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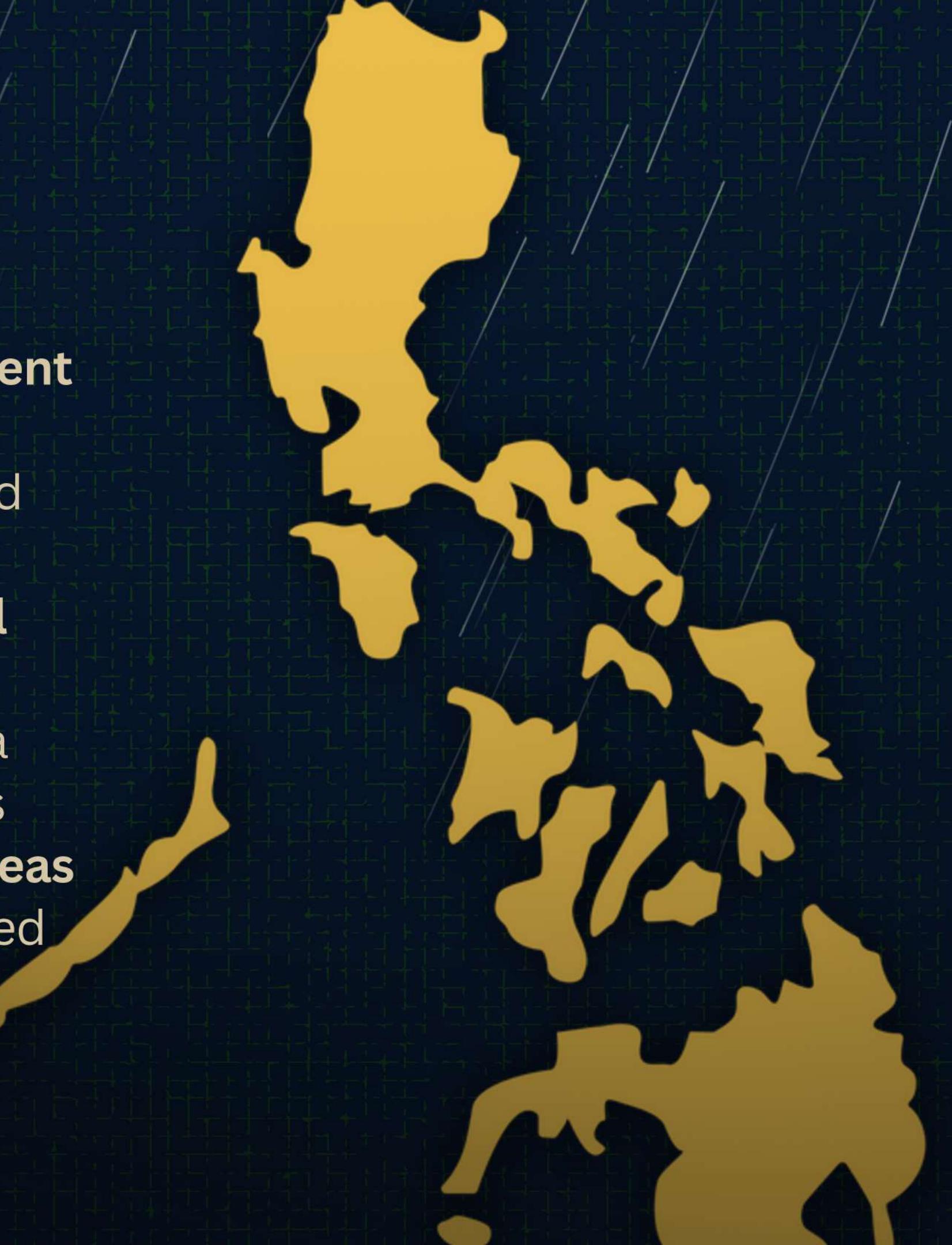
# BARANGAY-LEVEL EVACUATION DASHBOARD FOR QUEZON CITY

*Real-time guidance.  
Safer evacuation.  
Data that saves lives.*



# OVERVIEW

- The Philippines faces **stronger and more frequent floods**.
- Millions are displaced yearly – with fragmented and confusing evacuation information.
- Hot Issue proposes a **real-time, barangay-level** dashboard that:
  - Consolidates **weather, road, and relief** data
  - Suggests safe, optimized evacuation routes
  - Helps government **identify underserved areas**
  - is built as a **Streamlit web prototype** focused on Quezon City.



# BACKGROUND

*The “new normal” of extreme rainfall requires proactive disaster planning.*



## NDRRMC (2025)

- 10 million affected by recent typhoons
- 4,700+ families evacuated to 144 centers



We can't rely on resilience alone – we need data-driven contingency systems.

# THE PROBLEM

*Citizens face scattered and confusing information during floods:*



**PAGASA**  
*Weather Warnings*



**MMDA**  
*Flooded Roads*



**LGUs**  
*Evacuation Centers*

- **Result:** Wasted time, delayed evacuation, and higher risk.
- **Need:** A single, unified dashboard that tells people where, when, and how to evacuate safely.



# PROJECT OBJECTIVES

1

*Combine key disaster data sources into one interface*

2

*Provide safe + fastest routes to relief centers*

3

*Identify coverage gaps for future planning*

4

*Suggest personalized evacuation timing*

5

*Build a Streamlit-based demo using district-level data (2007–2017) from LiPAD*

# SCOPE & LIMITATIONS

## Scope

- **Focus:** Quezon City (2012-2017 data)
- **Data from:** QC LGU, LiPAD
- **Features:** Route visualization, 3 nearest relief ops centers

## Limitations

- English-only interface
- Internet required
- Dependent on data accuracy
- Excludes non-flood disasters (e.g., landslides)
- No real-time flood data (for now), only relies on historical data

# METHODOLOGY OVERVIEW

## *Data Pipeline*

### Data Collection

- QC LGU (boundaries, relief ops centers)
- LiPAD (floods)



### Processing



ETL + feature engineering for accessibility & risk

### Model Development

- Dynamic routing algorithm
- Flood-prone areas overview
- Relief center information



### Deployment



**Streamlit**  
dashboard for  
interactive  
visualization

# ROUTING ALGORITHM

## *Flood Evacuation Routing*

- **Input:** flood polygons (Var risk levels, EPSG:32651) + evac center coordinates + optional barangay centroid.
- **Preprocess:** simplify/dissolve flood geometry; build a smart grid (points only where needed) in meters.
- **Graph model:** grid points = nodes (each assigned a risk), edges to nearby neighbors with distance and weight.

# ROUTING ALGORITHM

## *Flood Evacuation Routing*

- **Cost model (soft avoidance):**
  - weight = distance × avg\_risk\_cost × risk\_multiplier, where risk\_multiplier is user-controlled (1.0 = no avoidance, >1 = prefer safer detours).
- **Routing:** A\* (euclidean heuristic in projected CRS) from nearest start node to evacuation center nodes; return up to 3 best routes sorted by weighted cost.
- **Outputs:**
  - route geometry (WGS84)
  - distance
  - risk exposure breakdown
  - interactive map.

# DASHBOARD ARCHITECTURE

## *Tools Used*

### Tool

Streamlit

### Purpose

UI & dashboard

OSMnx, NetworkX

Routing and spatial graph analysis

Pandas

Data integration and manipulation

LiPAD, PAGASA API

Live weather & flood data



All-in-one visualization for residents and authorities.

# EXPECTED OUTCOMES



Faster and safer **evacuations**



Reduced confusion and panic



Improved city-wide **coordination**



Identification of **underserved barangays**



Scalable model for other flood-prone LGUs

# PROTOTYPE DEMO

## *Walkthrough Flow*

1. **Landing Page:** Overview of Quezon City flood-prone zones
2. **Barangay Selection:** User inputs current barangay
3. **Evacuation Route Panel:**
  - Map with highlighted safe route
  - Real-time road status (green = clear, red = flooded)
  - Estimated travel time & recommended departure time
4. **Relief Center Info:**
  - Name, capacity, distance, and accessibility rating
5. **Insights Tab:**
  - Visual analytics of gaps in coverage
  - Suggested new relief center placements

# NEXT STEPS



Add multilingual support (Tagalog, Kapampangan, etc.)



Expand to Metro Manila, then national scale



Integrate real-time flood and traffic data; IoT flood sensors

Collaborate with NDRRMC and LGUs for pilot testing



**Preparedness is power**  
– and data is our strongest shield.