

Algeria's path to sustainable development: A comprehensive evaluation of key indicators (2011-2020)



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Abstract:

This study offers a holistic analysis of sustainable development in Algeria, examining its economic, social, and environmental indicators over the period from 2011 to 2020. Drawing on an extensive dataset, this analysis evaluates Algeria's progress toward sustainable development, revealing a general downturn in economic and environmental indicators, contrasted with social gains. These findings indicate that, despite numerous policy initiatives intended to advance sustainability, Algeria remains distant from realizing its sustainable development objectives. The metrics underscore the necessity for effective development strategies in the face of inadequate existing policies.

Keywords: Sustainable Development; Economic Indicators; Social Indicators; Environmental Indicators.

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Introduction:

Development has become a fundamental aspect of national policy for countries seeking macroeconomic stability, evolving over recent decades to prioritize sustainability. This shift, influenced by Western policy changes, was highlighted by the Brundtland Commission in 1987, which emphasized the need for sustainable resource management to meet present and future needs. The concept gained further prominence at the 1992 Earth Summit in Rio de Janeiro, where important treaties on biodiversity and climate change were established alongside Agenda 21, a comprehensive research agenda. This focus was reaffirmed at the 2002 Johannesburg Earth Summit, which reviewed progress and reinforced global commitments to sustainable growth. In line with these global trends, Algeria has pursued sustainability-oriented reforms, implementing macroeconomic policies to achieve balanced development. Despite these efforts, Algeria continues to face challenges related to its transition to a market economy and various economic, social, and environmental pressures. Addressing these issues requires Algeria to enhance its economic strategies, aligning them with international standards through well-planned and definitive programs.

Research Problem

This study evaluates sustainable development in Algeria from 2011 to 2020, examining economic indicators like GDP growth and diversification, social factors including education and healthcare, and environmental metrics such as resource management and pollution control. It assesses the effectiveness of these initiatives, highlighting progress and identifying gaps in achieving sustainable outcomes. The central research question is: **To what extent have Algeria's sustainable development metrics been realized during this period?**

Hypotheses

Drawing from the research question, the study advances the following hypotheses:

1. Algeria has undertaken significant initiatives to promote sustainable development.
2. Algeria has achieved demonstrable economic progress within the sphere of sustainable development.

Objectives

- To conduct an analysis of Algeria's progress toward achieving sustainable development goals over the 2011-2020 period.
- To identify and quantify indicators that assess Algeria’s sustainable development, including GDP growth, economic diversification, educational attainment, healthcare standards, poverty rates, resource conservation, and metrics for environmental pollution.

- To determine areas within the sustainable development agenda where objectives remain unmet.
- To emphasize the importance of natural resource preservation and environmental stewardship to sustainable development.

Research significance

The significance of this study lies in its focus on identifying measurable indicators to assess Algeria’s progress in achieving the economic, social, and environmental dimensions of sustainable development. By elucidating the extent of achievement across these dimensions, the study contributes to a critical evaluation of Algeria’s efforts in advancing comprehensive sustainable development.

Methodology

This research employs a descriptive approach, engaging with theoretical constructs of sustainable development and examining key performance indicators. The study is organized into three primary sections: the first presents the conceptual framework for sustainable development; the second examines Algeria’s strategic efforts in pursuing sustainability objectives; and the third offers a detailed analysis of the country’s sustainable development indicators during the period from 2011 to 2020.

1. Conceptual framework of sustainable development

a. Origins of Sustainable Development

The first inquiries into the environmental impacts of human advancement and resource exploitation surfaced over two centuries ago, with early reflections dating back to 1798 (Paul, 2008, p. 576). Sustainable development has since undergone several key developments through various landmark events, including:

- **The 1972 Stockholm Conference:** This United Nations conference on the human environment explored the link between environmental issues and global disparities in poverty and underdevelopment, emphasizing environmental concerns as a core component (Bouhjela, 2015, p. 73).
- **The 1992 Earth Summit:** As the most significant international summit of its time, it was the first event where heads of state convened to discuss global environmental issues. The summit, attended by 116 heads of state and over 8,000 delegates, alongside 3,000 NGOs in parallel sessions, sought to establish the foundational principles and action plans for future sustainable development. Its primary output was *Agenda 21*, a comprehensive document detailing the critical issues, stakeholders, and mechanisms required to achieve sustainable development into the 21st century (Kazi, John, & John, 2012, p. 30).

- **The 2002 Johannesburg Summit:** Building on earlier commitments, this summit emphasized actionable measures to support global implementation of prior environmental agreements, specifically targeting climate protection, biodiversity conservation, and a renewed commitment to combat desertification (Speth, 2003, p. 26).
- **The 2012 High-Level Political Forum:** Structured with limited authority and resources, this forum aims to enhance coordination and exert a substantive influence on sustainable development initiatives worldwide (Kenneth & Steven, 2015, p. 222).

b. Definition of Sustainable Development

Despite its widespread recognition and focus on human-environment equilibrium, sustainable development lacks a universally standardized definition (Beloura, Bousalem, & Beloura, 2017, p. 122). Introduced in 1980 by the International Union for Conservation of Nature, it gained prominence with the 1987 Brundtland Report, "Our Common Future," under the United Nations. This report describes sustainable development as meeting present needs without compromising future generations' ability (Al-Jabouri & Abdo, 2019, p. 153). Various definitions have since emerged, reflecting different perspectives—economic, social, or environmental (Mayeh & Ali, 2018, p. 148). The 1992 Rio Declaration's Principle 3 describes it as balancing developmental and environmental needs for current and future generations, while Principle 4 emphasizes that environmental protection is fundamental to development and should not be isolated (Khenfri & Bournissa, 2016, p. 169).

c. Dimensions of Sustainable Development

The Earth Summit’s Commission on Sustainable Development identified over 130 sustainable development indicators across four core dimensions: economic, social, environmental, and technological (Hammama & Ben Aoun, 2020, p. 39). Yet, scholars widely agree on three fundamental, interdependent dimensions—economic, social, and environmental—that focus on optimizing resource use and environmental protection (Satouri, 2016, p. 301). These dimensions are defined as follows:

- **Economic Dimension:** Focuses on continuous production of goods and services, aiming for high income that supports resource renewal and maintenance. It emphasizes sustainable growth, capital efficiency, economic equity, and meeting basic needs (Behlouli & Boudiaf, 2020, p. 234)
- **Environmental Dimension:** Prioritizes conserving natural resources to maintain viable ecosystems for future generations. Sustainable practices include minimizing resource use, utilizing recyclable and renewable materials, and responsible management to lessen environmental impact (Khenchoul, 2018, p. 76)

- **Social Dimension:** Aims to improve human well-being by enhancing access to healthcare, education, and security, while promoting human rights, cultural diversity, and inclusive participation in decision-making processes for sustainable social development (LOUKRIZ & KEZZAR, 2020, p. 341)

2. Algeria’s Initiatives in Sustainable Development

Over the past years, Algeria has pursued extensive initiatives in sustainable development through a range of policies, programs, and interventions aimed at fostering sustainable development across various sectors. Central to these efforts are economic recovery programs, which include:

- **Economic Support and Recovery Plan (PSRE, 2001-2004):** With an allocated budget of \$7 billion, this program aimed to complete ongoing projects, rehabilitate and maintain critical infrastructure, launch new initiatives, and strengthen national production capacities through strategic resource allocation (Saba, 2010, p. 147).
- **Complementary Growth Support Program (PCSC, 2005-2009):** With a \$200 billion budget, this foundational program aimed to address regional disparities by modernizing transport infrastructure, addressing water resource challenges, and improving citizens' living standards through healthcare, education, and public services. The program also sought to enhance public infrastructure and maintain equitable development across Algeria (Boufli, 2012, p. 255).
- **Five-Year Development Plan (2010-2015):** With a total budget of \$286 billion, this program aimed to achieve a qualitative leap in all sectors by leveraging the infrastructure developed in previous programs to create wealth, generate employment, and improve living standards. It particularly focused on the High Plateaus and southern regions, enhancing sectors critical to economic growth and living conditions such as housing, healthcare, and education
- **New five-year Growth Program (2015-2019):** Implemented as an extension of the previous five-year program, this initiative emphasized the enhancement of infrastructure, improvement of public services, and strengthening of Algeria’s economic capacity (Satouri, 2016, p. 305).
- **Five-Year Development Plan (2010-2016):** Algeria allocated \$262 billion to this plan, which focused on several key pillars: developing the national economy, upgrading and enhancing public services, improving governance, and promoting participatory democracy. The overall objective of the plan was to strengthen Algeria's economic resilience in the face of the global economic crisis at that time (Bouasida & Mansouri, 2018, p. 250).

To advance sustainable development, the Algerian government has set up key institutions like the National Fund for the Environment and Pollution Elimination (FENEP), the Special Fund for the Development of Southern Regions (FSRS), and the National Fund for Coastal and Marine Protection. These entities are supported by environmental levies, which include environmental taxes, fees for pollution and hazardous activities, charges for solid waste management, and specific taxes on air and industrial emissions (Bouasida & Mansouri, 2018, p. 251).

3. Analysis of Sustainable Development Indicators in Algeria (2011-2020)

Sustainable development indicators are crucial for evaluating progress in economic, social, and environmental domains. These metrics help set priorities and measure advancement towards a nation’s sustainable development goals.

Economic Indicators: These include various secondary metrics that reveal the structural characteristics of Algeria’s economy, providing a detailed view of the effects of government development initiatives.

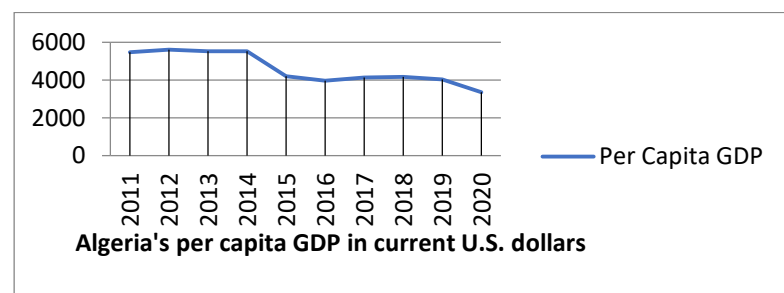
- **Per Capita Gross Domestic Product (GDP) in Algeria (2011-2020):** This metric measures the average economic output per person, calculated by dividing the total GDP by the population size.

Table 1: Algeria's Per Capita GDP (in current US dollars, 2011-2020)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Per Capita GDP	5473	5611	5520	5516	4197	3967	4135	4171	4022	3354

Source: based on data from the World Bank, accessed on May 12, 2022, at 8:00 PM. <https://data.albankaldawli.org>

Figure 1: Algeria’s Per Capita GDP from 2011 to 2020



Source: based on Table 1.

Figure 1 illustrates a consistent decline in Algeria's per capita GDP from \$5,473 in 2011 to \$3,354 in 2020, largely due to downturns in the hydrocarbon sector and volatile oil prices, given the country's heavy reliance on oil and gas exports. The decrease, particularly marked after 2017, is compounded by global oil

market fluctuations and the vulnerability of other economic sectors like agriculture and manufacturing, highlighting structural weaknesses in Algeria's economy.

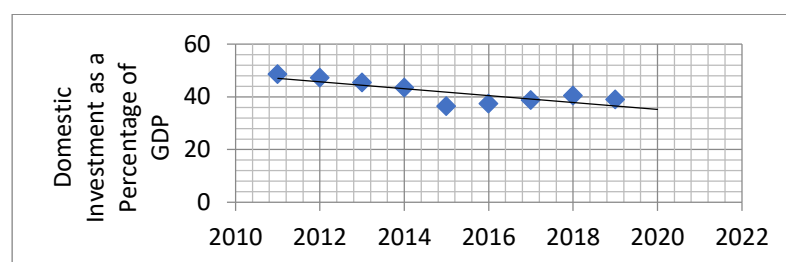
- **Domestic Investment as a Percentage of GDP:** The domestic investment-to-GDP ratio is a key indicator of economic dynamism. A rising ratio signals strong investment activity, reflecting a favorable environment for business growth and capital formation.

Table 2: Domestic Investment as a Percentage of GDP in Algeria (2011-2019)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Investment Ratio	48.49 %	47.19 %	45.37 %	43.35 %	36.41 %	37.37 %	38.69 %	40.36 %	38.85 %

Source: based on data from the World Bank, accessed on May 12, 2022, at 11:00 PM.

Figure 2: Domestic Investment as a Percentage of GDP in Algeria from 2011 to 2020



Source: based on Table 2.

Figure 2 illustrates significant fluctuations in Algeria's domestic investment to GDP ratio from 2011 to 2019. Starting at a high of 48.49% in 2011, the ratio declined steadily, reaching a low in 2017, then slightly rebounded to 38.69% in 2018, and settled at 38.85% in 2019. These changes reflect the Algerian economy's vulnerability to external shocks, particularly from sustained low oil prices—a key revenue source. Austerity measures, driven by fiscal limitations, led to reduced public spending, impacting investment ratios. Other contributing factors include political and economic instability, which raised doubts about long-term economic reforms, and weaknesses in the financial and infrastructure sectors, hindering domestic investment.

- **Gross Savings (GSR) as a Percentage of GDP:** This metric measures total savings as a share of economic output, highlighting the nation's ability to finance investments and support sustainable growth..

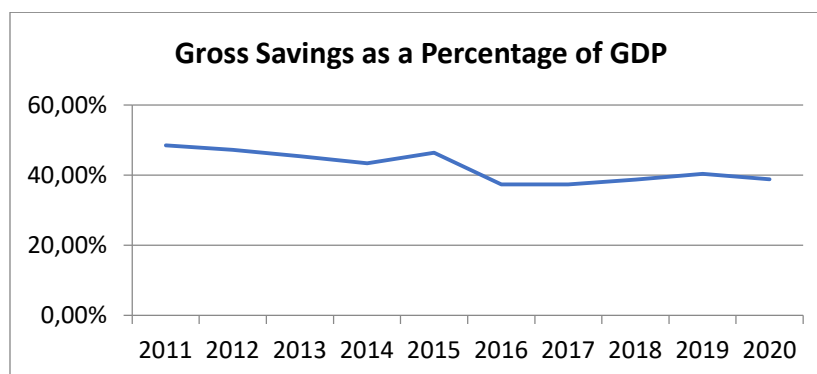
Table 3: GSR as a Percentage of GDP in Algeria (2011-2019)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019
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GSR (% of GDP)	48.49	47.19	45.37	43.35	36.41	37.37	38.69	40.36	38.85
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Source: bases on data from the World Bank, accessed on May 12, 2022, at 11:30 PM. <https://data.albankaldawli.org>

Figure 3: GSR as a Percentage of GDP in Algeria, 2011–2020



Source: based on Table 3.

Figure 3 illustrates a persistent decline in Algeria’s GSR as a share of GDP, starting from a peak of 48.49% in 2011. This downward trend stabilized briefly in 2017 and 2018, reaching 40.36% in 2018, before resuming its decline to 38.85% in 2019. This overall decrease can be attributed to sustained low oil prices, which constrained national revenue, alongside the implementation of austerity policies that suppressed household incomes. Additionally, the reduction reflects shifts in economic and savings patterns within Algeria over the study period.

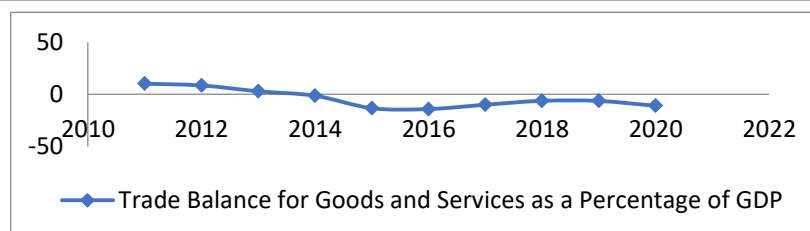
- **Trade Balance for Goods and Services as a Percentage of GDP:** This indicator tracks the export-import ratio relative to GDP. A positive balance indicates exports exceed imports, while a negative balance indicates a trade deficit.

Table 4: Trade Balance as a Percentage of GDP in Algeria (2011-2020)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Trade Balance (% of GDP)	10.1	8.37	2.8	-1.43	-13.35	-14.18	-10.05	-6.32	-6.43	-11.04

Source: based on WB data, accessed on May 13, 2022, at 9:00 PM. <https://data.albankaldawli.org>

Figure 4: Trade Balance as a Percentage of GDP in Algeria,



Source: based on Table 4.

Figure 4 shows Algeria's trade balance, which recorded a surplus from 2011 to 2013, decreasing from 10.10% in 2011 to 2.80% in 2013, driven by rising oil revenues. From 2014, the balance turned into a deficit, reaching -14.18% in 2016, influenced by a 54% drop in oil prices from 2011 to 2015 that slashed export revenue. The trade balance improved slightly in 2018 to -6.32%, but worsened to -11.04% by 2020. This persistent deficit results from Algeria’s reliance on hydrocarbon exports and continued developmental programs (the PSRE 2010-2014 and PCSC for 2015-2019) amidst fiscal challenges and corruption issues.

- **External Debt as a Percentage of GDP (2011-2020):** This ratio offers insights into the country's debt sustainability and its ability to meet international financial obligations.

Table 5: External Debt as a Percentage of GDP in Algeria (2011-2020)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
External Debt (% of GDP)	3.05	2.68	2.55	2.64	2.89	3.44	3.40	3.33	3.28	3.65

Source: Based on World Bank data, accessed on May 13, 2022, at 9:35 PM. <https://data.albankaldawli.org>

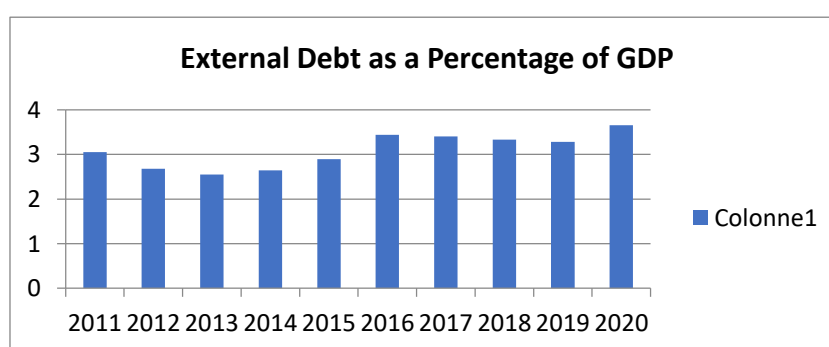


Figure 5: External Debt as a Percentage of GDP in Algeria, 2011–2020

Source: based on Table 5.

Figure 5 reveals a decline in Algeria’s external debt-to-GDP ratio from 3.05% in 2011 to a low of 2.55% in 2013. However, the ratio gradually increased thereafter, reaching 3.65% in 2020. This consistent range, fluctuating between 2.64% and 3.65%, reflects Algeria’s ability to manage its external debt, a stability supported by elevated GDP levels resulting from higher oil prices in the earlier part of the period.

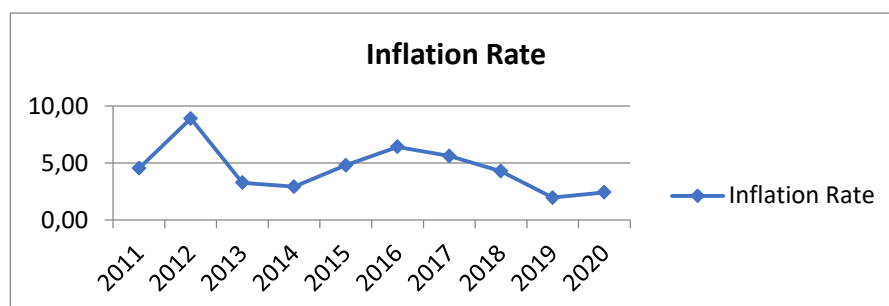
- **Annual Inflation Rate(AIR):** The AIR measures the yearly percentage increase in prices, indicating inflationary pressures that affect purchasing power and the cost of living.

Table 6: Annual Inflation Rate in Algeria (2011-2020)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Inflation Rate (%)	4.52	8.89	3.25	2.91	4.78	6.4	5.6	4.27	1.95	2.41

Source: Based on World Bank data, accessed on May 13, 2022, at 7:00 PM. <https://data.albankaldawli.org>

Figure 6: Annual Inflation Rate in Algeria, 2011–2020



Source: based on Table 6.

Figure 6 reveals fluctuations in Algeria’s inflation rate, with a peak of 8.89% in 2012, marking the highest rate during the study period. Following this peak, inflation declined to 2.91% in 2014, then rose to 6.4% in 2016, before tapering off to 2.41% by 2020.

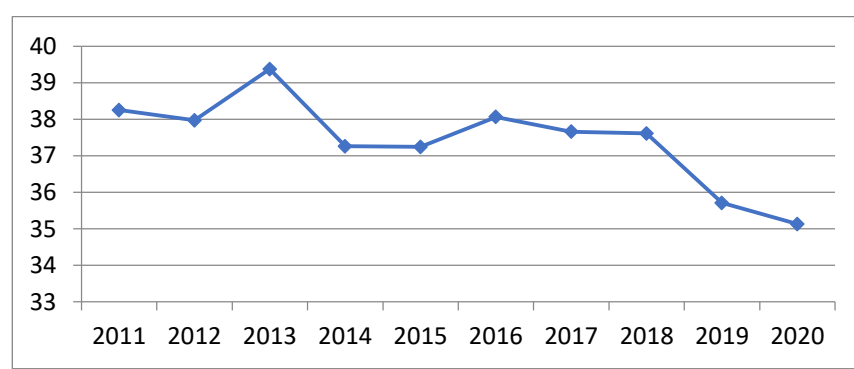
- **Employment-to-Population Ratio (+15):** The employment-to-population ratio for individuals aged 15 and older serves as a critical demographic indicator, measuring the proportion of the employed population within the total working-age cohort.

Table 7: Employment-to-Population Ratio (15+) in Algeria, 2011-2020

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Employment- R(%)	38.25	37.97	39.37	37.26	37.24	38.06	37.66	37.61	37.51	35.13

Source: based on World Bank data, accessed on May 13, 2022, at 19:45 PM.

Figure 7: Employment-to-Population Ratio (+ 15) in Algeria, 2011-2020



Source: based on Table 7.

The figure illustrates a consistent decline in Algeria's employment-to-population ratio, from a peak of 38.25% in 2011 to 35.13% by 2020. This trend underscores the limitations of Algeria's developmental initiatives in achieving substantial reductions in unemployment, particularly when assessed against regional and global standards. According to World Bank data, Algeria's average employment-to-population ratio for this period stood at 37.6%, markedly lower than the regional Arab average of 42.2% and the global average of 57.3%.

b. Social Indicators

Sustainable development relies on various social indicators that track societal advancement and improvements in individual well-being. Key social indicators relevant to sustainable development include the following:

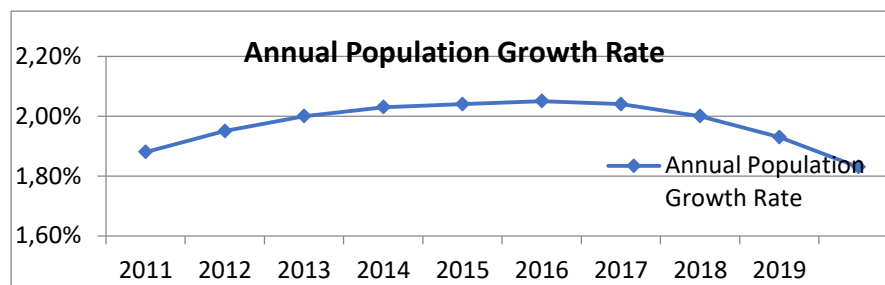
- **Annual Population Growth Rate:** This measures yearly population growth as a percentage by comparing the population size at the end of one year to the previous year. It helps understand demographic trends and their economic, social, and environmental impacts . .

Table 8: Annual Population Growth Rate in Algeria, 2011-2020

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
PG (%)	1.88	1.95	2.00	2.03	2.04	2.05	2.04	2.00	1.93	1.83

Source: Based on World Bank data, accessed on May 13, 2022, at 20:30 PM. <https://data.albankaldawli.org>

Figure 8: Annual Population Growth Rate in Algeria, 2011-2020



Source: based on Table 8.

Figure 8 reveals a gradual decline in Algeria's population growth rate from 2013 to 2020, despite the population continuing to grow throughout the decade. This trend highlights evolving demographic patterns, which introduce both challenges and opportunities for economic planning, social services, and infrastructure development. The declining growth rate can be partially attributed to changes in reproductive behavior, such as declining fertility rates influenced by increased female education, improved healthcare, expanded access to contraception, and shifts in societal norms and gender roles.

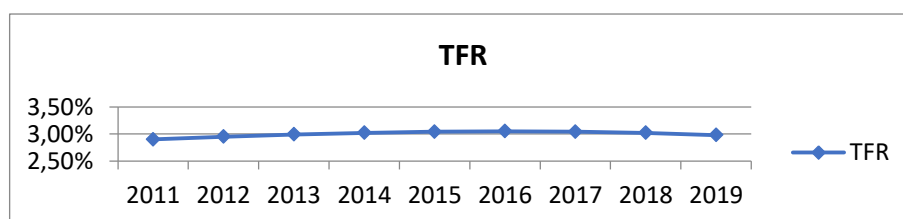
- **Total Fertility Rate (Births per Woman)** This represents the average number of children a woman would have over her lifetime, assuming current fertility rates stay constant. It is a key indicator for understanding reproductive patterns and demographic transitions.

Table 9: Total Fertility Rate (Births per Woman) in Algeria, 2011-2019

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Fertility Rate	2.909	2.952	2.990	3.022	3.043	3.052	3.045	3.023	2.988

Source:Based on World Bank data, accessed on May 13, 2022, at 22:00 PM. <https://data.albankaldawli.org>

Figure 9: Total Fertility Rate in Algeria, 2011-2019



Source: based on Table 9.

Figure 9 illustrates that the Total Fertility Rate in Algeria remained relatively stable during the study period, with a slight downward trend observed in the latter years. The TFR remained above the replacement level of approximately 2.1 births per woman, which is necessary to maintain a stable population. However, the gradual decline towards this threshold suggests changing economic and social conditions, such as improved access to education, evolving cultural values, and shifts in family planning preferences.

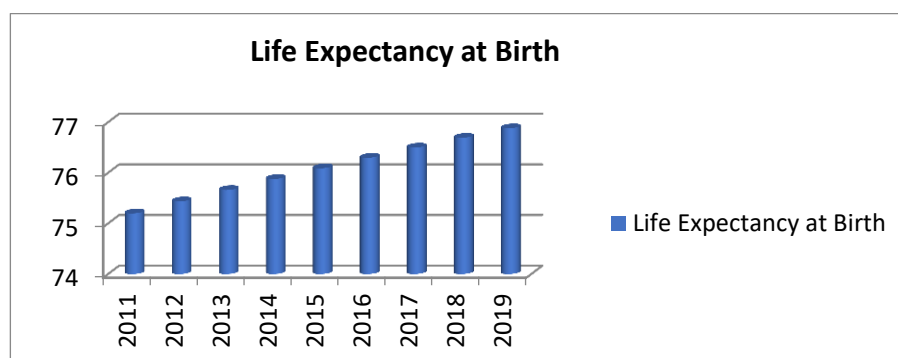
- **Life Expectancy at Birth:** Life expectancy at birth measures the average lifespan of newborns, reflecting health conditions and quality of life.

Table 10: Life Expectancy at Birth in Algeria, 2011-2019

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Life Expectancy (Years)	75.2	75.43	75.66	75.89	76.09	76.30	76.50	76.70	76.90

Source: Based on World Bank data, accessed on May 13, 2022, at 23:00 PM. <https://data.albankaldawli.org>

Figure 10: Life Expectancy at Birth in Algeria, 2011-2019



Source: based on Table 10.

Both the data and Figure 10 reveal a steady increase in life expectancy in Algeria, rising from 75.2 years in 2011 to a peak of 76.9 years in 2019, the highest recorded during the study period. This upward trend indicates significant advancements in healthcare, quality of life, and accessibility to essential services. Relative to global life expectancy benchmarks, Algeria demonstrates strong performance, underscoring its progress in bolstering public health outcomes and longevity.

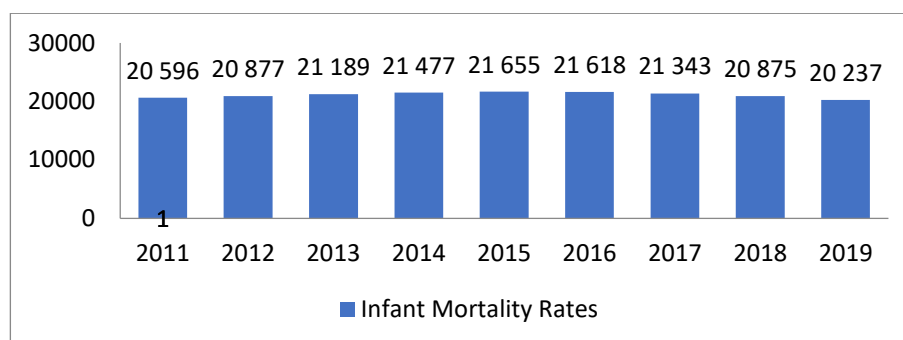
- **Infant Mortality Rate (IMR):** This measures the number of infants dying before their first birthday per 1,000 live births. It is a key indicator of pediatric healthcare quality and the overall health system's performance.

Table 11: Infant Mortality Rate in Algeria (2011-2019)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Infant Mortali ties	20,6	20,88	21,19	21,47	21,65	21,61	21,34	20,87	20,23

Source: Based on World Bank data, accessed on May 14, 2022.

Figure 11: Trends in Infant Mortality in Algeria (2011-2019)



Source:Based on Table 11.

Figure 11 illustrates a steady decline in Algeria’s IMR over the study period, reflecting notable improvements in healthcare access and service quality. As a critical indicator of maternal and child health, IMR reduction signals advancements in healthcare infrastructure and expanded access to essential services. Sustained efforts by government and healthcare institutions to strengthen maternal and child health services remain essential for further lowering IMR and supporting sustainable health outcomes.

- **Under-Five Mortality Rate (U5MR):** This metric measures the number of deaths of children under five per 1,000 live births, reflecting the quality of child healthcare and progress in public health.

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019
U5MR	26.7	26.2	25.8	25.5	25.2	24.8	24.3	23.8	23.3

Table 12: Under-Five Mortality Rate in Algeria (2011-2019)

Source:Based on World Bank data, accessed on May 16, 2022.<https://data.albankaldawli.org>

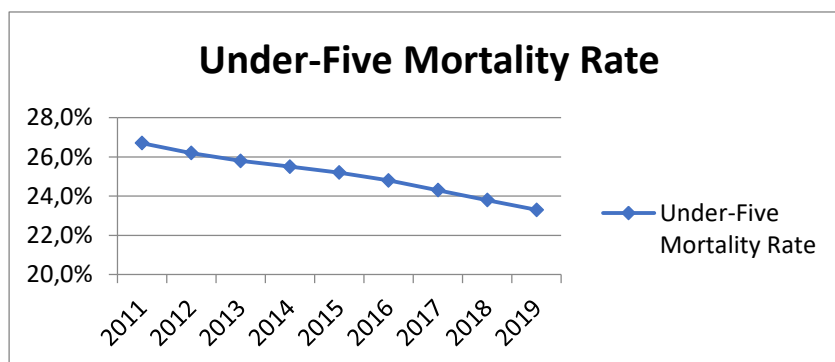


Figure 12: Decline in Under-Five Mortality Rate in Algeria (2011-2019)

Source: based on Table 12.

Figure 12 illustrates a steady decline in Algeria’s Under-Five Mortality Rate (U5MR) from 2011 to 2019, signaling notable advancements in child health outcomes and the strengthening of public health infrastructure. This downward trend suggests greater accessibility to essential healthcare services, particularly in maternal and preventive care, immunization programs, and early childhood interventions. Contributing factors likely include improvements in nutrition, housing conditions, and health education among families, all of which reinforce this positive development.

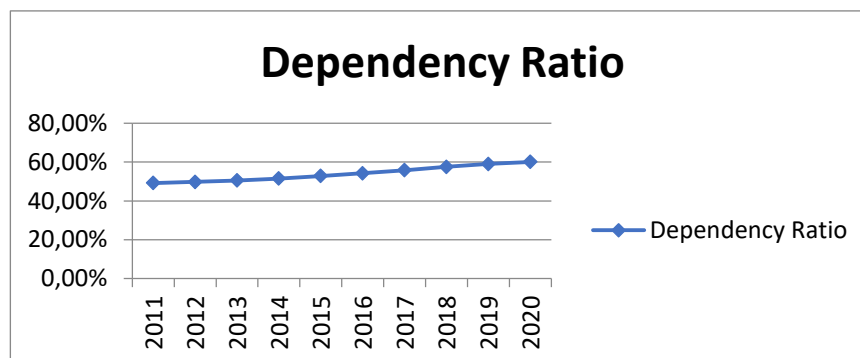
- **Dependency Ratio in Algeria:** This metric assesses the ratio of dependents (those outside the labor force) to the working-age population (those capable of contributing economically). It offers insights into the economic demands on the workforce and the support burden they carry.

Table 13: Dependency Ratio in Algeria (2011-2020)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Depen dency Ratio (%)	49.2	49.7 7	50.4 9	51.50	52.83	54.18	55.80	57.50	58.99	60.06

Source:Based on World Bank data, accessed on May 17, 2022.<https://data.albankaldawli.org>

Figure 13: Dependency Ratio Indicator in Algeria (2011-2020)



Source:Based on Table 13.

Figure 13 a steady increase in Algeria's dependency ratio, rising from 49.2% in 2011 to 60.06% in 2020, indicating a growing economic burden on the workforce. This increase is driven by limited job opportunities, declining employment rates, and slow economic growth, along with shortcomings in infrastructure and services like healthcare and education.

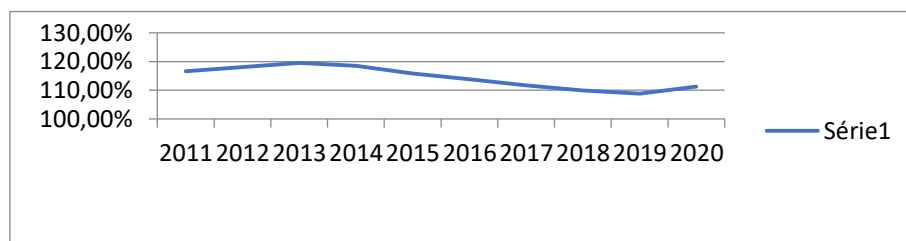
- **Primary School Enrollment Rate:** These metric measures total primary school enrollment, expressed as a percentage of the population within the official school age, and evaluates the educational system’s performance(El-Hout & El-Sayed, 2009, p. 8)

Table 14: Aggregate Primary School Enrollment Rate in Algeria (2011-2020)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Enrollment Rate (%)	116.57	118.08	119.54	118.50	115.88	113.83	111.76	109.88	108.85	111.28

Source:Based on World Bank data, accessed on May 20, 2022, at 23:00.<https://data.albankaldawli.org>

Figure 14: Aggregate Primary School Enrollment Rate in Algeria (2011-2020)



Source: based on Table 14.

The oscillations observed in Figure 14 over the study period can be attributed to a variety of influences including shifts in educational policies, economic conditions, and societal changes. It is noteworthy that the gross enrollment ratio exceeding 100 percent may reflect late or early school enrollment due to grade repetition or non-standard age school attendance.

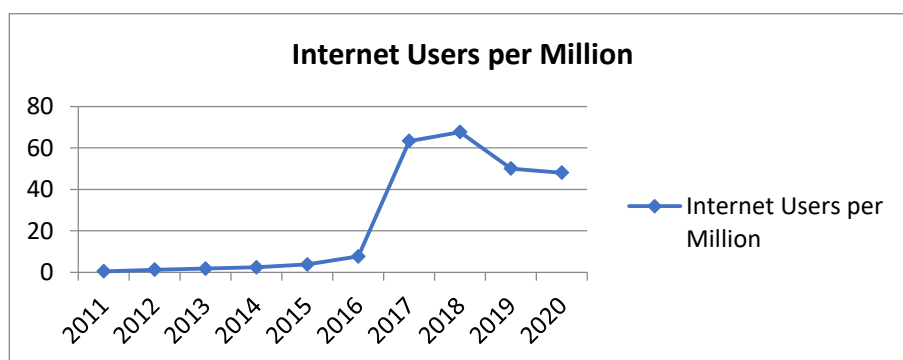
Internet Penetration per Million: This indicator delineates the number of internet users relative to the total population, scaled to per million, serving as a metric to gauge technological adoption and internet penetration within the community.

Table 15: Internet Users per Million in Algeria (2011-2020)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Users per Million	0.49	1.23	1.78	2.41	3.82	7.61	63.32	67.60	50.03	48.02

Source:Based on World Bank data, accessed on May 25, 2022, at 23:00.<https://data.albankaldawli.org>

Figure 15: Internet Users per Million in Algeria (2011-2020)



Source: Based on Table 15.

The statistics in Figure 15 illustrate a marked increase in internet usage in Algeria, particularly between 2016 and 2018, with a slight decline in subsequent years. This suggests an expanding integration of digital technology in various aspects of life, influenced by economic, cultural, and technological dynamics.

- **Urban Population Percentage:** This indicator evaluates the proportion of the total population residing in urban areas, providing insight into urbanization trends and demographic distribution across urban and rural areas.

Table 16: Urban Population as a Percentage of Total Population in Algeria (2011-2020)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Urban Population (%)	68.24	68.92	69.58	70.22	70.85	71.46	72.05	72.63	73.19	73.73

Source: Based on World Bank data, accessed on May 26, 2022, at 23:00. <https://data.albankaldawli.org>

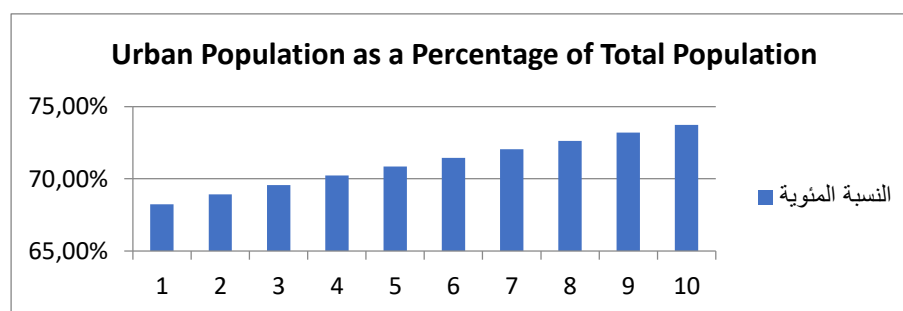


Figure 16: Urban Population Percentage in Algeria (2011-2020)

Source:Based on Table 16.

From 2011 to 2020, Algeria’s urban population increased from 68.24% to over 73.73%, indicating a steady urbanization trend. This increase highlights the need for improved urban infrastructure and services, requiring sustainable planning and balanced development strategies to accommodate the growing urban population. Strategic measures are essential to provide adequate employment, social services, and a healthy environment for urban sustainability.

c. Environmental Indicators:Environmental indicators are crucial for monitoring sustainable development and assessing the impact of socio-economic activities on the environment. They guide necessary actions for environmental conservation and sustainability enhancement. Key indicators for Algeria include:

- **Carbon Dioxide Emissions per Capita (Metric Tons):** This indicator varies by country based on factors like energy consumption, sources, infrastructure, lifestyle, and environmental policies, making a standard benchmark for emissions impractical.

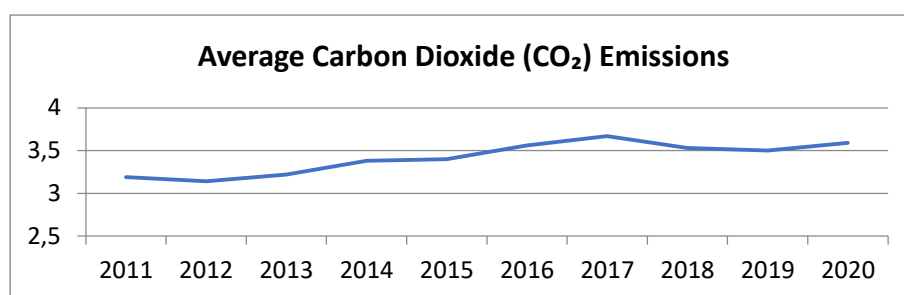
Table 17:Algeria's CO₂ Emissions Indicator (2009-2018)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
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CO ₂ Emissions	3.19	3.14	3.22	3.38	3.40	3.56	3.67	3.53	3.50	3.59
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Source:Based on data from the World Bank, accessed on May 26, 2022, at 23:45.<https://data.albankaldawli.org>

Figure 17: Algeria's CO₂ Emissions Indicator (2009-2018)



Source: Based on table 17

This graphical representation depicts a general upward trend in Algeria's per capita CO₂ emissions, oscillating between 3.14 metric tons in 2010 and peaking at 3.67 metric tons in 2015. This indicator highlights the pollution associated with economic activities and underlines the critical need for improving energy efficiency and transitioning towards renewable energy sources, particularly in the industrial and agricultural sectors, to mitigate greenhouse gas emissions and reduce environmental impact.

- **Forest Area Index (Square Kilometers):** This monitors changes in forest coverage over the year, crucial for biodiversity conservation and sustainable wildlife habitats.

Table 18: Forest Area Indicator in Algeria (2011-2020)

Years	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Forest Area (km ²)	19,256	19,332	19,408	19,484	19,560	19,560	19,430	19,300	19,390	19,490

Source:Based on the World Bankdata, accessed on May 27, 2022, at 23:45.<https://data.albankaldawli.org>

Figure 18: Forest AreaIndicator in Algeria (2011-2020)

Source: Based on table 18

This metric includes both natural and planted forest areas, capturing the total land area covered by forests and woodlands. The data reveal fluctuations in Algeria's forest area, reflecting pressures from unsustainable practices like deforestation and seasonal wildfires that decimate large swathes of forestland

annually. Forest cover plays an essential role in ecosystem balance, biodiversity preservation, and resource provision, underscoring the need for effective forest management policies.

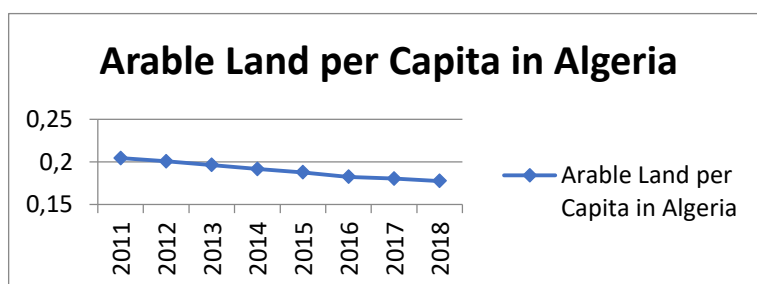
- **Arable Land per Capita Index (Hectares per Person):** Arable Land per Capita Index (Hectares per Person): This index measures the amount of cultivable land available per person by dividing total arable land by the national population, expressed in hectares. It is essential for assessing a nation's agricultural capacity and food security.

Table 19: Arable Land per Capita in Algeria (2011-2018)

Year	2011	2012	2013	2014	2015	2016	2017	2018
Arable Land (Ha per Person)	0.2046	0.2007	0.1965	0.1918	0.1878	0.1825	0.1805	0.1777

Source: Based the World Bankdata, accessed on May 28, 2022, at 23:45. <https://data.albankaldawli.org>

Figure 19: Arable Land per Capita in Algeria (2011-2018)



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decreasing trend in arable land per capita as showcased in figure 19, highlights the challenges faced by the agricultural sector, such as population growth, urban sprawl, and environmental changes, which collectively exert pressure on available arable land. This decrease poses significant concerns for future food security in Algeria.

Conclusion

Between 2011 and 2020, Algeria underwent substantial developmental progress through various programs aimed at economic growth and improved living conditions. Key sectors such as housing, education, and healthcare were targeted to enhance infrastructure and public services, promoting sustainable development across economic, social, and environmental dimensions.

Our Findings across economic, social, and environmental indicators reveal distinct trends:

- **Economic Indicators:** GDP per capita dropped to \$3,354 in 2020, below the global average. Contributing factors include industrial underperformance,

reduced investment, high unemployment, and a decline in domestic investment (from 48.49% to 38.35% of GDP). A persistent trade deficit and lower external debt-to-GDP ratio were observed, alongside reduced inflation and employment rates.

- Social Indicators: Declines were seen in fertility rates, infant mortality, under-five mortality, and primary school enrollment. However, improvements were noted in life expectancy, dependency ratio, internet penetration, and urbanization, though the latter increased environmental and social pressures in cities.
- Environmental Indicators: CO₂ emissions steadily increased, intensifying climate change concerns. Forest area fluctuated due to expanding agriculture, risking biodiversity, while arable land per capita decreased, threatening future food security.

Recommendations

To support Algeria's sustainable development, several recommendations are proposed based on insights from economic, social, and environmental indicators:

- Enhance investment in core economic sectors and national infrastructure to boost economic growth.
- Invest in non-hydrocarbon sectors to lessen oil dependency and bolster local investment.
- Develop domestic industries for self-sufficiency and improve the trade balance.
- Expand family support and access to quality healthcare to lower mortality rates and enhance public health.
- Encourage using solar and wind energy to cut fossil fuel reliance and reduce greenhouse emissions.
- Implement strict environmental policies to protect forests and arable land.
- Increase public awareness of sustainability through policy and personal decision-making.

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