

## Project Design Phase

### Problem – Solution Fit Template

Date	15 February 2025
Team ID	LTVIP2026TMIDS77028
Project Name	Rising Waters – A Machine Learning Approach to Flood Prediction
Maximum Marks	2 Marks

#### **Problem – Solution Fit Overview**

Problem–Solution Fit means identifying a real and urgent problem faced by the target users and ensuring that the proposed solution effectively addresses that problem. In the context of flood prediction, the system must align with the needs, behavior, and constraints of disaster management authorities and residents in flood-prone areas.

The Rising Waters system achieves this by delivering an AI-based predictive solution that directly addresses the lack of early flood forecasting tools.

#### **Customer Problem**

Floods are one of the most destructive natural disasters, causing:

- Loss of human life
- Damage to infrastructure
- Economic instability
- Delayed emergency response

Current systems mainly rely on:

- Manual monitoring
- News-based alerts
- Basic weather forecasts
- Reactive emergency actions

These methods are not predictive and do not provide early warning based on data analytics.

#### **Root Cause of the Problem**

- Lack of automated AI-based flood prediction systems
- Limited use of historical rainfall data for predictive analysis
- Dependence on delayed weather reporting
- Inconsistent and unpredictable climate patterns

#### **Purpose:**

The proposed solution is a **Machine Learning-based Flood Prediction System** that:

- Uses historical rainfall and environmental data
- Applies classification algorithms (Random Forest, XGBoost)

- Predicts flood occurrence in advance
- Provides results through a user-friendly web interface
- Supports future integration with real-time weather APIs

## Template:

<b>1. CUSTOMER SEGMENT(S)</b>	<b>CS</b>	<b>2. CUSTOMER CONSTRAINTS</b>	<b>CC</b>	<b>5. AVAILABLE SOLUTIONS</b>	<b>A5</b>
<p>• Disaster Management Officers • Residents in flood-prone areas • Government planning authorities • Urban planners in high-risk zones</p>		<ul style="list-style-type: none"> <li>• Limited access to advanced tools</li> <li>• Budget constraints for technology adoption</li> <li>• Lack of technical expertise</li> <li>• Dependence on delayed reports</li> </ul>		<ul style="list-style-type: none"> <li>• Manual weather monitoring</li> <li>• News-based flood alerts</li> <li>• Basic weather forecast apps</li> <li>• Government warning announcements</li> <li>• Historical rainfall reports</li> </ul>	
<b>2. JOBS-TO-BE-DONE / PROBLEMS</b>	<b>J&amp;P</b>	<b>9. PROBLEM ROOT CAUSE</b>	<b>RC</b>	<b>Limitations:</b>	
<ul style="list-style-type: none"> <li>• Predict flood occurrence before it happens</li> <li>• Allocate rescue teams and resources effectively</li> <li>• Inform residents about flood risk in advance</li> <li>• Reduce damage to life and property</li> <li>• Make data-driven disaster management decisions</li> </ul>		<ul style="list-style-type: none"> <li>• Lack of automated predictive systems</li> <li>• Dependence on reactive rather than proactive systems</li> <li>• Inconsistent weather patterns due to climate change</li> <li>• No AI-driven early warning solution</li> <li>• Limited use of historical data analytics</li> </ul>		<ul style="list-style-type: none"> <li>• Not predictive</li> <li>• Delayed alerts</li> </ul>	<ul style="list-style-type: none"> <li>• Not personalized</li> <li>• No AI-based analysis</li> </ul>
<b>3. TRIGGERS</b>	<b>TR</b>	<b>9. PROBLEM ROOT CAUSE</b>	<b>RC</b>	<b>6. CUSTOMER CONSTRAINTS</b>	<b>CC</b>
<ul style="list-style-type: none"> <li>• Heavy rainfall alerts</li> <li>• Rising water level reports</li> <li>• News of nearby flooding</li> <li>• Seasonal monsoon warnings</li> <li>• Government disaster alerts</li> </ul>		<ul style="list-style-type: none"> <li>• Lack of automated predictive systems</li> <li>• Dependence on reactive rather than proactive systems</li> <li>• Inconsistent weather patterns due to climate change</li> <li>• No AI-driven early warning solution</li> <li>• Limited use of historical data analytics</li> </ul>		<ul style="list-style-type: none"> <li>• Limited access to advanced tools</li> <li>• Budget constraints for technology adoption</li> <li>• Lack of technical expertise</li> <li>• No integrated prediction platform</li> <li>• Dependence on delayed reports</li> </ul>	
<b>4. EMOTIONS: BEFORE / AFTER</b>	<b>EM</b>	<b>10. YOUR SOLUTION</b>	<b>SL</b>	<b>8. CHANNELS OF BEHAVIOUR</b>	<b>CH</b>
<ul style="list-style-type: none"> <li>• Alert notifications, concepts, in-person visits and outreach</li> <li>• User presence - connects - lets &amp; hear your communication &amp; design</li> </ul>		<p><b>Rising Waters – ML-Based Flood Prediction System</b></p> <ul style="list-style-type: none"> <li>• Uses Machine Learning (XGBoost, Random Forest)</li> <li>• Analyzes rainfall &amp; climate parameters</li> <li>• Predicts flood occurrence</li> <li>• Provides instant results via web interface</li> <li>• Scalable for real-time API integration</li> <li>• Supports early warning &amp; disaster planning</li> </ul>		<p><b>ONLINE</b></p> <ul style="list-style-type: none"> <li>• Weather apps → Government websites</li> <li>• News portals → Social media alerts</li> </ul> <p><b>OFFLINE</b></p> <ul style="list-style-type: none"> <li>• Local announcements → Community meetings</li> <li>• Emergency sirens → Disaster response centers</li> </ul>	

## References:

1. <https://www.ideahackers.network/problem-solution-fit-canvas/>
2. <https://medium.com/@epicantus/problem-solution-fit-canvas-aa3dd59cb4fe>