Project Design Phase
Problem – Solution Fit Template

Date	19 February 2026
Team ID	LTVIP2026TMIDS75186
Project Name	Rising Waters: A Machine Learning Approach to Flood Prediction
Maximum Marks	2 Marks

Problem–Solution Fit Template: Rising Waters

Government agencies, urban planners, and disaster management teams face significant challenges due to the unpredictable and destructive nature of sudden flooding and rising water levels.

Problem

- Emergency Services struggle to deploy resources accurately, leading to delayed evacuations and increased risk to life.

- Urban Planners cannot assess infrastructure vulnerability effectively, risking catastrophic failure of drainage systems and power grids during surges.

- Insurance & Property Owners find it difficult to quantify real-time risk, leading to massive financial losses and inadequate protection measures.

Solution

A machine learning–powered prediction system that integrates satellite imagery, IoT river-gauge sensors, and real-time meteorological data to forecast flood levels and inundation zones.

- Early Warning Precision: Predicts water cresting and flow rates based on precipitation and soil saturation, enabling proactive alerts.

- Infrastructure Stress Mapping: Identifies high-risk zones and drainage bottlenecks to prioritize barrier deployment and utility shutdowns.

- Dynamic Risk Assessment: Provides hyper-local data to help agencies and insurers visualize the "flood footprint" before the water arrives.

Purpose

- ✅ Solve complex hydrological and logistical problems in disaster risk reduction and climate adaptation.

- ✅ Increase community resilience by making flood warnings more localized, accurate, and dependable.

- ✅ Sharpen communication with the public by providing clear, visual, and data-driven evacuation insights.

- ✅ Build trust with civic leaders and citizens by reducing the frequency of "false alarms" and "missed events."

- ✅ Improve the urban safety ecosystem by aligning emergency response with real-time environmental threats.

Channels & Adoption

- Integration with government disaster management systems
- Web-based monitoring dashboard
- SMS alert system for citizens
- API integration with weather data providers
- Pilot implementation in flood-prone districts

Success Metrics

- Prediction accuracy (Precision, Recall, F1-score)
- Reduction in flood-related damages
- Alert response time
- Improvement in evacuation preparedness
- Reduction in false alarms

Future Improvements

- Deep Learning-based time-series forecasting (LSTM models)
- Real-time IoT sensor integration for river levels
- Mobile application for citizen alerts
- Satellite image-based flood detection
- AI-driven district-level risk scoring