



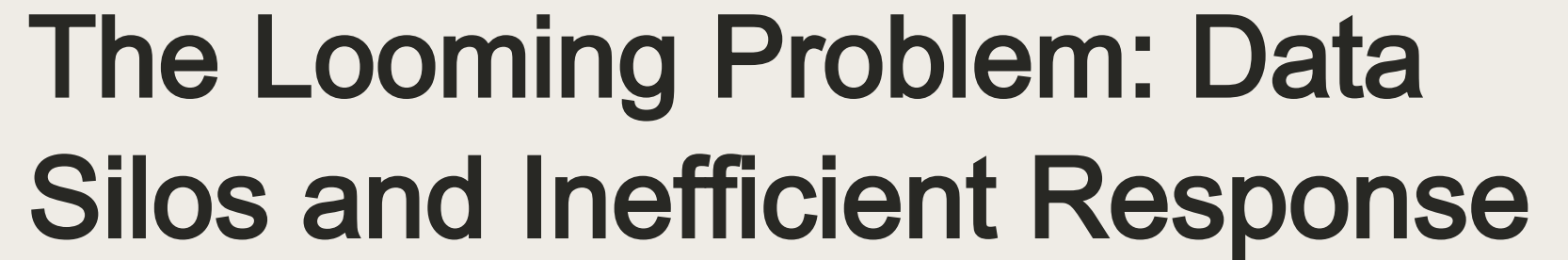
# Miami-Dade Infrastructure: A County at Risk

Miami-Dade sits on a low-lying coastal area averaging 6ft above sea level.

It faces threats from sea-level rise, flooding, storm surges, and aging roads and bridges.

 by Hamed AbdElalim



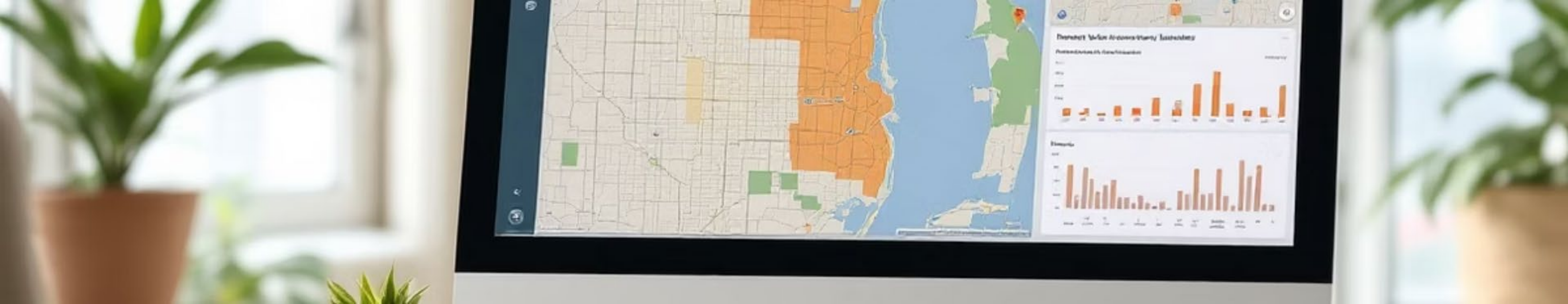


Scattered data slowed emergency response and damaged assessment post-hurricane.

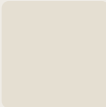
Overlapping projects caused wasted resources and poor coordination.

Damage estimate reached \$2.5 billion, exposing urgent data gaps.



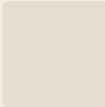


# GIS to the Rescue: Centralized Vulnerability Mapping



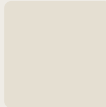
## County-wide Implementation

Unified system integrates data from water, transport, utilities, and more.



## Vulnerability Assessment

Maps highlight infrastructure at risk from climate and aging factors.



## Real-Time Monitoring

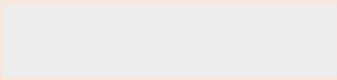
Sensors and weather data feed live updates for predictive preparedness.





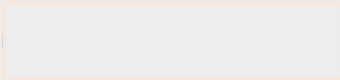
# How GIS Mapping Works: Specific Data Layers

Sea Level Rise	NOAA data with 1-foot increments to 6 feet
Flood Zones	FEMA maps and historical flood analysis
Critical Infrastructure	Hospitals, schools, emergency services mapped
Socioeconomic Data	Populations at risk and evacuation routes identified



# Implementing the Solution: Tools and Tech

Software	Data Acquisition	Open Data Initiative	Training
Esri ArcGIS Enterprise and Cityworks for asset management	LiDAR elevation data and high-res aerial imagery enhance accuracy	Public access promotes transparency and community engagement	150+ staff trained in GIS technologies and workflows





# Tangible Results: Enhanced Planning and Response

**30%**

## Faster Emergency Response

Emergency response improved by 30% during the 2022 hurricane season

**15%**

## Cost Reductions

Planning costs lowered by 15% through optimized resource use

**\$5M**

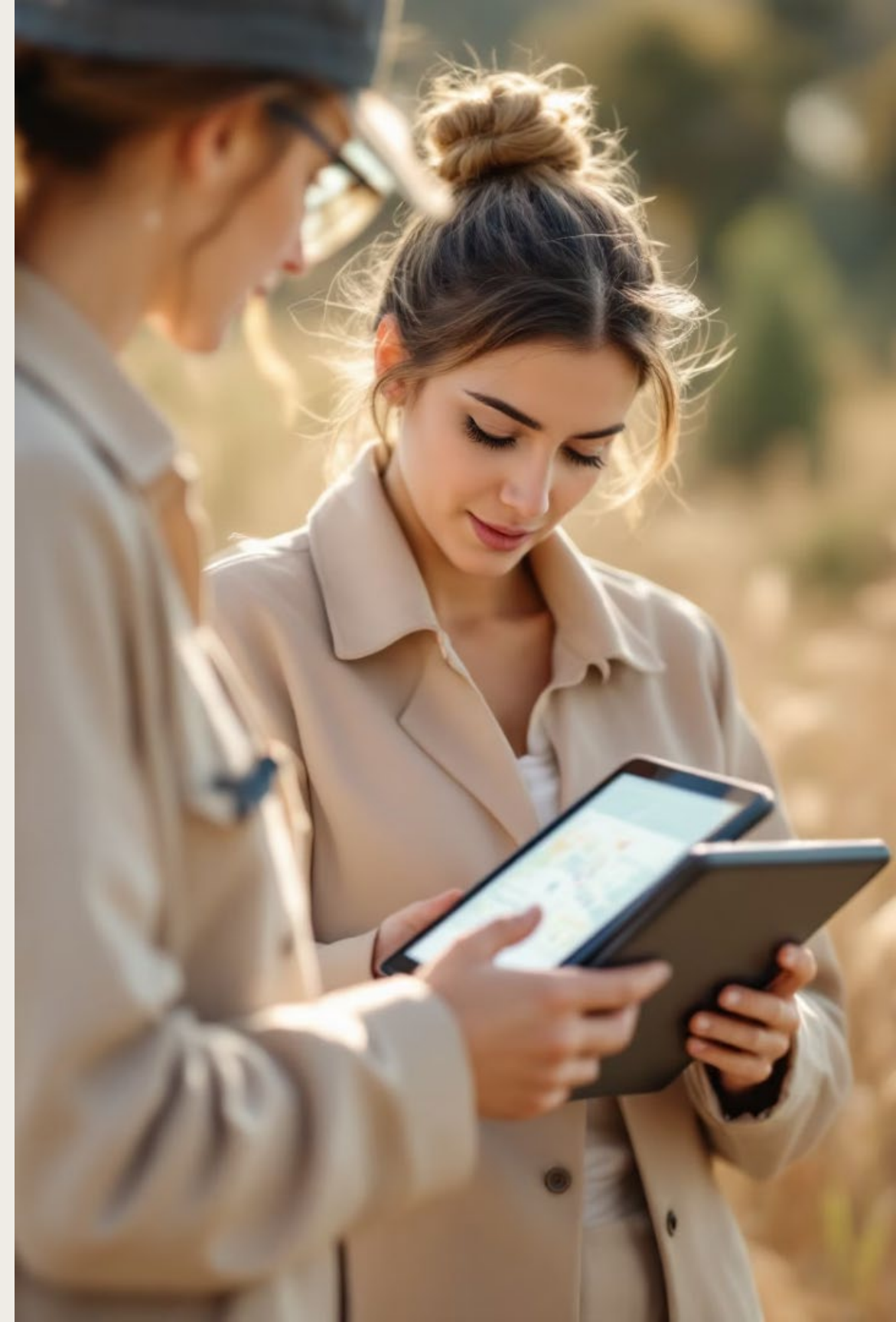
## Grant Funding

\$5 million secured based on vulnerability mapping evidence

**20%**

## Flood Insurance Benefits

20% reduction in flood premiums for high-risk neighborhoods



# Challenges and Lessons Learned

1

## Data Issues

Format inconsistencies and quality control hurdles

2

## Funding Challenges

Securing sustained finances for GIS system upkeep

3

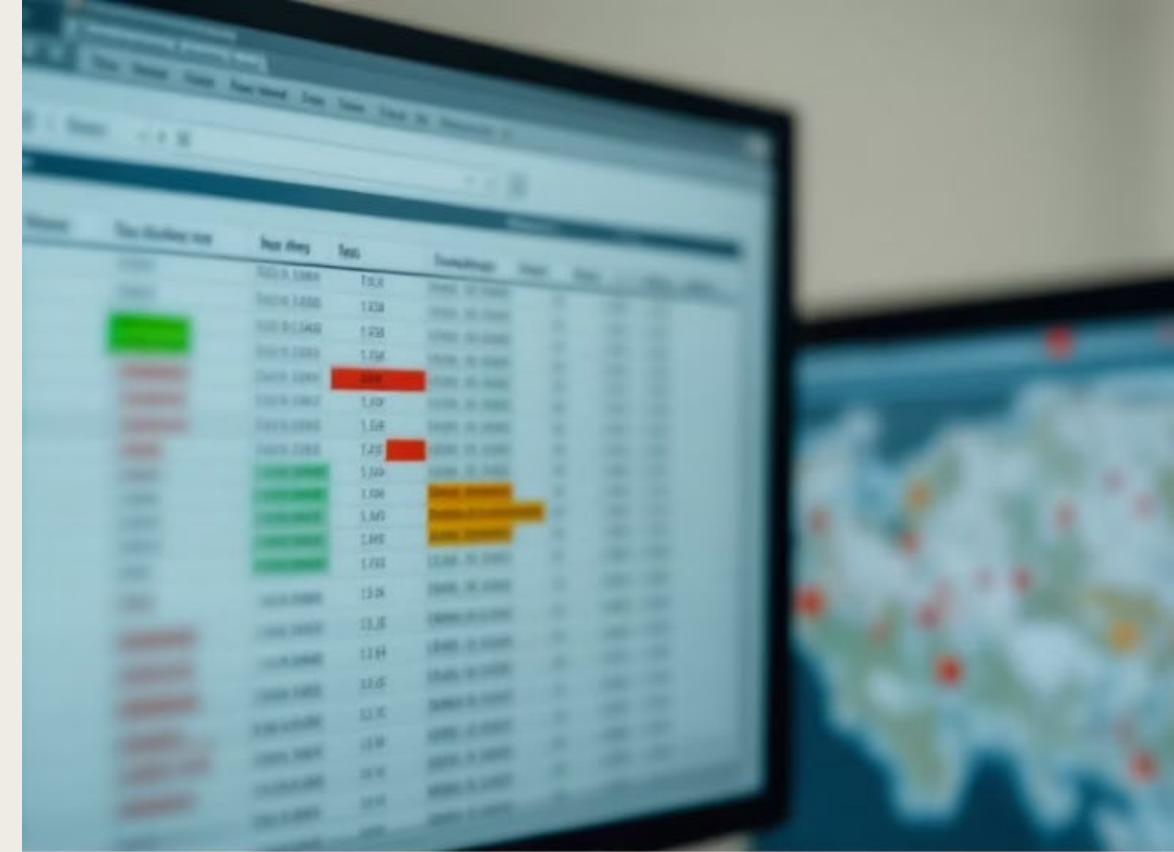
## Collaboration

Navigating diverse stakeholder interests across agencies

4

## Political Support

Maintaining commitment across changing administrations



# The Future: Resilient Miami-Dade

## Machine Learning

Predictive failure models enhance proactive maintenance

## Community Engagement

Public education empowers residents to prepare and respond



## Smart Infrastructure

IoT sensors provide real-time monitoring and alerts

## Climate Planning

GIS integrated into long-term resilience strategies

## Regional Collaboration

Data sharing boosts resilience across neighboring counties

