

Analysing the Impact of Corruption on Food Security: A Study of the Relationship Between Corruption Index and Global Hunger Index (GHI) (SDG 2: Hunger & SGD: 16: Corruption)

Concept of the Project

Corruption is a pervasive issue affecting millions of people worldwide, leading to serious socio-economic problems and exacerbating food insecurity. This project aims to analyze the relationship between corruption and food security by examining Corruption Index and Global Hunger Index (GHI) data. According to the 2022 Global Hunger Index, approximately 828 million people worldwide are undernourished. Countries with high levels of corruption often struggle with effective governance and resource allocation, leading to poor outcomes in food security. By leveraging data analysis tools and methodologies, this project seeks to propose actionable solutions aligned with Sustainable Development Goal 2 (SDG 2): Zero Hunger and Sustainable Development Goal 16 (SDG 16): Peace, Justice, and Strong Institutions. These SDGs aim to end hunger, achieve food security, and promote peaceful and inclusive societies through effective, accountable, and transparent institutions. The research will utilize data from multiple years (2000, 2007, 2014, and 2022) to identify trends and correlations, providing a comprehensive understanding of how corruption impacts food security over time.

Problem Statement

Food insecurity remains a significant global challenge, particularly in regions plagued by high levels of corruption. According to the 2022 Global Hunger Index, many countries with severe hunger issues also have high corruption levels, impeding progress in food distribution and security. Corruption undermines food distribution systems, leading to inefficiencies and inequities that exacerbate hunger and malnutrition. For instance, Sub-Saharan Africa and South Asia are regions where corruption and hunger levels are critically high. Despite various measures, ensuring food security remains challenging due to the lack of precise data and effective policy implementation. This project aims to address this problem by analysing the correlation between corruption levels and food insecurity using the Corruption Index and GHI data. Additionally, targeted interventions will be proposed to improve food security and reduce corruption. By understanding the specific ways in which corruption impacts food security, policymakers can develop more effective strategies to combat both issues, thereby promoting sustainable development and social stability.

Objective of the Project

The primary objective of this project is to analyze the impact of corruption on food security by examining the relationship between the Corruption Index and the Global Hunger Index (GHI). Specific objectives include:

1. Collecting and analyzing data on corruption and food security from reliable sources.
2. Identifying the correlation between the Corruption Index and the Global Hunger Index (GHI).
3. Understanding temporal and spatial trends of corruption and food insecurity.
4. Developing predictive models for future food security levels based on current data.
5. Proposing actionable solutions and policy recommendations to combat corruption and enhance food security.
6. Assessing the potential impact of these solutions on achieving SDG 2 and SDG 16.

Data Sources Used

The project will use datasets on corruption and food security from the following sources:

1. **Corruption data:** Kaggle

2. Global Hunger Index (GHI): Kaggle

Features

The key features of the dataset will include:

- **Country:** This column contains the names or labels of various countries or regions.
- **Corruption Index:** A numerical value or index quantifying the level of corruption within each country.
- **Annual Income:** Represents average annual income or income per capita for each country.
- **Rank_in_2022:** The GHI ranking for each country in 2022.
- **Year_2000, Year_2007, Year_2014, Year_2022:** GHI values for specific years.
- **Absolute change since 2014, Percent change since 2014:** Indicate changes in GHI since 2014.

Tool for Analysis

The following tools and technologies will be used for data analysis:

1. **Python:** For data cleaning, analysis, and visualization, using libraries such as Pandas, NumPy, Matplotlib, and Seaborn.
2. **Jupyter Notebooks:** For documenting the analysis process and visualizations.
3. **Scikit-learn:** For developing predictive models and machine learning algorithms.
4. **Tableau:** For creating interactive dashboards and visualizations to present the findings.

Hypothesis

The hypothesis of the project is that higher levels of corruption are significantly associated with higher levels of food insecurity, as indicated by the Global Hunger Index (GHI). Additionally, addressing corruption through targeted interventions can lead to a significant reduction in food insecurity over the next decade.

Methodology

The project will be conducted in the following phases:

Data Collection:

- Gather Corruption Index and Global Hunger Index (GHI) data from Kaggle.
- Merge the two datasets based on the common column (e.g., 'Country').

Data Cleaning and Preprocessing:

- Handle missing values, outliers, and inconsistencies in the data.
- Standardize data formats and integrate datasets from different sources.

Exploratory Data Analysis (EDA):

- Perform descriptive statistical analysis to understand the distribution and variability of corruption and food insecurity.
- Understand the distribution of corruption indices and annual income.

Correlation Analysis:

- Use correlation analysis and regression models to identify the relationship between corruption indices and annual income.
- Use correlation analysis and regression models to identify the relationship between corruption indices and GHI values
- Analyze by checking if countries with higher corruption tend to have worse hunger indices
- Explore GHI rankings and changes over time for specific regions and countries

Predictive Modeling:

- Develop machine learning models (e.g., linear regression, random forest) to predict rank-class [Low Rank (0): Well-nourished countries, Medium Rank (1): Moderately nourished countries and High Rank (2): Severely nourished countries] of hunger level for countries based on historical data.
- Validate and test the models using appropriate metrics.

Solution Development:

- Based on the analysis, propose solutions such as strengthening anti-corruption measures, improving governance, and enhancing food distribution systems.
- Assess the feasibility and potential impact of these solutions.

Reporting and Presentation:

- Compile the findings into a comprehensive report.
- Create visualizations and interactive plots such as scatter plots or heatmaps to visualize relationships.
- Plot GHI trends over time for different countries to present the results.
- Develop policy briefs and recommendations for stakeholders.

Probable Outcome

The expected outcomes of the project are:

- **Comprehensive Analysis:** A detailed analysis of the relationship between corruption and food security, identifying key trends and correlations.
- **Predictive Models:** Reliable models for predicting future food security levels and assessing the impact of potential interventions.
- **Actionable Solutions:** Data-driven solutions and policy recommendations to combat corruption and improve food security.
- **Impact Assessment:** Evaluation of the potential impact of proposed solutions on achieving SDG 2 and SDG 16.
- **Awareness and Engagement:** Increased awareness among policymakers and the public about the impacts of corruption on food security and the benefits of proposed interventions.

By addressing the impact of corruption on food security through data analysis and evidence-based solutions, this project will contribute to creating sustainable and equitable food systems, aligning with the objectives of SDG 2: Zero Hunger and SDG 16: Peace, Justice, and Strong Institutions.

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