

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY: APPLIED BUSINESS AND EDUCATION RESEARCH

2025, Vol. 6, No. 1, 72 – 91

<http://dx.doi.org/10.11594/ijmaber.06.01.06>

Research Article

Regional Disparities of Social and Demographic Indicators in Morocco: A Comparative Cartographic Analysis Between the 2014 and 2024 Censuses

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Article history:

Submission 30 December 2024

Revised 07 January 2025

Accepted 23 January 2025

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ABSTRACT

This article aims to analyze the regional disparities of social and demographic indicators in Morocco by conducting a comparative cartographic study between the 2014 and 2024 censuses. Using data from the General Population and Housing Census (RGPH) and reports from the High Commission for Planning, combined with Geographic Information Systems (GIS), this research highlights significant spatial and temporal changes across various regions. Key indicators analyzed include population density, unemployment rates, urbanization levels, literacy rates, and economic activity. The results reveal stark regional disparities, with Casablanca-Settat and Tangier-Tetouan-Al Hoceima maintaining high population density and urbanization growth, while rural regions like Drâa-Tafilalet and Béni Mellal-Khénifra continue to face persistent challenges, such as high unemployment and illiteracy rates. Notably, the southern regions of Laâyoune-Sakia El Hamra and Dakhla-Oued Ed-Dahab have shown remarkable improvements in urbanization and economic activity due to targeted government-led development projects.

Quantitatively, the study identifies a 5.4% national increase in urbanization rates over the past decade, accompanied by a 7% reduction in national illiteracy rates. However, unemployment remains a critical issue, with some regions experiencing only marginal improvements. The ARIMA model projections indicate further urbanization by 2030, with potential risks of growing disparities if regional development policies are not effectively implemented. These findings underscore the urgent need for targeted policies aimed at promoting regional equity by investing in education, enhancing job opportunities in rural areas,

How to cite:

Akallouch, A., Hamjik, M., Mahjoub, A., & Boudilab, H. (2025). Regional Disparities of Social and Demographic Indicators in Morocco: A Comparative Cartographic Analysis Between the 2014 and 2024 Censuses. *International Journal of Multidisciplinary: Applied Business and Education Research*. 6(1), 72 – 91. doi: 10.11594/ijmaber.06.01.06

and fostering balanced urban growth. The study emphasizes the importance of integrating GIS-based spatial analysis into policy-making to ensure sustainable and inclusive development.

Keywords: Social indicators, Demographic indicators, Regional disparities, 2014 Census, 2024 Census, Cartographic analysis, GIS; Sustainable development, Morocco, Regional balance

Introduction

Regional disparities in social and demographic indicators remain one of the key challenges to achieving sustainable and equitable development in Morocco. Significant differences in unemployment, illiteracy, urbanization, and labor force participation across regions directly affect the quality of life and opportunities for economic growth and social development. Addressing these inequalities necessitates targeted development policies aligned with national and regional frameworks, such as the National Initiative for Human Development (INDH) and Morocco's Vision 2030 strategy. These frameworks emphasize reducing social inequities, fostering balanced regional development, and ensuring equitable access to resources and opportunities.

The importance of addressing regional disparities in Morocco has grown in light of the country's rapid socio-economic transformations over the past decade. The disparities are not only a reflection of historical imbalances but also a challenge to the ongoing efforts toward inclusive growth and sustainable development. Policymakers have increasingly recognized the need for comprehensive strategies that integrate spatial, social, and economic dimensions to create a cohesive national development framework.

In recent years, analyzing social and demographic disparities in Morocco has become increasingly important, especially following the 2014 General Population and Housing Census (RGPH 2014) and subsequent reports issued by the High Commission for Planning. These data provide a critical baseline for understanding regional differences in development indicators and assessing the impact of national policies on regional growth. With the upcoming 2024 census, a comparative analysis between these two periods is essential to track progress, evaluate

policy effectiveness, and identify persistent regional gaps.

This study seeks to address key research questions aimed at understanding and mitigating regional disparities: What are the current spatial patterns of social and demographic indicators in Morocco? How do these disparities influence sustainable development and social equity? What policy measures can be adopted to bridge the development gaps between regions?

The general objectives of this study include:

Analyzing spatial disparities: Conducting a detailed analysis of key social and demographic indicators across Morocco's regions to uncover patterns of inequality and identify the most vulnerable areas.

Understanding relationships and forecasting trends: Employing statistical models to explore the relationships between various indicators, such as unemployment, literacy, and urbanization, and projecting future trends based on observed patterns.

Providing policy recommendations: Developing evidence-based recommendations that align with Morocco's national development goals, including Vision 2030 and the Sustainable Development Goals (SDGs), to foster regional equity and sustainable growth.

The significance of this research lies in its potential to support the development of more balanced and equitable policies by offering a nuanced understanding of regional disparities. By integrating spatial and temporal analysis, the study provides policymakers with actionable insights that can guide investments, improve public services, and promote inclusive economic growth. Furthermore, it highlights the critical role of comprehensive data analysis in designing effective strategies for sustainable regional development.

Literature Review

The study of social and demographic disparities has been a central topic in regional development research, particularly in understanding the socio-economic imbalances that hinder inclusive growth. Existing literature underscores the role of spatial analysis in identifying regional inequalities and guiding policy interventions. In Morocco, several studies have examined regional disparities, but most of these have either focused on specific indicators or lacked a comprehensive temporal comparison between different census years.

Role of Geographic Information Systems (GIS):

Geographic Information Systems (GIS) have emerged as indispensable tools in the analysis of regional disparities. (Goodchild 1992) described GIS as a science that enables the visualization and interpretation of spatial data to reveal patterns of inequality. In regional studies, GIS has proven effective in identifying socio-economic disparities and guiding targeted interventions. (Maguire et al. 2005) demonstrated how the integration of GIS with statistical models enhances urban planning and regional policy-making. Despite its global recognition, the application of GIS in Morocco has been relatively limited in scope. This study aims to fill this gap by employing GIS-based cartographic analysis to provide a spatial perspective on regional disparities.

Statistical Analysis and Forecasting:

In addition to GIS, statistical analysis plays a crucial role in understanding the relationships between various social and demographic indicators. (Wooldridge 2010) emphasized the importance of using regression models and time-series analysis to predict trends and derive evidence-based recommendations. In the Moroccan context, studies such as those by (Bencheikh & Ouhmou 2016) have explored regional disparities through descriptive statistics. However, the use of advanced predictive models, such as ARIMA, remains limited. By integrating GIS with statistical tools, this research offers a more holistic approach to analyzing and forecasting regional disparities.

Gaps in the Literature:

Despite the availability of studies on social and demographic disparities in Morocco, significant gaps persist. First, there is a lack of integrative approaches that combine GIS-based spatial analysis with advanced statistical forecasting. Second, few studies have conducted a temporal comparison of key indicators across different census years to track long-term changes. Third, limited attention has been given to the policy implications of regional disparities in terms of sustainable development and social equity.

This study seeks to address these gaps by employing a multidisciplinary methodology that combines spatial and statistical analyses. By comparing data from the 2014 and 2024 censuses, the research provides a comprehensive temporal perspective on regional disparities, offering actionable insights for policymakers to design more effective development strategies.

Methodology

This study adopts a multidisciplinary scientific methodology combining both spatial and temporal analyses to explore regional disparities in Morocco between 2014 and 2024. The approach integrates Geographic Information Systems (GIS) for spatial analysis with statistical modeling for temporal projections, ensuring a comprehensive understanding of the changes in key social and demographic indicators.

Data Collection:

The study relies on reliable and relevant data sources, including:

General Population and Housing Censuses: The 2014 and 2024 censuses provide the primary datasets, offering detailed information on demographic, social, and economic indicators.

Official Development Reports: Reports from the High Commission for Planning and regional authorities offer insights into regional disparities and developmental trends.

Geographic Data:

Additional geographic sources, such as satellite imagery and regional maps, are used to enhance the spatial analysis.

Data Processing and Analysis:

The collected data undergoes systematic processing to ensure accuracy and consistency:

Quantitative Analysis: Key indicators, including population density, urbanization rates, unemployment rates, literacy rates, and economic activity, are analyzed to identify spatial patterns and temporal trends.

Percentage Change Calculation: The percentage change in each indicator between 2014 and 2024 is computed to highlight the magnitude of regional disparities.

ARIMA Model for Temporal Projections:

The Auto-Regressive Integrated Moving Average (ARIMA) model is employed to analyze time-series data and forecast future trends. The choice of ARIMA is justified by its robustness in handling temporal data with trends and seasonality, making it suitable for projecting key indicators such as unemployment and economic activity.

Why ARIMA?

ARIMA is particularly effective in projecting socio-economic indicators because it accounts for past values (auto-regression), trends over time (integration), and past forecast errors (moving average). This makes it a reliable tool for policymakers seeking forward-looking insights.

Limitations of the Data:

While the census data and official reports are generally reliable, certain limitations must be acknowledged:

Data Consistency: Differences in data collection methods between the 2014 and 2024 censuses may introduce variability.

Assumptions in Modeling: The ARIMA model assumes that future trends will follow past patterns, which may not account for unexpected socio-economic or political changes.

Spatial Analysis Using GIS:

Geographic Information Systems (GIS) are used to create thematic maps that visually represent the spatial distribution of indicators. This allows for an intuitive understanding of regional disparities and highlights areas requiring targeted interventions.

Thematic Maps: The study produces maps for key indicators, including population density, urbanization, unemployment, and literacy rates, enabling a clear visualization of regional variations.

Qualitative Interpretation: The maps are complemented by a qualitative analysis linking observed spatial patterns to socio-economic contexts.

Research Tools and Techniques:

GIS Software: Tools such as ArcGIS and QGIS are used for map creation and spatial analysis.

By combining these methodologies, the research offers a robust framework for analyzing regional disparities and provides actionable insights for policymakers. This approach ensures that the study not only identifies existing disparities but also offers forward-looking solutions to promote balanced regional development in Morocco.

Results

The results derived from the analysis of statistical and cartographic data between 2014 and 2024 reveal significant changes in demographic, social, and economic indicators across Morocco's regions. These changes underscore dynamics such as population growth, urbanization, and economic activity, accompanied by notable improvements in education and reductions in illiteracy rates in several regions. However, stark regional disparities between urban and rural areas persist, highlighting the need for targeted and balanced regional development strategies.

As shown in Table 1 and Table 2, population growth is most pronounced in regions like Casablanca-Settat and Rabat-Salé-Kénitra, where urbanization rates exceeded 70% in both 2014 and 2024. These urban hubs demonstrate increasing economic activity and higher education levels, with Casablanca-Settat achieving a 90.5% education level in 2024, compared to 88.5% in 2014. Conversely, rural regions such as Drâa-Tafilalet and Béni Mellal-Khénifra exhibit slower improvements in education and persistent challenges in employment, with unemployment rates remaining above 20% in some areas.

Table 1. General Population Statistics for 2014

Region	Population	Education Level	Illiteracy Rate	Activity Rate	Unemployment Rate	Urbanization Rate
Guelmim-Oued Noun	433755	81	32.9	40.1	27.1	42
Marrakech-Safi	4520569	82	37.8	47.2	13.1	58
Casablanca-Settat	6861739	88.5	26.2	50.7	16.3	78
Rabat-Salé-Kénitra	4580866	86	29.4	49.7	16.9	70
Béni Mellal-Khénifra	2520776	79	39.1	43.5	15.6	40
Souss-Massa	2676847	83	33.1	44.3	14.4	47
Drâa-Tafilalet	1635008	75	34.5	39.8	15.5	35
Tanger-Tetouan-Al Hoceima	3556729	86.5	31.0	51.1	14.9	60
Laâyoune-Sakia El Hamra	367758	82	21.5	52.5	28	88
Dakhla-Oued Ed-Dahab	142955	85	22.3	62.8	10.1	92
Oriental	2314346	81	34.4	44.3	21.5	52
Fès-Meknès	4236892	84.5	34.7	45.4	16.5	52

(Source: General Census of Population and Housing, 2014)

Table 2. General Population Statistics for 2024

Region	Population	Education Level	Illiteracy Rate	Activity Rate	Unemployment Rate	Urbanization Rate
Guelmim-Oued Noun	448685	83	26.2	37.4	31.5	45
Marrakech-Safi	4892393	85.4	28.8	40.4	20.8	61
Casablanca-Settat	7688967	90.5	19.6	44	18.8	80
Rabat-Salé-Kénitra	5132639	88.7	22.4	43.1	19.8	73
Béni Mellal-Khénifra	2525801	82.5	32.0	37.3	26.8	42
Souss-Massa	3020431	86.3	26.2	41.1	19.7	50
Drâa-Tafilalet	1655623	80	28.3	34.5	22.2	37
Tanger-Tetouan-Al Hoceima	4030222	89.9	22.8	46.2	19.6	65
Laâyoune-Sakia El Hamra	451028	85	15.3	46.4	26.6	90
Dakhla-Oued Ed-Dahab	219965	87.5	14.8	60.9	10.6	95
Oriental	2294665	84	28.3	37.6	39.4	55
Fès-Meknès	4467911	87	27.5	38.9	23.3	56

(Source: General Census of Population and Housing, 2024)

Cartographic representations further illuminate these disparities, emphasizing the spatial distribution of urbanization and demographic concentration. Maps illustrate how regions like Tanger-Tetouan-Al Hoceima and Souss-Massa are emerging as transitional zones, showing balanced growth in education

and economic activity. Meanwhile, southern regions like Laâyoune-Sakia El Hamra and Dakhla-Oued Ed-Dahab highlight the effectiveness of targeted infrastructure investments, with urbanization rates exceeding 90% by 2024, accompanied by declining illiteracy rates. The findings also underscore the

importance of addressing the challenges faced by vulnerable regions. While urban centers thrive with sustained development, rural and less urbanized regions require focused interventions to bridge disparities. These spatial and temporal insights, as depicted in the maps, provide a foundation for regional policy design aimed at achieving sustainable and inclusive development.

Population and Density in 2014:

In 2014, Morocco's population and population density showed significant regional variations. The regions with the highest population density were Casablanca-Settat (383.2

inhabitants/km²) and Tanger-Tetouan-Al Hoceima (251.5 inhabitants/km²), reflecting their status as major urban and economic hubs. These regions benefited from strong economic activity, robust infrastructure, and migration from rural areas. On the other hand, regions like Dakhla-Oued Ed-Dahab and Laâyoune-Sakia El Hamra exhibited the lowest population densities, at 1.6 and 3.2 inhabitants/km² respectively, due to their vast geographical areas and smaller population sizes. This disparity underscores the urban-rural divide in population distribution, with urban regions hosting larger, denser populations compared to rural and southern regions.

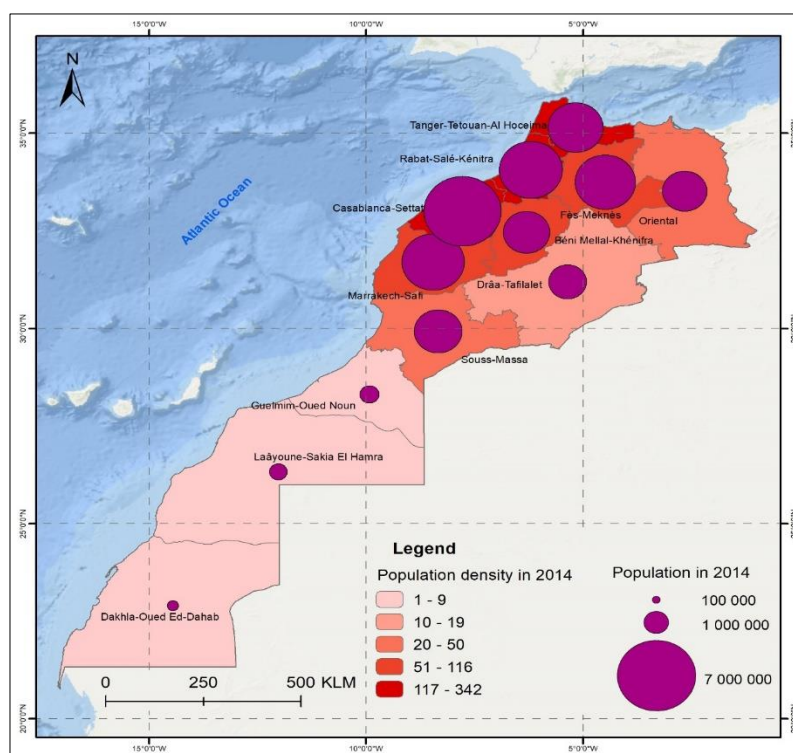


Figure 1. Population and Population Density by Regions of Morocco in 2014
(Source: General Census of Population and Housing, 2014)

Population and Density in 2024:

By 2024, Morocco experienced a slight increase in population density across most regions, with notable growth in urbanized areas. Casablanca-Settat remained the most densely populated region (approx. 383.5 inhabitants/km²), maintaining its position as the country's economic heart. Tanger-Tetouan-Al Hoceima also saw marginal growth in density

(approx. 252 inhabitants/km²), driven by ongoing urbanization and industrial expansion. Meanwhile, regions in the south, such as Laâyoune-Sakia El Hamra and Dakhla-Oued Ed-Dahab, showed marked improvements in density, with figures rising to 3.17 and 1.62 inhabitants/km², respectively. This growth reflects the impact of targeted developmental projects aimed at attracting populations to these areas.

Despite these changes, population density patterns continued to highlight significant regional disparities, with urban regions remain-

ing densely populated while rural areas, particularly in the south, maintained relatively low densities.

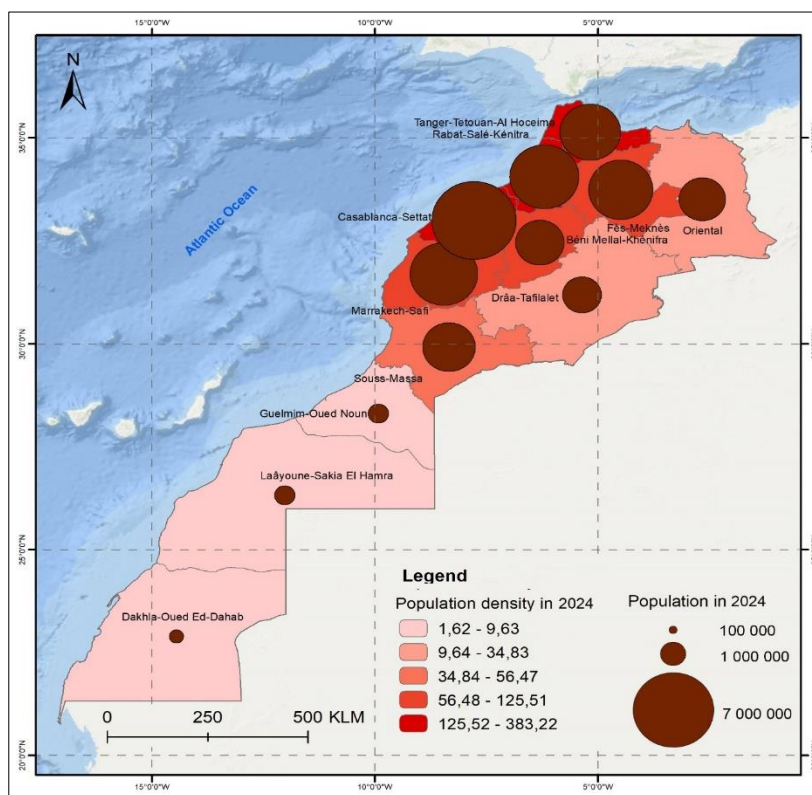


Figure 2. Population and Population Density by Regions of Morocco in 2024 (Source: General Census of Population and Housing, 2024)

Morocco experienced notable population growth between 2014 and 2024, with an increase in population across nearly all regions. In 2014, the Casablanca-Settat region recorded the highest population, with 6,861,739 inhabitants. By 2024, this figure had risen to 7,688,967 inhabitants, reflecting an increase of 827,228 people. This growth underscores Casablanca’s continued role as a key economic hub attracting populations from other regions.

The Rabat-Salé-Kénitra region ranked second in terms of population, increasing from 4,580,866 inhabitants in 2014 to 5,132,639 inhabitants in 2024, an addition of 551,773 people. This growth highlights the region’s improved infrastructure and expanded job oppor-

tunities, which enhance its appeal as a population center. In the southern regions, Dakhla-Oued Ed-Dahab experienced the highest relative growth, with its population rising from 142,955 in 2014 to 219,965 in 2024—an increase of approximately 54%. This significant growth reflects the impact of developmental policies and economic projects implemented in these areas. Conversely, some regions showed relatively modest population growth. For instance, Béni Mellal-Khénifra saw only a slight increase, from 2,520,776 inhabitants in 2014 to 2,525,801 in 2024, indicating a stagnant growth rate. This stability may result from limited migration to the region, as people tend to move toward larger urban centers.

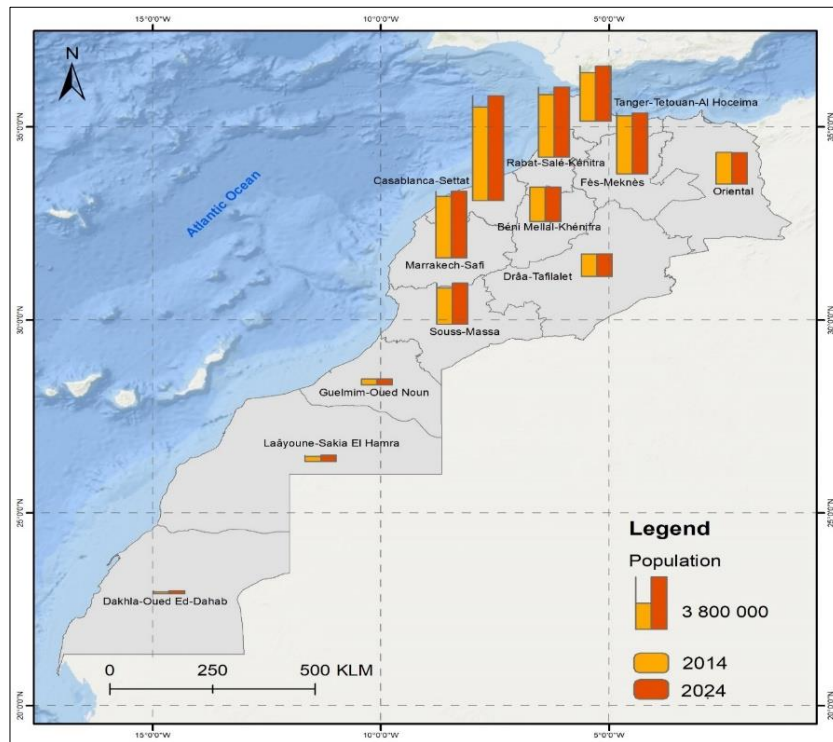


Figure 3. Population and Population Density by Regions of Morocco in 2014 (Source: General Census of Population and Housing, 2014 and 2024)

Urbanization Between 2014 and 2024 Urbanization rates in Morocco experienced significant changes between 2014 and 2024, with regional variations reflecting developmental and social disparities. In 2014, the Casablanca-Settat region recorded the highest urbanization rate at 79.7%, followed by Rabat-Salé-Kénitra at 74.6%, and Tanger-Tetouan-Al Hoceima at 64.8%. Conversely, rural regions like Drâa-Tafilalet and Béni Mellal-Khénifra had much lower urbanization rates of 36.8% and 40.6%, respectively. In the southern regions, Dakhla-Oued Ed-Dahab recorded an urbanization rate of 49.8%, while Laâyoune-Sakia El Hamra stood at 68.3%, reflecting limited urban development due to the desert environment that restricts rural living. By 2024, urbanization rates increased across all regions, with notable

jumps in the southern regions. Laâyoune-Sakia El Hamra reached an urbanization rate of 89.7%, while Dakhla-Oued Ed-Dahab recorded the highest rate at 95.2%. These figures reflect the desert nature of these regions, where urban centers are the preferred choice for residents due to harsh rural living conditions and scarce resources. Casablanca-Settat remained the most urbanized region, with a rate of 82.9%, and Tanger-Tetouan-Al Hoceima saw an increase to 69.7%. Despite the significant improvements in urbanization in the southern regions, rural areas in Drâa-Tafilalet and Béni Mellal-Khénifra continued to record low urbanization rates, at 39.8% and 44.8%, respectively, in 2024, indicating ongoing developmental challenges.

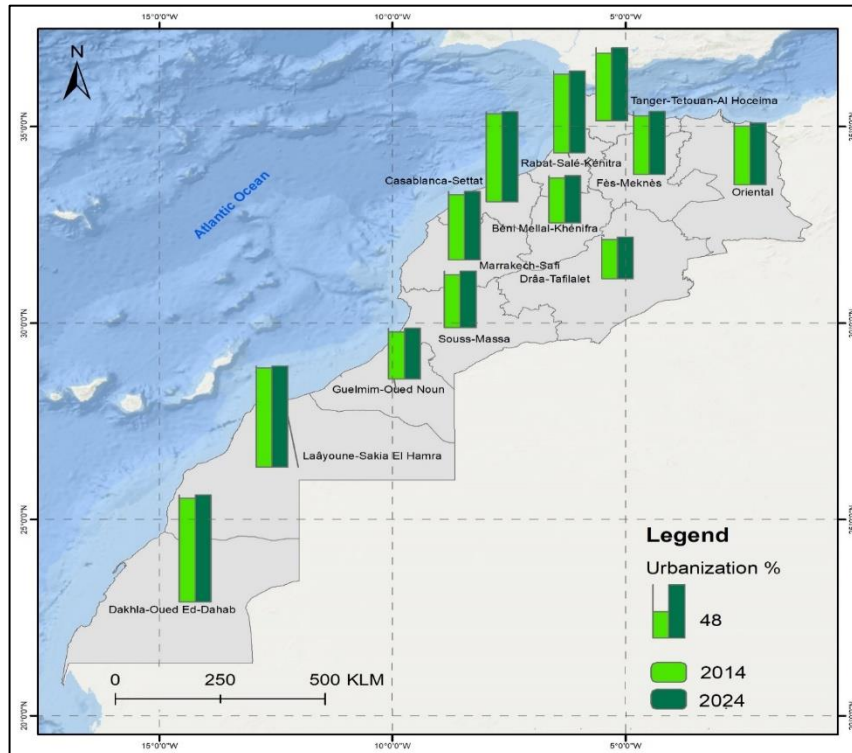


Figure 4. Urbanization Rates by Regions of Morocco in 2014 and 2024 (Source: General Census of Population and Housing, 2014 and 2024)

These results highlight a continued trend toward urbanization, especially in desert regions where urban centers provide better living conditions. However, the persistent gap between urban and rural areas calls for enhanced developmental policies to improve living standards in rural regions and ensure a more balanced population distribution across the country.

Education Between 2014 and 2024

The education sector in Morocco saw significant improvements between 2014 and 2024, with noticeable progress in school enrollment rates and reductions in illiteracy nationwide. In 2014, the Casablanca-Settat region recorded the highest school enrollment rate at 88.5%, followed by Rabat-Salé-Kénitra at 87.2%, reflecting strong educational infrastructure and services in urban areas. In contrast, rural regions like Drâa-Tafilalet and Béni Mellal-Khénifra had lower enrollment rates of 73%

and 75%, respectively, due to limited infrastructure and difficult access to schools. By 2024, school enrollment rates improved across all regions. Casablanca-Settat increased slightly to 91%, while Rabat-Salé-Kénitra reached 89.8%. The most notable progress occurred in southern regions, with Dakhla-Oued Ed-Dahab reaching 85% and Laâyoune-Sakia El Hamra achieving 87.5%. These improvements reflect the impact of government initiatives like the "National Initiative for Human Development," which focused on building new schools and upgrading educational facilities in remote areas. Illiteracy rates also declined significantly. In 2014, Drâa-Tafilalet had an illiteracy rate of 34.5%, which dropped to 29% by 2024. Similarly, Casablanca-Settat saw a reduction in illiteracy from 19.6% in 2014 to 15.2% in 2024, showing the success of literacy programs targeting women and youth, particularly in urban areas.

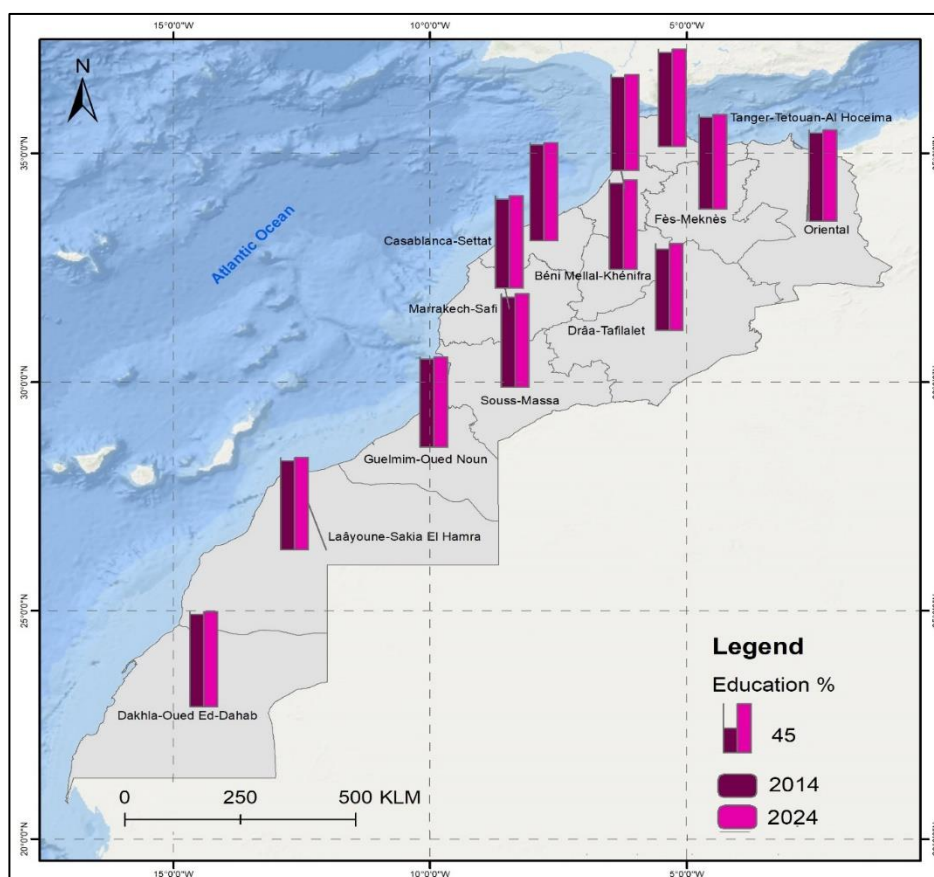


Figure 5. School Enrollment Rates by Regions of Morocco in 2014 and 2024 (Source: General Census of Population and Housing, 2014 and 2024)

The progress in education between 2014 and 2024 demonstrates the success of developmental initiatives and educational policies aimed at improving access to education in both rural and urban areas. Despite these achievements, gaps between rural and urban regions remain a challenge, requiring further strategies to ensure equal educational opportunities for all and to promote sustainable development and social equity.

Illiteracy Between 2014 and 2024 Illiteracy rates in Morocco saw a significant decline between 2014 and 2024, with regional differences reflecting efforts to combat illiteracy. In 2014, Drâa-Tafilalet recorded the highest

illiteracy rate at 34.5%, followed by Béni Mellal-Khénifra at 34.2%, highlighting the lack of educational infrastructure and limited literacy programs in rural and remote areas. On the other hand, Casablanca-Settat had the lowest illiteracy rate at 19.6%, reflecting better educational services in urban regions. By 2024, illiteracy rates dropped noticeably across most regions. In Drâa-Tafilalet, the rate decreased to 29%, while Béni Mellal-Khénifra reduced its rate to 28.5%. Casablanca-Settat continued to improve, with illiteracy falling to 15.2%, showcasing the success of national policies and literacy programs, particularly those targeting women and marginalized groups.

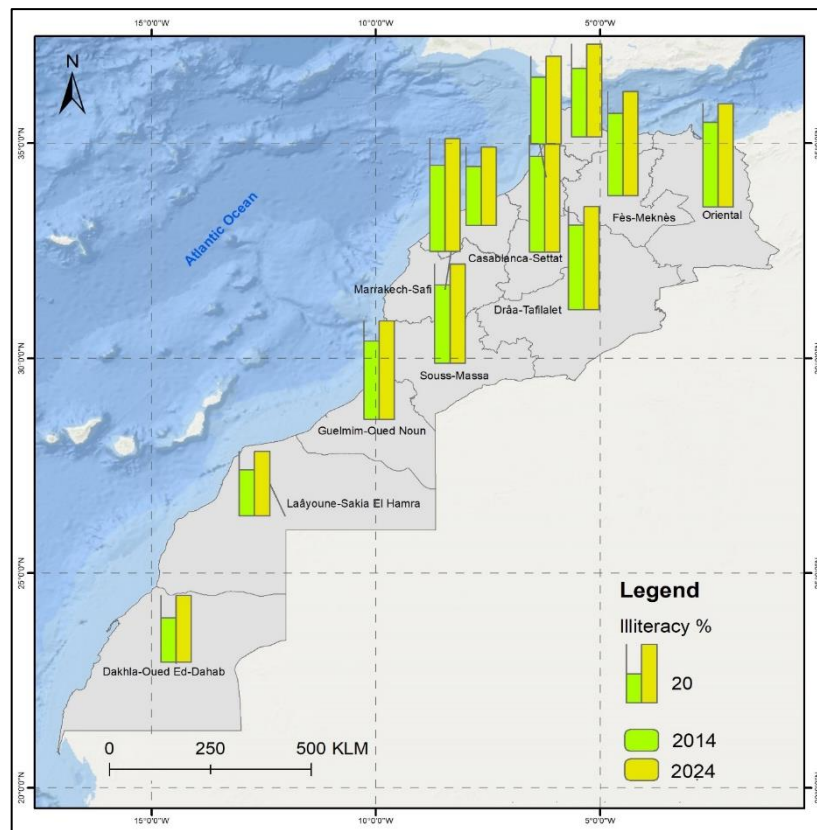


Figure 6. Illiteracy Rates by Regions of Morocco in 2014 and 2024
(Source: General Census of Population and Housing, 2014 and 2024)

These results reflect Morocco's national efforts, including adult literacy programs and initiatives to improve access to education. However, gaps between rural and urban areas persist, requiring further investment in education and literacy programs in remote regions to achieve inclusive development and social equality.

Unemployment Between 2014 and 2024 Unemployment rates in Morocco showed notable changes between 2014 and 2024, with persistent regional disparities reflecting economic and developmental challenges. In 2014, the Eastern region recorded the highest unemployment rate at **21.5%**, followed by Tangier-Tetouan-Al Hoceima at **14.9%**, highlighting a

reliance on seasonal industries and a lack of economic diversification. In contrast, Dakhla-Oued Ed-Dahab had the lowest unemployment rate at **10.1%**, thanks to targeted investments in local development. By 2024, unemployment rates decreased slightly in most regions. The Eastern region saw a drop to **19.8%**, while Tangier-Tetouan-Al Hoceima reduced its rate to **13.2%**. Southern regions remained relatively stable, with Dakhla-Oued Ed-Dahab recording an unemployment rate of **10.6%**. These changes indicate limited improvements in some areas due to economic initiatives, but challenges remain significant in regions with high population density.

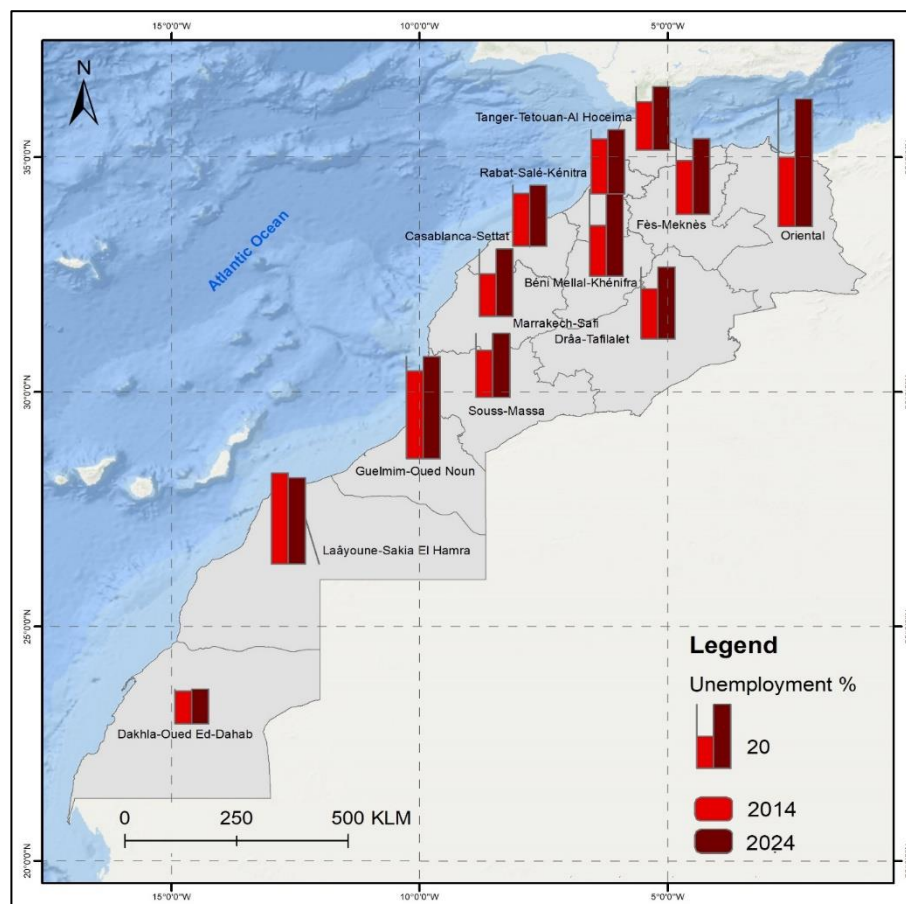


Figure 7. unemployment Rates by Regions of Morocco in 2014 and 2024 (Source: General Census of Population and Housing, 2014 and 2024)

Despite some progress, the gap between urban and rural regions persists. These figures highlight the need for more effective economic policies to stimulate investment and create job opportunities, particularly in regions with high unemployment rates. Supporting local industries and small and medium-sized enterprises could be key to achieving economic balance and reducing unemployment across the country.

Economic Activity Rate Between 2014 and 2024 The economic activity rate in Morocco experienced a significant decline between 2014 and 2024, driven by successive economic and social crises that impacted the labor market. In 2014, the Casablanca-Settat region recorded the highest activity rate at 50.7%, followed by the Fès-Meknès region at 49.7%, reflecting the dynamism of urban economies. Conversely, the

Drâa-Tafilalet region had the lowest activity rate at 34.5%, highlighting limited economic activities in rural areas. By 2024, Casablanca-Settat saw a sharp decline in its activity rate, dropping to 44%, indicating the adverse effects of economic crises on productive activities and employment in the region. Similarly, Fès-Meknès experienced a reduction in its activity rate to 42.9%, mirroring the broader economic slowdown. In the southern regions, Dakhla-Oued Ed-Dahab also recorded a decline from 46.1% in 2014 to 40.3% in 2024, reflecting the impact of economic challenges on development projects in these areas. Rural regions such as Drâa-Tafilalet experienced a further drop in activity rates, reaching 31.8%, underscoring the persistent lack of economic opportunities and employment in these regions.

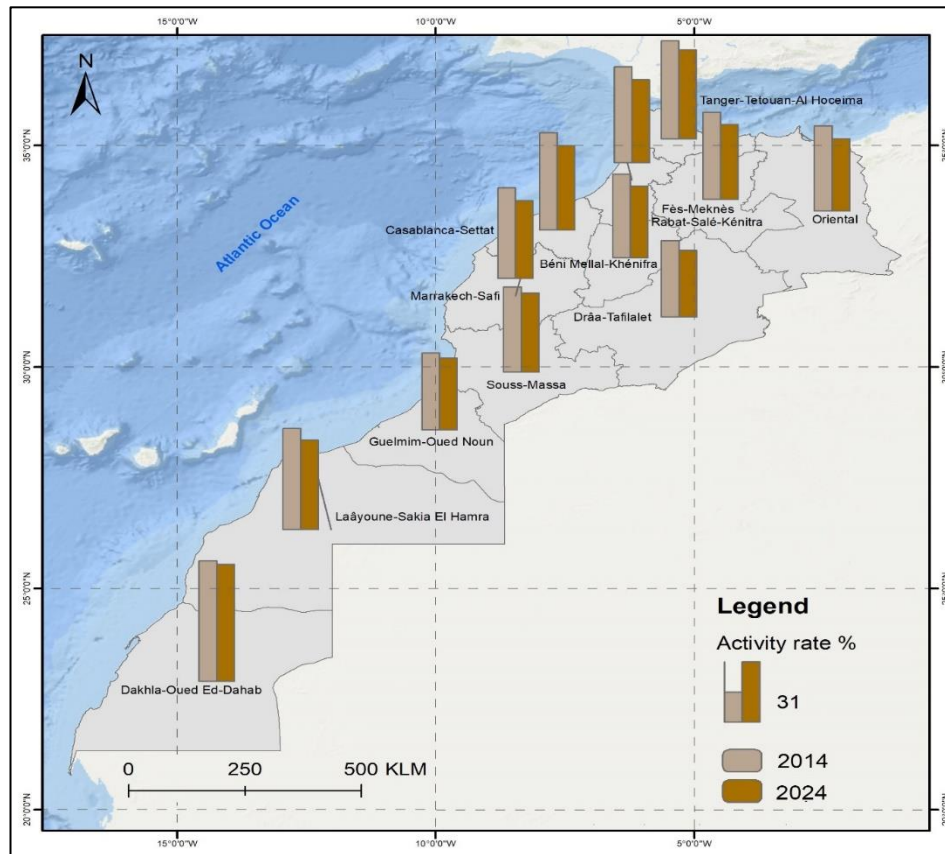


Figure 8. Economic Activity Rates by Regions of Morocco in 2014 and 2024
(Source: General Census of Population and Housing, 2014 and 2024)

These figures highlight the detrimental effects of ongoing economic crises on Morocco's labor market, emphasizing the urgent need for interventions to revitalize the national economy. This can be achieved through policies aimed at supporting investments in productive sectors, strengthening local industries, and promoting small and medium-sized enterprises. Additionally, bridging the gap between urban and rural regions remains crucial for fostering inclusive economic growth and improving overall conditions nationwide.

Discussion

Between 2014 and 2024, Morocco experienced significant changes in demographic, social, and economic indicators, revealing stark regional disparities. These changes were shaped by various factors, including global economic crises, national development policies, and specific local circumstances.

Regional Disparities and the Impact of Economic Crises

Data indicate a noticeable decline in economic activity rates across most regions, particularly in major urban centers. For instance, the Casablanca-Settat region saw a significant drop in activity rates from 50.7% in 2014 to 44% in 2024. This decline reflects the adverse effects of global economic crises and the slowdown in key sectors such as industry and services, which are the backbone of this region's economy. As pointed out by Hanushek and Woessmann (2020), regions heavily reliant on urban industrial activities are particularly vulnerable to global economic disruptions.

In the Eastern region, the closure of borders with Algeria since 1994, coupled with stricter controls on informal cross-border trade with Melilla, had profound economic implications. Informal trade had long served as a livelihood for many households in this region, and its de-

cline contributed to a sharp reduction in economic activity rates, which fell from 45.2% in 2014 to 39.8% in 2024. This trend highlights the dependency of the Eastern region's economy on cross-border activities, as discussed by Feliu (2021).

The economic stagnation in the Eastern region also led to increased internal migration towards larger urban centers like Casablanca, Rabat, and Tangier. This migration exacerbated regional disparities, as these urban centers struggled to absorb the influx of migrants in terms of providing adequate housing, employment opportunities, and public services. Moreover, the tightening of border controls limited the ability of local businesses to diversify their economic activities, further deepening the region's economic challenges.

Beyond economic activity, the decline in cross-border trade and reduced economic opportunities have also had a social impact. Many households in the Eastern region have faced declining income levels, increased dependence on remittances, and growing social inequalities. The reliance on seasonal or informal employment has created a precarious economic environment, leaving the region more exposed to external shocks.

Looking ahead, addressing these disparities requires targeted development strategies. Policies that promote economic diversification, enhance formal trade opportunities, and foster industrial development could help stabilize the region's economy. Additionally, expanding infrastructure and creating incentives for investment in less developed regions are critical to reducing dependence on informal economies and mitigating migration pressures.

Urbanization and Population Growth

Southern regions, such as Dakhla-Oued Ed-Dahab and Laâyoune-Sakia El Hamra, have shown remarkable growth in urbanization rates, reaching 95.2% and 89.7%, respectively, in 2024. This significant urbanization can be attributed to large-scale development projects supported by the Moroccan government. These projects include the expansion of ports, the construction of major road networks, and the establishment of economic zones, all of which

have attracted populations to urban centers in these desert regions (Gallup, 2022).

The success of these government initiatives highlights their commitment to fostering balanced development across Morocco's regions. By investing in southern areas historically characterized by low population densities and challenging living conditions, the government has managed to transform them into hubs of economic activity and improved quality of life. Urban centers like Dakhla and Laâyoune now serve as critical economic and administrative nodes, offering better job opportunities, education, healthcare, and infrastructure.

However, this rapid urbanization also presents significant challenges. The influx of people to these cities puts considerable pressure on their ability to provide essential services such as housing, clean water, sanitation, and reliable transportation systems. Moreover, the concentration of economic activities in a few urban centers risks creating inequalities between cities and the surrounding rural areas, which often remain underdeveloped.

The environmental sustainability of such rapid urban growth is another concern. In desert regions like Dakhla and Laâyoune, resources such as water are already scarce. The increased demand from a growing urban population could exacerbate these challenges, making resource management and environmental planning crucial for long-term sustainability.

Looking forward, ensuring the success of these urban centers will require comprehensive planning. Expanding public services, building affordable housing, and investing in sustainable infrastructure are essential to accommodate the growing urban population. Additionally, focusing on rural development in nearby areas could help balance regional growth and reduce migration pressures on urban centers.

Education and Literacy

Between 2014 and 2024, Morocco achieved significant progress in education and literacy rates across most regions, largely driven by government initiatives and targeted programs. In southern regions such as Laâyoune-Sakia El Hamra and Dakhla-Oued Ed-Dahab, school

enrollment rates increased notably, reaching 87.5% and 85%, respectively, in 2024. These improvements are the result of policies focusing on expanding access to education in remote areas, including the construction of schools and the provision of transportation for students (UNESCO, 2020).

National programs like the National Initiative for Human Development (INDH) played a pivotal role in reducing illiteracy and improving school enrollment rates, especially for girls. This was achieved through literacy programs and the establishment of Dar Taliba (boarding homes for female students) in rural and remote areas. These facilities provided secure accommodation and essential support for female students, enabling them to continue their education and reducing dropout rates significantly in disadvantaged regions.

Urban regions such as Casablanca-Settat and Rabat-Salé-Kénitra maintained high school enrollment rates, improving from 88.5% and 87.2% in 2014 to 91% and 89.8% in 2024, respectively. This reflects a robust educational infrastructure and government focus on enhancing access and quality of education. However, rural regions like Drâa-Tafilalet and Béni Mellal-Khénifra, despite some progress, still face challenges, with school enrollment rates and literacy improvements lagging behind urban counterparts.

On the literacy front, Morocco recorded a steady decline in illiteracy rates nationwide. In 2014, illiteracy rates in rural regions such as Drâa-Tafilalet and Béni Mellal-Khénifra were as high as 34.5% and 34.2%, respectively. By 2024, these figures dropped to 29% and 28.5%, attributed to adult literacy programs and educational outreach led by social welfare organizations and public initiatives. In urban areas like Casablanca-Settat, literacy rates improved from 19.6% to 15.2%, demonstrating the effectiveness of targeted interventions, especially for women and marginalized groups (Hanushek & Woessmann, 2020).

Moreover, initiatives by social welfare institutions contributed significantly to addressing educational disparities. Programs providing incentives for school attendance, scholarships, and infrastructure improvements ensured bet-

ter access to education for vulnerable populations. The focus on empowering women and girls through these efforts had a transformative effect, particularly in rural areas.

Despite these achievements, challenges persist. Limited school access, insufficient teacher training, and cultural barriers continue to affect rural areas disproportionately. Dropout rates remain high in economically struggling regions, where families often prioritize labor over education. Moving forward, equitable distribution of resources, expansion of programs like Dar Taliba, and integrating digital learning tools can bridge the urban-rural divide and sustain progress in education and literacy.

Unemployment and Economic Activity: Interconnected Challenges and Deep-Rooted Impacts

Between 2014 and 2024, Morocco faced significant economic and social challenges, characterized by rising unemployment and declining economic activity across most regions. These intertwined issues highlight the combined effects of global crises and limited economic diversification at the national level. Regional disparities further underscore the uneven distribution of development, infrastructure, and opportunities between urban and rural areas.

In rural regions such as Drâa-Tafilalet and the Eastern Region, the decline in economic activity was pronounced. This decline is attributed to the heavy reliance on agriculture, which remains highly vulnerable to climate variability and water scarcity, and the absence of alternative industries to stimulate local economies. In the Eastern Region, the closure of borders with Algeria and the reduction of informal trade with Melilla further exacerbated economic stagnation, leaving many households without viable income sources (Feliu, 2021).

Urban centers like Casablanca-Settat and Rabat-Salé-Kénitra, while economically stronger, also faced structural issues. The economic activity rate in Casablanca dropped due to slower industrial growth and reduced foreign investments. Meanwhile, unemployment among youth and recent graduates in these regions remained persistently high, reflecting a

mismatch between the education system and labor market needs (Hanushek & Woessmann, 2020).

Southern regions, such as Dakhla-Oued Ed-Dahab and Laâyoune-Sakia El Hamra, managed to maintain relatively better economic activity rates, supported by state-led development projects in renewable energy and logistics. However, even these regions saw a decline, demonstrating the limitations of large-scale projects when not accompanied by broader economic diversification and local job creation initiatives.

The interplay between unemployment and declining economic activity reflects systemic weaknesses in Morocco's economic structure. Persistent regional disparities, reliance on a few economic sectors, and inadequate infrastructure in rural areas have limited the country's ability to adapt to external shocks, such as inflation, global trade disruptions, and the lingering effects of the COVID-19 pandemic.

Addressing these intertwined challenges requires strategic interventions that focus on regional economic diversification, vocational training tailored to local needs, and enhanced investment in infrastructure. Promoting balanced regional development and integrating marginalized communities into the labor market will be key to reversing these trends and fostering sustainable growth.

Socioeconomic Projections in Morocco (2014-2030): An ARIMA Model Analysis Amid Global Challenges

The ARIMA (AutoRegressive Integrated Moving Average) model is a powerful statistical tool for forecasting time-series data by analyzing historical trends and extrapolating them into the future. This model is particularly useful for understanding the dynamics of Morocco's socioeconomic indicators between 2014 and 2024, while also projecting potential

outcomes to 2030 under current conditions. The analysis considers the impacts of global economic crises, the ongoing consequences of the COVID-19 pandemic, rising geopolitical tensions, and inflationary pressures in major economies. These factors have reshaped global and national economies, particularly for countries like Morocco, which face vulnerabilities in critical areas such as economic activity, unemployment, and urbanization. This study highlights how Morocco's socioeconomic trajectory may continue under the current circumstances if no significant interventions are implemented.

Explaining the ARIMA Model

The ARIMA model, which integrates Auto-Regressive (AR), Integrated (I), and Moving Average (MA) components, has been applied to analyze Morocco's demographic and socio-economic trends. This model utilizes historical data from Morocco's High Commission for Planning (HCP) and international databases to simulate future scenarios, assuming no major policy shifts or significant global changes. The analysis highlights potential trends in economic activity, unemployment, and urbanization, providing valuable insights for policymakers.

To provide a comprehensive analysis, we will focus on specific regions as representative models, including Casablanca-Settat, Drâa-Tafilalet, and the Eastern Region. These regions showcase diverse socio-economic dynamics, allowing us to draw broader conclusions about national trends. The model forecasts a decline in economic activity rates nationally and regionally, with urbanization continuing to rise, especially in the southern regions. Unemployment challenges persist, particularly among youth and in vulnerable regions. The following tables summarize the key projections derived from the ARIMA analysis.

Table 3. Projected Economic Activity Rates (National and Regional)

Region	2014	2024	2030 (Projected)
National	47.6%	41.6%	39.5%
Drâa-Tafilalet	39.8%	34.5%	28.3%
Casablanca-Settat	50.7%	44.0%	42.0%
Eastern Region	44.3%	37.6%	34.5%

Table 4. Projected Unemployment Rates (National and Regional)

Region	2014	2024	2030 (Projected)
National	16.2%	21.3%	22.7%
Casablanca-Settat	16.3%	18.8%	19.5%
Eastern Region	21.5%	30.4%	33.3%
Drâa-Tafilalet	15.5%	22.2%	24.8%

Table 5. Projected Urbanization Rates (National and Regional Trends)

Region	2014	2024	2030 (Projected)
National	60.4%	62.8%	65.5%
Dakhla-Oued Ed-Dahab	92.0%	95.0%	98.5%
Laâyoune-Sakia El Hamra	88.0%	90.0%	93.8%
Casablanca-Settat	78.0%	80.0%	83.2%

These projections emphasize the continued urbanization trend, with regions like Dakhla-Oued Ed-Dahab and Laâyoune-Sakia El Hamra leading in growth due to targeted infrastructure investments. Conversely, economic activity rates are projected to decline, reflecting the cumulative effects of global economic challenges and structural issues in rural economies. Unemployment is expected to rise nationally and regionally, highlighting the urgent need for interventions to address labor market mismatches and promote economic diversification.

Recommendations Based on ARIMA Projections

Economic diversification remains a cornerstone for Morocco's sustainable growth, necessitating investments in key sectors such as renewable energy, agribusiness, and digital services. Supporting small and medium-sized enterprises (SMEs) in rural areas can foster job creation and reduce regional disparities. Labor market reforms should emphasize vocational training aligned with market demands and incentivize private sector investments in underdeveloped areas through tax breaks and improved infrastructure. Urban planning must address the needs of a growing population, particularly in southern cities, by strengthening infrastructure and embedding sustainable practices, including renewable energy and resource efficiency.

Infrastructure development remains a cornerstone for sustainable economic growth in emerging economies. (Oberman, Dobbs, &

Manyika 2023) emphasize that addressing the infrastructure gap through targeted investments in transportation, energy, and digital connectivity can significantly reduce regional disparities. They argue that a comprehensive approach combining public-private partnerships and innovative financing mechanisms is crucial for sustaining long-term development. By prioritizing critical infrastructure projects, governments can improve access to markets, enhance productivity, and promote inclusive growth across all regions.

Between 2014 and 2024, Morocco experienced significant changes in demographic, social, and economic indicators. While progress has been made, regional disparities persist, primarily due to unequal access to infrastructure, healthcare, education, and economic opportunities. Initiatives like the National Initiative for Human Development (INDH) have shown potential in reducing inequalities through localized and participatory programs. However, rural areas, particularly in northern and interior regions, continue to face challenges like high unemployment and limited access to quality services, necessitating tailored strategies and enhanced governance.

The southern regions, such as Laâyoune-Sakia El Hamra and Dakhla-Oued Ed-Dahab, highlight the success of targeted investments in infrastructure, driving urbanization and economic activity. These cases demonstrate the transformative impact of focused regional development. Comparative insights from North African neighbors, such as Tunisia and Egypt,

underscore the importance of integrating inclusive social policies with infrastructure projects. Morocco's balanced approach provides a robust model for regional development but can benefit further by aligning with international best practices, like Tunisia's focus on regional industrial zones.

Moving forward, Morocco's trajectory must prioritize diversification in rural economies, promote SMEs, and invest in human capital development. Leveraging digital tools, such as GIS, for data-driven decision-making will improve policy efficiency. By implementing sustainable and inclusive policies, Morocco can address disparities, foster regional equity, and ensure cohesive national development that leaves no region behind.

Conclusion

The comparative analysis of regional disparities in Morocco's social and demographic indicators between the 2014 and 2024 censuses reveals both significant progress and persistent challenges. Urban centers like Casablanca-Settat and Rabat-Salé-Kénitra have demonstrated notable improvements in population density, literacy, and economic activity, benefiting from targeted investments and policies. Conversely, rural areas and underdeveloped regions such as Drâa-Tafilalet and Béni Mellal-Khénifra continue to face barriers like high unemployment, limited access to quality education and healthcare, and inadequate infrastructure, which deepen the socio-economic divide.

These findings highlight the uneven distribution of development benefits, where urban hubs attract resources and talent while rural regions struggle with stagnation. Although rapid urbanization in southern regions, including Dakhla-Oued Ed-Dahab and Laâyoune-Sakia El Hamra, reflects the success of government-led initiatives, it also underscores the need for sustainable planning to address pressures on urban infrastructure and services, such as housing, transportation, and water supply.

Infrastructure and street access play a critical role in determining the level of development in urban and peri-urban areas. (Betten-court & Marchio 2023) highlight the strong

correlation between street accessibility, informality, and socio-economic development at the block level in sub-Saharan Africa. Their analysis underscores how inadequate street networks can perpetuate social exclusion and hinder access to essential services, thereby exacerbating regional disparities. By improving street connectivity and formalizing informal settlements, policymakers can foster more inclusive and sustainable urban development

Initiatives like the National Initiative for Human Development (INDH) have shown potential in reducing inequalities through localized and participatory programs. However, rural areas, particularly in northern and interior regions, continue to face challenges like high unemployment and limited access to quality services, necessitating tailored strategies and enhanced governance. The advanced regionalization project in Morocco has been instrumental in reducing regional disparities and promoting sustainable human development. Despite improvements observed at the regional and provincial levels, significant inequalities persist at the communal level. To address these disparities, it is crucial to enhance local governance, increase targeted investments, and ensure effective coordination among various stakeholders, including the public and private sectors. By focusing on micro-level development and promoting spatial equity, Morocco can achieve a more balanced regional development and accelerate its progress toward the Sustainable Development Goals (SDGs). Future policies should emphasize the importance of spatial planning and targeted support for underdeveloped areas to foster inclusive growth (Ibourk & Raoui, 2021).

To bridge these disparities, an integrated development approach is critical. Recommendations include diversifying rural economies to reduce dependency on agriculture, improving access to education and healthcare through targeted programs, and strengthening infrastructure to connect remote areas with urban centers. Sustainable and inclusive development in economically left-behind regions requires tailored policy approaches that combine social, environmental, and economic dimensions. Key strategies include fostering place-based innovation, enhancing local governance, and

promoting equitable access to resources and opportunities. By addressing the unique challenges faced by marginalized areas, these strategies can bridge regional disparities and contribute to national cohesion. Furthermore, integrating sustainability principles into local economic development can ensure long-term resilience and stability in these regions (Benner, Tripl, & Hassink, 2024). Encouraging public-private partnerships and fostering small and medium-sized enterprises (SMEs) can also stimulate local economies and create sustainable employment opportunities.

Measuring development in rural areas requires a holistic approach that integrates various dimensions such as economic performance, social inclusion, and environmental sustainability. (Abreu, Mesias, & Ramajo 2021) propose a participatory framework for constructing a development index that actively involves local stakeholders. This approach not only enhances the accuracy of development metrics but also fosters community engagement, ensuring that policies and interventions are tailored to the specific needs of rural populations. By adopting such participatory methodologies, governments and development agencies can better address regional disparities and promote inclusive growth in disadvantaged areas

The study underscores the value of Geographic Information Systems (GIS) and advanced statistical tools in understanding spatial patterns and informing evidence-based policies. By leveraging these tools, policymakers can better allocate resources and prioritize interventions to maximize their impact. Projections using the ARIMA model provide a forward-looking framework to anticipate future trends and adapt strategies accordingly.

As Morocco advances toward its sustainable development goals, addressing regional inequalities must remain central to its agenda. Balanced regional development is essential not only for promoting social equity but also for enhancing national cohesion and economic resilience. This study offers actionable insights to guide policymakers and development practitioners in adopting inclusive, data-driven approaches. By prioritizing equitable growth and ensuring that no region is left behind, Morocco

can pave the way for a more cohesive and prosperous future.

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