

KABUL RIVER EARLY WARNING SYSTEM

VISION: STRENGTHENING DISASTER RISK REDUCTION AND COMMUNITY RESILIENCE TO RIVERINE FLOODING THROUGH INTEGRATED, PEOPLE-CENTRED EARLY WARNING SYSTEMS DELIVERED VIA PUBLIC-PRIVATE PARTNERSHIP.

Context: Khyber Pakhtunkhwa faces escalating climate-driven hazards, including riverine floods, flash floods, extreme rainfall, and heat stress. These threats compromise lives, livelihoods, and critical infrastructure¹. Traditional reactive approaches are insufficient. KREWS presents a proactive, integrated, and anticipatory system focused on real-time monitoring, predictive modeling, and community engagement for timely data-driven decisions.

Public-Private Partnership for Disaster Risk Reduction and Community Resilience

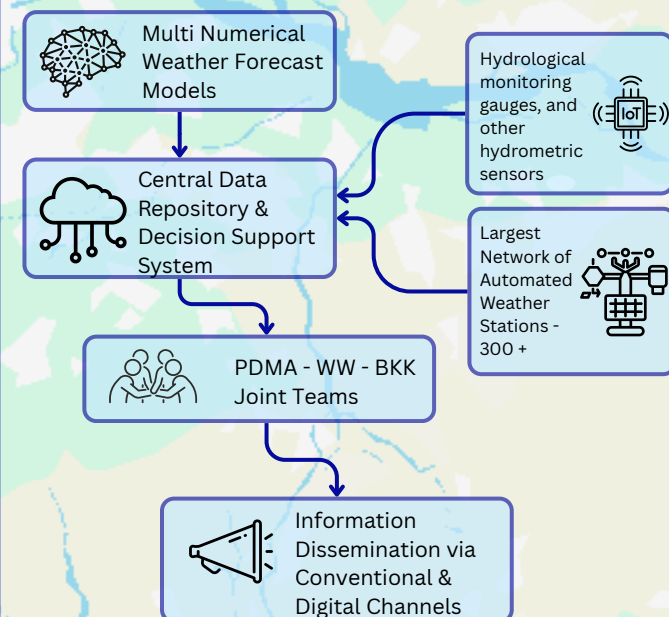
The Kabul River Early Warning System (KREWS) is a collaborative public-private initiative involving PDMA-KP, WeatherWalay Pvt. Ltd. (WW), and BaKhabar Kissan Pvt. Ltd. (BKK). The partnership combines public leadership, advanced technical capacity, and community engagement to strengthen disaster risk reduction and resilience to riverine flooding and other climate induced hazards in Khyber Pakhtunkhwa through people centred, end to end early warning and anticipatory action. WW provides AI driven forecasting supported by the largest ground based weather station network in the country, generating accurate real time hydrometeorological data, while BKK ensures inclusive risk communication and last mile dissemination that reaches vulnerable populations facing barriers related to literacy, connectivity, and gender. Aligned with the NDMA Act 2010, the National Disaster Risk Reduction Strategy 2025-2030, WMO standards, and UNDRR early warning guidance, KREWS integrates risk knowledge, monitoring, forecasting, and timely alert dissemination to deliver a scalable multi hazard disaster risk reduction system. The initiative strengthens preparedness, enables anticipatory action, and provides a replicable model for expanding people centred early warning systems across the country.

Key Highlights

- Unified Operations:** The system integrates monitoring and alerting mechanisms to provide timely, reliable flood warnings, enabling coordinated protective actions for communities across Nowshera District.
- Technical Innovation:** Advanced hydrometeorology, predictive modeling, and digital platforms leverage private expertise while benefiting from public oversight.
- Inclusive Public Preparedness:** Capacity-building trainings, awareness programs, and preparedness activities ensure communities understand how to respond to riverine flooding. Communication strategies are designed to reach all societal segments, including women and marginalized groups.
- Data Driven Decisions:** The integration of historical flood data, real-time weather and river conditions, and advanced predictive models empowers decision-makers with reliable, evidence-based insights. This ensures that flood preparedness actions are not only timely but also targeted to the most at-risk areas, optimizing resource allocation and response strategies for maximum impact.
- Stakeholder Collaboration:** The system is aligned with the Irrigation Department Khyber Pakhtunkhwa, district disaster management authorities, and other relevant agencies, ensuring that flood warnings lead to timely and organized government actions.



Public-Private early warning model that integrates real-time weather and river monitoring, predictive analytics, and community-centered dissemination to protect millions through anticipatory flood risk management.



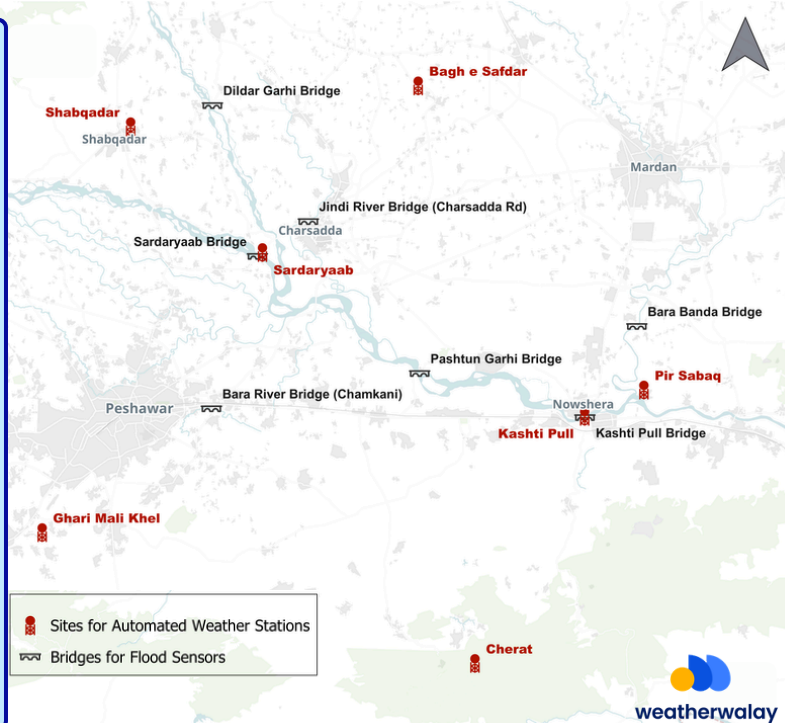
1. Pakistan Floods 2022 Post-Disaster Needs Assessment — Main Report, 2022

Site Selection & Risk Assessment

A data-driven and governance-based approach has been employed to identify the most critical monitoring locations for KREWS.

The site selection process for KREWS is underpinned by an extensive risk assessment that combines scientific analysis with local governance expertise. This assessment was collaboratively conducted by PDMA-KP, WeatherWalay, BaKhabar Kissan, and key stakeholders such as the Irrigation Department KPK and local authorities.

By integrating historical flood data, real-time river conditions, topographic features, and community vulnerability, the assessment ensures that monitoring sites are strategically positioned in high-risk zones where they can most effectively reduce loss of life and damage during flood events.



Alert Dissemination Network:

A multi-channel, last-mile alert dissemination network delivering timely warnings ensuring rapid reach to authorities and at-risk communities.

PDMA/DDMU
Portals



Conventional
WW/BKK



Digital Channels
PDMA/WW/BKK



API supporting
various
departments,
local authorities



Social Media
PDMA/WW/BKK



Distribution
Sirens, community
messengers, mosques, and
other local communication
channels



Anticipated Results, Outcomes, and Impacts

- **Proactive Risk Reduction:** Timely and reliable early warnings enable prompt evacuations and protective measures, significantly reducing loss of life, injuries, and damage to homes and livelihoods caused by riverine flooding.
- **District-Wide Preparedness:** Over 1,000 individuals will receive direct capacity-building through specialized trainings, with an even broader outreach achieved through video campaigns, SMS alerts, mobile notifications, local cable TV, and community outreach, ensuring that households are well-prepared to respond to floods.
- **Multi-Hazard Readiness:** While the system strengthens flood preparedness, it also lays the groundwork for tackling additional hazards such as flash floods and extreme heat, enhancing overall disaster resilience.
- **Operational Reliability:** Continuous calibration, performance tracking, and joint oversight ensure the system remains accurate, dependable, and fully operational, delivering timely warnings during critical disaster events.
- **Stronger Community Resilience:** By implementing inclusive communication strategies and last-mile preparedness measures, the system empowers people from all social groups, including women and vulnerable populations, to anticipate risks, protect assets, and recover more quickly from disasters.

Sustainability and Institutional Continuity

- **Sustained Government Ownership:** The system is designed for long-term operation under the leadership of PDMA Khyber Pakhtunkhwa and relevant line departments, ensuring continuous monitoring, warning dissemination, and emergency coordination beyond the project phase.
- **Operational Continuity:** Integration with existing government procedures and control rooms guarantees the system remains functional and effective in the long term.
- **Capacity Retention:** Training programs for local officials and technical staff ensure that institutions can operate, maintain, and improve the system independently.
- **Data and Decision Support:** Continuous data flows and analytics enhance disaster preparedness, planning, and resource allocation across the province.
- **Foundation for Future Strengthening:** Lessons learned from the Nowshera pilot provide a solid foundation for expanding and enhancing early warning capabilities in other high-risk areas.

Why KREWS is Transformational?

- **Anticipatory Riverine Flood Early Warning:** Developed through a strategic public private partnership to enable timely early warning and anticipatory action.
- **From Reactive Response to Early Action:** Uses real time monitoring, forecasting, and communication to protect at risk communities before flooding impacts occur.
- **Scalable Model for Disaster Risk Reduction:** Provides a replicable blueprint for provincial and national expansion.