



ADVANCED WEATHER WARNING SYSTEM IN MOROCCO: PRECISION AND COMMUNICATION FOR EFFECTIVE DISASTER MANAGEMENT

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INTRODUCTION

The General Directorate of Meteorology (DGM) in Morocco is the national meteorological services in the country. Operating under the Ministry of Equipment and Water, the DGM plays a crucial role in weather forecasting, climate monitoring, and providing essential meteorological data and services. It's important to highlight that the weather warning system, initially implemented at the provincial level in 2008, was further refined to the municipal level in 2022. This system provides essential information from the DGM to public authorities, citizens, and the media, supporting the state's efforts to ensure the safety of people and property and maintain the continuity of socio-economic activities.

SPATIAL DOWNSCALING IN THE WARNING SYSTEM

Province with large geographical areas: The case of Taroudant

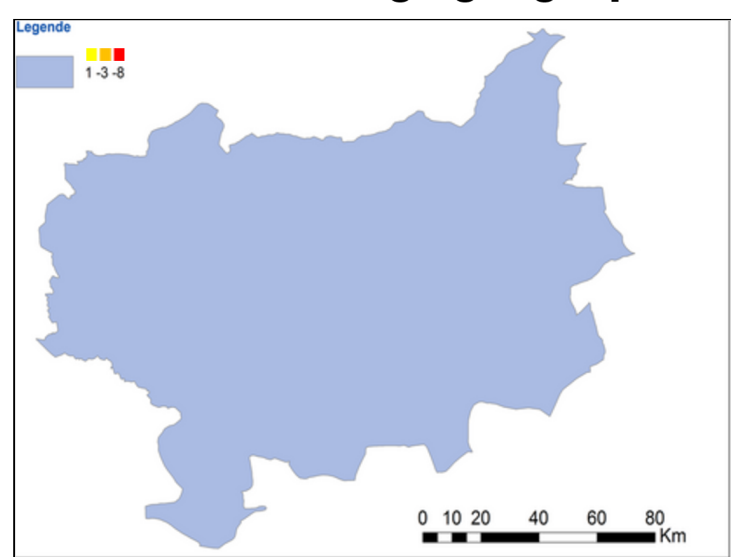


Figure 1: Minimum temperature thresholds in the province of Taroudant for January

First Map (Figure 1)

This map shows the minimum temperature threshold across the entire province of Taroudant for January.

Importance of Downscaling

- **Resolution Difference:** The first map gives a general idea but lacks the finer details that can be crucial for localized weather warnings. The second map, on the other hand, highlights the importance of downscaling to a more granular level, (communal areas), to better understand and respond to local weather conditions.
- **Practical Implications:** Downscaling allows for more accurate and specific weather warnings, which can significantly improve early warning systems and disaster preparedness. It shows that different municipalities within the same province can experience very different minimum temperatures, which could be critical for agricultural planning, resource allocation, and public safety.

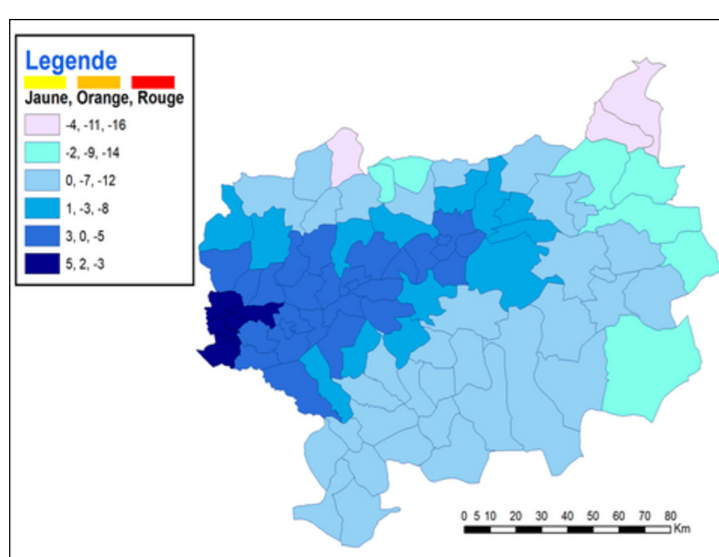


Figure 2: Minimum temperature thresholds by municipality in the province of Taroudant for January

Second Map (Figure 2)

This map displays the minimum temperature threshold by municipality (communale) within the province of Taroudant for January.

CONCLUSION

The enhancement of communication methods and the refinement of the warning system in Morocco have significantly improved the country's preparedness and response to weather-related risks. Despite challenges in implementing a multi-risk impact-based forecasting system, the DGM has prioritized this project, ensuring national coordination and alignment with the WMO's Early Warning for All initiative. These efforts are crucial in strengthening Morocco's resilience against natural disasters.

COMMUNICATION METHODS FOR WEATHER WARNINGS IN MOROCCO

Public



Weather warnings are communicated to the public through national TV channels and radio stations, as well as in real-time on the official DGM website and social media platforms, ensuring wide and timely dissemination.

Authorities



Civil authorities are updated on predicted risks through real-time briefing sessions with the DGRN. In the event of an orange-level warning, notifications and SMS are sent to local authorities, enabling them to make timely and informed decisions.



Weather information in Morocco is communicated in Arabic, Amazigh, and French to reach the entire population. This multilingual approach ensures that everyone, including those in rural areas, has access to vital weather updates. It enhances public safety by making information accessible to all linguistic groups.

Impact of Downscaling the Warning System

The spatial refinement of the warning system allows for precisely targeting at-risk municipalities. Thanks to this downscaling, SMS and notifications from a dedicated mobile app are sent to municipal officials, facilitating quick and appropriate decision-making.

CHALLENGES IN IMPLEMENTING IMPACT-BASED FORECASTING

The DGM faced several challenges in implementing a multi-risk impact-based forecasting system, such as the collection of exposure and vulnerability data and the regularization of partnerships among stakeholders. As the project leader, the DGM must also ensure coordination among all national stakeholders. Although the project is in its early stages, it is considered one of the most important strategic actions for the DGM, aligning with the WMO's recommendations for the Early Warning for All initiative.