Case #5 Overview

Meeting Date: 10/30/24

Objective of the Case:

The Logistics Cluster, led by the World Food Program, is seeking real-time mapping and monitoring of road accessibility in Lebanon. This initiative aims to improve logistics coordination and support humanitarian efforts by enabling route optimization and providing updated road condition data to humanitarian responders through the LogIE platform.

Overview of Recommendations:

Experts provided recommendations centered on leveraging satellite imagery, using proxy data sources, collaborating with local partners, and ensuring secure data sharing. Key areas of feedback addressed real-time road accessibility mapping, alternative data resources, and integration strategies to meet the project's goals efficiently.

Key Points and Discussions

Feedback from Experts:

- **Expert 1**: Proposed using Sentinel-1 SAR imagery to detect road accessibility based on terrain changes, layering this data with road network information from OSM. Provided a code link for initial SAR data analysis in Google Earth Engine.
- **Expert 2**: Suggested leveraging social and mobility data sources like Facebook Data for Good, Crisis Ready, and remote sensing data through UNOSAT and ETH. Emphasized the importance of lessons learned from previous EU crisis management projects.
- **Expert 3**: Recommended high-resolution optical imagery (e.g., Maxar, Airbus) for more detailed road assessments. Highlighted that real-time machine-readability may have limitations, advocating for manual AOI-focused analysis. Recommended restricting public access to ensure operational security.
- **Expert 4**: Recommended considering Google Earth Engine (GEE) as a platform due to its extensive, daily-updated satellite imagery database, which reduces data acquisition steps compared to other platforms. GEE's base map, updated in 2024, includes Lebanon's road networks. She suggested Landsat 9 for time series analysis to monitor both roads and vegetation coverage over time.

Tools and Data Resources Suggested:

- **Sentinel-1 SAR Imagery:** For terrain and road accessibility monitoring.
- **Open Street Map (OSM):** Base road network data.
- **Google Earth Engine (GEE):** Platform for SAR and remote sensing data analysis.
- **UNOSAT and ETH Open Data:** Remote sensing resources for conflict zones.
- **Meta/Facebook Data for Good:** Mobility data for real-time road accessibility.
- **Uber/Food Delivery Data:** Proxy indicators for blocked or accessible routes.

- **EU Horizon 2020 Crisis Management Resources:** Lessons and insights for humanitarian logistics

Recommendations

Case Specific Recommendations

- **Define and Focus on High-Priority AOIs**: To ensure timely and accurate analysis, prioritize small, critical areas for real-time monitoring rather than the entire country.
- **Pilot SAR Masking Approach**: Test Thomas's SAR-based terrain masking methodology on Google Earth Engine for viability in Lebanese terrain.
- **Explore Proxy Mobility Data**: Consider integrating mobility data from social platforms or ride-sharing services to infer accessibility status.
- **Secure Data Access**: Limit accessibility of sensitive road data on LogIE to verified humanitarian actors only, using password protection as needed.

Recommended Resources:

- **Google Earth Engine Code** (for SAR analysis): SAR Code Link from Thomas
- **Humanitarian OpenStreetMap Team (HOT)**: Open-source mapping support.
- **UNOSAT and ETH Remote Sensing**: Potential imagery resources.
- **Meta/Facebook Data for Good**: Mobility data resources for real-time road accessibility monitoring.
- **EU Horizon 2020 and Crisis Management Resources**: Resources on agility and responsiveness in humanitarian logistics.
- **LiveUAmap**: A platform originally developed to track conflict events in Ukraine, now geotagging news and Twitter reports in near real-time in various conflict zones, including a specific tag for road blockages. Includes an API for accessing this data in real-time (link: israelpalestine.liveuamap.com).

Conclusion

The expert panel provided a range of strategic and actionable recommendations to enhance the Logistics Cluster's Road accessibility mapping in Lebanon. Leveraging both SAR and optical imagery offers a robust, layered approach for detecting real-time changes in road conditions, with Sentinel-1 and high-resolution satellite imagery identified as essential tools. While these technologies provide foundational data, the integration of proxy mobility data sources, such as social mobility from Facebook Data for Good or real-time data from Uber and food delivery services, was highlighted as an innovative method for filling gaps in accessibility information.

Implementing a focus on high-priority areas (AOIs) rather than attempting nationwide coverage was recommended to allow for quicker and more accurate results, supporting agile response times. Additionally, ensuring that data shared on LogIE remains secure by limiting access to verified humanitarian actors was emphasized as a key measure to maintain the operational security of sensitive road and accessibility data.

By combining high-resolution imagery with creative proxy data and refining access protocols, the Logistics Cluster can enhance its responsiveness and effectiveness in supporting humanitarian operations. This multifaceted approach will allow for informed, real-time routing and increased safety and efficiency for responders navigating Lebanon's complex logistics landscape.