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NORTHEAST REGION: REFLECTIONS ON THE CHALLENGES TO PROMOTE SUSTAINABLE DEVELOPMENT

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Abstract: The performance of several municipalities in the Northeast region in the social vulnerability index – IVS, between 2000 and 2010, achieved a substantial improvement. A result, certainly, resulting from the combination of a favorable situation, marked by economic growth and successful public policies. With special emphasis on the group of 31 municipalities (1.75% of municipalities in the region) that achieved low social vulnerability. However, the challenges are still immense to improve the performance of other municipalities in the region, and it is necessary to support initiatives aligned with sustainable development and focused on investments in areas in which the region has revealed opportunities, such as renewable energy and respective parts production chains, components and final goods. In this sense, this article reflects on these issues, highlighting the importance of supporting initiatives to promote sustainable development, reduce the unemployment rate and improve the region's socioeconomic indicators.

Keywords: Regional Development; Socioeconomic Inequality, Unemployment, Sustainable Development.

INTRODUCTION

According to the social vulnerability index – IVS, calculated by IPEA based on data from the 2000 and 2010 IBGE Censuses, a significant improvement was observed in the performance of several municipalities in the Northeast region, with emphasis on a small group of 31 municipalities (1.75% of municipalities in the region) that achieved the low social vulnerability classification.

The economic situation favorable to regional development in the first decade of this century, especially in the second half of the decade, when the average growth rate of national GDP reached 4.5% per year (IBGE), largely explains the general result achieved by the municipalities of the region in IVS 2010. However, the differentiated performance of the group of 31 municipalities can also be associated with successful public policies, in areas such as infrastructure, education and health and employment and income, with such experiences serving as a reference for others municipalities in the region.

During this period, the HDI and the municipal Gini Index also showed a generalized improvement in the country, despite regional disparities and high unemployment rates remaining, especially when comparing the performances observed in the South and Southeast regions.

A better understanding of these experiences can help other municipalities in the region to develop public policies to promote sustainable development, aligned with the UN 2030 Development Goals (SDGs), and thus achieve low social vulnerability.

In 2020, according to IBGE data, this group of 31 municipalities with low IVS had a population of 4,959,471 inhabitants, a GDP of R$72.105 billion, an average GDP per capita of R$11,560.22 and a generation of taxes, net of product subsidies, of R$9.489 billion. In relative terms, these values represented, respectively, 9.36% of the population of the Northeast region, 13.79% of the regional GDP, 58.56% of the regional average GDP per capita and 14.73% of the taxes generated in the region.

Therefore, this article aims to contribute to reflection on the challenges of the Northeast region to improve performance in the Social Vulnerability Index – IVS, as well as promote sustainable development.

THE NORTHEAST REGION: INEQUALITIES, CHALLENGES AND SUSTAINABLE DEVELOPMENT

The Northeast region occupies a prominent position in the economic formation of Brazil from the colonial period to the present day. In the colonial period, the successful experience in the cultivation of sugar cane in the Pernambuco forest zone began the first major economic cycle in the country's economic formation, between the 16th and 18th centuries, based on the production of sugar to supply the European markets with high demand for the product.

Currently, the northeastern economy is characterized by economic diversification, size of the consumer market and sectors with great potential to contribute to sustainable development, such as renewable energies: biofuels, wind, solar, hydraulic, tidal and green hydrogen. In large numbers, in 2022 the Northeast region had a population of 55.7 million inhabitants (IBGE Census estimate), a GDP estimated at R$ 1.3 Trillion and a territory of 1.6 million km², respectively, 26.8% of the population, 13.6% of Brazilian GDP (average from 2002 to 2020) and 18.8% of the national territory.

Regarding administrative division, the Northeast region is made up of nine states (Alagoas, Bahia, Ceará, Maranhão, Paraíba, Pernambuco, Piauí, Rio Grande do Norte and Sergipe) and 1,768 municipalities.

In terms of *GDP per capita*, however, the states in the Northeast region are in the lowest positions in the national ranking, with the regional average of R$24,308 in 2022, representing only 52.67% of the country's GDP per capita. With such numbers reflecting characteristics of the regional economy, such as: the contrast between sectors of activity in relation to promoting modernization, competitiveness gains, innovation and increased technological content; high levels of income inequality and poverty; and, high unemployment rates. Despite the great investment opportunities in the various sectors of activity, paradoxically the region still lives with high unemployment rates and serious social problems.

In environmental terms, the regional territory has four biomes: Atlantic Forest, Caatinga, Savannahs and Amazon Forest. The Atlantic Forest area is located in the strip of land between the east coast bathed by the Atlantic Ocean and the interior of the region, going from Rio Grande do Norte to the south of Bahia. The Caatinga and the savannahs occupy most of the regional territory, the semi-arid region. The area with Amazon Forest is observed in the northwest of the State of Maranhão.

The Northeast region has a long coastline, 3,338 km long from Maranhão to Bahia. Considering the territory of 200 nautical miles, the region has a maritime area of 1 million km² (equivalent to 67% of the regional territory) with great potential for structuring activities related to the economy of the oceans and the environmental preservation of marine life, such as: tourism, water sports, aquaculture (fish, crustaceans and algae) and generation of offshore wind and tidal energy, among other activities.

On the mainland, the Brazilian Northeast also presents great opportunities for promoting sustainable development, with emphasis on the renewable energy sectors - biofuels, biogas, H2V (Green Hydrogen) and wind and solar energy. In agricultural activity, the basis of regional development since the colonial period, the areas with irrigated fruit growing, in ``Vale do Rio São Francisco``, and grain producing areas, in the savannahs of Bahia, Maranhão and Piauí stand out.

The list of important sectors for regional development also includes tourism, culture,

industry, the production of metallic and non-metallic minerals, forestry and the production of paper and cellulose and the services sector. The development of economic hubs related to such sectors of activity plays a strategic role in generating employment and income in the region and, consequently, reducing the social vulnerability of the population.

In this sense, it is worth remembering that the Brazilian Northeast is also characterized by the great contrasts of very different economic and social realities in its territory. A regional reality that in turn causes a high social risk for a relevant portion of the population. For example, the poverty situation observed on the outskirts of large cities coexists side by side with several promising economic hubs that account for a large part of the region's wealth generation. The vast territory of the drought polygon in the semi-arid region contrasts with the green areas irrigated with fruit, soy and coffee crops in the irrigation perimeters of ``Vale do Rio São Francisco``.

The wealth generated along the coast on the regional coast contrasts with the social vulnerability of populations on the outskirts of metropolitan regions and Sertão areas. Coastal cities concentrate the majority of the population and regional GDP, where eight of the nine state capitals, the main commercial centers, the main industrial hubs, the main tourist destinations and the large airports and port complexes are located.

Thus, the contrast between the great opportunities for generating wealth and the major social problems existing in the region, such as high-income inequality and high poverty rates, constitute one of the main characteristics of regional development. With this reality revealing the social risks present in urban and rural areas of the region.

Despite the great potential for development, the Northeast region has the highest national poverty and income concentration rates in the country, with large population contingents living in conditions of high social risk on the outskirts of large cities and in rural areas, with a portion of the population living in subnormal high-risk housing, on hillsides and on the banks of rivers, canals and streams, without access to basic public services, such as sanitation, health, education and public transport.

In the semi-arid northeast, Caatinga and savannah biomes, where 25.8 million inhabitants live (2022 IBGE Census) (47% of the regional population) in 1,171 municipalities (66% of the region's municipalities), the situation becomes even more critical. Furthermore, this group of municipalities is joined by 91 municipalities in the North of Minas Gerais, with 1.353 million inhabitants in 2022 and a socioeconomic profile similar to municipalities in the northeastern semiarid region. During periods of long drought, part of this population migrates to other parts of the country due to limited public policies to mitigate the effects of reduced availability of water for drinking, personal hygiene, cleaning and economic production. A cyclical situation that directly impacts the social conditions of the inhabitants of the Sertão, depresses economic activity and contributes to an increase in social risk in the regional territory.

THE SOCIAL VULNERABILITY INDEX – IVS

The Social Vulnerability Index - IVS was structured based on sixteen indicators organized into three dimensions: i) urban infrastructure; ii) human capital; and iii) income and work.

The Urban Infrastructure Dimension was formed by three indicators: garbage collection; inadequate water and sewage; and, home-to-work commuting time. These indicators captured social vulnerability related to sanitation infrastructure, public health and

urban mobility, paving of streets and avenues and transport.

The Human Capital Dimension was formed by eight variables: infant mortality; children aged 0 to 5 years out of school; do not study, do not work and low income, Children aged 6 to 14 out of school; Young mothers (10 to 17); Mothers without primary education + children up to 15; Illiteracy; and, Children in households where no one has completed primary education. These indicators captured social vulnerability related to the population's education, focusing on elementary education and children, adolescents and women (mothers).

The income and work Dimension were formed by five variables: income less than or equal to R$255; Low income and elderly dependent; Unemployment; Child labor; and, Informal occupation without primary education. These indicators reflect social vulnerability related to the local labor market, focusing on the level of personal income, degree of informality, level of education, unemployment, and the situation of children who work instead of going to school.

The IVS varies from 0 to 1, from very low to very high vulnerability, with municipalities being classified into five ranges of social vulnerability, namely: Very Low, between 0 and 0.200; Low, between 0.201 and 0.300; Average, between 0.301 and 0.400; High, between 0.401 and 0.500; and, Very High, between 0.501 and 1.

The IVS was calculated for the years 2000 and 2010, using as a reference data from the Census carried out by IBGE. Together with other socioeconomic indicators calculated by IBGE, the IVS contributes to a better perception of the evolution of the social situation of Brazilian municipalities, thus contributing to the assessment of local and regional development in the country.
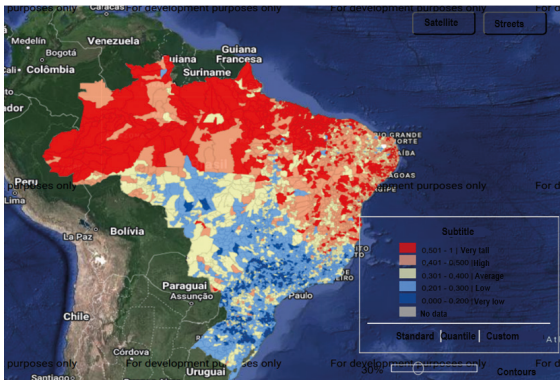
Observing the performance of the country's municipalities in the IVS of 2000 and 2010 reveals the great disparities between the major regions, with the South, Southeast and Central-West regions showing low social vulnerability, while the North and Northeast regions concentrated the highest rates of social risks (See Maps 1 and 2 and Tables 1 and 2).

However, the 2010 IVS showed an improvement in reducing social vulnerability in a significant number of municipalities in the Northeast region. In 2010, many northeastern municipalities reached the medium vulnerability range and a small group of 31 municipalities (1.75% of the region's municipalities) achieved low IVS. Among the three dimensions of the IVS (Urban Infrastructure, Human Capital and Income and Work) the biggest drops in growth rates in the IVS were observed in the Urban Infrastructure dimension, despite the other dimensions showing a decline in all municipalities. With this performance showing the importance of infrastructure for reducing social risk in municipalities in the Northeast (See Maps 1 and 2 and Tables 1 and 2).
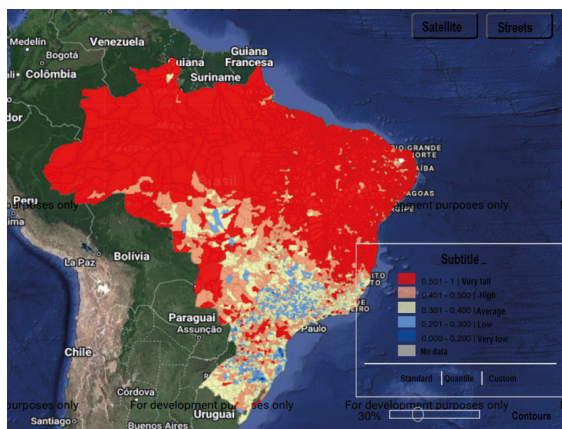
Map 1. Social Vulnerability Index (IVS) – 2000

Source: IPEA. http://ivs.ipea.gov.br/index. php/pt/

Map 2. Social Vulnerability Index (IVS) - 2010

Source: IPEA. http://ivs.ipea.gov.br/index. php/pt/

In relation to population, this group of 31 municipalities had the following distribution: four state capitals (12.9%), with a population above 500 thousand inhabitants; a municipality with 384 thousand inhabitants (Campina Grande) (3.2%); three municipalities (9.7%) in the range between 202 thousand and 259 thousand inhabitants (Parnamirim, Imperatriz and Mossoró); two municipalities (6.4%) in the range between 137 thousand and 188 thousand inhabitants (Barreiras and Sobral); seven municipalities (22.6%) in the range between 50 thousand and 100 thousand inhabitants; and, 14 municipalities (45.2%) with less than 50 thousand inhabitants (TABLE 2).

In the group of municipalities located in the semi-arid region, in the drought polygon defined by Sudene, the municipalities with a differentiated microclimate and located in the area of influence of large rivers, such as the São Francisco rivers (Barreiras/BA and Luís Eduardo Magalhães/BA) stood out, Parnaíba (Teresina/PI and Floriano/PI), Jaguaribe (São João do Jaguaribe/CE), Tocantins (Imperatriz/MA), Acaraú (Sobral), Mossoró (Mossoró/RN) and Seridó tributary of the Piranhas-Açu Hydrographic Basin in Rio Grande do Norte and Paraíba, where 11 municipalities with

low IVS are located, such as: Caicó, Acari and Timbaúba dos Batistas in Seridó Potiguar, plus six municipalities presented later in the Case Study of this Technical Note, and São José do Sabugi and Floodplain in Seridó Paraibano.

The microclimate observed in several of these municipalities is a favorable factor for local sustainable development. Factors such as altitude, water availability and rainfall constitute characteristics common to several municipalities in the region that achieved low IVS.

UNEMPLOYMENT RATE: REGIONAL PERFORMANCE 2012-2024

The Brazilian labor market has two striking characteristics: high unemployment rates for long periods, well above the considered full employment rate of 4%, and very unequal performance between the Major Regions. With the exception of the South region, the other regions showed more resilience to reduce the unemployment rate to levels close to full employment, of 4%. Over the period observed, the Central-West region was the one that came closest to the performance achieved by the South region, with minimum unemployment rates being between 5% and 6% in some periods. The Southeast and North regions were in the next positions with rates between 6% and 8% at the best times. Finally, the Northeast region presented the highest unemployment rates throughout the observed period, with a minimum of 8% and a maximum of 18.9% (GRAPHICS 1 to 7).

In state terms, it was observed that some states in each Major Region of the country presented more critical situations in terms of unemployment rate, with higher rates during the period analyzed, namely: North, Amapá, Amazonas and Pará; Northeast, Pernambuco and Bahia; Southeast, Rio de Janeiro; South, Rio Grande do Sul and Paraná; and, Central-

UF	Municipality	IVS	IVS Urban Infrastructure	IVS Human Capital	IVS Income and Work
BA	Barreiras	0,273	0,123	0,380	0,317
BA	Itapetinga	0,283	0,065	0,421	0,364
BA	Luís Eduardo Magalhães	0,267	0,114	0,429	0,259
BA	Madre de Deus	0,295	0,140	0,335	0,409
BA	Santo Antônio de Jesus	0,294	0,135	0,356	0,391
CE	São João do Jaguaribe	0,273	0,104	0,363	0,352
CE	Sobral	0,286	0,098	0,381	0,379
MA	Imperatriz	0,252	0,118	0,324	0,315
PB	Cajazeiras	0,296	0,118	0,378	0,392
PB	Campina Grande	0,280	0,123	0,352	0,365
PB	João Pessoa	0,286	0,238	0,329	0,292
PB	Patos	0,291	0,068	0,393	0,411
PB	São José do Sabugi	0,280	0,087	0,365	0,388
PB	Várzea	0,252	0,114	0,255	0,386
PI	Floriano	0,284	0,147	0,360	0,344
PI	Picos	0,286	0,120	0,364	0,373
PI	Teresina	0,288	0,227	0,311	0,325
RN	Acari	0,258	0,015	0,347	0,411
RN	Caicó	0,248	0,090	0,309	0,345
RN	Carnaúba dos Dantas	0,256	0,109	0,348	0,310
RN	Currais Novos	0,294	0,084	0,403	0,396
RN	Ipueira	0,244	0,063	0,331	0,337
RN	Jardim do Seridó	0,255	0,093	0,283	0,390
RN	Mossoró	0,254	0,105	0,329	0,328
RN	Natal	0,292	0,287	0,306	0,284
RN	Parnamirim	0,247	0,173	0,300	0,269
RN	Pau dos Ferros	0,291	0,108	0,393	0,371
RN	Santana do Seridó	0,296	0,039	0,470	0,380
RN	São José do Seridó	0,254	0,057	0,424	0,282
RN	Timbaúba dos Batistas	0,223	0,004	0,349	0,317
SE	Aracaju	0,287	0,260	0,311	0,289

Table 1. Northeast Region. Municipalities with a Low Social Vulnerability Index (IVS) - 2010

Source: IPEA. http://ivs.ipea.gov.br/index.php/pt/

State	Municipality	Population 2010 (In habitants)	IDHM 2010	HDI Long-life	IDHM Education	MHDI Income	Gini Index	
							2000	2010
BA	Barreiras	137.427	0,721	0,807	0,668	0,695	0,6357	0,5704
BA	Itapetinga	68.273	0,667	0,790	0,562	0,667	0,5857	0,4962
BA	Luís Eduardo Magalhães	60.105	0,716	0,826	0,590	0,754	...	0,6337
BA	Madre de Deus	17.376	0,708	0,794	0,667	0,670	0,5605	0,5631
BA	Santo Antônio de Jesus	90.985	0,700	0,815	0,622	0,677	0,5702	0,5498
CE	São João do Jaguaribe	7.900	0,654	0,784	0,576	0,620	0,5640	0,5110
CE	Sobral	188.233	0,714	0,832	0,675	0,647	0,6273	0,5702

MA	Imperatriz	247.505	0,731	0,803	0,698	0,697	0,6087	0,5612
PB	Cajazeiras	58.446	0,679	0,815	0,574	0,668	0,6156	0,5637
PB	Campina Grande	385.213	0,720	0,812	0,654	0,702	0,6346	0,5859
PB	João Pessoa	723.515	0,763	0,832	0,693	0,770	0,6245	0,6287
PB	Patos	10.674	0,701	0,821	0,628	0,667	0,5866	0,5630
PB	São José do Sabugi	4.010	0,617	0,781	0,514	0,584	0,4531	0,4348
PB	Várzea	2.504	0,707	0,800	0,714	0,619	0,4279	0,4078
PI	Floriano	57.690	0,700	0,802	0,633	0,676	0,6040	0,5579
PI	Picos	73.414	0,698	0,800	0,621	0,684	0,6163	0,5630
PI	Teresina	814.230	0,751	0,820	0,707	0,731	0,6514	0,6171
RN	Acari	11.035	0,679	0,779	0,634	0,633	0,4730	0,4915
RN	Caicó	62.709	0,710	0,824	0,619	0,703	0,5752	0,5620
RN	Carnaúba dos Dantas	7.429	0,659	0,796	0,577	0,624	0,5122	0,4078
RN	Currais Novos	42.652	0,691	0,794	0,617	0,673	0,5996	0,5912
RN	Ipueira	2.077	0,679	0,788	0,633	0,627	0,4987	0,3995
RN	Jardim do Seridó	12.113	0,663	0,772	0,584	0,647	0,5506	0,5025
RN	Mossoró	259.815	0,720	0,811	0,663	0,694	0,5828	0,5340
RN	Natal	803.739	0,763	0,835	0,694	0,768	0,6428	0,6217
RN	Parnamirim	202.456	0,766	0,825	0,726	0,750	0,5939	0,5604
RN	Pau dos Ferros	27.745	0,678	0,803	0,584	0,666	0,5776	0,5547
RN	Santana do Seridó	2.526	0,642	0,767	0,580	0,595	0,4213	0,4068
RN	São José do Seridó	4.231	0,694	0,815	0,647	0,634	0,5656	0,4476
RN	Timbaúba dos Batistas	2.295	0,640	0,723	0,591	0,614	0,6152	0,3684
SE	Aracaju	571.149	0,770	0,823	0,708	0,784	0,6409	0,6341

Table 2. Northeast Region. Municipalities with Low IVS. Population, Human Development Index (HDI) and Gini Index – 2000/2010.

Source: PNUD, IPEA. IBGE. DATASUS.

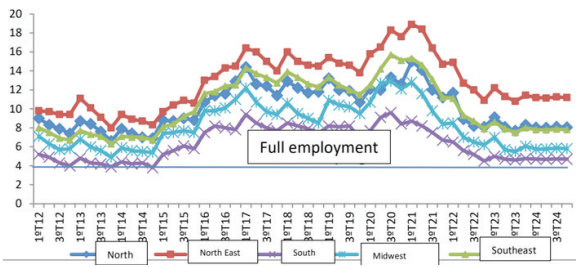West, Federal District and Goiás (GRAPHICS 3 to 7).
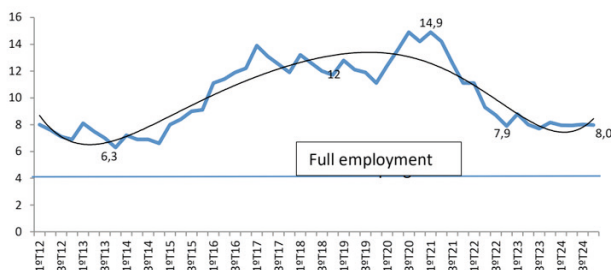
Graph 1. Brazil. Quarterly unemployment rate, in the reference week, of people aged 14 or over - 2012-2024 (%)

Note: Estimate for 2024: three-quarter moving average.

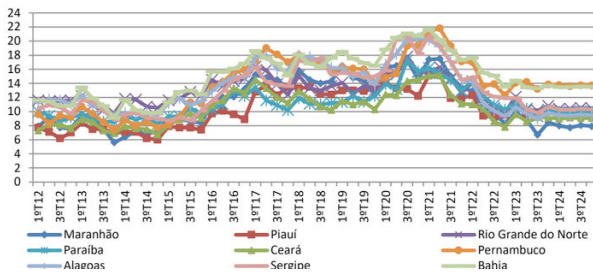Source: IBGE - National Household Sample Survey Continuous quarterly - PNADT, 2023.

Analysis of the unemployment rate in spatial terms helps to identify territories where economic activity is not generating enough jobs to meet the available labor supply, thus showing the existence of possible market failures that must be corrected through policies public policies focused on encouraging investments, strengthening human capital and creating new jobs, thus focusing on the causes and less on emergency programs to mitigate social problems.

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Graph 2. Brazil. Quarterly unemployment rate by Major Regions, of people aged 14 or over - 2012-2024 (%)

Note: Estimate for 2024: three-quarter moving average.

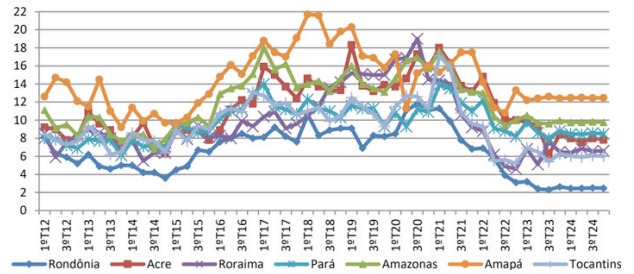Source: IBGE - National Household Sample Survey Continuous quarterly - PNADT, 2023.

Graph 3. Northeast Region. Quarterly unemployment rate by State, for people aged 14 and over - 2012-2024 (%)

Note: Estimate for 2024: three-quarter moving average.

Source: IBGE - National Household Sample Survey Continuous quarterly - PNADT, 2023

Understanding the unemployment situation in the Northeast region and the respective impacts on other regions of the country is essential to building a sustainable solution to the country's social problems. A case to be studied, how a region with great investment opportunities has lived for decades with very high unemployment rates, forcing part of the population to migrate to other regions of the country in search of work. Noting that, many times, some of these migrants are unable to quickly enter the job market, only increasing unemployment rates in these regions, as well as putting pressure on the demand for social infrastructure, such as housing, education and health. The lack of priority in defining public policies focused on reducing unemployment impacts social conditions in the region itself as well as affecting other regions of the country, as part of this population migrates to other regions of the country in search of employment.
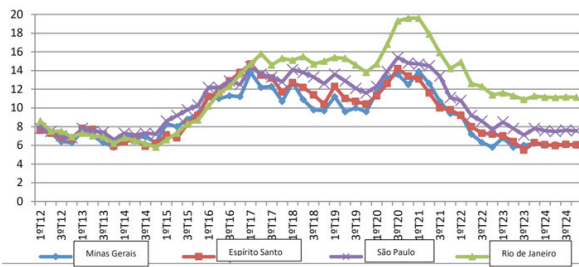

Graph 4. North Region. Quarterly unemployment rate by State, for people aged 14 and over - 2012 -2024 (%)

Note: Estimate for 2024: three-quarter moving average.

Source: IBGE - National Household Sample Survey Continuous quarterly - PNADT, 2023.

These numbers show that the Northeast region must be prioritized in terms of public policies, followed by the North and Southeast regions, as they have the highest unemployment rates in the country, thus presenting a portion of the population at social risk due to unemployment, with the minimum rate achieved in the period was 8%, twice the full employment rate. Thus, taking as a reference how far each region is from full employment, the prioritization of public policies and government incentives could aim to reduce the unemployment rate in regions that present more critical situations, such as the Northeast region.

Graph 5. Southeast Region. Quarterly unemployment rate by State, for people aged 14 and over - 2012-2024 (%)

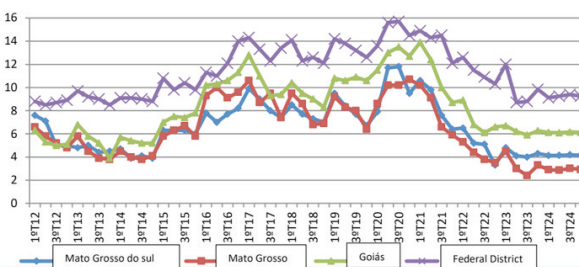Note: Estimate for 2024: three-quarter moving average.

Source: IBGE - National Household Sample Survey Continuous quarterly - PNADT, 2023.
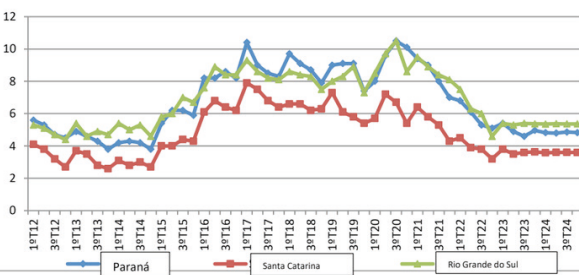
Graph 6. South Region. Unemployment rate by State, in the reference week, of people aged 14 or over - 2012 -2024 (%)

Note: Estimate for 2024: three-quarter moving average.

Source: IBGE - National Household Sample Survey Continuous quarterly - PNADT, 2023.

Graph 7. Central-West Region. Quarterly unemployment rate by State, for people aged 14 and over - 2012 -2024 (%)

Note: Estimate for 2024: three-quarter moving average.

Source: IBGE - National Household Sample Survey Continuous quarterly - PNADT, 2023.

Finally, the importance of prioritizing the region in defining the Union's public policies and in policies to encourage investments in the country must be highlighted, given the importance of these initiatives to improve the region's performance in social indicators, in terms of which region presents the worst positions in the national ranking, such as GDP per capita, inequality, poverty, unemployment rate, education and health. Furthermore, a more significant increase in investments in the Northeast region would contribute to reducing the unemployment rate in other regions of the country, as it could reduce the portion of the population that migrates to other regions of the country in search of employment, which often arrives They cannot find the job they want there and only help to increase unemployment rates and the demand for social services in large cities.

FINAL CONSIDERATIONS

The Northeast region faces major challenges in mitigating social risks, improving the population's quality of life and increasing regional development potential. On the other hand, the region has several opportunities capable of promoting sustainable development, such as the renewable energy sector and respective production chains, irrigated agriculture hubs, intensive in technology and high productivity, tourism, the transformation and the innovation ecosystem, among other branches of services.

Support for the development of these highly competitive agricultural hubs shows possible ways to reduce the unemployment rate in the region. In this sense, the existing opportunities in the ``Vale do Rio São Francisco``, ``Vale do Açu-RN`` and MATOPIBA stand out - a region proposed by EMBRAPA that covers the savannahs in Maranhão, Tocantins, Piauí and Bahia, which in recent decades has become a new locomotive of regional development,

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due to the expansion of soybeans and corn. Therefore, projects to overcome existing infrastructure bottlenecks stand out, such as, for example, waterways on the São Francisco, Parnaíba, Tocantins and Araguaia rivers, and connections with the North-South, Transnordestina and West-East railways.

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