**Project Title: Predictive Flood Modeling for Resilient Communities in Sierra Leone.**

**1. Project Idea, Problem and Project Goal:**

The project aims to develop a flood prediction model for predicting flood in Sierra Leone, a country often faced with flood disaster during the rainy seasons. This will be done by leveraging environmental data such as rainfall patterns, typography, and river flow. The goal is to provide accurate and timely predictions to enable swift measures for mitigating the impact on communities and infrastructure.

**2. Relevance to Sustainable Development Goals (SDGs):**

The project directly aligns with 3 SDGs; SDG 11 – Sustainable Cities and Communities, SDG 13 – Climate Action, and SDG 9 – Industry, Innovation, and Infrastructure. Additionally, it is indirectly related to SDG 1 – No poverty. By addressing the impact of flooding on communities and Infrastructure, the project aligns with the broader goal of reducing the number of deaths and people affected thereby reducing economic impact related to GDP caused by disasters, addressing the impact of climate change, and emphasizing the importance of developing resilient infrastructure to support human well-being and economic growth. While not directly related to SDG 1, mitigating natural disasters can contribute to poverty reduction by protecting livelihoods and preventing economic loss. Therefore, this project is relevant to SDG 1 – No Poverty as well.

**3. Literature Examples:**

* **Flood Prediction Using Machine Learning Models: Literature Review**

This research paper explores the advancement of prediction models that contributed to risk reduction, policy suggestion, minimizing the loss of human life and reduction of property damage associated with floods.

* **Urban flood forecasting using a hybrid modeling approach based on a deep learning technique.**

This research paper focused on developing a flood forecasting model based on a hybrid modeling approach that is combined rainfall-runoff model and a deep learning model focused on urban river basins, combined rainfall amounts, duration, and time distribution to create virtual rainfall scenarios.

**4. Data Description:**

This project will utilize dataset that will be sourced from meteorological agencies, satellite imagery, and environmental monitoring stations. However, while the project is primarily focused on Sierra Leone, data will be sourced from other countries flood data due to lack of data. The data will be in CSV and image formats and will include information on rainfall patterns, historical flood records, typography, and others. The data will be processed to handle missing values and ensure compatibility with machine learning model training.

**5. Approach (Machine Learning or Deep Learning):**

The project will use a hybrid approach, combining machine learning and deep learning techniques. Machine learning algorithms will be used to feature engineer the model, process data, and perform initial model training. Deep learning algorithms will be utilized for capturing complex temporal and spatial patterns in the data. This approach aims to leverage the strength of both approaches for improved flood prediction accuracy.