SDG 1 - No Poverty

Problem Definition:

The Impact of Colonialism on Land Distribution and Poverty in South Africa

Specific Problem:

In South Africa, the legacy of apartheid has resulted in significant racial disparities in land ownership and distribution. Historically marginalized communities, particularly Black South Africans, continue to face barriers to land access, which perpetuates poverty and economic inequality. This issue is compounded by ongoing systemic racism and inadequate policy responses.

Data-Driven Approach:

To address this issue in South Africa, we can utilize data to analyse:

1. Land Ownership Patterns:

- Collect and analyse data on land ownership by race/ethnicity, particularly focusing on the distribution of agricultural versus urban land.
- Map historical land dispossession and current ownership to illustrate the impact of apartheid policies.

2. Economic Outcomes:

- Examine economic indicators (e.g., income, employment rates, and poverty levels) among different racial groups, correlating these with land ownership data.
- Investigate how lack of land access affects economic mobility and overall livelihoods in historically disadvantaged communities.

3. Access to Resources:

- Assess data on access to agricultural resources, credit, and government support programs for land reform aimed at marginalized communities.
- Analyse barriers faced by Black farmers in accessing markets and technical assistance.

4. Community Impact Studies:

- Conduct surveys and focus groups to gather qualitative data on the perceptions of land ownership and its role in community empowerment and poverty alleviation.
- Investigate the impact of land distribution on food security and mental well-being among marginalized populations.

5. Policy Analysis:

- Review current land reform policies and their effectiveness in addressing racial disparities in land ownership.
- Analyse the impact of government initiatives aimed at promoting equitable land distribution, identifying gaps and areas for improvement.

By leveraging this data, policymakers, NGOs, and community organizations can develop targeted interventions to promote equitable land distribution, address the historical injustices faced by marginalized communities, and work towards eradicating poverty in South Africa. This approach will foster economic empowerment and social equity, ultimately contributing to the broader goals of SDG-1.
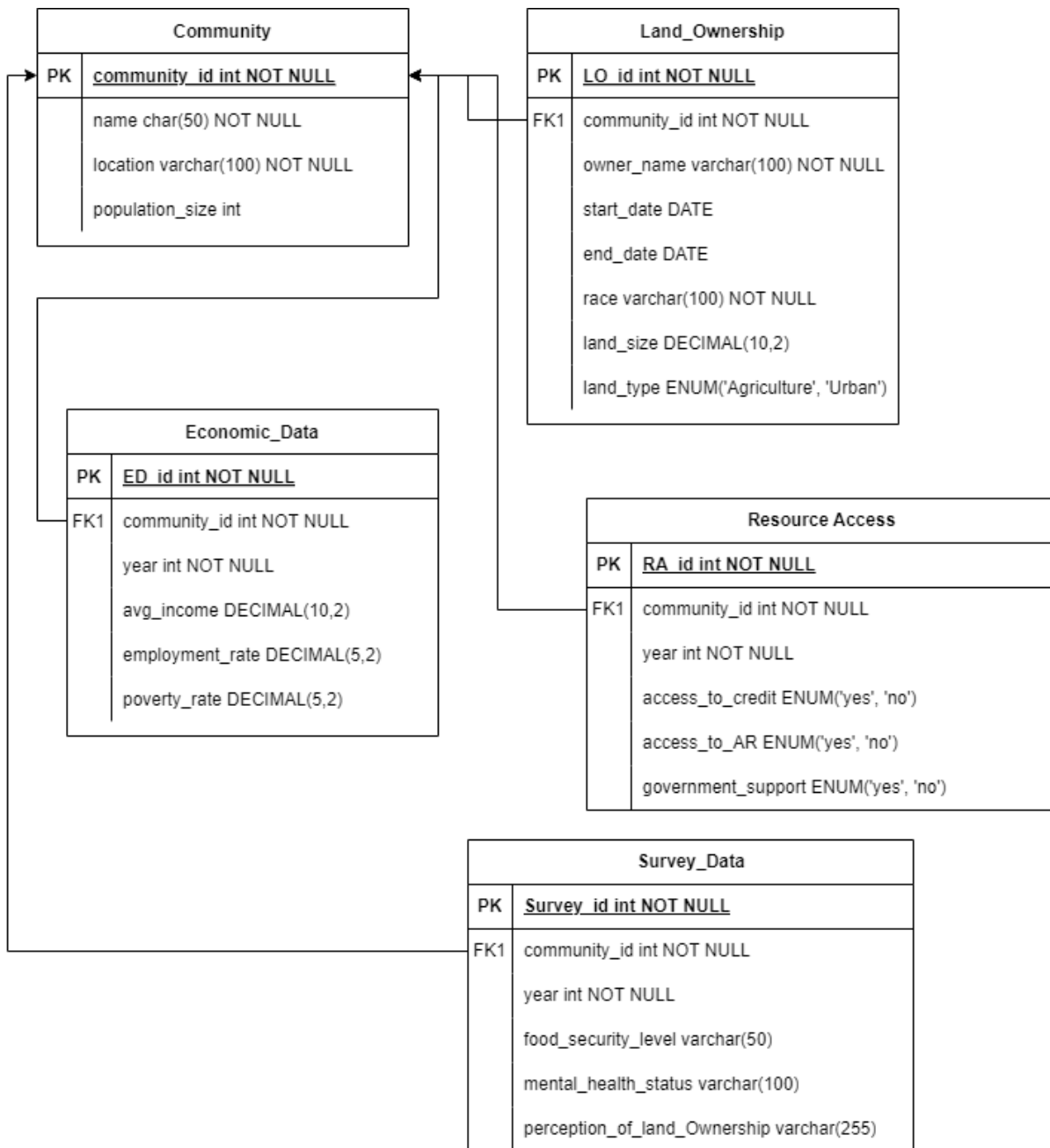
Database Design

Figure 1: *ERD of the necessary entities for the project*

```sql
CREATE TABLE Community (
    Community_ID INT PRIMARY KEY,
    Name VARCHAR(100),
    Location VARCHAR(100),
    Population_Size INT
);

CREATE TABLE Land_Ownership (
    Land_Ownership_ID INT PRIMARY KEY,
    Community_ID INT,
    Owner_Name VARCHAR(100),
    Race VARCHAR(50),
    Land_Size DECIMAL(10, 2),
    Land_Type ENUM('Agricultural', 'Urban'),
    Ownership_Start_Date DATE,
    Ownership_End_Date DATE,
    FOREIGN KEY (Community_ID) REFERENCES Community(Community_ID)
);

CREATE TABLE Economic_Data (
    Economic_Data_ID INT PRIMARY KEY,
    Community_ID INT,
    Year INT,
    Average_Income DECIMAL(10, 2),
    Employment_Rate DECIMAL(5, 2),
    Poverty_Rate DECIMAL(5, 2),
    FOREIGN KEY (Community_ID) REFERENCES Community(Community_ID)
);

CREATE TABLE Resource_Access (
    Resource_Access_ID INT PRIMARY KEY,
    Community_ID INT,
    Year INT,
    Access_to_Credit ENUM('Yes', 'No'),
    Access_to_Agricultural_Resources ENUM('Yes', 'No'),
    Government_Support ENUM('Yes', 'No'),
    FOREIGN KEY (Community_ID) REFERENCES Community(Community_ID)
);

CREATE TABLE Survey_Data (
    Survey_ID INT PRIMARY KEY,
    Community_ID INT,
    Year INT,
    Perception_of_Land_Ownership VARCHAR(255),
    Food_Security_Level VARCHAR(50),
    Mental_Health_Status VARCHAR(50),
    FOREIGN KEY (Community_ID) REFERENCES Community(Community_ID)
```

```sql
);


-- Sample data for Community
INSERT INTO Community (Community_ID, Name, Location, Population_Size) VALUES
(1, 'Community A', 'Location A', 1500),
(2, 'Community B', 'Location B', 2000),
(3, 'Community C', 'Location C', 1000);

-- Sample data for Land_Ownership
INSERT INTO Land_Ownership (Land_Ownership_ID, Community_ID, Owner_Name, Race,
Land_Size, Land_Type, Ownership_Start_Date) VALUES
(1, 1, 'Owner 1', 'Black', 10.00, 'Agricultural', '2000-01-01'),
(2, 1, 'Owner 2', 'White', 5.00, 'Urban', '1990-01-01'),
(3, 2, 'Owner 3', 'Black', 15.00, 'Agricultural', '2010-01-01'),
(4, 3, 'Owner 4', 'Coloured', 8.00, 'Urban', '2005-01-01');

-- Sample data for Economic_Data
INSERT INTO Economic_Data (Economic_Data_ID, Community_ID, Year,
Average_Income, Employment_Rate, Poverty_Rate) VALUES
(1, 1, 2022, 2500.00, 75.00, 20.00),
(2, 2, 2022, 1800.00, 65.00, 30.00),
(3, 3, 2022, 2200.00, 70.00, 25.00);

-- Sample data for Resource_Access
INSERT INTO Resource_Access (Resource_Access_ID, Community_ID, Year,
Access_to_Credit, Access_to_Agricultural_Resources, Government_Support) VALUES
(1, 1, 2022, 'Yes', 'Yes', 'Yes'),
(2, 2, 2022, 'No', 'No', 'No'),
(3, 3, 2022, 'Yes', 'Yes', 'Yes');

-- Sample data for Survey_Data
INSERT INTO Survey_Data (Survey_ID, Community_ID, Year,
Perception_of_Land_Ownership, Food_Security_Level, Mental_Health_Status)
VALUES
(1, 1, 2022, 'Positive', 'High', 'Good'),
(2, 2, 2022, 'Negative', 'Low', 'Poor'),
(3, 3, 2022, 'Neutral', 'Medium', 'Average');

```
```

Figure 2: *SQL Queries to design the required tables and sample data as per the ERD on figure 1*

SQL Programming

1. Data Retrieval

Here are SQL queries to retrieve the data related to land ownership, economic outcomes, resource access, and survey results:

a) Retrieving Land Ownership by community:

This query retrieves the land ownership data for each community, showing the owner's name, race, land size, and land type. It helps in understanding the distribution of land within different communities.

```sql
SELECT c.Name AS Community_Name,
       lo.Owner_Name,
       lo.Race,
       lo.Land_Size,
       lo.Land_Type
FROM Land_Ownership lo
JOIN Community c ON lo.Community_ID = c.Community_ID
ORDER BY c.Name, lo.Land_Size DESC;
```

b) Retrieve Economic Data by Community:

This query retrieves economic data for each community, including average income, employment rate, and poverty rate, providing insights into the economic status of each community.

```sql
SELECT c.Name AS Community_Name,
       ed.Year,
       ed.Average_Income,
       ed.Employment_Rate,
       ed.Poverty_Rate
FROM Economic_Data ed
JOIN Community c ON ed.Community_ID = c.Community_ID
ORDER BY ed.Year DESC, c.Name;
```

c) Retrieve Resource Access by Community:

This query retrieves data about communities' access to credit, agricultural resources, and government support. It helps assess whether communities have access to resources necessary for economic mobility.

```
SELECT c.Name AS Community_Name,
       ra.Year,
       ra.Access_to_Credit,
       ra.Access_to_Agricultural_Resources,
       ra.Government_Support
FROM Resource_Access ra
JOIN Community c ON ra.Community_ID = c.Community_ID
ORDER BY ra.Year DESC, c.Name;
```

d) Retrieve Survey Data for Perception of Land Ownership:

This query retrieves the perception of land ownership, food security levels, and mental health status for each community, providing qualitative insights into the impact of land ownership on well-being.

```
SELECT c.Name AS Community_Name,
       sd.Year,
       sd.Perception_of_Land_Ownership,
       sd.Food_Security_Level,
       sd.Mental_Health_Status
FROM Survey_Data sd
JOIN Community c ON sd.Community_ID = c.Community_ID
ORDER BY sd.Year DESC, c.Name;
```

2. Data Analysis

The following SQL queries help analyse the data and generate insights based on the retrieved data:

a) Analyse Correlation Between Land Ownership and Economic Outcomes:

This query analyses whether communities with larger land ownership tend to have higher average incomes and lower poverty rates, helping to assess the economic impact of land ownership.

```
SELECT c.Name AS Community_Name,
       SUM(lo.Land_Size) AS Total_Land_Owned,
       AVG(ed.Average_Income) AS Avg_Income,
       AVG(ed.Poverty_Rate) AS Avg_Poverty_Rate
FROM Land_Ownership lo
JOIN Economic_Data ed ON lo.Community_ID = ed.Community_ID
JOIN Community c ON lo.Community_ID = c.Community_ID
GROUP BY c.Name
ORDER BY Total_Land_Owned DESC;
```

b) Analyse the Effect of Resource Access on Economic Mobility:

This query analyses how access to credit and agricultural resources correlates with employment rates and poverty levels, providing insights into how resource access affects economic mobility.

```sql
SELECT c.Name AS Community_Name,
       ra.Access_to_Credit,
       ra.Access_to_Agricultural_Resources,
       AVG(ed.Employment_Rate) AS Avg_Employment_Rate,
       AVG(ed.Poverty_Rate) AS Avg_Poverty_Rate
FROM Resource_Access ra
JOIN Economic_Data ed ON ra.Community_ID = ed.Community_ID
JOIN Community c ON ra.Community_ID = c.Community_ID
GROUP BY c.Name, ra.Access_to_Credit,
ra.Access_to_Agricultural_Resources
ORDER BY Avg_Poverty_Rate ASC;
```

c) Analyse the Impact of Land Ownership on Food Security:

This query examines how the amount of land owned by a community correlates with food security levels, helping to determine whether land ownership positively impacts food security.

```sql
SELECT c.Name AS Community_Name,
       SUM(lo.Land_Size) AS Total_Land_Owned,
       AVG(sd.Food_Security_Level) AS Avg_Food_Security_Level
FROM Land_Ownership lo
JOIN Survey_Data sd ON lo.Community_ID = sd.Community_ID
JOIN Community c ON lo.Community_ID = c.Community_ID
GROUP BY c.Name
ORDER BY Total_Land_Owned DESC;
```

d) Analyse the Perception of Land Ownership and Mental Health:

This query analyses the relationship between communities' perception of land ownership and their mental health status, providing insights into the psychological impact of land ownership.

```sql
SELECT c.Name AS Community_Name,
       sd.Perception_of_Land_Ownership,
       AVG(sd.Mental_Health_Status) AS Avg_Mental_Health_Status
FROM Survey_Data sd
JOIN Community c ON sd.Community_ID = c.Community_ID
GROUP BY c.Name, sd.Perception_of_Land_Ownership
ORDER BY Avg_Mental_Health_Status DESC;
```