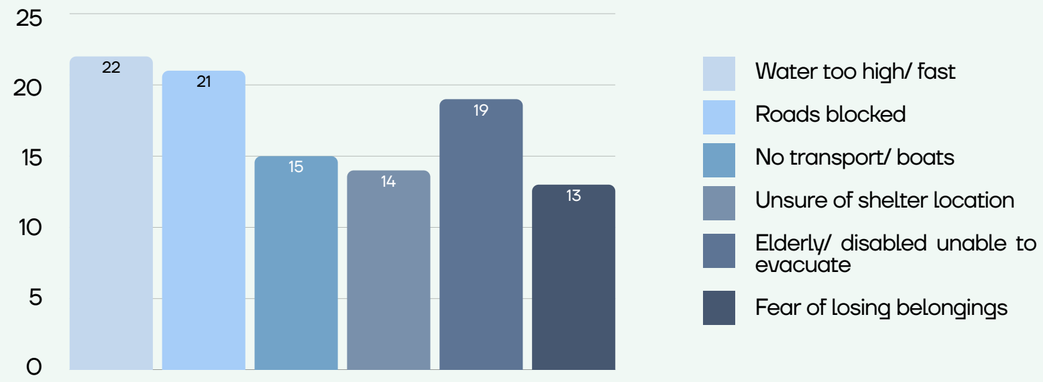
Awareness efforts are not reaching many community members.



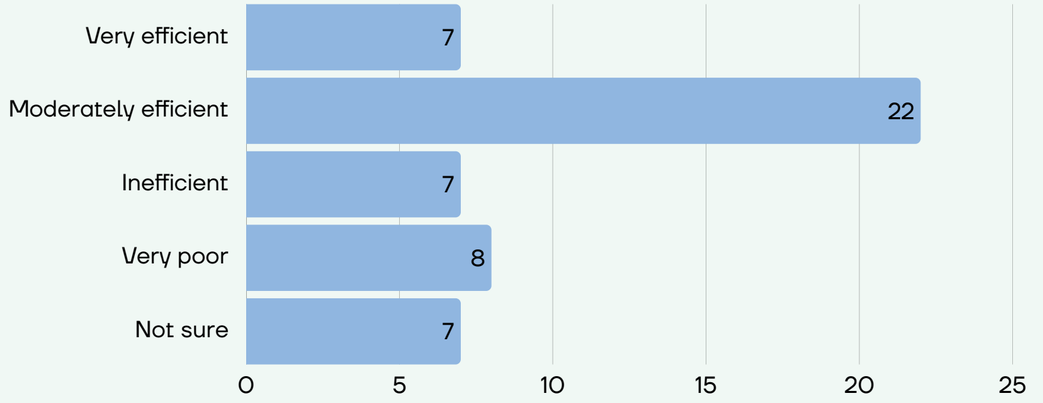
Task 1 Survey Questionnaire & Results

Section 4: Flood Response

Q1: "What are the top difficulties during evacuation?"

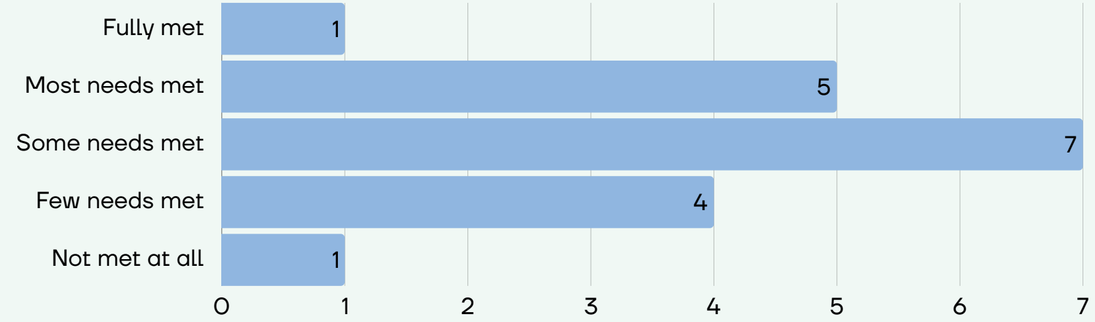


Q2: "How efficient are evacuation routes during floods? "

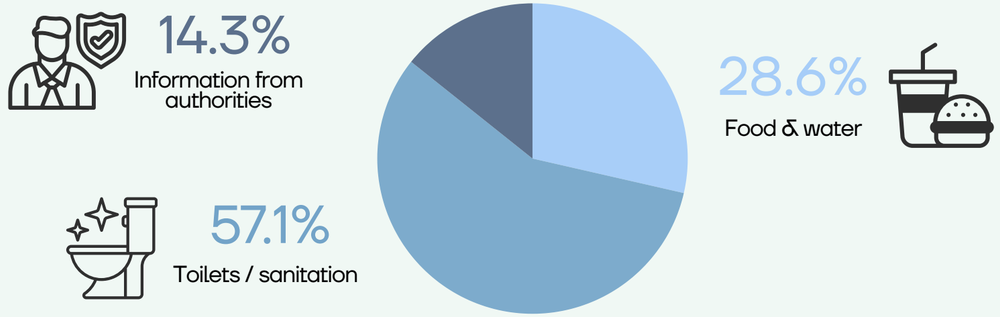


Q3: " Have you ever been to a flood shelter?"

If Yes, were your basic needs met?



If No, what were you not satisfied with at the flood shelter?



Task 1 Survey Key Findings

MAJOR ISSUES

Evacuation is difficult due to blocked roads, high water, and lack of transport.

Elderly and disabled individuals struggle to evacuate safely.

Some shelters lack sanitation, food, water, and reliable information.

KEY IMPROVEMENTS SUGGESTED

Faster and more coordinated council response

Speed up deployment of workers, boats, and support teams during evacuation.

Clearer communication on routes and shelters

Provide accurate, timely updates so residents know where to go and what to expect.

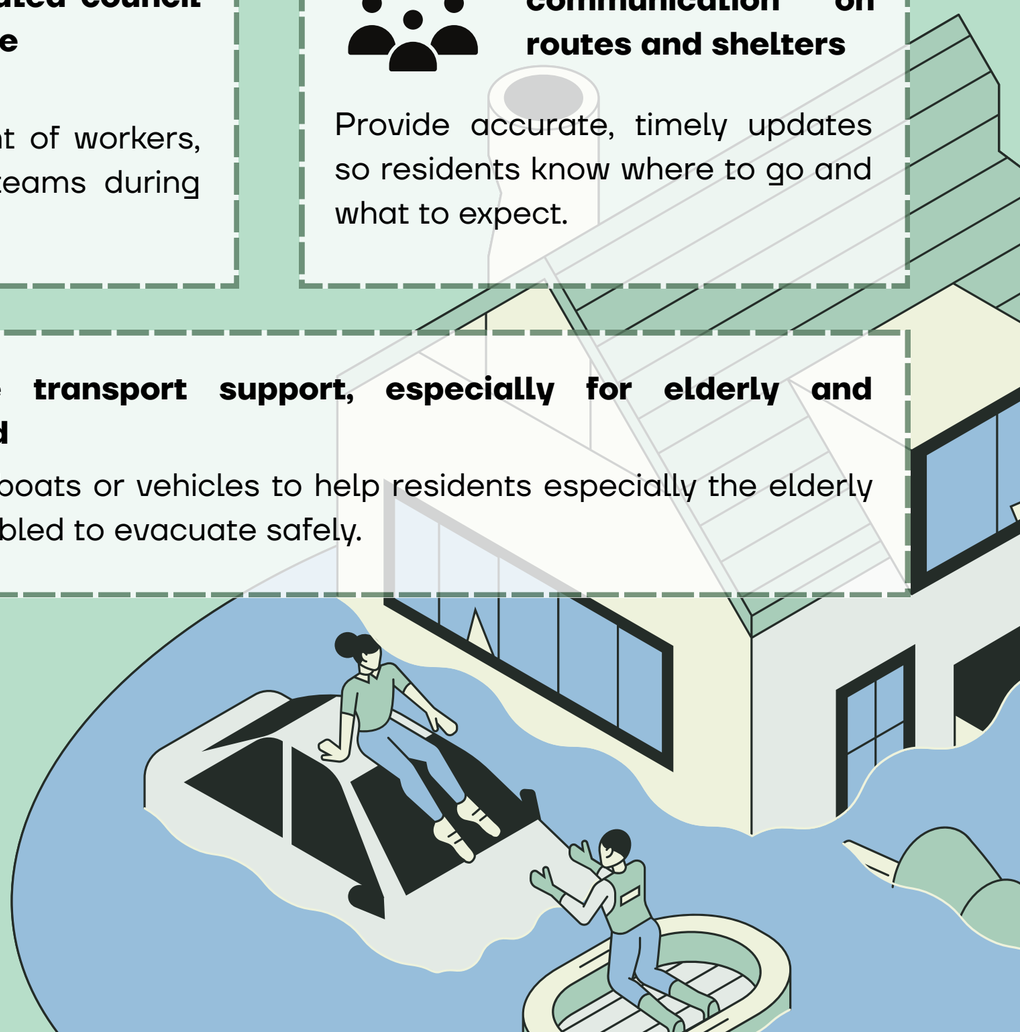
Improve transport support, especially for elderly and disabled

Provide boats or vehicles to help residents especially the elderly and disabled to evacuate safely.

LEARNING IMPACTS

Response delays and poor communication increase danger for residents.

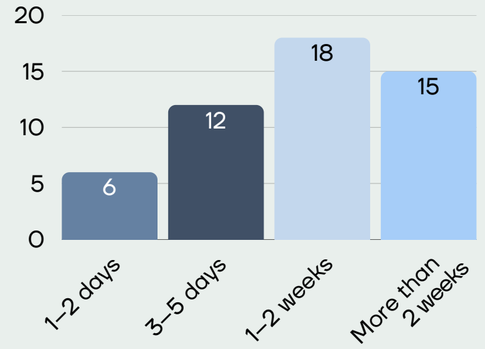
Vulnerable groups need stronger support during evacuation.



Task 1 Survey Questionnaire & Results

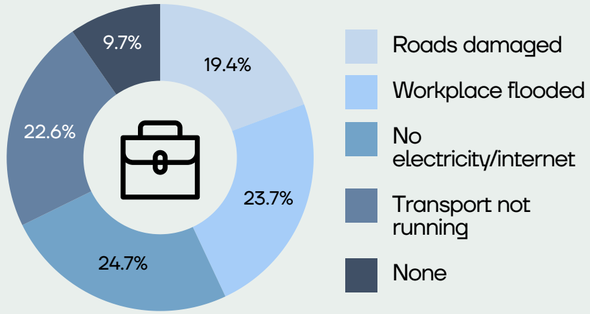
Section 5: Flood Recovery

Q1: "How long does recovery usually take for daily activities to return to normal?"

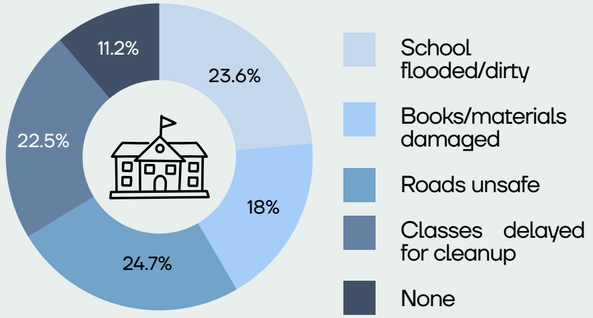


Why does recovery take long?

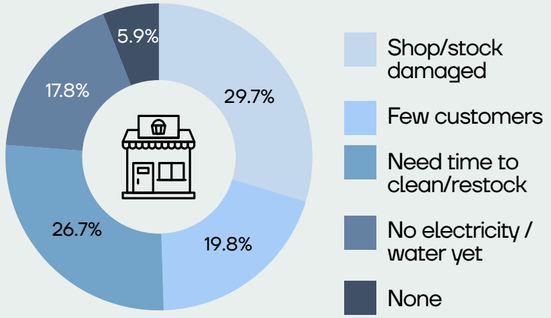
Work:



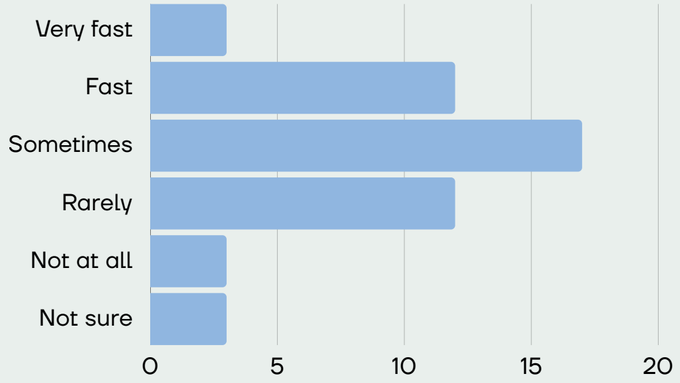
School:



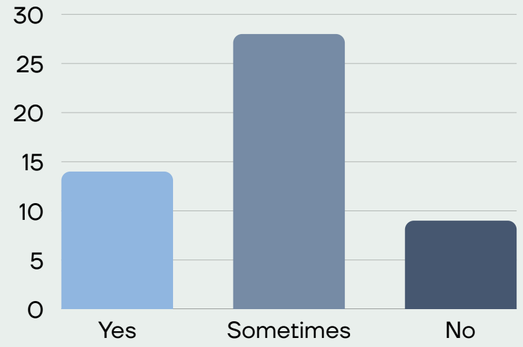
Shops:



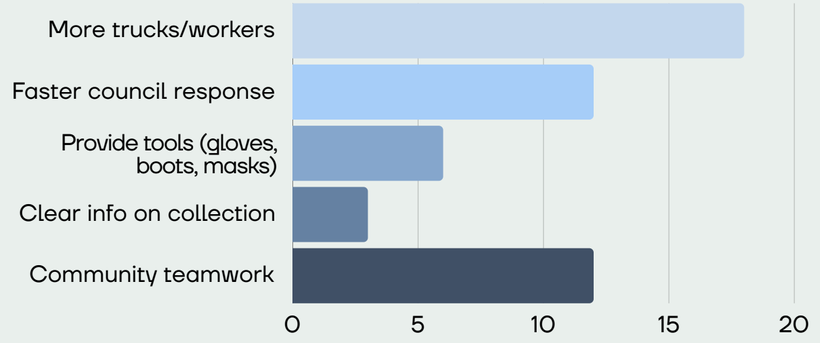
Q2: "How fast is post-flood clean-up?"



Q3: "Do you think your street drainage is regularly cleaned by authorities?"



Q4: "What is the best way to encourage residents to keep drains clean?"



Task 1 Survey Key Findings

MAJOR ISSUES

Recovery is slow due to damaged roads, utilities, schools, and shops.

Clean-up is often delayed by days or weeks.

Drains are not cleaned regularly, causing repeated flooding.

KEY IMPROVEMENTS SUGGESTED

Speed up post-flood clean-up efforts

Quick removal of mud, debris, and waste helps communities resume normal activities sooner.

Provide tools to residents (gloves, boots, masks)

Allow communities to start cleaning safely without waiting for authorities.

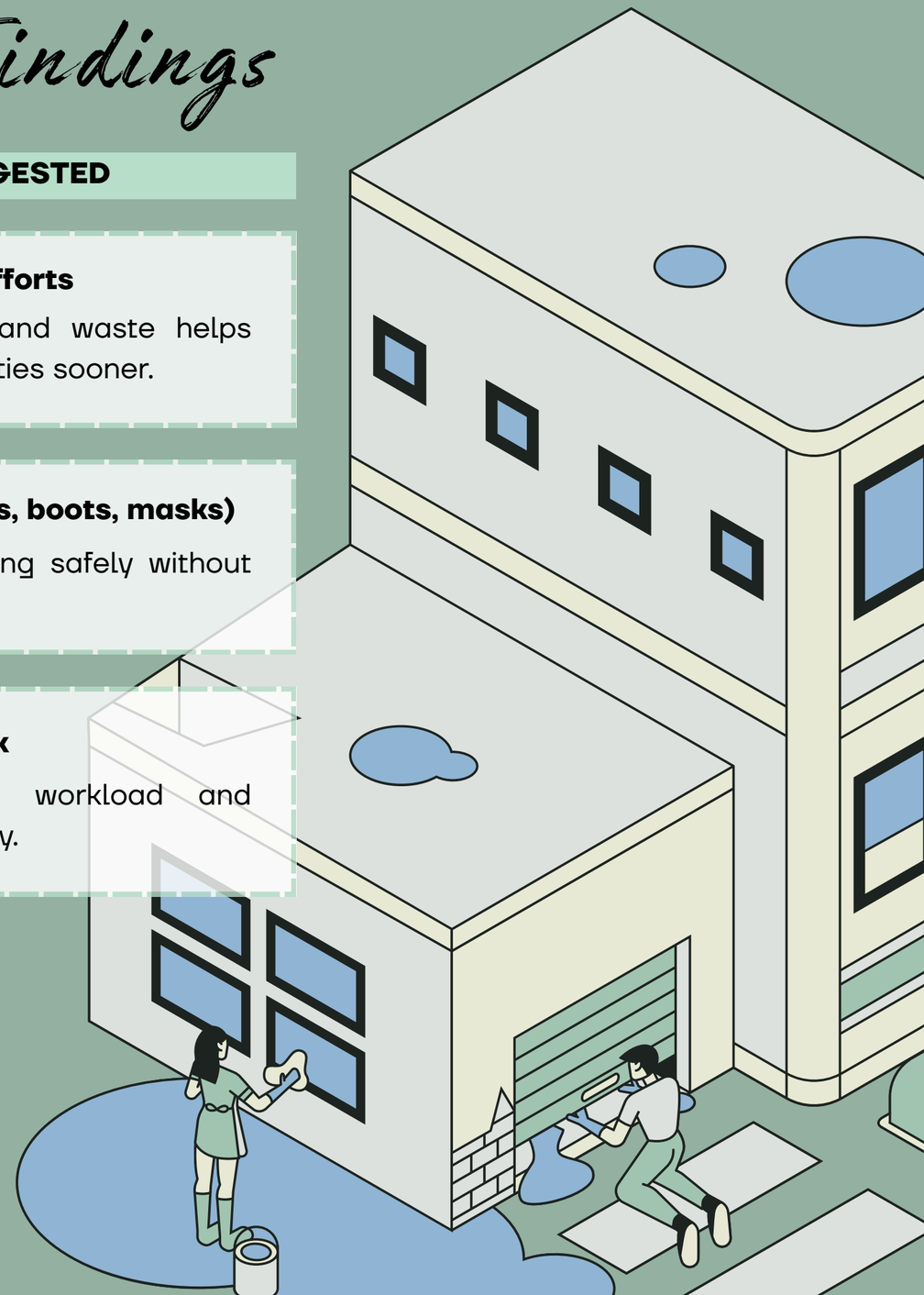
Encourage community teamwork

Joint clean-up efforts reduce workload and accelerate neighbourhood recovery.

LEARNING IMPACTS

Slow clean-up and maintenance gaps prolong recovery.

Community participation plays a big role in speeding up the return to normal life.



Research Methodology: Expert Interview

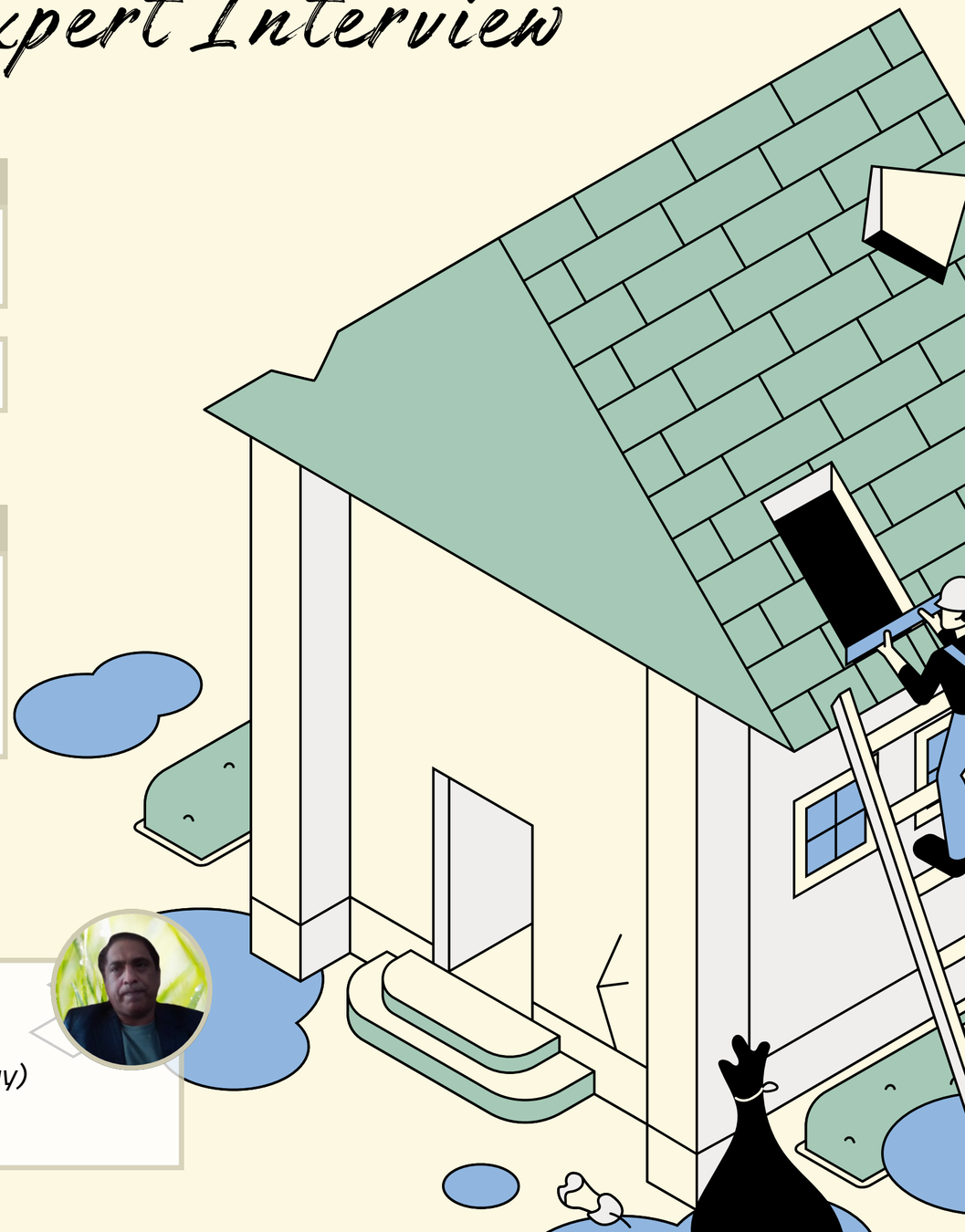
METHOD CHOSEN

Online face-to-face interview
(via Zoom)

Semi-structured interview

REASON FOR CHOOSING THIS METHOD

- To gather professional insights on flash flood issues
- To validate assumptions with real-world experience
- To understand problems from both technical and social perspectives



Interview Participant (Expert Profile)

01

Ir. Ts. Dr Safari
National Water Research Institute of Malaysia (NAHRIM)

02

Dr Cyril
Solnovation (SMART technology)
(more to data analytics)

Themes for Sections

Identify the key factors—environmental, structural, and human—that contribute to rapid flooding in urban areas.

Section 1

Causes of Urban Flash Floods

Section 2

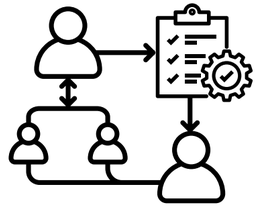
Priority Mitigation Actions

Assess the key strategies and interventions needed to reduce urban flood risks effectively.

Examine how agencies coordinate, communicate, and operate during flood events to ensure effective response.

Section 3

Organisational Response & Rules



Task 1 Interview Questionnaire & Results

Section 1: Causes of Urban Flash Floods

Q1: "What do you think are the main factors that contribute to recurring flash floods in urban areas?"

IR. TS. DR SAFARI

Social Behaviour & Waste Mismanagement

- Small scattered waste (e.g., tissue, packaging) often **clogs drains**.
- **Public attitude** of relying on authorities instead of personal responsibility.
- Need for **education** among students, parents, and communities.

Climate Change Impacts

Increasingly intense and frequent rainfall events

Inadequate Drainage Design

Existing drains may **not** be **sized** or **designed** for **current urban conditions**.

Land Use Changes

- **Reduction of natural infiltration** as urban surfaces increase.
- Leads to higher surface runoff.

DR CYRIL

Outdated & Historically Built Drainage Systems

- Urban drainage networks were built long ago and **may not match today's needs**.
- **Inherited systems** may be **outdated**, **undersized**, or **poorly planned**.

Climate & Weather Uncertainty

Flash flood prediction is difficult due to shifting, uncertain climate patterns.

Loss of Natural Catchments

Cities have **removed or built over** lakes, wetlands, and catchment zones.

Example: Bangalore reduced from 150 lakes to only 2 → major cause of urban flooding.

Poor Monitoring Systems

- Drains are often **not monitored in real time**.
- Recommends **sensor systems** to detect rising water and blockages.

Task 1 Interview Key Findings

MAJOR ISSUES

Human Behaviour Issues

Poor waste habits and low public responsibility cause drains to clog.

Structural Weaknesses

Outdated drains and lost catchments limit the city's ability to absorb runoff.

Extreme Rainfall

Intense and unpredictable rainfall overwhelms drainage systems.

KEY IMPROVEMENTS SUGGESTED

Strengthen Public Awareness & Behaviour Change

Increase education on proper waste disposal and community responsibility to reduce drain blockage.

Upgrade & Redesign Drainage Systems

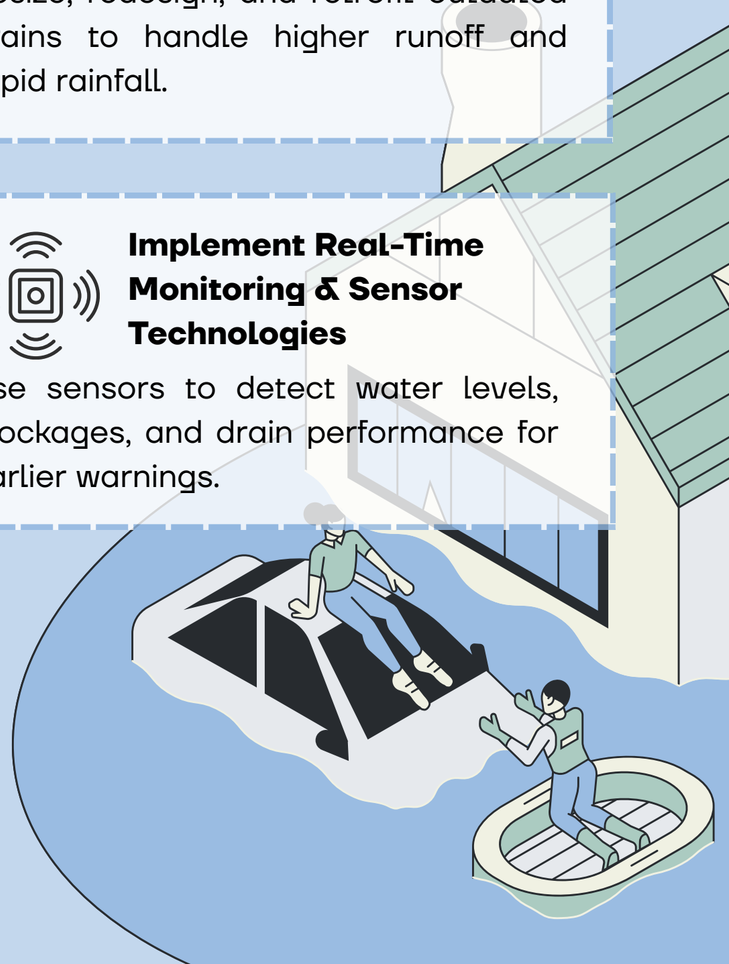
Resize, redesign, and retrofit outdated drains to handle higher runoff and rapid rainfall.

Protect & Restore Natural Catchment Areas

Preserve wetlands, lakes, floodplains, and infiltration zones to naturally store water.

Implement Real-Time Monitoring & Sensor Technologies

Use sensors to detect water levels, blockages, and drain performance for earlier warnings.



LEARNING IMPACTS

Flooding is caused by both people and infrastructure.

Natural catchments are essential.

Real-time monitoring improves early detection.

Task 1 Interview Questionnaire & Results

Section 2: Priority Mitigation Actions

Q2: “Which mitigation actions should be prioritised to reduce the impact of urban flash floods in communities?”

IR. TS. DR SAFARI

Engineering Mitigation

- **SMART Tunnel** as a major structural solution.
- **Off-river storage** to temporarily hold excess water during extreme rainfall.
- Helps **slow down water velocity** and prevent overflow.

Community Education & Adaptation

- **Public awareness** is part of adaptation.
- Educating people on **flood behaviour** and **preparedness**.
- **Reduces human-related issues** and improves response during floods.

Integrated Water Resources Management (IWRM)

- Most **essential framework** for long-term flood management.
- **Ensures coordinated planning** across agencies and sectors.
- **Government** must prioritise **cost-effective** and appropriate **solutions**.

DR CYRIL

Infrastructure Monitoring & Risk Management

- Continuously monitor **slopes**, **waterways**, and **drainage**.
- Use sensors to detect **instability** or **blockages**.
- **Improve monitoring systems** to prevent slope-related flooding.

Community-Level Flood Response Measures

- Install simple **water-level sensors** in neighborhoods.
- Provide **timely flood alerts** for safety.
- **Assist local traffic management** during floods.

Data-Driven Prediction & Early Warning Systems

- Use existing flood data from **NADMA** and **METMalaysia**.
- **Apply AI and satellite-based prediction tools.**
- Install **IoT sensors** to monitor water levels.
- Provide **real-time alerts** (e.g., amber/green/red signals).

Task 1 Interview Key Findings

MAJOR ISSUES

- Insufficient real-time monitoring
- Low community preparedness
- Inaccurate early-warning systems
- Limited structural capacity

KEY IMPROVEMENTS SUGGESTED

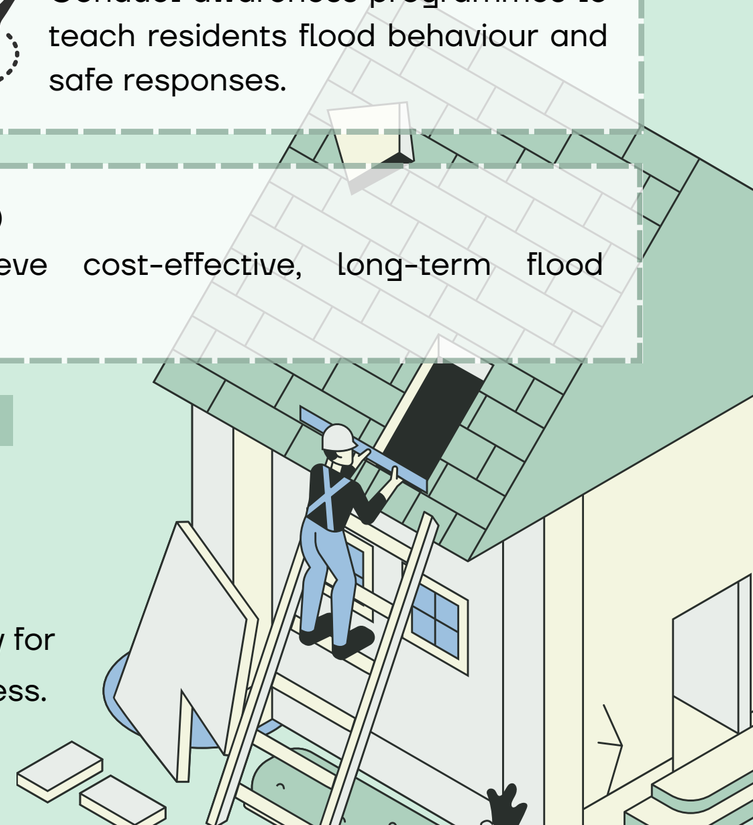
Engineering & Structural Enhancements
Expand off-river storage and use large-scale solutions like SMART Tunnel.

Improve Early Warning Systems
Use IoT, AI, and satellite tools for quick, accurate alerts and real-time warnings.

Strengthen Monitoring & Risk Management
Install sensors for blockages and water levels, and monitor slopes continuously.

Enhance Community Preparedness
Conduct awareness programmes to teach residents flood behaviour and safe responses.

Integrated Water Resources Management (IWRM)
Coordinate planning across agencies to achieve cost-effective, long-term flood management.



LEARNING IMPACTS

Flood mitigation needs both engineering solutions and community responsibility.

Technology like IoT and AI is crucial for accurate monitoring and quick response.

Community awareness and coordinated planning are key for long-term success.

Task 1 Interview Questionnaire & Results

Section 3: Organisational Response & Rules

Q3: “What roles does your organization typically obey during a flash flood? And how effectively does it function in practice?”

IR. TS. DR SAFARI

Organisation’s Role

- **NWRIM** is a **research institute**, not an engineering response agency.
- Focuses on **research**, **education**, and **awareness**, not physical flood operations.

Collaboration With Agencies

- Works with **emergency agencies** such as **Bomba** and others responsible for alerts.
- Supports agencies by **educating the public on how to respond**.

CEPA Programme (Core Strategy)

- Uses **Communication**, **Education**, **Participation** & **Public Awareness (CEPA)**.
- Develops **education modules** for **different age groups** (primary, secondary, university).
- Conducts **community outreach** in villages and residential areas.

Public Flood Awareness & Warning System

- Promotes use of Public **Info Banjir** for real-time flood data.
- Explains government investments in **monitoring stations**. →
  - Rainfall stations
  - River level stations
  - Flow volume probes
- Educates people on the **three alert levels**. → Alert → Warning → Danger
- Teaches communities how to respond at each level.
- **Emphasises importance of recognising siren sounds** during floods.

Task 1 Interview Key Findings

ORGANISATIONAL RESPONSE & ACTIONS

Improving Drainage Rules & Compliance

The organisation updates drainage maintenance rules and SOPs together with DBKL and DID to ensure consistent enforcement.

Collaborative Agency Response Efforts

Agencies like DID, DBKL, JPS, and Alam Flora work together to maintain drainage and share information for quicker flood response.

Public Flood Warning & Monitoring Education

The organisation teaches communities to use Public Info Banjir, understand alert levels, and respond to real-time signals.

Increase Public Awareness & Education

Through CEPA, the organisation runs modules, workshops, and outreach to promote flood awareness and readiness.

KEY STEPS

Early Warning Dissemination

Provides timely alerts to help communities prepare before conditions worsen.

Inter-Agency Coordination

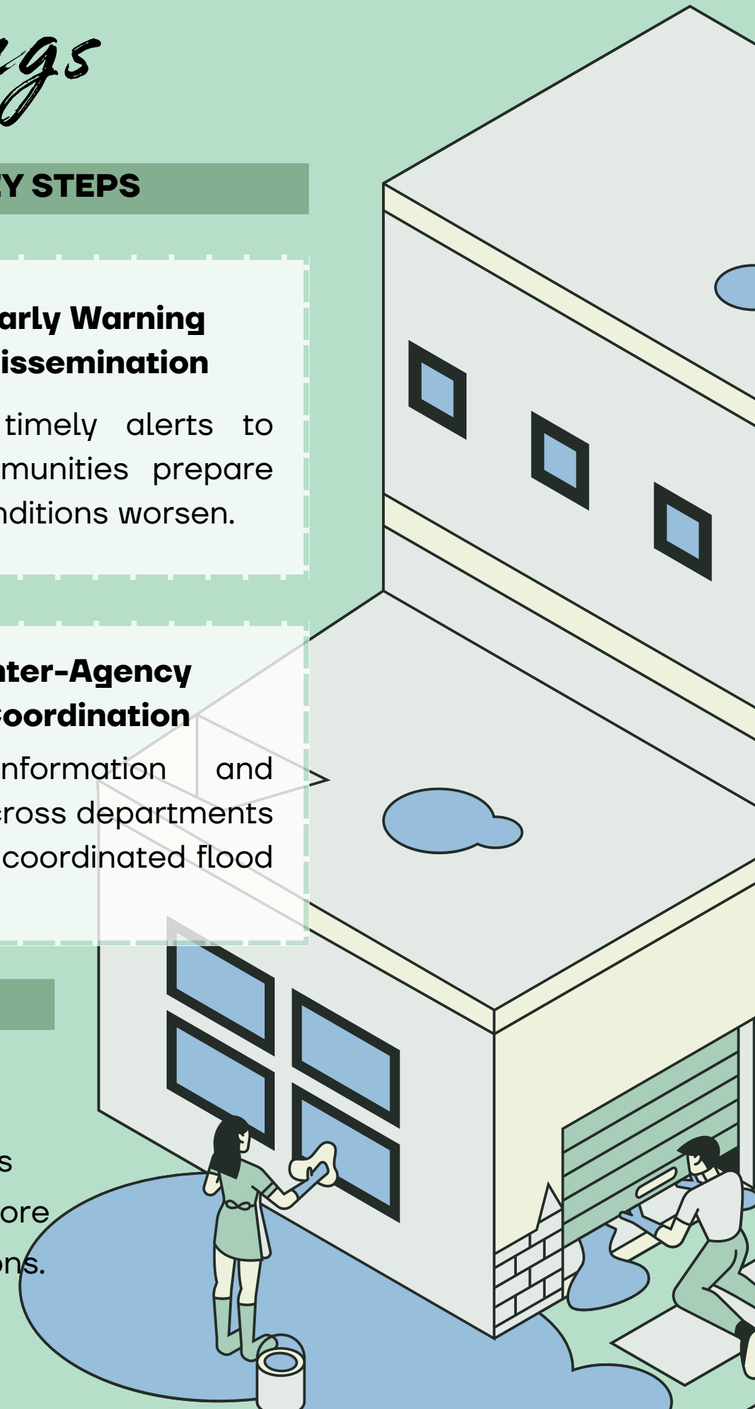
Unifies information and actions across departments for faster, coordinated flood response.

LEARNING IMPACTS

Reliable community data is crucial for effective flood prediction.

Involving residents strengthens early detection and preparedness.

Collaboration between agencies leads to faster, more coordinated actions.



Task 1 Key Overlapping Findings of Expert & Residents

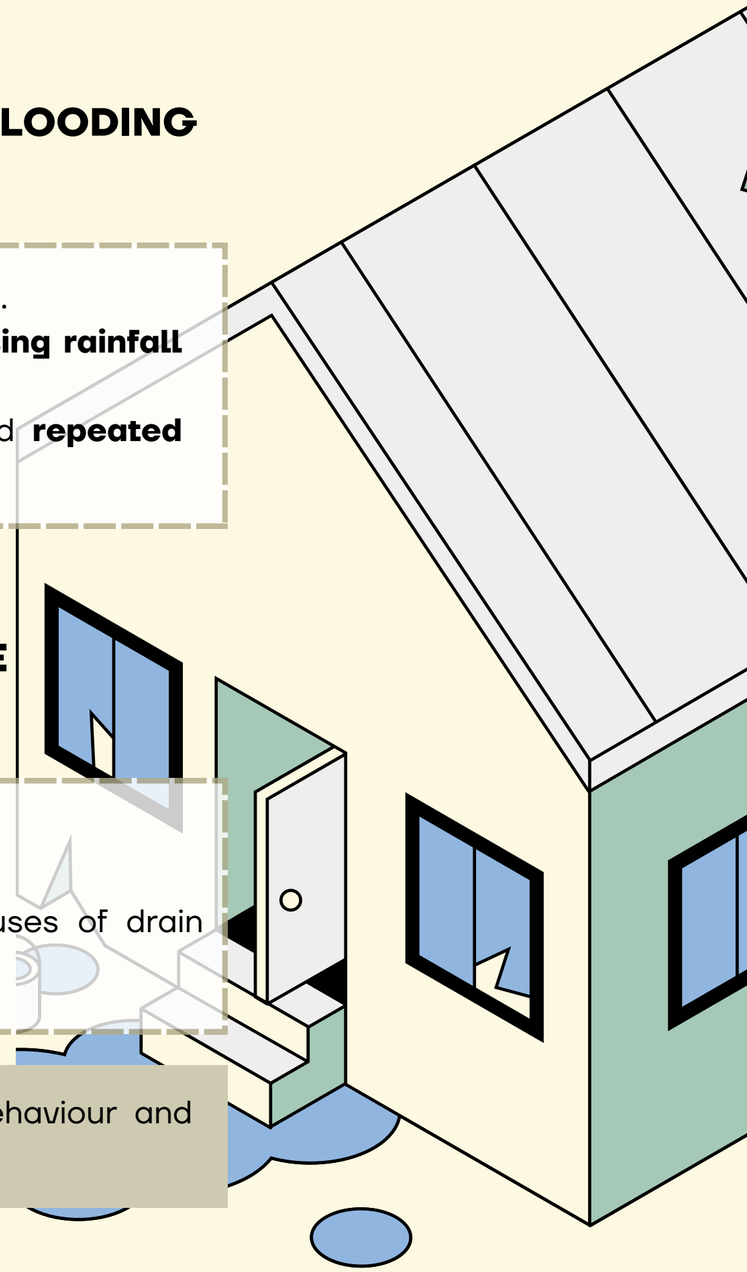
INADEQUATE DRAINAGE SYSTEMS ARE THE PRIMARY FACTOR OF URBAN FLOODING

- Both **experts** and **communities** consistently identify **drainage failure** as the **main factor** leading to flooding.
- **Experts** explain that many **drainage systems** are **outdated**, undersized, and unable to cope with **increasing rainfall intensity.**
- Communities directly experience flooding through **clogged** and **narrow drains**, **irregular cleaning**, and **repeated flooding** in the same areas.

HUMAN BEHAVIOUR & AWARENESS ARE AS CRITICAL AS INFRASTRUCTURE

- Both **experts** and **communities** identify **human behaviour** as a **key factor** in urban flooding.
- Experts highlight **waste mismanagement**, **low public responsibility**, and **lack of preparedness.**
- Communities acknowledge **littering, irregular clean-ups**, and **weak awareness programmes** as causes of drain blockage.

Both expert and community surveys reveal that effective flood mitigation depends on changing public behaviour and upgrading inadequate drainage systems, as neither engineering nor awareness alone is sufficient.

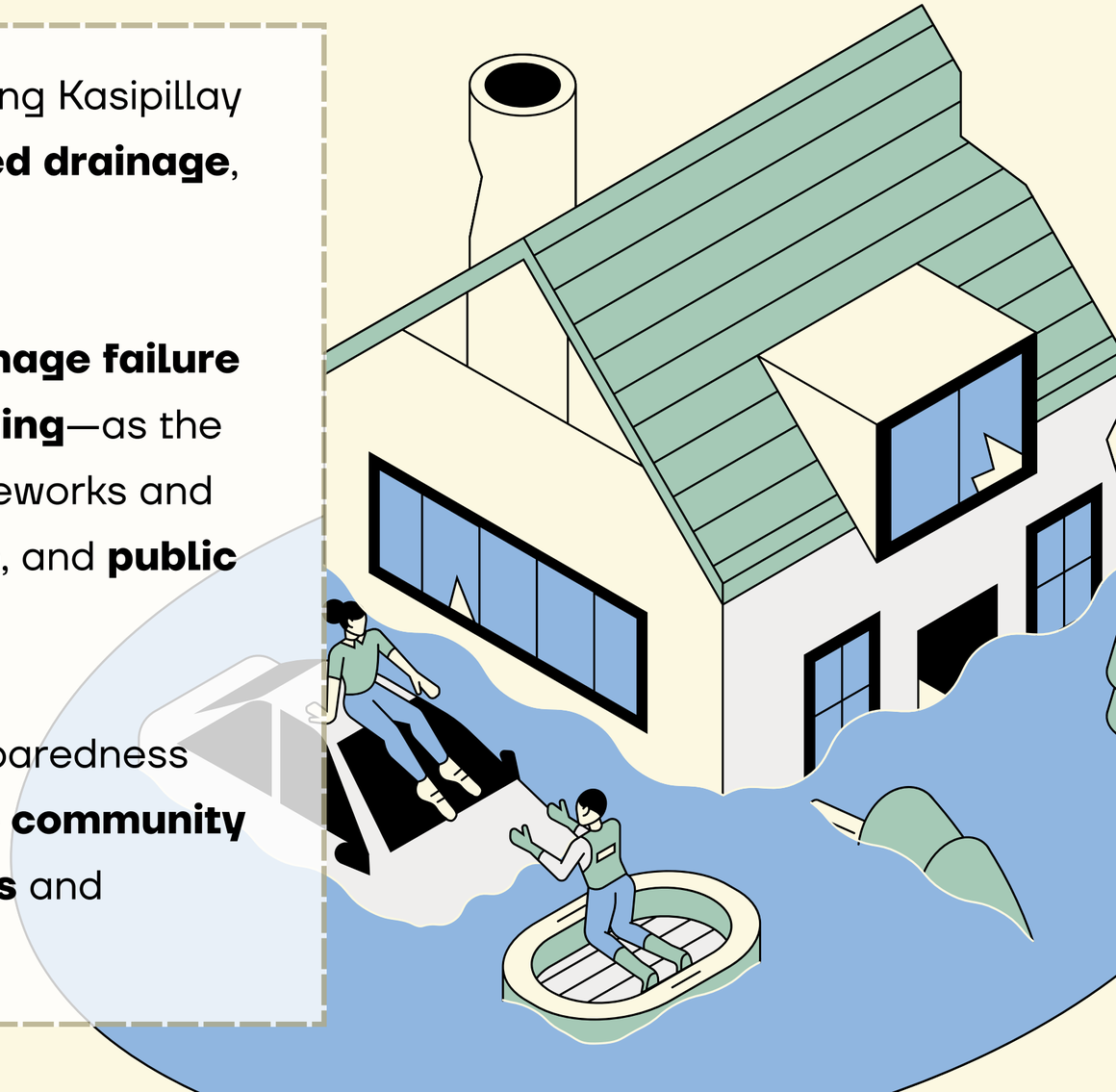


Conclusion

In conclusion, Task 1 shows that **flood vulnerability** in Kampung Kasipillay stems not just from **environmental factors** but from **outdated drainage**, **poor maintenance**, and **human behaviour**.

Both **community** surveys and **expert** interviews point to **drainage failure** —due to **clogging**, **undersized systems**, and **irregular cleaning**—as the main cause of recurring flash floods. Although volunteer frameworks and early warning tools exist, **gaps** in preparedness, **coordination**, and **public awareness** remain.

This underscores the need for an **evidence-based flood** preparedness training module to **strengthen volunteer capacity**, **enhance community responsibility**, and **improve coordination** between **residents** and **authorities**.



Task 2

Townwatching Ecosystem (AR/VR Content)

Prepared by
Task 2 Group N, O, P, Q

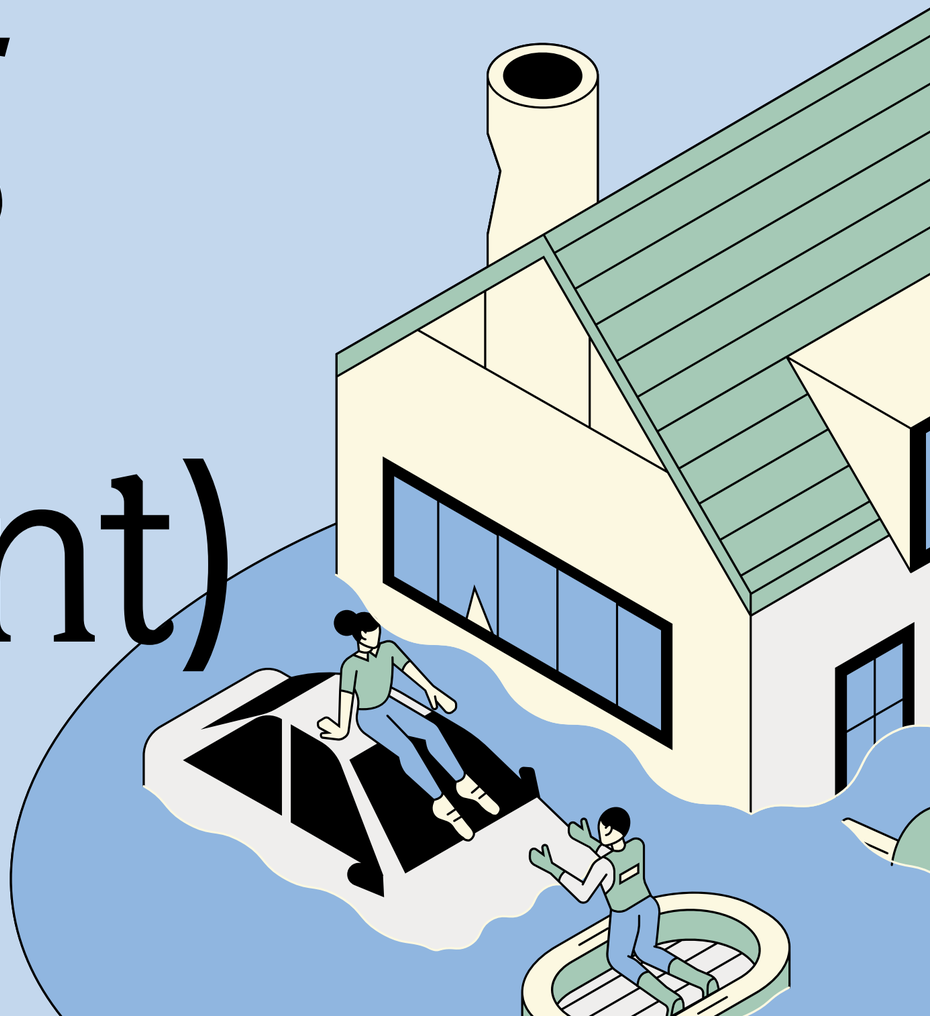


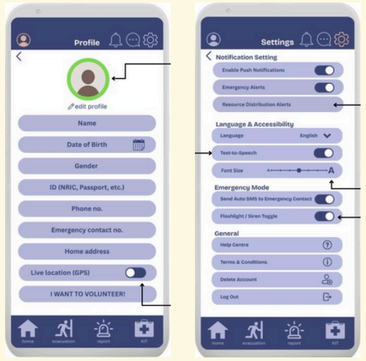
Table of Content

Background Study

The EVACC app is a mobile evacuation support system designed to assist users during flood emergencies. It provides a centralized platform where essential tools and information are easily accessible.

Homepage

General Settings



The EVACC homepage gives users quick access to key tools like the SOS alert, shelter guide, inventory, and dashboard, with added features such as hands-free use, live location, and safety indicators.

Harzard Notifications

The Hazard Notification page provides real time updates on flood conditions, including water level, flood duration, spread, and severity through a colour coded system. Users can view live flood movement, filter information, and access clickable icons for Google Map directions. The page also lists nearby evacuation centres with call and chat options for quick enquiries.

Warning System

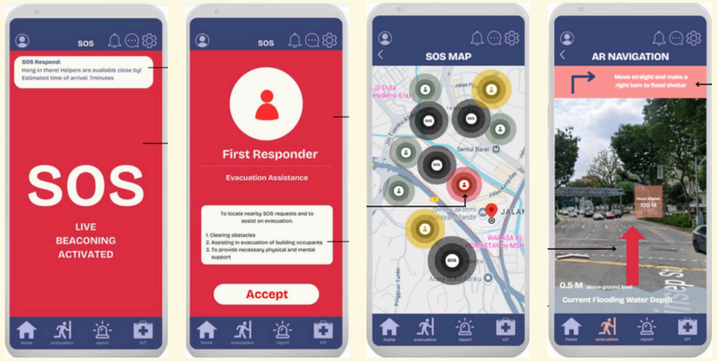
The Warning System page uses a simple colour coded alert green, yellow, and red to show the current flood risk. It instantly informs users of their safety level and directs them to the flooding zone page, helping them understand whether they are in a safe, caution, or high danger area.

Health Monitoring

The Health Monitoring page lets users report their condition by selecting symptoms, attaching images or medical records, and using auto-filled GPS. A quick Yes/No checklist and symptom form help assess health, and the report is sent to local authorities with a summarized health status.

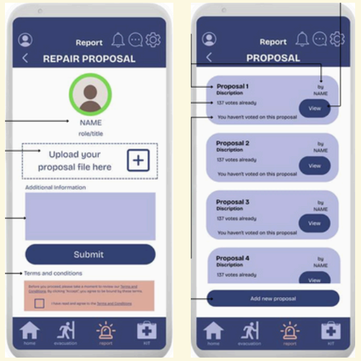
Background Study

During Harzard



The During Hazard page supports users with SOS alerts, responder notifications, and live flood views. It provides a nearby assistance map and AR navigation that shows safe routes, water depth, and shelters for quick evacuation.

Damage report & Community Rebuilding Proposal



This feature allows users or NGOs to submit proposals for community rebuilding. Users can attach images, PDFs, or videos, describe their ideas and benefits, and submit with consent. Submitted proposals are displayed with submitter info, a summary, and a vote counter to show public support.

After Harzard

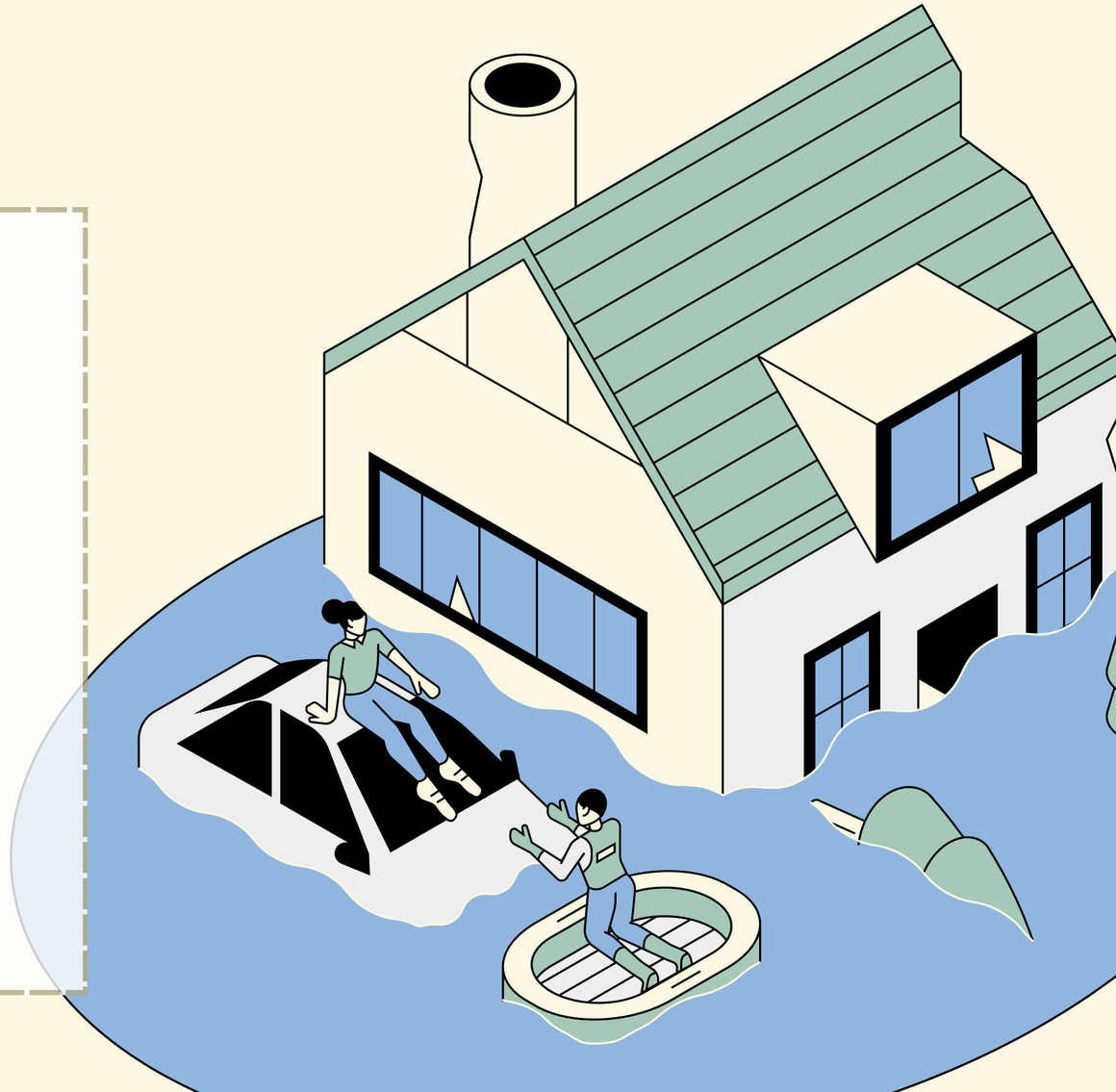
The After Hazard page allows users to report flood damage by uploading photos, adding descriptions, and tagging locations. Reports appear on a live map to inform the community and support damage tracking and rebuilding efforts.

Psychological Support & Community Networking

This page provides quick access to mental health support and resources. Users can chat with therapists, watch guided videos, view survivor testimonials, learn coping strategies, and locate nearby emergency help to promote resilience during and after floods.

Problem Statement

Kampung Kasipillay still faces frequent flooding, yet it is uncertain whether **residents understand the risks, trust existing warnings, or know how to respond during emergencies.** These behavioural gaps make it difficult to evaluate **how effective** a digital tool like the MyEvac App would be. At the same time, without expert input, the app may face issues such as **unrealistic features, poor usability in harsh flood conditions, unreliable data, or misalignment with actual disaster-response practices.**



Research Methodology: Online Surveys

METHOD CHOSEN

Online
questionnaire
(via Google Forms)

REASON FOR CHOOSING THIS METHOD

- Allows collection of both quantitative and qualitative data.
- Reaches a large number of residents efficiently.
- Captures personal experiences, opinions, and perceptions.
- Easy to analyze and compare results for planning purposes.

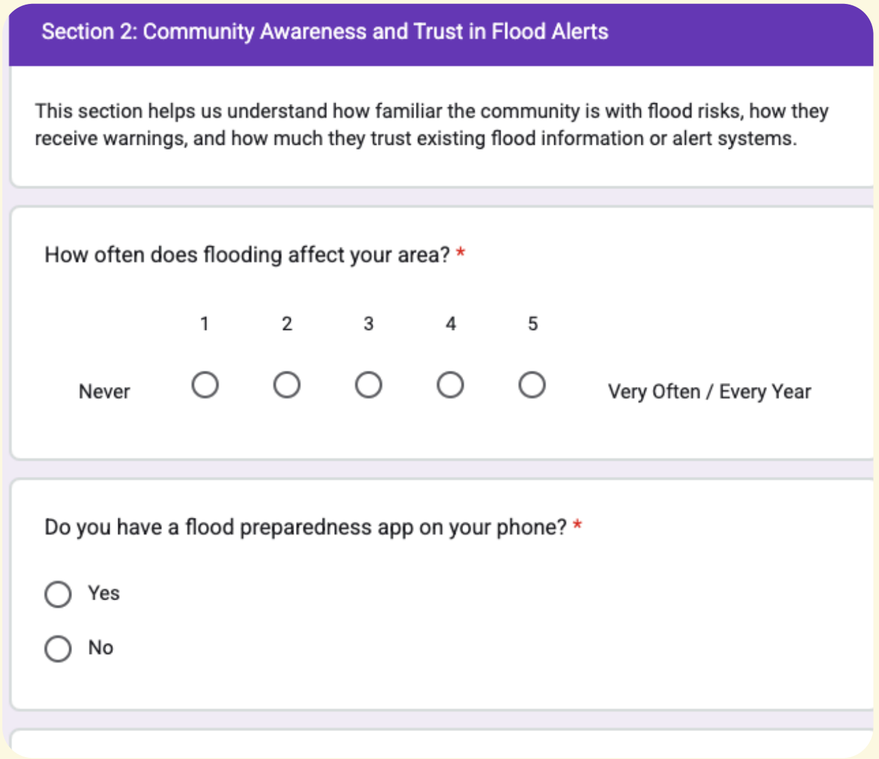
Survey Participant

Residents
Kampung Kasipillay, Kuala Lumpur

MAIN PURPOSE OF SURVEYS

- Collect **community-wide data** on **residents' flood experiences and needs.**
- Identify **common patterns and issues** across households.
- Assess residents' **preparedness and awareness** of flood preparedness apps.
- Provide evidence for **improvement of the MyEvac App.**

Questionnaire (Google Form)



Questions included **multiple-choice, Likert-scale, rating scale and open-ended responses** to capture both quantitative and qualitative data.

Community Flood Survey

Themes for Sections

Section 1
Respondent Background

Understand who the respondents are to interpret their level of familiarity with the area.

Section 2
Community Awareness and Trust in Flood Alerts

Helps to understand what the community needs, concerns, and expectations so that it can be improved.

Section 3
Awareness of Augmented Reality (AR) or Virtual Reality (VR) Technology

Helps assess how familiar the community is with AR/VR and their level of knowledge, ensuring the app's features match their abilities and comfort level.

Section 4
Preferences for App Features

Helps identify the community's preferred app features and functions so the design matches their needs, comfort, and expectations.

Section 5
Community Preparedness & Participation

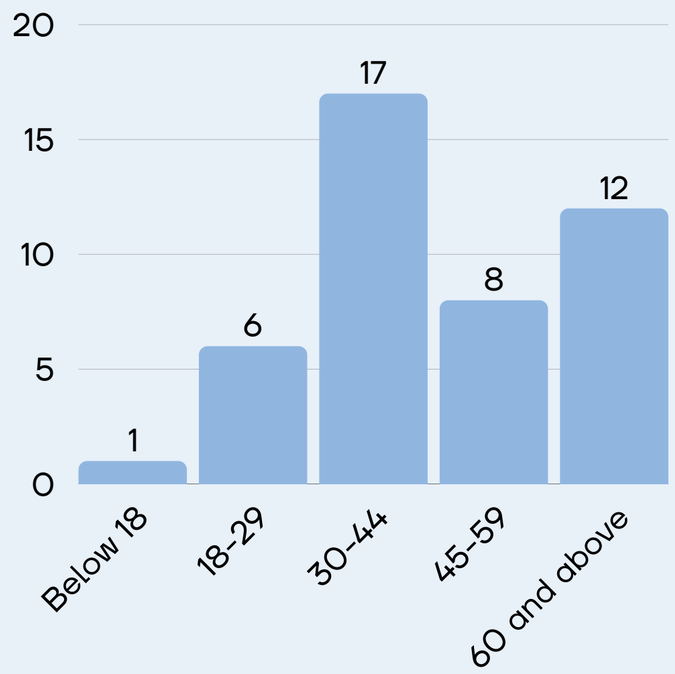
Helps assess how prepared the community is and how willing they are to participate in using the app during real flood emergencies.

Task 2 Survey Questionnaire & Results

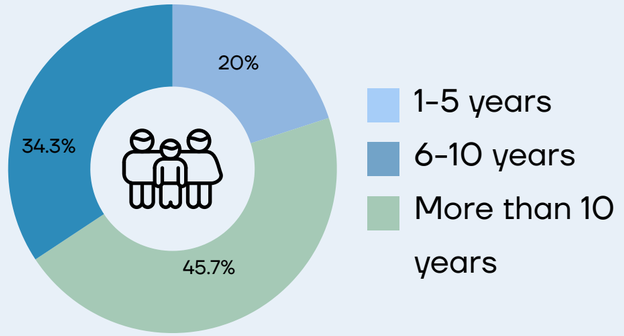
A total of 44 responses were collected.

Section 1: Respondent Background

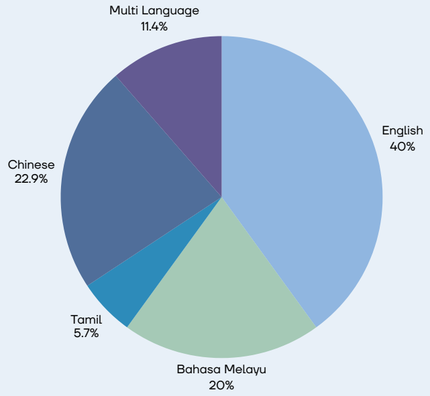
AGE GROUP



YEARS LIVED IN KAMPUNG KASIPILLAY



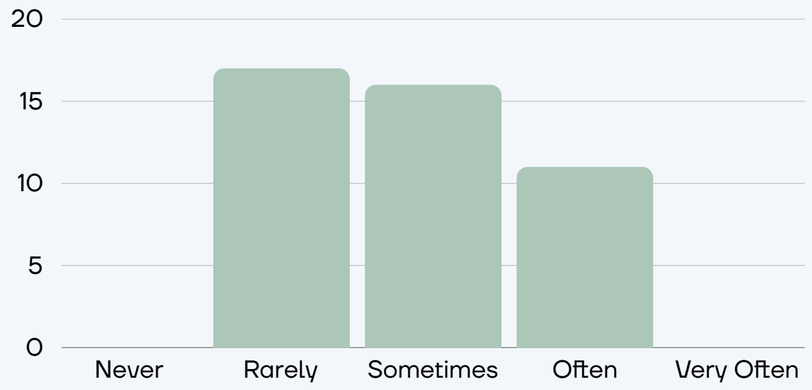
USER LANGUAGE PREFERENCE



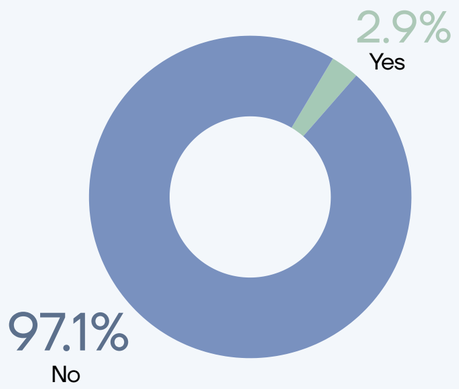
Task 2 Survey Questionnaire & Results

Section 2: Community Awareness and Trust in Flood Alerts

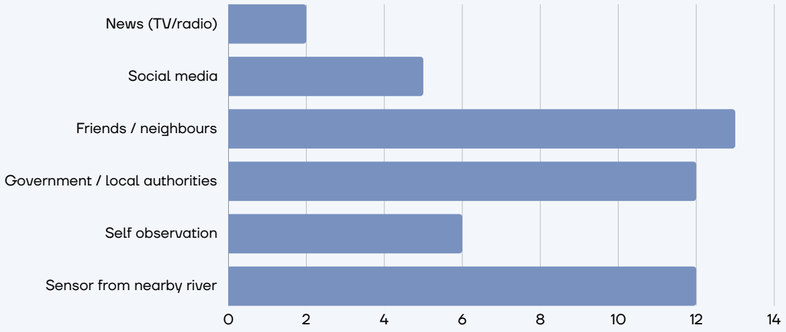
Q1: "How often does Flooding affect your area?"



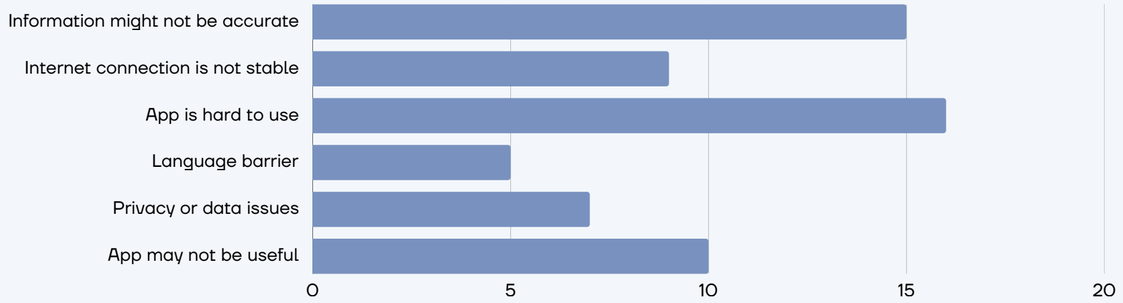
Q2: "Do you have a flood preparedness app on your phone?"



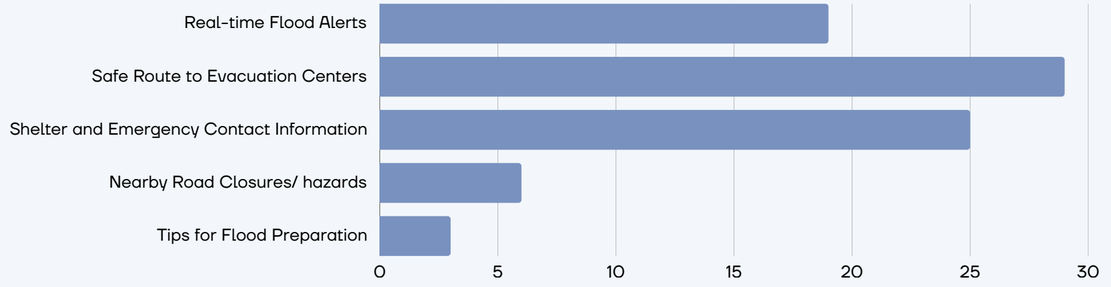
Q3: "How do you usually get flood information or warnings?"



Q4: "What problems might you encounter while using a flood preparedness app?"



Q5: "What kind of information would you like to receive from a disaster app?"



Task 2 Survey Key Findings

MAJOR ISSUES

Low awareness on flood preparation apps

Digital accessibility is high however the awareness of flood apps is extremely low (only 2.9% use one).

Low reliance on flood apps

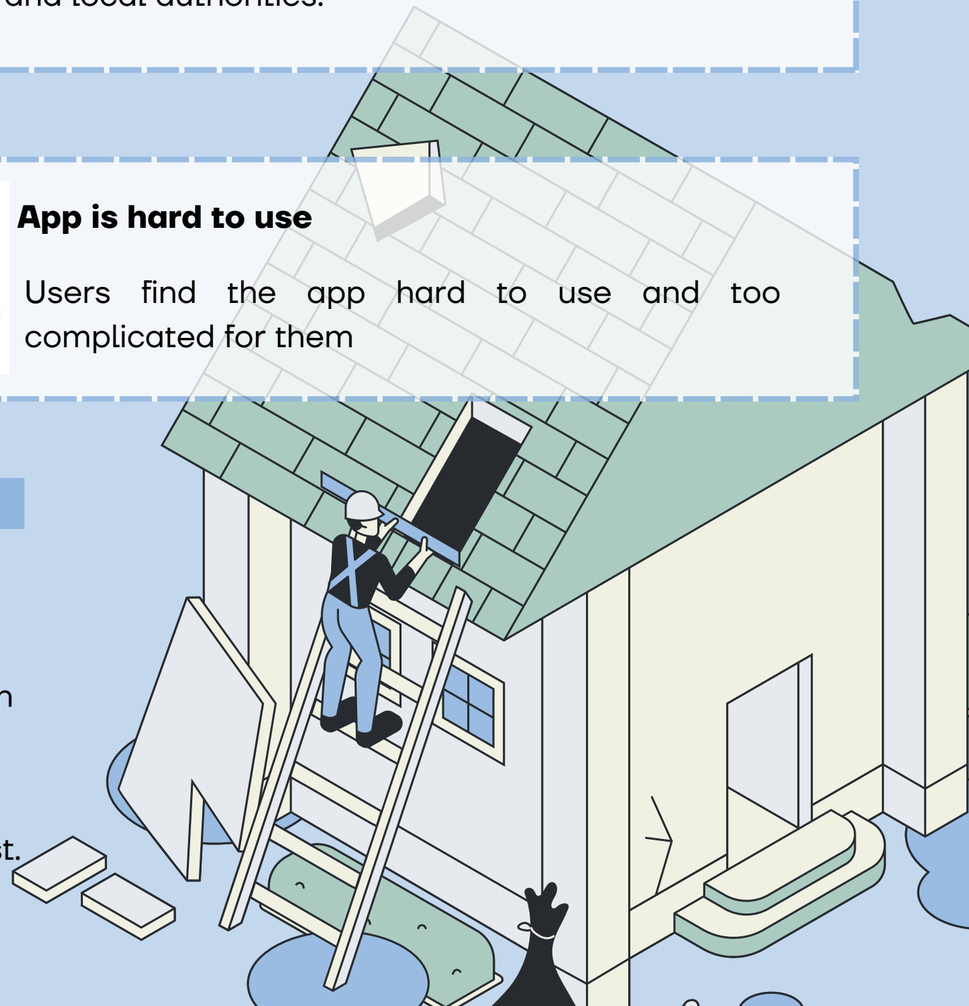
Most residents depend on neighbours, social media, and local authorities.

Barriers to Effective App Usage

Users find the app hard to navigate and question the accuracy of its information

App is hard to use

Users find the app hard to use and too complicated for them



PROPOSED IMPROVEMENTS

Focus on essentials first:

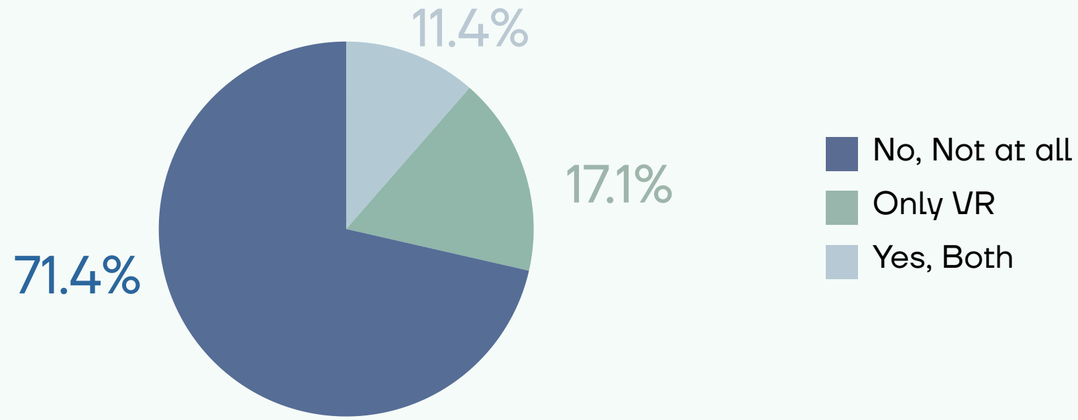
- Real-time alerts
- Clear evacuation maps
- Emergency contacts
- SOS activation

Alerts and information should collaborate with trusted sources to gain residents' trust.

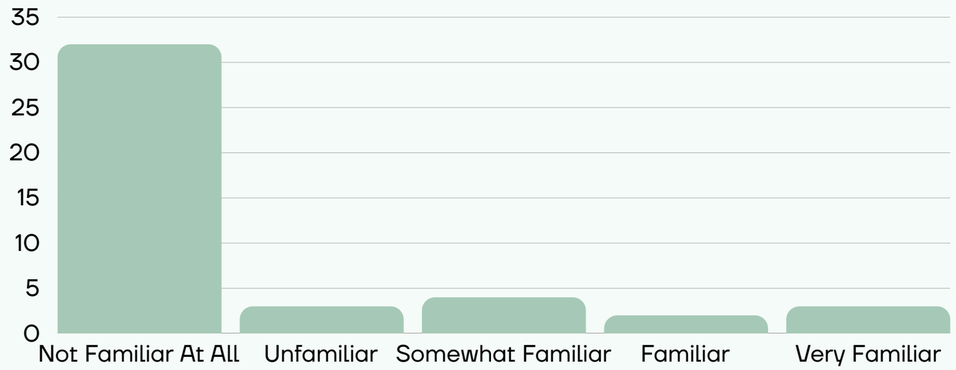
Task 2 Survey Questionnaire & Results

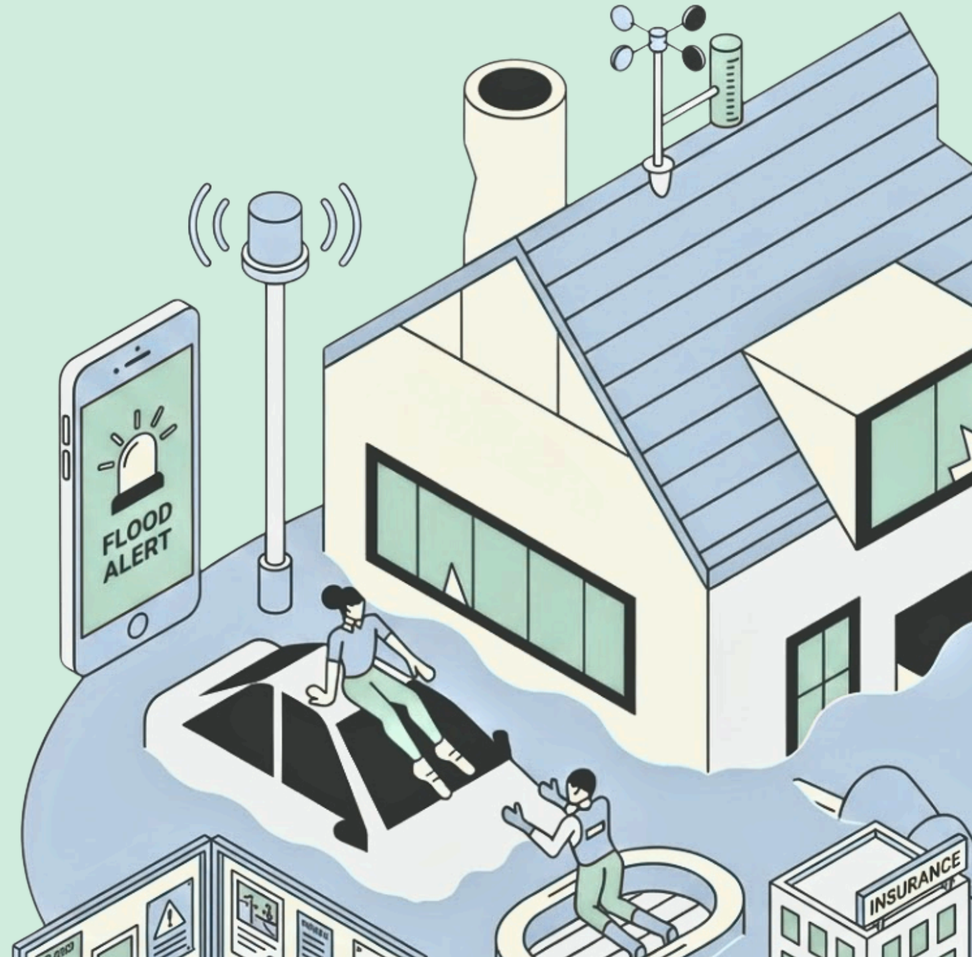
Section 3: Awareness of Augmented Reality (AR) or Virtual Reality (VR) Technology

Q1: "Have you heard of Augmented Reality (AR) or Virtual Reality (VR) before this survey?"



Q2: "How familiar are you with using AR/VR features in mobile apps?"





Task 2 Survey Key Findings

MAJOR ISSUES

Low Familiarity on AR/VR

The majority of the community is unfamiliar with VR and AR and has little to no knowledge of these technologies.

Limited Exposure

This may be due to limited exposure to immersive technologies, lack of access to compatible devices, and minimal integration of VR/AR in everyday applications or public education.

PROPOSED IMPROVEMENTS

Community awareness & education

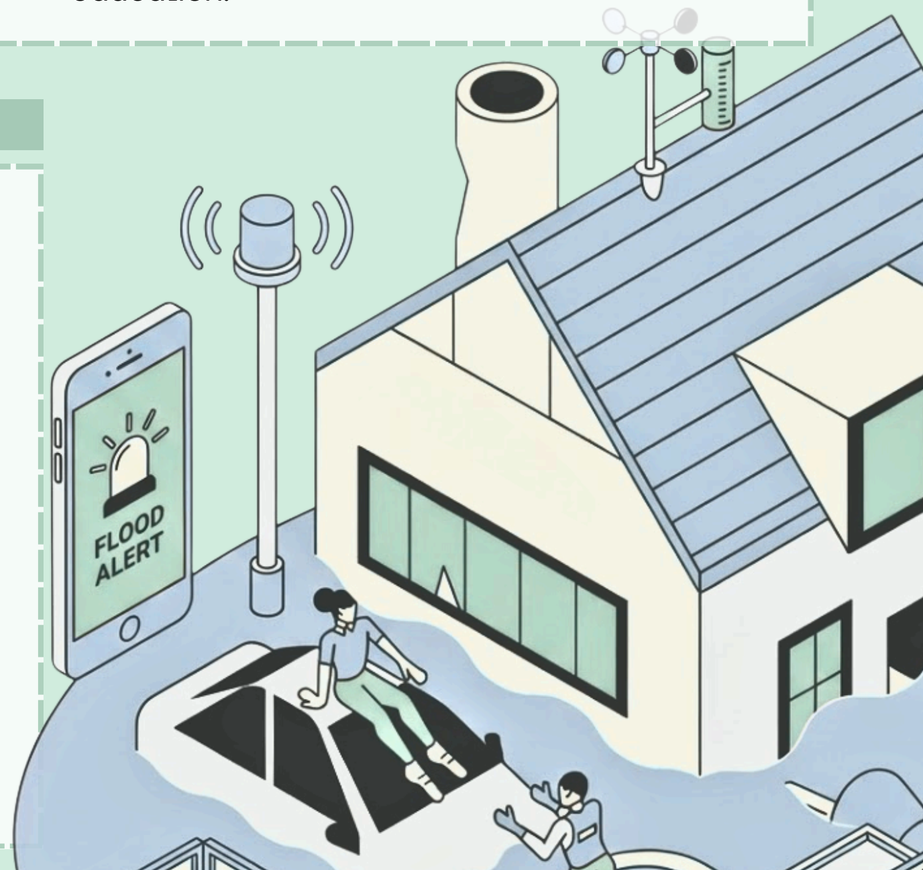
Introduce basic awareness campaigns, short workshops, or demonstrations to familiarize the community with VR and AR concepts.

Simple & guided user experience

Design VR/AR features with clear tutorials, step-by-step guidance, and minimal interaction complexity.

Optional and non-mandatory use

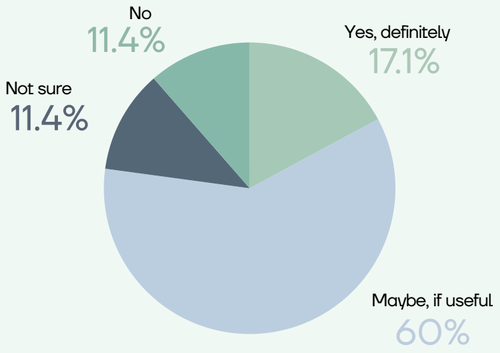
Make VR/AR features optional rather than compulsory.



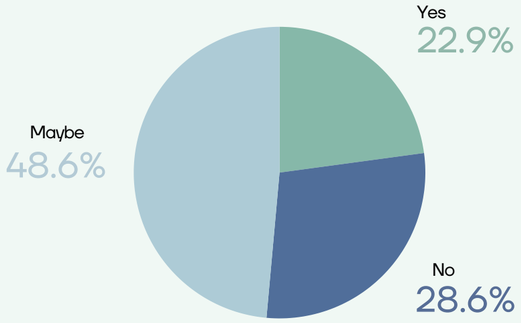
Task 2 Survey Questionnaire & Results

Section 4: Preferences for App Features

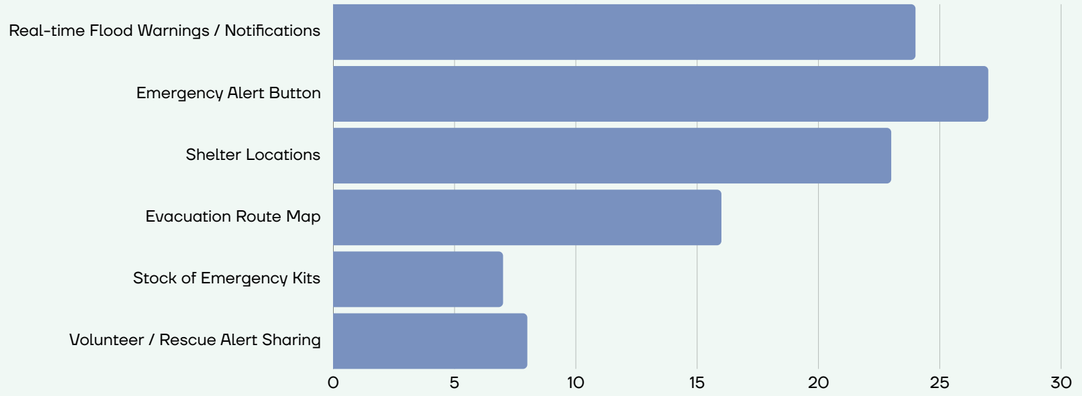
Q1: "If the MyEvac app were available, would you download and use it to prepare for floods?"



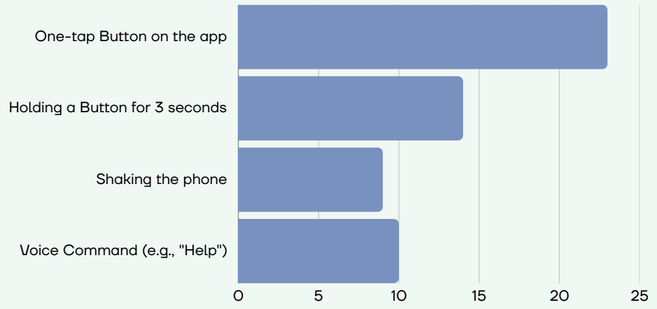
Q2: "Would you be willing to use flood preparedness training tools in the app (guides, videos, simulations)?"



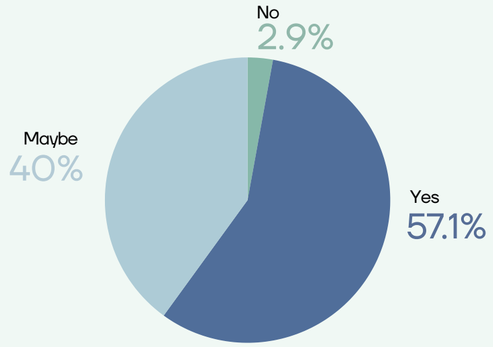
Q3: "Which features would you find most useful in a flood preparedness app?"



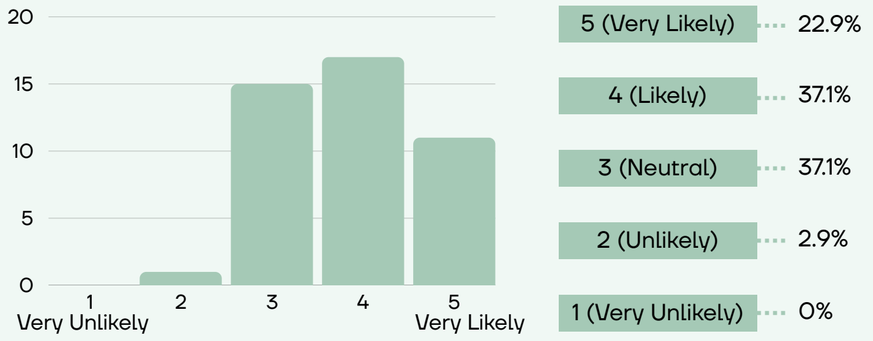
Q4: "How would you prefer to activate an SOS emergency alert?"



Q5: "Would you like the app to automatically send your location to emergency responders when you tap SOS?"



Q6: "Would you like the app to automatically send your location to emergency responders when you tap SOS?"



Task 2 Survey Key Findings

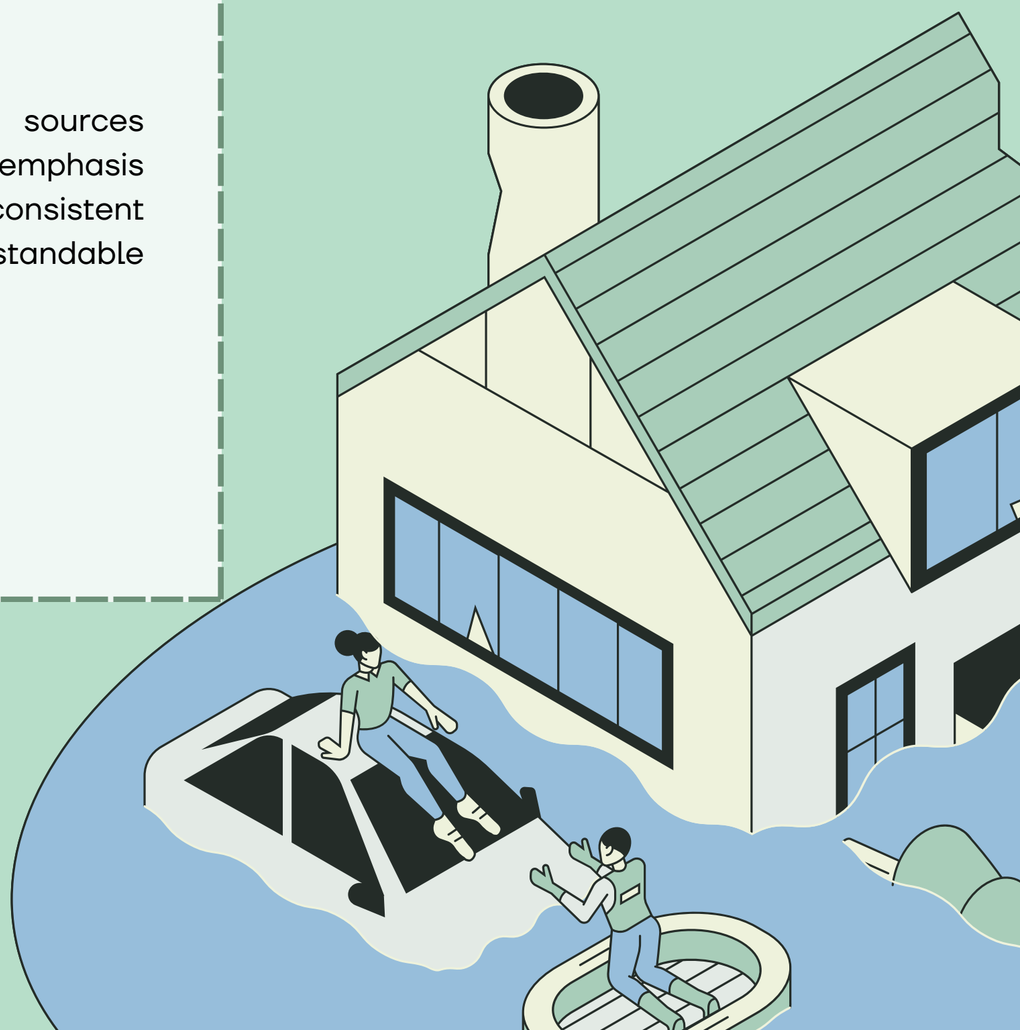
PROPOSED IMPROVEMENTS

Essential Features Over Complexity

Residents prioritize simple, life-saving features such as real-time flood alerts, clear evacuation routes, shelter locations, and a reliable SOS button.

Trust Built Through Clear and Verified Information

Clear information from trusted sources shapes residents' trust, with an emphasis on verified government updates, consistent notifications, and easily understandable language.



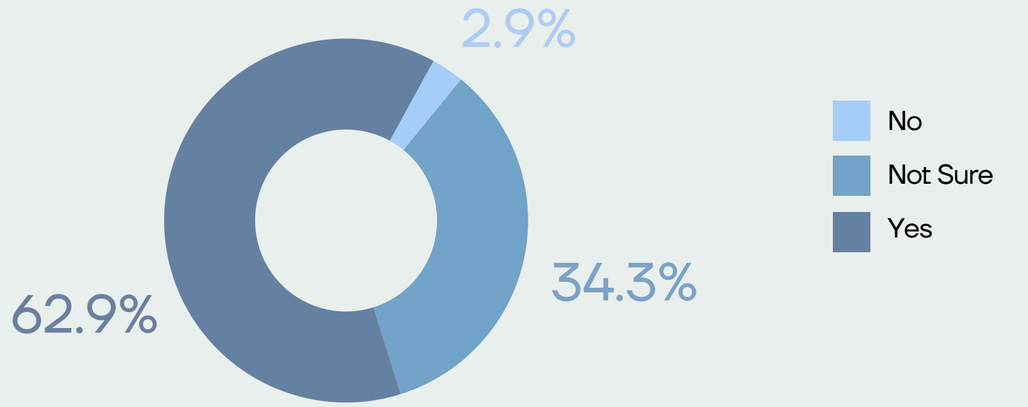
Automatic SOS Button

Residents prefer a SOS button that automatically shares their location with emergency responders. These features enhance safety, reduce response time, and build trust through reliability and ease of use

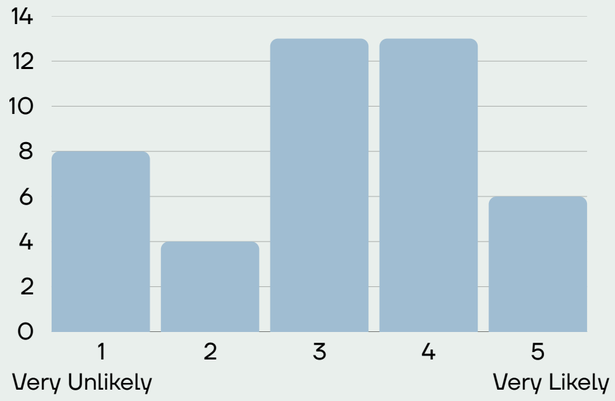
Task 2 Survey Questionnaire & Results

SECTION 5: Community Preparedness & Participation

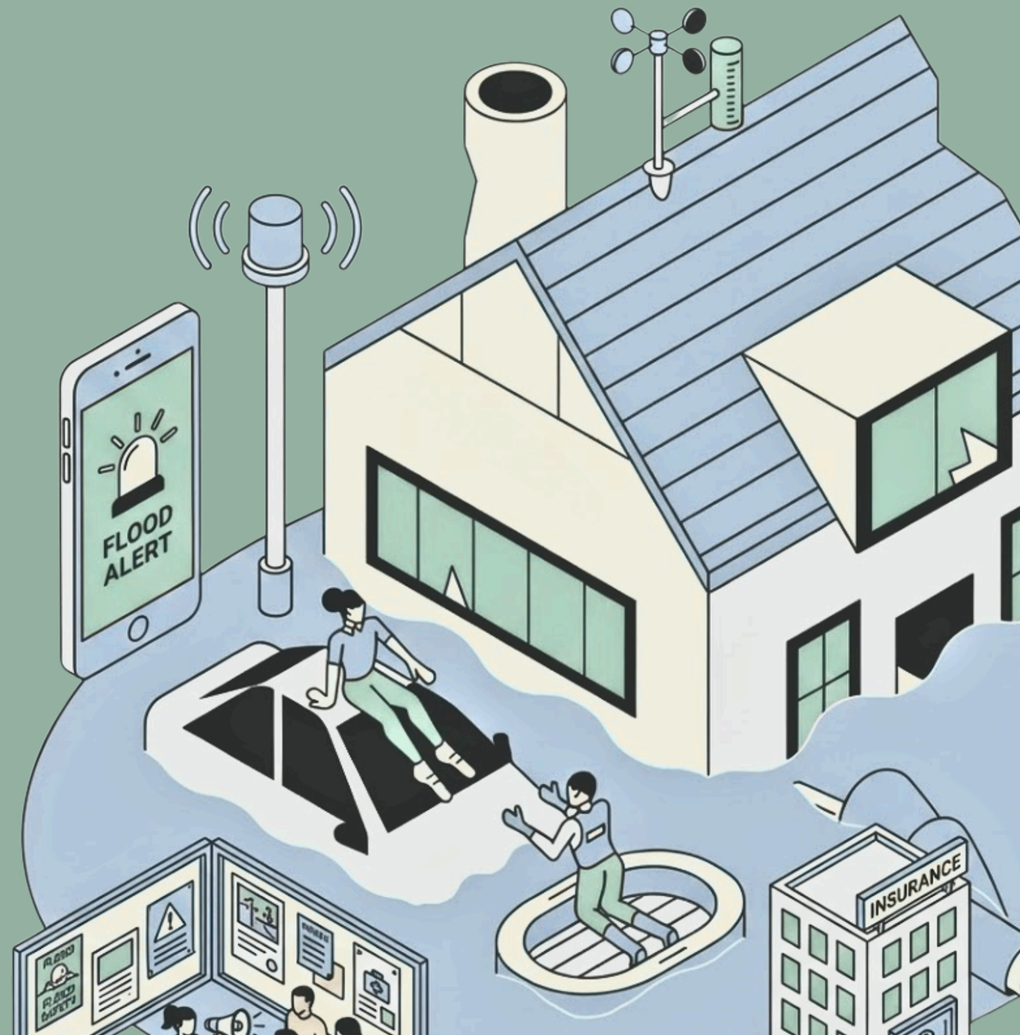
Q1: "Do you think the MyEvac app can help improve community preparedness for floods?"



Q2: "How likely are you to use the MyEvac app and recommend it to others?"



5 (Very Likely)	14.3%
4 (Likely)	28.6%
3 (Neutral)	34.3%
2 (Unlikely)	11.4%
1 (Very Unlikely)	11.4%



Task 2 Survey Key Findings

OVERALL COMMUNITY PERSPECTIVES

62.9% of the community believe that MyEvac can improve preparedness, showing cautious optimism about the app's potential

Majority recognize the value of having timely flood alerts, evacuation routes, and emergency support at their fingertips. It reflects a general willingness to adopt technology that can enhance safety during emergencies.

Many residents however remain neutral or unsure, indicating a need for clearer education and greater visibility of the app

The uncertainty among users suggests that not everyone fully understands the app's functions or benefits.

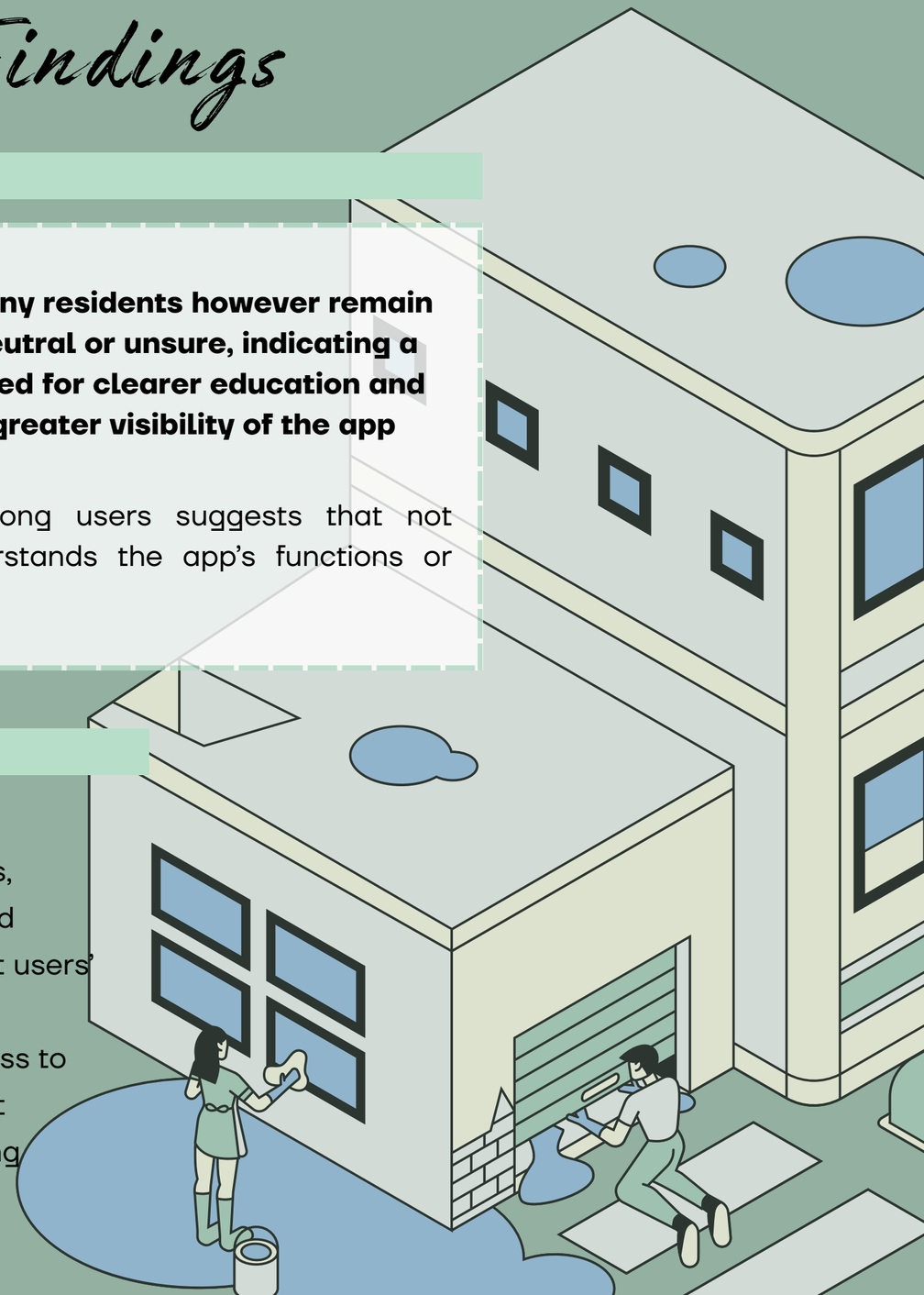
PROPOSED IMPORVEMENTS

Targeted awareness campaigns, demonstrations, and user-friendly tutorials could help increase familiarity, trust, and adoption of the app.

Build trust through partnerships:

- Local leaders
- Government authorities
- Community groups

Providing timely alerts, evacuation routes, and emergency support at users' fingertips reflects the community's willingness to adopt technology that enhances safety during emergencies.



Research Methodology: Expert Interview

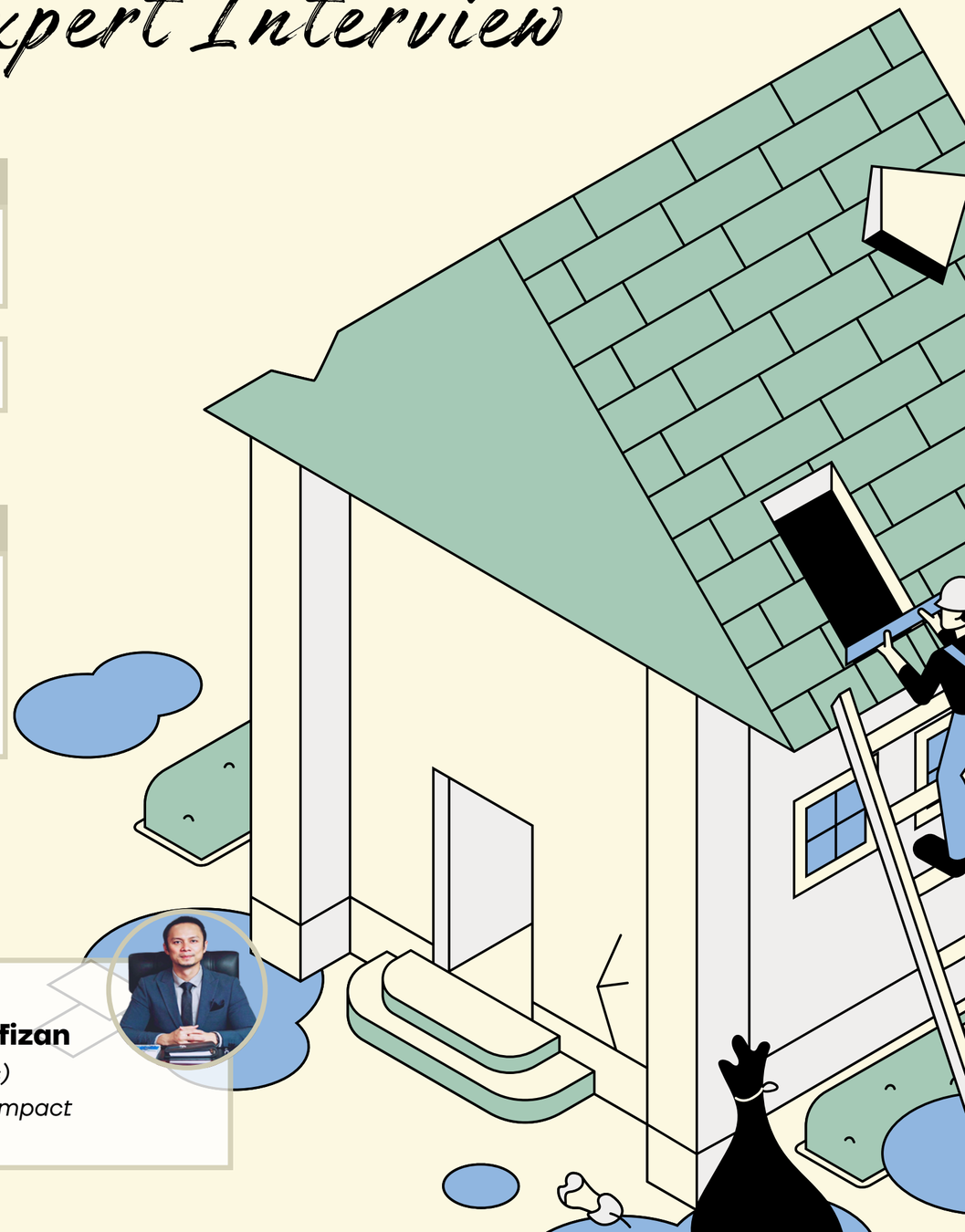
METHOD CHOSEN

Online face-to-face interview
(via Zoom)

Semi-structured interview

REASON FOR CHOOSING THIS METHOD

- To gather professional insights on flash flood issues
- To validate assumptions with real-world experience
- To understand problems from both technical and social perspectives



Interview Participant (Expert Profile)

01

Ir. Ts. Dr Safari
National Water Research Institute of Malaysia (NAHRIM)

02

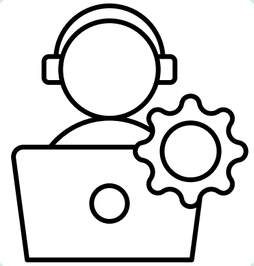
Associate Professor Ts. Dr. Afizan
School of Computer Science (Taylors)
Digital Innovation & Smart Societies Impact Lab Director

Themes for Sections

To identify the app's most useful features, its role in emergency response, and potential improvements for professional use.

Section 1

Section 2: Interview for Ir. Ts. Dr Safari



Section 2

Section 2: Interview for Associate Professor Ts. Dr. Afizan

To gain insights into the app's technical functions and the implementation of AR and VR components.

Task 2 Interview Questionnaire & Results

Section 1: Function of MyEvac in Flood Mitigation and Planning

IR. TS. DR SAFARI

Q1: "Which **user category** should flood preparedness apps primarily target to maximize effectiveness? (Arrange using 1-4 based on priority)"

MyEvac should also target **schools and higher institution**

Local authorities and municipal councils

Urban planners, developers, and researchers

Emergency responders and disaster managers

General public (households, communities)

Q2: "Please arrange the following **types of data** in order of importance for an app **that requires user attention** during a flood."

Answer: Everything is important but should **segment into pre-flooding /during flooding / post-flooding**

Pre-flooding

Rainfall intensity and weather alerts

Emergency contacts/ hotlines

Hazard zone map (flood-prone areas)

During flooding

Real-time water level updates

Safe-route navigation (including OKU-friendly routes)

User location sharing with authorities or family

Road closure and blocked route information

Post-flooding

Evacuation shelter locations and capacity

Infrastructure status (power outage, drainage issues)

Task 2 Interview Questionnaire & Results

Section 1: Function of MyEvac in Flood Mitigation and Planning

IR. TS. DR SAFARI

Q3: "Which **types of data** do you think you could extract from the MyEvac app that would be **useful for your professional work** in flood mitigation ?
(For example, planning evacuation routes, analysing community movement, or organising post-flood recovery work)"

Community Movement & Behaviour

Population movement patterns during evacuation

High-risk zones based on user locations

Emergency response time and SOS activation data

Route & Transport Conditions

Reports of blocked routes or road accessibility

Shelter & Community Needs

Shelter occupancy and resource needs

Hazard Intelligence & On-Ground Observations

User-submitted hazard reports (photos, locations)

Infrastructure failure reports (power, drainage)

Task 2 Interview Questionnaire & Results

Section 1: Function of MyEvac in Flood Mitigation and Planning

IR. TS. DR SAFARI

Q4: “From your perspective, what is your **expectation**/ what you would like to see in MyEvac app?”

MyEvac should include a window for experts to put their research findings

Possible Department

- **National Water Research Institute of Malaysia (NAHRIM)**
- National Hydraulic Research Institute of Malaysia
- Department of Irrigation and Drainage (JPS/DID Malaysia)
- Malaysian Meteorological Department (MetMalaysia)
- Department of Environment (DOE/JAS malaysia_)

Useful Research

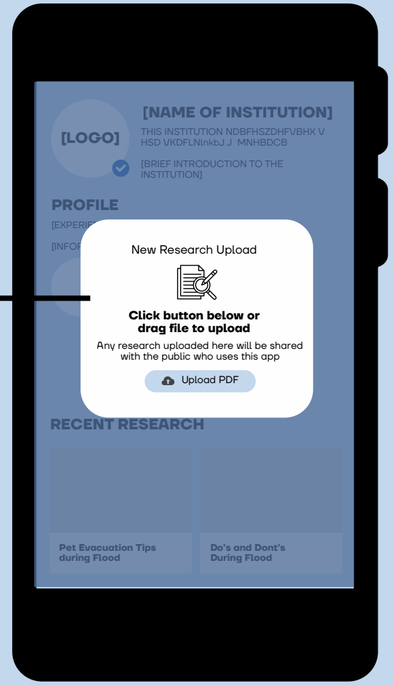
Research-Based Prepareness Content

- How to turn off electric/gas
- Pet evacuation tips
- How to protect documents

Post-Flood Recovery Research

- Health risk warnings
- Cleaning guide after flood
- Mental health support info
- Safe return time indicators

Page to Upload Research



Page to Study Research

Task 2 Interview Key Findings

Section 1: Function of MyEvac in Flood Mitigation and Planning

MAJOR ISSUES

Info Overload

Too many informations in the app may cause confusion

Narrow User Focus

Focus on general public only , hence insufficient supporting features for authorities

Lacks Collaborative Features

No local data upload, restricting community and professional use

KEY IMPROVEMENTS SUGGESTED

Segmented Info Based on Timing

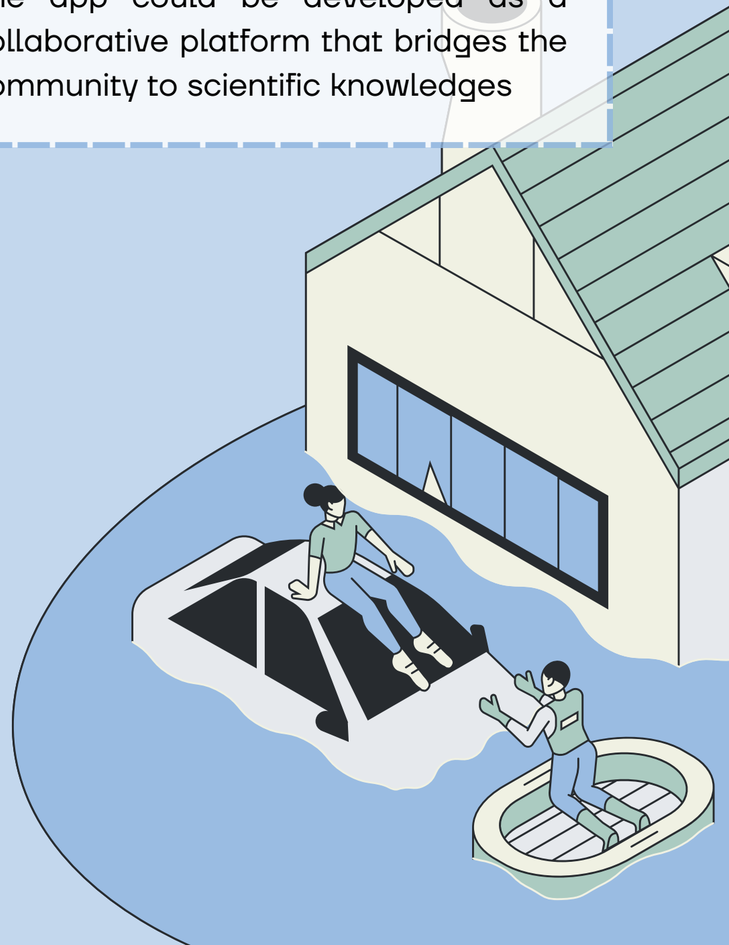
Flood related data are sorted according to pre-flooding, during flooding and post flooding to improve clarity

Implement a Window for Research Upload

The app could be developed as a collaborative platform that bridges the community to scientific knowledges

To be used as Data Source for Authorities

Instead of a public information app, it can evolve into a professional support tool for long term flood mitigation planning.



LEARNING IMPACTS

The MyEvac app is useful for different groups of people

The MyEvac app can promotes data sharing and boosts interconnection between community and authorities during floods

Task 2 Interview Questionnaire & Results

Section 2: MyEvac Early Stage Development

ASSOCIATE PROFESSOR DOCTOR AFIZAN

Q1: Can you share some of your experience in flood mitigation?

Early concepts involve using sensors installed in the cars, where cars act as agents to detect flood-related issues

Change to app development for better mitigation and evacuation

Team Focus Area

- Artificial Intelligence (AI)
- Address and Data Security
- App Design

Q2: What is the efficiency of AR arrows in the My Evac App during real-world conditions like fog, heavy rain, low lighting, or dirty camera lenses?

AR functionality has not been tested yet, to be developed by Vortex Team

Yes, we hope to make it more efficient

AR arrows offer strong user engagement and intuitive direction under good conditions

BUT in real-world flood scenarios, operational efficiency is **moderate to low** unless combined with **multi-modal navigation support and robust sensor integration.**

Task 2 Interview Questionnaire & Results

Section 2: MyEvac Early Stage Development

ASSOCIATE PROFESSOR DOCTOR AFIZAN

Q3: How should the app operate during low-signal or no-signal conditions during floods to avoid misleading users?

Provide **temporary network tower** to the affected area using MyEvac App

Acts as a temporary communication network when normal signals are down.

Provides temporary connectivity for a limited time to ensure safety and coordination.

Allows flood-affected residents to contact their families, authorities and external parties during emergencies

Q4: Flood situations often make phone screens wet and difficult to scroll. Which design solution would be most effective for MyEvac to remain usable in these conditions?

Hands-free Interaction

Integrate **voice-based interaction** as primary navigation method

Allows users to operate MyEvac without relying on touch-based controls that may fail under wet conditions

HOW it helps?

Voice commands remains **functional** even cannot physically interact with the screen

Improves **reliability** of MyEvac during emergency scenarios

Allow **faster interaction** without fiddling with the screen.

Task 2 Interview Questionnaire & Results

Section 2: MyEvac Early Stage Development

ASSOCIATE PROFESSOR DOCTOR AFIZAN

Q5: May we know any suggestions/ improvement to overcome?

Provide a **platform** to fill a critical gap for residents affected by flash floods

Malaysians rely heavily on WhatsApp, so the app leverages this behaviour.

Integrate AI to read :


Photos


Text


Videos


Messages

which strengthen the accuracy of real-time situation updates

When information comes directly from the community, it becomes fast, a network that can update quicker than government dashboards

Improving prediction using AI

- Current government systems notify residents after floods have already affected the area.
- MyEvac uses machine learning to:


Analyse real-time data


Predict flood severity earlier


Give residents more time to evacuate

Using the same warning phase

- The ML algorithm adopts government colour phases:

Different colour to warning different phases.
- Yellow
- Orange
- Red

Predicts:
- How much time residents have before needing to evacuate at each stage.

Task 2 Interview Questionnaire & Results

Section 2: MyEvac Early Stage Development

ASSOCIATE PROFESSOR DOCTOR AFIZAN

Q6: Do you have any additional recommendations?

Core features and app architecture are already developed , but further refinement requires real life data and user feedback with stress-testing features in actual flood condition for reliability.

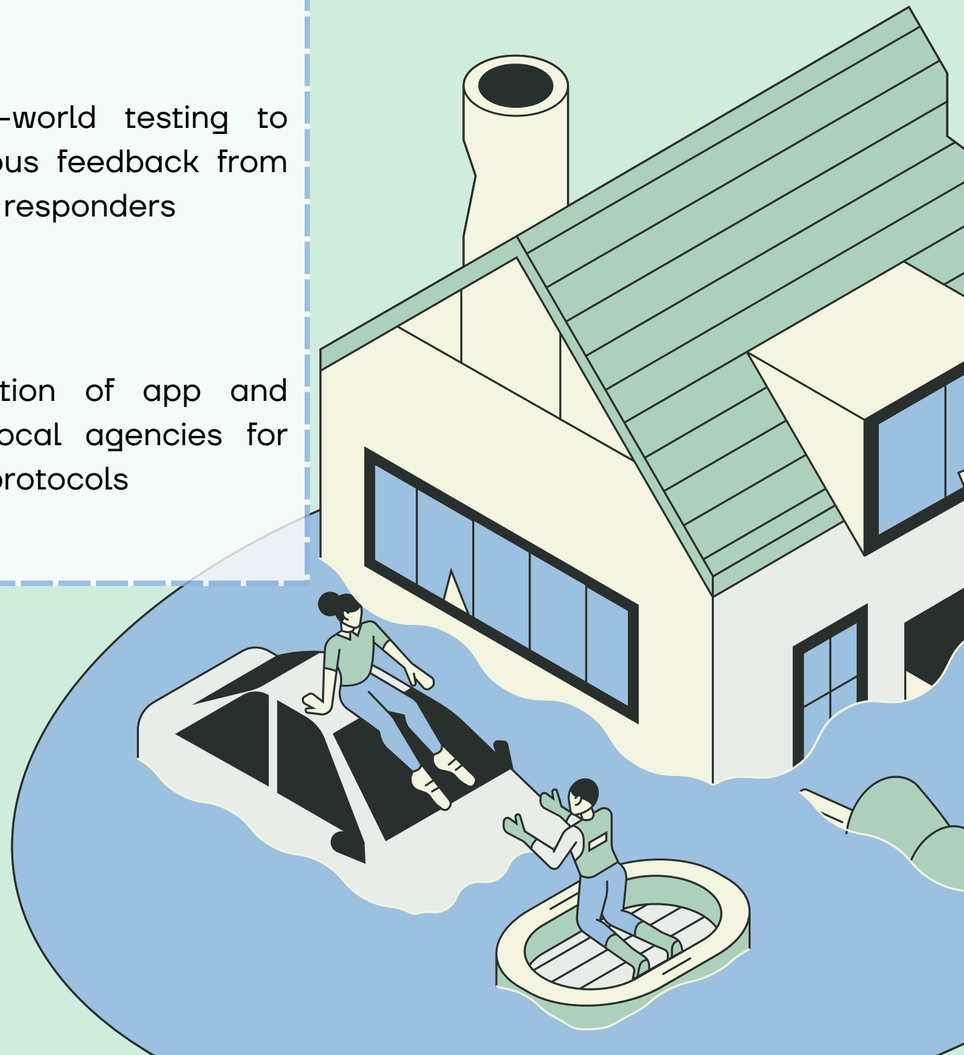
Need for Partners and Local Representatives

- Support outreach and engagement with target communities
- Help coordinate on-site logistics and communication
- Provide legitimacy and facilitate government-level approvals

Purpose of Collaboration

Enable real-world testing to get continuous feedback from resident and responders

Boost adoption of app and align with local agencies for emergency protocols



Task 2 Interview Key Findings

Section 2: Improvement for MyEvac App

ASSOCIATE PROFESSOR DOCTOR AFIZAN

MyEvac fulfils a real and significant gap in **public-facing disaster preparedness** and evacuation guidance.

The app's success depends on **accurate, real-time, multi-agency data integration.**

AR navigation should be treated as a support feature, not a primary tool, due to environmental and hardware limitations.

The app must adopt a m**ulti-modal communication strategy** (maps, audio, text, vibration).

Strong potential to support both communities and professionals, especially through **user-generated reports and movement data analytics.**

Ensuring **accessibility, simplicity, and reliability** will be critical for adoption, particularly among elderly, OKU, and rural users.

Task 2 Key Overlapping Findings of Experts & Residents

01

Interface

The app must avoid clutter. Both groups agree that too much information is dangerous; the focus must be on immediate, digestible guidance.

02

Features

Both groups prioritize reliable, basic life-saving tools over advanced optional features (like AR/VR), which are viewed as secondary.

03

Verification

The app must be a recognized channel of official, verified truth to combat the community's reliance on unverified social media rumors.

04

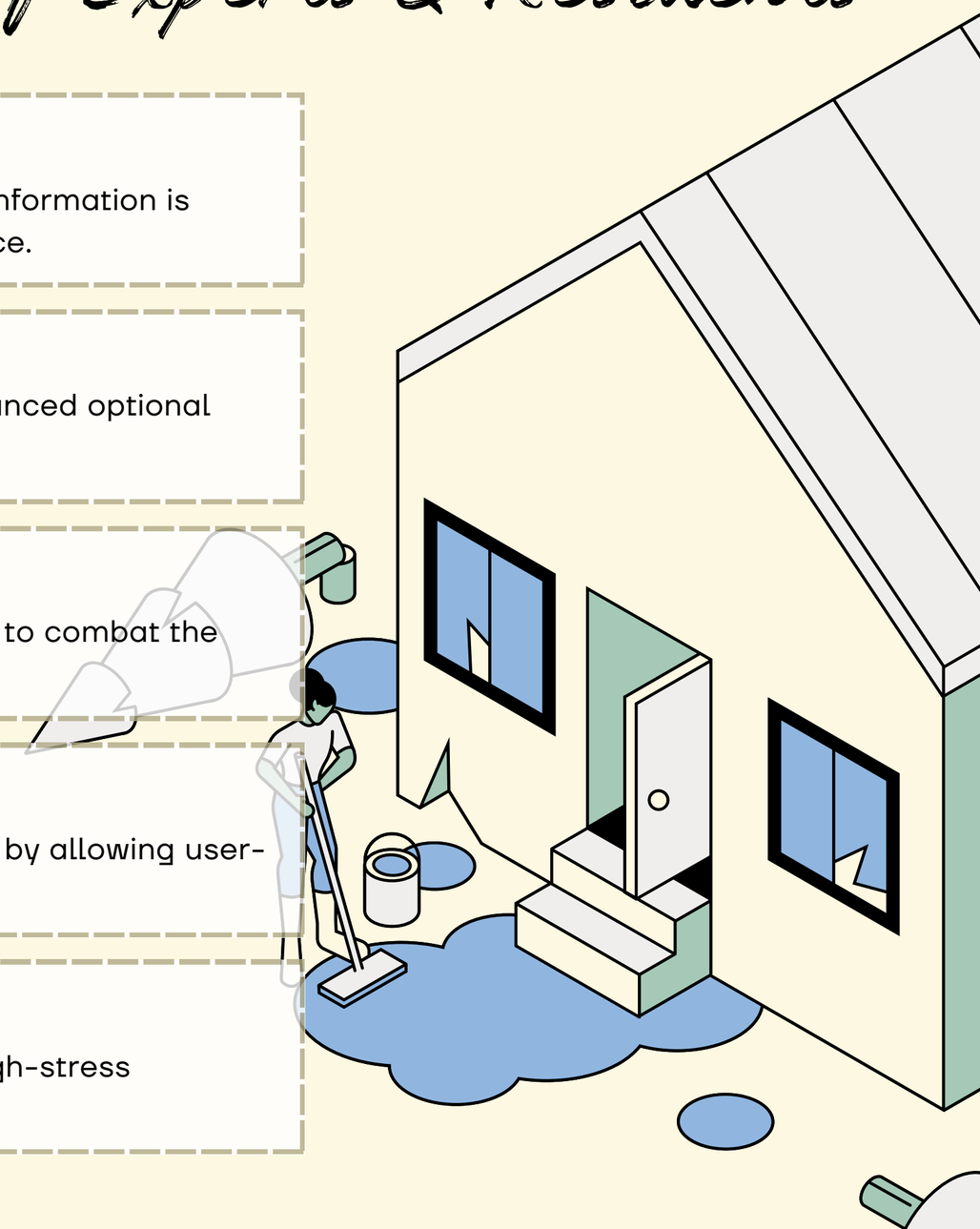
Collaboration

The app should formalize what the community is already doing by allowing user-generated reports to inform authorities and other residents.

05

Inclusivity

The app must be designed for the most vulnerable user in a high-stress environment, not just the tech-savvy user.

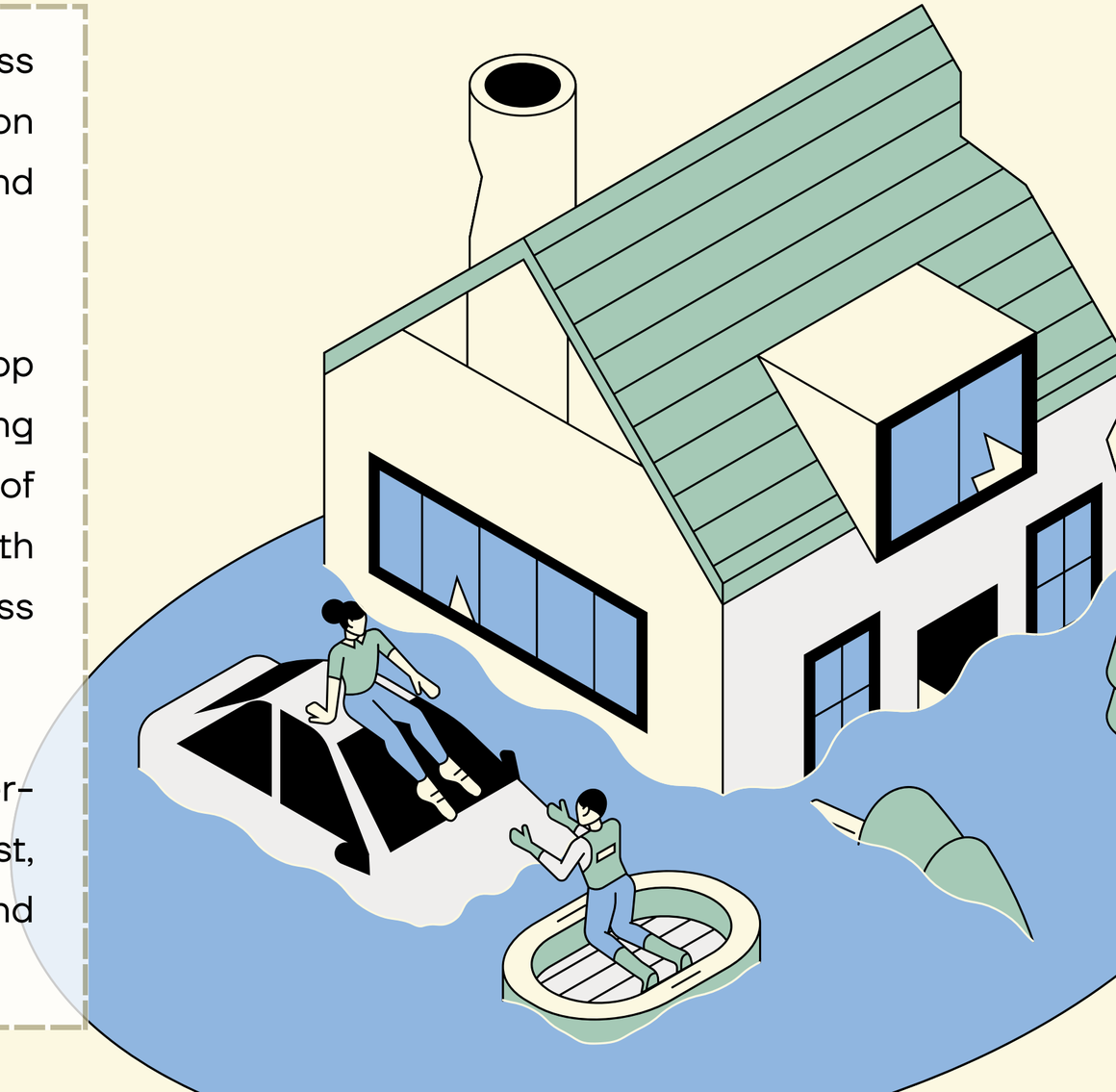


Conclusion

In conclusion, the community's ability to use flood-preparedness technology effectively depends not only on accurate alerts but also on community awareness, trust in warnings, technological familiarity, and preferred app features.

According to community feedback, improving the adoption of the app requires features that are easy to understand and accessible, along with helpful advice on how to use AR and VR. Despite the existence of early warning systems, their efficacy is still limited by issues with community involvement, technical comprehension, and preparedness behavior.

These findings highlight the need for an evidence-based, user-centered flood preparedness app that fosters community trust, improves digital literacy, facilitates informed decision-making, and increases overall preparedness for actual flood events.



Task 3

Prepared by
Task 3 group S, T, U, V

Emergency Kit for Natural Disaster Preparedness

Table of Content

Background Study

Flood events in Kampung Kasipillay highlight the need for a community-ready, accessible, and sustainable Flood Survival Kit System.

Key Features:

01 Smart Needs Assessment
Tailor kits based on household size, vulnerabilities & risk level.

02 Proactive Alerting & Navigation
Support evacuation with simple alerts, clear routes & nearby kit points.

03 Kit Procurement & Delivery
Ensure fast, reliable access through pre-arranged kits and local distribution hubs.

04 Sustainable Kit Management
Simple, low-cost upkeep to ensure kits remain usable year-round.

05 Modular Kit Design
Flexible kit components that adapt to different user groups and flood scenarios.

Flood Kit Proposal

WHAT? An emergency flood kit is a pre-packed set of essentials that helps you stay safe and survive for 24–72 hours during a flood.

Durable, Waterproof Materials

- Nylon base: tough, lightweight, tear-resistant
- TPU coating: waterproof, weldable, abrasion-resistant, non-toxic

Preparedness & Storage

- Zippered compartment for documents and essentials.
- Encourages households to stay ready with essential items

Functional Structural Design

- TPU-coated nylon shoulder straps
- Air inlet/outlet valve for inflation
- Waterproof TPU zipper
- Extendable side strap for adjustable fit
- Bright red TPU-coated fabric for high visibility

Inflatable Flotation

- Air valve enables buoyancy (supports ~28 kg).

Problem Statement

WHAT ARE THE CURRENT ISSUES?

There is a critical need for **proactive**, **accessible**, and **adaptive emergency preparedness strategies** during the recurring flood events.

1. Hurdles in last-minute delivery during crisis
2. Identifying specific household needs
3. Ensuring equitable access to vital resources

Research Methodology: Online Surveys

METHOD CHOSEN

Online
questionnaire
(via Google Forms)

REASON FOR CHOOSING THIS METHOD

- Allows collection of both quantitative and qualitative data.
- Reaches a large number of residents efficiently.
- Captures personal experiences, opinions, and perceptions.
- Easy to analyze and compare results for planning purposes.

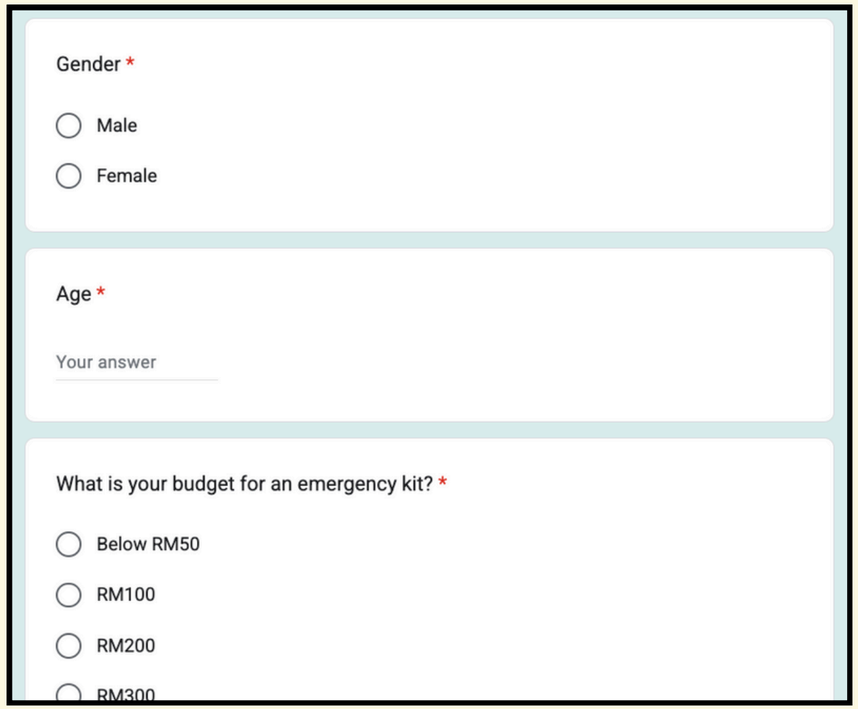
Survey Participant

Residents
Kampung Kasipillay, Kuala Lumpur

MAIN PURPOSE OF SURVEYS

- Collect **community-wide data** on **residents' flood experiences and needs.**
- Identify **common patterns and issues** across households.
- Assess residents' **preparedness and awareness** of flood risks.
- Provide evidence to **support planning and flood mitigation strategies**.

Questionnaire (Google Form)



Questions included **multiple-choice, Likert-scale, and open-ended responses** to capture both quantitative and qualitative data.

Community Flood Survey

Themes for Sections

Section 1

Respondent Background

Understand who the respondents are to interpret their flood experiences accurately.

Section 2

Affordability of Flood Kits

Ensure that the proposed flood emergency kit is financially accessible to institutes, allowing it to be realistically adopted, maintained, and sustained within their budget constraints.

Section 3

Portability of Flood Kits

Assess how flood kits are easily carried and be designed efficiently

Section 4

Content of flood kits

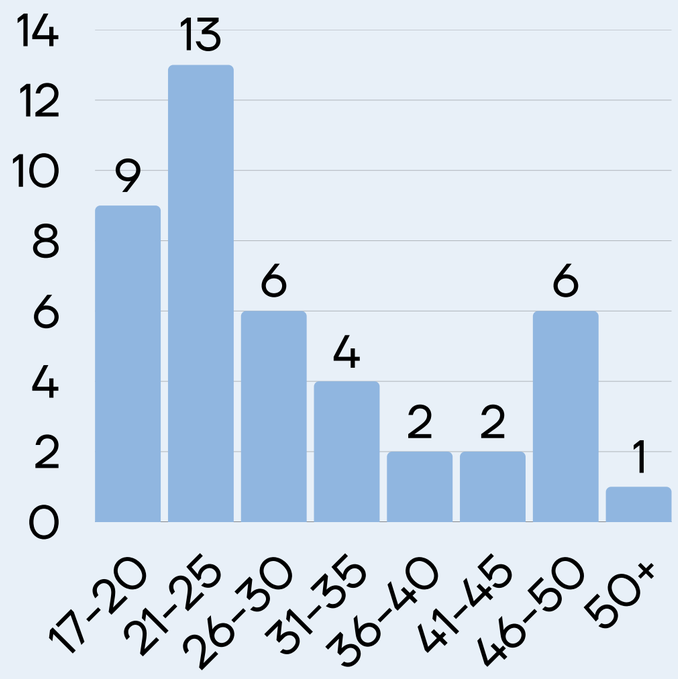
Assess the key strategies and interventions needed to reduce urban flood risks effectively.

Task 3 Survey Questionnaire & Results

A total of 43 responses were collected.

Section 1: Respondent Background

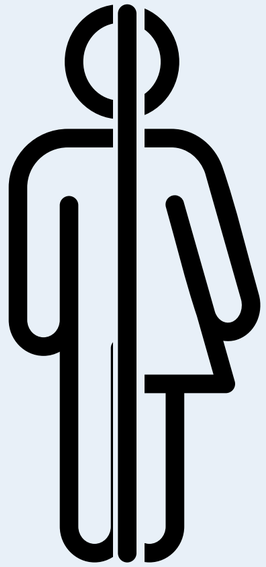
AGE GROUP



GENDER

57%

Male



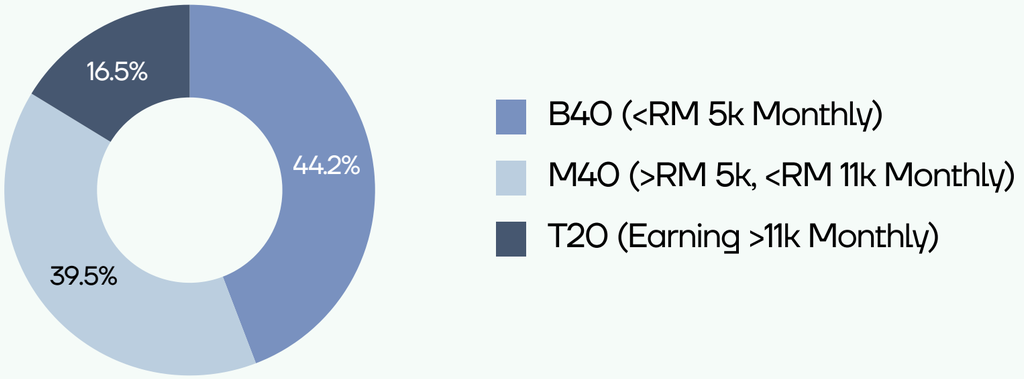
43%

Female

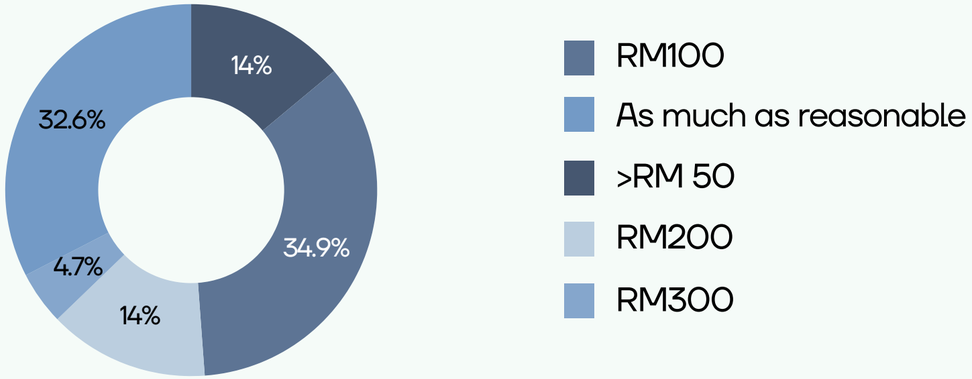
Task 3 Survey Questionnaire & Responses

Section 2: Affordability of Flood Kits

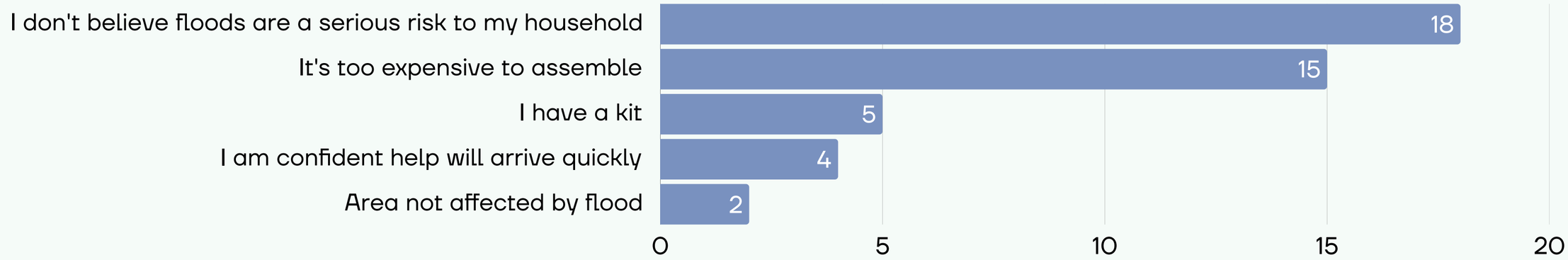
Q1: "What is your monthly income?"



Q2: "What Is Your Budget for an emergency kit?"



Q3: "Do you already have an emergency flood kit, if you don't, why?"



Affordability and Economic Constraints in Flood Emergency Kit Adoption

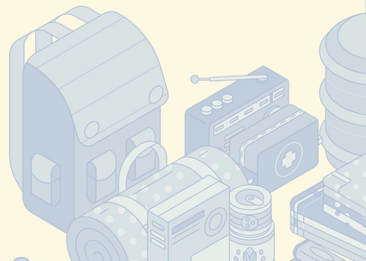
Key Findings

ISSUES

Income diversity	44.2% of respondents are from the M40 group, indicating a need for a cheaper design or subsidy.
Low perceived importance of flood kits	few are willing to spend on flood kits; 48.9% would spend RM 100 or less.
Low assigned budget	“Too expensive to assemble”, and the lack of perceived risk of floods affects the acquisition of a flood kit

POSSIBLE DESIGN DIRECTIONS

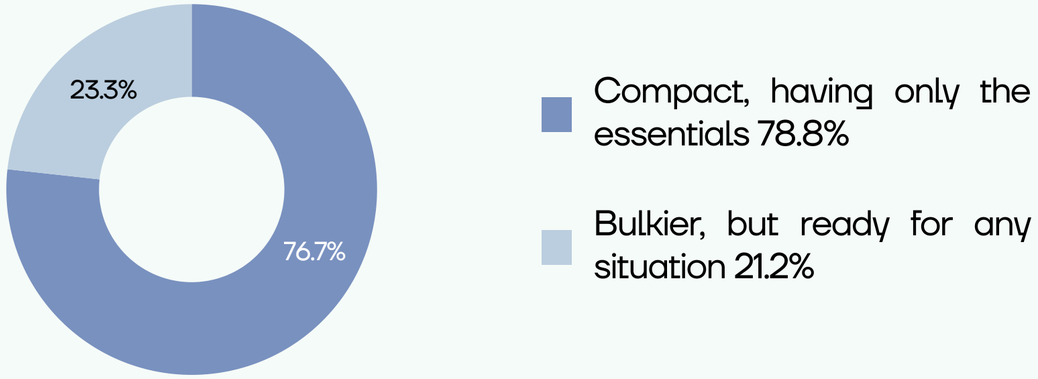
- Provide subsidy and different pricing tiers for income groups
- Focus on low-cost items with reasonable quality (i.e. Kit contents, materials)
- Market the kit to be multi-purposed outside of flood scenarios



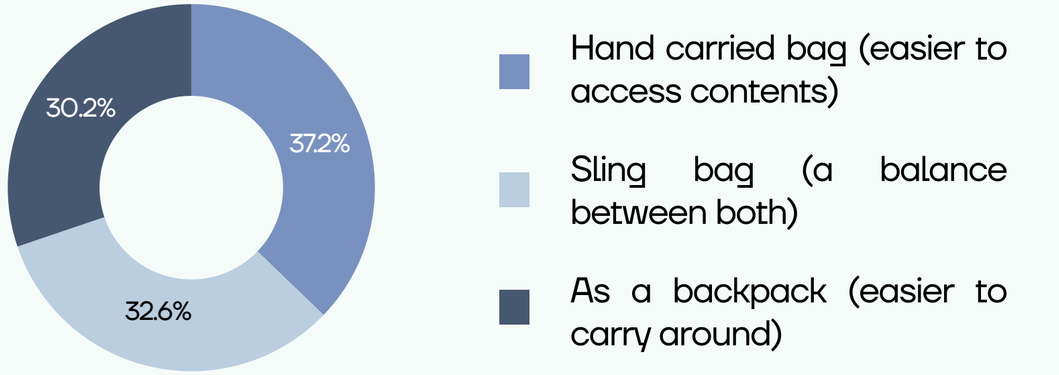
Task 3 Survey Questionnaire & Responses

Section 3: Portability of Flood Kits

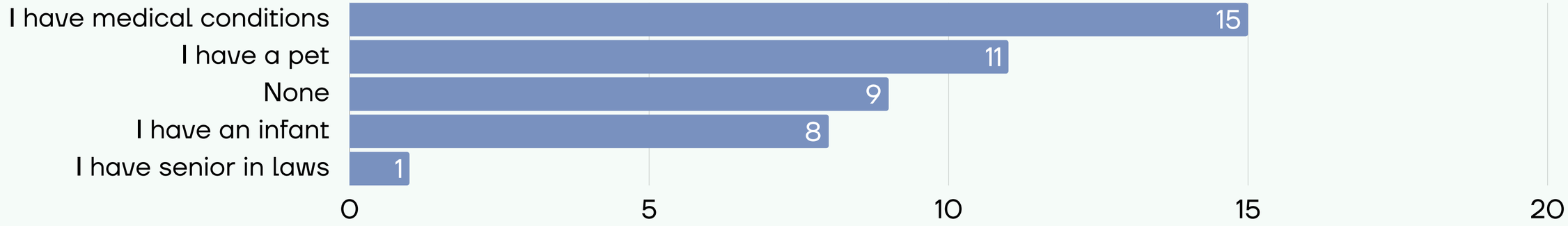
Q1: "How big do you prefer the bag to be?"



Q2: "How do you prefer to carry the emergency bag?"



Q3: "What are some unique needs that you might have?"



Balancing Compactness, Customisation, and Usability in Flood Kit Design

Key Findings

CHALLENGES

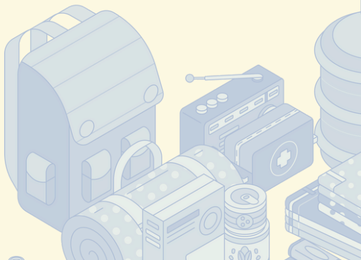
Preference on Compactness	Overwhelming 76.7% of residents expect a compact kit that suits their essentials during flood. HOWEVER, ~79% of respondents have unique needs. But there is no cheap and compact, yet one design fits all solution.
Majority with Unique needs	
Conflict between portability and ease of reach for contents	Users are mostly tied with the 3 options for carrying methods, indicating how residents have split preferences.

POSSIBLE DESIGN DIRECTIONS

Design kits to be compact, customizable, in other words, modular.

Include only the essentials in a core module, to be compact in each module.

Possible methods of carrying differs based on the size of the modular kit users own

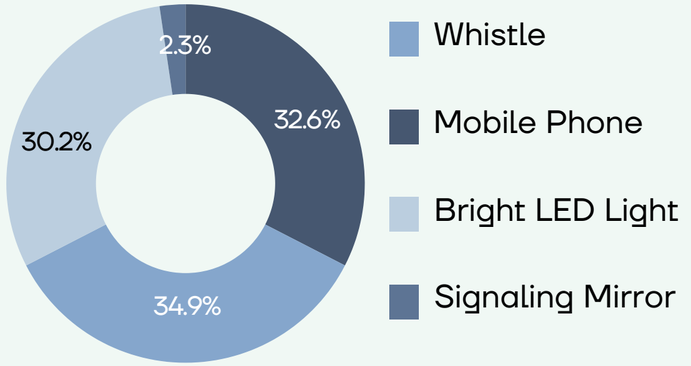


Task 3 Survey Questionnaire & Responses

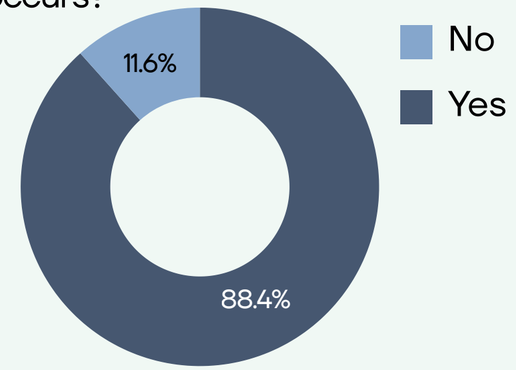
Section 4: Analysis on Content Priority

Q1: Are food items required in a survival kit? If yes, what type is necessary to be included?

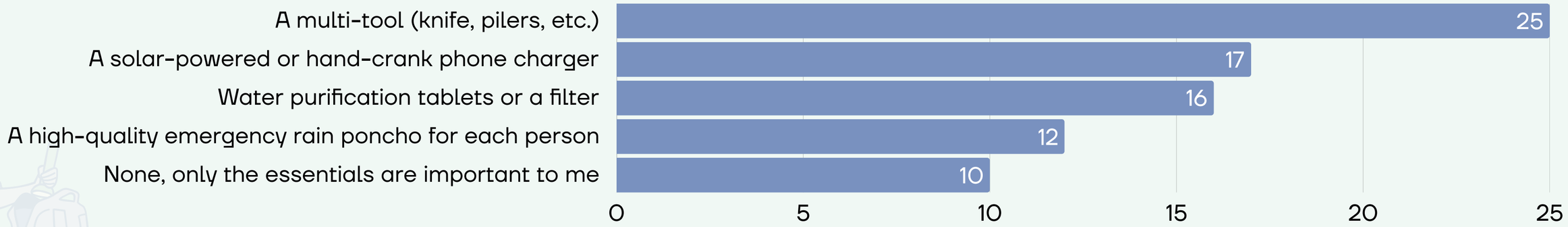
Q2: If you needed to attract the attention of a rescue team, what your FIRST action be?



Q3: Do you know about any nearby shelters when a flood occurs?

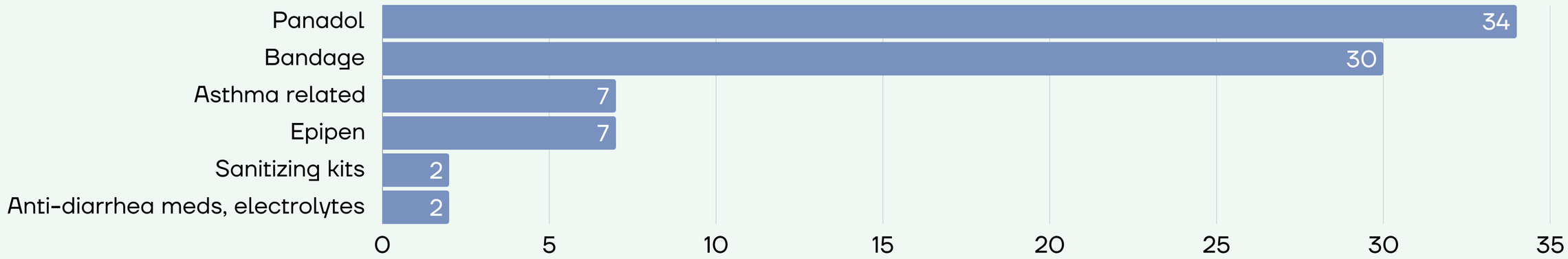


Q4: "Which of these 'non-essentials' items would significantly increase your willingness to buy a kit?

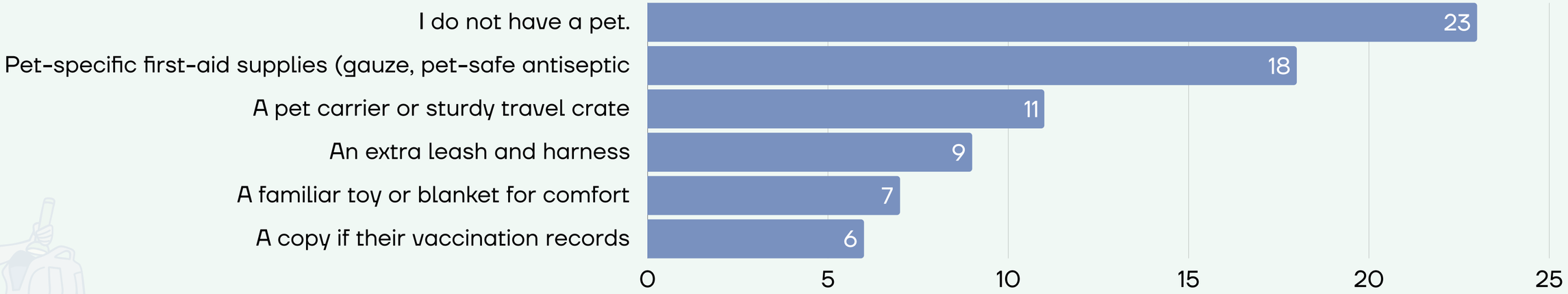


Task 3 Survey Questionnaire & Responses

Q5 What are the specific medicinal items needed for your first aid kit?

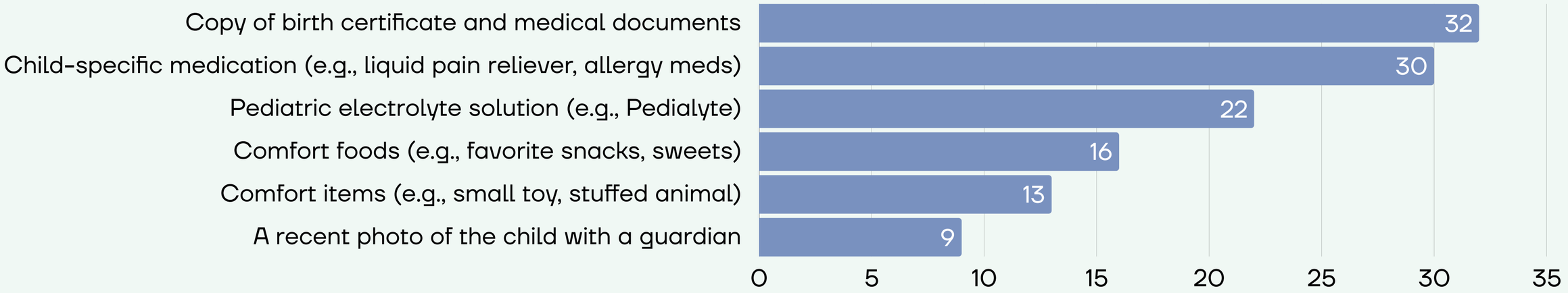


Q6: "Which of these pet-specific items would you need to include in your emergency kit? (select all that applies)"

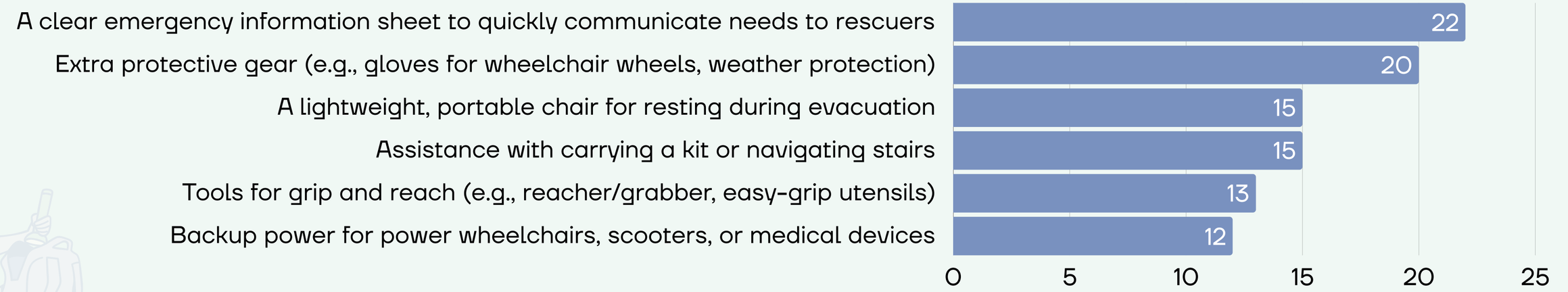


Task 3 Survey Questionnaire & Responses

Q7: "If you're preparing for a child, which of these items would you need to include? (select all that applies)"



Q8: "Which of the following would be important for you or a member of your household during an evacuation? (select all that applies)"



Prioritising Essential Needs and Tiered Solutions in Flood Emergency Kit Design

Key Findings

CHALLENGES

Basic non-negotiable necessities	Though needs are diverse, basic medication, long-lasting foods, water, whistle, and a map would be included for the general public of Kampung Kasipillay.
Specific needs for minority groups	**Trends:** Survival over comfort Child - Medication as priority Pet - First aid, pet carrier Disabled - Sheet to communicate needs, protective gear.
Providing options for luxury items	Some residents prefer items which are not cheap or essential, (e.g. comfort toys and dietary needs), suggesting a way to promote the kits by appealing to them.

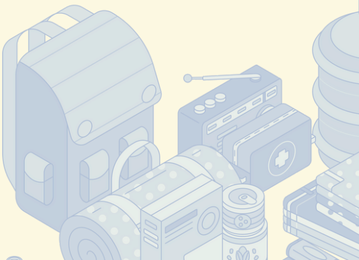
POSSIBLE DESIGN DIRECTIONS

Create a core kit to include the essentials which are simple, cheap and, long-lasting.

Have separate add-on kits for groups with special needs such as children, pet-owners, and the disabled.

Create a luxury core kit for those who want the added comfort. Includes a power bank, better tasting food, a multi-tool, etc.

Can have luxury add-ons for the separate kits to offer extra options for those who feel a necessity to provide comfort during flood.



Research Methodology: Expert Interview

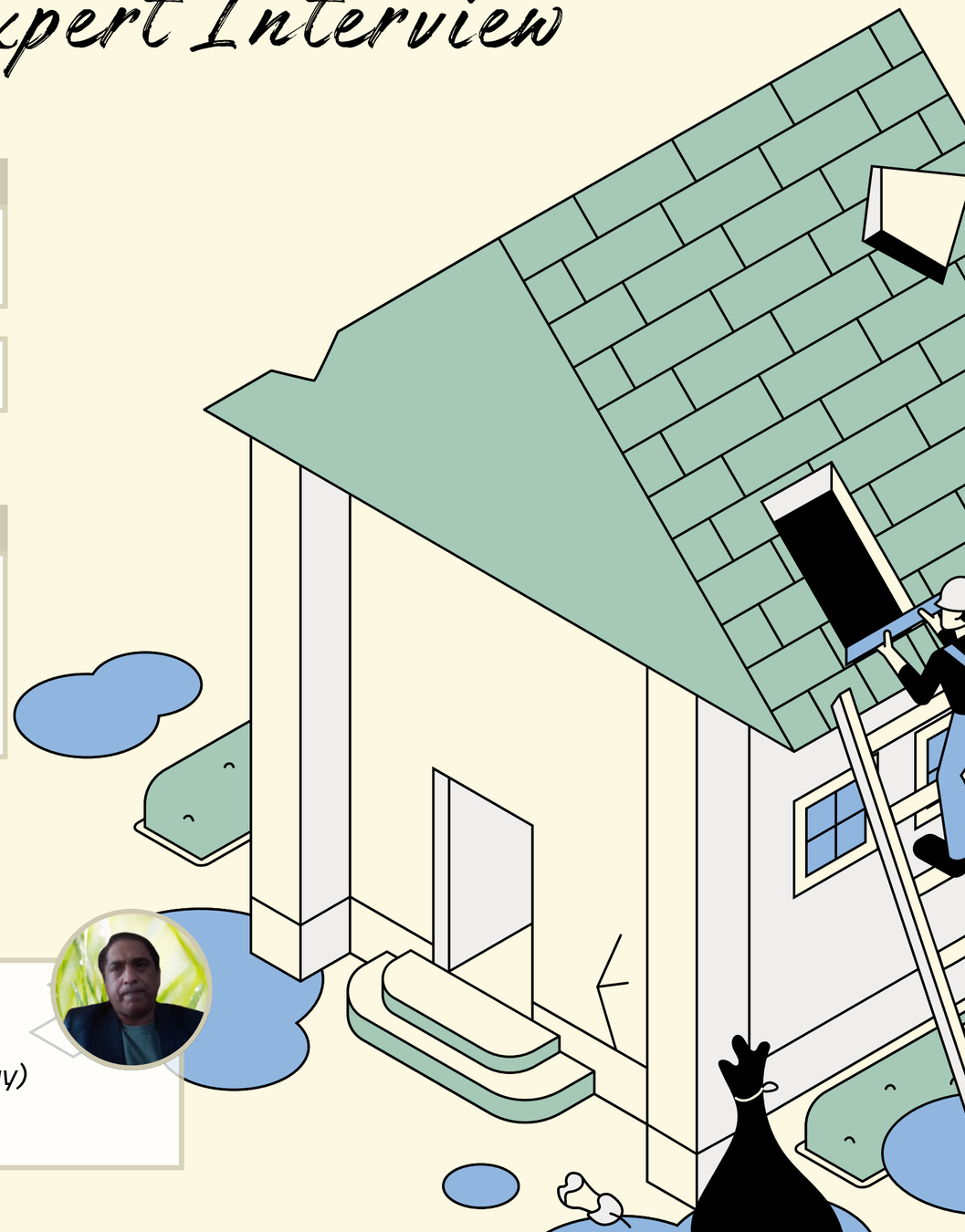
METHOD CHOSEN

Online face-to-face interview
(via Zoom)

Semi-structured interview

REASON FOR CHOOSING THIS METHOD

- To gather professional insights on flash flood issues
- To validate assumptions with real-world experience
- To understand problems from both technical and social perspectives



Interview Participant (Expert Profile)

01

Ir. Ts. Dr Safari
National Water Research Institute of Malaysia (NAHRIM)

02

Dr. Cyril
Solnovation (SMART technology) (more to data analytics)

Themes for section

Section 1

Reliability of Flood Kit Delivery

Evaluates how effectively flood kits are delivered during emergencies, focusing on coordination, capacity, and system reliability.

Section 2

Real Case Highlight

Uses real flood incidents to demonstrate practical successes and failures in flood kit distribution.

Section 3

Kit Packaging & Materials

Examines suitable materials and packaging strategies based on durability, cost, sustainability, and flood conditions.

Section 4

Priority Groups for Distribution

Identifies vulnerable groups that should receive flood kits first to ensure equitable and effective aid distribution.

Section 5

Suggested Improvement

Highlights key system improvements required to enhance flood kit preparedness and distribution efficiency.

Task 3 Interview Questionnaire & Results

Reliability of Flood Kit Delivery

Q1: “How reliable is the current system in delivering flood kits during emergencies?”

ASSOCIATE PROF. SAFARI

NGO's

- **Flood response** in Malaysia heavily **depends on NGOs**.
- NGOs are **active and efficient** during flood disasters.

Focus

- Operational **coordination**
- On-ground **realities**

Major issues

Lack of **coordination** and **communication**.

Poor management can result in:

- **Uncollected aid**
- Food **wastage**

Systems exist, but better **communication** and **management** are needed.

DR CYRIL

NGO's

Flood kit delivery relies largely **on NGOs** and community efforts.

Focus

- **Capacity** limitations
- **System** gaps

Major issues

Government disaster agencies have:

- Limited **boats**
- Limited **manpower**

Community-based response is essential but under-resourced.

Overall **infrastructure** is not sufficient for large-scale floods.

Task 3 Interview Questionnaire & Results

Reliability of Flood Kit Delivery

Q2: “What are the essential Items in Flood Survival Kits? “

ASSOCIATE PROF. SAFARI

Local Adaptation & Preparedness

- Agencies and NGOs in Malaysia already provide sufficient flood survival kits.
- Kits should be context-sensitive, built to last, and suited to the specific flood environment.

Risk-Specific Essentials

- Kit contents must vary by flood type (flash vs monsoon) and water velocity/depth.
- Life vests are critical in high-risk zones with strong currents.
- Focus on flexibility instead of rigid, one-size-fits-all lists.

Structural & Long-Term Resilience

- Flood survival kits provide short-term support, but long-term safety depends on infrastructure measures like raised riverbanks and improved drainage.

DR CYRIL

Communication as a Survival Priority

- Communication is the most critical missing element.
- SMS-based alerts are unreliable during disasters.
- Kits must prioritize reliable communication systems.

Essentials

- Battery-operated radio for official updates.
- SOS communication systems
- Whistle for low-tech signaling.
- Focus on climate-appropriate essentials like waterproof storage, hygiene supplies, and mosquito protection.

Standardization with Local Adaptation:

- Kits should be standardized but adapted to Malaysia’s tropical climate and local needs.
- Avoid unnecessary cold-climate items (e.g., thermal blankets).

Task 3 Interview Questionnaire & Results

Real Case Highlight

Q3: " Can you show an example of its successes or failures, if you have any experience with it?"

ASSOCIATE PROF. SAFARI

Dr. Safari shared a real incident during the 2021 Shah Alam floods:

Success

Many NGOs responded very quickly and brought large amounts of flood kits, food, and supplies.

Failure

Poor communication and weak coordination led to major issues.

Conclusion

The system is strong in volunteer response, but fails in coordination, communication, and distribution management.

Major Issues

Poor coordination led to:

- Food and donated items were left along the road, uncollected.
- Many supplies went to waste.
- A gas cooking cylinder got stuck in a drain, blocking water flow and worsening flooding.

showing that the distribution system was ineffective despite having enough resources.

DR CYRIL

Success

NGOs and communities play a major role in delivering flood kits.

- They are often the ones most active and willing to move quickly.
- Some kits do reach the affected communities because of community effort, not because of a strong national system.

Failure

The government relies too heavily on NGOs and communities.

- have limited manpower
- have very few boats and equipment
- cannot handle large-scale disasters alone

Therefore, kit delivery is only partially successful, and not enough during major floods.

Conclusion

Malaysia's current system depends heavily on NGOs like NADMA , but insufficient government logistics and manpower lead to delayed, inconsistent kit distribution

Task 3 Interview Questionnaire & Results

Kit Packaging & Materials

Q4: “ What materials are suitable for flood kit packaging ?”

DR CYRIL

Material choice depends on

- Durability
- Budget
- Sustainability goals

Packaging could be designed to

- Be waterproof
- Possibly float

Recommendations

Sustainable material for flood kits:

- **recycled plastic**
- **coconut coir**
- **biodegradable rice hulls**

Since it is available in plenty in Malaysia.

Urban farming on a rooftop is a great, sustainable thing and very helpful during floods as a food source.

Priority Groups for Distribution

Q5: “ Which communities should receive flood kits first?”

DR CYRIL

Key Priority Groups

Kits should go first to :

Children → Senior citizens → Individuals with disabilities

Recommendations

Local communities are best positioned to identify vulnerable individuals.

A bottom-up, community-led approach is more effective than top-down distribution.

Task 3 Interview Questionnaire & Results

Kit Packaging & Materials

Q6: “ What is the most effective way to distribute flood kits ?””

DR CYRIL

Key Strategies Identified

Decentralized storage
(e.g. schools, community centres).

Avoid reliance solely on disaster agencies due to limited manpower.

Leverage professional logistics companies:

- GPS tracking
- Structured delivery systems
- Proven logistics expertise

Most Important Improvement Needed

Q7: “ What is the single most important improvement Malaysia needs in flood kit preparedness?”

DR CYRIL

Core Expert Recommendation

Use AI & data-based demand prediction tools in order to:

- Estimate required kit quantities
- Reduce waste
- Allocate kits more efficiently

Why it matters

Kits are limited, not unlimited.

Historical flood data can guide smarter distribution.

Prevents overproduction and food wastage.

Distribution System

Key Findings

ISSUES

Gap in System

Although a system exists, **communication** and **management** is poor

why? →

Reliance on NGOs

Flood kit delivery relies heavily on **NGOs** and **community efforts**

Limited Manpower

Government disaster agencies and **community based responses** have limited resources

IMPACT

Wastage

Supplies were left **uncollected**, which led to **food wastage**

Uneven Distribution

Resulting in unfair or unequal distribution

Priority group don't get needs met

EXAMPLE

Shah Alam Flood 2021

Large volumes of food and first aid was delivered but resulted in **wastage**

SO?

Hence, the steps need to be taken to improve the system in terms of **communication** and **management** to ensure an **efficient distribution**

EXPERT ADVICE

Who should receive first?

Children, ***senior citizens***, *and* ***people with disabilities*** are the key priority groups

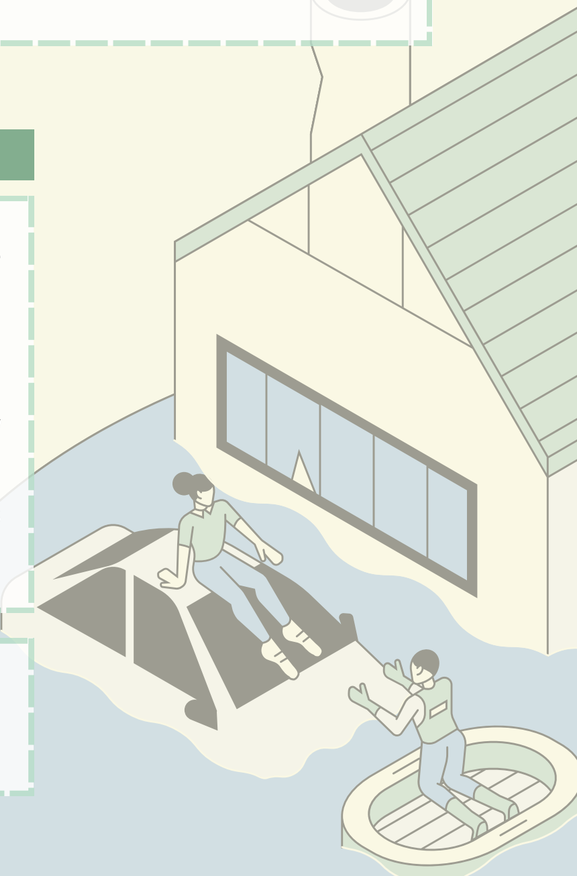
A **bottom-up, community led approach** is more effective than a top-down approach

STRATEGIES

Leverage professional logistics companies:

- GPS tracking
- Structured delivery systems
- Proven logistics expertise

Use AI & data-based demand prediction tools to avoid overproduction



Reliability on NGO & Current System

Key Findings

ISSUES

Heavy Reliance on NGOs

Flood response depends mainly on NGOs for **speed, logistics,** and **community networks.**

Weak Government Infrastructure

Government agencies face **coordination issues, slow supply chains**, and **limited manpower**

Fragile Humanitarian Ecosystem

NGO burnout, **funding drops,** or **resource shortages** can collapse overall flood response.

↓ ↓ ↓

IMPACT

Uneven Distribution & Overdependence

Supplies were left **uncollected**, which led to **food wastage**

Operational Strain & Delays

Limited personnel, slow procurement, and unclear coordination roles.

NGOs take over key government roles like **logistics, assessment**, and **delivery**.

High System Vulnerability

The current ecosystem depends on **volunteers, donations**, and **small NGO networks**.

SO?

Malaysia's flood response system is breaking because the tools, roles, and **coordination structures don't match real flood conditions** and this mismatch **creates waste, overstretch,** and **high system vulnerability.**

EXPERT ADVICE

Improve Coordination & Communication Across All Actors

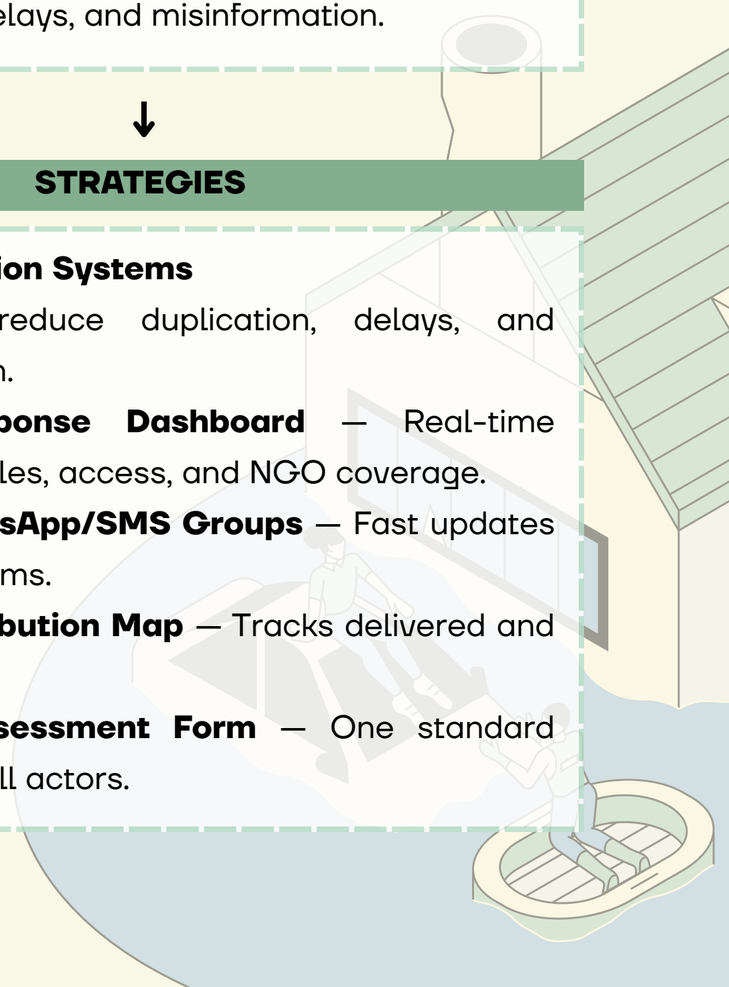
Experts say using **standard forms**, **shared dashboards**, and **regular briefings** helps avoid duplicate work, delays, and misinformation.

↓

STRATEGIES

Shared Information Systems

- Tools that reduce duplication, delays, and misinformation.
- **Unified Response Dashboard** — Real-time needs, stockpiles, access, and NGO coverage.
- **District WhatsApp/SMS Groups** — Fast updates for ground teams.
- **Shared Distribution Map** — Tracks delivered and pending aid.
- **Common Assessment Form** — One standard template for all actors.



Task 3 Key Overlapping Findings of Experts & Residents

FLOOD KITS ARE AVAILABLE BUT POORLY COORDINATED

Both experts and the community agree that **flood kits exist** and are **distributed mainly through NGOs** and **community networks**.

- Weak coordination and unclear management often reduce delivery efficiency during emergencies.
- Both perspectives highlight that current flood kits lack reliable communication tools.

PREPAREDNESS AND KNOWLEDGE OF KIT USAGE ARE LIMITED

- Both groups recognise that many residents are unsure how to use flood kits effectively
- Vulnerable groups require clearer prioritisation and more decentralised storage locations.
- A need for clearer guidance, training, and standardisation

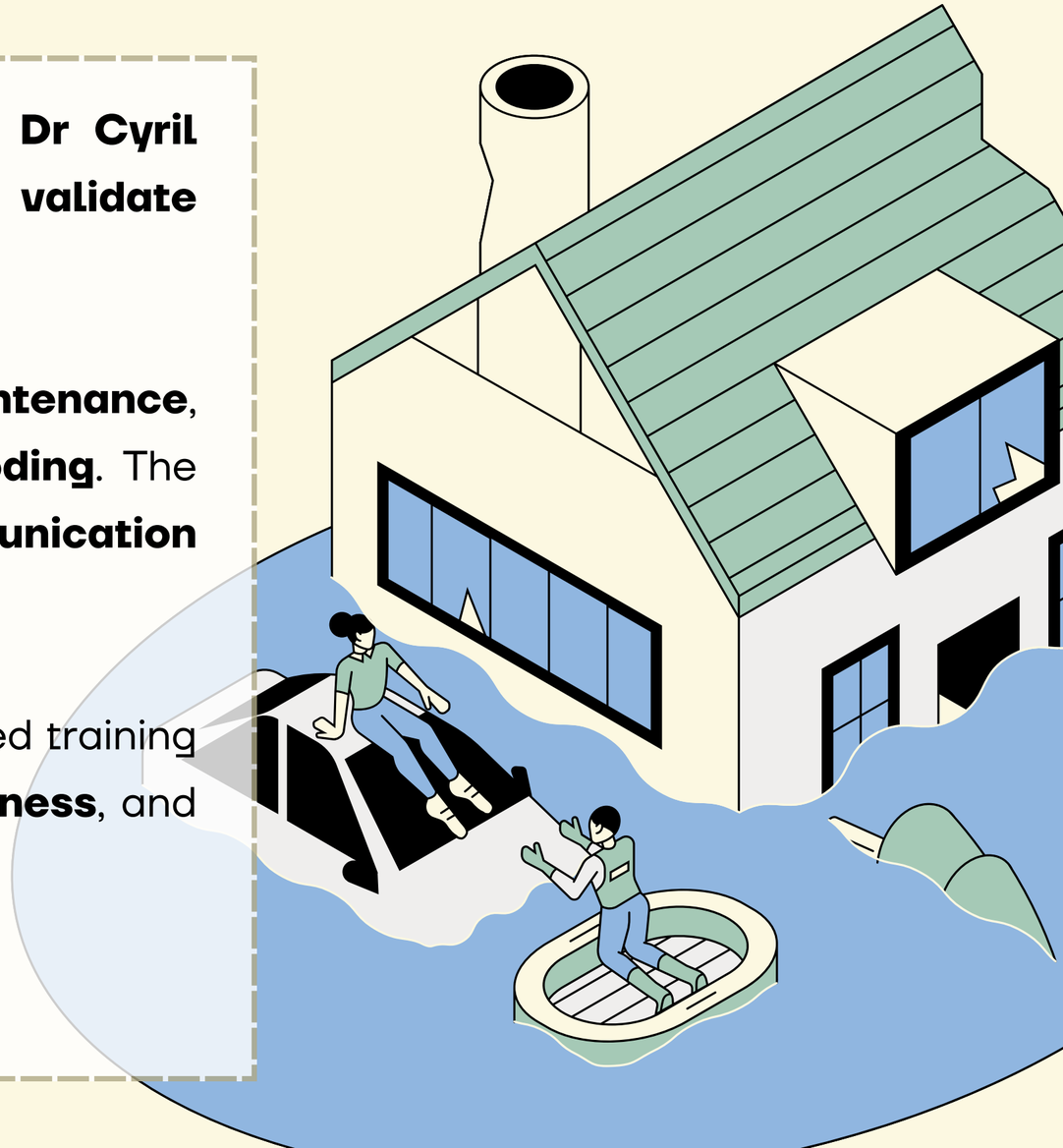
Improving flood kit impact requires better system planning, clearer delivery strategies, and stronger community readiness to ensure kits truly support people during emergencies.

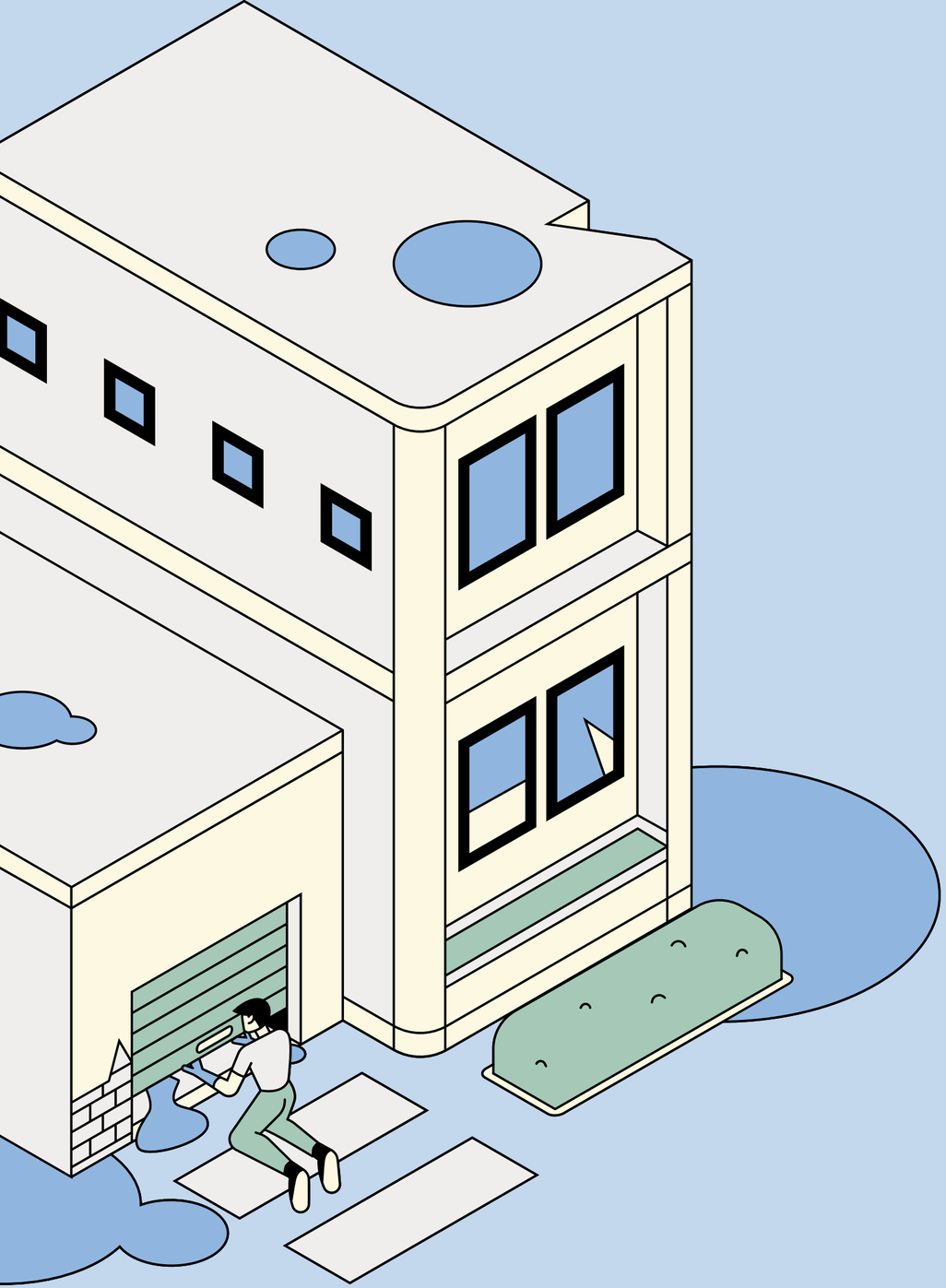
Conclusion

In conclusion, Task 3 shows that **insights from Dr Safari & Dr Cyril** strengthen our **understanding of local flood challenges** and **validate the issues raised** in the community survey.

Both interviews highlight that **clogged drains**, **inadequate maintenance**, and **outdated infrastructure** remain the **key triggers of flooding**. The experts also emphasize **gaps in community readiness**, **communication channels**, and the **consistency of volunteer training**.

These findings reinforce the need for a structured, evidence-based training module that improves **volunteer skills**, increases **public awareness**, and **strengthens coordination** between **residents** and **authorities**.





The End

Thanks for Your Attention!