# Aerial GeoAI

Hybrid Geo-AI Framework for Village-Scale Flood Risk Mapping

National GeoAI Hackathon | Theme 2

Team Aerial GeoAI
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# Why Flood Mapping at Village Scale is Hard

- Flooding is highly localized, not district-wide
- Raw drone & LiDAR data is underutilized
- AI-only or GIS-only approaches fail in isolation
- Minor terrain variations (≤1 m) decide flood paths at village scale

# Our Key Insight

- Flood risk is a terrain problem first,
  and an AI problem where perception fails.

Hybrid Geo-AI > Pure AI or Pure GIS

# Hybrid Geo-AI Pipeline

LiDAR Point Cloud

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AI-based Point Classification
(Ground / Non-ground)

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Digital Terrain Model (DTM)

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Hydrological Analysis

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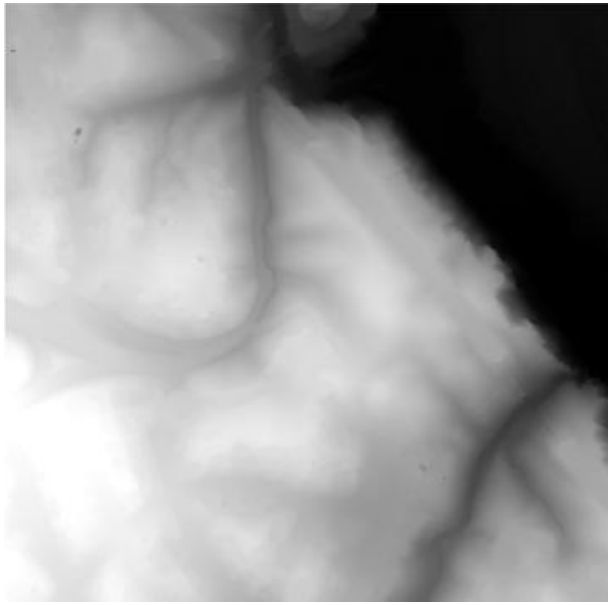
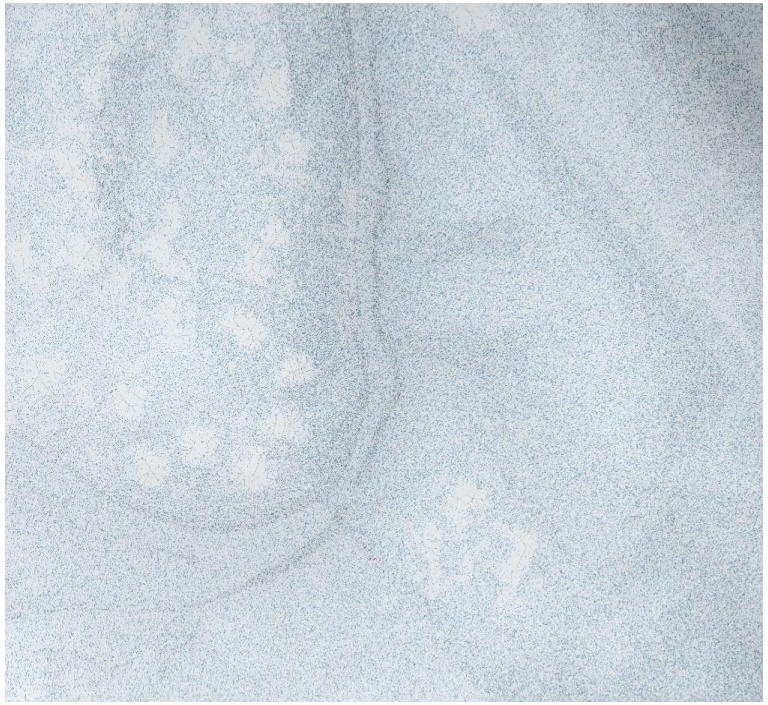
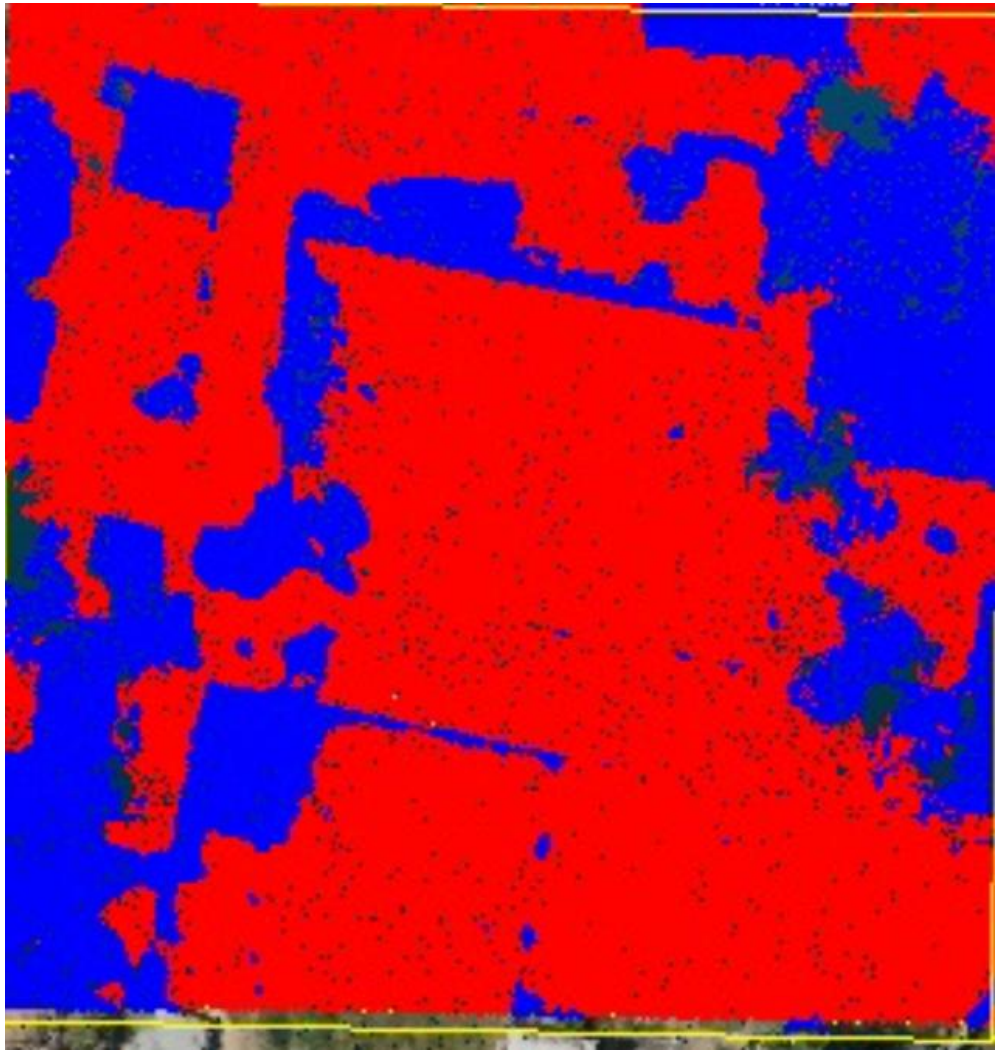
Flood Risk Hotspots

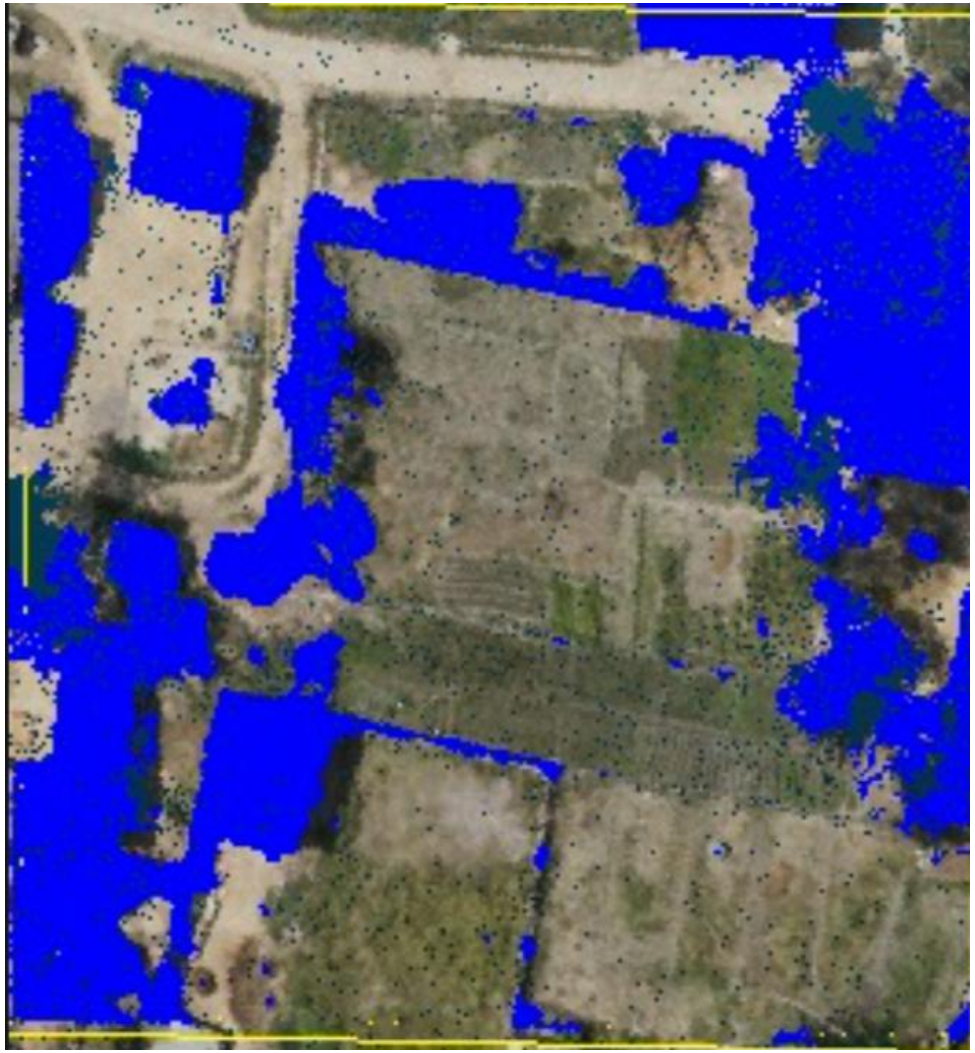


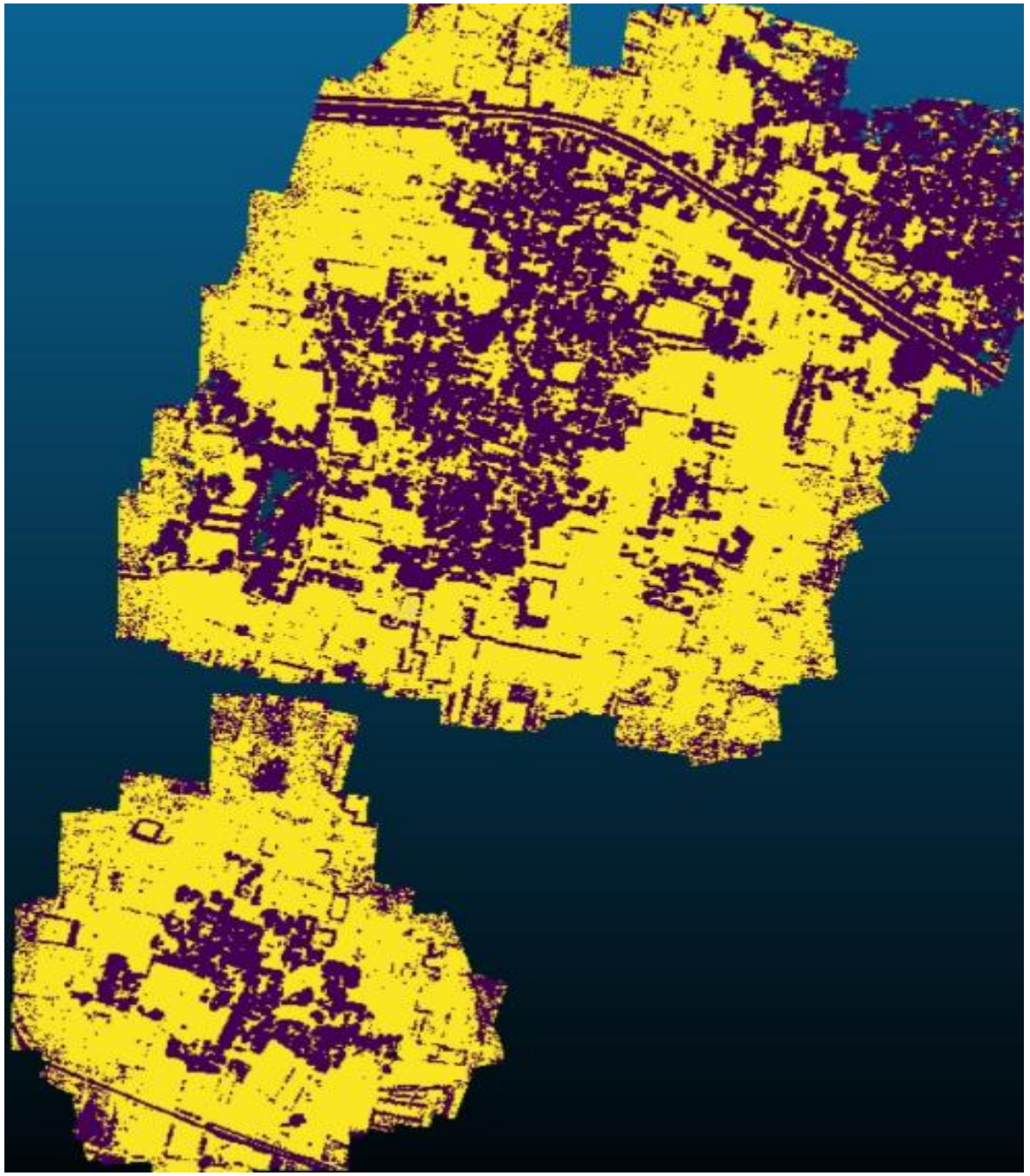


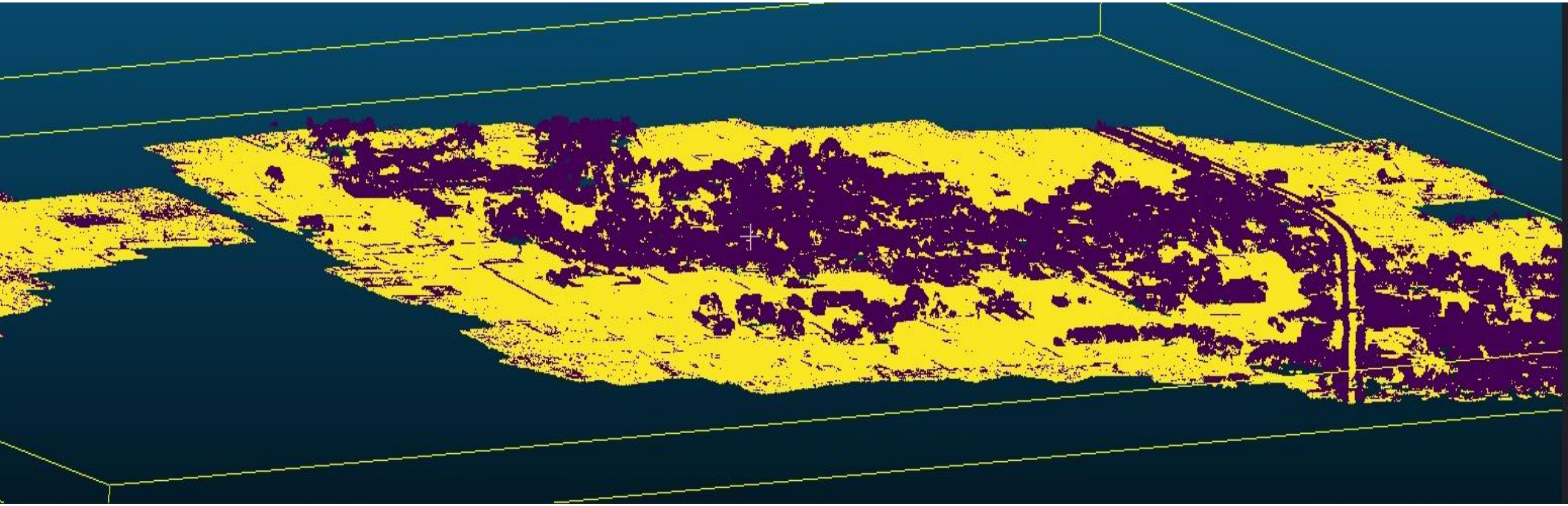
# Role of AI in Our System

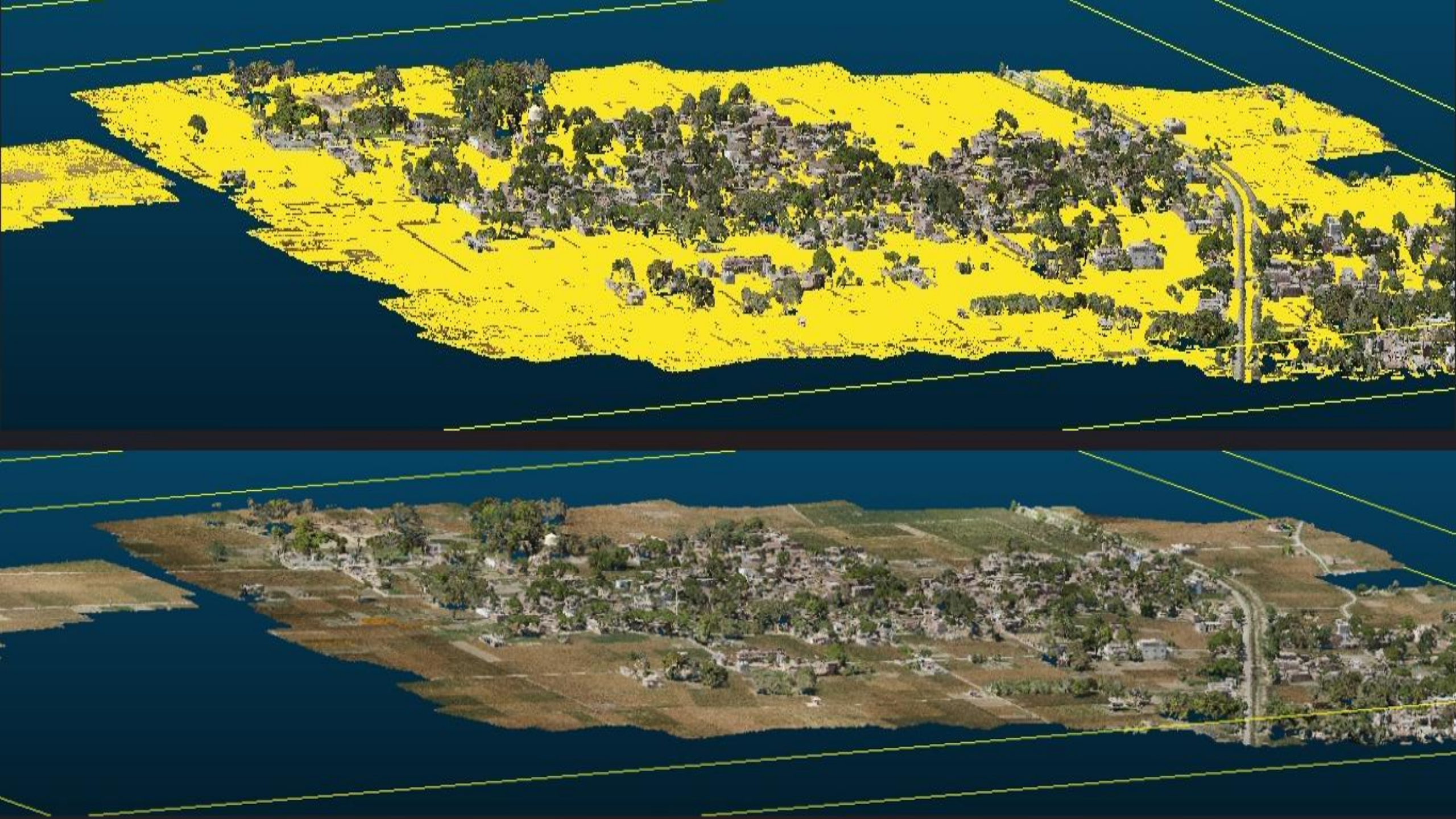
- 3AI-driven 3D point cloud classification (RandLA-Net inspired)
- Separates **ground vs non-ground** in cluttered village scenes
- Reduces terrain distortion caused by buildings & vegetation
- AI used **only where physics-based terrain methods brea**











# From Terrain to Flood Risk

- Ground points → accurate DTM
- Terrain governs water movement
- Hydrology reveals accumulation zones
- DTM HILLSHADE IMAGE

Hydrology converts elevation into actionable flood risk

# Why Aerial GeoAI Stands Out

- AI + Physics, not AI everywhere
- Designed for government deployment
- Modular & scalable across villages

# Real-World Deployment Potential

- Village-wise processing
- Supports drainage planning
- Can integrate with SVAMITVA workflows

# Closing Note

Our work demonstrates that **accurate village-scale flood mapping is achievable today**
by combining **terrain physics with targeted AI**, not by replacing one with the other.

This hybrid GeoAI approach is **practical, scalable, and ready for real-world deployment**.

THANK YOU