**Project Design Phase**

**Problem – Solution Fit Template**

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| 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