# Digital Technology in Climate Resilience and Disaster Management

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# Importance of Climate Resilience and Disaster Management

Human Safety and Well-being

Economical Stability

Preserving Ecosystem

Community Sustainability

Protecting Infrastructure

# Key Challenges in Climate Resilience and Disaster Management

# Digital Technology in Climate Resilience and Disaster Management

## Flood Prediction in Vietnam

- AI based flood prediction system to analyze historical and
- Real time data
- Real time alerts

## Earthquake and Tsunami Early Warning System in Indonesia

- Seismography
- GPS Technology
- Buoy sensor

## Drone for disaster Response in Nepal

- Damage Assessment
- Search and rescue operation
- Effective relief planning
- Identify critical needs

## Flood Monitoring in Bangladesh

- Reiver Gauges
- Weather Stations
- Satellite imagery
- Timely warning
- Effective evacuation of community

# Distribution Management and Outage Management in Wildfire & Cyclone restoration

## DMS

- Fault detection and Isolation system
- Predictive Analysis
- Smart Grid
- AMI
- Real Time Data Monitoring

## OMS

- Mobile Work Force Management
- Customer Outage communication
- Drones and remote sensing
- Integrated emergency Management
- GIS

**Ontario Fire data as per CIFFC**

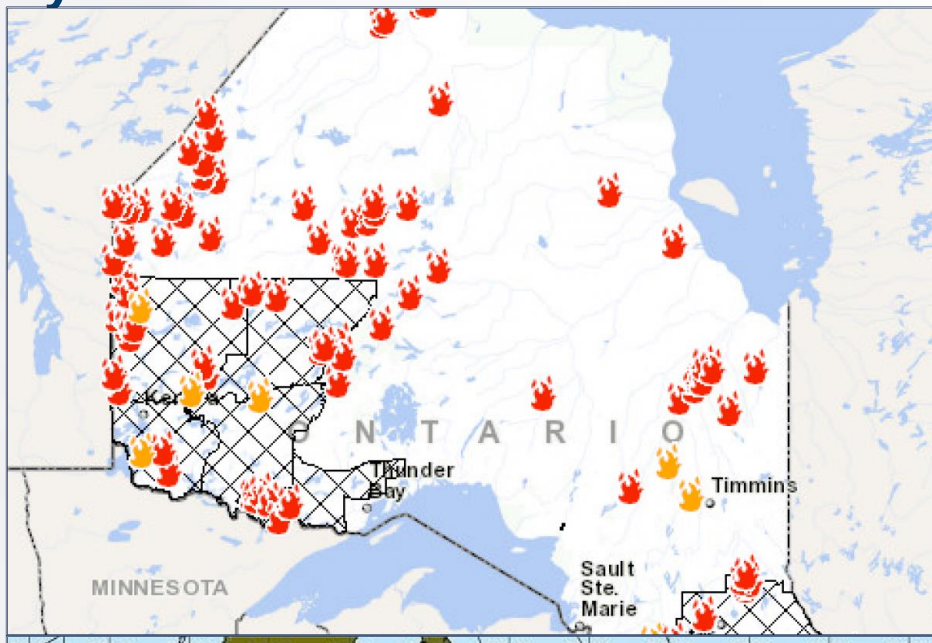
**2022 –** 2,337 Hectares

**2023 –** 85,909 Hectares

**Total 223 fires in Apr'23 – Jun'23**

Cause 103 (humans)

173 (natural)

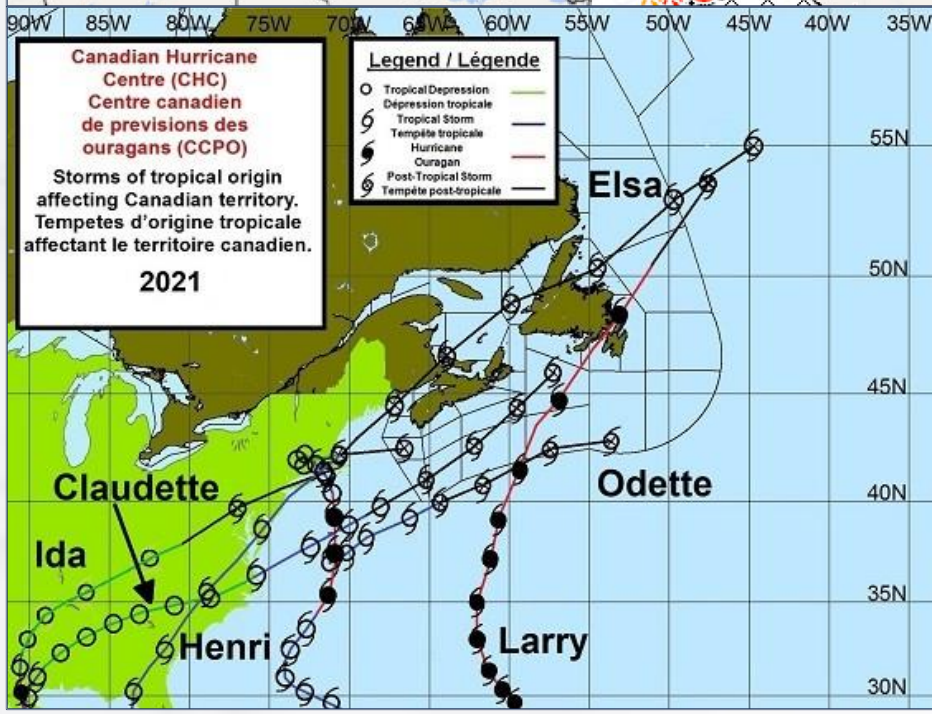



**Canadian Hurricane Centre**

**2021 – 5**

**2020 – 4**

**2019 – 3**



# Digital Technologies in Vegetation Management System

**VMS**

- Satellite Image
- Drones based Aerial Photography
- LiDAR – 3D Image
- AI/ML based predictive analysis & Automated detection
- AR & VR simulated training

- **Vegetation management largest preventative maintenance expense.**
- **$100 million spent on vegetation management in US utilities**
- **Outages cost an average of $33 billion annually in the US alone.**



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# Decision Management and Outage Management in Wildfire restoration

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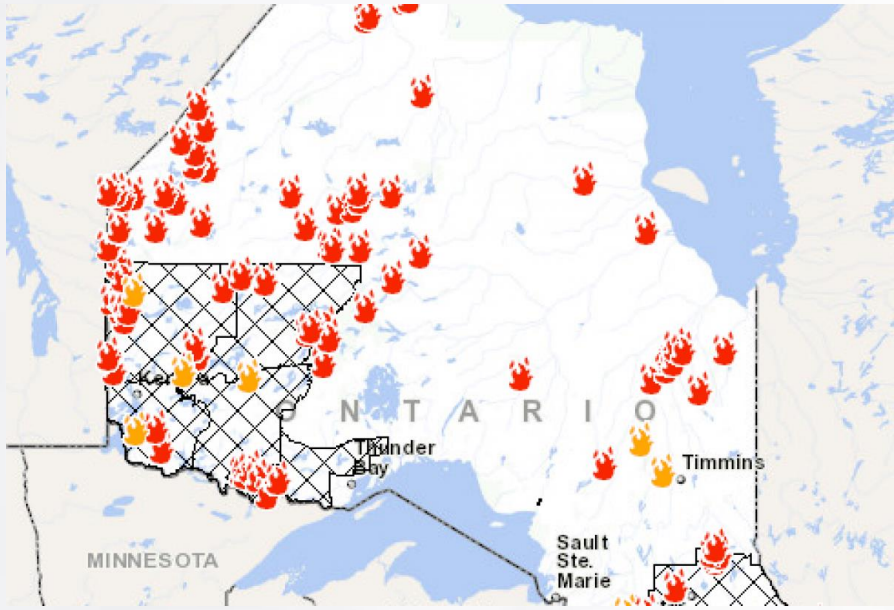


- Geographic Information System
- Remote Sensing
- Weather Monitoring Systems
- Communication Systems
- Predictive Analytics
- Unmanned Aerial Vehicles
- Artificial Intelligence
- Mobile Applications

- Effective & quick response
- Mitigate the risk
- Protect lives and properties
- Accurate assessment
- Search and rescue operation
- Improved incident awareness
- Resource identification and deployment



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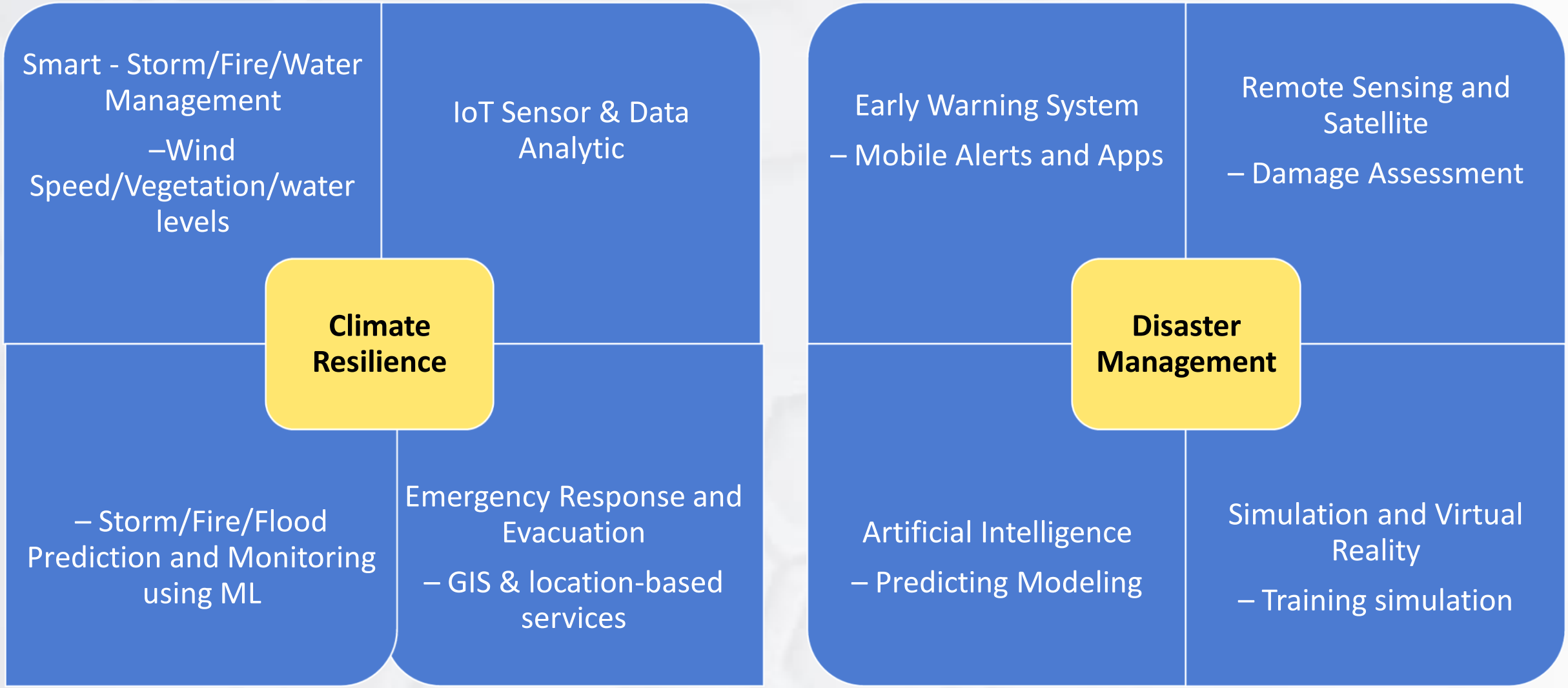
# Digital Technology in Climate Resilience and Disaster Management



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# Future Trends in Climate Resilience and Disaster Management

## AI & ML

- Predictive Modeling
- Risk Assessment
- Accuracy of early warning
- Optimize Resource allocation
- Enhance decision making

## Digital Twin

- Virtual Replicas of physical Infra
- Real time monitoring
- Analysis of critical assets
- Identification of vulnerabilities
- Implementation of resilience measures

## AR & VR

- Training Emergency responses
- Simulate Disaster scenarios
- Simulated training
- Improves preparedness
- Decision making

## Robotic System

- Drones & Automation vehicles
- Search & Rescue operation
- Access hard to reach areas
- Survey disaster affected area
- Assist in locating and aiding survivors

# Digital technology in Storm Management

| Remote Sensing and Satellite Technology | Drones | GIS and Mapping | Blockchain |
|---|---|---|---|
| • Real time imagery<br>• Strom tracking<br>• Damage assessment | • Assess storm affected area<br>• Identify the survivor and their location<br>• Access danger / unsafe area | • Identify the location of affected area<br>• Identify the access route<br>• mapping the affected zone | • Protect sensitive info<br>• Tamper proof record<br>• Trace source of donation<br>• Very and manage identities of affected individuals |
| • Improved Response Coordination<br>• Accurate and up to date information | • Quick Damage assessment<br>• Search and Rescue operation | • Evacuation route plan<br>• Resource allocation<br>• Risk Assessment<br>• Enhance situational awareness | • Secure sensitive data<br>• Unchangeable record of all transactions and activities<br>• Donor tracking<br>• Secure verification and quicker & accurate aid distribution |

# Recommendation of Digital Technology in Climate Resilience and Disaster Management

- Develop & Enhance early warning system using IoT devices, Satellite imagery & predictive analytics
- Remote sensing and satellite technology for real-time monitoring of climate patterns, natural disasters, and environmental changes
- Integrate AI and predictive analytics to analyze historical and real-time data for more accurate risk assessments
- Use digital platforms, mobile apps, and social media to engage with and educate communities
- Continuously monitor the performance of digital technologies and frameworks. Conduct periodic evaluations to assess their effectiveness, identify areas for improvement, and adapt strategies based on lessons learned
- SCADA/DMS/OMS for Cyclone & Fire Management

# Thank you!