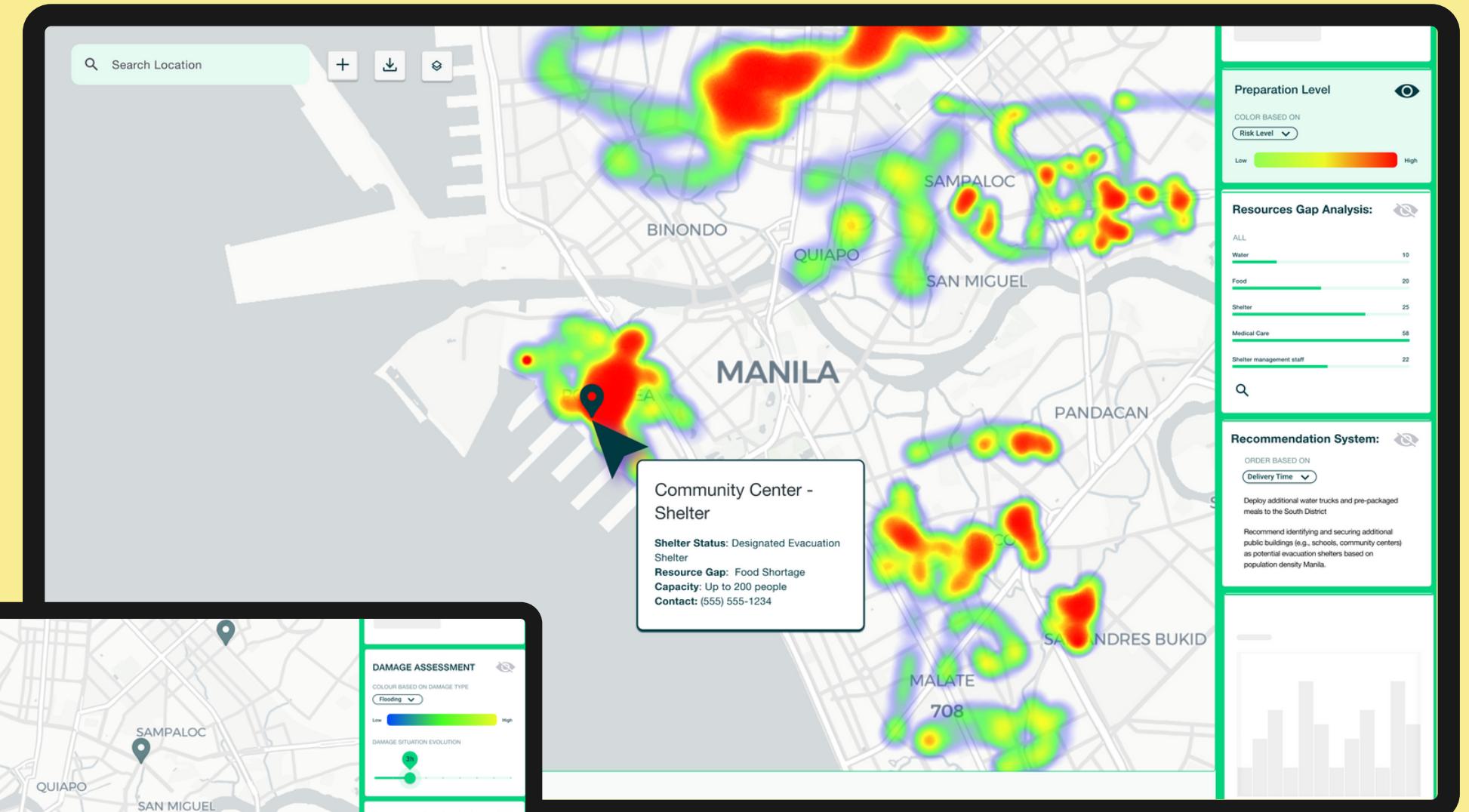
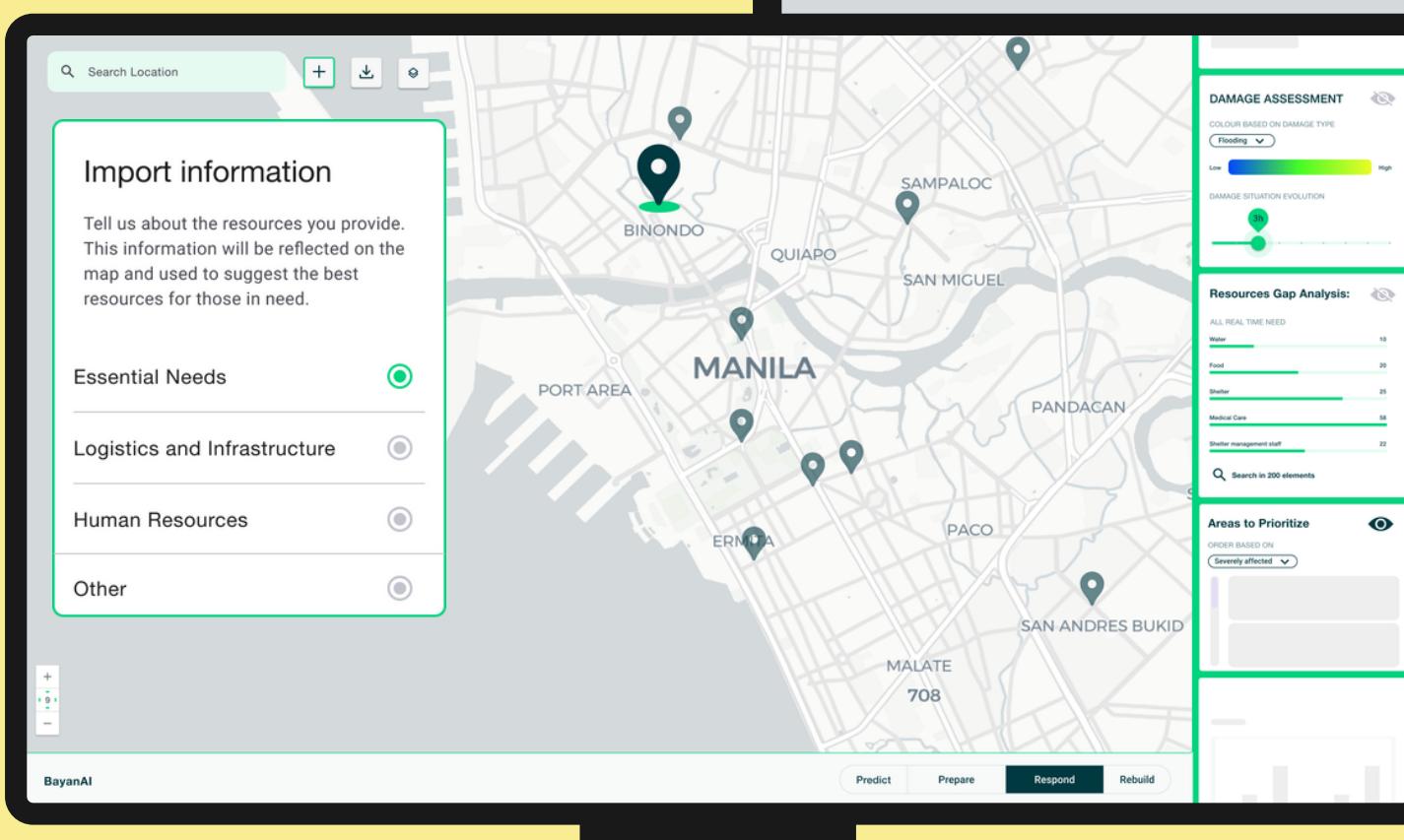


BayanAI

BayanAI provides a real-time information and AI predictions of direction, risk, damage and potential impact of extreme weather events, helping Philippine communities and organizations prepare for, respond to, and recover from disasters.



Summary

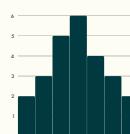
PROBLEM



The Philippines' vulnerability to typhoons, fuelled by climate change, demands a shift towards proactive **community-centred** disaster preparedness.



The lack of real-time actionable information, leaves **communities exposed**, exacerbating impact and prolonging recovery.



While **data** is collected during emergencies, it's often **inaccessible** for frontline communities and organisations, hindering response and resource allocation.

PROCESS

Desk research, primary research, and interviews with residents, NGOs, and AI experts, uncovered key insights:

Disaster response involves web of stakeholders

Protocols lack transparency and coordination among these stakeholders

Vital disaster data is scattered/inaccessible, hindering efficient decision-making

A centralised data hub would dramatically improve disaster preparedness; saving lives by enabling targeted, efficient response

PROPOSAL

BayanAI revolutionises disaster response using weather, geo-spatial & crowdsourced data:

Resource Gap Analysis:

Identifies needs in affected areas through damage assessments/organisational input.

Recommendation System:

Real-time insights for targeted recovery efforts, as organisations share assistance information.

Crowdsourced Data Input Interface:

Organisations/community leaders report on aid provided and areas requiring further support.

Based on insights we designed BayanAI.

We validated assumptions with a local NGO (viability), Filipino residents (desirability) and AI experts (feasibility).



“The Filipino spirit of 'Bayanihan' is a remarkable asset in disaster response. We observe communities sharing resources, providing shelter, and working together for post-cyclone redevelopment.”



Quote from our interview with a Philippine resident

In 2023:

#1

Most at risk from natural disasters

Source: World Risk Report

€600+M

Average damage inflicted by large typhoon

Source: Statista

12.5 M

Filipinos affected by extreme weather events

Source: [United Nations OCHA](#)

80%

Of filipinos own a smart phone

Source: [Statista](#)

Problem Introduction

The Philippines is deeply rooted in family and community.

Unfortunately though, the archipelagic country is extremely vulnerable to intensifying cyclones and typhoons fuelled by climate change.

Information, situational awareness and communication between stakeholders are crucial for preparing and responding to disasters.

While data is collected during emergencies, it's often inaccessible for frontline communities and organisations.

The Need for Data-Driven Solutions

Despite a wealth of data collected during emergencies, a critical gap exists – this data is not efficiently translated into actionable insights for those on the ground.

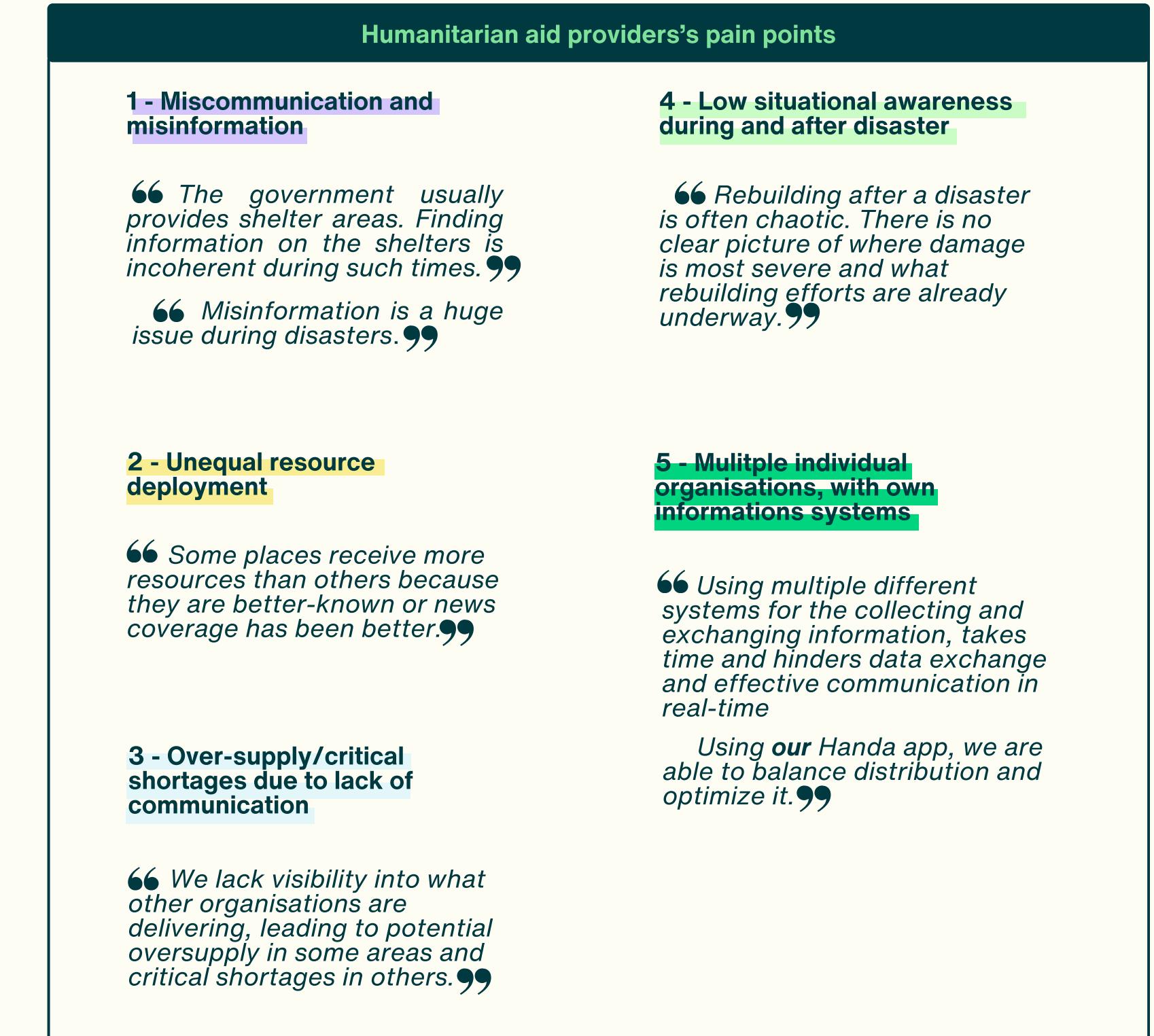
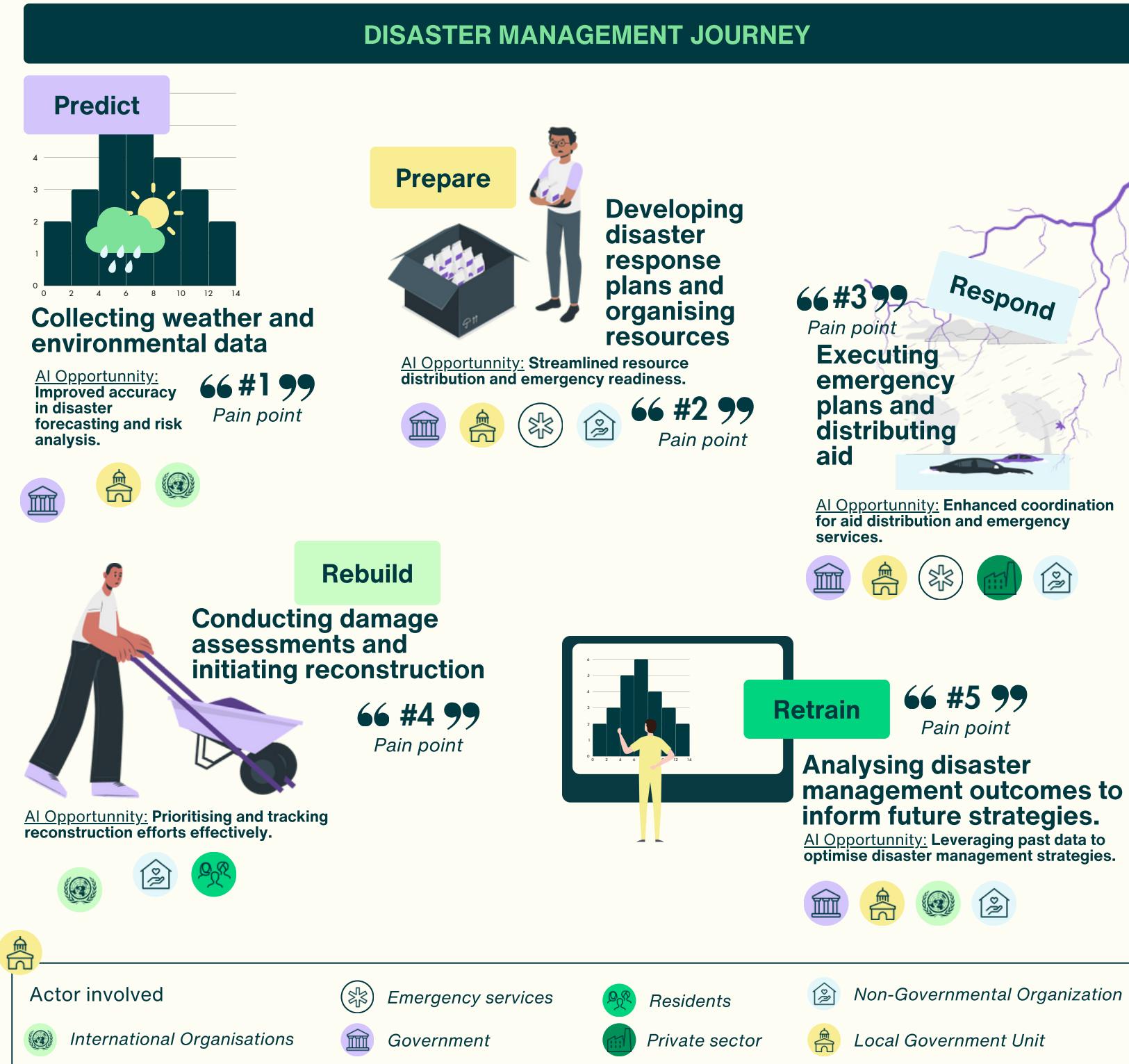
Harnessing existing data and identifying new sources would dramatically improve decision-making for organisations and communities - increasing effectiveness of preparation and targeted relief efforts - and ultimately saving lives.

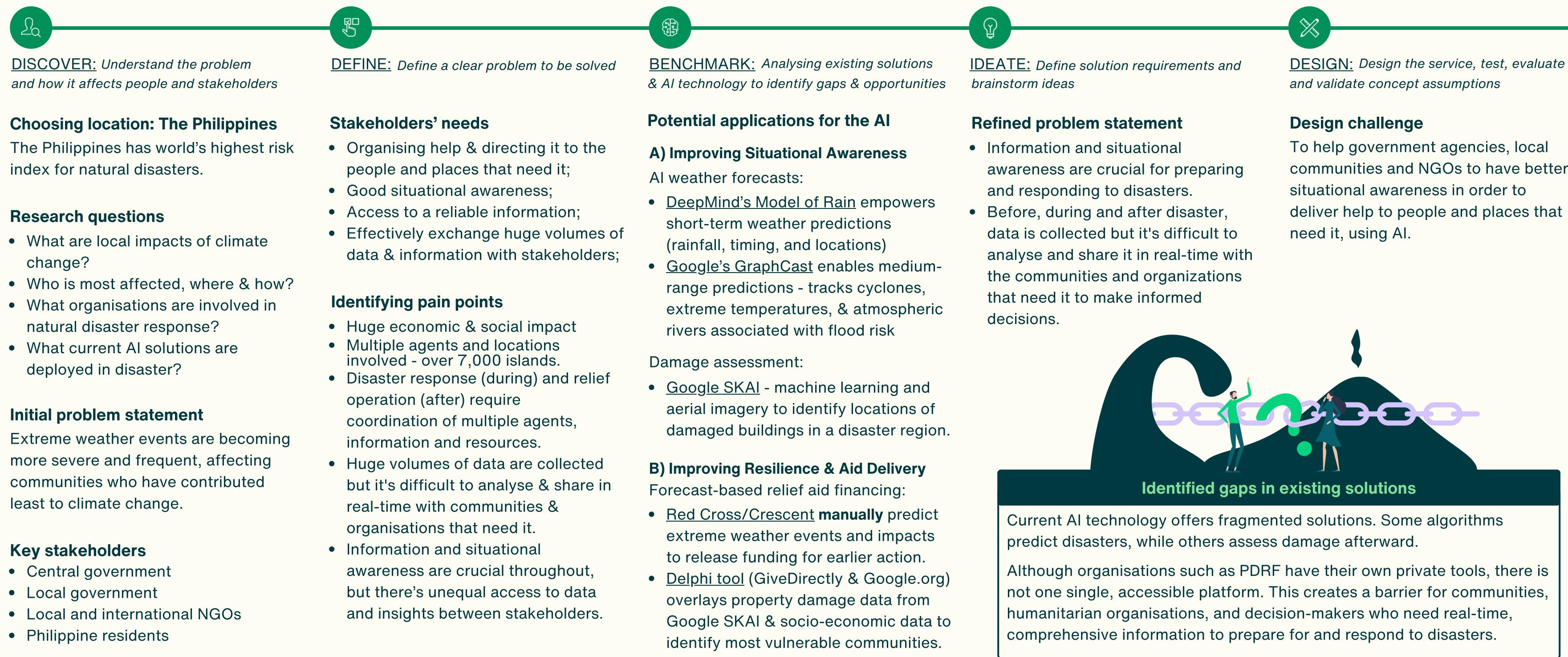
Climate Change and Disaster Impacts

Typhoons like Haiyan (2013) leave deep economic & social wounds: loss of lives, food insecurity, housing crises, compromised public health, and trauma of displacement.

While the government focuses on climate change adaptation, there's a crucial need to shift towards preventive measures that empower communities.

AI can empower communities to tackle these climate-driven challenges, building resilience and shaping their response to disasters.





CO-DESIGNING

Interviews with Filipino residents

Leveraged existing Filipino connections to learn more about experiences related to natural disasters & local methods of coping.



Interview with Filipino NGOs providing natural disaster aid

Insights from The Ayala Foundation and The Philippine Disaster Resilience Foundation (PDRF) who provide support for communities hit by natural disasters, to learn about challenges they face providing disaster relief.



Validating concept with humanitarian organisations

To validate we reached out to the UNHCR Innovation Service, who support innovations mitigating impacts of the climate change in contexts of forced displacement.

Validating concept with Filipino residents and NGO

We presented our solution to Filipino residents and NGO representative we interviewed, to validate our assumptions and gather their feedback to iterate our proposal.

Validating technical feasibility with AI experts

We consulted AI senior experts in our network to consult technical feasibility of our proposed solution.

LOCAL AUTHORITY DASHBOARD

PREDICT

PREPARE

Enhanced strategic planning with precise forecasts, allowing organisations to pre-position resources and personnel.

Streamlined resource allocation and training, ensuring readiness and reducing time to action.

THE FEATURES

Preparation Level

COLOR BASED ON

Risk Level

Low High

Import information
Tell us about the resources you provide. This information will be reflected on the map and used to suggest the best resources for those in need.

Essential Needs

Logistics and Infrastructure

Human Resources

Other

Resources Gap Analysis:

Category	Value
Water	10
Food	20
Shelter	25
Medical Care	58
Shelter management staff	22

Search in 200 elements

Recommendation System:

ORDER BASED ON

Delivery Time

Recommend identifying and securing additional public buildings (e.g., schools, community centers) as potential evacuation shelters based on population density Manila.

Deploy additional water trucks and pre-packaged meals to the South Districta

1. **Disaster Prediction**
2. **Vulnerability Assessment:** preparation level by area, resource gap analysis, recommendation system
3. **Hyper-local 'Crowd-Sourced' Data Input**

LOCAL AUTHORITY DASHBOARD

The dashboard features a map of Manila with various locations marked. On the left, there's a sidebar for 'Import information' where users can select 'Essential Needs' (selected), 'Logistics and Infrastructure', 'Human Resources', and 'Other'. The main area shows a 'DAMAGE ASSESSMENT' section with a color-coded bar for flooding from 'Low' to 'High' and a 'DAMAGE SITUATION EVOLUTION' timeline. Below that is a 'Resources Gap Analysis' table:

ALL REAL TIME NEED	Value
Water	10
Food	20
Shelter	25
Medical Care	50
Shelter management staff	22

At the bottom, there are buttons for 'Predict', 'Prepare', 'Respond', and 'Rebuild'.

RESPOND **REBUILD**

Optimised real-time coordination for efficient emergency response, minimising overlap and maximising impact.

Data-driven decision-making for targeted recovery efforts, ensuring resources meet most critical needs.

THE FEATURES

The 'Damage Assessment' section shows a color-coded bar for flooding from 'Low' to 'High'. The 'Areas to Prioritize' section lists areas based on severity, such as 'Ang Bahay Parola Area' and 'Cattleya Compound Shelter', each with 'deploy' and 'contact' buttons.

Damage Assessment

COLOUR BASED ON DAMAGE TYPE
Flooding

DAMAGE SITUATION EVOLUTION
3h

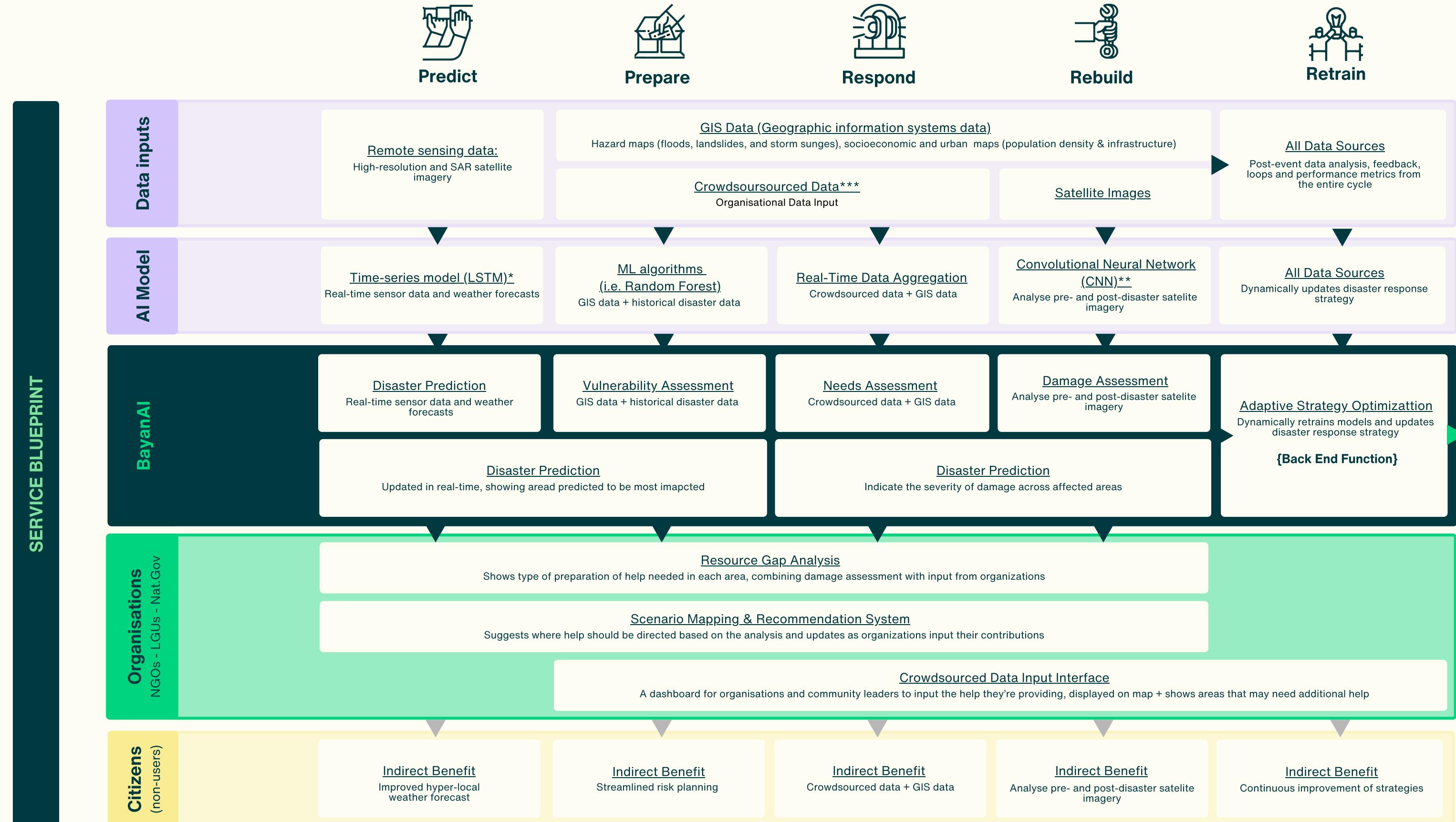
Areas to Prioritize

ORDER BASED ON
Severely affected

- Ang Bahay Parola Area
8486+XPR, Zavala Tatlong Hari st
Need medical care **deploy** **contact**
- Cattleya Compound Shelter
H37Q+2GW, Roundabout, Pasig, Metro
Need Sanitation **deploy** **contact**

1. Impact & needs assessment for each community
2. Resource allocation recommendations across organisations
3. Reconstruction prioritisation
4. Organisation & 'crowd-sourced' data input

Holistic Service Mapping



*Accurate typhoon intensity forecasting using LSTM, historical data, and a rolling forecast approach, as proposed by Yuan et al. (2021) in the *Typhoon Intensity Forecasting Based on LSTM Using the Rolling Forecast Method*.

**Rapid disaster response leveraging GIS, satellite data, and real-time CNN analysis, based on the framework proposed by Linardos et al. (2022) in *Machine Learning in Disaster Management: Recent Developments in Methods and Applications*.

***Based on “CrowdLearn”, crowdsourced data management and deep learning approach, as developed by Zhang et al. (2019) in *CrowdLearn: A Crowd-AI hybrid system for deep learning-based damage assessment applications*.

Systemic solution:

BayanAI addresses climate change challenges holistically - we recognise that local environmental issues are linked to global systems.

We address the root causes - such as environmental degradation and social & economic disparities - by empowering communities to adapt to and mitigate climate change impacts.

Wider Issues:

Our tool considers the interconnectedness of social, economic, and environmental factors.

Improved disaster response not only saves lives but also helps maintain local economies and ecosystems.

Unintended Consequences:

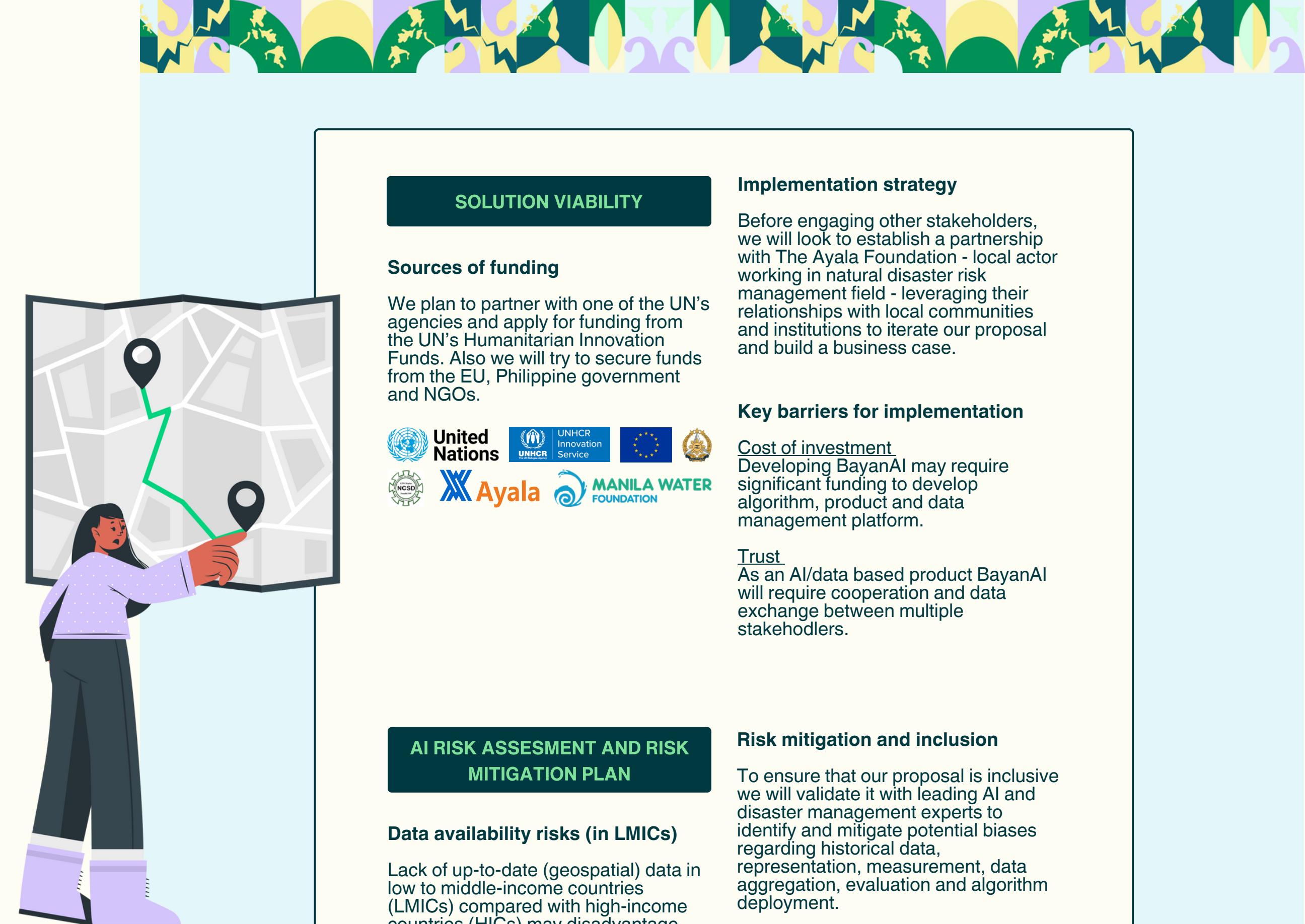
While AI can greatly enhance disaster response, we are acutely aware of the risks of technology dependency and privacy concerns.

Our solution will ensure that AI complements human decision-making and that data use complies with ethical standards throughout.

A view to the future

Differing from top-down approaches, BayanAI fosters ownership for local leaders & tailors solutions to the unique context of each community.

In future iterations we envision providing a trusted source of truth to directly empower all Filipino citizens.



SOLUTION VIABILITY

Sources of funding

We plan to partner with one of the UN's agencies and apply for funding from the UN's Humanitarian Innovation Funds. Also we will try to secure funds from the EU, Philippine government and NGOs.



AI RISK ASSESSMENT AND RISK MITIGATION PLAN

Data availability risks (in LMICs)

Lack of up-to-date (geospatial) data in low to middle-income countries (LMICs) compared with high-income countries (HICs) may disadvantage some areas of the Philippines and bias our algorithm.

Implementation strategy

Before engaging other stakeholders, we will look to establish a partnership with The Ayala Foundation - local actor working in natural disaster risk management field - leveraging their relationships with local communities and institutions to iterate our proposal and build a business case.

Key barriers for implementation

Cost of investment
Developing BayanAI may require significant funding to develop algorithm, product and data management platform.

Trust
As an AI/data based product BayanAI will require cooperation and data exchange between multiple stakeholders.

Risk mitigation and inclusion

To ensure that our proposal is inclusive we will validate it with leading AI and disaster management experts to identify and mitigate potential biases regarding historical data, representation, measurement, data aggregation, evaluation and algorithm deployment.