



IEEE Workshop on Electronics for mitigating Climate Change (EmC2)

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Advancing Flood Resilience in Derna, Libya:

The Role of Electronic Technologies and Collective Action in Combating Climate Change

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Outline of the Presentation

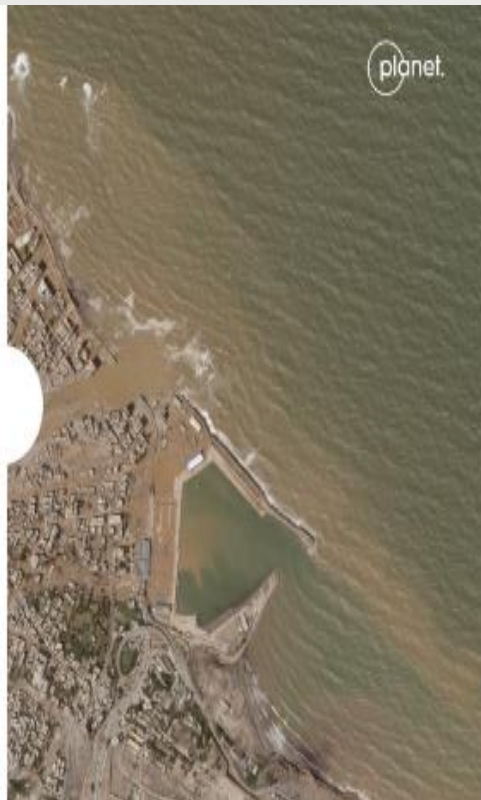
- ❖ Derna, Libya Before and After the floods.
- ❖ Understanding the Challenge: **Floods in Derna ,Libya.**
- ❖ Climate and Floods: **A growing Threat in Derna, Libya.**
- ❖ Challenges in Flood Management: **Derna, Libya.**
- ❖ Harnessing Electronics: **Mitigating Climate Change Impact.**
- ❖ Innovative Electronic Solutions: **Addressing Flood Challenges in Derna.**
- ❖ Harnessing Collective Strength: **Collaborative Approaches to Mitigate Flood Risks.**
- ❖ Building a Resilient Future: **Together We Can Make a Difference.**

Drena Before and After the Floods

Before



After



Coastal road destroyed by floodwaters

Before



After



Understanding the Challenge:

Floods in Derna, Libya

- **Brief introduction to the issue of floods in Derna, Libya:**
- Derna, a city in Libya, has been facing severe flooding incidents due to climate change-related factors.
 - Increasing frequency and intensity of rainfall, coupled with inadequate drainage systems, have led to devastating floods in the region.





➤ Importance of Addressing Climate Change-Related Disasters:

- **Climate change exacerbates extreme weather events, making it crucial to address its impact on vulnerable communities.**
- **Floods not only cause immediate destruction but also have long-term consequences on infrastructure, economy, and public health.**



➤ Purpose of the Presentation

- ❖ The purpose of this presentation is to explore innovative electronic solutions that can mitigate the effects of floods in Derna, Libya.
- ❖ By harnessing advanced technologies, we can enhance early warning systems, improve disaster response, and ultimately save lives.

Drena Before and After the Floods



Drena After the Floods



Climate and Floods: A Growing Threat in Derna, Libya

- **Climate Change:** Climate change refers to long-term changes in the average weather patterns on Earth. It leads to alterations in temperature, precipitation, and weather-related phenomena.
- **Impact on Extreme Weather Events:** Climate change intensifies extreme weather events, such as heavy rainfall, leading to increased instances of flooding. Rising global temperatures contribute to the volatility of weather patterns.





❖ Data and Statistics on Floods in Derna

- **Frequency of Floods:** Provide statistics on the frequency of floods in Derna over recent years to highlight the escalating problem.
- **Human Cost:** Share data on the number of lives lost, injuries, displaced populations, and damage to infrastructure caused by floods in Derna.

❖ Environmental Consequences:

- **Erosion and Soil Degradation:** Explain how flooding leads to erosion of soil and degradation of agricultural land, impacting local livelihoods.
- **Impact on Biodiversity:** Discuss the effect of floods on local ecosystems and wildlife, emphasizing the need for sustainable solutions to protect the environment.

Challenges in Flood Management: Derna, Libya



Overview of Challenges Faced During and After Flood Events: **Limited Resources**

Derna, like many other regions, faces challenges due to limited financial and human resources, hindering effective disaster preparedness and response.

- **Infrastructure Damage:** Floods cause severe damage to roads, bridges, buildings, and utilities, making it difficult for emergency services to reach affected areas promptly.
- **Loss of Lives:** The primary concern is the loss of human lives. Floods lead to casualties and injuries, often impacting vulnerable communities the most.





Environmental a Pollution:

- Floodwaters can carry pollutants, leading to contamination of water sources, posing health risks to the population.
- **Damage to Agricultural Land:** Farmlands are often inundated, leading to crop loss and food security issues for the local population

Social and Economic Consequences: Displacement of Communities

- Floods force people to evacuate their homes, causing temporary or long-term displacement and placing a burden on already strained resources.
- **Economic Setback:** Businesses suffer due to damage to infrastructure, disruption of services, and decreased consumer spending, leading to economic setbacks for the region.

Harnessing Electronics: Mitigating Climate Change Impact

➤ How Electronics Can Play a Crucial Role:

- ✓ **Real-time Monitoring:** Electronic sensors and monitoring systems can provide real-time data on weather conditions, water levels, and soil moisture, enabling accurate predictions and timely responses to potential floods
- ✓ **Early Warning Systems:** Advanced electronics allow the development of early warning systems that can detect changes in weather patterns and issue alerts to vulnerable communities, enabling them to evacuate in advance.
- ✓ **Data Analysis and Predictive Modeling:** Electronic tools facilitate data analysis and predictive modeling, helping authorities understand flood patterns, plan infrastructure, and allocate resources effectively.

✓ **Communication Technologies:**

- **Improved Communication:** Electronic devices enhance communication during emergencies. Mobile phones, social media, and apps enable authorities to disseminate crucial information and safety guidelines to the public.
- **Resilient Networks:** Developing robust communication networks ensures that emergency messages reach people even in challenging conditions, enhancing the efficiency of evacuation and relief efforts.

✓ **Remote Sensing and Mapping:**

- **Drone Technology:** Drones equipped with sensors and cameras can conduct aerial surveys, assess flood damage, and create detailed maps, aiding in rapid damage assessment and resource allocation.
- **GIS Mapping:** Geographic Information System (GIS) technology helps create detailed maps identifying flood-prone areas, allowing urban planning that reduces vulnerability and enhances resilience.



Innovative Electronic Solutions: Addressing Flood Challenges in Derna

➤ IoT Sensors and Monitoring

- IoT sensors.
- Data Analysis.
- Predictive Modeling.

➤ Early Warning Systems

- Sensor Networks
- Alert Mechanisms
- Community Engagement

➤ Drone Technology

- Aerial Surveys.
- Remote Sensing.
- Rapid Responses.

➤ Community Engagement Apps

- Information Dissemination.
- Safety Tips.
- Emergency Contacts.



Harnessing Collective Strength: Collaborative Approaches to Mitigate Flood Risks

➤ **Shared Responsibility:**

- **Explanation:** Addressing climate change impacts and mitigating flood risks require a collective effort from governments, communities and businesses.
- **Impact:** Collaborative actions distribute the responsibility, enabling a more comprehensive and effective response to the challenges faced.

➤ **Pooling Resources:**

- **Explanation:** Collaboration allows the pooling of financial, technical, and human resources from various stakeholders.
- **Impact:** Combined resources empower communities with better infrastructure, advanced technology, and comprehensive disaster preparedness plans

➤ **Knowledge Exchange:**

- **Explanation:** Collaboration facilitates the sharing of knowledge, expertise, and best practices among different organizations and communities.
- **Impact:** Knowledge exchange promotes innovation, allowing communities to learn from successful initiatives, ultimately enhancing their resilience against floods.

➤ **Effective Risk Assessment:**

- **Explanation:** Collaboration enables the collection and analysis of data from multiple sources for accurate risk assessment.
- **Impact:** Informed decision-making based on thorough risk assessments helps in developing targeted flood mitigation strategies, minimizing potential damages.

➤ **Community Engagement:**

- **Explanation:** Collaborative efforts engage local communities in the decision-making process and implementation of flood resilience measures.
- **Impact:** Empowered communities become active participants, leading to higher compliance with safety protocols, better preparedness, and a quicker response during flood events.

➤ **Policy Development:**

- **Explanation:** Collaboration among policymakers results in the development of comprehensive policies and regulations addressing climate change adaptation and flood management.
- **Impact:** Well-defined policies guide sustainable development, promote eco-friendly practices, and ensure the incorporation of resilience measures in urban planning.

➤ **Innovation and Research:**

- **Explanation:** Collaborative networks foster innovation and research in flood prediction, early warning systems, and sustainable technologies.
- **Impact:** Technological advancements and innovative solutions developed through collaboration enhance the overall effectiveness of flood mitigation efforts.

➤ **Global Solidarity:**

- **Explanation:** Collaboration extends beyond local boundaries, involving international cooperation and solidarity in facing climate change challenges.
- **Impact:** Global collaboration amplifies resources, knowledge, and support, strengthening the resilience of communities worldwide against the impacts of climate change.

Building a Resilient Future: Together We Can Make a Difference

➤ Reinforce Importance of Collaboration:

Stress the significance of collaboration among governments, communities, NGOs, and businesses in addressing flood risks and climate change challenges.

➤ Call to Action:

Outline specific actions the audience can take, such as supporting local initiatives, participating in awareness campaigns, or volunteering for disaster response organizations.

➤ Advocate for Policy Change:

Stress the importance of advocating for policies that support climate change adaptation, sustainable development, and investment in resilient infrastructure.

➤ Contact Information and Resources:

Provide relevant contact details for organizations, NGOs, and government agencies working on flood resilience and climate change adaptation.



2050: what happens if we ignore the climate crisis

**The
Guardian**

Message of earth to us





Thanks for Listening



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