# Project Scoping

# Topic: Predictive Modeling for Donor Retention in Haitian NPOs

### 1. Project Context

Non-Profit Organizations (NPOs) play a vital role in Haiti’s social, educational, and economic development.   
However, most NPOs rely heavily on donations from individuals, Organizations, and sponsors to sustain their programs.  
  
A major challenge for Haitian NPOs is maintaining donor engagement and loyalty. While some donors give regularly, many only donate once.   
Despite collecting donor information, most organizations do not use these data effectively to anticipate donor behavior.  
  
This project aims to leverage machine learning and data science to help NPOs in Haiti predict and understand donor retention patterns, enabling more strategic fundraising and communication.

### 2. Problem Statement

Using historical donor data, can we predict whether a donor is likely to make another donation in the next few months?  
This predictive model will help NPOs identify loyal donors to retain, at-risk donors to re-engage, and improve donor communication strategies.

### 3. Project Objectives

General Objective: Develop a predictive machine learning model to help NPOs forecast the likelihood of future donations and improve donor retention strategies.

Specific Objectives:  
- Build or simulate a donor dataset with relevant behavioral and demographic variables.  
- Clean, preprocess, and explore the data to identify key trends.  
- Train and evaluate supervised learning models for donor retention prediction.  
- Analyze feature importance to determine which factors most influence donor loyalty.  
- Provide data-driven recommendations for NPOs’ fundraising and donor management efforts.

### 4. Dataset Overview

The dataset will represent typical donor information collected by a NPOs, including variables such as donor\_id, age, gender, country, total\_donations, num\_donations,   
last\_donation\_date, avg\_donation\_amount, campaign\_type, contact\_frequency, event\_participation, response\_to\_emails, and re\_donate (target variable).

### 5. Methodology

1. Data Exploration (EDA)  
2. Data Preparation (cleaning, encoding, feature engineering)  
3. Modeling (Logistic Regression, Random Forest, XGBoost)  
4. Evaluation & Interpretation (AUC, F1-score, Recall)  
5. Recommendations (strategies for donor engagement and retention)

### 6. Expected Deliverables

- Python Notebook (data exploration, modeling, evaluation)  
- Cleaned and documented dataset  
- Final report (methodology, results, recommendations)  
- Presentation or dashboard (PowerPoint, Streamlit, Tableau)

### 7. Expected Results & Impact

- Better understanding of donor loyalty drivers.  
- Ability to predict and prevent donor churn.  
- Data-driven decision-making to improve fundraising performance.  
- A reusable predictive framework for multiple Haitian NGOs.

### 8. Project Timeline

1. Problem definition and scoping – 3 days  
2. Data collection and preparation – 5 days  
3. Data exploration and visualization – 4 days  
4. Machine learning modeling – 6 days  
5. Evaluation and insights – 3 days  
6. Reporting and presentation – 4 days

### 9. Tools & Technologies

- Python (pandas, scikit-learn, matplotlib, seaborn)  
- Excel / Power Query  
- Streamlit / Tableau / Power BI  
- Jupyter Notebook

### 10. Conclusion

This capstone project demonstrates how machine learning can support Haitian NPOs in strengthening donor relationship management through predictive analytics.   
By identifying potential recurring donors and understanding engagement patterns, NGOs can optimize fundraising strategies and ensure the sustainability of their social missions.