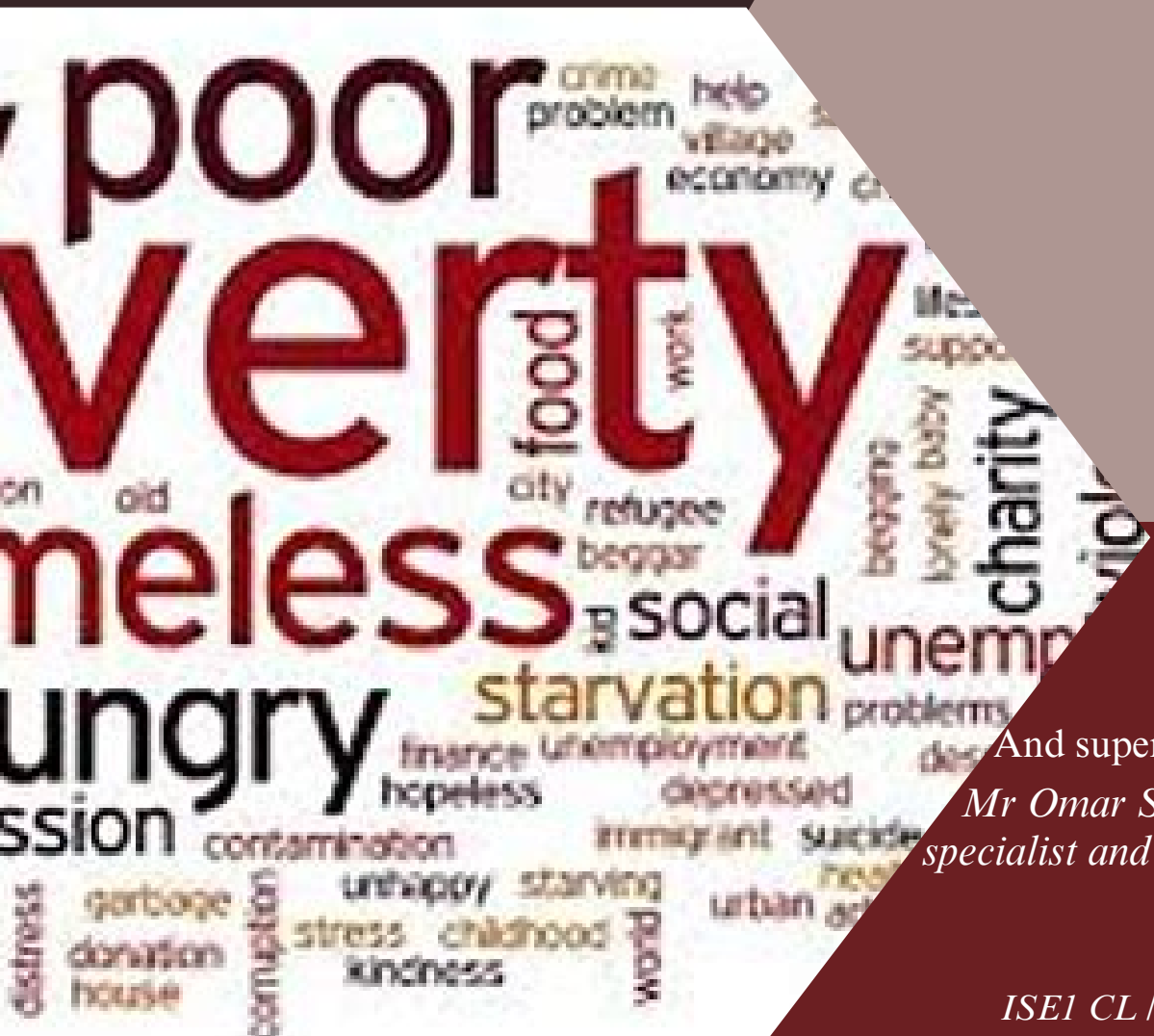
# POVERTY ANALYSIS

*Project*





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*ISE1 CL | February, 28th 2025*

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**This report evaluates the impact of monetary transfer scenarios on poverty in Senegal, comparing rural and urban areas. It highlights the effects on poverty levels and offers insights into the most effective scenarios for poverty reduction.**

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# INTRODUCTION

October 17 is not just another date—it marks the International day for the eradication of poverty. Since 1987, it has been recognized as the World day for Overcoming extreme poverty and was officially designated by the United Nations in 1992 as a day to reaffirm global commitment to ending poverty in all its forms. This day underscores the global commitment to Sustainable Development Goal 1 (SDG 1): ending poverty in all its forms. Poverty is based on income levels or the ability to access basic needs such as food, shelter, and healthcare. There are various methods for measuring poverty, including absolute versus relative poverty and multidimensional poverty. Poverty is deeply linked to vulnerability, as those affected face heightened risks with limited means to cope (OECD, 2001). Social transfers play a crucial role in mitigating these risks by providing financial support to disadvantaged households.

This report presents a data aging and simulation process for poverty analysis in Senegal. Using the 2018 EHCVM Welfare Dataset, economic and demographic adjustments are made to estimate conditions in 2023. The study updates household welfare indicators by integrating population growth, GDP per capita growth, and inflation trends. Additionally, policy scenarios simulate the effects of various social transfer programs, assessing their potential impact on household well-being.

"Poverty is deeply linked to vulnerability, as those affected face heightened risks with limited means to cope (OECD, 2001)."

# I. METHODOLOGY

## 1. Sources

The methodology for this analysis follows a structured approach to assess the impact of social transfer programs. Initially, the 2018 EHCVM Welfare Dataset is imported into Stata, with the working directory set for consistency. Growth parameters, including population, GDP per capita, and inflation rates, are defined using data from the ANSD and the World Bank. The data is then aged to 2023 by adjusting household weights, updating per capita expenditures, and revising the poverty line to reflect the current year. Individual-level data is merged with household-level indicators, such as the presence of children, elderly, and disabled members. Eight social transfer scenarios are defined, targeting specific household types, including rural households and those with children, elderly, or disabled members. Transfers of 100,000 CFA are allocated to eligible households, and the effects on per capita expenditures and total household welfare are computed. The total cost incurred by the government for each scenario is calculated. Finally, the enriched and aged dataset is saved for further analysis and policy evaluation. Following the work in **Stata**, the analysis transitions to **ADEPT** for the automatic generation of tables and figures, streamlining the presentation of results.

This study relies on multiple data sources :

- ANSD (The National Agency of Statistics and Demography)

The National Agency of Statistics and Demography (ANSD) is Senegal's primary institution for data collection and statistical analysis. It is responsible for producing official statistics on various aspects of the country's economy, population, and society. ANSD plays a key role in supporting government planning, policy-making, and monitoring development progress.

- World Bank

The World Bank is an international financial institution that provides financial and technical assistance to developing countries. Its mission is to reduce global poverty and promote shared prosperity through funding projects in education, healthcare, infrastructure, agriculture, and more. The World Bank works closely with governments, NGOs, and other partners to improve the economic and social conditions in developing nations.

- BCEAO (Central Banks of West African States)

The Central Bank of West African States (BCEAO) serves as the central bank for the eight West African countries that form the West African Economic and Monetary Union (WAEMU). BCEAO is responsible for monetary policy, ensuring financial stability, regulating banking systems, and overseeing the issuance of the common currency, the West African CFA franc. It plays a critical role in maintaining economic stability in the region.

# I. METHODOLOGY

## 1. Sources

The dataset from the World Bank at https://donnees.banquemondiale.org/indicateur/NY.GDP.MKTP.KN?name_desc=true&locations=SN provided data related to projections of GDP per capita for the years 2023-2025, including consumer price and GDP per capita.
Dataset from ANSD at Données de population | Agence Nationale de la Statistique et de la Démographie (ANSD) du Sénégal provided the population of Senegal in 2018 and 2023.
To convert US Dollars (USD) to West African CFA Franc (XOF), the exchange rate provided by BCEAO (Banque Centrale des États de l'Afrique de l'Ouest) is used. However, since exchange rates fluctuate, we refered to the 2023 (2nd january) rates issued by BCEAO.

# I. METHODOLOGY

## 2. Calculus

**Foster-Greer-Thorbecke (FGT) Index:**

It measures the depth and severity of poverty in a population. It is often used in poverty analysis to assess the percentage of the population below a specific poverty line, as well as the intensity of poverty among those who are poor.

$$FGT(\alpha) = \frac{1}{N} \sum_{i=1}^{N} \left( \frac{z - y_i}{z} \right)^{\alpha}$$

Where:

• NNN is the total number of individuals.

• zzz is the poverty line.

• yiy_iyi is the income or expenditure of individual iii.

• α is the poverty sensitivity parameter. For α=0, it measures the proportion of the population below the poverty line (headcount ratio). For α=1, it measures the poverty gap, and for α=2, it measures the severity of poverty.

**Gini Coefficient**

The Gini coefficient is a measure of income inequality, with a range from 0 to 1. A value of 0 indicates perfect equality, and a value of 1 indicates maximum inequality.

It is calculated as:

$$G = \frac{1}{2N^2\mu} \sum_{i=1}^{N} \sum_{j=1}^{N} |y_i - y_j|$$

Where:

- y*i, yj* are individual incomes (or expenditures).
- Nis the total number of individuals.
- μ is the mean income (or expenditure).

# I. METHODOLOGY

## 2. Calculus

**Efficiency of Each Scenario:**

The efficiency of each scenario is calculated using the formula:

$$\text{efficiency} = \frac{(\text{GapBaseline} - \text{GapEndline})}{\text{Total Transfer}}$$

The "gap" refers to the difference between the poverty line and the average income or expenditure of the poor. A greater reduction in the poverty gap after the transfer indicates a more efficient scenario.

Here are some calculated indacators

| Indicators | 2018 | 2023 | Growth rate |
|---|---|---|---|
| **Population** | 15 726 056 | 18 126 390 | 15,30% |
| **Inflation** | 0,46% | 5,94% | 24,45% |
| **GDP in Dollards** | 2,131E+10 | 2,652E+10 | 24% |
| **GDP per capita** | 1355,1 | 1463,19 | 7,39% |

# II. POLICIES DESCRIPTIONS

This analysis introduces eight targeted social transfer scenarios, each allocating a fixed transfer amount of 100,000 CFA per eligible household. These scenarios aim to assess the cost and impact of direct financial support on household welfare.
The scenarios 1 and 6 are the most expensive whereas the scenarios 4 and 8 are the less expensive.

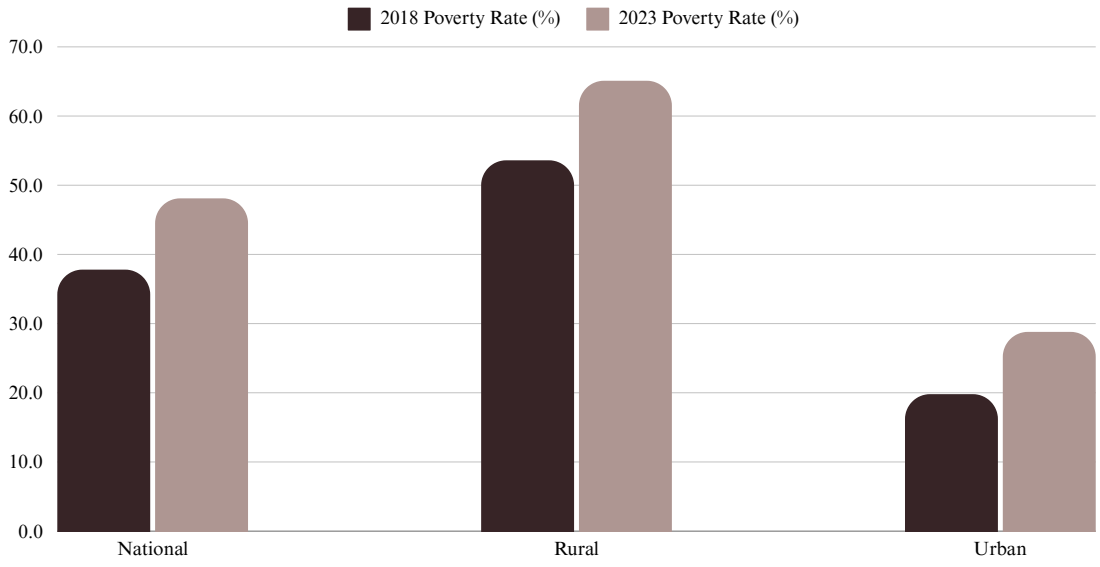
| 2023 Scenarios | Description | Cost as % of GDP |
|---|---|---|
| Scenario 1 | Universal Transfer (all households receive support) | 1,335 |
| Scenario 2 | Rural Household Transfers (targeting rural areas) | 0,621 |
| Scenario 3 | Households with Children under 2 | 0,511 |
| Scenario 4 | Rural Households with Children under 2 | 0,296 |
| Scenario 5 | Households with Children under 5 | 0,856 |
| Scenario 6 | Households with Children under 18 | 1,181 |
| Scenario 7 | Households with Elderly Members (65+ years old). | 0,400 |
| Scenario 8 | Households with Disabled Members | 0,320 |

# III. RESULTS AND KEY FINDINGS

## 1. Comparison between 2018 end 2023

Between 2018 and 2023, the national poverty rate increased from 37.8% to 48.1%, which represents a rise of 10.3 percentage points. This indicates a significant deterioration in living conditions over the period. The increase in poverty was more pronounced in rural areas, where the poverty rate surged from 53.6% to 65.1%, a jump of 11.5 percentage points. In urban areas, the poverty rate increased from 19.8% to 28.8%, an increase of 9.0 percentage points.

Graphic 1: Poverty Rates from differents areas (2018–2023)



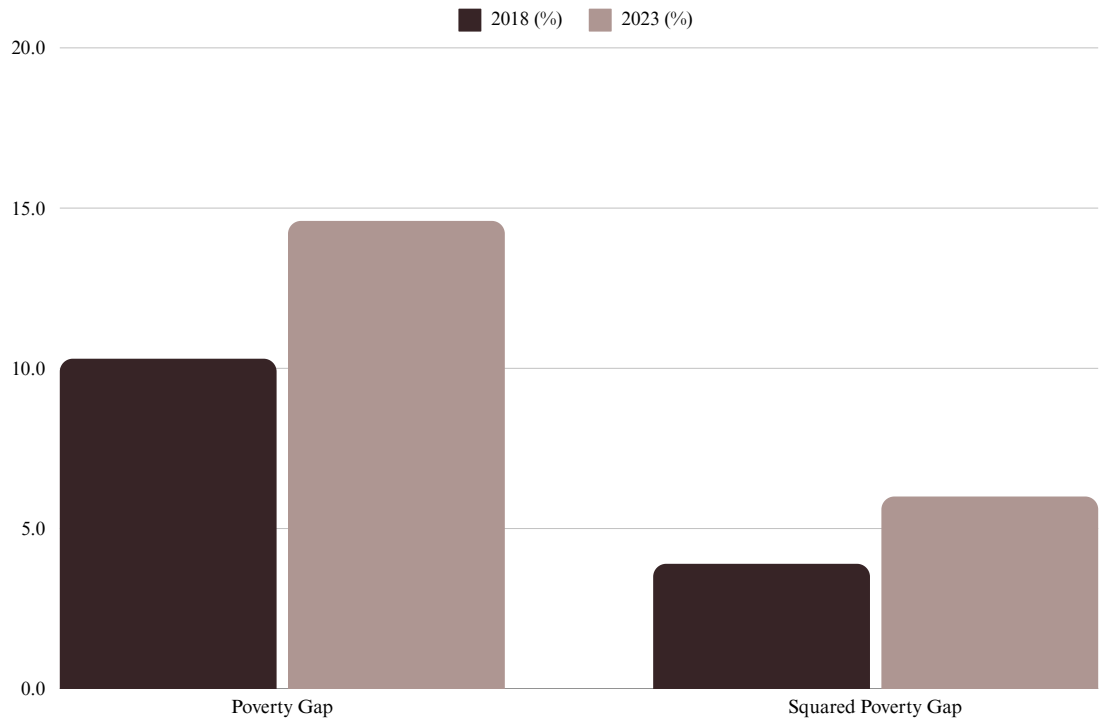

Source: EHCVM 2018, Own Calculations

# III. RESULTS AND KEY FINDINGS

## 1. Comparison between 2018 end 2023

The widening of the poverty gap further illustrates the worsening situation, with the gap increasing from 10.3% to 14.6%, which is an increase of 4.3 percentage points. This suggests that poor households have fallen further below the poverty line on average. Similarly, the squared poverty gap grew from 3.9% to 6.0%, reflecting a deeper concentration of extreme poverty within the population.

Graphic 2: Poverty Gap and Squared Poverty Gap (2018–2023)



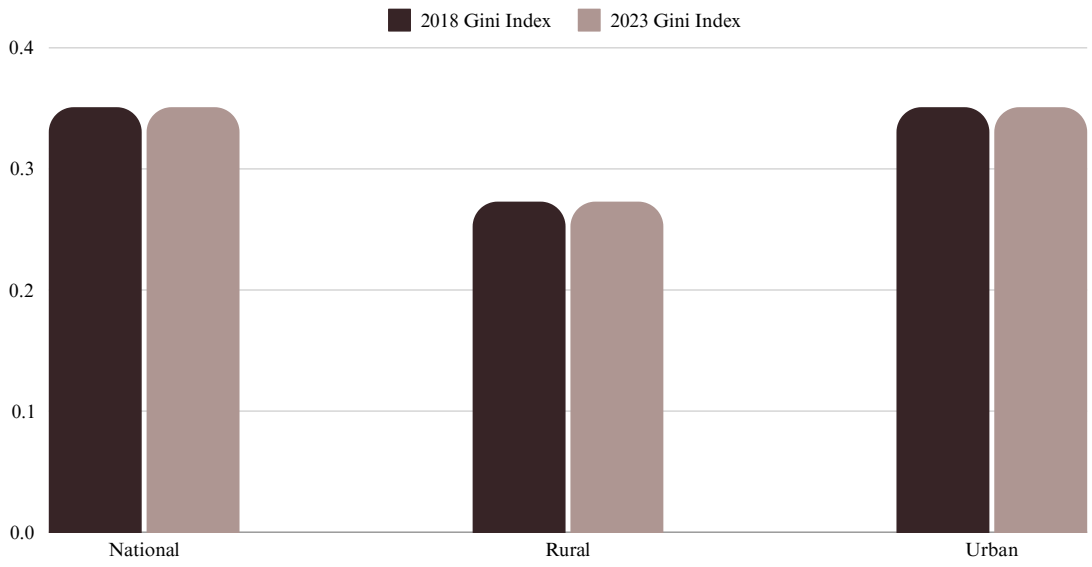

Source: EHCVM 2018, Own Calculations

# III. RESULTS AND KEY FINDINGS

## 1. Comparison between 2018 end 2023

Despite the increase in poverty and the widening of the poverty gap, the Gini index, a measure of inequality, remained unchanged both in rural and urban areas. The Gini index values were 0.351 for the national level, 0.351 for urban areas, and 0.273 for rural areas. This indicates that inequalities in income distribution remained stable over the period.

Graphic 3: Gini index (2018–2023)




Source: EHCVM 2018, Own Calculations

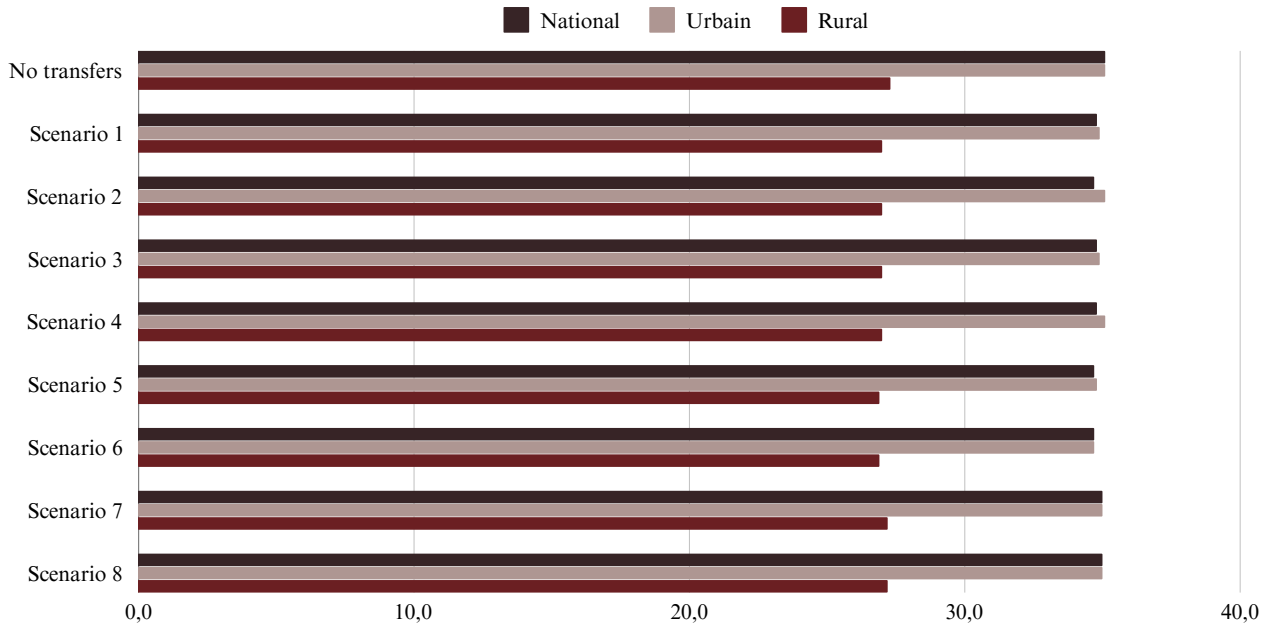
# III. RESULTS AND KEY FINDINGS

## 2. Comparison between the scenarios

When comparing the effect of various scenarios on national inequality, the results show that Scenarios 2, 5, and 6 had the most significant impact on reducing inequality, each with a reduction of 0.004 in the Gini index. The Universal Transfer Scenario (Scenario 1) also contributed to reducing inequality, but to a lesser extent, with a reduction of 0.003 in the Gini index. On the other hand, Scenarios 7 and 8 had the least impact, with a minimal reduction of 0.001 in the Gini index.

A comparison of the Gini index changes between urban and rural areas across different scenarios reveals some interesting insights. Scenarios 2, 4, 5, and 6 had a more pronounced impact in rural areas. Specifically, Scenario 6 reduced the rural Gini index to 0.269, marking a decrease of 0.004. This highlights the importance of transfers to households with children, which can significantly alleviate inequality in rural regions. In urban areas, Scenario 6 also had the most significant impact, reducing the urban Gini index by 0.004. This suggests that households with children are among the most vulnerable in urban areas as well.

Graphic 4: Gini index dependant on areas and scenarios




Source: EHCVM 2018, Own Calculations

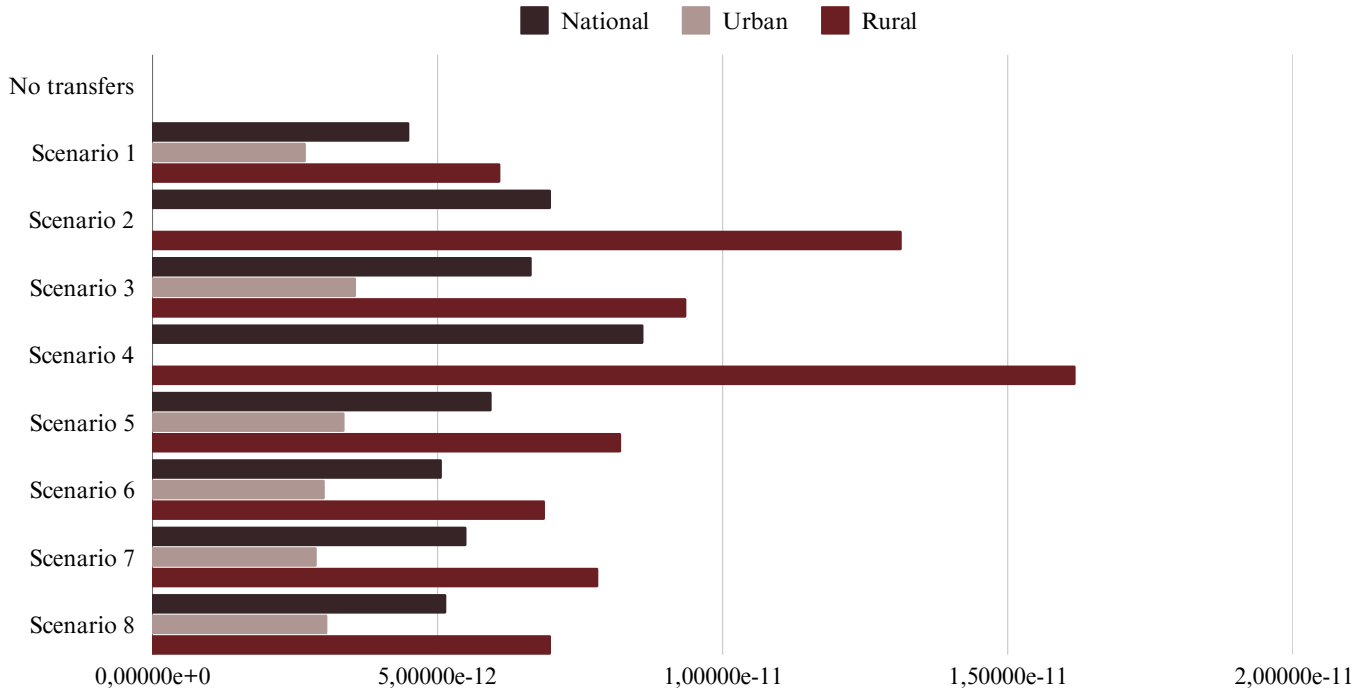
# III. RESULTS AND KEY FINDINGS

## 2. Comparison between the scenarios

In terms of efficiency, the scenario "Households with children under 2 in rural areas" proved to be the most efficient, with an efficiency rating of (9.92E-12). This indicates that the poverty gap was reduced optimally relative to the funds allocated. This was followed by the "Households with children under 2" scenario (8.05E-12) and the "Households with children under 5" scenario (7.67E-12), both showing relatively high efficiency. The "Households with elders" scenario (6.88E-12) exhibited intermediate efficiency.

On the other hand, scenarios such as "Households with a member with a disability" (5.94E-12), "Households with children under 18" (5.86E-12), and "Rural Universal Cash Transfer" (5.82E-12) demonstrated lower efficiency, despite the higher amounts of transfers involved. The least efficient scenario was the "Universal Cash Transfer" scenario, with an efficiency of (5.20E-12), despite mobilizing the highest amount of transfers.
In conclusion, while various scenarios show promise in reducing poverty and inequality, the most efficient interventions seem to be those that target specific vulnerable groups, particularly households with young children, especially in rural areas. These interventions not only have a notable impact on poverty reduction but also do so with optimized resource allocation.

Graphic 5: The scenarios efficiency dependant on areas and scenarios




Source: EHCVM 2018, Own Calculations

# IV. POLICY IMPLICATIONS AND RECOMMENDATIONS

The analysis reveals that from 2018 to 2023, the national poverty rate increased significantly —from 37.8% to 48.1%—with rural areas experiencing even sharper rises. Although the Gini index remained unchanged, the widening poverty and squared poverty gaps indicate that vulnerable households are falling further below the poverty line. These findings underscore the need for targeted social transfers, particularly for rural households and those with young children, which have demonstrated the greatest potential for reducing poverty effectively. Policymakers should prioritize these interventions, regularly adjust transfer amounts to account for inflation, and strengthen monitoring systems to ensure that resources are efficiently allocated. Additionally, complementary investments in economic inclusion and infrastructure are essential to foster long-term, sustainable poverty reduction.

# CONCLUSION

In conclusion, the analysis reveals a substantial rise in poverty from 2018 to 2023, with rural areas experiencing sharper increases. While income inequality remains stable, the widening poverty and squared poverty gaps indicate that vulnerable households are falling further below the poverty line. Targeted social transfer interventions, particularly those focusing on rural households and families with young children, show the greatest potential for effectively reducing poverty. These findings highlight the urgent need for well-targeted and adaptive policy measures to alleviate poverty and support sustainable development in Senegal.

# ANNEXE AND REFERENCES

## ANNEXE : FGT INDICATORS (%)

| | National | | | | | Urbain | | | | | Rural | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gini coefficient | Poverty Headcount Rate | Income Gap Ratio | Poverty Gap | Squared poverty gap | Gini coefficient | Poverty Headcount Rate | Income Gap Ratio | Poverty Gap | Squared poverty gap | Gini coefficient | Poverty Headcount Rate | Income Gap Ratio | Poverty Gap | Squared poverty gap |
| 2023 | 35,1 | 48,1 | 30,4 | 14,6 | 6,0 | 35,1 | 28,8 | 25,2 | 7,2 | 2,7 | 27,3 | 65,1 | 32,4 | 21,1 | 9,0 |
| Scénario 1 | 34,8 | 46,3 | 29,6 | 13,7 | 5,5 | 34,9 | 27,0 | 24,8 | 6,7 | 2,5 | 27,0 | 63,2 | 31,4 | 19,8 | 8,2 |
| Scénario 2 | 34,7 | 47,1 | 29,6 | 13,9 | 5,6 | 35,1 | 28,8 | 25,2 | 7,2 | 2,7 | 27,0 | 63,2 | 31,4 | 19,8 | 8,2 |
| Scénario 3 | 34,8 | 47,2 | 29,8 | 14,1 | 5,7 | 34,9 | 27,9 | 25,0 | 7,0 | 2,6 | 27,0 | 64,2 | 31,7 | 20,4 | 8,5 |
| Scénario 4 | 34,8 | 47,6 | 29,9 | 14,2 | 5,8 | 35,1 | 28,8 | 25,2 | 7,2 | 2,7 | 27,0 | 64,2 | 31,7 | 20,4 | 8,5 |
| Scénario 5 | 34,7 | 46,5 | 29,7 | 13,8 | 5,6 | 34,8 | 27,3 | 24,9 | 6,8 | 2,5 | 26,9 | 63,5 | 31,5 | 20,0 | 8,3 |
| Scénario 6 | 34,7 | 46,3 | 29,6 | 13,7 | 5,5 | 34,7 | 27,0 | 24,8 | 6,7 | 2,5 | 26,9 | 63,2 | 31,4 | 19,8 | 8,2 |
| Scénario 7 | 35,0 | 47,4 | 30,1 | 14,3 | 5,9 | 35,0 | 28,1 | 25,1 | 7,1 | 2,6 | 27,2 | 64,4 | 32,0 | 20,6 | 8,7 |
| Scénario 8 | 35,0 | 47,7 | 30,1 | 14,4 | 5,9 | 35,0 | 28,4 | 25,0 | 7,1 | 2,6 | 27,2 | 64,7 | 32,1 | 20,8 | 8,8 |

# REFERENCES

Cours de référence des principales devises contre Franc CFA | BCEAO

Données de population | Agence Nationale de la Statistique et de la Démographie (ANSD) du Sénégal

https://donnees.banquemondiale.org/indicateur/NY.GDP.MKTP.KN?name_desc=true&locations=SN