Flood Risk ESG Portfolio Project Plan

# 1. Project Overview

This project models flood risk across Indian states using historical flooding data, rainfall records, geomorphology, and lithology. The model integrates real-time rainfall APIs and socioeconomic exposure data (population and GDP) to provide an interactive dashboard showing state-level flood risk. The project is framed within ESG and business-relevant contexts.

# 2. Objectives

• Build an interactive flood risk map of India at the state level.

• Integrate real-time rainfall data with a rolling 7-day window to adjust flood risk dynamically.

• Incorporate population and GDP per state to quantify human and economic exposure.

• Report results as ESG-aligned KPIs and business-relevant insights.

# 3. Data Sources

• Flood events (2009–2019): Historical data with state labels.

• Rainfall data: Daily, state-labeled rainfall amounts + live API feed for current updates.

• Geomorphology and Lithology: Physical landscape and soil/rock characteristics.

• Population data: Census of India (2011), WorldPop, or UN datasets.

• GDP per state: RBI, MOSPI, or World Bank subnational data.

# 4. Methodology

Step 1: Preprocess historical data (flood events, rainfall, geomorphology, lithology).

Step 2: Compute rainfall severity index:

– Aggregate rolling 7-day rainfall totals by state.

– Compare against historical thresholds (percentiles).

– Classify severity (Low, Medium, High).

Step 3: Merge flood severity with population and GDP data.

Step 4: Create KPIs (people at risk, GDP at risk, states at severe risk).

Step 5: Build an interactive dashboard (Streamlit/Plotly/Leaflet).

Step 6: Integrate real-time rainfall API for rolling updates.

# 5. ESG and Business Goals

Environmental (E): Climate risk disclosure (SDG 13), flood hazard trends, CO₂ implications of extreme weather.

Social (S): Human exposure (population at risk), vulnerable communities, disaster preparedness.

Governance (G): Transparent, auditable reporting for insurers, investors, and governments.

Business Use Cases: Insurance underwriting, investment risk scoring, infrastructure planning, agriculture & supply chain resilience.

# 6. Dashboard Features

• Base map of India with states colored by flood risk severity.

• Popups showing population and GDP exposure per state.

• Overlay of rainfall severity based on rolling 7-day totals.

• ESG KPI panel (e.g., X million people and Y billion GDP at risk).

# 7. Deliverables

• Interactive flood risk dashboard (deployed via Streamlit/Heroku).

• GitHub repository with code and documentation.

• Portfolio write-up (executive summary framed in ESG/business language).